



COMPARATIVE ANALYSIS OF DISASTER DATABASES

**FINAL REPORT
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LA RED



Background

The present report “ Comparison of Disaster Databases” has been elaborated for Working Group 3 (WG3) of the Inter-Agency Task Force (IATF) of the International Strategy of Disaster Reduction (ISDR) on Risk, Vulnerability and Impact Assessment as part of the working group’s efforts towards “Improving the Quality, Coverage and Accuracy of Disaster Data.

The original proposal to develop the study was formulated at the 2nd meeting of WG3 that was held in Geneva on October 3 – 4, 2001 and reported to the 4th meeting of the ISDR – IATF in Geneva on November 15 – 16, 2001 (see www.unisdr.org/unisdr/Wgroup3.htm).

A Sub- working group on *Improving Disaster Impact Data Analysis* was formed to lead WG3 activities in this area. The Development Objective of the Sub-working group is: Improved consistency, coverage and accuracy of disaster impacts data to inform risk management practice at all levels. One of the activities proposed by the Sub-working group was a “*Systematic comparison for a sample of countries between the entries in EM-DAT and DesInventar in order to document and analyse their similarities and differences. This analysis will make it possible to design an approach for virtually interlinking the local/national and global scopes into a complementary source that allows for a better and more comprehensive record of damages related to hazard events in countries where both systems are operating.*”

Maxx Dilley (IRI, Columbia University), on behalf of the Sub-working group, held discussions with CRED and LA RED regarding the implementation of this proposed WG3 activity during the CRED-TAG meeting (New York, March 26 – 27). A follow-up discussion was held between Andrew Maskrey (convener of WG3) and Debarati Guha-Sapir (CRED) in New Delhi on April 18. These meetings were reported on by WG3 to the Fifth Meeting of the ISDR-IATF, held in Geneva on 25-26 April 2002 (see www.unisdr.org/unisdr/Wgroup3.htm).

The terms of reference (ToR) for the study were developed in May 2002. After receiving comments and inputs on the TOR from CRED, LA RED and IRI the study was commissioned to OSSO, University of Valle, Cali. The preliminary phase of the study was completed in September 2002 and a meeting of the Sub-working group of WG3 was scheduled for September 18. UNDP, IRI, CRED and LA RED attended the meeting. Apologies were received from DMF, World Bank. The methodology and preliminary findings of the study were presented and discussed. The group also brainstormed on the potential implications of the results and the need to better link national and international disaster reporting. It was agreed that the preliminary results of the study should be presented to the Sixth Meeting of the IATF, which was held in Geneva in October 2002.

The present report, available in its original language Spanish as well as in an English translation, contains the full results as well as conclusions and recommendations of the comparative study of the two databases.

The views expressed in the report are the exclusive responsibility of the authors and do not necessarily express or represent the position of the ISDR Inter Agency Task Force ISDR Secretariat or of UNDP.

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PRESENTATION

This document sets out the preliminary results of the comparative analysis of the types of database on disasters – the Emergency Events Database – EmDat – developed by the Centre for Research on the Epidemiology of Disasters (“CRED”) of the University of Louvain in Belgium with the support of Office of Foreign Disaster Assistance (“OFDA”), and the System of Disaster Inventories (DesInventar – developed in Latin America by the Social Studies Network for Disaster Prevention (“LA RED”).

Because of the differences in scale, coverage and even fields of information between EmDat and DesInventar, we felt it was important to identify what was common to both databases and in what respect they differed and to allow, using the Global Identifier Number (“GLIDE”) or a similar mechanism, the identification, comparison and analysis of the common information in the case of Latin America. Commissioned by ISDR Working Group 3, LA RED commenced work on 1 September 2002; with a view to developing a comparative analysis of the two types of database in respect of four countries in Latin America, in order to identify the common body of information already in existence, the complementarity of the two databases, and possible ways of organising the exchange of information.

In addition, and in order to corroborate the hypothesis that the information contained in EmDat is based mainly on major disasters at the national level in the various countries, an effort was made to identify and separate the major disasters from medium and small scale disasters and analyse this specifically, in order to draw practical conclusions on information systems on disasters.

The preliminary results were presented in Geneva (Switzerland) on 19 September 2002 to a meeting of Working Group 3 including CRED representatives. A Preliminary Report was submitted to UNDP on 15 October 2002. The main points were included in the report presented by Working Group 3, at the ISDR-IATF meeting held in Geneva (Switzerland) on 24 and 25 October 2002.

This is the Final Report, representing the results of the work carried out, accompanied by a CD-ROM that includes:

1. an installer for the program DesConsultar, for managing databases such as DesInventar;
2. tables for comparing EmDat and DesInventar events on an entry-by-entry basis;
3. the sub-databases generated in the course of the analysis process, which may be opened and consulted using DesConsultar;
4. the original EmDat databases used for the comparison, based on CRED's Internet site (www.cred.be/emdat, in August 2002).

The work was carried out by LA RED and OSSO (as associate body of LA RED) between 1 September and 30 November 2002. The research was carried out by Andrés Velásquez, Cristina Rosales and Fernando Ramírez, with valuable assistance from the DesInventar-OSSO team, particularly Mario Andrés Yandar, John Henry Caicedo and other members of staff who took part in this work and to whom we would like to express our profound gratitude.

We would also like to express our thanks for support from the ISDR Secretariat and UNDP in developing this work, including the ever-relevant comments made by Mr Andrew Maskrey, and for CRED's willingness to participate in various discussions and working meetings at which matters of essential importance to the work were discussed.

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0. EXECUTIVE SUMMARY

Commissioned by Working Group 3 (on Risk, Vulnerability and Impact Assessment) of the Inter-Agency Task Force (“IATF”) on Disaster Reduction of the International Strategy on Disaster Reduction (“ISDR”), a comparison was carried out of two types of database, one with world coverage and the other concentrating on South America. The databases included in the analysis were EmDat and DesInventar. Four countries were selected – Chile, Jamaica, Panama and Colombia.

In the two databases, the fields possible for comparison were identified (date, type of event, number of deaths and number of people affected) and the terms of comparability established. Equivalent entries in each database were identified, ie those DesInventar entries that corresponded to the same disaster recorded in EmDat. It was not possible to establish equivalences for all the EmDat entries, either because of the general nature of the EmDat information, or because the event was not recorded in DesInventar.

The non-equivalent entries in EmDat could not be analysed in relation to DesInventar, because there is no reasonable way of establishing possible comparisons or equivalences.

The non-equivalent entries in DesInventar were analysed in two ways; firstly, by identifying those entries that individually or grouped together (resembling an EmDat-type entry) meet the criteria for inclusion in the EmDat database, viz. ten or more deaths and/or a hundred or more people affected; and secondly, by analysing the remaining entries, ie those non-equivalent entries that do not meet the EmDat criteria, in relation to all the entries in the DesInventar databases.

Sections 1 and 2 of this report describe the general framework and details of the methodology used in carrying out the comparison. Sections 3 and 4 set out the overall results of the comparative analysis for the equivalent and non-equivalent entries respectively. Appendices III to VI give the analyses for each country. The overall results show that equivalent entries represent 58% of the EmDat entries and 6% of the DesInventar entries. In terms of number of deaths, the entries in EmDat are generally of the same order of magnitude as in DesInventar; in terms of number of people affected, the differences are substantial, due to the under-recording of this variable in DesInventar for three equivalent entries.

Among the non-equivalent entries in DesInventar, 7015 were identified that, either grouped together or individually, meet the EmDat criteria; these have been called "virtual EmDat entries". They represent a total of 2968 EmDat-type entries. In defining the "EmDat disaster universe" as the sum of the available entries plus the virtual entries, the former represent 5% of this universe; in terms of number of deaths and people affected, they represent 90% and 40% respectively.

Those non-equivalent DesInventar entries that do not meet the EmDat criteria represent approximately 60% of the total number of DesInventar entries. In terms of the variables analysed, they represent 7% of the total number of deaths recorded and 10% of the number of homes destroyed.

1. CONCEPT OF THE COMPARISON

1.1 General aspects

The present work seeks to draw up a comparative analysis of two types of database on historic disasters that have different characteristics, criteria, structures, sources of information and objectives¹, but which have to some extent become the reference databases in Latin America for the analysis of risks and disasters and, in various ways, for reaching decisions on the possibilities of and need for intervention.

EmDat was created with the manifest intention of becoming a tool for use worldwide in improving decision-making on preparedness and response to disasters, and to provide an objective basis for evaluating vulnerabilities and determining priorities. In a way it came into being as a response to one of the priorities of the international aid community, namely making better preparations to deal with disasters and doing more to prevent them happening². It is a worldwide database, supplied and maintained since 1988 by the WHO Collaborating Centre for Research on the Epidemiology of Disasters (CRED) at the University of Louvain. January 1999 saw the start of collaboration between OFDA and CRED, with a view to completing the EmDat database and validating its content. Since then, OFDA and CRED have maintained a single database (OFDA/CRED, 2002).

