OPEN DATA FOR RESILIENCE INITIATIVE

Policy Note and Principles

GFDRR

OPEN DRI Open Data for Resilience Initiative

Acknowledgments

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The team is grateful for discussion and feedback from Abigail Baca, Robert Banick, David Lallemant, Cristiano Giovando, Mikel Maron, Steven Rubinyi, and Benson Wilder.

Foreword

The foundation of successful disaster risk management is information. Yet valuable data is often fragmented across government institutions and the private sector or lost in file formats that don't facilitate reuse. Furthermore, weak data sharing arrangements between different actors result in high transaction costs and limit the participation of new communities on the challenge of understanding and managing disaster and climate risk. Open data can contribute to solving these problems but we need to do a better job of making the case for it so that we can create lasting change.

Affected populations are the first responders during any emergency, but these citizens are also involved in everyday decisions and policies that influence the risk. We have partnered with the OpenStreetMap community to facilitate participatory mapping processes to help capture local stakeholders knowledge about critical assets in their neighborhoods so that this information can be front and center on the management of disaster risk.

Risk information can be highly technical and is quite often difficult to use, interpret or act upon by decision-makers or the public. InaSafe, developed in partnership with AusAID and the Indonesian government, is one tool that helps partners in government make use of available data. However, we need more of open-source tools that can be customized for end-user needs. We can also learn from communication and behavioral sciences as we seek to design and develop new solutions in this space.

In the end, all disaster risk management is local. Our efforts to create global models, partnerships, and solutions can fail if they marginalize or disempower local actors or ignore the contexts and processes in which decision-making related to risk occurs. Government counterparts, universities and civil society organizations in the developing countries are our first clients and ultimately the individuals who will make any disaster risk management project successful.

Since launching the Open Data Resilience Initiative (OpenDRI) in July of 2011 we have worked in over 35 countries to engage new communities in the challenges of disaster risk management (DRM) and building resilience to climate change. The principles, case studies, and resources in this Policy Note represent our best attempt to document what works, lessons learned, and sources of inspiration that have guided the OpenDRI project over the past five years. We hope that its publication will stimulate discussion, provoke critical reflection, and contribute to a more safe and resilient society.

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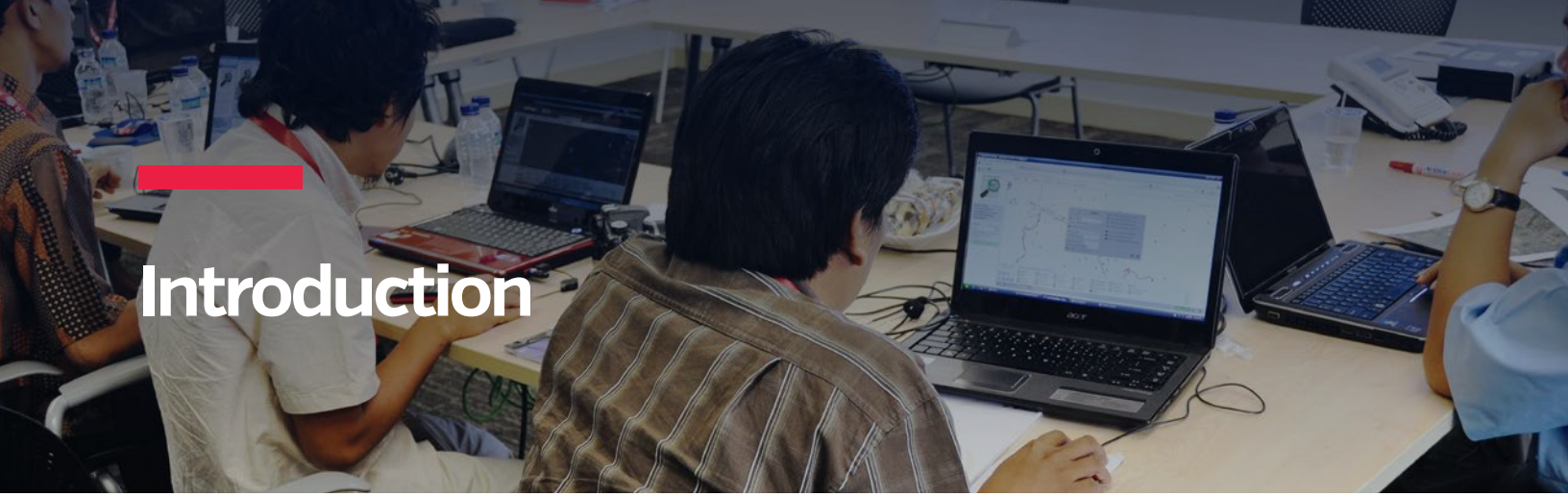


