



DesInventar Sendai 10.1.2

User Manual on Analysis Module

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United Nations Office for Disaster Risk Reduction

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This manual was led and coordinated by Ms. Ritsuko Yamazaki-Honda, Programme Management Officer of UN Office of Disaster Risk Reduction (UNDRR) (honda@un.org), and drafted by Ms. Sreeja S. Nair, independent consultant (sreejanair22@gmail.com), with contributions by Ms. Iria Touzon Calle, Programme Officer of UNDRR (iria.touzoncalle@un.org). Mr. Julio Serje was a lead designer and developer of the DesInventar-Sendai and provided a guidance on the manual.

Welcome to the Analysis Module!

Introduction

There is an increasing demand for information on damages and loss due to disasters globally. This interest is partly driven by an anticipated increase in catastrophic events and also the desire to better understand the impacts of past events/hazards and strengthening disaster preparedness and prevention for resilience. Disaster information management system can serve as systematic collection, documentation, dissemination of location-based disaster loss and damage information as well as data analysis attributed to disasters (For more information, see *DesInventar Sendai User Manual -Data Management-*).

DesInventar-Sendai was developed by United Nations Office for Disaster Risk Reduction (UNDRR; formally called UNISDR) to accommodate data required for Sendai Framework monitoring (Target A-D), which are commonly used for monitoring Sustainable Development Goals (SDG's), under Goals 1, 11 and 13. DesInventar has two main modules; Administration module and Analysis module.

The **Analysis Module (DesConsultar)** provides an instrument that allows the users to query, visualize and analyse, in space and time of the events/hazards that have been entered in the database. There is no user authorisation required for accessing the analysis module i.e. no username or password required.

The basic criteria of the system are:

- All inventories must use the same definitions and variables to measure the effects, and a homogeneous and basic classification of hazards or events;
- the information compiled and processed must be entered in a scale of time and at a geo-referenced spatial level;
- the inventories must be analyzed (with computer tools, in this case), which is a basic requirement in comparative research and to support decision-making processes for disaster risk reduction (DRR).

DesInventar Sendai

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Disaster loss data for Sustainable Development Goals and Sendai Framework Monitoring System



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The DesInventar Sendai server software is open-source and is free of charge for commercial and non-commercial use. It is distributed under an "Apache-2" license, which is even less restrictive than GNU and FreeBSD licenses.

Please use it well, this software has been built and is distributed this way thinking that it can help a bit making this planet a better place.

[Download DesInventar Sendai and other materials →](#)

Documentation



The full documentation can be downloaded here. Browse the available material for downloadable versions.

[Explore the documentation →](#)

Publications



Disaster type definitions



Look up terms from the DesInventar methodology. Our methodology and our office are part of the Disaster Loss Data (DATA) project, under the umbrella of the Integrated Research on Disaster Risk (IRDR) programme and will apply the common standardized classification and definition after their approvals.

[Explore the definitions →](#)

Datasets for the GVR 2015



65 datasets covering 82 countries and 3 states have been especially updated and customized for the GvR 2015. These datasets contain a standardized subset of the records of the original datasets as produced by each country. The GvR only uses records of disaster of geological or weather related origin. In addition, several tight criteria of quality has been imposed on these records in order to be analyzed. One of the highlights of GvR 2015 analysis is

Other DesInventar Servers



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About the Analysis Module

The Analysis module is a querying instrument and a tool for the thematic, spatial and temporal analysis of impacts attributed to disasters hosted by DesInventar in a standardized format. Its purpose is to facilitate the understanding of disasters as losses and damages. The functionality provided to make statistical analyses and spatial representations of queries are oriented to suggest some answers to the user, and raise questions to inform the ongoing debate in DRR policy decisions.

To facilitate the compilation and treatment of the information, all inventories represented in the Analysis Module use the same variables to measure effects, and the classification of effects is homogeneous and basic. As mentioned previously, the information entered in the system is geo-referenced according to the basic political-administrative divisions of each country.

The Analysis Module helps discovering several classes of trends and patterns:

- Spatial patterns by means of **Thematic Maps** showing occurrences and/or effects over a region, and **Charts** comparing the impact in different regions over time.
- **Temporal patterns and trends** with the aid of various types of time-oriented charts, including seasonal and multi-period occasional charts.
- **Statistics** generated by aggregation of effects by different fields i.e. deaths, injured, missing etc. annually or any desired time period or desired geographical level.

Please note that the Analysis Module does not have the functionality to edit or update data.

Starting the Analysis Module

Analysis can be carried out online and also in the local host, if DesInventar server is installed and the database is hosted in the local server.

Starting DesInventar is normally accomplished by starting a browser and typing the URL:

UNDRR server - <http://www.desinventar.net>

Local host - <http://localhost:8081/DesInventar>

Main Menu Bar

The main menu (see Figure 1), is constantly available at the top of the screen. It consists of:

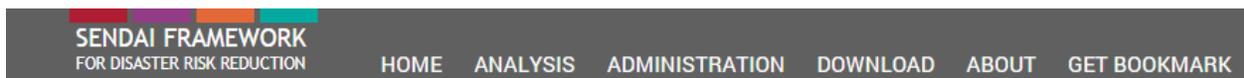


Figure 1. Main menu Bar

Home: This option navigates the user to the home of the DesInventar Sendai, a ‘Welcome’ page with a brief description of the system.

Analysis: Click on this link to return to the list of countries/regions contained within the system. From here users will be able to access the country profiles by selecting the chosen country/region from the list. (see below)

Administration: Clicking this link will bring you to the module for data entry or administration purposes. Note that this module is password protected and you will be presented with the Login screen (see Login and Logout options later in this section).

Download: Click on this link to get to the download page. In the download page you can (usually) download the software of the system and/or the databases and manuals. This behaviour can be modified by your system administrator.

Login/Logout: These options may also be accessed using the tool bar located to the right of the map, and will be disabled if you are not seeing the map windows.

Help: The Help menu gives you different ways to take advantage of the help system, which normally starts with the Table of Contents (first page). The help system is recommended to catch the spirit of the tool, and search quickly a general subject. Use the links in the text to get to other topics from here.

About: This page gives credits to organizations that have supported the DesInventar Initiative.

Get bookmark: Clicking on this link will instruct the system to produce a link in the address bar that can be used to set a page in the Favourites menu of Internet Explorer or a Bookmark in Firefox. This link can also be sent to other users when the DesInventar server is accessible over the Internet.

Analysis module

Users have an option to either select the Analysis Module from the menu bar or click the world map to get into Analysis module (See Figure 2).

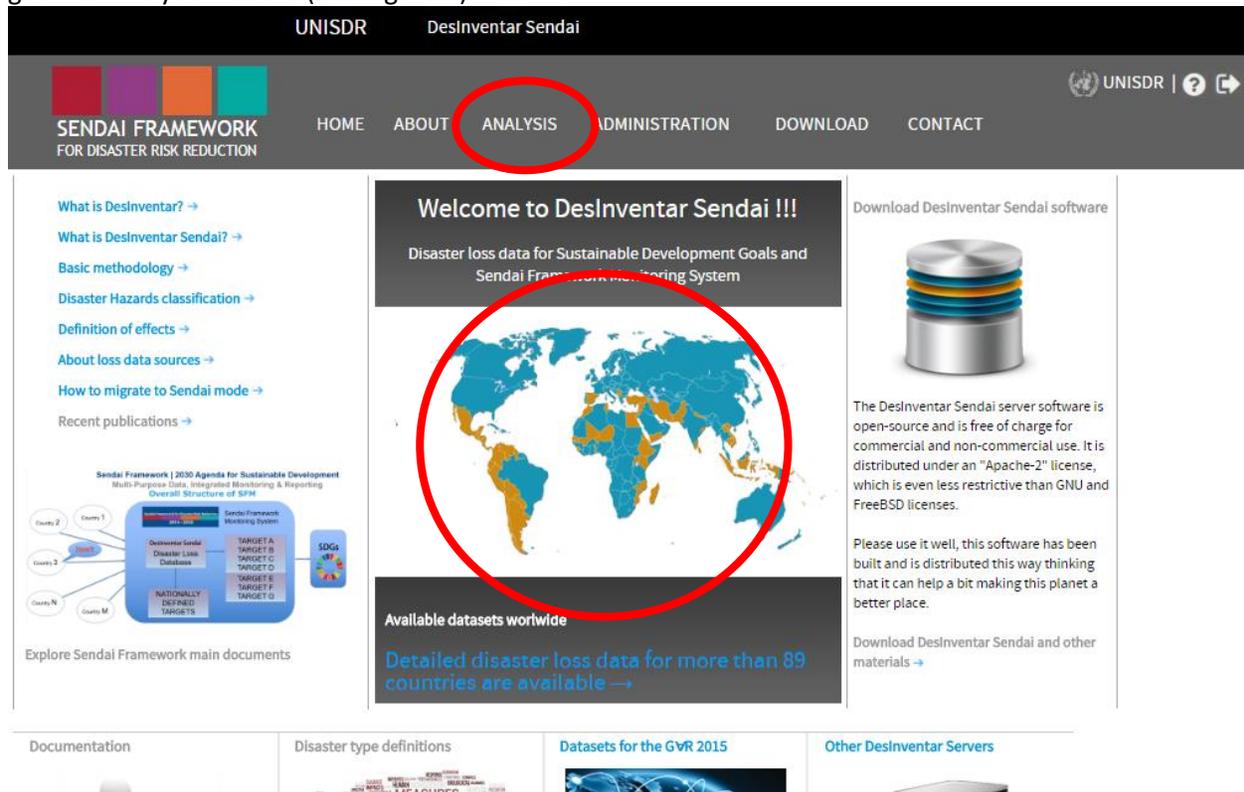


Figure 2. Main page to select Analysis Module

Then a list of countries and regions show up which can be selected for analysis, just by clicking on the corresponding name (See Figure 3). Once you select the region; a profile link will appear in the right side of the window with every region, where a quick automated Preliminary Analysis made based on the data present in the system can be viewed. The Preliminary Analysis contains composition charts (for the number of records, mortality, housing sector and affected people) and also trend charts and thematic maps for the same set of variables. This preliminary analysis is useful for obtaining a quick overview of a particular country or region relating to past hazards, perhaps for inclusion in their annual reports (See Figure 3).

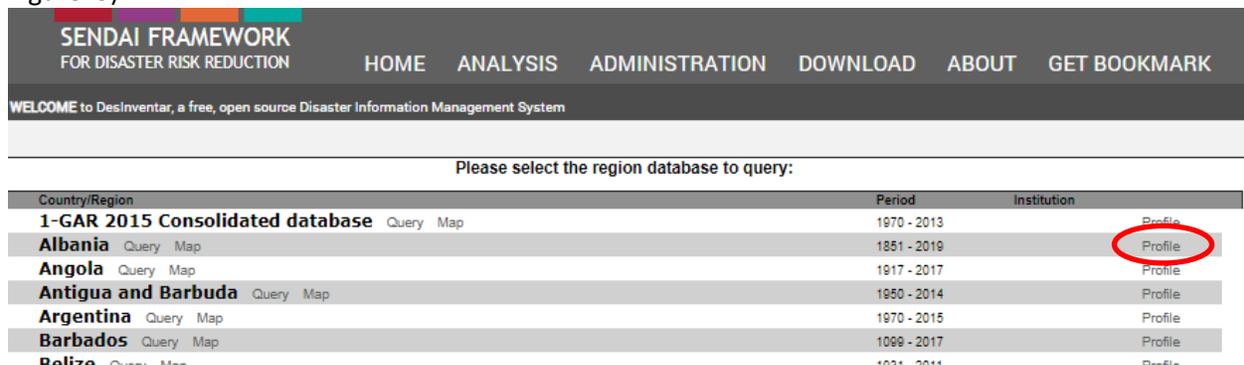


Figure 3. List of countries and regions which can be used under Analysis Module

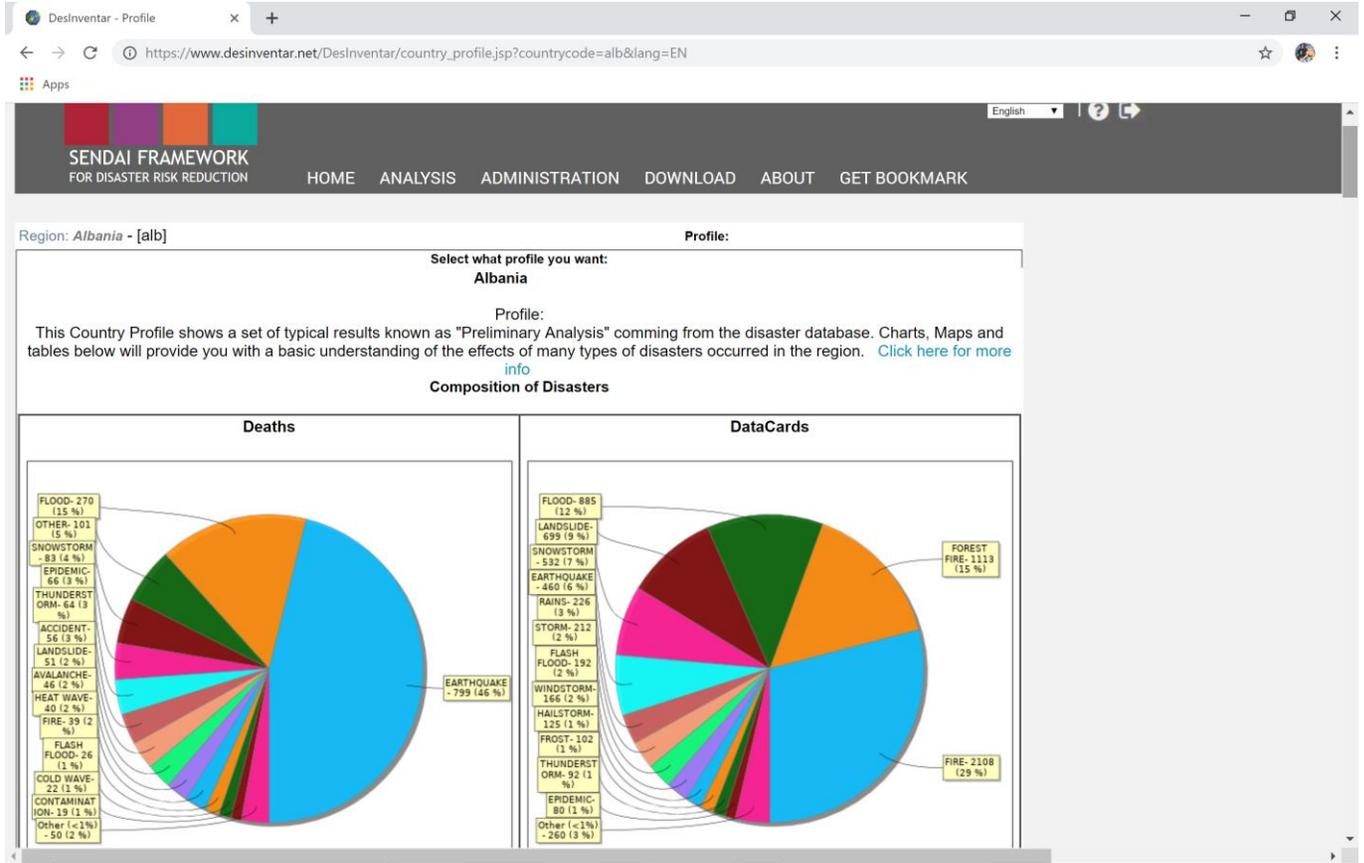


Figure 4. Example of a Country Profile (Albania)

The Analysis Module ‘Tabbed’ Interface Menu

The most important feature of the Analysis Module is the ‘tabbed’ interface menu (see Figure 4) which will enable you to navigate the various tools to help you manipulate the data. You can move from any tab of the system to any other tab at any given time. That gives you, the user, a lot of freedom in the way you wish to do your work.