A number of international bodies, such as the Economic Commission for Latin American and the Caribbean (ECLAC), the Inter-American Development Bank (IADB), the Office for the Coordination of Humanitarian Affairs (OCHA) and others (eg PAHO/WHO, 1994), have made use of this database to compile their own analyses of what is happening in the world of disasters, construct indicators on the state of the various countries in terms of effect, recurrence and aid priorities in preparation for disasters or making investments. Some of the main analyses by country or by region of the world that have been carried out have used this as a source of information and in this sense it has become the database most used and quoted by humanitarian aid (eg IFRC, 2002).

EmDat is a database with a global observation level and a national resolution level. Its entries are limited to those that are deemed relevant on a global scale and as such they must fulfil conditions for the information to be entered in the database (ten or more deaths, a hundred or more people affected, international aid requested or state of emergency declared) and the differentiation between a natural event and a disaster points to an element in its concept of disasters to which we shall return later. The information is entered centrally; the database currently lists approximately 12 000 entries for the period 1900-2002.

Development of the disaster inventory system DesInventar³ began in 1994 (see Velásquez and Zilbert, 1995), initially as a tool for investigating and collecting historical information

¹ For a description of the two databases, see Appendix I ("General characteristics of the databases analysed") and Appendix II ("Technical comparison of the disaster databases EmDat and DesInventar").

² For details of its objectives and intentions, see www.cred.be/emdat

³ For more information, consult www.desinventar.org for the Methodology Guide (LA RED, 1998a) the DesInventar User's Handbook (LA RED, 1998b) and the DesConsultar User's Handbook (LA RED, 1998c).

on disasters because of the absence of creditworthy empirical information that was relatively verifiable which would make it possible to back up a number of hypotheses maintained at the time by LA RED and now commonly accepted, such as for example the importance of the social and economic impact of "small" and "medium-sized" disasters⁴.

The development of DesInventar and the various applications that have evolved from it in various countries shows the versatility of the tool and of the information it contains and its use in decision-making in terms of the management of both risk and disasters at various scales, ranging from the regional, through the national to the local scale (eg Celis 2000; Rosales, 2000a; Zilbert, 2000).

DesInventar was constructed using a combination of databases, in most cases of a national nature (although some are regional or supra-national), constructed in a decentralised manner but coordinated by various users (either governmental, non-governmental or academic) using the DesInventar methodology.

Given that the level of observation and resolution of the information on disasters has an effect on the vision and understanding that may be had of them, DesInventar seeks to associate various spatial scales, to make it possible to both see the "small scale invisible disasters" and break down those that affect extensive areas into the multiple, differentiable disasters they really are and the specific nature of the significance of their impact on each community affected. In most of the existing databases, cover is national and with municipal resolution (or equivalent depending on the country), although there are applications at other levels (regional cover with municipal or lower resolution).

There are at present DesInventar databases for sixteen countries in Latin America and the Caribbean (Mexico, El Salvador, Guatemala, Costa Rica, Panama, Dominican Republic, Jamaica, Trinidad and Tobago, Colombia, Venezuela, Ecuador, Peru, Bolivia, Chile and Argentina), three more are under construction (for Cuba, Guyana and Haiti) and five special applications have been drawn up for disasters (Honduras and Nicaragua – Hurricane Mitch in October 1998; El Salvador – earthquakes in January and February 2001; Venezuela – the disaster caused by rain in Vargas State in December 1999; Peru – the earthquake of 21 June 2001). Three further databases have also been developed with regional coverage (State of Florida in the USA, Paraiba State in Brazil, and the Departments of Antioquia and Valle del Cauca in Colombia), one with municipal coverage (Pereira in Colombia) and one of a supranational nature for Central America. Lastly, the information contained in DesInventar (and at the same time the completion and updating of its databases) is currently being used in various projects being developed by LA RED. Particular note should be made of the project on "management of ENSO risks" (LA RED-IAI, 1999) currently being developed in eight countries of the continent with financing from the Inter-American Institute for Global Change Research (IAI).

⁴ On this point, see *Revista Desastres y Sociedad*, no. 3, August-December 1994, 'Hachos y Deshechos', Vth General Meeting of LA RED, account of the DesInventar project and *Revista Desastres y Sociedad*, no. 4, January-June 1995, account of the workshop on the DesInventar project held in Quito, Ecuador, as part of the Vth General Meeting of LA RED.

1.2 Major differences

As already mentioned, there are major differences between the two types of database in terms of their characteristics, criteria, structures, objectives and sources of information. The main difference, however, lies in the concept and conceptualisation of the idea of risk and disasters behind each of these databases. These major differences may be summed up as follows:

a. The concept of disaster in each database

The EmDat database is constructed around the recording of natural or technological "events" that cause damage in terms of human lives or above a certain number of people affected, or for which an appeal for international aid was made or a state of emergency declared.

In terms of the concept of what constitutes a disaster, this has two main implications; a disaster is defined by its equivalence to a natural event (*hurricanes, flooding and earthquakes are disasters*), but at the same time by the minimum levels for the number of people affected required for classification and inclusion of an entry, or appeals for international aid or the declaration of a state of emergency.

Ultimately, what appears to be the defining feature in EmDat is the natural phenomenon itself and not the conditions that enable the phenomenon to cause damage. Moreover, since the database is intended to be used to assist in the provision of humanitarian aid, particularly on the part of international bodies, the definition implies the determination of a threshold above which aid becomes necessary or relevant? In this sense, its most important variables (although there are others) are numbers of deaths, injured people, people affected, and people left homeless, which are all determining factors in humanitarian aid.

In DesInventar, the concept of disaster is related on the one hand to the concept of risk, understood as a social construction (not something natural), and on the other to the concept of losses and damage. A disaster is a manifestation of a risk that exists in a society or community, a risk that has been generated by that society, inasmuch as society creates the conditions for the risk to be generated, to build up and to continue to exist (eg Lavell, 1996).

On the other hand, however, the disaster as the manifestation or materialisation of the existing risk is constituted by the combination of social losses and damage suffered that occurs when the risk is materialised in this way. The risk factors that determine these situations are different and differentiable combinations of threats of various origin (natural, socio-natural and induced by man) and conditions of pre-existing vulnerability that are also different and differentiable. In this sense the natural event is not enough to define the disaster (or the risk). Not every natural event (not every earthquake, for example) is a disaster. Some events, in a specific combination with the vulnerability factors, could turn into a disaster.

This conception, for example, implies that for DesInventar there is no need to define thresholds for the entries. If there are social losses, an event can and should be included.

But there are also implications for the use made of the information; although it takes as its foundation the information gathered in the event of a disaster, it may be useful for the response and for humanitarian aid, including in assisting a government in deciding on the need to appeal for international aid or to declare a state of emergency⁵, the essential feature of the disaster inventory system, as a historical inventory, is to be able to make an analysis of the historical processes constructing the risk, correlating disasters that have occurred with the existing risk conditions, and identifying means of intervention that would make it possible to reduce the existing risk. The spectrum of variables taken into consideration is broader than in EmDat, and there is also the possibility of including variables not used in the initial construction of the tool but that the user may consider should be taken into account.

b. Levels of observation and resolution – the relative and fractal nature of disasters

Another important conceptual difference between the two databases refers to the levels of observation of the phenomena analysed and spatial resolution of the information and its handling; these are also related to the concept of disaster implicit in each database.

In EmDat the level of observation is global and the level of resolution national. However, its underlying concept of disaster is linked to the definition of the natural event that is the ultimate cause of the disaster. In this sense the concatenations of events that result in specific disasters are not necessarily taken into consideration. For example, a hurricane may generate various types of events (rain, landslides, flooding) that are in turn related to various specific disasters that occur in a given territory. These various events and these specific disasters maybe "invisible" in EmDat – all that exists is the original hurricane. At the same time, given its national level of resolution, it does not make it possible to consider that the same case of flooding (caused by a river breaking its banks, for example) may set off various disasters in various territories affected which, it is true, have different conditions of vulnerability.

