



GLOBAL REGIONAL AND NATIONAL BEST PRACTICES

on BIPAD Portal related similar DIMS Platform and
Lessons Learned for Nepal



Publication Date

March 2021

Published by

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Citation

Youth Innovation Lab (2020). Global Regional and National Best Practices on BIPAD Portal related similar DIMS Platform and Lessons Learned for Nepal.

Funded by UK AID with the technical support from the Data for Development Programme under The Asia Foundation.

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Executive Summary

This report presents information on constituents and components of some well-recognized global, regional, and national Disaster Information Management System (DIMS). These components have been studied for their core features and impacts created, from which learnings have been compiled as suggestions for inclusion in BIPAD portal. As different countries and regions follow different frameworks of DRRM and have different approaches towards DRRM, diverse ways of collecting, disseminating, and using information can be found in such DIMS. A comparative study of the DIMS platforms could help establish a clear understanding of key components required in a standard DIMS. This report attempts at identifying such key components and presents the components that are relevant in the context of Nepal as recommendations for the BIPAD portal.

This research takes several DIMS platforms as references including the Japan-Bosai Platform, Global Risk Data Platform, INFORM, Desinventar, Pacific Disaster Centre, and other popular platforms. This paper presents recommendations in a few aspects of BIPAD portal relating to features, user interface elements and data download ability that help increase the usability, accessibility, and effectiveness of the platform.

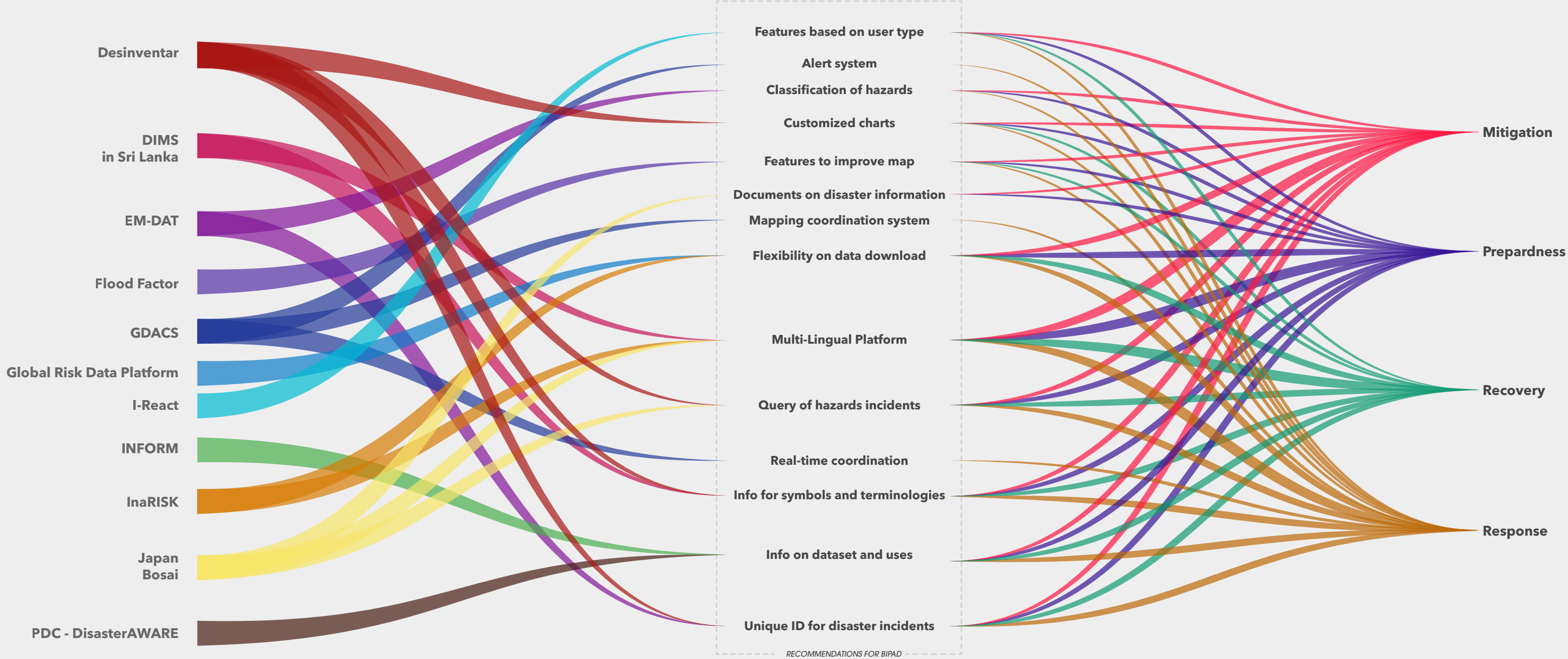
BIPAD portal categorizes hazards into some basic categories viz. Natural and Non-natural hazards, which it references from the Nepal Government's

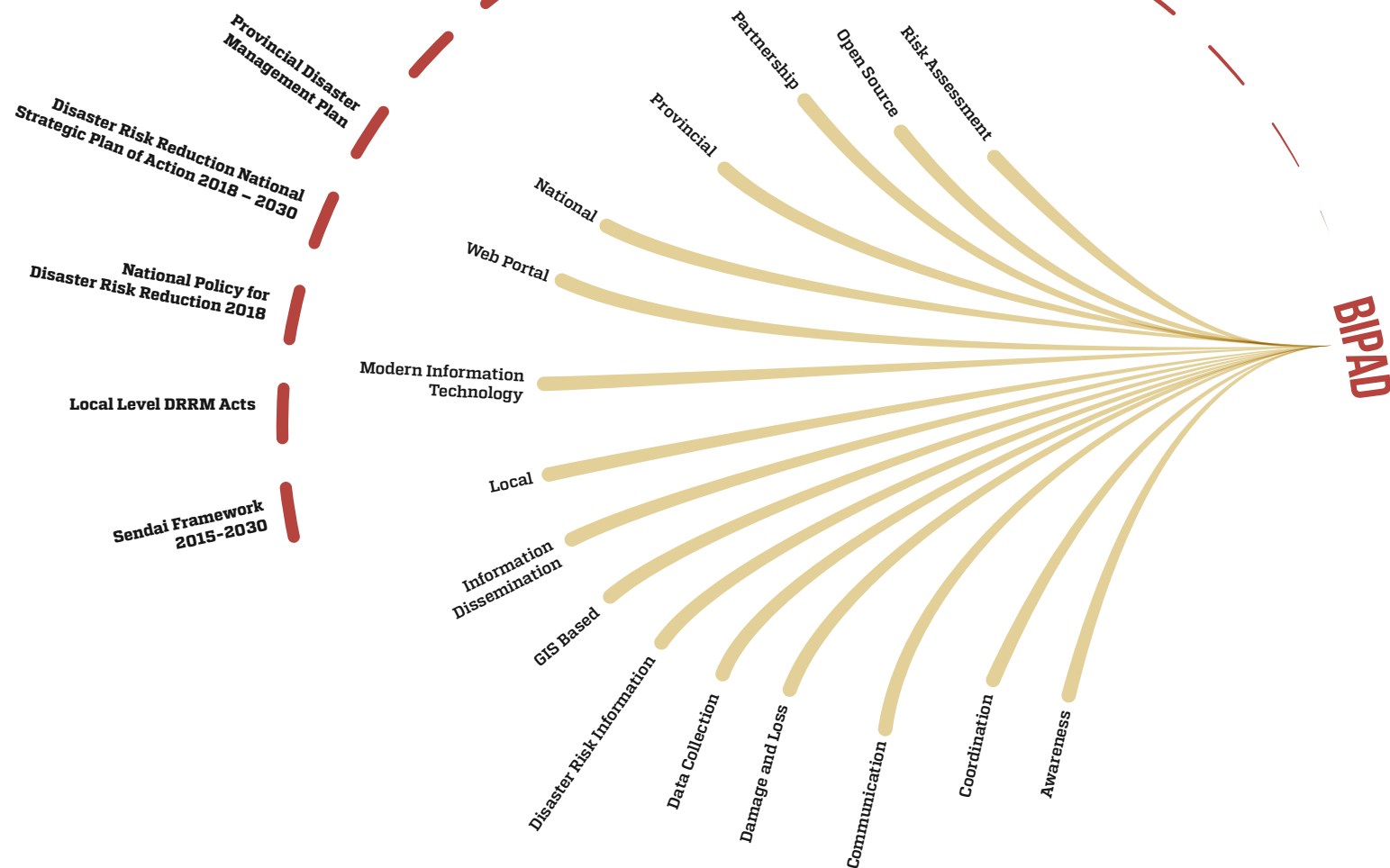
DRR portal. Further categorization of some hazards could also be done (e.g., hydro-meteorological hazards, technological hazards, environmental hazards, etc.) to better organize disaster data and make the platform more streamlined. Also, a separate section could be provided in BIPAD portal for containing detailed information on various terminologies and symbology used in the platform. Furthermore, BIPAD portal could employ a nomenclature system for uniquely coding each disaster event that enables easier distinction of individual disaster events while at the same time helping relate various linked incidents together, as seen on various platforms like DesInventar, EMDAT, and Global Risk Data Platform.

Furthermore, BIPAD portal utilizes maps to visualize hazards data that provides a greatly intuitive visualization of hazards in the spatial domain. Moreover, further ways of visualizing and analyzing data could also be integrated into the platform like customized graphs and charts that could provide information such as disaster trends, linkages between various hazards, comparative annual losses from hazards in specific regions, etc. This could significantly boost the usability of the platform and enable not only information dissemination but also analytics, which otherwise requires a user to rely on other platforms currently. BIPAD portal also allows downloading of available maps in PNG format. It could further enhance the usability of the maps and visualizations by allowing users to download vector maps in shape file formats and raster maps in geolocated GeoTIFF formats.