Introduction

The Open Data for Resilience Initiative (OpenDRI) was launched in 2011 to bring the policies and practices of the global open data movement to bear on the challenges of reducing vulnerability to natural hazards and the impacts of climate change. The OpenDRI project supports World Bank Disaster Risk Management Teams and our partners in governments, civil society, and international organizations to build local capacity and long-term ownership of open data projects that are tailored to meet specific needs and goals of their stakeholders.

OpenDRI projects work to improve processes surrounding the sharing, creation, and communication of risk data.

To increase public access to risk information, OpenDRI engages in dialogue with governments on the value of open data through the creation of local working groups and pilot projects that evolve into long-term locally owned open data projects. OpenDRI provides technical solutions and assistance for the project implementation in the form of open data platforms. Such platforms allow for hosting, analyzing and managing data that is necessary for planning decision-making related to disaster risk. Partners can share geospatial data, combine those data into visualizations and exchange both the raw data and maps they produce.

To engage communities in the creation of accurate and timely data about the rapidly evolving urban and rural environments in which they live, OpenDRI works with governments and local communities to utilize simple, collaborative, crowdsourcing mapping tools through community mapping. Community mapping projects mobilize the residents of a place to collect and maintain geospatial data about their built environment and its exposure to natural hazards, providing a dynamic source of infrastructure and risk information. Mapping projects also seek to build partnerships with development organizations and universities to support local efforts with remote mapping and crowdsourcing.

To ensure that risk information is used effectively to assist decision-makers and the public in planning, preparedness and response activities, OpenDRI works with partners to engage in effective risk communication. Risk information needs to be fit-for-purpose and targeted towards the decision-makers who rely on it for guidance, yet communicating this information in clear and useful ways is challenging. OpenDRI supports the development and implementation of a number of tools and approaches to accomplish this.

This document describes the approach taken by the OpenDRI team to design and enact impactful and sustainable projects with our partner organizations and communities. It is organized into a series of nine principles, the first 5 of which guide our thinking about how risk information should be created, managed, and used. The final 4 principles shape our relationships with other actors involved in OpenDRI work. Following a short description of the principle, we also provide examples from past OpenDRI projects and suggestions for relevant resources.

If you have comments, suggestions, or an interest in partnering with OpenDRI on your project, please contact info@opendri.org so we can continue the conversation.

OpenDRI Principles

Disaster risk data should be:

1. Open by default

2. Accessible, Licensed, & Documented

3. Co-created

4. Locally Owned

5. Communicated in ways that meet needs of diverse users

Open Data projects in the disaster risk space should be designed to:

6. Engage user communities

7. Develop Strong Institutional Partnerships

8. Prioritize Open Source

9. Set clear, long-term goals

Disaster risk data should be:

1. Open by default

Those seeking to access closed disaster risk datasets will frequently encounter a variety of arguments, such as privacy or security concerns, as to why such data cannot be released to the public. Too often, however, these arguments are convenient excuses for maintaining the status quo. For example, the vast majority of data related to disaster risk has no bearing upon individual privacy or public security concerns.In other cases, government organizations are mandated to sell the data they create and maintain as part of cost-recovery meaures. In such situations, alternate funding models should be found that support such tasks without creating artificial barriers to widespread access to risk information.