DesInventar handles a more relative and more flexible concept of disasters, in that while the means of expressing losses and damage always take the form of a territory, there may be various approximations – more or less detailed – of the same disaster. To a certain extent this is what we have called the fractal nature of disasters (and risks) – various expressions of the event at various levels of resolution. In this sense the coverage and the level of resolution for a given disaster may change, depending on the needs of the users of the information. At the same time, independent of the coverage by country, as the level of resolution is uniform (municipality or equivalent), the comparability of the information at this level of detail is guaranteed. This also applies to the events themselves, both in terms

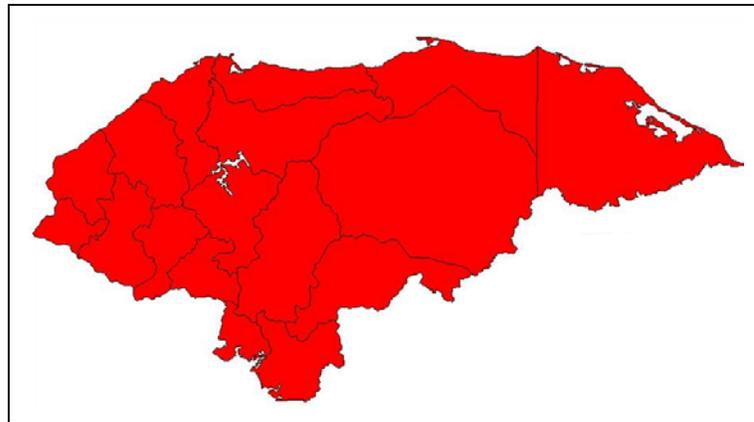
⁵ In the cases of Hurricane Mitch (Honduras and Nicaragua), the earthquakes in El Salvador in 2001 and the Vargas State disaster in Venezuela, the DesInventar tool was used to gather and organise the direct information on the events that occurred, which made it easier to take decisions at various levels, both national and also at the level of a number of international bodies. In the case of the earthquake in southern Peru in 2001, the information on the damage suffered, entered in DesInventar, helped UNDP in drawing up a Strategy for Sustainable Reconstruction in southern Peru (Jiménez and Quintero, 2001; Ramírez, 2001; Ortega, 1998; Rosales, 1998; Rosales, 2000b).

of the concatenated events referred to above, and in the case of a single event that causes a series of disasters.

This situation may be illustrated, firstly in respect of the concatenation of events, by the case of Santa Tecla in El Salvador. The information on a global scale looks as if the damage – more than 800 deaths and more than 90 homes destroyed (Jiménez and Quintero, 2001) – was caused by an earthquake. However, the existing hazard factor in this case was the possibility of a landslide, given the existing vulnerability conditions, producing the damage. The direct damage was indeed caused by the landslide, although it was concealed by the earthquake. Possibly, and hypothetically, a similar landslide could have been triggered by a different cause other than the earthquake – the ground being waterlogged by heavy rain, for example.

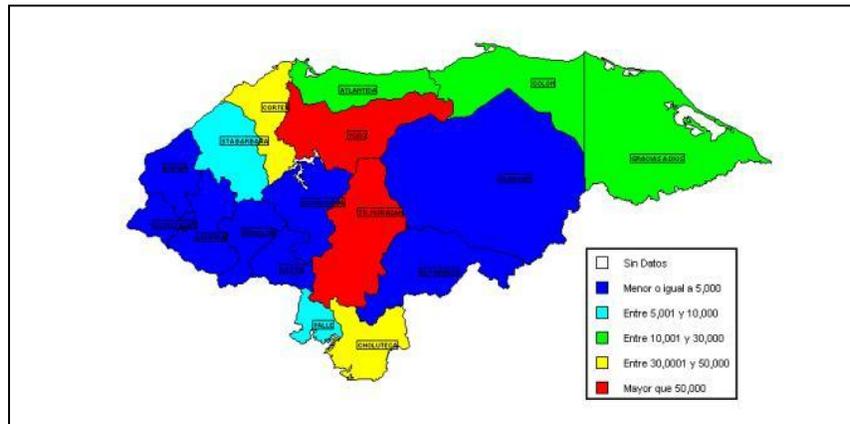
Secondly, the differences in the resolution of the information may be illustrated using the example of the different variable recorded in the case of Hurricane Mitch in Honduras (Rosales, 1998). Map 1.1 shows what would be the view of a global observer with national resolution of the impact of Hurricane Mitch in terms of the number of homes destroyed – a major disaster producing a large swathe of red on the map.

MAP 1.1
NUMBER OF HOMES DESTROYED BY HURRICANE MITCH (HONDURAS)
NATIONAL RESOLUTION



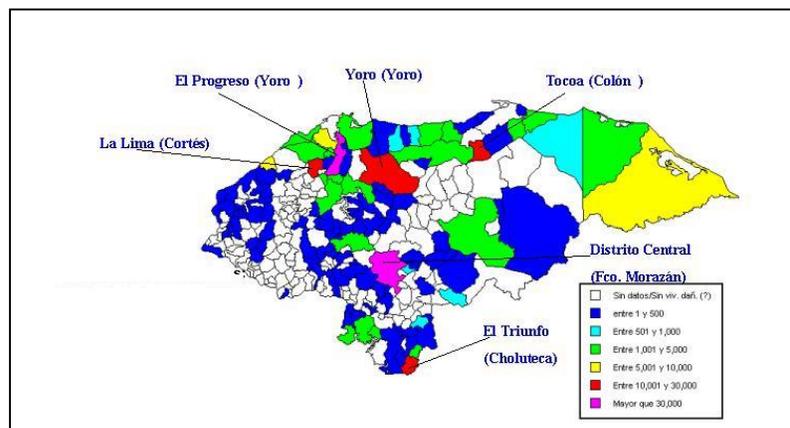
Map 1.2 sets out the same information, but with departmental resolution. We do not have the same patch of red; indeed we have a number of different colours, some of which are red (more serious losses and damage), but many are not – they have turned into other colours that mean less loss. Taken together, they mean different disasters.

MAP 1.2
NUMBER OF HOMES DESTROYED BY HURRICANE MITCH (HONDURAS)
DEPARTMENTAL RESOLUTION



Lastly, Map 1.3 sets out the same information at a resolution level of the municipality, which shows not only a change of colour away from red but even shows areas where in fact no losses were suffered at all.

MAP 1.3
NUMBER OF HOMES DESTROYED BY HURRICANE MITCH (HONDURAS)
MUNICIPAL RESOLUTION



c. Sources of information

The third major difference lies in the sources of information and the handling of them. In the case of EmDat, the sources quoted in the accessible public information are all of secondary origin – international aid bodies (OCHA), national foreign aid bodies (OFDA) or insurance companies. In some cases information is provided by the governments of the countries affected, academic institutions or NGOs.

Presumably the secondary data sources rely on primary data provided by governmental sources in each country affected or from humanitarian aid mission carried out by these

organisations. In the case of OFDA, it may be thought that at least part of the information is the result of application of the EDAN forms (Evaluation of Damage and Assessment of Needs) developed by the organisation and applied in general by national governments.

In the case of DesInventar, the sources used are varied and all are of national origin, for each database. In general newspaper sources are used, sometimes in combination with official data from the various governments. Some specific databases have been constructed using official information gathered at local, provincial and national level by civil defence or similar bodies. The information included in this study comes specifically from the following sources: for Panama, from the daily information gathered by the national civil defence system (SINAPROC, 2002) via the daily reports from its various local and provincial representations and centralised and entered into the system at the national level; for Chile (León *et al*, 2001) the basic information comes from newspaper sources (the 'El Mercurio' newspaper); for Jamaica (LA RED – University of the West Indies, 2002) from both newspaper sources (the 'Daily Gleaner' newspaper) and their comparison and supplementing with official sources (ODPEM); and for Colombia (OSSO, 2002), until 1992 information came from databases already in existence, compiled on the basis of newspaper data by the national office for the prevention of disasters, currently called the General Directorate for the Prevention and Attention of Disasters (DGPAD) at the Ministry of the Interior, or by academic institutions (OSSO) and, since 1993, official information reported to the Directorate by departmental or municipal committees for disaster prevention, confirmed and supplemented by information from the country's main newspapers.

Naturally, like any database, the information contained in the DesInventar system raises problems in relation to the sources of information, particularly regarding verification of the information (at least in terms of order of magnitude) and with the information on certain variables, especially socio-economic ones. In this sense the DesInventar methodology includes a categorisation of variables, depending on the level of reasonable certitude concerning the information (date, geography, type of event, deaths, people injured, homes destroyed and homes affected, for example, are fairly robust variables, whereas information on the number of people affected, the number of victims or economic evaluations tends to be less robust). In spite of this, the process of gathering information involves a detailed review of the information and attempts, inasmuch as it is possible or information exists, to corroborate or check it against other sources. In addition, the information is updated, refined and noted in the light of new sources or problems involving information detected by users of the system.

In conclusion, the primary and secondary sources of information are not the same in the two databases. Their official sources used in both do not necessarily imply that these are primary or correct in terms of quality of information. Newspaper information may present problems, but so do other sources. In most cases the various sources, including the official sources when there is more than one for a given disaster, report different information that is often contradictory and needs to be analysed and assessed in each case.