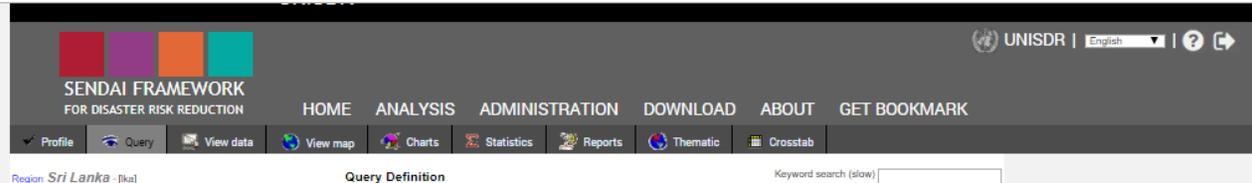


Figure 4: Tabbed Interface menu

For example, in the Query tab you can specify what data cards you want, and then move immediately to the Statistics tab in order to obtain statistics from the resulting query. However, you must remember that settings in each tab will influence the results displayed in another tab. For example, if you select volcano in the query tab and move to the profile tab this will display the profile only for volcanoes held in the system.

The following sections will provide detailed description each of the tabs providing details on how a user can develop a query within the Analysis Module.

Profile (Preliminary Analysis)

If a user only wishes to get a broader level overview of hazards at once, the analysis module has a user-friendly profile option which produces key figures and data tables to give the user a basic understanding of the effects of different types of natural disasters occurred in the region as predefined ‘‘Preliminary Analysis’’.

This type of analysis is called ‘‘Preliminary’’ because it is solely based in the all data contained in the repository, without doing any query or looking at other external information such as demographic data, topography, ecology, climate, etc.

The user has an option to select ‘‘Disaster Type’’ and ‘‘Country’’ using the drop down menus shown in Figure 5. The system will then generate the profile accordingly. In the profile window tables and graphs depicting the Composition of Disasters, Spatial Distribution and Temporal behaviour are produced.

* If you click ‘‘Profile’’ on the far right in the list of countries/regions, these two options will not show up.

Region: *Nepal* - [np]

Profile:

Select what profile you want:

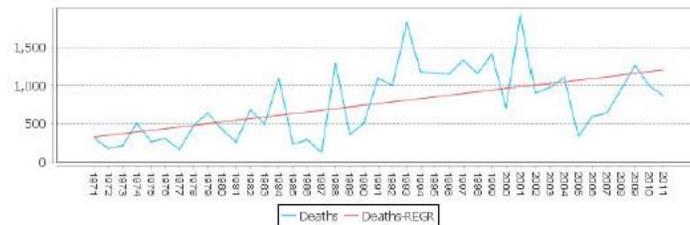
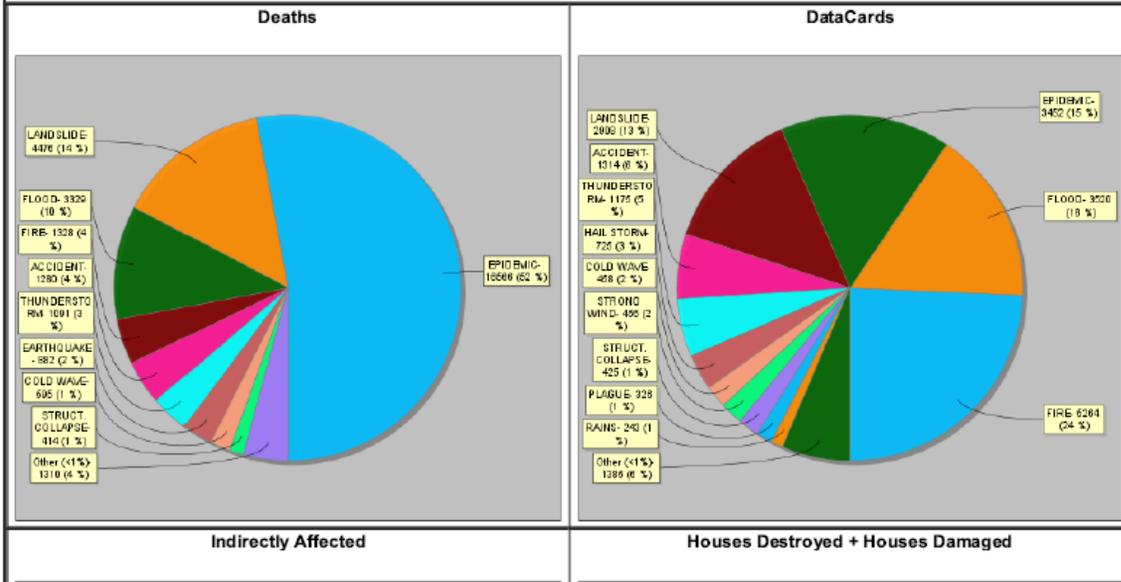
Disaster type Multi-hazard profile	Region ALL
---------------------------------------	---------------

Nepal

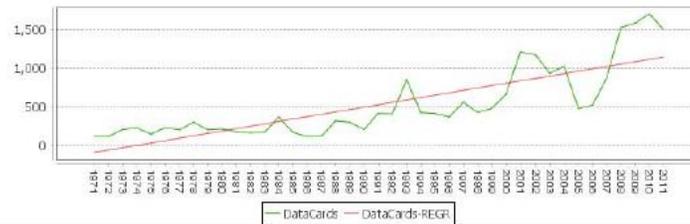
Profile:

This Country Profile shows a set of typical results known as "Preliminary Analysis" coming from the disaster database. Charts, Maps and tables below will provide you with a basic understanding of the effects of many types of disasters occurred in the region. [Click here for more info](#)

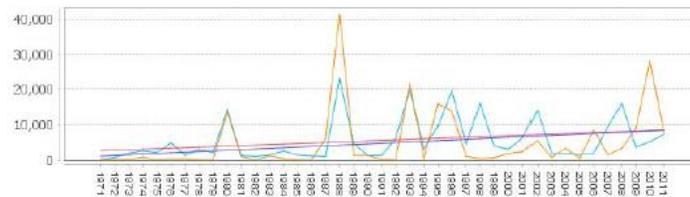
Composition of Disasters



DataCards



Houses Destroyed , Houses Damaged



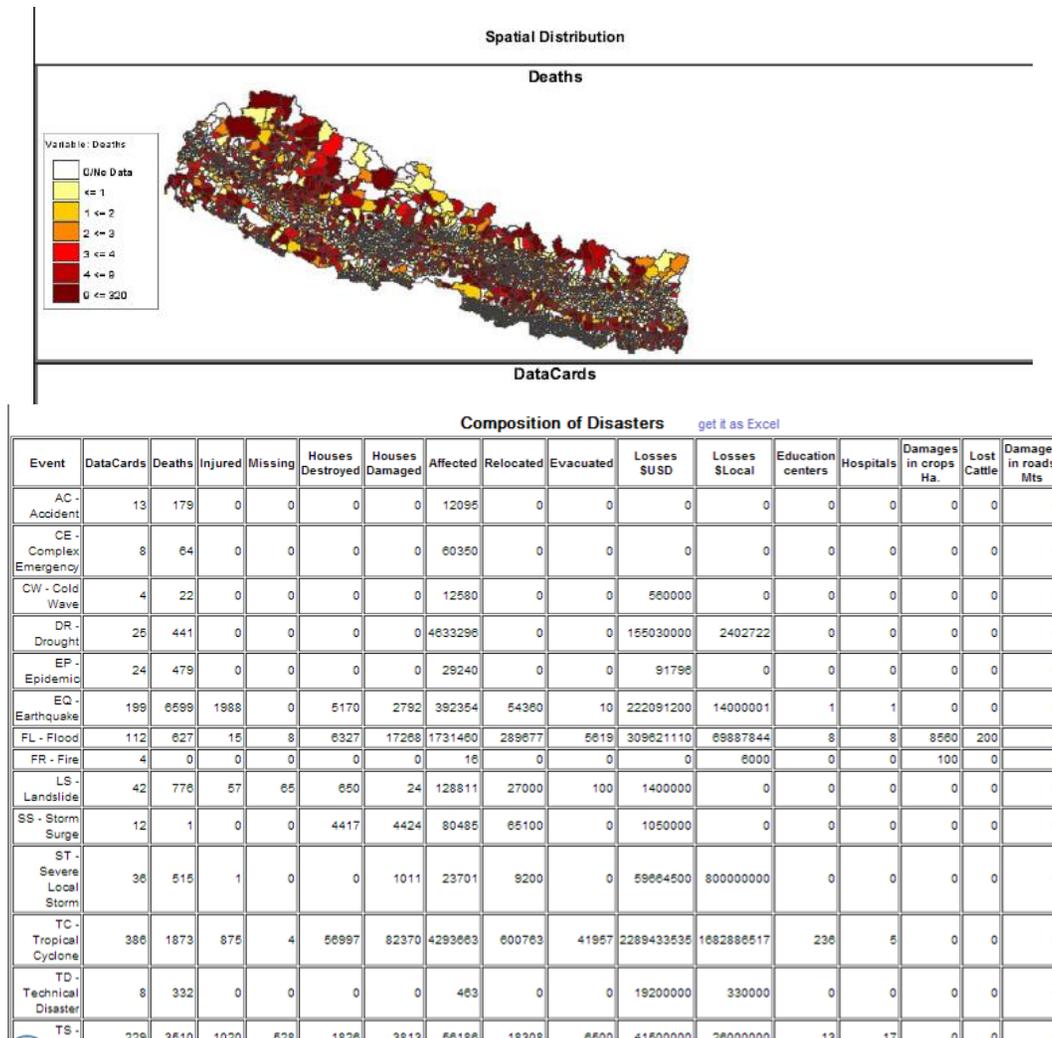


Figure 5: Profile Window

The “Preliminary Analysis” consists of the following displays:

- **Composition** or typological analysis: shows the number of records and effects with variables composed of different hazard/ disaster events. It is made usually by building charts comparing the value of a variable for each type of hazard.
- **Temporal** Analysis: shows the behavior of an effect variable over time (or the number of records for a specific hazard). This will be discussed further under Temporal Data.
- **Spatial** analysis: shows the behavior across space of a variable (number of records or a specific effect variable). This will be discussed in detail in the Thematic section.
- **Statistical** Analysis: calculates several statistical indexes with summary records

The **Composition or comparison by hazards** in the Statistics part shows what types of hazards are prevalent and also of utmost concern for the region, country or state based on comparison to other hazards. Relevancy is calculated in terms of the number of records as well as based on the impact variables, such as Number of deaths, Number of destroyed houses, etc. It is also possible to understand the interrelationship between the occurrences of 2 or more disaster events e.g. Floods and epidemics, floods and landslides, earthquake and landslides and so on

The provided sequence of figures normally gives a good idea what types of hazards and variables should be taken into consideration and/or correlated to other factors not comprehended in the database, for example:

- Data cards: The number of records for each type of disaster.
- Deaths: The number of people who died during the disaster, or directly after, as a direct result of the hazardous event, for each type of disaster.
- Houses destroyed and Houses damaged: The number of houses damaged or destroyed for each type of disaster.

Tip!

The total **Number of Records** in a database does NOT necessarily reflect the number of disaster events. The DesInventar methodology suggests that the effects of a disaster should be disaggregated in each of the affected geographic units. Under this approach a medium or large scale hazard that affects multiple geographic units will generate also multiple reports in the database. This is why this variable will be named as number of Records (or **DataCards**) and not 'hazards'.

However, should the user have some specific questions, it is recommended to follow the steps in the upcoming chapters to see how they can develop their own customized analysis.

Query

For data analysis the information retrieval processes must be selective, specific to the characteristics of the information. In the Analysis Module, after selecting a country or region, select the **Query** tab to determine what data is to be retrieved and displayed, based on thematic criteria (type of hazards and causes), spatial component (geography) and time (dates) criteria. In this screen you will be able to select the information in the system, which you want to see in terms of the dimensions described such a disaster type, specific geography (administrative units), date range, events with deaths, injured, houses destroyed/damaged, hospitals, as well as basic service affected, etc (see Figure 6). A brief description of the components of the Query Window can be found below.

Figure 6: The Query Window

Disaster Type

A list of all the hazards that have been defined is displayed in the first window. If you want a query (or report) on one or more events, select them from the list. As you make your selections they will appear highlighted.

If you do NOT select any hazard, the query (report) will include **ALL** the hazards.

Tip!

It is recommended to familiarize with the definitions of the DesInventar Sendai before beginning the analysis though no standard definition for hazards / disasters exist so far and the definitions vary in different countries and regions. Definitions in the system follows the *Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction*.

Tip!

Select the event by clicking on the word. To deactivate, use ctrl-click (press the Ctrl key, and without releasing it, click it again).

Using a very standard Microsoft (MS) Windows methodology you can:

- Select and deselect individual elements of the list with Ctrl-Click
- Select only one element with a single click
- Select a range of contiguous elements in the list by Clicking in the first element and Shift-Clicking on the last.

To clear all selections of events, click on the “New Query” button.

Geography Level

Geography levels are shown in three lists, Country, Level 1 and Level 2 from which you can select the geographic regions required for your query. The analysis is been carried out at these administrative boundary levels (see Figure 7).