Changing the existing license on a dataset can be far more challenging than ensuring that newly created data will be open. We should therefore adopt a strategy of 'open by default' in which data collected or produced during disaster risk management efforts is assumed to be open, unless there is a specific reason why its release would have negative impacts. Such an approach is less likely to encounter obstacles than efforts to change existing data management regimes. Plans should therefore be in place at the start of any project that will produce data to ensure that the data will be open at the end of the process.

Example: The World Bank Open Data Policy

In 2010, the World Bank announced an Open Data Policy and made data contained in the World Development Indicators (WDI) openly available at the http://data.worldbank.org website. Since then, the World Bank has also made numerous other datasets, maps, reports freely accessible to the public. Most content is released under terms that permit reuse and distribution for both commercial and non-commercial purposes. Only in a few select cases, typically when the World Bank is not the primary owner of a dataset, are further restrictions imposed. The World Bank data policy is, therefore, open by default.

Further Reading:

Why "set the default to open"? Because information is a public good. By the Sunlight Foundation
http://theodi.org/guides/impacts-of-non-open-licenses

Some of the Impacts of Non-Open License by the Open Data Institute
http://theodi.org/guides/impacts-of-non-open-licenses

United States White House Executive Order: Making Open and Machine Readable the New Default for Government Information
https://www.whitehouse.gov/the-press-office/2013/05/09/executive-order-making-open-and-machine-readable-new-default-government-

Open Data: Unlocking Innovation and Performance With Liquid Information
http://www.mckinsey.com/business-functions/business-technology/our-insights/open-data-unlocking-innovation-and-performance-with-liquid-information

2. Accessible, Licensed, & Documented

Open data should be released in a manner that facilitates the widest use possible. There are a number of best practices established by the open data community that provide useful guidance to OpenDRI projects. These practices relate to accessibility, licensing, and documentation. Taking each in turn:

Accessibility:

In this context, accessible data is data that is released in a machine-readable format, structured in consistent and meaningful way, and in a standard data format. Essentially, users must be able to access the data and easily bring it into their own analysis or visualization tools. Tables, charts, or maps embedded in PDFs and Word documents, for example, would therefore not be considered open data. The following recommendations provide guidance on how to ensure open data can be made as accessible as possible:

Release downloadable data in non-proprietary machine-readable formats. For tabular data, this might include .csv files. Spatial data could include shapefiles, geojson, geotiff or any of the formats recommended by the Open Geospatial Consortium (OGC).

Data provided online should have permanent, individual web addresses where users can download data and access relevant documentation including standard metadata.

Data owners should also provide well-documented Application Programming Interfaces (API) that software developers can use to incorporate the data into their tools and applications

Licensing:

It is necessary that open data be distributed along with a reference to the terms that governs its usage. For many OpenDRI projects that involve spatial data, a short sentence outlining the license and providing a link to online documentation can be included within the"Licensing" and/or "Use Constraints" sections of ISO 19115-compliant metadata (see next section). For example:

"This data is released under a Creative Commons (CC-BY) License which provides for fair use, requiring only XYZ be attributed as the initial creator. For more information, refer to: http://creativecommons.org/licenses/by/3.0"

Clear licensing of datasets is necessary to protect both the data owner and potential users. Releasing data with clearly stated licensing and terms of use reduces uncertainty and thus increases accessibility for new users. Many data providers are drawn towards non-commercial clauses, fearing that others will resell the data they are making available for free. This is a mistake as there is no viable business model in reselling data that is open. More importantly, commercial use can be beneficial, and include activities such as repackaging, analysis, or custom visualization.

Documented:

Users need to understand what this data is and where it came from in order to make effective use of it. Risk information is complex and its limitations and potential uses should be clearly communicated. Documentation that describes the data source, how it was created, and provides information can also facilitate peer a fundamental aspect of good science. There are a number of standards that guide the production of such documentation, usually referred to as metadata, including OGC , ISO 19115, and Dublin Core

Example: GeoNode software

GeoNode is an open-source software platform that is frequently used as part of OpenDRI projects to manage and share geospatial data. By default, each dataset uploaded to a GeoNode has its own unique web-address where it can be accessed, along with standard metadata. All data stored in GeoNode can be accessed through documented APIs as well as downloaded in common formats including GeoTiffs and Shapefiles.