Lastly, BIPAD portal could also increase the flexibility for users in querying and searching data on the platform - currently it allows querying for one or more hazards in the spatial and temporal domain. Adding the ability for a user to query hazards based on the extents of impacts created from the hazards such as various kinds of loss and damages incurred, like in the DesInventar, could be of great additional help to the users (including relief organizations and National / Provincial / Local governments) in gaining better insights into the impacts created by hazards, which could further translate to better preparedness and mitigation efforts. Since BIPAD portal's database consists of information on various hazards from varying periods, clearly depicting the timeline for which information on any hazard is available on the platform could also help decrease any confusion for the end-users. Moreover, in addition to the hazard information currently available, BIPAD portal could integrate various contents (papers and publications) on hazard solutions, and avail the ability to query such solutions based on keywords and filters to ensure that the platform conforms to the high standards of user-friendliness. Lastly, BIPAD portal could be developed as a platform for real-time coordination between the government authorities at different tiers of the government and other disaster responders for effective management of activities post disasters.

Introduction





Background

The world is challenged by various catastrophes. For effective management of disasters, precise and prompt organization of information, collection, processing, and dissemination of chunks of data and communication in a clearly-defined and widely recognized mechanism are needed¹. In the time of emergency, the information system plays a vital role in improving

the efficiency and effectiveness of disaster response plans and decision-making as it is a system that records, collects, keeps, retrieves, and analyzes inputs, produces reports, and required disaster information and renders them to targeted people. The information system also supports disaster management, especially for coordinating activities, processing information, and communicating

with stakeholders¹. It helps to make better decisions in designing policies, response planning, and management of disasters, monitoring and evaluating disaster programs and services and reducing damages.

Sendai framework for disaster risk reduction (2015-2030) highlights the importance of baseline information, assessment, management of information, the transformation of data into usable knowledge that aids in decision-making. This emphasizes the development of an information management system with updated information on disaster loss and damage that enables foreseeing disaster risk². Acts and policies of Nepal in national, provincial, and local level has integrated the constituents of Sendai framework³. DRRM Act 2017 has highlighted the development and functioning of the Disaster Information Management System (DIMS) for systematic and efficient collection, analysis, and processing of disaster-related information and data in all levels of government⁴. Likewise, the National Strategic Plan of Action (2018-2030)⁵ emphasizes the importance of Geographic Information System (GIS) based on DIMS and the institutionalization of the system.

Disaster Information Management System (DIMS) should be designed and guided by several goals such as improve decision-making before, during, and after emergencies through improved access and quality information, provide information that is specifically designed to meet users' needs, promote efficiency and effectiveness, and stimulate and facilitate mitigation.

The Government of Nepal (GoN), with technical support from Youth Innovation Lab (YI-Lab), has built a disaster information management system called the Building Information Platform Against Disaster (BIPAD)⁶. It is built upon the concept of creating a national portal embedded with

independent platforms for national, provincial, and municipal governments with a bottom-up approach of disaster data partnership. BIPAD portal has a wide range of stakeholders as users at each tier of government, and among them the key users are DRR focal person at a municipality (Local level), Mayor of the municipality (Local level), An ordinary citizen/Bystander (Local level), Researcher at a local NGO (Local level), Disaster Response expert at Red Cross (Local level), Member of Provincial Disaster Management Committee/Council (Provincial level), Urban Planner at Provincial government (Provincial level), NDRRMA CEO (Federal level), and MoHA official (Federal level)⁷. BIPAD portal is developed to be used for informed decision-making in all aspects of DRRM by authorities in all tiers of the government and all other relevant stakeholders.

To institutionalize BIPAD portal and ensure its sustainability, BIPAD portal needs to be developed such that it can provide robust, and timely services in challenging environments. Features in BIPAD portal should enhance the usability, accessibility, and effectiveness of the system such that its users can easily navigate the system, understand aspects of DRRM, coordinate with relevant stakeholders, and eventually aid in decision making.

Objective of the Research

The research aims to study key features in the global, regional, and national Disaster Information Management System (DIMS) platforms, and provide recommendations for enhancement of BIPAD portal and ultimately increase its usage in DRRM.

Research Methodology

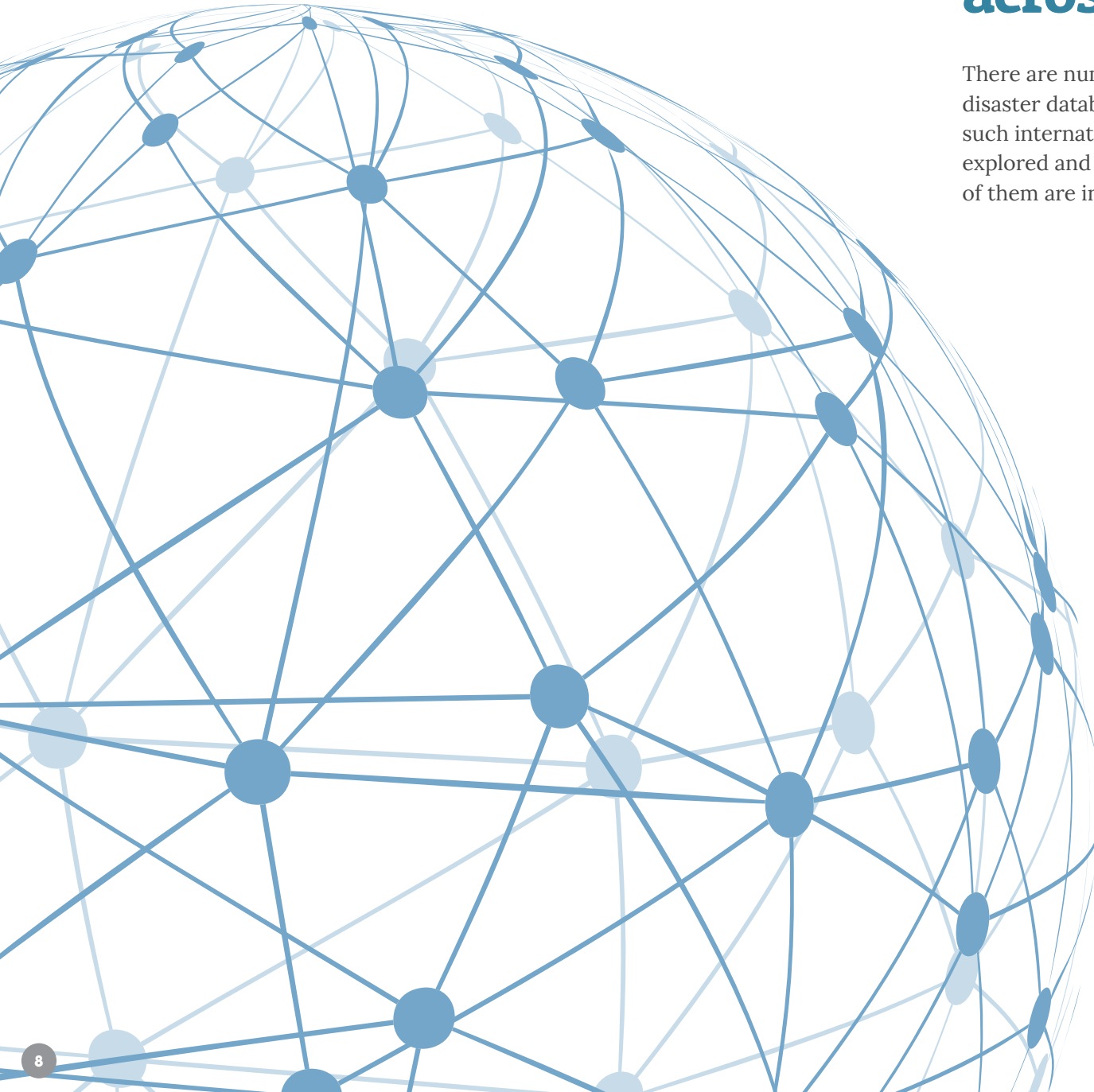
The research is carried out through the study of some well-recognized and currently functional global, regional, and national Disaster Information Management System (DIMS) platforms, their key features, and user interface. The research presents information on constituents and components of such DIMS and the learnings from them have been compiled as suggestions for the inclusion in BIPAD portal.

Limitations

The report focuses on the key features of respective DIMS that are relevant to BIPAD and its users and does not include detailed study and analysis of the overall system. Also, the operational management (including technical or financial aspects) of the systems were not explored. The paper includes comparison of UI/UX of DIMS, visualization of data and its relevancy to BIPAD irrespective of the datasets presented and use and analysis of the data in the respective DIMS. The case studies on their uses in disaster scenarios and what features of DIMS worked and did not work in real disaster scenario were not explored during the study. Also, the challenges and opportunities faced by each DIMS and measures implemented during their institutionalization process have not been included in this report.

DIMS platforms across the globe

There are numerous global, regional, and national disaster databases currently available. Various such international disaster information system was explored and their key features were studied. Some of them are introduced in next page.



JAPAN BOSAI PLATFORM

www.bosai-jp.org

01

The Japan Bosai Platform⁸ adopts a holistic approach to reduce disaster impacts and aims to make society disaster-resilient and sustainable by sharing solutions to the world to reduce the impacts. It supports all phases of disaster management with a wide range of technologies applied to various natural hazards and links to the database of solutions through a systematic Bosai solution map. The comprehensive solution map can be accessed from a multi-perspective approach comprising individual components from three different perspectives: Hazard, Solution purpose, and Solution theme that altogether cover each major aspect of DRRM. Measures of disaster impact reduction of each hazard category of all DRM phases based on the multiple solution themes such as risk assessment, research and investigation, disaster prevention plan, infrastructure technology, education, and training, etc. can be accessed in the platform.