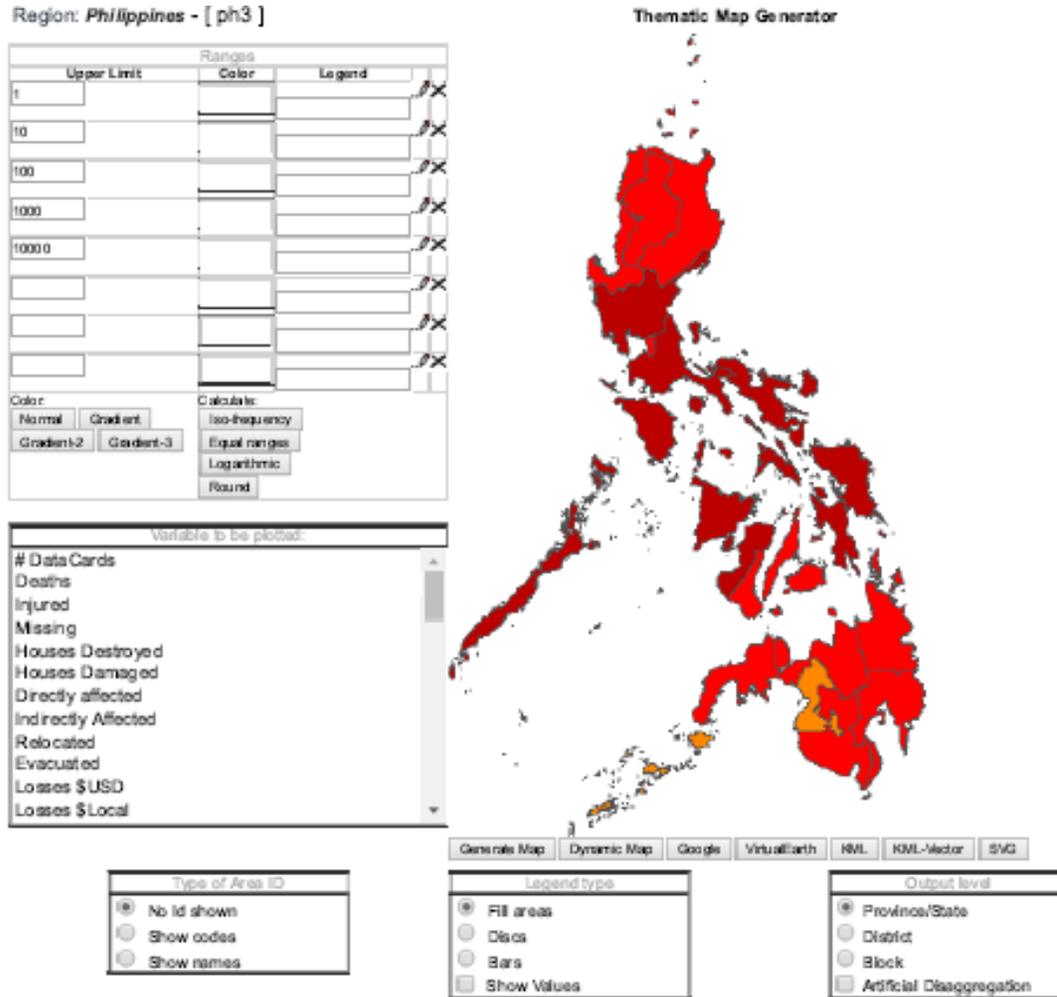


Figure 7: Thematic map depicting analysis at 3 levels

If you do NOT select any geography, the query (report) will include ALL the hazards in the entire country of the region. Consequently, if you select no states in the first list, the datacards of all the states will be retrieved.

For example, disaster databases of Nepal, Sri Lanka, Philippines, India etc. analysis can be carried out at 3 geography levels. Pacific Islands (PDN), or Pacific Damage and Loss (PDaLo) Information System, uses one geography level – country presently.

Cause

Information regarding the 'Cause' of an hazard is incorporated in the DesInventar Sendai. Selecting causes from this list will restrict the results to those data-cards in which this cause is set in Query. Again, as in the list of hazards and geography, if you do not select something from a list, you are implying that you want information about all the causes. Description of causes can be added to elaborate of an event happened due to more than one cause. E.g. landslide in hilly area as a result of earthquake and a following heavy rainfall.

Figure 8.: The Query depicting cause of flood hazards caused due to heavy rain

Events with Specific Effects

If you are interested in hazards that have had specific impacts, you can choose descriptive features to generate a report that meets your needs, i.e. you work in the housing sector looking for Houses Damaged, Relocated, etc. simply click respective blank boxes to the left of each option.

Please note:

- If the checkbox of the effect is selected, results will be restricted to those cards in which the impact happened.
- If an entry is placed in the first of the To/From boxes, results will be restricted to those data-cards where the effect was equal to or greater than this number.
- If an entry is made in the second of the To/From boxes, results will be restricted to those data-cards where the effect was equal to or less than this number.
- If both numbers of the To/From boxes are set, case results will be restricted to those data-cards with this effect magnitude between the two values (and including the values as well).

Remember: if you do not select any specific effects, all effects will be included in your query. For example, if you would like to know how many flood hazards in a state resulted in deaths (human life loss)

Select events and geographic units, and set the options that specify the disasters you want to query:

Disaster type	State	District	Block	Cause
Flash Flood ELECTRIC STORM CLOUD BURST SNOWSTORM FLOOD SNOWFALL STORM EARTHQUAKE DROUGHT	Uttarakhand	Uttarkashi Chamoli Rudraprayag Tehri Garhwal Dehradun Garhwal Pithoragarh Bageshwar Almora Champawat		Overflow Plague Rain Short circuit Strong wind Technical Sna Tempest Thermal inver Tropical depr Unknown

Use Ctrl-Click and/or Shift-Click to deselect or for multiple selections. If no selections are made, all items will be selected.
NOTE: Selections of District have precedence over selections of State.

Select only events with:

<input checked="" type="checkbox"/> Deaths	<input type="checkbox"/> Injured
<input type="checkbox"/> Houses Destroyed	<input type="checkbox"/> Houses Damaged
<input type="checkbox"/> Directly affected	<input type="checkbox"/> Indirectly Affected
<input type="checkbox"/> Evacuated	<input type="checkbox"/> Relocated
<input type="checkbox"/> Hospitals	<input type="checkbox"/> Missing
<input type="checkbox"/> Damages in roads Mts	<input type="checkbox"/> Damages in crops Ha.
<input type="checkbox"/> Lost Cattle	<input type="checkbox"/> Education centers

Select events that affected:

<input type="checkbox"/> Water supply	<input type="checkbox"/> Sewerage
<input type="checkbox"/> Health sector	<input type="checkbox"/> Education
<input type="checkbox"/> Industries	<input type="checkbox"/> Transportation
<input type="checkbox"/> Communications	<input type="checkbox"/> Power and Energy
<input type="checkbox"/> Relief	<input type="checkbox"/> Agriculture
<input type="checkbox"/> Other sectors	

Profile Query View data View map Charts Statistics Reports Thematic Crosstab

Region Uttarakhand - [005] Data: Query Results Standard Extension Result

Serial	Event	State	District	Block	Date	Location	Deaths	Injured	Missing	Houses Destroyed	Houses Dama
UA69	FLOOD	Uttarakhand	Udham Singh Nagar	Sitarganj	2004/08/27	Nasrigota	5				
UA33	FLOOD	Uttarakhand	Tehri Garhwal	Kirtinagar	2004/07/29	Near Bacchellikhal	12	12			

Figure 9: The Query depicting cause of flood hazards caused due to heavy rain in 2004

Hazards that Affected...

Queries can also be restricted to hazards that have affected the sectors you are interested in e.g., Water supply, Agriculture, Education, etc. Click once on the fields in “Hazards that Affected”, on the Query Window.

Remember: if you do not select anything, all of them will be selected.

Logic of Selection

If you want to query hazards that have destroyed homes **AND** affected public services, click the corresponding describers and select the option “AND” in the logic box. Similarly, if you want to query hazards that destroyed homes **OR** affected public services, select the option “OR”.

Date range: (YYYY MM DD)

Date range fields could be used to sort data cards determining data within the selected time frame. If you do not use the date “From”, the data cards will be displayed with no restrictions, except for those resulting from the date UNTIL. The same applies to “To” dates.

- If you type the date “From” only, all the cards with a date equal to or later than the “From” date will be retrieved.
- If you use the date “To” only, the cards with dates prior to the date indicated will be retrieved.

- If you include both dates, the cards whose dates are within the period specified will be retrieved.

It is important to clarify that if you enter “year” in Data range, you also need to enter month and day. Otherwise, January 1st will be taken as a starting date, and December 31 as an ending date. If you enter the year only in the ending year, only the cards of that year and previous years will be retrieved.

GLIDE Number

The GLOBAL IDENTIFIER number reflects the idea of a globally common Unique ID code for disasters where the “GLIDENumber.net, and the GLIDE generator facilitate linkages between records in diverse disaster databases”¹. You can search by GLIDE number if you know the GLIDE number of the record you are looking for by entering the number in this box. View the GLIDE number website for more details and history events under <http://www.glidnumber.net>

Query Buttons

- **View Data** - This button will link you to the view data tab, which displays the tabular form of the results of your query. You will be able to see the datacards that comply with the specifications given in the Query tab.
- **New Query** - This button erases all the selections marked in the fields of the Query Window. All queries will be deleted or not, prior confirmation, with a double click.
- **Save Query** - This button allows you to save the current status of your selections.
- **Load Query** – This button allows you to update your own data files/do files.

Expert Selection

At the bottom of almost every window in the Analysis Module you will see the ‘Expert Selection’ field with button. The Expert button shown here in the Query window and in other windows (See Figure 10) opens another window to prepare a query using the universal language of database query and management: SQL (Structured Query Language).

This window is designed for users that have some experience in computing, especially in the area of databases, and they are already familiar with these concepts. As the button implies, this is for experts in SQL therefore, this section is not a lesson in SQL, rather a description of it and what an expert can do.

The variables appear in a list, to use them in SQL, find the variable you wish to use and double click. Alternatively, you can mark the variable and click the ‘Add’ button. The selected variables will appear in the ‘Expert Selection’ box underneath. To run the query, select ‘Validate’. If an error occurs, a pop-up box detailing the error will appear, read the error message carefully; take into account the relevant parenthesis, and make sure that the words typical of SQL are correct (select, from, where, order by).

¹ <http://www.glidnumber.net/glide/public/disclaimer.jsp>

Figure 10: Expert: an advanced query system

With this language, an average user can “pose questions” to a database, especially to relational databases such DesInventar.

This window shows in a box the SQL query, which corresponds with the user query that was specified in the Query Window. For example, if you make a query choosing the hazard FLOOD only with number of deaths more than 10, the SQL question will look pretty much like this:

```
select * from datacards where event='FLOOD' and (Deaths >10)
```

As you select hazards, geography, dates and other possible conditions for data retrieval, the SQL question becomes more and more complex. For example:

```
select * from cards
where ((event='LANDSLIDE') or (event='FLASH') or
(event='HURRICANE') or (event='SEDIMENTATION')) and
((level0='05') or (level0='08') or (level0='17') or
(level0='23')) and (((dateyear*373)+(datemonth*31)+dateday)>= 740437) and
((deaths<>0) OR (injured<>0) OR (health<>0))
order by event, name0, name1, name2, dateyear, datemonth, dateday
```

This question asks four possible types of hazards, in four Level 0 regions, limited to a date, where people were killed, or injured, or the health sector was affected with specified thresholds, ordering the result by hazard, geography and date.

The study of SQL is not within the scope of this tool, here are some basic rules to get you started:

The general form of SQL questions is as follows:

```
select {fields in the database}
from {table}
where {selection condition}
order by {ordering fields}
```

The Analysis Module will allow users to add mathematical expressions to the WHERE **{selection condition}** as part of the SQL question. Many users find the WHERE clause the most useful and interesting option for creating new and useful queries.

For example, if you want to retrieve from the database cards of hazards where more than 10 people died, the WHERE clause would be as follows:

```
select * from cards where
(deaths>10)
```

The Expert will help you to generate the clauses corresponding to most of the variables of interest. Take your time and try as under Analysis module, you will not damage the database.

Hits Per Page

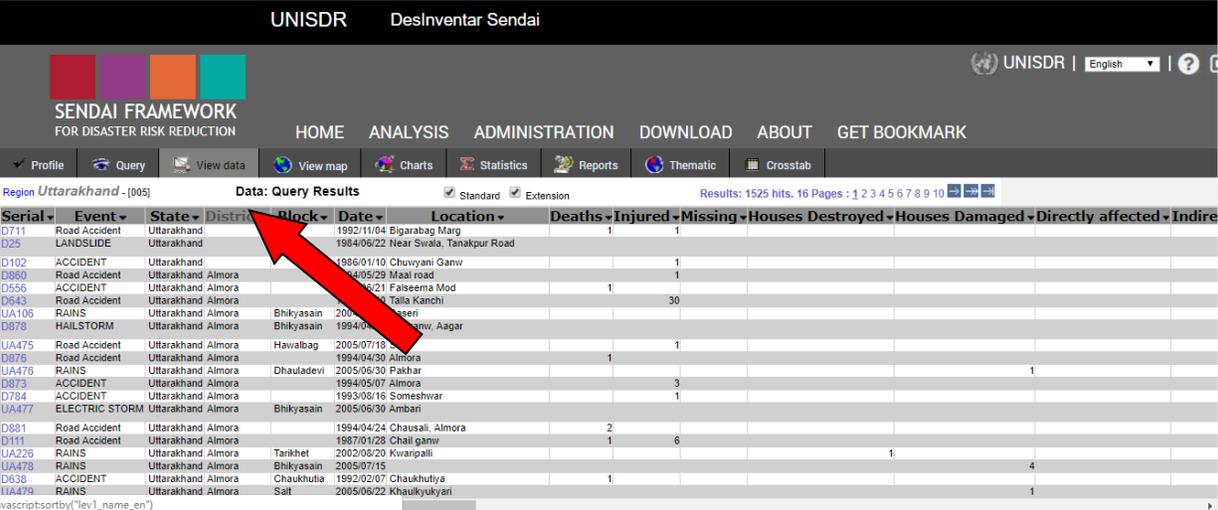
Choose the number of records you would like displayed per page when viewing the results of your query.

View Data

This tab will display the results of your query in tabular form. You will be able to see the data cards that comply with the specifications given in the Query tab. The following text describes, how you can alter the view to have better results that meet your needs.

Ordering

This will affect the order in which the datacards appear on the 'Datacards' viewing sheet (see Figure 11). Just click one of the data titles to sort by these criteria. For example, to sort by district, click on the heading, which will sort the datacards in alphabetical order. Please note if no value is entered from your chosen criteria, such blank cells will appear on the top while sort in Ascending order.



The screenshot shows the 'Data: Query Results' table for Uttarakhand. The table has columns for Serial, Event, State, District, Block, Date, Location, Deaths, Injured, Missing, Houses Destroyed, Houses Damaged, Directly affected, and Indirectly affected. A red arrow points to the 'District' column header.