1.3 Scope and limitations of the comparison

The difference in concept in the EmDat and DesInventar databases, particularly as regards the scale or level of resolution and the actual purpose of the information, makes it difficult to compare the two. In addition to the three major differences already referred to, there are others that prevent a comprehensive comparison; these include the following points:

- EmDat is intended to serve as an international instrument for use in humanitarian aid in the event of an emergency. DesInventar is intended for use in the local and national management of risks.
- EmDat does not report disasters where there are fewer than ten deaths and/or fewer than a hundred people affected. DesInventar gives details of every type of effect that disasters have.
- EmDat uses and provides "large-scale" information for each country, for example in terms of spatial location of the data (eg centre of the country, south, north-east, etc). DesInventar gives details of the location, emphasising a local level resolution (municipal or equivalent level).
- The two databases use different terminology for the events they cover. Many EmDat entries are present in DesInventar but split up into sub-types of specific events.
- Except for "number of deaths", the definitions of effects on people are also different, which is why it is necessary to seek ways of comparing available data in the two databases.
- The structural form and content of the two databases are different, which makes it necessary to compare step by step for each disaster recorded and/or transfer the information from the two types of database to platforms so that each entry can be compared.

In the circumstances, it was necessary to draw up a definition of the terms of comparability on the basis of the criteria for entering information in the two databases. These "**Adjusted Criteria**" are based on general aspects of the reports, such as **type of event**, **location** and **date** of occurrence (as robust variables that allow the identification of common events) and a number of shared variables concerning effects in human terms (number of **deaths** or **people affected**), although there are some differences in the definitions in the two databases for the number affected. Thus, taking these difficulties into account, the possibilities for comparison fall within the context of the following elements:

- Comparison in terms of coverage of disasters in terms of time and space.
- Evaluation of the information comparable in the two databases for disasters identified in both.

- Evaluation of the deficit of information in the two databases, especially as regards information that exists in only one of the databases and not in the other.
- Provision of recommendations for the two databases, especially as regards the possibility of their merger (proposing, initially, the inclusion of the missing information in both directions – EmDat to DesInventar and DesInventar to EmDat).
- Comparison of the databases using the common events, on the basis of those events included in the EmDat database of natural events. Thus events of technological or other origin are not included in the evaluation.

The prior revision of both databases showed that most of the disasters generated by high-impact events (mainly earthquakes, eruptions and hurricanes) corresponded well and could be compared relatively easily.

A more complicated area of comparison involved extensive-impact events, particularly those generated by climatic phenomena such as rain or storm conditions that may in turn result in flooding, flash flooding and landslides in many places in a given country.

A broad criterion was adopted for both the equivalent events in both EmDat and DesInventar and those events only recorded in DesInventar, so that multiple entries in DesInventar over consecutive days (plus or minus one day) for a given town or region (region in Chile, department in Colombia, province in Panama or parish in Jamaica) could be identified and grouped together. In this way we are able to offer a new vision halfway between the fractalised DesInventar universe, which is particularly useful for governments and local and national authorities, on the one hand, and on the other the generalised, although sometimes partial, view provided by the EmDat entries, in keeping with the comparison of the total number of DesInventar entries that meet the criteria for inclusion in EmDat (point item 4.1).

To achieve greater comparability between the databases, the "Adjusted Criteria" (point 1.3) have been adopted. Despite this, the conceptual and structural differences and the different sources for the two types of database make it impossible to guarantee that their comparison can be totally comprehensive. Indeed everything is taken into account that is or could reasonably be equivalent, and for all the disasters that are not equivalent in both databases the question is asked either why they do not fulfil the common requirements in accordance with the criteria for each, or why in fact the information is not available in either one.

2. METHODOLOGY USED

2.1 General criteria

On the basis of the foregoing considerations and taking into account the scope and limitations identified, a number of minimum comparative parameters have been defined, taking into account the following basic elements:

- a. An initial review of the structure and content of the databases makes it possible to locate common variables that could be compared. Firstly the **type of event**, the **date** of its occurrence and its geographical **location** (in the case of DesInventar, municipal level for all countries, in the case of EmDat, national or general regional level for entries prior to 1975 and with geographical location coordinates for many but not all entries from 1995 onwards). These three variables make it possible to define equivalent entries in the two databases.
- b. The events were standardised (see Standardised Events in Table 2.1) according to the various existing definitions in the two databases, especially taking account of the fact that, for example, a "hurricane" event in EmDat may correspond to various different events in DesInventar, such as flooding, flash flooding, landslide, etc caused by the hurricane. This standardisation was carried out for each of the events considered in EmDat in relation to those in DesInventar, and for each EmDat entry in relation to one or a number of DesInventar entries.
- c. The comparison is restricted to the information contained in the EmDat databases corresponding to "natural" events, excluding technological events and those related to hunger or a shortage of food. The respective entries in the DesInventar databases were therefore excluded (see Excluded Events in Table 2.1).
- d. Variables common to both databases or which could be assimilated to these, with different levels of comparability, were also identified. The first, **number of deaths**, constitutes the robust identified (for comparison purposes the figure used is that defined in EmDat, namely **deaths + number of missing persons**). The second variable, **Number affected**, exists in both databases, but the definitions are not the same; an approximate equivalence that permits comparison is that the figure for "**people affected**" in EmDat is similar or may be considered to be similar to "**number of people affected + number of victims**" in DesInventar. A third variable identified is "**persons left homeless**", which exists in EmDat but not in DesInventar, although nevertheless, according to the definition of the variable in EmDat (number of homes destroyed multiplied by five) it may be assimilated to the variable "**number of homes destroyed**" in DesInventar **multiplied** by five.
- e. Although these three variables (deaths, number affected and persons left homeless) are analysed, for the purpose of comparison and taking account of the fact that EmDat restricts the definition of a disaster to at least ten deaths and/or at least a hundred people affected, only the results of these two are taken.
- f. An EmDat entry may be the equivalent, given the differing levels of observation and resolution, to one or more DesInventar events. On the whole, this equivalence exists, except in the case of those entries that are "not common" since the EmDat entry does not correspond to any entry in DesInventar and it was not possible to express it in equivalent DesInventar entries.

TABLE 2.1
STANDARDISATION OF EVENTS IN DESINVENTAR AND EMDAT

Standardised events		
DesInventar	EmDat	
	Type	Sub-type
River flooding	Landslide	Avalanche
Landslide	Landslide	Landslide
Avalanche	Landslide	Landslide
Alluvium	Landslide	Landslide
Epidemic	Epidemic	15 sub-types
Eruption	Volcano	
Forest fire	Forest fire	Forest fire
Forest fire	Forest fire	Scrub
Earthquake	Earthquake	
Fault-line	Earthquake	
Surge wave	Wave/surge	Surge wave
Tsunami	Wave/surge	Tsunami
Freezing temperatures	Extreme temperatures	Cold wave
Heat wave	Extreme temperatures	Heat wave
Drought	Drought	
Flooding	Flooding	
Extreme storm	Storm	Tropical storm
Hurricane	Storm	Hurricane
Hurricane	Storm	Cyclone
Hurricane	Storm	Tornado
Hurricane	Storm	Typhoon
Various (hurricane, gale, etc)	Storm	Winter
Rain	Storm	
Tempest	Storm	
Gale	Storm	
Hail	Storm	
Snowfall*	Storm	
Plague	Insect Infestation	
DesInventar events excluded from the analysis (not standardised):		
Accident, Drowning*, Biological events, Contamination*, Escape, Explosion, Fire, Coast, Other events, Ozone*, Panic, Sedimentation.		

2.2 Selection of databases and periods taken into consideration

The databases common to both EmDat and DesInventar were restricted to the bases in existence for the sixteen countries of Latin America and the Caribbean where DesInventar

* Events created in some national databases to meet users' needs.

has been developed. The project involves carrying out the comparison for four countries in the region, based on the following criteria defined jointly with ISDR Working Group 3:

- geographic coverage should be representative, ie at least one should correspond to South America, one to the Caribbean and one to Central America;
- they should receive information from different types of institutions (governmental, non-governmental, academic);
- they should have had different experiences in handling information.