JBP is founded on strong support from and collaboration with the Japanese government, academia, and the private sector. Sendai framework also validates the platform and its policies and strategic direction by stating it as a key role of the private sector to reduce disaster risks through developing and disseminating appropriate DRR technologies, and through strengthening partnerships with various other sectors⁸. The platform has been collaborating and coordinating to improve the DRR capacity of emerging countries, mainly in Asia, by utilizing leading Japanese technologies and knowledge related to DRR⁹. It not only provides knowledge on DRR via its platform, but also installs community-based flood monitoring system in flood prone areas for flood risk management. The system has been installed in Bangladesh, Myanmar, Philippines, Brazil and Japan¹⁰.



FEATURES APPLICABLE FOR BIPAD PORTAL

Disaster-related Documents

Comprehensive compilation of all the required information and publications on hazard, disasters related solution purpose, and solution theme that altogether cover each major aspect of DRRM.

Availability in Local Language

The Japan Bosai platform can be accessed in both English and Japanese languages, which helps localize the platform.

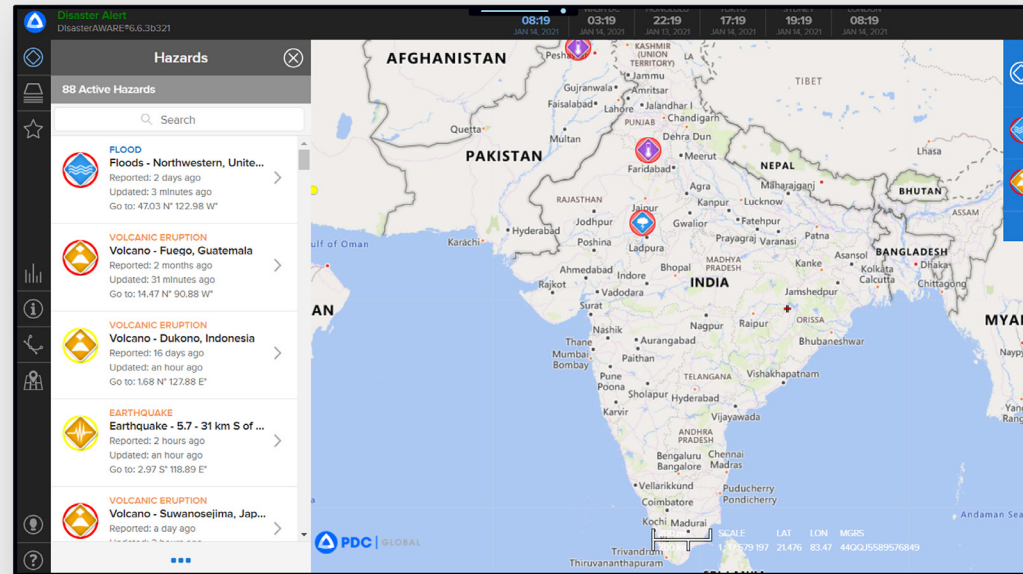
PACIFIC DISASTER CENTER - DISASTER AWARE

www.pdc.org

02

Pacific Disaster Centre (PDC)¹¹ was conceived as a center to improve systems of communication and technology for disaster prevention. PDC is an applied research center managed by the University of Hawaii who is continuously developing new technologies and best practices to help many global partners effectively mitigate, prepare for, respond to, and recover from disasters. They work side by side with government agencies, Non-Governmental Organizations (NGOs), and humanitarian relief organizations to conduct baseline risk and national disaster preparedness assessments, create mitigation strategies, support training, and exercises, and to implement the powerful disaster risk intelligence platform, DisasterAWARE technology to empower disaster management decision-makers and the public. DisasterAWARE is the DIMS developed by PDC as disaster information and an alert system. The platform provides information about the areas that any active hazard might affect soon, who might get affected, what could be at risk, and the information of nearby shelters and evacuation zones. This application is currently used by 1.5 million users globally¹².

PDC works in multifaceted partnerships involving civilians, military, academia, public sector, private sector, and national and international institutions, communities, and other stakeholders. It supports evidence-based decision making and promotes the concepts of DRR using information, science, and technology¹³. DisasterAWARE produces near real-time disaster alerts through its web application, mobile application (Disaster Alert), SMS, and e-mail. The platform also has a social media panel that allows the users to see what people are publicly reporting from the ground of any area of interest. Especially in this era where people are constantly connected through social media, this could help gather a stream of updates and information constituting of widespread observations.



FEATURES APPLICABLE FOR BIPAD PORTAL

Audio-visual manuals and explainers

The “DisasterAWARE” platform provides short demo clips about its features and how the system should be used. This provides an easier and more interactive way of helping users learn about the platform and ensure that its full potential is leveraged.

Dedicated page for hazard

Each hazard in DisasterAWARE is allocated a dedicated page with more details (demographic break down, rural or urban residence, hazard distance, capital exposed in terms of critical infrastructures, exposure by severity level, multi-hazard risk, and resilience) on the hazard.

Annotation and drawing tools

The platform has a well-equipped drawing tool where users can annotate, attach images, and draw shapes over the map and allows users to perform measurements. The users can interactively work on the information to generate infographics, metrics, and figures that could significantly assist in making more sense of the data and ultimately in the decision-making process.

Custom report generator

The platform can identify active hazards as well as generate location-specific reports for custom area selections. This could help provide meaningful insights for any area of interest to disaster professionals as well as decision-makers.

PHILIPPINE DISASTER RESILIENCE FOUNDATION

03

www.pdrf.org

To make the Philippines strong, resilient, and disaster-ready, the Philippine Disaster Resilience Foundation (PDRF)¹⁴ was founded. PDRF also launched the first-ever private Emergency Operation Centre (EOC) in April 2018 and has been anchoring disaster prevention/mitigation, preparedness, response, recovery, and rehabilitation. Among the three key features of PDRF-EOC (PDRF network, permanent office, and DIMS), the disaster information management system integrates all reliable, accurate, and timely information on disaster management. It employs the customized ArcGIS online platform from ESRI called HANDA or Hazard and Disaster Analysis for Business Resilience.

PDRF-HANDA is a customized web-based platform that helps the member companies navigate and access information on hazards and assess their risk before potential disasters. The platform also allows these companies to plan relief and rehabilitation efforts that complement business continuity plans and programs. HANDA is not a publicly accessible platform and requires login credentials. The key features of HANDA are incident reporting, management, monitoring, and hazard monitoring.



FEATURES APPLICABLE FOR BIPAD PORTAL

Hazard monitoring

This application allows members of PDRF to plot their facilities' assets and properly assess the threats presented by different hazards around the country. It contains geohazard data from various government agencies.

Incident monitoring

The incidents reported by the offices/units across the country can be monitored by donor companies using the incident monitoring dashboard. Through this dashboard, PDRF and its member companies can monitor incidents that have already been coordinated with proper authorities.

Incident management

This application is the ticketing system of the PDRF EOC. It helps PDRF manage all reported incidents within the network.

GLOBAL DISASTER ALERT AND COORDINATION SYSTEM (GDACS)

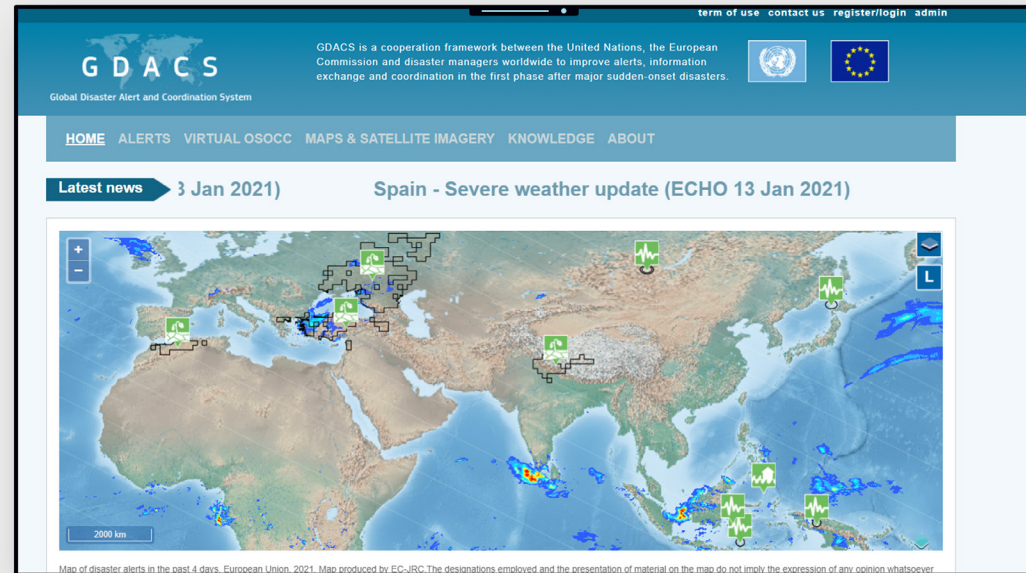
www.gdacs.org

The Global Disaster Alert and Coordination System (GDACS)¹⁵ was created as a cooperation framework between the United Nations and the European Commission in 2004, to address significant gaps in information collection and analysis in the early phase of major sudden-onset disasters.

The platform provides general public with automated early warnings for earthquakes, possible tsunamis, tropical cyclones, and floods. It gives preliminary impact estimates on natural disasters around the world.

The alert / early warnings are aimed at the government authorities, disaster responders, and all the international humanitarian community for having a coordinated response during disasters and to assess the possibility of the need for international assistance during such events.

04



FEATURES APPLICABLE FOR BIPAD PORTAL

Real-time coordination

The platform allows various government and non-government disaster responders to coordinate for disaster response. The users provided with the access to the Virtual OSOCC can view breaking emergency records, and discussions are set up for each major sudden-onset emergency; they are usually triggered by a red GDACS alert. Various information on the relief team, relief items, situational reports, and other key information for various sources are shared.