Serial	Event	State	District	Block	Date	Location	Deaths	Injured	Missing	Houses Destroyed	Houses Damaged	Directly affected	Indirectly affected
D711	Road Accident	Uttarakhand			1992/11/04	Bigarabag Marg	1	1					
D25	LANDSLIDE	Uttarakhand			1984/06/22	Near Swala, Tanakpur Road							
D102	ACCIDENT	Uttarakhand			1986/01/10	Chuvyani Ganw		1					
D860	Road Accident	Uttarakhand	Almora		2005/05/29	Maal road		1					
D556	ACCIDENT	Uttarakhand	Almora		2005/05/21	Faiseema Mod	1						
D943	Road Accident	Uttarakhand	Almora			Tella Kanchi			30				
UA106	RAINS	Uttarakhand	Almora	Bhikyasain	2005/06/30								
D878	HAILSTORM	Uttarakhand	Almora	Bhikyasain	1994/06/22	Amv, Aagar							
UA475	Road Accident	Uttarakhand	Almora	Hawalbag	2005/07/10			1					
D876	Road Accident	Uttarakhand	Almora		1994/04/30	Almora	1						
UA476	RAINS	Uttarakhand	Almora	Dhauladevi	2005/06/30	Pakhar						1	
D873	ACCIDENT	Uttarakhand	Almora		1994/05/07	Almora			3				
D784	ACCIDENT	Uttarakhand	Almora		1993/06/16	Someshwar			1				
UA477	ELECTRIC STORM	Uttarakhand	Almora	Bhikyasain	2005/06/30	Ambari							
D891	Road Accident	Uttarakhand	Almora		1994/04/24	Chausali, Almora	2						
D111	Road Accident	Uttarakhand	Almora		1987/01/28	Chail ganw	1	6					
UA226	RAINS	Uttarakhand	Almora	Tarikheth	2002/08/20	Kwaripalli				1			
UA478	RAINS	Uttarakhand	Almora	Bhikyasain	2005/07/15							4	
D638	ACCIDENT	Uttarakhand	Almora	Chaukhutia	1992/02/07	Chaukhutya		1					
UA479	RAINS	Uttarakhand	Almora	Sait	2005/06/22	Khaukyukyan						1	

Figure 11: Sorting alphabetically in ascending order by district name

View Datacard

The DataCard Window (See Figure 12) stores the details of the event that are entered using the Data Entry module of the DesInventar information system. The disaster Data Card is designed that the information can be homologized in all inventories made with DesInventar. You cannot change the card, but you can create “extensions” that will sufficiently meet the needs of other possible fields in the database.

Once you have entered your data, you can view the information in each datacard by clicking on the serial number of the event listed on the far left column. This window is called the Data Card Viewing Sheet.

The content of the card is divided into several sections including a map depicting the location of the event and comments from the individual who entered the data.

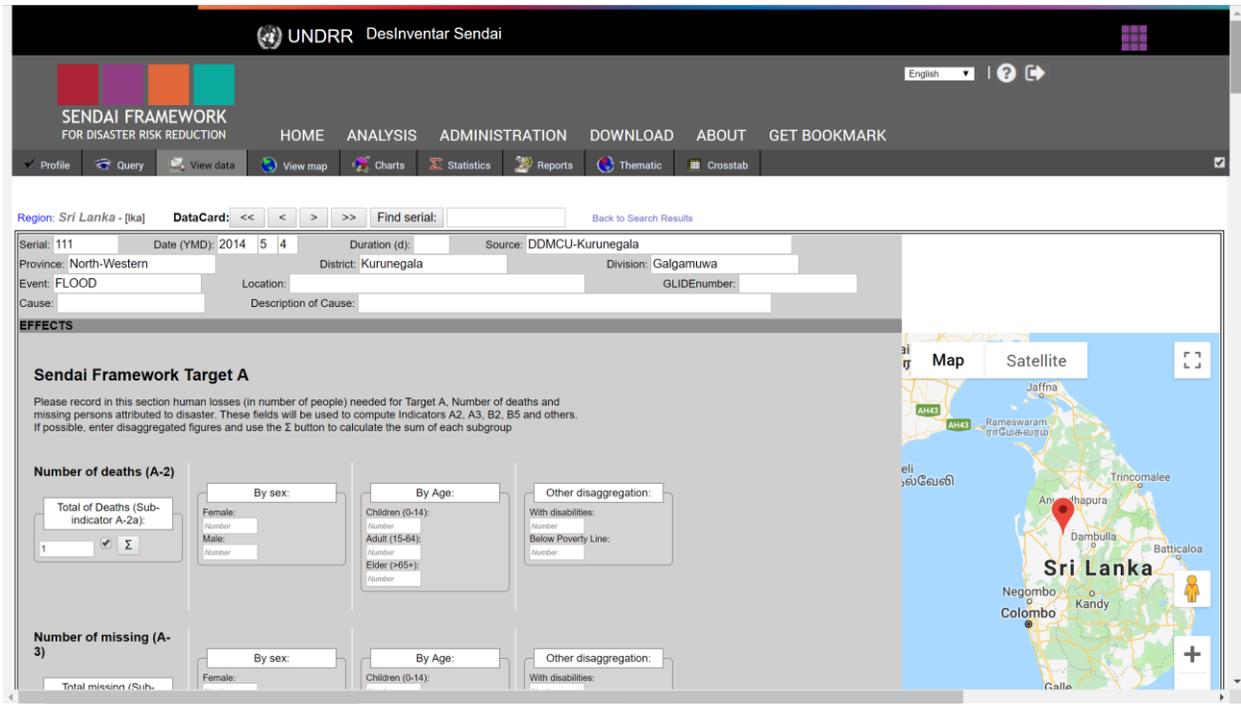


Figure 12: Data card Display

The DesInventar Sendai information system has modified extension fields to enable users to look at the information migrated from the older version of DesInventar systems. This information can be accessed using the extension tabs in the white section of the screen which needs to be created under **Extension** in the ADMINISTRATION (data management) module (see Figure 13).

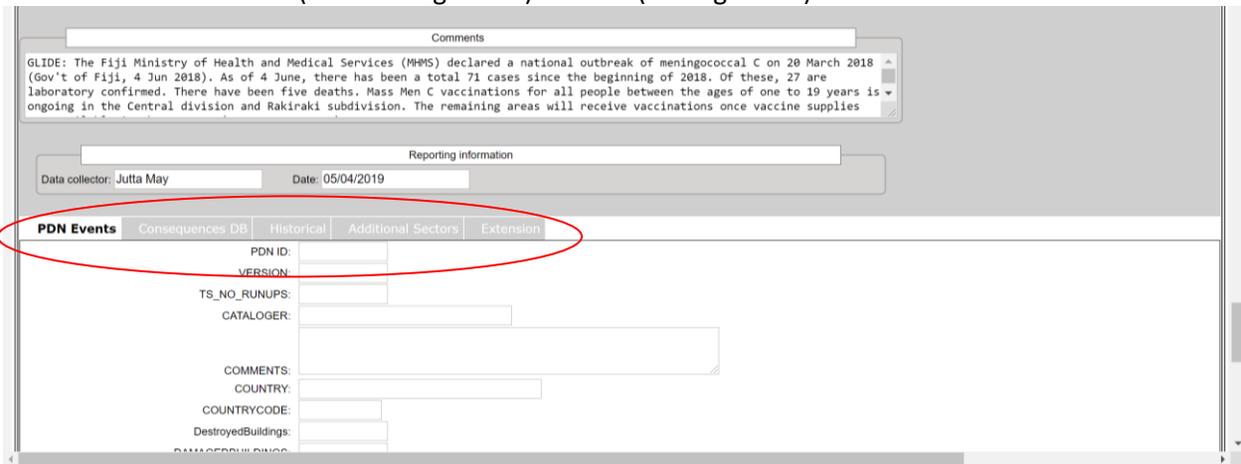


Figure 13: Additional Information in Data card Extension

By navigating through the tabs users can view the data contained within the existing systems (see the tabs encircled red in Figure 13). It may appear differently for each region and depends on the fields created in the extensions. This function could be useful as not all datasets contain the same information and allows a user to refer to information stored within other systems without leaving the analysis module.

View Map

The analysis module is provided with facilities to handle simple maps of the study regions. These maps can be exported in to other documents by doing a right click on your mouse and selecting “Copy”. In this way, the user can then go to the file in which they would like to insert the map and right click again, select “Paste” and the map will be inserted in to the document and can be formatted using the picture toolbar.

These maps serve three purposes:

- Show users the shape (administrative boundaries), size and location of the zones forming the division (usually administrative boundaries) used to geo-reference the data.
- Serve as a tool to select specific zones of which information is required. The application is particularly useful for users who do not have a practical knowledge of the study region.
- Serve as a base map for the production of thematic maps. See more information in the corresponding section.

When users first select the View Map tab the geographic regions selected in the Query window will be highlighted (see Figure 14).

The analysis module is provided with facilities to handle simple maps of the study regions. These maps can be exported into other documents by doing a right click on your mouse and selecting “Copy”. In this way, the user can then go to the file in which they would like to insert the map and right click again, select “Paste” and the map will be inserted in to the document and can be formatted using the picture toolbar.

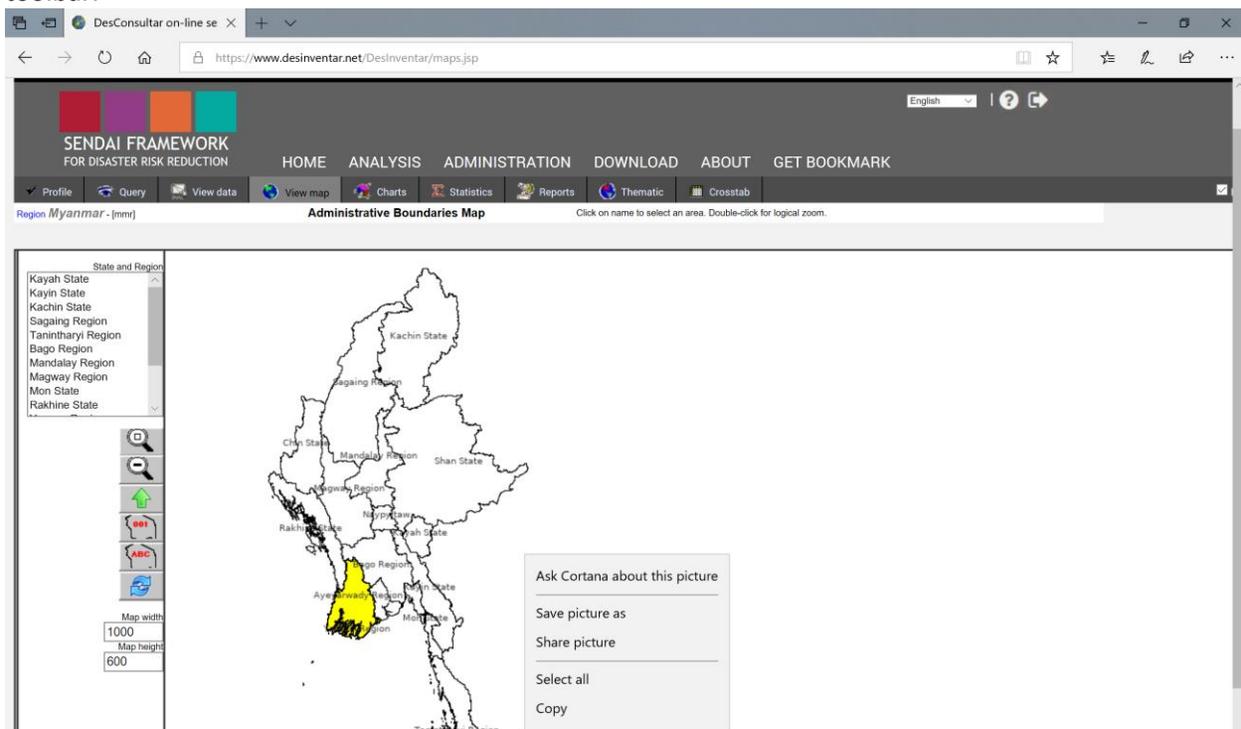


Figure 14: View Map Window

It is also possible to select the geographical areas of interest by selecting the countries from the left hand side. A visual interactive tool bar is also displayed to the left of the map, with the following options:



Zoom (Enlarge) Map. When you select this option, the system enlarges the map by 25%.



Reduce Map. This option reduces the map size by 25%.



One level up: after drilling down to one area you may click this button to get back to the previous higher level.



Map showing codes. This option displays the codes of the geographical areas, instead of the names. Depending on the density of the geographical (or political-administrative) areas, the map might result illegible due to overlapping of the codes. In this event, it would be advisable to enlarge the map.



Map showing names. This option displays the names of the geographical areas, instead of the codes. Depending on the density of the geographical (or political-administrative) areas, the map might result illegible due to overlapping of the names. In this event, it would be advisable to enlarge the map.



Map refresh. This option will force a re-display of the areas names.

Map width	1000
Map height	600

Map Width and Height. Allows the user to adjust the size of your map to suit your needs.

Charts

One of the main strengths of the analysis module is the ability to generate charts about disasters. Charts are excellent means to represent the behaviour of a variable over time and to compare a set of variables.

The mechanism of producing charts with the analysis module involves a similar process as with the other result generators. It is based on a definition of a query based on a selection of geographical units, hazard types, range of dates and several data characteristics. Once a query is satisfactory, its results can be charted in the several formats.

The main screen of the Charts tab is shown in Figure 15, charts are displayed to the right hand side of the screen and the type of chart and variable to be plotted are selected using the lists on the left hand side.

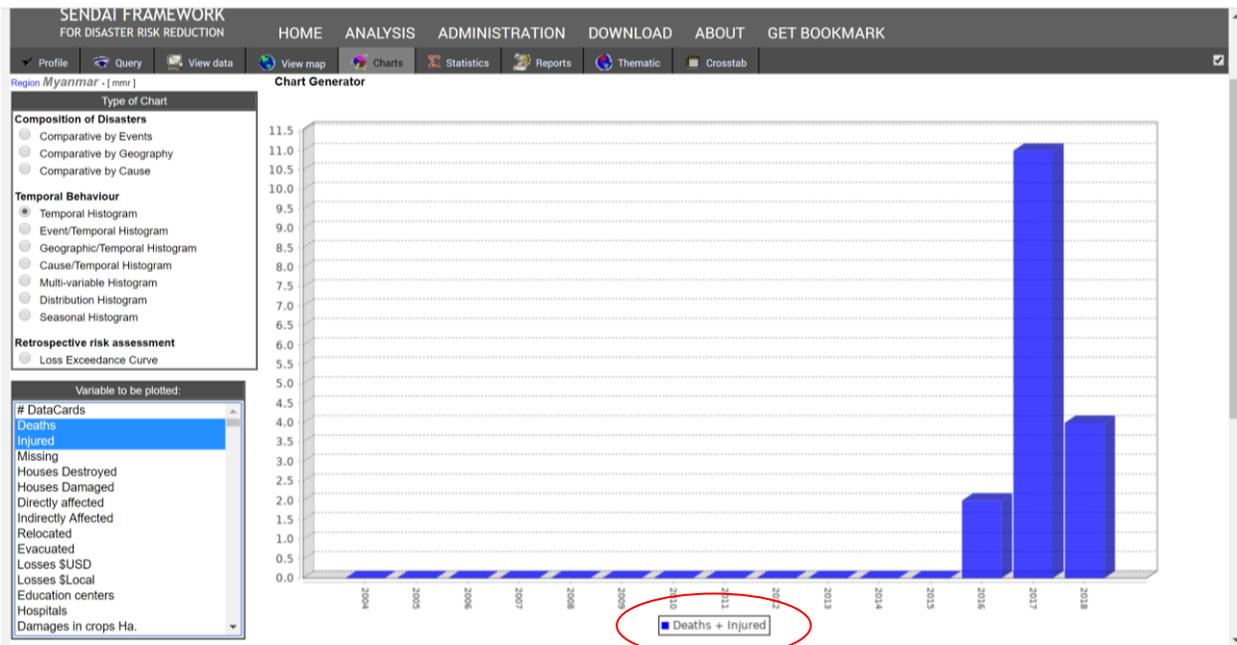


Figure 15: Charts Window showing a temporal histogram of deaths + injured due to flood during 2004-2018 period

Users can select **'Type of Chart'** to produce by first identifying "Composition of Disasters" from the following three options. **'Variable to be plotted'** can be selected from the window below the type of chart. Initially the variable to be plotted is data cards and other options can be found in the list on the left. Note that if you select multiple valuables by Ctrl key, the graph shows sum of these selected valuables.