Further Reading:

Sunlight Foundation's Open Data Policy Guidelines
http://sunlightfoundation.com/opendataguidelines/

GeoNode Software http://geonode.org

Guide to choosing an Open Data license
http://opendefinition.org/guide/data/
http://opendatatoolkit.worldbank.org/en/essentials.html#licenses

3. Co-created

Wherever possible, the creation of risk information should be an inclusive process. Stakeholders from government, scientific and technical agencies that are intended users of the data, and the public can all have a role to play in the planning and execution of activities related to producing risk data. The local knowledge of at risk communities is vital and should also be included. These approaches have been demonstrated successfully through decades of participatory GIS and community mapping activities. In recent years, the OpenStreetMap (OSM) platform has been used to develop base maps and asset databases in support of risk modeling and contingency planning work. OSM, which was founded in 2004 in the UK, is now a global project that seeks to create an open-source map of the world that anyone can access and anyone can contribute to. The fields of Citizen Science and Participatory GIS provide rich, if underexplored, opportunities for further research and practice related to inclusive approaches to the creation of risk information.

Example: Open Cities Kathmandu

Between 2012 and 2014, the Open Cities project partnered with the Government of Nepal, local Universities, and local scientific organizations to support mapping of schools and health facilities in the Kathmandu Valley for use in seismic risk assessment. The project trained over 2,200 university students, government officials, or members of community organizations in basic surveying techniques and the use of the OpenStreetMap (OSM) platform and organized a series of mapping activities around Kathmandu. Throughout the project, participants surveyed 2,256 schools and 350 health facilities, creating a comprehensive map of the health and education infrastructure in the valley. The data was stored and made available to the public through OSM and a new organization, Kathmandu Living Labs (KLL) was created at the end of the project to continue supporting the growth of the Open Data community in Nepal. KLL and the local OSM community were very active in supporting the 2015 Nepal Earthquake response.

Further reading:

Planning an Open Cities Mapping Project
https://www.gfdrr.org/sites/gfdrr/files/publication/Planning-an-Open-Cities-Mapping-Project_0.pdf

Good practices in practices in participatory mapping
https://www.ifad.org/documents/10180/d1383979-4976-4c8e-ba5d-53419e37cbcc

4. Locally Owned

Wherever possible risk information should be managed at the scale that it describes. In other words, OpenDRI projects usually seek to work with local governments to manage city level data, national governments to take responsibility for country level data, and so forth. Other communities, including universities, civil society organizations, and technical agencies also have a stake in disaster and climate risk information and should be included. This ensures that the primary user base for this data is involved in its ongoing maintenance. Global data platforms run the risk of marginalizing potential users at national and subnational levels. Local management of risk data also contributes to building necessary capacity for its use and management.

Example: Malawi Spatial Data Working Group

The Malawi Spatial Data Portal (MASDAP) was established in 2012 to address the issues of access to spatial data and to improve collaboration and use of the data by the Government of Malawi, the public and other key stakeholders. In order to set up, manage and maintain the technical platform and its data, a MASDAP working group was created comprising the key stakeholders involved in producing or using risk information. Originally, the working group was created around the Shire River Basin Management Program Technical Team and implementation agencies, the project it originally supported. Over time the working group extended to more general management of the platform at the national level, including institutions such as National Statistics Office, Surveys Department, Department of Climate Change and Meteorological Services, Agricultural Development Division, Department of Disaster Management, Water Resources, Universities of Malawi like The Polytechnic College and Chancellor College.

Examples of activities undertaken by the working group include: i) Regular meetings and shared communications ii) awareness campaigns to different stakeholders iii) Conduct trainings and capacity building on the usage of MASDAP platform and other related tools iv) provide feedback to improve the functionality of MASDAP platform v) develop a policy framework for sharing geospatial and other required data among all stakeholders,

define minimum metadata and data quality vi) ensure baseline data required for post disaster assessments are collated and are available in ready and open to use format vii) the working group also coordinates and develops the strategy for the collection and use of the data gathered using community mapping techniques. In the southern region of Malawi, a sub-group of the national forum has been created to focus specifically on issues of data access and availability in their area.