Mapping coordination system

The GDACS Satellite Mapping and Coordination System (SMCS) provides a communication and coordination platform where organizations can share information about completed, ongoing, and planned mapping activities with other stakeholders during emergencies. The end goal is to reduce duplication of mapping efforts and to increase awareness of existing products.

Alerts through SMS and social media

The platforms allow the alerts of events selected by the registered users to be shared through SMS. Also, all alerts are shared with the public through the official Facebook and Twitter accounts of GDACS.

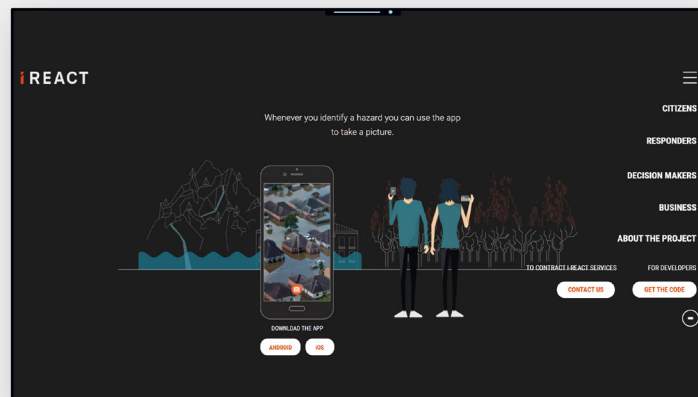
05 I-REACT

www.i-react.eu

I-React¹⁶ is the first European-wide platform that integrates emergency management data of multiple sources, including that provided by citizens through crowdsourcing and social media. The platform has been very effective in producing information faster and allows citizens, policymakers, and civil protection services to plan for the prevention and reaction against disaster.

The platform has three components; I-React Social, Reporting and EMS. I-REACT Social is a Machine Learning enabled module capable of scanning twitter for finding publications in six different languages that provide the most accurate disaster information. I-REACT

Reporting is a bi-directional communication that enables efficient communication between disaster managers and responders to communicate crucial updates and information in real-time, and between citizens and authorities with possibilities to receive alerts and send reports. The I-REACT EMS integrates all resources into a single big data platform capable of providing visualizations of data through real-time map layers. It also integrates a Decision Support System (DSS) capable of generating suggestions to the users in real-time based on the specific protocols of actions of the organization.



FEATURES APPLICABLE FOR BIPAD PORTAL

Information categorization towards different user types

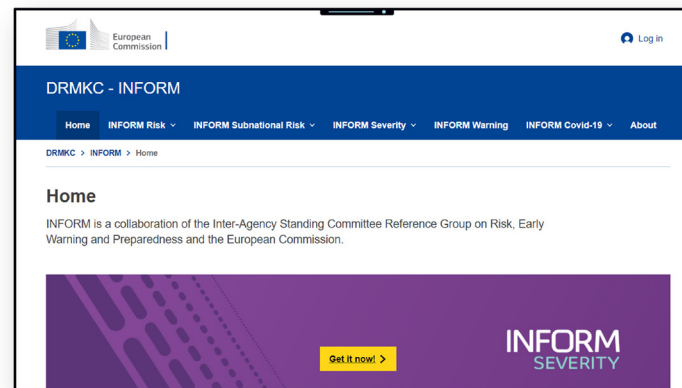
The platform organizes all the information into categories targeted towards different user types: Citizens, Responders, Decision-makers, and business groups. Relevant hazard data, tools, and technologies relating to the DRRM are all segregated for each of the user types, hence decluttering the platform and making it easier and quicker for use.

06 INDEX FOR RISK MANAGEMENT (INFORM)

drmkc.jrc.ec.europa.eu

INFORM¹⁷ initiative began in 2012 as a confluence of interests of UN agencies, donors and NGOs, and research institutions to establish a common evidence base for global humanitarian risk analysis. It identifies the countries at higher risk of the humanitarian crisis that is more likely to require international assistance. The INFORM Risk Index model is based on risk concepts published in scientific literature and envisages three dimensions of risk: Hazards & Exposure, Vulnerability, and Lack of Coping Capacity. INFORM comprises in-depth information on each country and shows trends, comparisons with other countries

with similar risk, regional and income-group averages, and more information at the indicator level through a separate "country profiles" page. This page also interactively visualizes indicators (GRI, Hazard & exposure, Vulnerability, and Lack of coping capacity) for each country. INFORM also prioritizes the subnational index which shows a detailed picture of risk and its components within a region or a country. INFORM epidemic consists of the information relating to the INFORM Epidemic Risk, which is a hazard dependent risk index that was created in 2018 and is under experimentation - primarily targeted towards assessing the risk of various countries to epidemic outbreaks.



FEATURES APPLICABLE FOR BIPAD PORTAL

The flexibility of data download

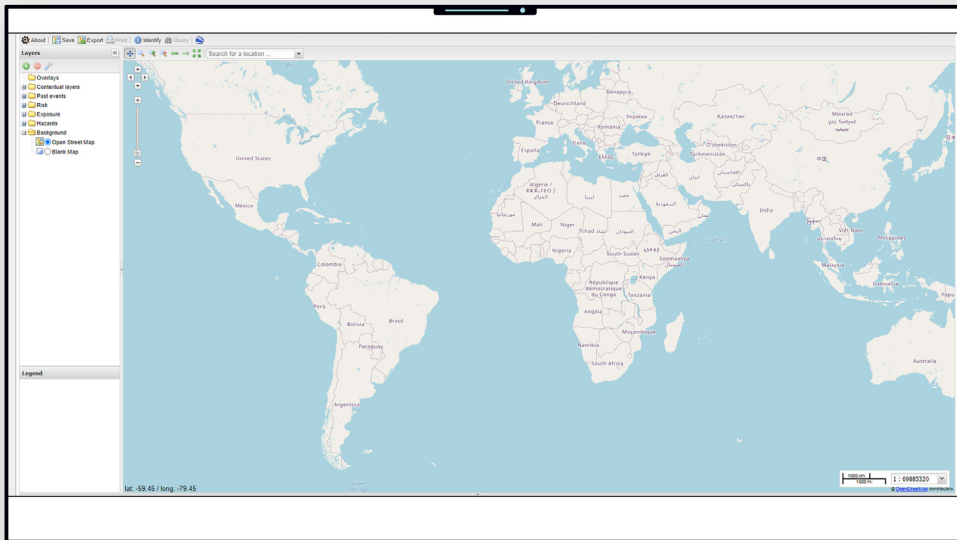
INFORM allows downloading of year-wise results and data on Global Risk Information (GRI) which are openly available. All the source data and the calculation steps for functional levels, categories, and dimensions as well as indicators for each country are downloadable in excel format.

07 GLOBAL RISK DATA PLATFORM

<https://preview.grid.unep.ch/>

The Global Risk Data Platform¹⁸ is an effort of multiple agencies. The objective is to provide global information on hazards, vulnerabilities, exposure, and disaster risks in support of the implementation of the Hyogo Framework of Action. PREVIEW contains the global risk information produced for the 2009 and 2011 Global Assessment Reports on Disaster Risk Reduction of the United Nations Strategy for Disaster Reduction (UNISDR).

The primary objective of the platform was sharing all scientific data produced during the project by making them visible to the largest possible audience and to promote the concept of data reusability¹⁹. It is a platform that is used to provide general hazards, exposure, and risk context for the disaster community and the media¹⁹. It offers the possibility to freely and easily access data that could be useful for preparedness, response, and mitigation phases by decision-makers.



FEATURES APPLICABLE FOR BIPAD PORTAL

The flexibility of data download

Global Risk Data Platform allows users to download maps in vector formats (shapefile and GeoTIFF) that helps increase the usability of the downloaded data and maps.

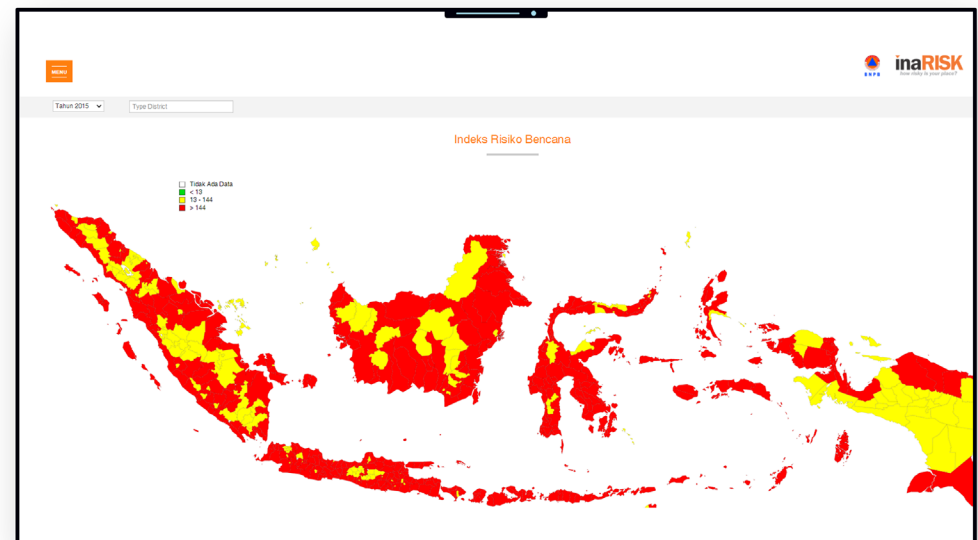
08 INARISK

<http://inarisk.bnpb.go.id/irbi>

InaRISK²⁰ is a risk assessment portal that uses ArcGIS server as data services that describe the coverage of disaster threat areas, affected populations, potential physical losses, potential economic losses, and potential environmental damage and integrated with the realization of disaster risk reduction activities as a monitoring tool to reduce the disaster risk index. It provides information on the disaster risk index of the entire nation. It has a built-in tool for monitoring the SFDRR targets.