Comparative by Hazard – Initially this displays a Pie chart, proportionally segmented according to the values aggregated per hazard for the variable to be graphed (see Figure 16). This graph can also be generated as bar or line chart by selecting a chart type in the chart features box.

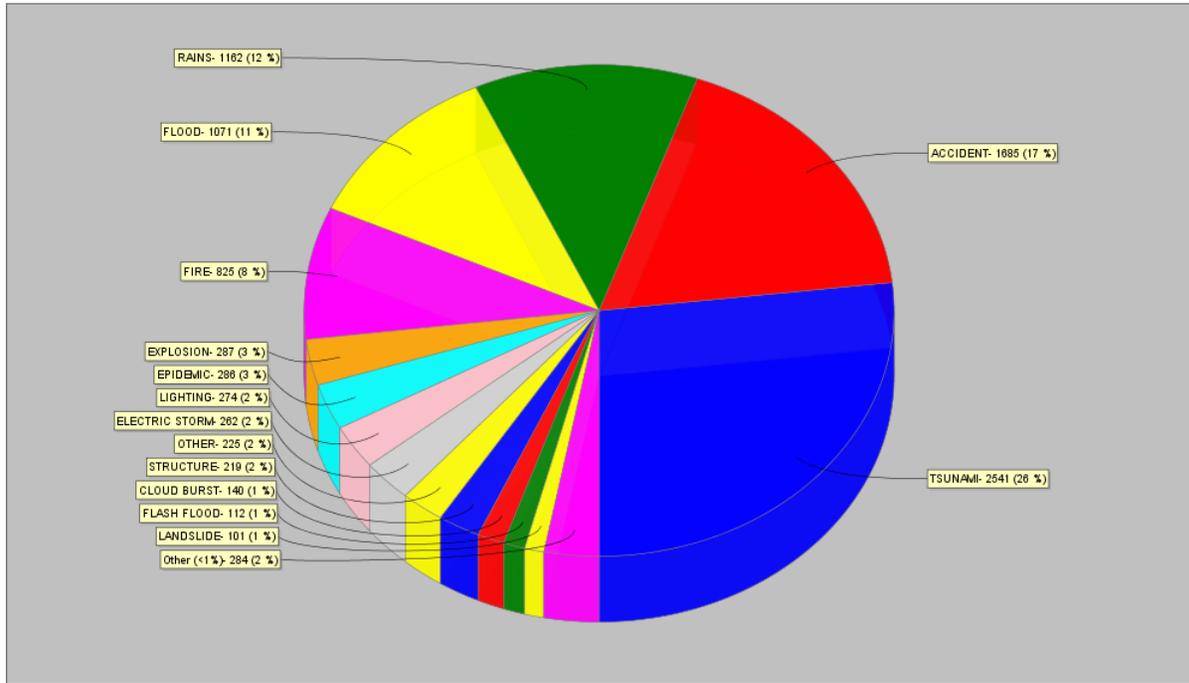


Figure 16: Comparative by Hazard

Comparative by Geography - It is similar to the Comparative by Hazard, but by geographical region. Again, this Figure can be generated as a bar (See Figure 17) or line chart.

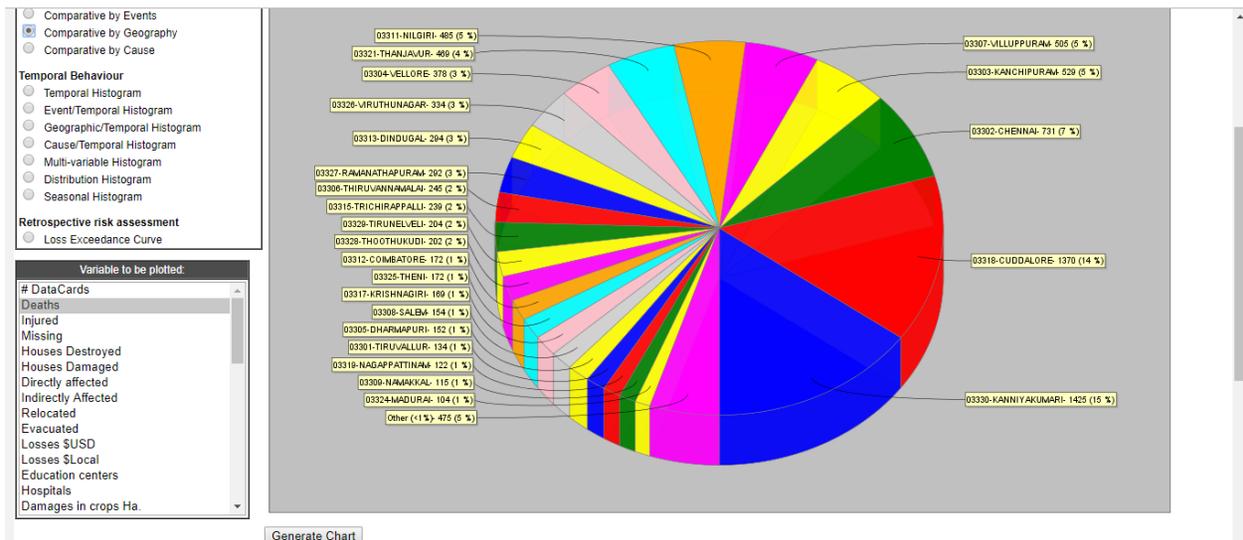


Figure 17: Comparative by Geography

Comparative by Cause – In line with the above this chart shows the proportion of causes while the graph can be generated as bar or line chart as well.

Temporal Histogram - Generates a simple histogram according to the variable selected for graphing. The occurrence frequency (Y axis) of the variable to be graphed will be displayed according to the period selected in the Period window, which defines the time intervals (X axis). This Figure is generated as bar or line chart (see Figure 18).

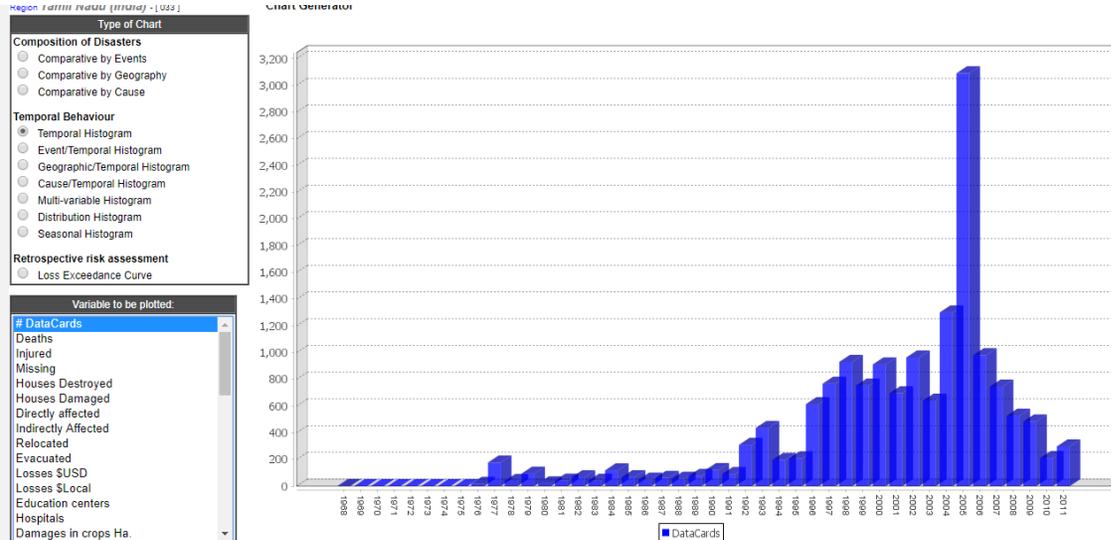


Figure 18: Temporal Histogram

Hazard/Temporal Histogram will represent the values that correspond to the variable that is to be graphed, in each class interval, differentiating each hazard series by colours. Legends for hazard type will appear at the bottom.

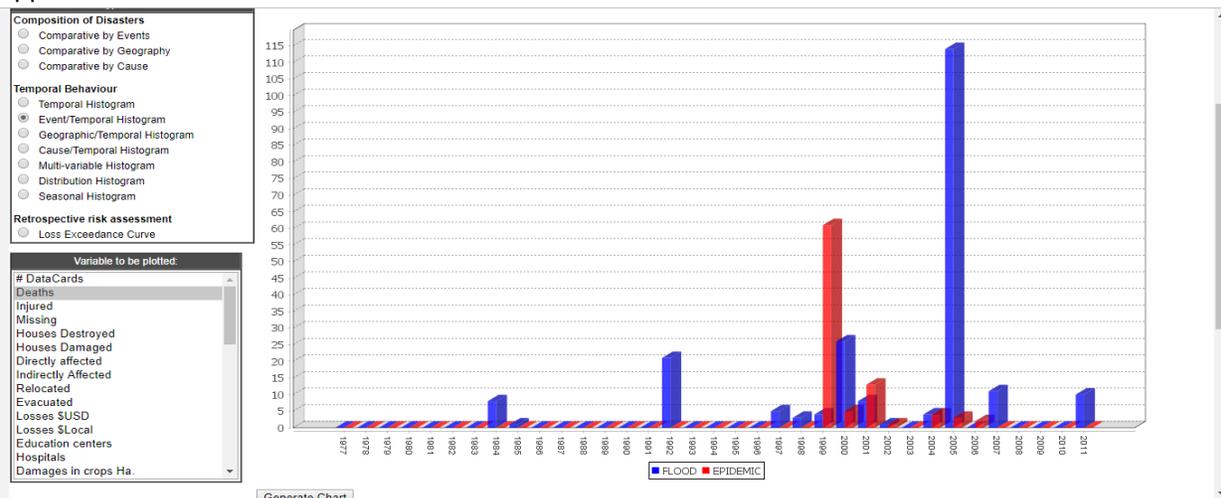


Figure 19: Hazard/Temporal Histogram

Hazard temporal histograms can be created to understand the interrelationship between different disaster events. For example, floods and epidemics related deaths; earthquake and landslides; drought and forest fire etc.

Geographical/Temporal Histogram will display values that correspond to the variable to be graphed allocating colours for each geography. It works similarly to the previous Hazard/Time Histogram graph. This Figure is generated only as bar or line chart (See Figure 20).

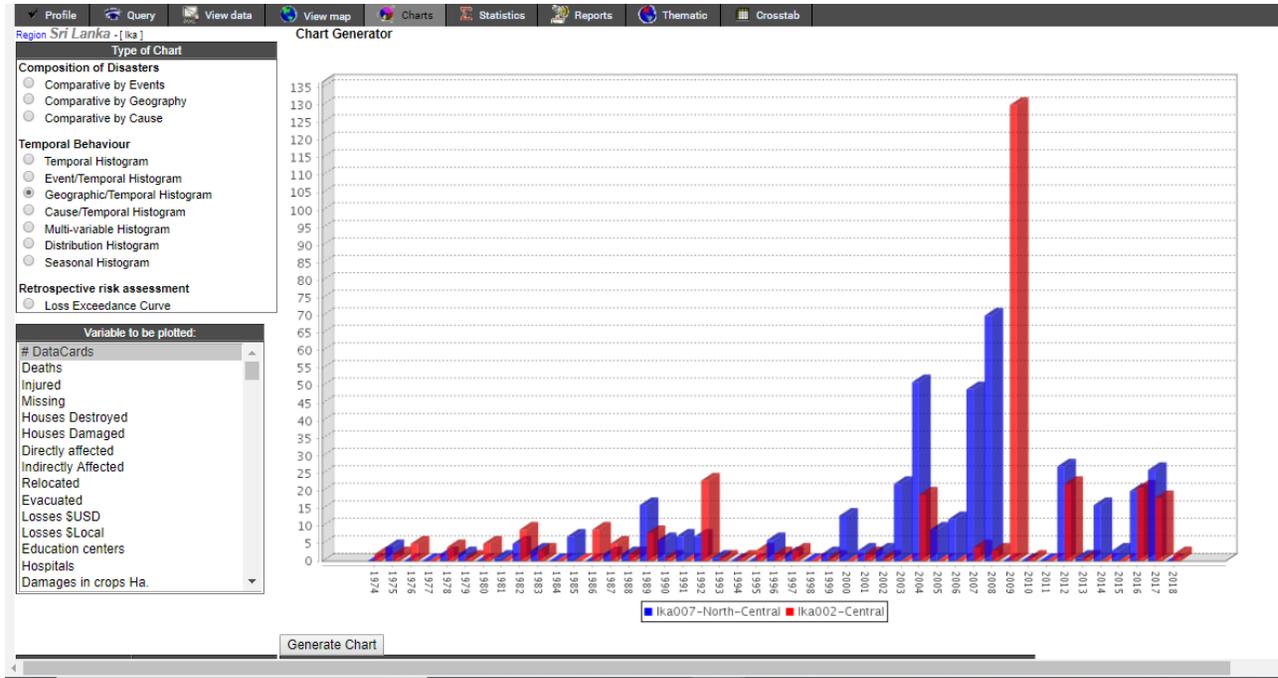


Figure 20: Geographical/Temporal Histogram

Multi-Variable Temporal Histogram will produce a histogram with each variable series. This Figure can be generated as bar or line chart. In the example below, a line graph with number of events and deaths (see Figure 21).

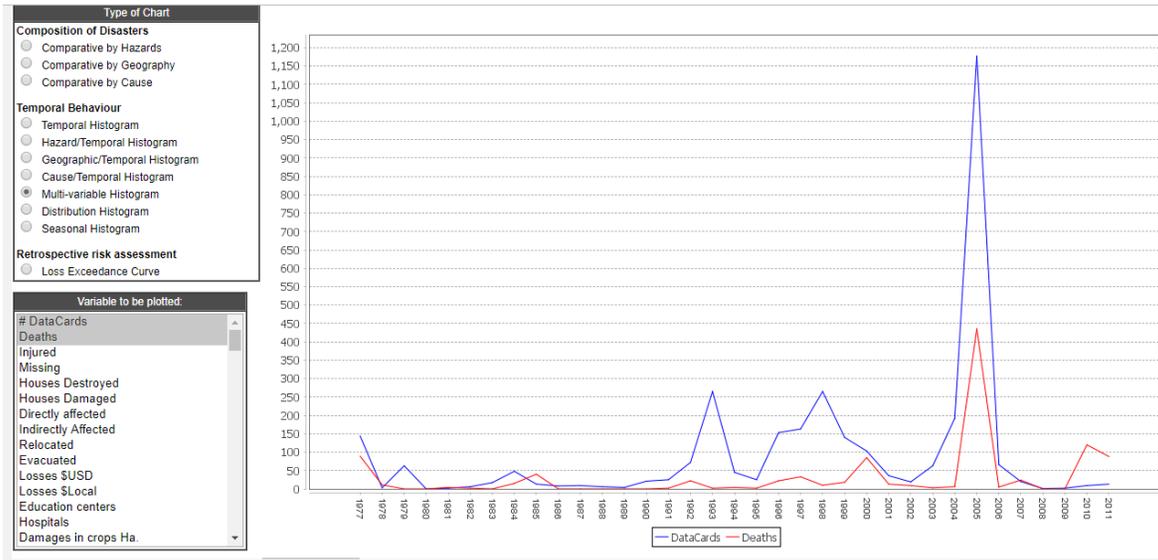


Figure 21: Multi-Variable Histogram

Distributional Histogram displays frequencies of the variable that is to be graphed.

