E/ESCAP/CDR(2)/INF/5

UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific

Distr.: For participants only
21 April 2011

English only

Economic and Social Commission for Asia and the Pacific
Committee on Disaster Risk Reduction

Second session
Bangkok, 29 June-1 July 2011
Item 4 of the provisional agenda
Recent trends in disasters and their socio-economic and environmental aspects

Addressing disaster risk reduction and development through improved data on disasters*

Summary

The present information note, prepared by the secretariat with a contribution from the Asia-Pacific Regional Centre of the United Nations Development Programme, provides a concise review of available international and national statistical disaster databases. It points to the need to improve the capacity to collect and analyse disaster-related data and statistics and to improve collaboration between national statistical systems and disaster management authorities.

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* The present document has been issued without formal editing.

I. Special characteristics of disaster data

1. Reliable and timely statistics are essential for disaster preparedness planning and response readiness. After a disaster has struck, statistics are used for assessing the initial disaster impact, and for subsequent monitoring and evaluation. The information for pasts disasters are also used in policy planning and decision-making at all levels in the country for disaster risk reduction, preparedness, mitigation, response, relief and recovery. Disaster databases and resulting statistics serve also as tools for measuring the progress and achievements of the policies and plans.

2. The timing of disasters cannot usually be predicted, but advance preparation and contingency planning can reduce disaster risk and mitigate the impact of disasters. Statistics and statistical methodologies are tools to be used in that prior preparation. They also play a critical role in the wake of disasters in providing a correct picture of the scale of losses and the progress of relief and reconstruction.

3. Statistics telling about already occurred disasters have special characteristics as disasters (i) can be localised affecting only a small area and population, (ii) can affect a major part of a country, or even (iii) can expand to the territory of more than one country. The duration of a disaster can vary from momentary (earthquake) to several weeks (flooding) or even years long (prolonged drought).

4. Apart from surviving victims of disasters as respondents of information collection, the reporting on disasters involves players from various national authorities and relief organizations. Consequently, the events are more than likely to become recorded and reported differently in various databases and data sources. As data collection can only be a secondary priority at the time of response and emergency relief, reaching consistency in the reporting on disasters is challenging. Statistical methods in disaster data collection and analysis need to be pragmatic and sound enough, but they hardly can be perfected as methodological prudence is time-consuming and costly.

Although the data about disasters and their impacts is collected after the occurrence of the events, the institutional capacities, systems and protocols for collecting the data is required to be built prior to the occurrence of such events

II. Internationally comparable data and disaster trends

5. The leading publicly available international database, the Emergency Events Database (EM-DAT), records core data on the occurrence and effects of over 18,000 mass disasters in the world, stretching, in principal, from year 1900 to present. EM-DAT was created with the initial support of the WHO and the Belgian Government and is maintained by the Centre for Research on the Epidemiology of Disasters (CRED) at the School of Public Health of the Université Catholique de Louvain in Brussels. Their website[1] provides up-to-date weekly lists of

[1] EM-DAT. The International Disaster Database, www.emdat.be.

individual natural disasters and technological disasters (e.g. fires, traffic and mining accidents).

6. The current EM-DAT data recording system uses a unique identifier[2] for each disaster and attempts to cover all disasters meeting at least one of the following criteria (i) ten or more people reported killed, (ii) 100 or more people reported affected, (iii) declaration of a state of emergency, and (iv) all for international assistance.

7. The advantage of this database is its seeming consistency of reporting. The ambitious global coverage means that the number of variables collected is necessarily limited. EM-DAT only records disaster incidents and casualties in terms of the number of deaths and people affected, and economic damage caused.

8. EM-DAT can be used to compare trends of major types of disasters between different countries and areas. The Asia Pacific Disaster Report 2010 analysed disaster trends and disaster risk in detail[3]. While an upward trend was observed in the number of reported disasters, the Report noted that it could be attributed to the increase of population exposed to natural hazards and improvements in reporting of disaster to the database. The Report compared EM-DAT data to nationally reported disaster data in selected countries and found discrepancies between the sources. This points out to the need to improve the need to harmonize methodologies and improve the quality of data collection in all sources.

9. Annex I provides an update of the latest disaster trends for different world regions from 1980 onwards. The Asian and Pacific region has consistently had by far the largest number of people affected by natural disasters in the world. Also the region's estimated economic damage and number of deaths have been topping the charts almost every year.

III. National disaster loss databases

10. Disaster management at national level requires detailed data, including on small disasters in particular those that are frequently occurring, below the EM-DAT thresholds that can have wide human, economic and environmental impact. A large number of countries in the Asia-Pacific region are vulnerable to disasters and would benefit from more systematic approaches in disaster-related data collection and from better integration of data collection and use in the overall disaster management.