InaRISK can be used by all parties, including the community in drawing up disaster management plans and in addition to being a portal for spatial data sharing in the form of service is. InaRisk can be used for dissemination of disaster risk assessment results to the Government, Local Government, and other stakeholders, which can be used as the basis for planning disaster risk reduction programs. And will help in assisting the Government, Local Government, and the parties in formulating strategies for the implementation of programs, policies, and activities to reduce the risk of a disaster at the national to regional levels.

InaRISK has been officially launched by the Head of the National Disaster Management Agency (BNPB) on November 10, 2016.



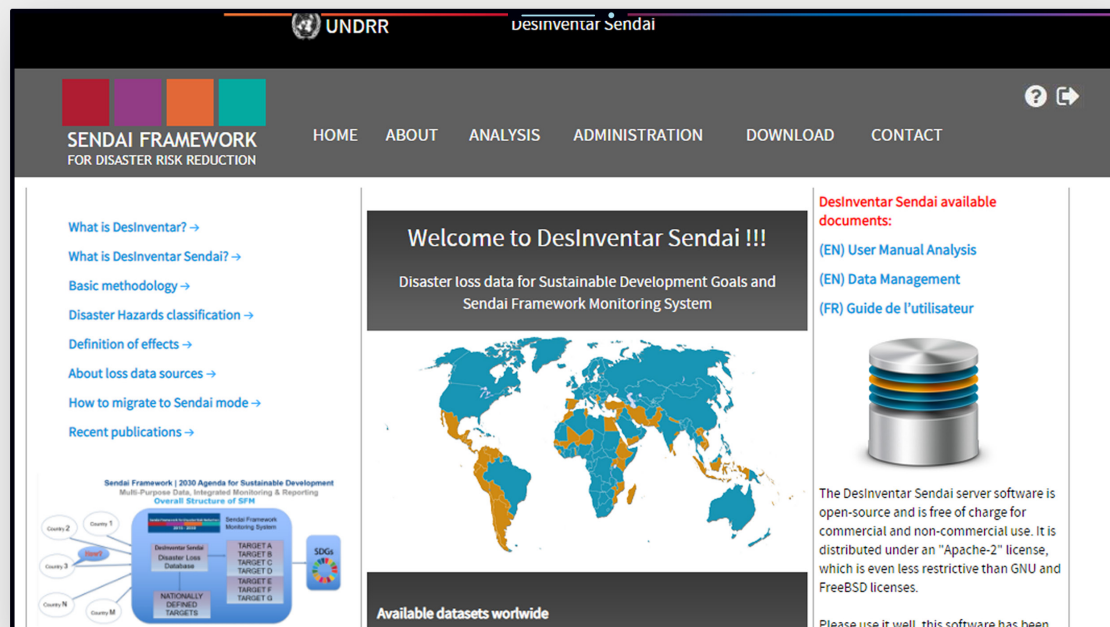
FEATURES APPLICABLE FOR BIPAD PORTAL

1. Availability of the platform and user manuals in local language
2. Ability to download the maps in ArcGIS supported raster and/or vector data formats

DesInventar²¹ is a conceptual and methodological tool for the generation of National Disaster Inventories and the construction of databases of damage, losses, and in general the effects of disasters.

The Disaster Information Management System (DesInventar methodology) includes a software product with two main components. The Administration and Data Entry module is a relational and structural database through which the database is fed by filling in predefined fields (space and temporal data, types of events and causes, sources) and by both direct and indirect effects (deaths, houses, infrastructure, economic sectors). The Analysis module allows access to the database by queries and allows to represent of those queries with tables, graphics, and thematic maps.

DesInventar is designed for research and academic groups, national and sub-national authorities and DRR practitioners, and institutes of environmental management to access national and regional disaster data and enable to monitor, analyze, and disseminate information on key hazards and vulnerabilities. The platform helps provide information on damage and loss for disasters to support national planning and investment decisions that currently do not necessarily consider disaster risks.



FEATURES APPLICABLE FOR BIPAD PORTAL

Unique ID/codes for disaster incident and event

Disaster events recorded in the database are given a unique code/ ID. Desinventar adopts the glide number which is a unique id code for disasters. The components of a GLIDE number consist of two letters to identify the disaster type (e.g., TC - Tropical Cyclone); the year of the disaster; a six-digit, sequential disaster number; and the three-letter ISO 3661 code for country of occurrence. For example, the GLIDE number for a Tropical Cyclone in Fiji is TC-2010-000054-FJI.

Reference information for symbols and definitions

Desinventar has defined specific definitions where a user can know more about the definitions of hazards and their symbols used in the platform. Also, information on the definition of the terminologies used for defining the loss and damage datasets are included in the platform.

Inclusion of enhanced graphical visualization of data

Desinventar allows users to create customized charts for data visualization. It allows the user to choose the type of chart (comparative by events, geography, cause, temporal behavior) and the variable such as loss and damage datasets can be chosen manually.

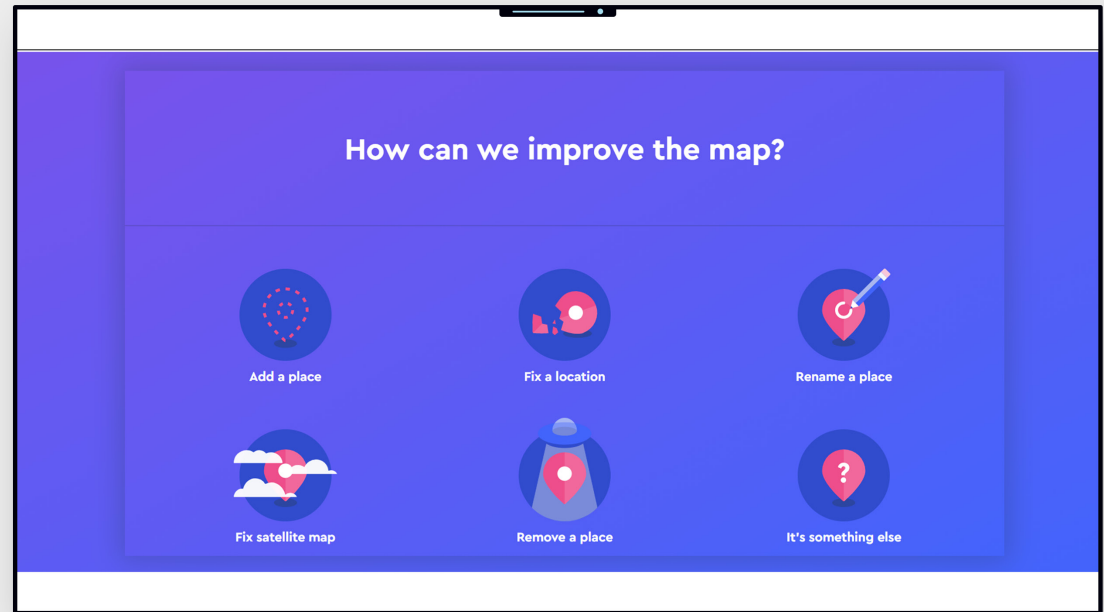
FLOOD FACTOR

<https://floodfactor.com/>

10

Flood factor²² is a free online tool that has been created by the nonprofit First Street Foundation to make people of America find their property's risk of flooding and also understand the changing risks of flood due to the changing environment²². The foundation aims to quantify and communicate America's flood risk by providing flood risk data freely which helps the community in preparing for and mitigating the risk of flood. Flood factor encourages to be used in conjunction with the Federal Emergency Management Agency (FEMA) flood maps to have more powerful data for decision-making.

The platform allows visualizing the area of interest by flood factor, which is an indicator of the comprehensive risk of flood in the location. It also helps in estimating the properties impacted and the likelihood of flood of a particular location of the running year, 15 years, and 30 years. This helps in identifying the level of risk of the area of interest and planning for the better response and preparedness of the flood. The platform also provides information on the environmental changes that are possibly triggering the flood risks. The projected information on precipitation changes, sea-level rise, and sea surface temperatures of the current year, 15 years, and 30 years have been visualized in the country-wide map. The platform also highlights the solutions of the possible flood events and measures that the community can use to adapt to higher risks and limit damages and lower flood insurance costs.



FEATURES APPLICABLE FOR BIPAD PORTAL

Feature to Improve the Map

This feature helps in improving the maps as per the knowledge of the locals. As the platform uses map box and OpenStreetMap data which is open source, the users can help improve the map of their area by suggesting actions such as adding places, fixing locations, renaming places, fixing satellite maps, removing a place, and others. This can help update the maps continuously as per the changes in the particular area. The updated maps are very useful in allocating the resources, relief materials, and also efficient planning for the preparedness of flood in the risk areas.

DIMS IN SRI LANKA

<http://www.desinventar.lk/>

The Disaster Information Management System²³ in Sri Lanka is a sustainable arrangement within an institution for the systematic collection, documentation, and analysis of data about losses caused by natural and man-made disasters. The Disaster Management Centre (DMC) of the Ministry of Disaster Management and Human Rights (M/DM&HR) with technical and financial support from the Disaster Risk Management (DRM) program of the United Nations Development Programme (UNDP) and the UNDP Regional Centre in Bangkok (RCB) has initiated the development of the database on the past disaster incidents from 1974 to date. The Disaster Information Management System is a

tool that helps to analyze the disaster trends and their impacts in a systematic manner. With an increased understanding of the disaster trends and their impacts, better prevention, mitigation, and preparedness measures can be planned to reduce the impact of disasters on the communities²³. The platform follows the Desinventar methodology for maintaining the disaster database.