Seasonal Histogram - displays accumulated frequencies of the variable that is to be graphed, during the selected season and at a level of detail defined by the period. The “Season” must be longer than the “Period”.

A typical (and most natural) example is a yearly season; select Month as Period and Year as Season. In this case all the values generated during January will be accumulated in the first bar, the values of February in the second, and so on. These type of charts are useful for understanding seasonality of hazards/ disasters. The figure 22 shows that most of the deadly cyclones in the Indian State of Orissa happened in the month if October and November.

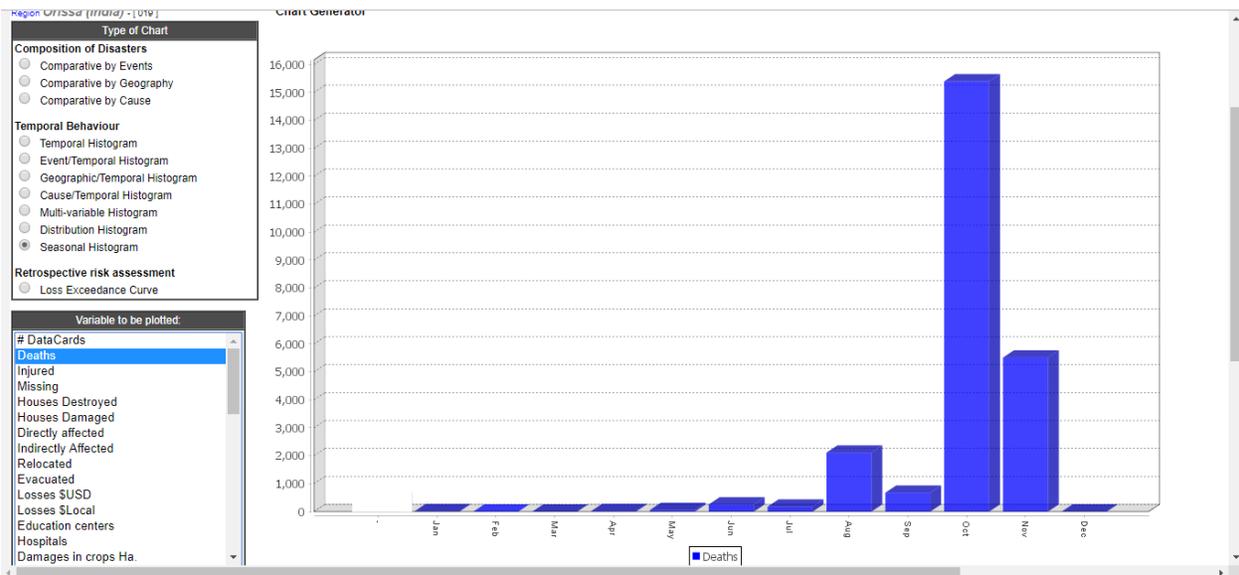


Figure 22: Seasonal Histogram

Variable to be plotted

Possible variables to graph can be selected from the list in the relating window on the left, such as the number of events, the effects that the disaster produced or the losses it has left. Based on the current query, the Analysis Module allows charting variables one by one or accumulation of the selected ones.

At the bottom of the 'Charts' tab there are additional options which can be selected to enable a user to display a Chart type which best fits their requirements (see Figure 23).

Period		Season		Chart Features	
<input type="radio"/> Annual	<input type="radio"/> Century	<input checked="" type="radio"/> 1	<input type="radio"/> Decade	<input checked="" type="radio"/> Bar Chart	<input checked="" type="radio"/> 3D
<input checked="" type="radio"/> Month	<input type="radio"/> Quinquennium (5 yrs)	<input type="radio"/> 2	<input checked="" type="radio"/> Year	<input type="radio"/> Line Chart	<input type="radio"/> 2D
<input type="radio"/> Week	<input type="radio"/> Month	<input type="radio"/> 3		<input type="radio"/> Pie Chart	<input checked="" type="radio"/> Normal
<input type="radio"/> Day		<input type="radio"/> 4		<input type="checkbox"/> Regression	<input type="radio"/> Stacked
		<input type="radio"/> 5		<input type="radio"/> Color	<input type="radio"/> Cumulative
		<input type="radio"/> 6		<input type="radio"/> B/W	<input type="checkbox"/> Logarithmic Scale (Y)
		<input type="radio"/> 7			<input type="checkbox"/> Logarithmic Scale (X)
		<input type="radio"/> 8			
SIZE		Width: 1000	Height: 600	Formula <input type="text"/> <input type="button" value="Expert"/>	

Figure 23: Additional Variables to be defined by the User

Period

Allows the user to select the unit of time for the display of information in all Histograms. Simply click in the circle to the left hand side of your selected option. Only one option may be chosen.

- Annual
- Month
- Week
- Day

Season

With this option, multi-temporal histograms can be created. When using it, it is recommended to select first the type of season as the Analysis module will suggest the recommended analysis period.

This type of chart is particularly useful to formulate hypothesis and verify correlations with climate variables or other types of variables and particularly with all of those that present periodic behaviours (or almost periodic) and those with secular variations. For reasons of visualization, the intervals of class cannot be greater than 1000.

- Century=100 years
- Decade=10 years
- Year
- Month

Chart Features

Color range - Choose from a range of colors to represent the different variables identified in your graph. When you click on one box of colour, a pop up box with a wide range of colors will allow you to customise what colors you want to use on your chart.

Bar Chart - Generates a bar chart, typical in histograms.

Line Chart - Represents the frequency of occurrence values of each class interval by means of a continuous thick line. Additionally, it graphs the linear regression with dotted lines.

Pie Chart - Draws the results in the form of a cake or 'pie', indicating the values that were obtained for each selection.

Regression – This is a mathematical procedure that determines the strength of the relationship between one dependent variable (usually denoted by Y) and a series of other independent variables. This relationship is typically in the form of a straight line (linear regression) that best approximates all the individual data points.

3D or 2D - There are two options to choose from, Three-dimensional (3D) and Two-dimensional (2D) for graphs of bars or pies; for lines, only 2D appearance is possible. For more clarity, it is recommended that two-dimensional be used when there are more than 30 class intervals.

Graph Mode

Normal - In this mode the system will show a histogram, line graph or pie with the values exactly as retrieved from database.

Stacked - For the Hazard and Geographic histograms with the bar option in Graph class, it allows to visualize the values of geographic units or events selected on the same bar. This Figure is valid only for bar diagrams. This is useful for geographic temporal histograms where each data of the geographic/administrative data will be stacked (piled up) and hence avoid cluttering like in a normal graph. The difference between Stacked and Normal mode is obvious when multiple variables are selected; in the Normal mode there are as many bars graphed as the number of events or geographic units selected.

Cumulative - The class intervals accumulate sequentially the values for frequency of occurrence over time. This type of graph is particularly useful to evaluate the tendencies of events, frequency, their associated effects or phenomena of interest. This option is valid only for bar or line charts.

Color or B/W

The user may select either displaying Figures with full color or in black and white. If the full color choice is selected the Analysis Module will assign colors automatically. The user may later edit the colors exporting the figure, with the option Copy, to Figures editors.

If the choice is black and white (B/W), the Analysis module will assign the fill automatically. B/W mode is recommended when the output/printer is not available color but B/W.

Logarithmic Scale

The analysis module allows the user to apply a logarithm to the X and/or Y axis.

This is a mathematical function that when the data covers a large range of values – the logarithm reduces this to a more manageable range. On a logarithmic scale, each tick mark on the scale is the previous tick mark multiplied by some number.

Maximum for Chart

This allows the user to set a maximum value for the Y axis.

Titles

Main Title: Allows the ability to identify each graph (histograms and pie) with a title that will appear horizontally on top of the chart. There can be up to 65 characters (including spaces) entered.

Subtitle: Allows enlarging or clarifying of the legend of the title; there can be up to 45 characters entered (including spaces).

Size - The size of your chart.

Width - How wide you want your chart.

Height - How tall you want your chart.

Formula - If you are an expert and familiar with using code, you can customize your charts here.

Additional Graph Operations (right-click):

Copy - Allows copying the image on screen and pasting it in other applications.

Print - Displays the standard print dialogue for printing.

Save - Generates an image in BMP format to archive.

Statistics

Upon selecting the Statistics tab the statistics relating to the query can be produced (see Figure 24). It has been designed to obtain global and semi-detailed results from the databases.

To define the information for your statistics you can select data from the 'Available' list and use the button 'Add' to include the details with your 'Selected' data. The button 'Remove' will essentially remove any selection from the 'Selected' box that you don't want showing up in your statistics.

Simply select the information to include from the 'Available' list and click either the 'Add' or 'Remove' buttons to alter the data in the 'Selected' list.

The 'Up', 'Down', 'Top' and 'Bottom' buttons allow you to move your selections within the 'Selected' box into an order that will make sense for your resulting report.

Figure 24: Statistics Generator

Users must select the statistical functions that they would like from the horizontal list by selecting the check box on the middle of the screen (see Figure 24). Users have a choice of

- Sum
- Average
- Maximum
- Variance
- Standard Deviation.

Totalisation Levels

The **three** levels of totalisation correspond to three lists containing data aggregation, including the Date, Cause, hazard, Geography Level, etc.

The fields of each level are mutually exclusive. For example, if you choose Geography Level 0 in the first level, and YEAR in the second, they will be excluded from the third totalisation level.

Click on the button “Continue” to display a spreadsheet containing statistical summary of the query made in this window as in Figure 25.

Event ▲	State and Region ▲	Code	Deaths ▲	Houses Damaged ▲	Directly affected ▲
FLOOD	Ayeyarwady Region	01	12	41783	370044
FLOOD	Bago Region	02	21	21232	258560
FLOOD	Chin State	03	8	272	3944
FLOOD	Kachin State	04	17	1888	4345
FLOOD	Kayah State	05	2	12	4838
FLOOD	Kayin State	06	21	3369	18762
FLOOD	Magway Region	07	33	84710	475393
FLOOD	Mandalay Region	14	27	19163	293457
FLOOD	Mon State	08	10	3865	93387
FLOOD	Naypyitaw	15	8	564	2375
FLOOD	Rakhine State	09	25	43380	39652
FLOOD	Sagaing Region	10	21	26519	211595
FLOOD	Shan State	11	19	7172	29769
FLOOD	Tanintharyi Region	12	12	364	32064
FLOOD	Yangon Region	13		6180	35051
TOTAL			236	260,473	1,873,236

Figure 25: Generating Statistics as Spreadsheet

Analyzing Temporal Data

This type of analysis, as indicated by its name, reveals the behaviour and occurrence of different variables over time.

Temporal analysis can be applied taking into account different variables (number of reports of deaths, housing, etc.). However, temporal analysis in DesInventar can focus on specific events and on specific geographical areas.

Temporal analysis can show the following behaviours:

- **Trends:** For instance, analysis on trends would be very useful in analysis on vulnerability. If the impact of some type(s) of disaster are increasing or decreasing that may be a sign that vulnerability is also increasing or decreasing. In particular the implementation of risk mitigation plans, early warning systems, etc., could be presented as an effective measure to reduce loss and damages for a certain disaster by aligning the implementation dates shown in plotted variables.
- **Continuity:** in some cases the occurrence of certain types of disasters is irregular, for example, earthquakes while other types of disasters may occur on a seasonal basis i.e. Tropical Cyclones. Each of these cases must be further analyzed and approached differently to see the continuity from a risk mitigation perspective.
- **Correlations:** in many cases there is a cause-effect between some types of disasters. Some of the most well-known include the relation between floods and epidemics or between droughts and fires. These facts can in many cases be identified using visual tools and charting two types of events along time to observe similarities in the shapes of the series.

Reports

The Analysis Module is provided with functionality to generate customized reports. These reports can be viewed on the screen or exported as Excel or CSV spreadsheets.

Simply select the data that you would like to appear in your report from the ‘Available’ list. This can be done either by double clicking on the data item or highlighting the data item and clicking the ‘Add>>’ button. The selected data will then appear in the ‘Selected’ list.

To remove any item from this list simply highlight it and click the ‘Remove<<’ button (see Figure 26).

The ‘Up’, ‘Down’, ‘Top’ and ‘Bottom’ buttons allow you to move your selections within the ‘Selected’ box into an order that will make sense for your resulting report.

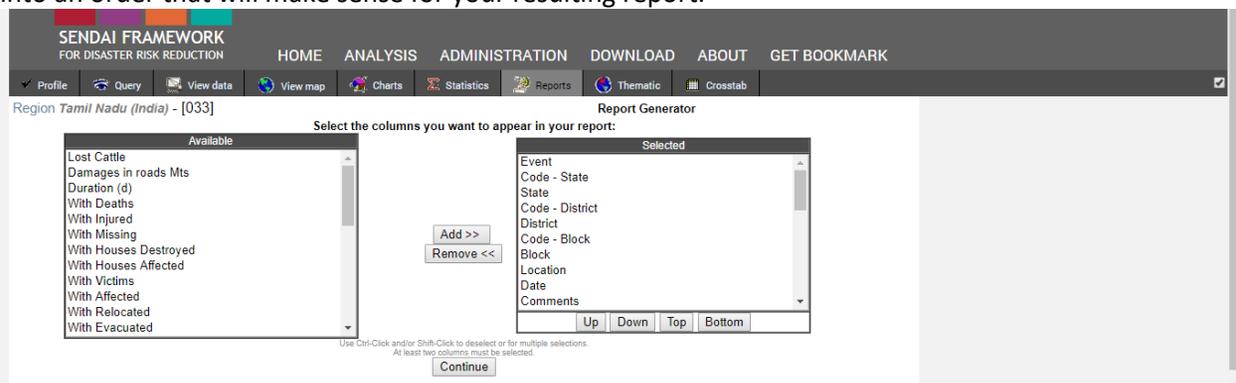


Figure 26: Reports Generator

Once you are satisfied with your data selection press the ‘Continue’ button and your data will appear in the same format as the **View data** tab.

To export the data into an Excel or CSV file, simply click the ‘**get it as Excel / CSV**’ link in the top right hand corner as shown in Figure 27.