11. UNDP Asia-Pacific Regional Center (APRC) has supported the establishment of disaster loss databases in several countries in Asia. The databases are configured and adapted to the needs of the country or province implementing them, including having the user interface in local languages and customizing the data items to be collected. The databases facilitate capture and analysis of the occurrence and impact of disasters for 30 different types of hazards and by three levels of administrative regions (e.g. province, district and sub-district).

[2] Compatible with GLIDE (GLobal IDEntifier) number, see www.glidenumber.net/

[3] See chapter 1 of the report. Available online at www.unescap.org/idd/pubs/Asia-Pacific-Disaster-Report%20-2010.pdf

12. Countries where databases with historical data of the past events have been set up using the DesInventar methodology include Indonesia, the Islamic Republic of Iran, Maldives, Nepal, and Sri Lanka (country-wide coverage) and India (states of Tamil Nadu and Orissa). Indonesia has also adapted the methodology to monitoring of poverty. Similar efforts are ongoing in Timor-Leste, Viet Nam and the Lao People's Democratic Republic. The databases are not country-wide but pertain to regions that have historically suffered from disasters or have otherwise become aware of the need for and benefits of systematic disaster data management[4].

13. The data from national disaster databases are used by policy makers and other stakeholders at national and sub-national levels in support of disaster risk reduction, mitigation, preparedness, response and recovery. As a result, they have better analysis and understanding of 'extensive' and 'intensive' disaster risks and the link between disaster and poverty. The databases allow the government to better understand the disasters and threats in order to effectively mitigate and prepare for them, which is particularly important when a nationwide risk assessment does not exist.

IV. Lessons learned from establishing disaster databases

14. Compiling statistics on disasters consistently over time and across regions is very challenging for a number of reasons that are valid both for international and national databases:

(a) Baseline information that could be used to estimate the initial impact is often non-existent or is outdated, and the creation of the baseline ex-post is problematic.

(b) Geographic areas used are not consistent across available data sources.

(c) Where the assessments are able to use satellite and aerial imagery, the baseline data may not be available and their interpretation may be based on different methodologies.

(d) The access to disaster areas and affected people who could provide accurate information is invariably difficult.

(e) The made estimates, including their comparability with other disasters, depend on the assessors' experience and the used estimation methodology.

(f) While the direct human casualties are often relatively simple to estimate, the estimation of the economic and environmental damage can be done with a number of methodologies, resulting in magnitude-scale differences between estimates.

(g) While the estimation of the impact for immediate disaster relief and early recovery usually takes the priority, and rightly so, the

[4] Some databases are online: Indonesia (http://dibi.bnpb.go.id, and http://dibi.jogjaprov.go.id), Sri Lanka (http://www.desinventar.lk), Tamil Nadu (http://indisdata-tn.gov.in).

assessment of the overall impact for longer-term recovery requires comprehensive statistics of all sectors of the economy and monitoring the recovery over a long period of time.

(h) Estimates on disaster variables are likely to suffer from different kind of reporting biases at different points of a long-term time series.

(i) Where the disaster area covers land or water of more than one country, the problems related to data availability and reporting consistency are compounded.

15. The UNDP Regional Programme on Capacity Building for Sustainable Recovery and Risk Reduction has documented[5] experiences in implementing disaster loss databases using the DesInventar methodology in Asia. The lessons learned can be summarised as follows[6]:

(a) Disaster loss databases must be developed as an integral part of overall disaster risk reduction initiatives. Before the methodology and data collection process is put in place, there must be a good understanding among the stakeholders of why the data are collected and what the end use of the data will be.

(b) Government ownership of the database from the outset is a critical success factor. Implementation outside of the government system should only be considered as a last option. Other determinants of success include advanced planning, assessment and appropriateness with regard to identifying counterpart nodal agencies and human resources at regional and country levels

(c) The process of disaster loss database implementation needs to be participatory and inclusive, involving governments and other partners to promote government ownership of the system and its institutionalization.

(d) Clear and complete documentation (data card and photocopy or digital copy of the source of data) are essential for data validation and quality assurance.

(e) Data collection staff must understand disaster terminology and be properly trained to collect and enter the data and requisite metadata. The training and professional development should be continuous and involve counterparts.

(f) The data collection process must be structured and have cross checks within it. Data records should be from ‘agreed and accepted’ sources and the sources must be documented and easily accessible.