Also, Sri Lanka Disaster Risk Information Platform is a public platform that holds GIS data of hazard, exposure, and base data such as landuse and elevation²⁴. The system allows the overlay of various layers while visualizing the maps.



FEATURES APPLICABLE FOR BIPAD PORTAL

1. The disaster information management platform provides definitions of the hazards/events that occur in Sri Lanka and are included in the database.
2. The platform provided incident validation forms in local languages.

11

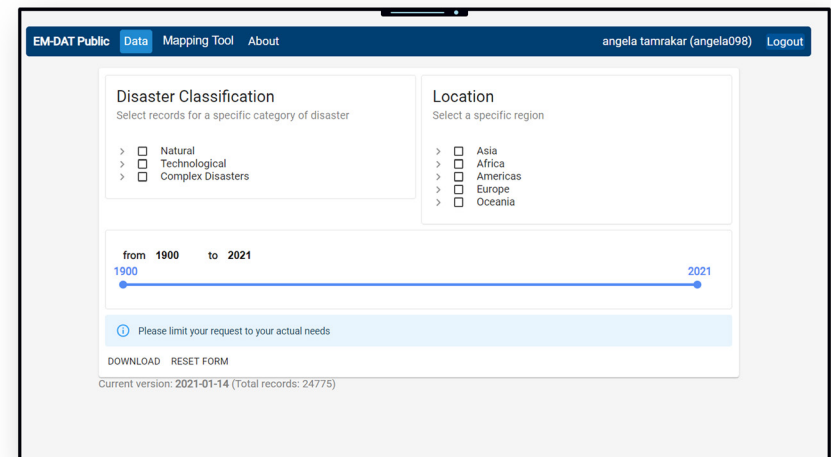
EM-DAT

<https://public.emdat.be>

The EM-DAT²⁵ database managed by CRED is a publicly accessible international disaster database including information on global natural and technological disasters. Events are entered on a country-level basis and information collected includes, amongst others, location, date, number of people killed/injured/affected, number homeless, and estimated damage costs. The database is searchable by country, disaster type, or period.

Its main objectives are to assist humanitarian action at both national and international levels; to rationalize decision-making for disaster preparedness, and to provide an objective basis for vulnerability assessment and priority setting. For example, it helps policymakers identify the disaster types that are most common in each country and that have had significant historical impacts on human populations.

12



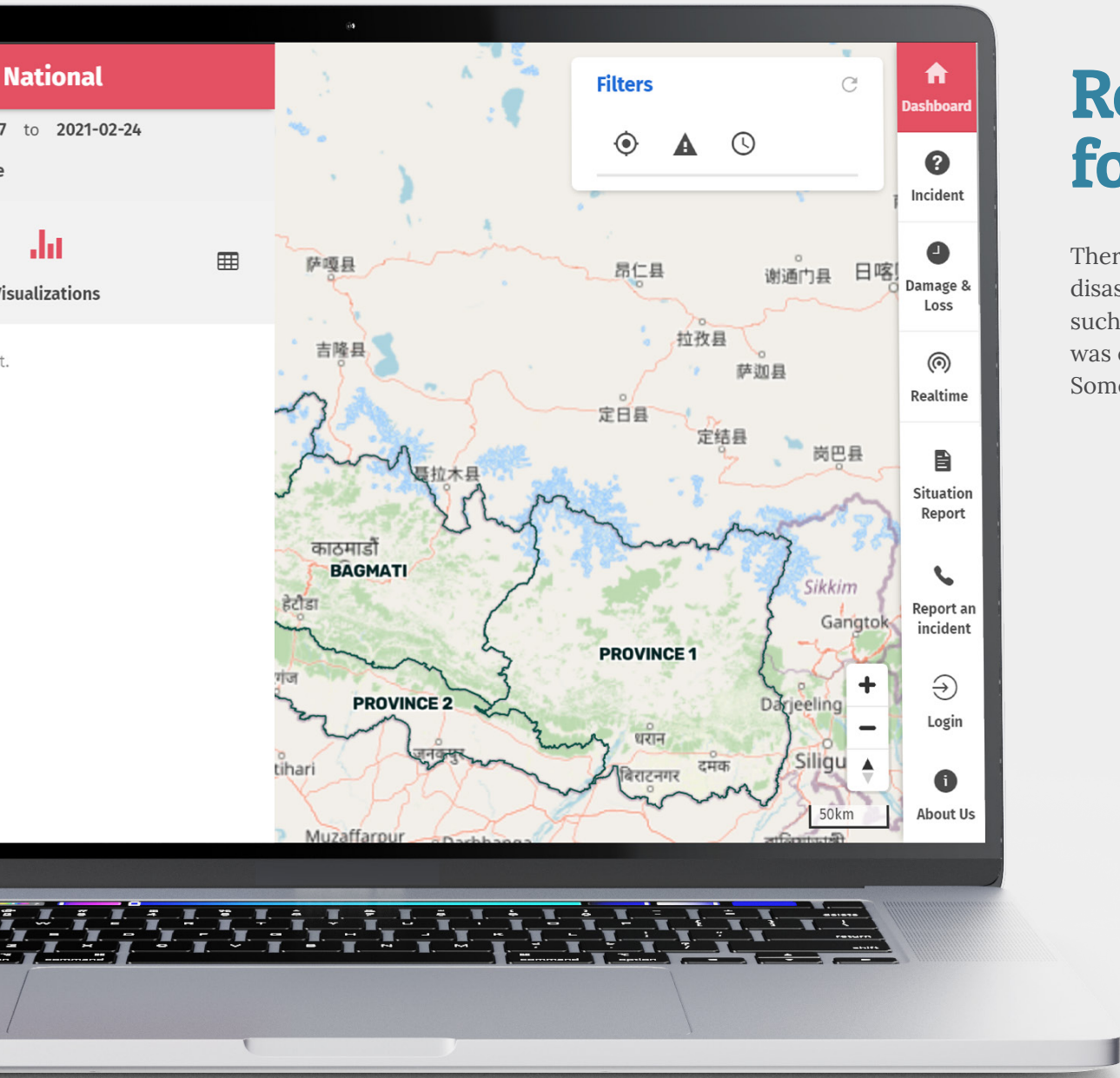
FEATURES APPLICABLE FOR BIPAD PORTAL PORTAL

Unique Disaster Number/ ID for each disaster incident

A unique 8-digit disaster number is generated for each disaster event. The "DisNo" includes the year (4 digits) and a sequential number (4 digits) which is unique for each disaster event (i.e., Tsunami 2004 = DisNo 2004-0659).

Classification of Hazard

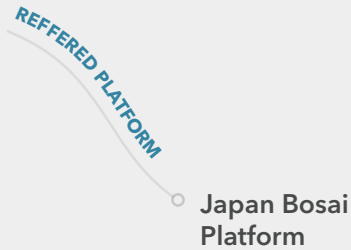
The Disasters classification used in EM-DAT is based on and adapted from the IRDR Peril Classification and Hazard Glossary



Recommendations for BIPAD portal

There are numerous global, regional, and national disaster databases currently available. Various such international disaster information system was explored and their key features were studied. Some of them are introduced below:

Inclusion of various reports and publications relating to disaster information



Relevancy to BIPAD portal

The feature to include acts, policies and other documents is already available in BIPAD portal. Inclusion of publications, documents on hazard, disasters related solution purpose, and solution theme which will help make BIPAD portal a comprehensive platform for disaster information.



Useability in DRRM cycles

These features can be helpful in gaining knowledge on the disaster related information and will eventually aid in all phases of DRRM cycle.



Recommendations

The reports and publications that present the contents of various phases of the DRM cycle, preparedness, response plans, and other relevant documents along with existing acts and policies should be included. This helps the users in knowing all the aspects of a disaster at a single platform. The feature to include acts, policies and other documents is already available in BIPAD portal and the finalization of inclusion of other categories of documents can be done in an immediate run.

Information for symbols and Terminologies



Relevancy to BIPAD portal

BIPAD portal provides information on hazards, in the module: alert, incident, damage and loss, and risk info. However, the details on what the listed hazards mean and represent are unclear as specific definitions for each hazard and indicators are missing. With such information, decision-makers, especially those with less DRRM expertise, will be benefitted.



Useability in DRRM cycles

All aspects of the DRRM cycle to develop a common understanding of the terminologies used²⁶.



Recommendations

BIPAD portal hosts data and information on all aspects of the DRRM cycle. Not all users of BIPAD portal will have a thorough knowledge of the terminologies used in the system. This information might be more useful for decision-makers with lower DRRM expertise better understand and efficiently navigate the platform. It will better inform the end-users on the available datasets on BIPAD portal.

The information on the symbols and definitions for the terminologies used in the system could be incorporated by including a document with the aforementioned information or a tip icon could be added in each module that would display the details on the terminologies and symbols used.

Customized charts for data visualization

REFERRED PLATFORM

Desinventar



Relevancy to BIPAD portal

Although the Damage and loss module and the incident module of BIPAD portal provide visualizations of the data in the form of charts, customized charts are not included yet. This feature could help decision-makers and researchers in developing a deeper understanding of the data on disaster loss and damage trends quickly.