On the basis of these criteria, the following four databases were selected:

a. Chile (South America)

In the context of the project (LA RED-IAI, 1999) to analyse the impact of the phenomenon of "El Niño" (ENSO) carried out by IAI (Inter-American Institute for Global Change Research) and LA RED, DesInventar is being developed in Chile under the direction of Dr. Prof. Alejandro León of the University of Chile. The source of information here is the press (mainly the 'El Mercurio' newspaper). The database covers the period 1970-2000, which offers complete information for analysis purposes (León *et al*, 2001).

b. Jamaica (Caribbean)

In the context of the UNDP regional project for the Caribbean region, which includes the development of databases on historical disasters, information on Jamaica was gathered during 2002 on the basis of official government and newspaper sources. The work was developed by LA RED in association with the Geography Department of the University of the West Indies, based in Jamaica. The database covers the period 1973-2001, and this entire period was used for the analysis (LA RED – University of the West Indies, 2002).

c. Panama (Central America)

Since 1996 the national civil defence system (SINAPROC) has been supplying the DesInventar database on a daily, systematic basis (SINAPROC, 2002), including all the disasters occurring in that country, including those that are not dealt with directly, for which external and primary sources of information are used, such as municipal authorities and the police. This represents an experience of the daily supply of information for the database, and it is important to compare this information with the data existing in EmDat.

Although SINAPROC has made an effort to enter information for years prior to 1996, - in fact the earliest entry dates back to 1897 -, this corresponds to isolated efforts with many gaps in terms of time, mainly covering flooding and landslides. For this reason, the period selected for the analysis is 1996-2001.

d. Colombia (South America)

This has been supplied with information by the OSSO investigation group (*Observatorio Sismológico del SurOccidente* – seismological observatory for the southwest) of Valle University on the basis of various sources of information, mainly the press up to 1992 and since then from newspaper and government sources, particularly the database maintained by the General Directorate for the Prevention and Attenuation of Disasters (DGPAD) of the Ministry of the Interior (OSSO, 2002).

Although the database currently covers the period 1914-10.2002, for the purpose of the analysis the period 1970-1999 was selected, since at the start of the study the DGPAD data for the years 2000, 2001 and 2002 had not been entered.

The following table shows the periods of time taken into consideration for the analysis in each country.

TABLE 2.2
PERIODS TAKEN INTO CONSIDERATION FOR THE ANALYSIS,
FOR EACH COUNTRY

Country	Period
Chile	1970 – 2000
Jamaica	1973 – 2001
Panama	1996 – 2001
Colombia	1970 – 1999

2.3 The stages in the comparison

The analysis of the four databases was carried out in the following stages.

a. STAGE 1 – Search for equivalent entries

Starting out from each of the EmDat entries, a search was made in DesInventar for those entries, for the reference period for each national database, that coincide in terms of "event", "date" and "geography". This comparison was made individually, ie seeking for each EmDat entry its possible correspondence with one or more DesInventar entries. Account was taken of the possible differences in the name of the event (a hurricane in EmDat may correspond to various cases of flooding, landslides, torrential river flooding or wind damage recorded in DesInventar, caused by a hurricane) and the date (given the possibility of the entry in either database, but more particularly in DesInventar where if information is taken from a newspaper source, having the date of the event or the date of the information, usually the day after the disaster).

The result of this initial identification is the generation of the following typology of entries:

- "A" and "AE": entries in EmDat and DesInventar that correspond totally or to a very considerable extent, in which an EmDat entry corresponds to one entry ("A") or to a number of entries ("AE") in DesInventar
- "B" and "BE": entries in EmDat and DesInventar with a relatively high level of correspondence, but there are doubts
- "D": there is no correspondence; EmDat entries that are not in DesInventar, or DesInventar entries that are not in EmDat
- "F": there is a substantial indication that the EmDat entry may be in DesInventar, but the very general nature of the information in EmDat makes it difficult to identify with certainty the corresponding DesInventar entry/entries

The CD-ROM attached to the present report gives tables of detailed comparison for each country that correspond to this exercise.

On the basis of the typology of the entries, two sub-databases were generated in DesInventar for each country:

- **B1d**: DesInventar database with entries of types "A", "AE", "B" and "BE";
- **B2d**: database with entries of types "D" and "F".

and two sub-databases in EmDat for each country:

- **B1e**: EmDat database with entries of types "A" and "B";
- **B2e**: Database with entries of types "D" and "F".

b. STAGE 2 – Analysis of the equivalent entries in the two databases

As already mentioned, this corresponds to the entries qualified as being of types "A", "AE", "B" and "BE" that are included in the sub-databases B1d and B1e. An analysis was carried out of the variables "number of deaths" and "number affected", according to the definitions set out above, and the corresponding results established.

c. STAGE 3 – Analysis of the entries that are in DesInventar but not in EmDat

This corresponds to the entries included in the DesInventar sub-database B2d qualified as being of types "D" and "F". For this sub-database (entries that are in DesInventar but not in EmDat) the analysis was carried out by searching in DesInventar for entries or groups of entries that ought to be in EmDat since they meet the conditions of number of deaths or number affected required for inclusion in the database but are not in fact there.

The main task consisted of searching for **multiple entries** and grouping them together by date (plus or minus one day), type of event and geographical region at level 0 (zero) in DesInventar (Region in Chile, Department in Colombia, Province in Panama and Parish in Jamaica) in such a way that, meeting the conditions for EmDat definitions, they may be identified or made equivalent to an individual EmDat entry, in the same way as the **individual entries** meet the EmDat criteria.

To do this, using B2, two additional sub-databases were generated, containing the DesInventar entries that could be grouped together (**B3**) and the DesInventar entries that could not be grouped together (**B4**). In simple terms, B4 is equal to B2 minus B3 (Table 2.3). Since B3 and B4 are mutually exclusive, those entries in each of these sub-databases that meet the EmDat criteria were identified in the following way:

- in B3, those entries that grouped together meet the EmDat criteria were selected and database **B100** was generated;
- and in B4, those individual entries that meet the EmDat criteria were selected and kept as database **B200**.

Lastly, databases B100 and B200 were added together to form **B300**. B300 contains those DesInventar entries not recorded in EmDat either as groups of multiple DesInventar entries or as individual entries. These entries were called "**Virtual EmDat Entries**".

For the databases generated during this stage, an analysis was carried out of the variables of "number of deaths" and "number affected".

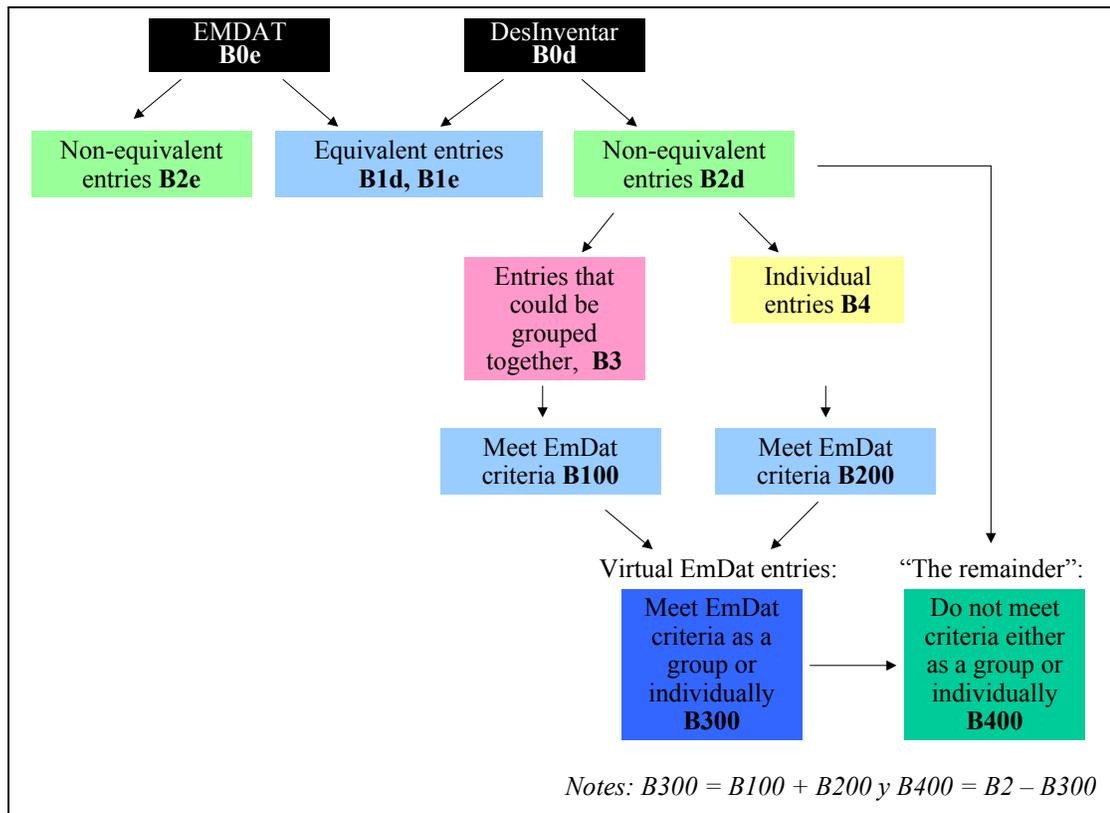
d. STAGE 4 – Small-scale disasters

The remainder generated by extracting the "virtual EmDat entries" from B2 were kept in **B400** databases (remainder of B300). The entries in these databases may be considered representative of small-scale disasters, in accordance with the initial hypothesis set forth that EmDat mainly records major disasters.