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[5] *Risk Knowledge Fundamentals: Guidelines and Lessons for Establishing and Institutionalizing Disaster Loss Databases.* UNDP. 2009. Available online at www.snap-undp.org/elibrary/Publications/DLDGuidelines.pdf

[6] See Annex II for details of UNDP’s approach to establishing national disaster loss databases.

(g) Analysis must be professional, clear, understandable and relevant to the target audience. Different levels of analyses should be prepared depending on the audience of the analysis. But in general, they should comprise quantitative and qualitative information that is user-friendly and supports the decision-making process. The database teams should have multi-skilled personnel in order to interpret the results correctly and comprehensively and prepare quality outputs.

(h) A disaster database without customization could be a wasted investment. Technical support has proved particularly useful in customizing the database to meet the needs of the government, and to ensure that it complements existing government systems and requirements, so that at the end of the day it is actually used. Also, the manuals are needed to be customized with the target group in mind.

(i) More efforts are needed by national and international development partners in advocating for the importance of disaster data collection and analysis.

V. International development goals call for improvement in statistical capacity

16. The priorities for the United Nations disaster-related statistical activities are inscribed in the United Nations resolutions and World Conferences, especially the Hyogo Framework for Action 2005-2015. Among the Hyogo Framework for Action indicators[7] is a specific one on systems that should be in place to monitor, archive and disseminate data on key hazards and vulnerabilities. From an institutional point of view, some others are also relevant for statistics, as compiled in Table 1.

Table 1
Indicators of the Hyogo Framework for Action that have relevance for official statistics

Hyogo Framework for Action indicator	Possible types of action by statistical offices
Systems are in place to monitor, archive and disseminate data on key hazards and vulnerabilities.	Invest in the improvement of technical capacity, systems development, and coordination.
Make disaster risk reduction a priority.	Mainstream disaster risk reduction in planning, define responsibilities and plans for statistical support for disaster risk reduction and assign a budget.
Improve risk information and early warning	Provide data and methodological support for risk assessment and data

[7] The Hyogo Framework for Action indicators are consolidated in annex III of the United Nations ISDR publication *Words into Action: A Guide for Implementing the Hyogo Framework for Action 2005-2015: Building the resilience of nations and communities to disasters*, which is available online at www.unisdr.org/eng/hfa/docs/Words-into-action/Words-Into-Action.pdf.

Hyogo Framework for Action indicator	Possible types of action by statistical offices
- National risk assessments based on hazard data and vulnerability information are available and include risk assessments for key sectors. - Systems are in place to monitor, archive and disseminate data on key hazards and vulnerabilities.	analyses on hazards and vulnerabilities and advise in data systems development.
Strengthening preparedness for response - An independent assessment of disaster preparedness capacities and mechanisms has been undertaken and the responsibility for implementation of its recommendations have been assigned and resourced. - Disaster preparedness plans and contingency plans are in place at all administrative levels, and regular training drills and rehearsals are held to test and develop disaster response programmes - All organizations, personnel and volunteers responsible for maintaining preparedness are equipped and trained for effective disaster preparedness and response. - Financial reserves and contingency mechanisms are in place to support effective response and recovery when required. - Procedures are in place to document experience during hazard events and disasters and to undertake post-event reviews.	Provide data and methodological support for national, regional and community-level preparedness planning

17. The recent experiences in the region in dealing with disasters have demonstrated that the preparedness for disasters is generally not at a desirable level. Statistical data systems and databases and the capacity of various national authorities to collaborate on data issues before, during and after disasters need and can be substantially improved.

VI. Capacity building needed for integrating statistics to national disaster management

18. Statistical data and methodologies are applicable for all stages of the disaster management cycle. Table 2 outlines statistical capacities that critical for different stages of the disaster management cycle, along with supportive actions that relevant statistical offices can provide. Much of the statistical capacity created for the prevention and preparedness stages is also relevant for the eventual impact assessments and recovery monitoring.

Table 2
Statistical capacity at different stages of disaster cycle

Stage of disaster management cycle	Critical statistical capacity needed	Support that statistical offices might provide
Mitigation	- Availability of small-area statistics, including community baseline statistics, to estimate and map the probability of different kind of hazards and the vulnerability of population to various risks - Regular conduct of population and agricultural censuses - Quality of statistics based on administrative records - Use of spatial coding in datasets. - Other capacity to link datasets - Use of GIS - Capacity to support evaluations of previous	- Analyse and record lessons learned for statistics from previous disasters. - Review of regular data collection programmes and instruments for disaster management. - (Ad hoc and sustainable) exchange of data and metadata within the national statistical system and with national disaster management authorities - Adopt GIS and other systems improvements. - Collect additional data in hazard-prone areas. - Improve coordination between the national statistical system and national disaster