Serial	Event	State	District	Block	Location	Date (YMD)	Comments	Cause	Deaths	Injured	Missing	Houses Destroyed	Houses Da
38	FLOOD	Tamil Nadu	CUDDLALORE	CHIDAMBARAM		2005/10/24		Overflow				825	
38	FLOOD	Tamil Nadu	CUDDLALORE	CHIDAMBARAM		2005/10/24		Overflow				415	
424	ELECTRIC STORM	Tamil Nadu	PERAMBALLUR	VEPPANTHATTAI		1999/4/25		Other	1				
448	ELECTRIC STORM	Tamil Nadu	VIRUTHUNAGAR			2000/4/25		Rain	1				
450	ELECTRIC STORM	Tamil Nadu	TRICHIRAPPALLI	MANAPPARAI		2000/5/3		Other	1				
475	ELECTRIC STORM	Tamil Nadu	PUDUKKOTTAI	PUDUKKOTTAI		2000/7/20		Rain	1				
477	ELECTRIC STORM	Tamil Nadu	SIVAGANGAI	SIVAGANGAI		1999/10/24		Rain	1				
470	ELECTRIC STORM	Tamil Nadu	THOOTHUKUDI	TUTICORIN		2000/7/22		Rain	1				
480	ELECTRIC STORM	Tamil Nadu	SALEM	SALEM		2000/7/3		Rain	1				
488	ELECTRIC STORM	Tamil Nadu	DHARMAPURI	DHARMAPURI		2000/8/3	Died in shock	Rain	1				
489	ELECTRIC STORM	Tamil Nadu	VIRUTHUNAGAR	VIRUDHUNAGER		2000/8/4		Rain	1				
490	ELECTRIC STORM	Tamil Nadu	RAMANATHAPURAM	KAMUTHI		2000/8/5		Rain	1				
483	ELECTRIC STORM	Tamil Nadu	NAGAPPATTINAM	KILVELUR		2000/7/28		Rain	1				
484	ELECTRIC STORM	Tamil Nadu	VILLUPPURAM	VILLUPPURAM		2000/8/5		Rain	2				
494	ELECTRIC STORM	Tamil Nadu	THOOTHUKUDI	KOVILPATTI		2000/8/14		Other	1				
532	ELECTRIC STORM	Tamil Nadu	COIMBATORE	AVINASHI		1997/8/7		Other	2				

Figure 27: Reports Display

Thematic

In the “Thematic” tab the user can generate coloured maps that can show the spatial distribution of the data selected in the Query tab. A set of options is displayed for the user to define in this window (see Figure 28).

The user may alter the values of **Ranges**, **Colours**, and **Legend** to generate the legend in the ‘Ranges’ panel (See Figure 28). They are specified in three columns as follows:

- **Upper Limit:** from smaller to larger, enter the upper limit of the ranges
- **Color:** to change the colors of each range, click the color you want to change, and then click another in the color palette at the bottom of the window
- **Legend:** enter the title for each range, which will appear on the right as a Legend. If you leave it blank, the system will generate a caption automatically according to the ranges

“Calculate” options are explained on page 37 (Box: Analysing Spatial Data).

The “**Variable to be plotted**” panel presents in a list with the quantifiable variables of disasters that can be represented Figure 28 (left side of the map). To select a variable, simply click on it. You may choose one or more variables. If more than one variable is chosen, the **sum of the variables will be plotted**.

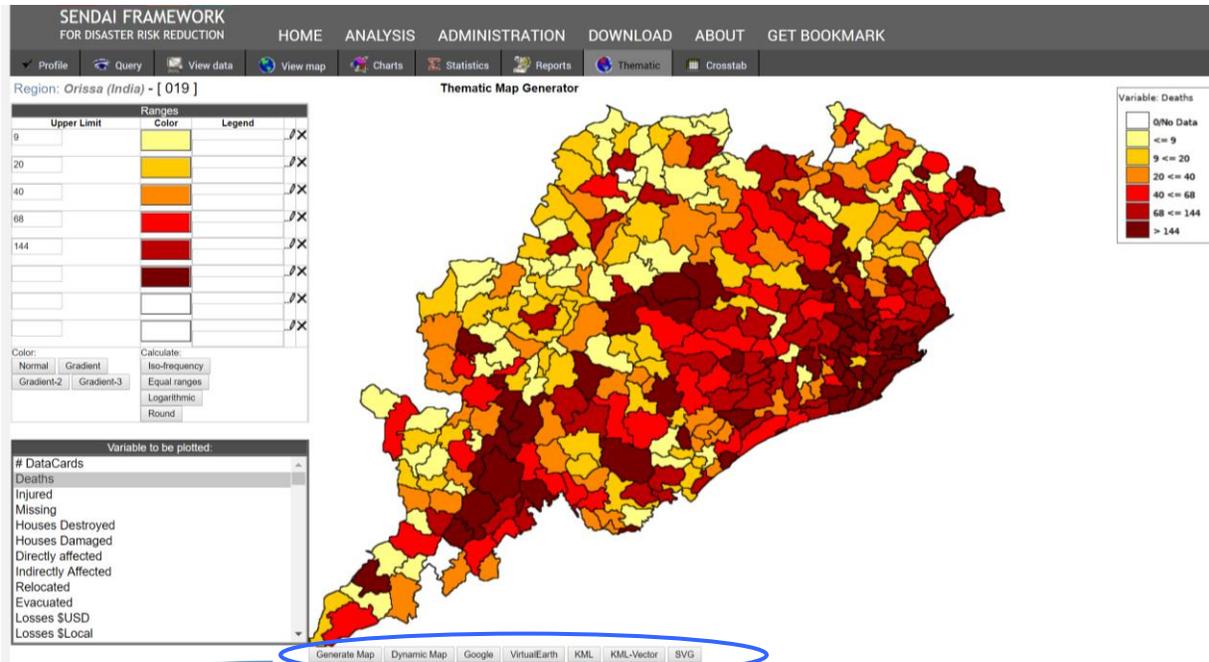
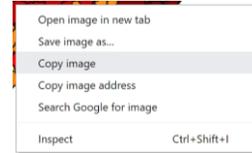


Figure 28: Thematic Map depicting mortality at subdistrict level for the state of Odisha (India)



Figure 28’: Toolbar for Thematic Map

By clicking on ‘Generate Map’ button, the thematic map will be displayed according to the specifications determined in the window represented in Figure 28. These maps can be copied or saved as image files. However this option will not copy the legend. The best way to make a copy is to take a screenshot using Fn-PrtSC keyboard combination for example, and then paste and trim the resulting image.



The “Dynamic Map” window will allow you to Zoom and PAN the image and also to check and uncheck layers similar to GIS. Also you can “on an off” the background (Figure 29). Maps can also be generated superimposed to external maps providers, as indicated by the corresponding buttons.

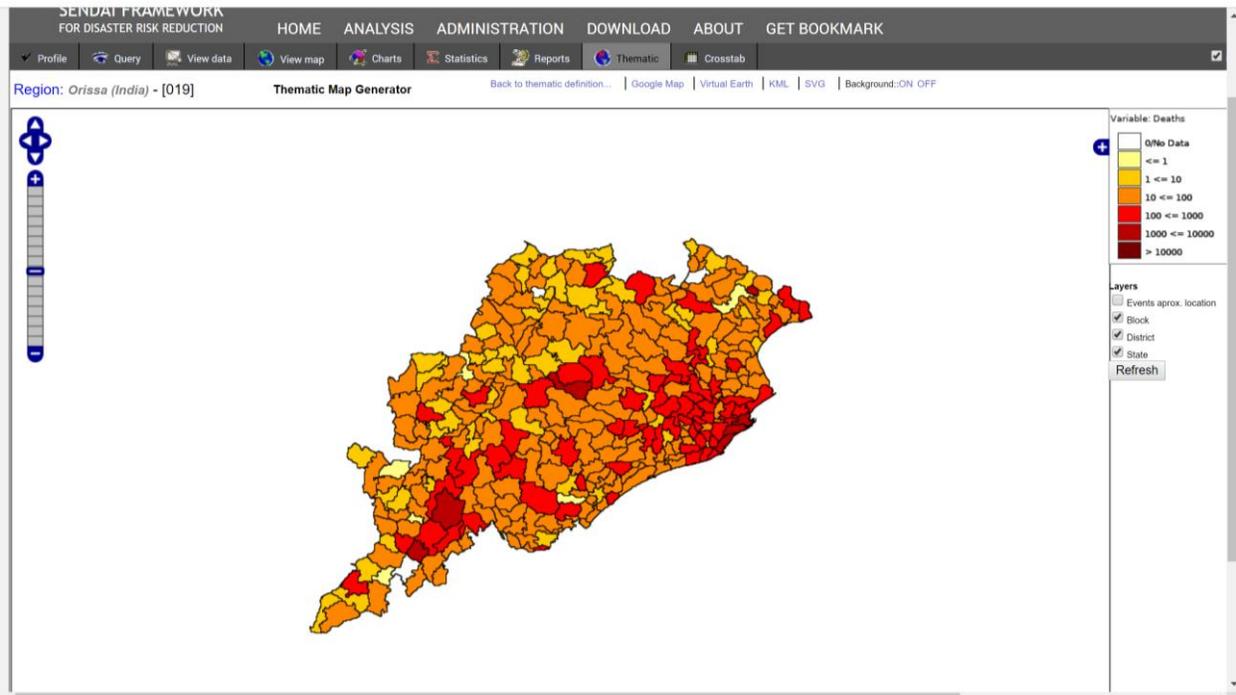


Figure 29: Dynamic Map generated at sub-district level for mortality

Once you click on the Google Button a new map window for Google Maps will be displayed. The thematic map generated will be displayed on the Google map as an interactive map similar to the Dynamic Map option.

Once you click on the Virtual Earth Button, the thematic map will be overlaid on Microsoft Bing Maps (or virtual earth) similar to Google maps.

The KML Button allows you to export the thematic maps in KML format which can be opened using Google Earth. The KML files can be exported as ESRI shape files or other formats like MapInfo and so on.

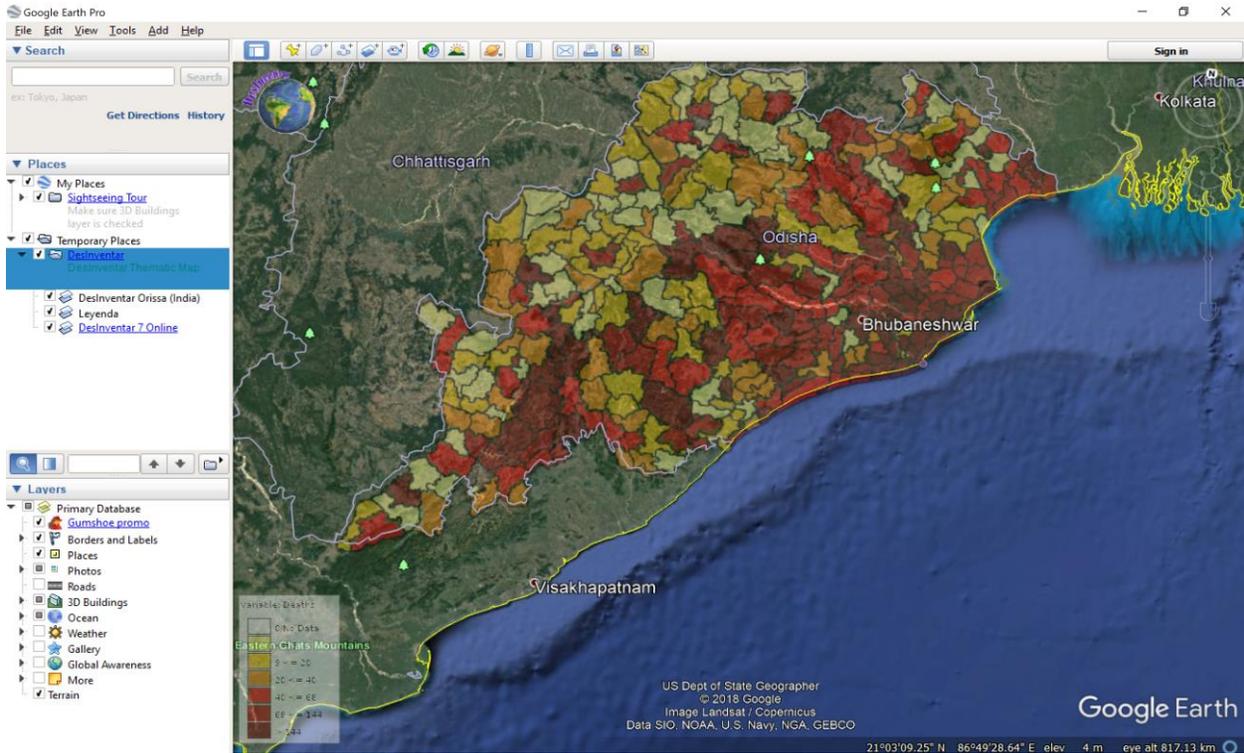


Figure 30 : Thematic map of mortality in Orissa saved as KML and displayed using Google Earth

The following features must be defined before producing a thematic map. Figure 31 shows the toolbar and its associated options for selection.

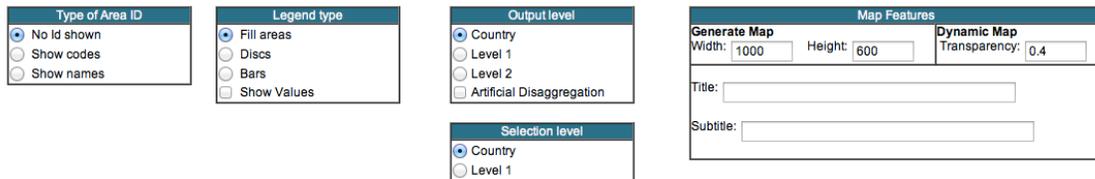


Figure 31: Bottom Toolbar for the Customisation of Thematic Map

Type of Area ID to show on the map from three choices; (i) no ID, (ii) the codes of the corresponding areas or (iii) the names of the corresponding areas.

Legend Type to accompany the map by three options; (i) fill areas, (ii) discs, (iii) bars or (iv) showing the values that correspond to the geographical units.

Output level which corresponds to the display of the geographical units can also be selected namely, (i) country level, (ii) Level 1, (iii) Level 2 and (iv) artificial disaggregation. DesInventar allows a user to identify geographical units according to the distribution used in the selected country such as Division, Province, District, Village, Island, Constituency, etc.

Selection Level, similar to the output level, the level to be chosen, either country level or Level 1.

Map Features can be manipulated by a user such as the map size, by altering the height and width, adding a title and subtitle to the display and the level of transparency required if the user is producing a dynamic map.

Analysing Spatial Data [Options of Calculation to display Ranges]

This type of analysis, as indicated by its name, attempts to reveal the distribution of different effects of variables across a geographic space. As with the temporal analysis, it can be applied taking into account different variables (number of reports of deaths, housing, etc.) and can be also targeted to specific events and to specific geographical areas.

DesInventar is capable of producing **thematic maps**, known in academic and scientific circles as choropleth maps shown in shaded or patterned in proportion to the measurement of a statistical variable being displayed on the map, such as number of reports, and number of deaths. It provides an easy way to visualize how a measurement varies across a geographic area. The maps can be made at different levels of resolution. If a database is fully disaggregated then all analyses can be made at the lowest (more detailed) level. However, if this is not the case, a combination of analysis (maps) at different levels may be required. It is important to present a note of warning about choropleth maps--especially where they show large areas, which may hide a lot of internal variations.