Although there is current discussion on what constitutes small-scale, medium-sized and major disasters, analysis of the remaining events is important in terms of the number of disasters involved and their importance.

The sub-databases referred to in the stages described above are set out in Tables 2.4 and 2.5. These tables include two sub-databases not already mentioned, viz. Total Database (**BT**) and Types of common events (**B0**).

**TABLE 2.3
MAIN STAGES IN THE COMPARISON**



**TABLE 2.4
DESINVENTAR SUB-DATABASES GENERATED
IN THE COURSE OF THE ANALYSIS**

Sub-database	Description
BT	Total of entries in each DesInventar database
B0d	Total of entries per type of standardised event
B1d	Equivalent entries in both databases – types A, AE, B and BE
B2d	DesInventar entries not recorded in EmDat
B3	Entries in B2d that could be grouped together
B4	Entries in B2d that cannot be grouped together (individual entries)
B100	Entries in B3 that, grouped together, meet EmDat criteria
B200	Entries in B4 that, individually, meet EmDat criteria
B300	"Virtual EmDat entries" – sum of grouped B3 entries and individual B4 entries that meet EmDat criteria
B400	Remainder in B300 (B2 less B300) – DesInventar entries that do not meet EmDat criteria

TABLE 2.5
SUB-TABLES OF EMDAT DATA GENERATED
IN THE COURSE OF THE ANALYSIS

Sub-tables	Description
B0e	Total of the entries in each EmDat table (per country)
B1e	Equivalent entries in both databases – types A, AE, B and BE
B2e	EmDat entries not recorded in DesInventar

2.4 General data used

From the total databases for each country (BT) that include all the types of events taken into consideration in the DesInventar methodology, those entries were selected (B0d) that correspond to the standardised events of the types of events taken into consideration in the natural disasters database EmDat. The following table lists the aggregate entries for each database (BT, B0d, B0e) for the various countries.

TABLE 2.6
EMDAT AND DESINVENTAR ENTRIES TAKEN INTO CONSIDERATION IN
THE ANALYSIS, AND ORIGINAL DESINVENTAR DATABASES

COUNTRY	EMDAT	DESINVENTAR	
	Entries for standardised events (B0c)	Total entries in original databases (BTd)	Entries for standardised events (B0d)
Chile	43	11 330	7294
Jamaica	18	859	688
Panama	5	1894	904
Colombia	83	11 495	10 286
Total	149	25 578	19 172

The B0 entries for each country formed the starting point for the analyses that are set out in Sections 3 and 4. In the case of EmDat, where all the entries in the "natural events" database were taken into account in the analysis, the databases BTe and B0e would be the same, which is why reference is only made to B0e.

These databases record the analysed variables of number of deaths and number affected with the respective aggregate values set out in Table 2.7.

TABLE 2.7
REPORTED NUMBER OF DEATHS AND NUMBER AFFECTED,
DATABASE OF STANDARDISED EVENT (B0)

COUNTRY	DEATHS		AFFECTED	
	EmDat	DesInventar	EmDat	DesInventar
Chile	1050	1877	4 341 049	3 694 449
Jamaica	185	288	1 623 090	128 719
Panama	2	46	8000	61 237
Colombia	29 900	34 589	7 214 894	15 048 564
TOTAL	31 137	36 800	13 187 033	18 932 969

3. EQUIVALENT ENTRIES

This section and the following section set out the overall results obtained from the comparative analysis carried out. The individual analyses for each country, which serve as the basis for this overall analysis, are set out in separate documents (Appendices III to VI).

The equivalent entries resulting from the search for disasters reported in both databases⁶ are set out in Table 3.1. Out of a total of 149 EmDat entries analysed, 87 correspond, in other words approximately 58% of the entries in EmDat are also to be found in DesInventar. However, this volume represents only 5.8% of the total number of DesInventar entries in existence for the four countries.

Furthermore, it was not possible to establish a positive correlation for 62 EmDat entries, which either do not exist in DesInventar or because of the very general nature of the information in EmDat cannot be identified in DesInventar with any reasonable certainty.

TABLE 3.1
ENTRIES FOR STANDARDISED AND EQUIVALENT EVENTS

Country	No. of entries for standardised events (B0)		Equivalent entries (B1) – as percentage of B0			
	EmDat	DesInventar	EmDat		DesInventar	
Chile	43	7294	19	44%	370	5%
Jamaica	18	688	11	55%	99	14%
Panama	5	904	2	40%	9	0.1%
Colombia	83	10 286	55	70%	632	6%
TOTAL	149	19 172	87	58%	1 110	6%

⁶ Stage 1 of the Comparison (point 2.3 a)

Comparison of the variables for equivalent entries (Table 3.2) shows that for "number of deaths" those recorded in EmDat are on whole of the same order of magnitude as those in DesInventar.

For Jamaica and Chile they are respectively 4% and 49% higher than those recorded in DesInventar, whereas for Colombia DesInventar records 10% more deaths than EmDat. For Panama there is only one death recorded in EmDat, and none are recorded in DesInventar.

The case of Colombia is illustrative in more than one sense. The consolidated information and its comparability between the two databases depends to a large extent on the importance of a major disaster being included with data of a similar order of magnitude in the two databases, namely the eruption of the Nevado del Ruíz Volcano in 1985 and its consequences. If the effects are considered separately, in terms of the number of deaths caused by this disaster (22 800 in EmDat and 23 500 in DesInventar), the difference in terms of number of deaths would increase for equivalent entries from 6% more in DesInventar to almost 20% more.

In the case of the number affected, the differences are substantial in all cases. For Jamaica and Chile in particular, EmDat records a greater order of magnitude of people affected (multiplied by 13 for Jamaica and by 6 for Chile). For Panama the situation is the opposite – the number of people affected recorded in DesInventar is five times higher than the number recorded in EmDat. The sets of data that are most similar are those for Colombia.

In Jamaica EmDat reports 810 000 affected by the hurricane in 1988 and 550 000 by flooding associated with heavy rain in 1991, whereas DesInventar reports no people affected. This points to a clear deficit in DesInventar for those disasters which make a substantial contribution to the differences between equivalent entries. If the data for these disasters is standardised, the differences in the number affected would be in order of 1:2 and not 1:13.

In Chile for the earthquake on 8 July 1971 EmDat, on the basis of international sources only, recorded more than two million affected where in DesInventar 63 entries based on municipal sources record 2 748 affected. DesInventar should also be revised, since it reports a total of 13 159 homes destroyed but no persons affected or victims. If the data for these disasters is standardised, the differences in the number affected would be in the order of 1:2 and not 1:6. Nevertheless, it must be taken into account that in cases like this and in the absence of detailed information, the sources used by EmDat take as the number affected the total population of the area or region concerned.

In Panama only one of the two equivalent entries reports people affected – the figure in EmDat is 500 and in DesInventar 2 565.

TABLE 3.2
DEATHS AND PEOPLE AFFECTED IN EQUIVALENT ENTRIES (B1)

Country	No. of deaths		No. affected	
	EmDat	DesInventar	EmDat	DesInventar
Chile	375	360	3 613 214	836 881
Jamaica	170	114	1 566 790	114 239
Panama	1	0	500	2565
Colombia	27 689	29 334	1 713 032	1 375 969
TOTAL	28 235	29 808	6 893 536	2 329 654

4. NON-EQUIVALENT ENTRIES

4.1 DesInventar entries that are not in EmDat

4.1.1 Virtual EmDat entries

Table 4.1 sets out the results of the exercise of grouping those DesInventar entries that are not in EmDat but which, taken together on the basis of their common characteristics, may represent EmDat entries as they meet the corresponding criteria. The table also includes those entries that on their own meet the EmDat criteria.

The criteria used for grouping are based on the premises referred to in the section on the general framework for the present report; it was not a question of making arbitrary groupings of entries in order to create an EmDat entry. It involved seeking out those groups of entries in DesInventar that, by their characteristics (common cause, similar date, geographical proximity, concatenated events or territorial impacts that are different but may be grouped together) could correspond to an EmDat entry, according to the criteria used for including entries in this database.

The group of entries that are not in EmDat but meet its criteria have been called "**Virtual EmDat Entries**".

A total number of 2 968 groups of entries were found to have these characteristics, equivalent to 7 015 DesInventar entries; they represent a total number of 4 567 deaths and 16 547 252 people affected.