Useability in DRRM cycles

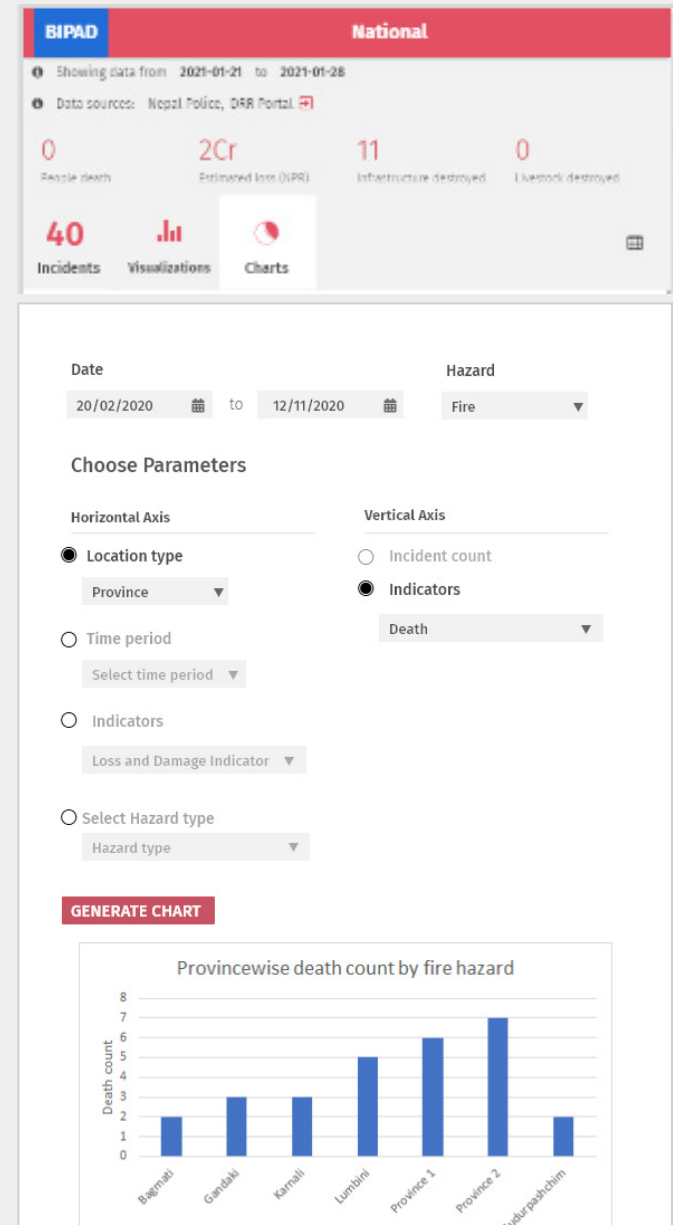
The customized chart helps better visualize the data as per the needs and requirement, hence aiding in Mitigation, Preparedness, Response, Recovery.



Recommendations

Most of the popular international DIMS platforms provide the ability to visualize data through interactive maps as well as through graphs and charts. Allowing the user, mostly researchers, and decision-makers, to choose the type of chart (comparative by events, geography, cause, temporal behavior) and the variables such as loss and damage datasets can enhance the user-friendliness, develop a deeper understanding of the data presented on the website and also help to quickly understand the disaster trends. This also reduces the effort of having to download the raw data and creating visualizations in software like excel.

A section in the Damage and Loss module of BIPAD portal could be added where the users can create customized charts based on the available datasets.



Classification of hazards

REFERRED PLATFORM

EM-DAT

Disasters classification used in EM-DAT is based on and adapted from the IRDR Peril Classification. It classifies disasters into natural and technological disasters with each having its sub and subgroups.



Relevancy to BIPAD portal

BIPAD portal has been following the Nepal Government's hazard classification and classifies the hazard into natural and non-natural. However, it lacks further classification under natural and non-natural hazards like; hydro-meteorological hazards, biological hazards, technological hazards, and many more. The classification will help in segregating the required information easily.



Useability in DRRM cycles

The classifications are important in adopting the same language and in classifying disasters that quite often present the co-existence of multiple hazards²⁷. The classification and identification of hazards can be useful in segregating the necessary information and also plan accordingly for the preparedness, mitigation, and emergency response of the particular hazard.



Recommendations

The classification of hazards into hydro-meteorological hazard, biological hazard, technological hazard, and many more has been one of the key considerations in the Sendai Framework as it broadened the scope of hazards and emphasized the inclusion of biological, technological, and environmental risk approaches in understanding risk. The classification of hazards can aid in obtaining information quicker and helps in making loss information comparable.

Classification of hazards into categories and their subcategories will help the researchers and decision-makers understand hazards in terms of the cause of their origin which will ultimately help them plan DRRM related activities by working around the field of expertise and getting related experts involved. For instance, for earthquake-related planning, expertise in the field of geohazard would be the most important. The classification would be

more beneficial during the mitigation and preparedness rather than response activities. Also, the Disaster Risk and Management Act 2017, which is the governing act in Nepal for DRRM, categorizes hazards into two categories in terms of origins of hazards- natural and non-natural. It further categorizes natural origin hazards as geophysical, meteorological, hydrological, climatological, and biological hazards.

The classification of hazard clusters adopted by UNDRR could also be integrated into BIPAD portal portal. The hazards are classified into meteorological and hydrological hazards, extraterrestrial hazards, geohazards, environmental hazards, chemical hazards, biological hazards, technological hazards, and societal hazards.

Unique ID for each disaster incident

REFERRED PLATFORMS

EMDAT

The unique ID generated is of the following format:
Year (4-digit number): unique number (4 digits):
Country (3 letters)

DesInventar

It uses GLIDE number for generating a unique id, which is of the following format. Disaster type (2 letters): year (4 digits): unique disaster number (6 digits): country (3 letters)



Relevancy to BIPAD portal

The incident and damage and loss module of BIPAD portal record the details of the incidents that occurred. The incidents have a distinction between them in terms of their location and time of occurrence, but BIPAD portal doesn't assign any unique codes/numbers to identify each incident. This numbering could help interlink various related disaster incidents and in cases where the impact is spread over multiple provinces and municipalities.



Recommendations

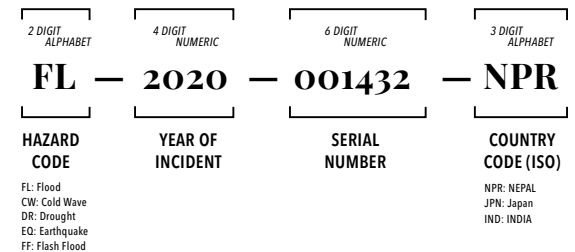
Currently, the database in BIPAD portal has a distinction between hazards in terms of their location and time of occurrence and does not assign any unique codes/numbers to identify each hazard. While this helps keep the system minimal, defining unique codes for each disaster helps make the data easier to access, and creates the possibility to link related hazards together by strategically assigning such codes, especially in the cases of larger disaster events that spread across multiple regions as well as cascaded hazards. An internationally recognized GLIDE numbering system could be adopted. Glide number is based on hazard code, year of occurrence, serial number, and country code.



Useability in DRRM cycles

Unique hazard identification will help standardize loss database²⁸, Damage and Loss datasets are useful in disaster mitigation, preparedness, response, and recovery⁷.

STRUCTURE GLIDE



Query of hazards and incidents

REFERRED PLATFORMS

- **Desinventar** The platforms allow queries of disaster data using loss and damage datasets as well.
- **Japan Bosai** The platform allows searching the documents using keywords.



Relevancy to BIPAD portal

In the Damage and Loss module of BIPAD portal, users can custom search data based on location, hazard, and/or time of occurrence of any disaster event. However, at present, it does not allow the filter of incidents by loss and damage indicators.

Likewise, BIPAD portal has the feature to search the acts, policies, and other relevant documents based on the default categories only, but allowing the users to search the documents with the help of keywords also can help users to navigate easily and make BIPAD portal more user friendly.



Useability in DRRM cycles

Query of hazards and incidents using keywords or filters of loss and damage datasets/document names will allow all users to get the required information quickly and easily, thereby increasing the usability of BIPAD portal in all aspects of the DRRM cycle.



Recommendations

In any DIMS platform, the most important feature is the ability to query data where the users can obtain data of their interest using keywords or search filters.

By loss and damage datasets: Along with the ability to filter data based on time, location, and hazard type, the platform should allow the user to filter incidents and events by datasets such as the number of deaths, injured/ missing/ affected (and their disaggregated information), estimated loss, the number of houses damaged and destroyed as well as by the infrastructures and services affected. Broadening the search query will help researchers and decision makers identify uniqueness in the impact of a disaster.

These detailed queries will help decision-makers focus on specific issues based on the previous impacts and plan preparedness and response activities accordingly. For instance, an NGO working on reducing the impacts of floods and landslides in the education sector

will want to search for information on the number of schools damaged by such events in the BIPAD portal.

By Hazard and Solutions: BIPAD portal hosts numerous documents on acts, laws, regulations, reports, publications, response plans, and frameworks related to disaster risk reduction and management. Although these documents can be sub-grouped based on the category and region, it would improve the user experience if the documents are searchable by the keywords entered by the user. Similarly, the projects and publications should also be searchable by the entered keywords. This can be done by assigning tags for each of the knowledge products.

The inclusion of the ability to query solutions through various publications, in addition to hazard information, would help stakeholders and decision-makers in planning DRRM effectively, and researchers, and other users in understanding every dimension of disasters better.

Multi-Lingual Platform

REFERRED PLATFORMS

Japan Bosai Platform

The platform is multilingual

DIMS in Srilanka

Although the platform is available only in English, some data collection and validation tools are available in the local language.

InaRisk



Relevancy to BIPAD portal

At present, BIPAD portal is available only in English. Since the goal of BIPAD portal is to act as the central DIMS platform of Nepal and not all local governments and authorities are comfortable using the platform/ and or filling data collection/ integration forms in English, the availability of BIPAD portal in Nepali is crucial.



Useability in DRRM cycles

Languages are crucial in delivering messages like emergency alerts²⁹. The multi-lingual platform facilitates in tailoring and translating messages related to DRM²⁹ which ultimately aids in planning for the preparedness, mitigation, and emergency response for disaster.



