Words into Action Guidelines:
National Disaster Risk Assessment
Special Topics

F. Data Management throughout the National Risk Assessment Process

Key words:

data management, data license, open data, metadata

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This section provides a general introduction for non-specialists to some of the main concepts involved in data management for national risk assessments.

Data management is an important part of a national risk assessment and can help ensure that the process is both effective and impactful. Risk assessment is an extremely data-intensive process and conducting a national risk assessment may involve accessing information from a wide range of stakeholders, including mapping agencies, scientific and technical ministries from across government, universities, research institutions and the private sector.

In addition, valuable new data and analysis are created during risk assessments. A strategy must therefore be developed to efficiently organize and manage the data as they come in, as well as to distribute the results to participants and stakeholders.

Data management plans govern the process by which data are gathered from participating entities, the technical and quality standards to which new data will be produced, how data will be maintained during the risk assessment, and the means by which the output data will be shared or secured.

Why Invest in Data Management for National Risk Assessments?

The data sets required for conducting risk assessment are valuable resources. They can be expensive to create but, when managed properly, can be used by a diverse set of users for multiple purposes beyond those for which they were initially produced. Conversely, if data are managed poorly, the investment made in creating them will not yield a full return.

Improper management or limiting access to data can lead to duplication of effort (other organizations may be recreating data that already exist). A well-crafted data-management plan can help encourage stakeholders to share their data and ensure that the processes for sharing data are effective and transparent. This will increase the value of the investment in the data and build trust in the results of the risk assessment, as more stakeholders have access to the raw data that underlie it.

Stakeholder Involvement and Accountability

To successfully develop and implement a data-management strategy for national risk assessment, stakeholders such as data producers and users should be involved early on in the planning. This will help ensure that the data management activities meet the needs of participants and increase their sense of ownership of the process – which is vital for successful implementation.

Many government entities engaged in national risk assessment are subject to legal regulation that controls the conditions under which they produce, maintain and share data. It is important to identify these constraints at the start of the process. The various obligations that stakeholders have in relation to creating or sharing data for risk assessment purposes can be documented in memorandums of understanding, signed by each participating organization, in order to formalize the agreement.

Standard Data Formats

Data management plans should also specify the preferred formats in which data sets should be created, maintained and shared. Generally speaking, these should always be standard data formats agreed upon by groups such as the Open Geospatial Consortium[1]. This will help alleviate compatibility challenges that have in the past made it difficult for data created in one software to be used in another.

Some examples include .csv for tabular data or .shp, .geojson and .kml for spatial data. Other data standards, the resolution at which spatial data are recorded or the attributes associated with records in an asset database, for example, should be considered during risk assessments where significant amounts of new data will be created.

Data Licences

A central element of any data-management strategy is clear articulation of the conditions under which data are to be shared. These conditions are specified by a data licence or terms of use that should accompany each data set. A well-written data licence should cover, at a minimum, attribution, modification and redistribution.

Attribution refers to citation of the owner of the data on products in which they are used. Modification governs the conditions that users of the data must comply with when altering the data set or combining it with other data. Redistribution refers to the permissions that users have to redistribute the data or any derived works once they have accessed them, and whether they may be used for commercial purposes.

In recent years, there has been increasing advocacy for adopting open data policies across government and academic research. Open data advocates argue that liberal, "open", data licensing supports transparency, efficiency and participation in government, peer review of science, and more widespread and effective data use for decision-making in general. If a country has concerns over sensitive asset data, it is important not to lose sight of the potential

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[1] Open Geospatial Consortium (2017). Available from www.opengeospatial.org/ .

value of releasing this information in aggregate form and making other components of the risk assessment, such as hazard data, openly available for further use by the public and private sector and academia. The Global Facility for Disaster Reduction and Recovery Open Data for Resilience Initiative (OpenDRI) has been working on these issues related to disaster and climate risk assessment since 2011 (box 1).

Metadata

The creation and maintenance of metadata is an essential component of data management. Metadata provide information about how and when data sets were created, what their attributes signify, who the initial authors and owners were, and the terms of the data licence. There are several well-recognized standards for metadata, including those published by the International Organization for Standardization[2] and the United States Federal Geospatial Data Committee[3]. Much geographic information system software also includes tools for authoring and sharing metadata. Data-management strategies should also include plans for storing, sharing and updating metadata when necessary for every data set they cover.

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[2] International Organization for Standardization (2014). ISO 19115-1 *Geographic Information Metadata Part 1: Fundamentals*.

[3] Federal Geographic Data Committee (2017). Content Standard for Digital Geospatial Metadata. Available from www.fgdc.gov/metadata/csdgm-standard.

Box 1

Open data: Malawi Spatial Data Working Group

Event: A cluster of 22 cases of severe respiratory diseases with seven deaths in country X were Since 2012, the Malawi Spatial Data Working Group has been sharing spatial data using MASDAP, the Malawi Spatial Data Platform (www.masdap.mw). The group began as a partnership between government ministries and other organizations working on flood risk assessment in the Shire River basin. Participants formed the Malawi Spatial Data Working Group to manage the activity and share important data during the project.

The working group, which meets monthly, has continued its efforts to gather and share data following the conclusion of the risk assessment, and MASDAP is now a valuable source of risk information for the whole country. MASDAP received support from the Global Facility for Disaster Reduction and Recovery Open Data for Resilience Initiative (OpenDRI).

OpenDRI has partnered with national governments, universities and community-based organizations to launch data-sharing platforms such as the Sri Lanka Disaster Risk Information Platform (http://riskinfo.lk), to support community mapping projects for disaster risk assessment (www.opencitiesproject.org) and to build tools to communicate complex risk information to diverse stakeholders (http://inasafe.org). More information about the data available through OpenDRI projects can be found at https://opendri.org

Recommendations

- Incorporate stakeholders from both potential contributors to and users of risk assessment data early in the planning process. Provide stakeholders with an understanding of the importance and value of their data for the quality of the risk assessment results. Give them an opportunity to make substantive contributions to the data-management plan.

- Agree upon the data licensing, metadata standards, acceptable formats and other protocols as early as possible.

- Whenever possible, release data under open licences that encourage wide use for many purposes.

- Develop a common repository for data during the risk assessment, which can also be used to share the results and outputs when the assessment is completed.

- Document the data-sharing plan in a memorandum of understanding or other formal agreement that can clarify the expectations and responsibilities of participating stakeholders

Free and open source tools for data management

- Various free and open source tools have been used to support the management and sharing of spatial and tabular data.

- GeoNode (www.geonode.org) is a tool that allows users to share and visualize geospatial and tabular data on the internet. The software is free but it requires installation and customization. Metadata authoring tools are also included.

- CKAN (http://ckan.org/) is another tool that acts as a full featured web-based data and metadata-sharing platform.

- QGIS (www.qgis.org/) is a desktop-based GIS software that provides features for data editing, manipulation and conversion. Free extensions can be used to automate some parts of metadata creation.

Resources for further information

- Field Guide to the Open Data for Resilience Initiative. Available from www.gfdrr.org/sites/gfdrr/files/publication/opendri_fg_web_20140629b_0.pdf

- Future Trends in Geospatial Information Management: The Five to Ten Year Vision. Available from http://ggim.un.org/docs/UN-GGIM-Future-trends_Secondedition.pdf

- A Guide to the Role of Standards in Geospatial Information Management. Available from http://ggim.un.org/docs/StandardsGuideforUNGGIM-Final.pdf

- Why Information Matters: A Foundation for Resilience. Available from www.internews.org/sites/default/files/resources/150513-Internews_WhyInformationMatters.pdf

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