5. Communicated in ways that meet needs of diverse users

Risk information is complex and, in most cases, created by and for technical experts in the area of disaster risk management. Yet the hazards and vulnerabilities that risk data seeks to describe are of concern to everyone. There are an increasing number of tactics that are being developed to include the public in informed policy and planning decisions related to risk. Where public dollars are going to be invested in the creation of risk information, OpenDRI seeks to explore ways for this information to be accessible and relevant to as wide an audience as possible. Innovations in the areas of data visualization or serious games, and software tools developed for specific use-cases and audiences can provide new ways for the public to engage with risk science. For instance, the World Bank and AusAID have been developing InaSAFE, a tool that analyzes and package information in a manner relevant to emergency planners and responders. The Disaster Risk Financing team of the World Bank has been developing a suite of tools designed to communicate and analyze risk information in a way relevant to Ministries of Finance.

Example: OpenDRI Serious game

In order to convey complex approaches and values such as (a) incorporating risk information into long-term planning decisions (b) the importance of open access to data for decision-making (c) the role of the community in providing up-to-date and accurate data, the usual format using presentations and workshops may not be enough and quickly forgotten. A different approach is to get the participants to learn through experience by putting them an active role. The OpenDRI team collaborated with the Red Cross/Red Crescent Climate Centre to create a "serious game" with an atmosphere of intense interaction, learning and dialogue, combining collaboration and competition, and ensuring that participants have to deal with issues of data sharing, data quality, politics versus evidence versus emotion in decision making. Through this serious game, the participants are placed in a simulated situation where they take a role representing real life actors such staff of the Ministry of Education, NGO, Ministry of Planning and they have to make decisions such as the prioritization of investments on schools balancing tight budgets and the objectives of better education and disaster mitigation. They can take advantage of the information and tools available to them such as the location of schools, flooding scenarios but they have a limited amount of time and have to share limited resources.

Through the interactive activity, as the participants are taken out of their comfort zone in an active role, they see the risk information and its applications in a new light. The risk information is changed from something that can be abstract and complex to something that is concrete and applicable and necessary for effective disaster risk mitigation.

Further reading:

InaSAFE
http://inasafe.org

Serious Game Concept
http://www.bu.edu/pardee/publications-library/2012-archive-2/games-climate-task-force/

Open Data projects in the disaster risk space should be designed to:

6. Engage user communities

During the planning phases of an open data project, program designers should identify target user groups for risk information and understand their needs. Engaging potential users to understand their priorities and what they would find more useful prior to project implementation can help prevent challenges from occurring later on. Target groups may include governments, local NGOs, universities and the scientific community, and development partners as well as existing open data and technology communities in the area where the project will take place. Once the data is released, it is good practice to support the activity and growth of activities and projects that can use the newly opened data.

Example: Code for Resilience

Code for Resilience is an international fellowship program that supports partnership between technologists and governments to meet the challenges of building resilience to disasters and the impacts of climate change in the 21st century. Code for Resilience fellows spend 6 months working with governments on open source software solutions to address problems identified by local stakeholders. These extended partnerships ensure opportunities for iterative solution design and that risk information can be made actionable for local decision-makers.

Further Reading:

Code for Resilience http://codeforresilience.org/

User Centered Design Basics http://www.usability.gov/what-and-why/user-centered-design.html

Build With Not For http://www.buildwith.org, a guide to civic technology by Laurenellen McCann

Digital Development Principles http://digitalprinciples.org/

7. Develop Strong Institutional Partnerships

Reducing climate and disaster risk and building resilience is a challenge that involves all of society. It's therefore desirable to treat the process of creating, managing, and using risk information the same. The design of a successful and sustainable open data project requires the development of strong networks of local partners. Potential partners include different branches of government, community groups, universities, and the private sector. Cultivating relationships between local partners can contribute to the sustainability of open data efforts and create possibility for new and unexpected activities beyond the time horizon of an individual project. In some countries, international programs such as the Open Government Partnership can also provide additional resources or legitimacy to a local open data project. Partnerships can help facilitate the transparent communication of activities, sharing of knowledge and results, and coordination that can reduce duplication of efforts across different sectors of society. Such practices help to build the necessary consensus for undertaking collective action related to reducing risk and preparing for and responding to disasters.