TABLE 4.1
"VIRTUAL EMDAT ENTRIES" – B300

Country	Groups	Entries	No. of deaths	No. affected
Chile	508	2 000	882	2 830 824
Jamaica	19	21	132	14 215
Panama	87	294	10	51 157
Colombia	2 034	4 700	3 543	13 651 056
TOTAL	2 968	7 015	4 567	16 547 252

If we now define the "**Universe of EmDat disasters**" as the sum of available EmDat entries plus the groups corresponding to "virtual EmDat entries", the former would represent 5% of the total number of groups in this "universe" for the four countries (Table 4.2). For Chile, Panama and Colombia the percentages are 8%, 4% and 4% respectively. In the case of Jamaica the percentage jumps to 49%. In relation to the number of deaths and the number affected recorded in EmDat, these would represent 90% and 40% of the "Universe of EmDat Disasters" respectively.

TABLE 4.2
"UNIVERSE OF EMDAT DISASTERS"

Country	EmDat available + virtual	No. of deaths	No. affected
Chile	551	1 932	7 171 873
Jamaica	37	317	1 637 305
Panama	92	12	59157
Colombia	2 117	33 443	20 865 950
TOTAL	2 797	35 704	29 734 285

4.1.2 "The remainder"

Analysis of what we shall call here "the remainder" enables us to make a first approximation, in terms of the data recorded, of the problem of small-scale disasters. This is a first approximation, that could be improved on and is far from providing a full answer to the problem, both because of the information itself and the suppositions that have to be established in order to be able to use it.

A first assumption, which forms the foundation for the limitations of the analysis to be carried out, is the use of just two variables in the previous analysis, which are those that define by exclusion what we shall call "the remainder". These variables (number of deaths and number affected) in fact restrict the comparison and prevent, by different effects on the comparison carried out, a more accurate approximation of the facts. In this way "the remainder" is defined as those disasters where there are fewer than ten deaths and/or fewer than a hundred people affected and, as may be seen subsequently, there are other variables in DesInventar that are able to indicate other levels of intensity of the disasters.

A second assumption is that those disasters where there are more than ten deaths and/or more than a hundred people affected may be classified as medium-sized or major disasters. Although this is not the place for a discussion on this representation and typology of disasters, as the possibility of fragmenting them and grouping them together remains relatively meaningless and depends naturally on the levels of observation and resolution of the information, we shall consider that the universe of EmDat entries contains what may be called medium-sized and major disasters and that "the remainder" represents mainly the lesser and more everyday disasters.

On these two assumptions, the exercise carried out took from the total non-equivalent DesInventar entries (B2d) all those entries not included in the "virtual EmDat entries" (B300) and generated database B400. Table 4.3 sets out the aggregate total number of deaths and number affected.

TABLE 4.3
THE "REMAINDER" OF THE DISASTERS
OR REMAINING SMALL SCALE DISASTERS – B400

Country	No. of entries	Deaths	Affected	Persons left homeless
Chile	4 924	635	26 744	27 820
Jamaica	568	42	265	300
Panama	601	36	7 515	450
Colombia	4 954	1 712	21 539	73 120
Total	11 047	2425	56 063	101 690

If we take into account just the two variables considered for the purpose of the comparison, "the remainder" – ie what we have called small-scale disasters – tend to be of relatively less importance and significance, although the number of deaths reported for them is fairly significant, as is the number affected (Table 4.3). Particularly in the cases of Panama and Chile, the number of deaths caused by small-scale disasters may be greater than the number recorded in EmDat. However, taking different variables, the situation may be considered from a different viewpoint, and the "small-scale disasters" would not be that unimportant. Simply as an example, we may take, for the same entries, the variables of the numbers of homes destroyed or affected and the number of hectares of cultivated land lost (Table 4.4).

This table indicates that small numbers of deaths and direct victims may correspond to relatively high losses in terms of homes (totally or partly) and land under cultivation. But in addition to the fact that to some degree everywhere in each country (particularly in the cases of Chile and Colombia) the accumulation of small-scale disasters over a period of time may represent impacts that are equal to or greater than some of the medium-sized disasters – and even some of the major disasters – that are recorded.

TABLE 4.4
SMALL SCALE DISASTERS ARE NOT
THAT UNIMPORTANT

Country	No. of entries	Homes destroyed	Homes affected	Hectares lost
Chile	4 924	5 564	22 060	601 457.27
Jamaica	568	60	78	26 044.00
Panama	601	90	1 773	40 531.50
Colombia	4 954	14 624	361 520	791 367.85
Total	11 047	20 338	385 431	1 459 400.62

4.2 EmDat entries that are not in DesInventar

From a methodological point of view, the non-equivalent EmDat entries cannot be analysed in relation to DesInventar as there is no reasonable way of establishing possible comparisons or equivalences.

Table 4.5 shows the data on the number of non-equivalent entries and what they represent as a percentage of each of the databases and each country (B0 databases). On average, 42% of EmDat entries have no correspondence or equivalence in DesInventar, while 94% of DesInventar entries have none in EmDat.

TABLE 4.5
NON-EQUIVALENT ENTRIES

Country	Entries for standardised events (B0)		Non-equivalent entries (B2) - percentage of B0 (B2)			
	EmDat	DesInventar	EmDat		DesInventar	
Chile	43	7 294	24	56%	6 924	95%
Jamaica	18	688	7	39%	589	39%
Panama	5	904	3	60%	895	60%
Colombia	83	10 286	28	34%	9 654	94%
TOTAL	149	19 172	62	42%	18 062	94%

4.3 Analysis

These results constitute an approach for identifying EmDat-type entries in the DesInventar databases. To some extent this approach shows us the effects of the differences in terms of concept, methodology, coverage and resolution that allow only a partial comparison, particularly for "mega-disasters", of some of the main effects.

It cannot be said that DesInventar records all the disasters that have occurred in the four countries in the course of the respective periods of comparison. There is under-recording, which is more or less significant depending on the country and the period. This is demonstrated by experience in updating the national databases. For example, this study uses the DesInventar-Colombia database, which contained 11 330 entries for the period 1970-1999 in August 2002; on the basis of new data provided by the project on "management of ENSO disaster risks"⁷ – IAI/LA RED, the database currently available on the Internet, updated on 15 November 2002⁸, contains 13 155 entries for the same period, ie 1 925 more than those taken into consideration for the present comparison.

Nevertheless, the volume of information it contains makes DesInventar a much larger database than EmDat and to a large extent it directly includes EmDat (58% of existing EmDat entries for the four countries are contained in DesInventar). In addition, as already

⁷ www.cambioglobal.org

⁸ <http://www.desinventar.org/sp/news/index.html>

shown, DesInventar includes a number of EmDat-type entries that theoretically ought to be recorded in that database but in fact are not.

Table 4.6 summarises the number of entries in DesInventar for each type of analysis carried out – equivalent entries, "virtual EmDat entries" and "the remainder". The results obtained from this exercise show that in DesInventar there is a total of 7 015 entries that correspond to 2 968 groups. These latter are equivalent to EmDat-type entries.

TABLE 4.6
SUMMARY OF THE ANALYSIS OF THE DESINVENTAR DATABASES

COUNTRY	TOTAL (B0)	EQUIVALENT (B1)	VIRTUAL EMDAT Entries - Groups (B300)		"REMAINDER" (B400)
CHILE	7294	370	2000	508	4924
JAMAICA	688	99	21	19	568
PANAMA	904	9	294	87	601
COLOMBIA	10 286	632	4700	2034	4954
TOTAL	19 172	1110	7015	2968	11 047

$$B0 = B1 + B300 + B400$$

This means that there is a serious deficit of entries in the EmDat database for the four countries, and that it is possible to supplement and update it using the information from the available DesInventar entries.

It may reasonably be supposed that this situation is no different in countries not taken into consideration in this exercise and that, at least for the existing DesInventar databases and over certain periods of time (at least between 1980 and 2000), an update could be carried out.

In terms of significance, this under-recording has serious implications for making decisions or projections, comparing situations in different countries or developing indicators on disasters.

Table 4.7 sets out the "universe of disasters" corresponding to the available EmDat entries.