When producing a Thematic map, researchers must choose appropriate ranges of values and associated colours or grey-shades to represent the different classes of data being mapped. For this purpose the system provides 4 types of automated scale generation tools:

1. **Iso-frequency:** a set of value ranges such that a more or less **equal number** of areas constitute each class. These maps provide the maps with the highest possible contrast.
2. **Equal Ranges:** the size of each interval is the same, independent of the number of elements in each class. Calculated as the maximum minus the minimum value divided by the number of classes desired.
3. **Logarithmic:** A logarithmic scale is a nonlinear scale used when there is a large range of quantities to represent skewness towards large values; i.e., cases in which one or a few points are much larger than the bulk of the data. A log scale makes it easy to compare values that cover a large range.
4. **Round:** Round can be used with any of the above 3 to have ranges in rounded values. (e.g, 10, 300, 1500 etc. instead of 8, 286 or 1456)

Spatial analysis is used mainly to discover patterns of spatial distribution, as follows:

- **Concentration:** For example, a useful pattern for identifying vulnerability would be observed; if the impact of some type(s) of disaster is concentrated in a few areas it may be a sign of a high vulnerability.
- **Correlations:** As mentioned above, there is a cause-effect between some types of disasters, such as the relation between floods and epidemics or between droughts and fires. Thematic maps can demonstrate or dismiss the hypothesis of high correlation that the two variables move together/opposite over time.

One final warning to the reader: The Analysis Module (Desconsultar) is not a replacement for a GIS system and does not have features and functionalities required to produce specialized spatial analysis.

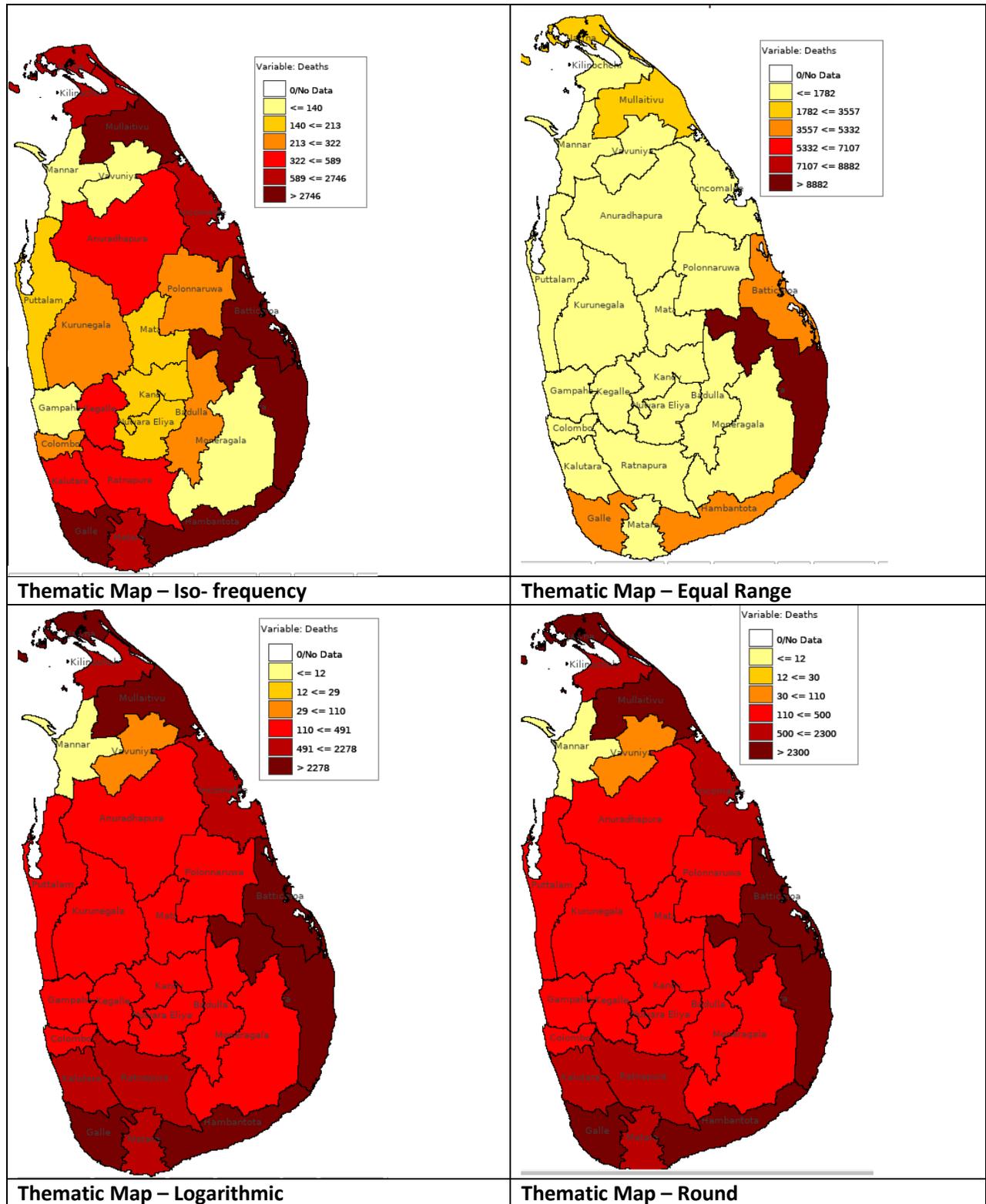


Figure 32: Thematic map of deaths at district level using 4 types of automated scale generation tools

Crosstab

This tab provides aggregates of the different variables found in the Database organized as cross-tabbed tables. Crosstabs always use two dimensions (one vertical and one horizontal) as levels of aggregation.

The Crosstab window is very similar to the Statistics window and as such, users simply select the information to include from the 'Available' list and click either 'Add' or 'Remove' buttons to alter the data in the 'Selected' list (see Figure 33).

The 'Up', 'Down', 'Top' and 'Bottom' buttons allow you to move your selections within the 'Selected' box into an order that will make sense for your resulting report.

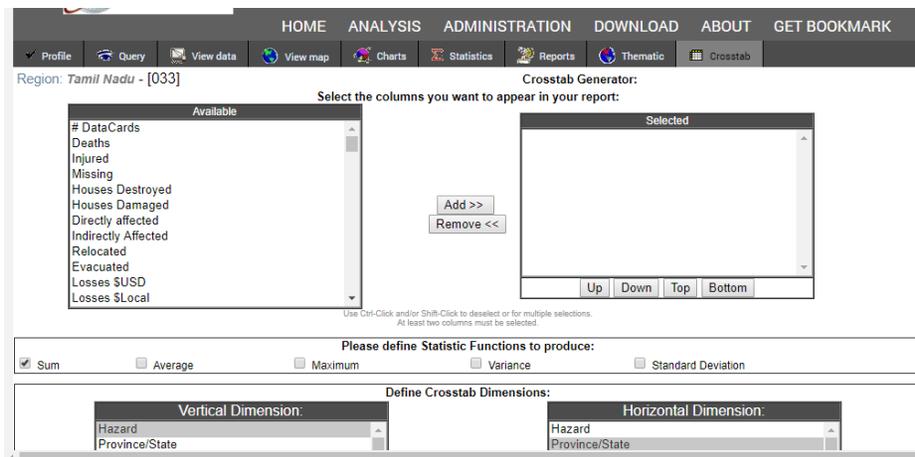


Figure 33: Crosstab Window

Users must select the statistical functions that they would like from the horizontal list by selecting the box to the left of the statistical function. The user has a choice of

- Sum
- Average
- Maximum
- Variance
- Standard Deviation.

The difference between the Statistics tab and Crosstab relates to how the data is displayed and analysed. Users must select a vertical and horizontal dimension as to how they would like to see the data. This is done by selecting data in the associated boxes.

Clicking on the “Continue” button will display a spreadsheet containing information similar to that in Datacard viewing sheet in the form of a statistical summary of the query made in this window. The data can also be exported to Excel by clicking on ‘get it as excel’ link in the upper right corner.

Now that you have learned basic and advanced functions under the Analysis Module, DesInventar-Sendai. Let’s get started and have fun exploring!

Annex 1: Hazard Definitions

Bellow you will find the **types of hazards** (threatening phenomena, or hazards, of natural, anthropic or technological origin) that the original DesInventar data entry **card** includes. The following is the alphabetical list of hazards used in the DesInventar information system:

Accident

Automobile, rail, aircraft or navigation accidents. Limited to accidents induced by natural phenomena, such as landslides, earthquakes, hurricanes, rain, etc. Includes transportation accidents generating spills or leaks of harmful substances, regardless of the cause.

Avalanche

Swift sliding of loosened ice and/or snow masses.

Alluvion

Torrential water flows dragging large amounts of solid material (pebbles, stones, and rock blocks) common in dry regions or river beds produced by heavy rain. Equivalent to the term “huaico” used in Peru.

Biological Event

Destruction of biological species for known or unknown reasons. In the end, these events may be associated to pollution or drastic changes in environmental parameters. An example could be the “red tide”.

Boat Capsize

Overturning of a boat due to hitting the water-bed or due to sea-disturbances.

Coastal erosion

Variations of the coast line and/or maritime zones near the coast. Includes formation and destruction of islands, beaches and sand banks and erosion of cliffs affecting populations, navigation, etc.

Cold Wave

Drop of atmospheric average temperature well above the averages of a region, with effects on human populations, crops, properties and services.

Drought

Unusually dry season, without rain or with rain deficit. As a whole, these are long periods (months, years, and even decades) typical in limited continental areas or on regional scales.

Earthquake

All movements in the earth’s crust causing any type of damage or negative effect on communities or properties. The event includes terms such as earth tremor, earthquake and vibration.

Epidemic

Disease attacking many individuals in a same community during short terms (days, weeks, months maximum), such as cholera, typhoid, bubonic plague, etc.

Eruption

Volcanic eruption with disastrous effects: eruption and emission of gas and ashes, stone falls (pyroclast), flows of lava, etc. This event includes eruption of sludge volcanoes found in some Caribbean regions.

Explosion

Explosions of any type, but limited to those induced or highly connected to natural phenomena, such as electrical storms, earthquakes, droughts, etc.

Fire

Urban, industrial or rural fires, but not including forest fires. Limited to those induced or highly connected to natural phenomena, such as electrical storms, earthquakes, droughts, etc.

Forest fire

Forest fire. The event includes all open-air fires in rural areas, natural and artificial forests, plains, etc.

Flood*

Water that overflows river-bed levels and runs slowly or quickly on small areas or vast regions. Tidal flooding in coastal zones will be reported as “Tidal wave”.

**For the Pacific region, we only use the category 'flood' for all flood-type events, for example, flash floods.*

Flash-flood

Torrential freshet. Violent water flow in a watershed, overflowing or as torrent. Flash-floods usually carry tree trunks and/or abundant fine to bulky sediment. They can be caused by rain, dam bursting or abundant landslides on a watershed or basin.

Frost

Temperature low enough to cause freezing, with damaging effects on population, crops, properties and services.

Gale/Tornado

All atmospheric disturbance generating strong and destructive winds, usually without rain or little rain. The term is synonymous with hurricane-type winds, whirlwind, squall, strong wind, blizzard, wind-blast, gust, and *tornado*. .

Hailstorm

Precipitation of hail. Frozen raindrops that fall violently in the form of hard pellets.

Heat Wave

Rise of atmospheric average temperature well above the averages of a region, with effects on human populations, crops, properties and services.

Hurricanes/Cyclones

Violent atmospheric anomaly characterized by strong whirling winds accompanied by rain. They are originated in the Caribbean Sea and tropical areas of the Pacific Ocean. They are equivalent to the cyclones in the Indian Ocean and to typhoons in the West Pacific Ocean.

Landslide

All mass movements other than surface erosion of a hillside. This event includes terms such as precipitation of earth, settling, horizontal land thrust , mass movement, displacement, subsidence, collapse of caves or mines, rock falls, (slow or quick) detachment of soil masses or rocks on watersheds or hillsides.

Leak

Leak of harmful liquid, solid or gas substances, whether radioactive or not, generated by technological accidents, human fault or transportation accidents.

Panic

Panic or mass hysteria among people concentrated in a certain place (stadiums, theaters, etc.) that can kill or injure them, and cause physical damage. Limited to those induced or highly connected to natural phenomena, such as electrical storms, earthquakes, etc., and early warnings about incoming events.

Plague

Proliferation of insects or animal pests affecting communities, agriculture, cattle or stored perishable goods; for example, rats, locusts, African bees, etc.

Pollution

Concentration of polluting substances in the air, water or soils, at levels harmful to human health, crops or animal species.

Rain

Precipitation. Includes punctual, persistent or torrential rain, or rain exceeding the rainfall averages of a specific region; also, unusual long rain periods. Rain includes terms such as downpour, cloudburst, heavy shower, deluge, persistent drizzle, squalls, etc.

Sedimentation

Deposits of solid material on hillsides and river beds produced by mass movements or surface erosion with damages on crops, utilities or other infrastructure.

Snowfall

Anomalous fall and accumulation of snow, especially when it occurs in zones not subject to seasonal changes. This term refers to events where precipitation exceeds the average multi-annual values, causing especially serious effects.

Storm

Rain accompanied by strong winds and/or electric discharges (lightning). Due to regional connotations, sometimes there is no difference between “storm” and “gale”.

Structural Collapse

Damages or collapse of any type of structure for reasons such as excess weight in public places, bridges, etc. This event includes damage that, although not taking the structures to the point of collapse, does make them unusable. Damages in structures caused by natural phenomena are reported as an effect of these phenomena.

Storm Surge

Great sea waves breaking on the littoral. Includes reports caused by Tidal waves, gales, storms -other than tsunami or seaquake, in the strict sense indicated under “tsunami”- by coincidence of wind directions and high tide periods, or by rise of average sea level during the phenomenon “El Niño”. In some places, tidal rises reaching maximum bimonthly levels or up to maximum annual levels are called "high tide".

Severe Local Storm

Rain accompanied by strong winds and/or electric discharges (lightning). Due to regional connotations, sometimes there is no difference between “storm” and “gale”.

Tropical Cyclone

Violent atmospheric anomaly characterized by strong whirling winds accompanied by rain. They are originated in the Caribbean Sea and tropical areas of the Pacific Ocean. They are equivalent to hurricanes, the cyclones in the Indian Ocean and to typhoons in the West Pacific Ocean.

Technical Disaster*

A hazard originating from technological or industrial conditions, including [large scale] accidents, dangerous procedures, infrastructure failures or specific human activities, that may cause loss of life, injury, illness or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. Examples of technological hazards include industrial pollution, nuclear radiation, toxic wastes, dam failures, transport accidents, factory explosions, fires, and chemical spills. Technological hazards also may arise directly as a result of the impacts of a natural hazard event (UNDRR).

Thunderstorm

Electrical Storm: concentration of atmospheric static discharges (lightning), with effects on people, cattle, domestic properties, infrastructure (mains, for example, causing blackouts), and industries. It is different from “storm” in that thunderstorms are not accompanied by rain and gusty winds.

Tsunami

The term is applied only to waves generated by undersea movements (caused by earthquakes, volcanic eruptions or landslides).

Volcano

Volcanic eruption with disastrous effects: eruption and emission of gas and ashes, stone falls (pyroclast), flows of lava, etc. This event includes eruption of sludge volcanoes found in some Caribbean regions.