Example: Sri Lanka OpenDRI Project

OpenDRI has been working in Sri Lanka since April 2012 to increase access and meaningful use of risk information in the country. The core of the partnership has centered around the development of an online database, RiskInfo , which is based on the free and open-source

tool GeoNode. Riskinfo is managed by the Disaster Management Center (DMC) and hosted on servers provided by the Information and Communication Technology Agency of Sri Lanka (ICTA). It acts as a metadata catalog, data download portal, and map visualization platform for DRM data in the country.

Several national government agencies including the Disaster Management Center, the Survey Department and the Census Department have been involved from the beginning in the design and management of the project. Over the course of the project, other key national agency have been regularly consulted for inputs and updated on the progress and results of work. These partnerships have provided the initiative with a strong ownership within the DMC, an important credibility, and a legitimacy to interact with the local government. The national agencies also provide staff from the local offices to support the project and build their capacity through their involvement in the project.

Community mapping efforts in several parts of the country have also contributed to the development of new risk information, which is also made available through RiskInfo and has created opportunities to broaden the number of partners involved in the project, including universities, local community groups, and technology organizations. Over 60,000 buildings including location and structural characteristics have been mapped using the OpenStreetMap platform through this work. International coordination with groups such as the State Department's Humanitarian Information Unit (HIU) and the Humanitarian OpenStreetMap team helped to secure up-to-date imagery and quality assurance of the incoming data. OpenDRI Sri Lanka's success in developing partnerships across ministries, at various levels of government, and with non-governmental actors has helped to contribute to sustainable, broad-based, improvements in how risk information is managed and used in the country.

Further Reading:

Open Government Partnership
http://www.opengovpartnership.org

Open Data Charter http://opendatacharter.net/

Climate Services for Resilient Development Partnership
https://www.whitehouse.gov/the-press-office/2015/06/09/fact-sheet-launching-public-private-partnership-empower-climate-resilien

8. Prioritize Open Source

Where possible, open data projects should also seek to engage with open source software. A common misperception about open source is that its primary benefit is the lack of licensing fees. In practice, the main advantages tend to result more from participation in active and collaborative communities that grow up around open source software and create expertise within the government, private and academic sectors with the ability to customize and extend software to suit specific use cases. Without licensing and cost constraints, it is also easier for contributors to just start trying and iterate towards more complex use cases as well as to spend more resources on capacity building. When investing in software development or purchase, it makes sense to first investigate whether a comparable open source exists and the activity levels of its developer and user communities.

Example: InaSafe

The InaSafe platform is an open source tool that is used to develop scenario-based impact assessments. The software provides a user-friendly, rigorous way for decision-makers to understand and engage with risk information. The tool was developed through a long-term partnership between the Government of Indonesia, the Australia-Indonesia Facility for Disaster Reduction (AIFDR), the Global Facility for Disaster Reduction and Recovery and the World Bank for use within the Indonesia Disaster Management Agency (BNPB). Because the tool is open source, it has since been customized for use in a number of other contexts including the Philippines and Malawi.

Further Reading:

The How and Why of Nonprofits Contributing to Open Source
http://www.nten.org/article/the-how-and-why-of-nonprofits-contributing-to-open-source

Open Source Software Licenses
https://opensource.org/licenses

9. Set clear, long-term goals

Investing in open data can result in many benefits, including increased public participation in decision-making, decreasing duplication of investment in data and information products, encouraging peer-review of science, and facilitating non-traditional partnerships. Indeed, open data projects should be designed to encourage as many of these things. However, it is important that specific and measurable goals be defined at the start of the project. These may change over the course of the project as the result of new learnings or newly articulated priorities, but having clearly defined and agreed upon targets prior to initiating activities will help manage expectations and support clear communication between project partners and stakeholders.