TABLE 4.7
AVAILABLE ENTRIES AND "EMDAT DISASTER UNIVERSE"

	No. of ENTRIES (1) No. of GROUPS (2)	No. of DEATHS	No. AFFECTED
AVAILABLE EMDAT ENTRIES (1)			
CHILE	43	1 050	4 341 049
JAMAICA	18	185	1 623 090
PANAMA	5	2	8 000
COLOMBIA	83	29 900	7 214 894
TOTAL AVAILABLE	149	31 137	13 187 033

"EMDAT DISASTER UNIVERSE" (2)			
CHILE	551	1 932	7 171 873
JAMAICA	37	317	1 637 305
PANAMA	92	12	59 157
COLOMBIA	2 117	33 443	20 865 950
TOTAL UNIVERSE	2797	35 704	29 734 285
(2) AS PERCENTAGE OF (1)			
CHILE	8%	54%	61%
JAMAICA	49%	58%	99%
PANAMA	5%	17%	14%
COLOMBIA	4%	89%	35%
RATIO	5%	87%	44%

In terms of number of entries, those available in EmDat for the four countries alone represent 5%, which implies under-recording in the order of 95% in EmDat.

Analysed country by country, the level of under-recording is significant in all four countries, but varies considerably: in Chile, Panama and Colombia the percentages for under-recording are 92%, 96% and 96% respectively, and in Jamaica, the country where there is the least under-recording, the figure is in the order of 51%.

Although the total entry for deaths is 86% for the four countries, the situation is dramatically different in the individual countries. In Panama, for example, the EmDat database only records 17% of the total number of deaths caused by disasters that meet the EmDat criteria; the figure is 54% for Chile and 58% for Jamaica. Here again, Colombia has the best recording (89%) by EmDat, but as already mentioned the almost 23 000 deaths caused by the Ruiz Volcano disaster make a substantial contribution to this percentage.

In terms of numbers affected, the situations in the different countries are again very different. For example, the number affected recorded by EmDat in Jamaica is 99%, whereas the corresponding figure for Panama is 14%. Lastly, for the number of people left homeless, the results show that recording is acceptable in the EmDat database for Chile (87%) and Colombia (76%), complete for Jamaica (100%), and seriously deficient for Panama (18%).

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Main conclusions

Drawing conclusions from the foregoing analysis involves taking into account the limitations that these same conclusions may have. Firstly, it must be pointed out that neither EmDat nor DesInventar records absolutely all the disasters analysed in the respective countries, according to the criteria for each. In this sense, any conclusion drawn refers to the content of the two databases, each taken in relation to the other.

Secondly, the analysis does not refer to the total number of events recorded in the two databases, but to the specific cases of four countries, and in all cases only to the types of events common to the databases. In this sense, some results may be valid for this group of countries but not for all those countries that have (EmDat and DesInventar) databases. For this, account must be taken of the fact that the choice of the countries does not mean that these constitute a representative sample of the universes of the EmDat and DesInventar databases. Being able to apply the conclusions generally to the entire respective total number of events would mean carrying out the analysis at least for those countries for which there is information in both databases.

Bearing these points in mind, the conclusions of the analysis carried out in terms of comparison of what is comparable in the two databases, and taking into account the limitations of the analysis as pointed out, the conclusions and results may be summed up as follows:

1. Out of a total of 149 EmDat entries analysed, 87 correspond, ie for 58% of the total number. Taking the total number of EmDat entries in each country, the level of correspondence is significant in Panama (80%) and Colombia (65%) and less so in Jamaica and Chile.
2. Out of a total of 19 172 DesInventar entries analysed, 6% correspond with EmDat, ie 1 110 entries. The results by country show similar results for Chile and Colombia (5% and 6% respectively). In Jamaica the DesInventar entries show an equivalence with EmDat of 14%, the highest of the four countries, and in Panama the lowest at 0.1%.
3. In respect of the variables analysed for equivalent entries, the results show a good level of correspondence as regards numbers of deaths, both for the total and for the figure for each country, with the exception of Jamaica, where the differences are considerable. In the case of numbers of people affected, the differences are on the whole significant, due to the deficit of information in DesInventar, particularly in the cases of Jamaica and Chile, for which EmDat records hundreds of thousands and millions of people affected in entries that are equivalent to DesInventar entries that report no people affected.
4. In respect of the analysis of EmDat entries that are not included in DesInventar or which, because of the general nature of the information, cannot be identified with a reasonable degree of certainty, these constitute 62 entries that represent 9.3% of the total number of deaths recorded in EmDat and 48% of the total number of people affected. However, inasmuch as they cannot be correlated to any DesInventar entry but there is for some of them a reasonable doubt as to their existence in the database, in these cases the original sources of the information should be reviewed in order to be able to either locate them in existing entries or include them in DesInventar as new entries.
5. Analysis of those DesInventar entries that are not in EmDat produces a number of significant results:

- a) Those that may be assimilated as EmDat entries, which we have called "virtual EmDat entries", are 17.8 times more than those currently contained in this database, the case of Colombia (multiplied by 24.4) being particularly significant. If we add together the "real EmDat entries" and the "virtual EmDat entries", in order to construct what we have called the "universe of EmDat entries" in relation to DesInventar, we find that the available EmDat entries represent no more than 5% of the total number of entries in the universe thus constructed and 44% of the number affected, although it includes slightly more than 87% of the number of deaths.
- b) This means that, in relation to the information recorded in DesInventar, there is a serious deficit in the entries and the number of people affected in EmDat.
- c) As regards the analysis of "the remainder", and if these events are considered "small-scale disasters", it is possible to demonstrate their importance in the universe of disasters for the first time and in a reasonable manner; in DesInventar, they represent approximately 60% of the total. In terms of the variables analysed, they represent 7% of the total number of deaths recorded and 10% of the number of homes destroyed.

5.2 Recommendations

1. The analysis for the four countries shows an important level (greater than 50%) of coincidence between the entries of disasters in the two databases. If to this is added the construction of "virtual EmDat entries" and their possible inclusion in the database, the number of entries common to both databases would be highly significant, which would for example make it possible to consider making use of GLIDE in DesInventar. These possibilities allow the following recommendations:
 - a) extension of the comparative analysis to other countries that have both EmDat and DesInventar databases, with a view to complementing the analysis carried out and identifying virtual EmDat entries that may be included in the EmDat database subsequently;
 - b) include the "virtual EmDat entries" identified and those identified in other countries in this database;
 - c) work on the construction of a GLIDE making it possible to apply a single identifier to a series of entries, which could be incorporated into databases of the DesInventar type.
2. A second consideration that arises from the analysis already carried out concerns the importance of having databases at different levels to the global level (particularly national) and the possibility of constructing a global database on the basis of information from national databases. The present comparison would be meaningless if it were not based on information at a national and local level of observation and resolution. In this sense, the development of high resolution national databases is instrument is to be recommended.
3. Lastly, the preliminary work presented here on the identification and analysis of small and medium-sized disasters should be further developed in a systematic function.

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7. GLOSSARY

Adjusted Criteria. Criteria defined on the terms of comparability with the database for the criteria for entering information into each database.

EmDat Criteria. Criteria that EmDat defines for the inclusion of disasters in its database, here in relation to number of deaths (more than 9) and people affected (more than 99).

"The Remainder". This is the name given to those entries that are left once the "virtual EmDat entries" have been extracted from the DesInventar database for standardised events.

Standardised events. These correspond to the types of DesInventar events that have been standardised in relation to the types of EmDat events taken into consideration in the EmDat natural disasters database.

Entries that may be grouped together. DesInventar entries that, when grouped together, correspond to an individual EmDat-type entry.

"EmDat disasters universe". This corresponds to the sum of the "virtual EmDat entries" plus the available EmDat entries.

"Virtual EmDat entries". DesInventar entries (grouped or individual) entries that are not recorded in EmDat (or for which there is no equivalence) that meet the EmDat criteria.

Equivalent entries. These correspond to those entries in either EmDat or DesInventar that are clearly identified as being recorded in both databases.

Individual entries. Name given to those DesInventar entries that cannot be grouped together, ie they constitute an EmDat-type entry but are not available in EmDat.

8. ACRONYMS

CRED – Centre for Research on the Epidemiology of Disasters – University of Louvain (Belgium)

DesInventar – System for listing disasters

DGPAD – General Directorate for the Prevention and Attenuation of Disasters (Colombia)

ECLAC – Economic Commission for Latin America and the Caribbean

EDAN – Evaluation of Damage and Assessment of Needs

EmDat – Emergency Events Database

ENSO – El Niño Southern Oscillation

GLIDE – Global Identifier Number

IADB – Inter-American Development Bank

IAI – Inter-American Institution for Global Change Research

IFRC – International Federation of Red Cross and Red Crescent Societies

LA RED – Social Studies Network for Disaster Prevention in South America

OCHA – Office for the Coordination of Humanitarian Affairs (UN)

ODPEM - Office of Disaster Preparedness and Emergency Management (Jamaica)

OFDA – Office of Foreign Disaster Assistance

OSSO – Seismological Observatory for the Southwest – Valle University (Colombia)

SINAPROC – National Civil Defence System (Panama)

UNDP – United Nations Development Programme