Recommendations

As a crucial aspect of any DIMS platform, to ensure that the accessibility of BIPAD portal reaches every level and type of users, including the local people and communities who are the ultimate actors in DRRM, it is crucial to have the platform in the Nepali language, which is the formal language as well as the major language used by most individuals and communities in Nepal. The use of the platform contents in local languages has been seen in popular practice in many popular DIMS platforms. Though this is an important aspect of the localization of BIPAD portal, it will require significant time to implement.

Addition of an alert system

REFERRED PLATFORM

GDACS



Relevancy to BIPAD portal

At present, information on BIPAD portal is available as a web app. The feature to produce alerts through social media and SMS has not yet been incorporated. With such features, decision-makers as well as the local community can be timely informed of any disaster incident.



Useability in DRRM cycles

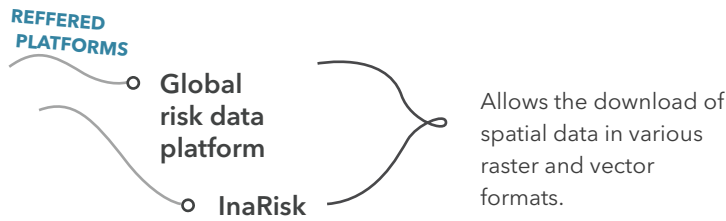
Sharing notifications on alerts through SMS, emails and social media, users can get timely updates and respond quicker to disaster events. Such a feature will aid in emergency response^{30,31}.



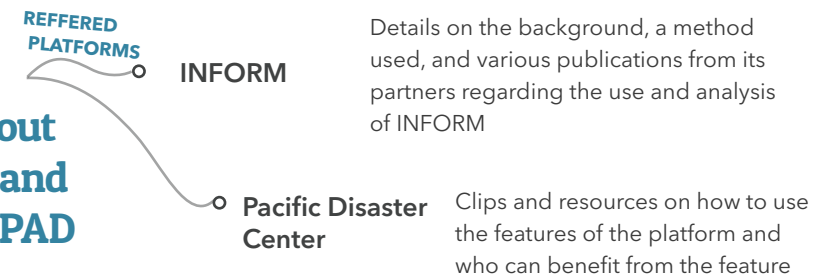
Recommendations

It is recommended to add a feature where a user to subscribe to alerts so that they can get email or SMS alerts whenever there is any new notification for a particular disaster in the particularly selected region/ area. The authorities in the government, disaster responders as well as the general public could be allowed to subscribe to alerts to get timely updates. Although this addition could require significant time and resources, this could prove to be a crucial feature of the platform.

Flexibility on the data download formats



Reference materials about the features and dataset of BIPAD portal



Relevancy to BIPAD portal

BIPAD portal allows downloading of the maps only in png format. Allowing the user to download maps in other formats like shapefiles, GeoTIFF, or other GIS supported formats can increase the compatibility and usability of the maps in various geospatial and analysis tools as well, while at the same time allowing the use of higher resolution maps in infographics and reports.



Useability in DRRM cycles

Maps like hazard maps are important in risk identification and making local knowledge visible³². Maps can provide clear and attractive pictures of the geographical distribution of potential hazards. Disaster-related data when visualized in maps can contribute to proper planning and allocation of resources for disaster preparedness. Map downloadable feature in the platform can hence increase the usability of the platform.



Recommendations

Inclusion of the ability to download maps in various formats would help aid in getting relevant data only and in making full utilization of the downloaded data. Furthermore, allowing the downloading of vector files in shapefile format and raster files in the GeoTIFF format helps increase the usability of the data, which can also be used with GIS software, and various utilities can be produced with those maps as base layers. Currently, BIPAD portal allows downloading of the maps only in png format. Similarly, to make the system user-friendly, the map download feature should allow users to download maps in A3/A4 or any other usable format. Also, the ability to choose custom scales and sizes of maps allows for the maps to be used in reports and publications easily.



Relevancy to BIPAD portal

Manuals, guides, and SOPs including the detailed information on BIPAD portal, each dataset, and the use of each type of data in decision-making can be included in the publication section of BIPAD portal. BIPAD portal has a variety of user types in different tiers of government and authorities with various levels of engagement, goals, and technical capacities who could benefit from this feature.



Useability in DRRM cycles

This feature doesn't directly compliment in DRM cycle but the existing datasets in the DIMS platform could be of use in the different phases of DRM, only if the proper usage and detailed information of each dataset are delivered to the users.



Recommendations

BIPAD portal can add videos, demo clips on how to use each feature and modules of BIPAD portal, and what kind of decision-making it can support. Producing guides and manuals in audio-visual formats can help increase the user-friendliness of BIPAD portal and help overcome some limitations caused by the inadequacy of technical capacity in all tiers of government.

Real-time coordination

REFERRED PLATFORM

o GDACS



Relevancy to BIPAD portal

Although BIPAD portal allows its users at various levels of the government to add and comment on the incidents recorded, an interactive interface where both governmental and non-governmental disaster responders can share information for coordinated action is missing. Various information on the relief team, relief items, situational reports, and other key information for various sources can be shared in real time among stakeholders in real time.



Useability in DRRM cycles

The real time coordination feature that allows sharing information among governmental and non government organizations, disaster responders coordinate in real time will enhance data partnership. This will enhance disaster response³³.



Recommendations

Once alerts and incidents are recorded in the system, a platform to share information such as search, rescue, and relief teams, relief items, situational reports, and other relevant information will drastically improve the coordination among the stakeholders. The coordination of government authorities and other disaster responders is crucial for effective emergency response management. This section can also aid effective communication among all tiers of the government for demarcation of roles and responsibilities for effective management during and after disaster incidents.

BIPAD portal could include a section in the backend and provide login credentials for the government authorities at each tier of the government and humanitarian aid agencies for sharing relevant information, a platform to discuss the plans for emergency response, and to post updates as relevant.

Mapping coordination system

REFERRED PLATFORM

o GDACS



Relevancy to BIPAD portal

At present BIPAD portal lacks a section where government and the humanitarian agencies working in mapping activities and emergencies can share their work so that the efforts are not duplicated, rather resonated through collaboration.



Useability in DRRM cycles

With a feature to share relevant mapping activities among disaster responders, emergency aid agencies and the government the emergency response will be enhanced³⁴.



Recommendations

A section for providing a communication and coordination platform where organizations can share information about completed, ongoing, and planned mapping activities with other stakeholders during emergencies could be included in BIPAD portal. This will help the dissemination of relevant information such as maps showing road blockage after an incident and will reduce duplication of mapping efforts and increases awareness of existing products.

A separate set of features based on user type

REFERRED PLATFORM I-REACT



Relevancy to BIPAD portal

BIPAD portal has a variety of user types including different tiers of government and authorities with various levels of engagement and goals. BIPAD portal could provide separate sets of features bundled together as per user types. BIPAD portal has separate sub domains for provincial and local levels. The sub-domain should only display information that is relevant to the specific user type. For instance, the district wise hazard map would not be much of a use to the municipal government and could be filtered out for the municipal level users.



Useability in DRRM cycles

This feature doesn't directly relate to any specific phase of DRRM- however, is a way to ease the use of the platform for a different type of user by presenting only useful tools for the respective user. This ultimately helps in increasing the usability and efficiency of the platform for users and intervening in all the phases of the DRRM.



Recommendations

BIPAD portal has a variety of user types including different tiers of government and authorities with various levels of engagement, approaches, and goals. Hence, a DIMS must take slightly different approaches to address these differences, providing different accesses to the platform with varying approaches, components, and sets of features to these different levels of government. BIPAD portal could provide separate sets of features bundled together as per user types which could play a significant role in ensuring its maximum utilization.

Features to improve the map

REFERRED PLATFORM Flood Factor



Relevancy to BIPAD portal

BIPAD portal relies on OSM and Mapbox for visualizing data. In Nepalese context, lots of places and features are yet to be mapped while the features are rapidly changing due to urbanization and development processes. Hence, to help ensure more accurate location information, a feature that allows users to suggest addition or edits of features in the base layer map could help create feature-rich maps that ultimately help with getting more accurate situational awareness as well as in more efficient relief and preparedness efforts.



Useability in DRRM cycles

Map data has a significant role in helping in all phases of DRRM and updated and more accurate map data help increase the effectiveness of any elements of disaster management.



Recommendations

A feature can be added in the BIPAD portal where users can report issues in the base layer map(OSM or Mapbox) and provide suggestions such as information on locations, places, names of the features and other relevant suggestions to improve the map as per the local knowledge. This can help update the maps continuously as per the recent changes in the particular area that the user is familiar to. A button can be added on the navigation bar that pop up a form to include suggestions and report issues on the map.

Challenges

Few challenges that could be encountered while integrating the learnings from standard DIMS platforms are as follows:

- The Disaster Risk and Management Act 2017, which is the governing act in Nepal for DRRM, categorizes hazards into two categories in terms of origins of hazards- natural and non-natural. It further categorizes natural origin hazards as geophysical, meteorological, hydrological, climatological, and biological. BIPAD portal currently follows the classification of hazards in terms of their origins- natural and non-natural only. For BIPAD portal, while the categorization of hazards into further related sub-categories in terms of the nature of hazards could be achieved following an international trend, it could create issues with seamless exchange of information between BIPAD portal and various levels of government who are governed by the DRRM Act 2017.
- The practice of assigning unique codes to each disaster incident has yet not been adopted in Nepal. So, while creating such a nomenclature system for disasters in Nepal, a thorough and nation-wide acceptable system needs to be developed, which could be a challenging task - to gather all the stakeholders and government representatives to work together in creating such a system.
- Also, bringing in various technical changes based on the recommendations would require additional time and resources based on the complexity in each of the recommendations.

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