Further, it is important to recognize that open data projects are fundamentally about affecting behavior and relationships. Meaningful change related institutional and individual interaction with risk information is a significant undertaking. Too often, interventions in this space take the form of short, discrete activities without a broader vision or operational theory of change. Sustained engagement is required for open data projects to achieve success.

Example: OpenDRI Analysis Tool

The OpenDRI analysis tool provides a common reference methodology and guidelines for implementation of OpenDRI projects. After the initial engagement with government's DRM experts through which project goals and user needs are defined, a typical next step is an in-depth assessment of technological capacity and data availability. This guide provides templates for conducting IT assessments interviews with stakeholders, as well as reference data models to understand potential gaps in existing risk related datasets. A report is then generated describing the status of available resources with respect to desired implementation, offering options for proposed investments needed to achieve project goals. The OpenDRI analysis tool finally provides clear practical guidelines and checklists for developing efficient Geonode projects through which risk related data is aggregated, managed and shared.

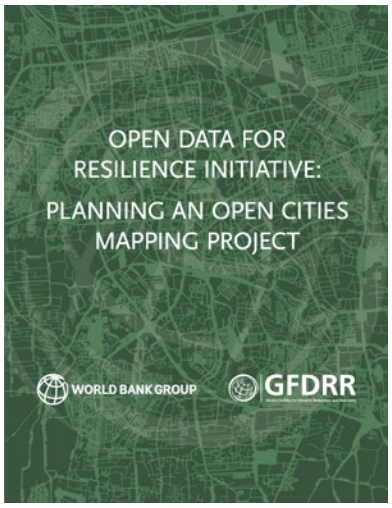
Recommendations for effective sustainability of Geonode projects are also offered along with monitoring and evaluation methods that ensure long term success built on solid open data principles. More information can be found at: www.opendri.org/resources

Further Reading:

World Bank Open Data Readiness Assessment
http://opendatatoolkit.worldbank.org/en/odra.html

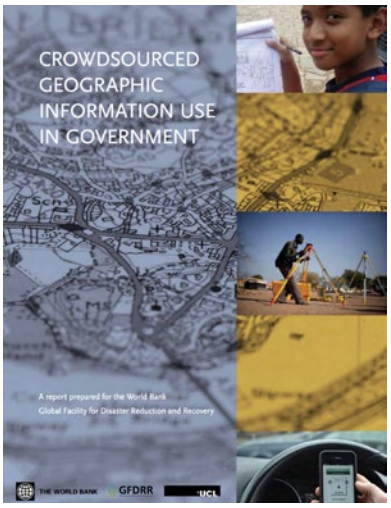
Open Data Watch: Monitoring
http://opendatawatch.com/monitoring/

OpenDRI Publications



Open Data for Resilience Initiative: Planning an Open Cities Mapping Project

Open Data for Resilience Initiative: Field Guide



Crowdsourced Geographic Information Use in Government

About OpenDRI The Open Data for Resilience Initaitive (OpenDRI) is a project of the Global Facility for Disaster Reduction and Recovery (GFDRR). Launched in 2011, OpenDRI seeks to bring the philosophies and practices of the global open data movement to bear on the challenges of reducing vulnerability to natural hazards and the impacts of climate change. OpenDRI has been active in over 35 countries around the world in efforts to improve the sharing, collection, and communication of risk information.

About GFDRR The Global Facility for Disaster Reduction and Recovery (GFDRR) is a global partnership that helps developing countries better understand and reduce their vulnerabilities to natural hazards and adapt to climate change. Working with over 400 local, national, regional, and international partners, GFDRR provides grant financing, technical assistance, training and knowledge sharing activities to mainstream disaster and climate risk management in policies and strategies. Managed by the World Bank, GFDRR is supported by 34 countries and 9 international organizations.

WWW.GFDRR.ORG