

QGIS, InaSAFE and OpenStreetMap for Impact Forecasting

NatCatRisk

The logo for NatCatRisk features a large, solid black downward-pointing arrowhead.

GFDRR

Global Facility for Disaster Reduction and Recovery

Rick Murnane

Topics

- Impact and risk
 - Open Source
 - OpenStreetMap
 - QGIS and InaSAFE
 - Concluding remarks
-

Risk Versus Impact

The Components for Assessing Risk

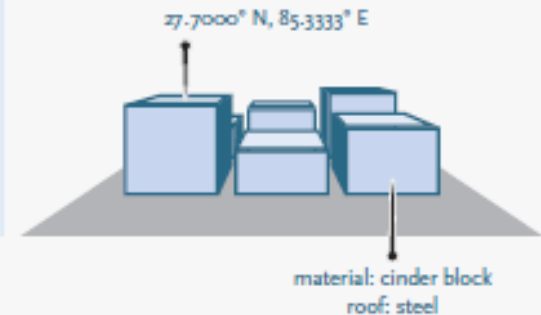
HAZARD

The likelihood, probability, or chance of a potentially destructive phenomenon.



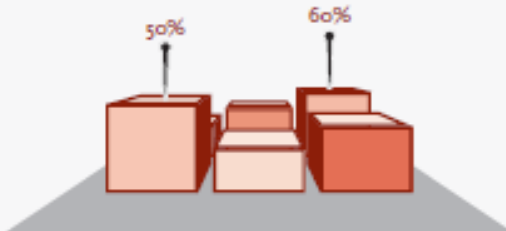
EXPOSURE

The location, attributes, and values of assets that are important to communities.



VULNERABILITY

The likelihood that assets will be damaged or destroyed when exposed to a hazard event.



IMPACT

For use in preparedness, an evaluation of what might happen to people and assets from a single event.



RISK

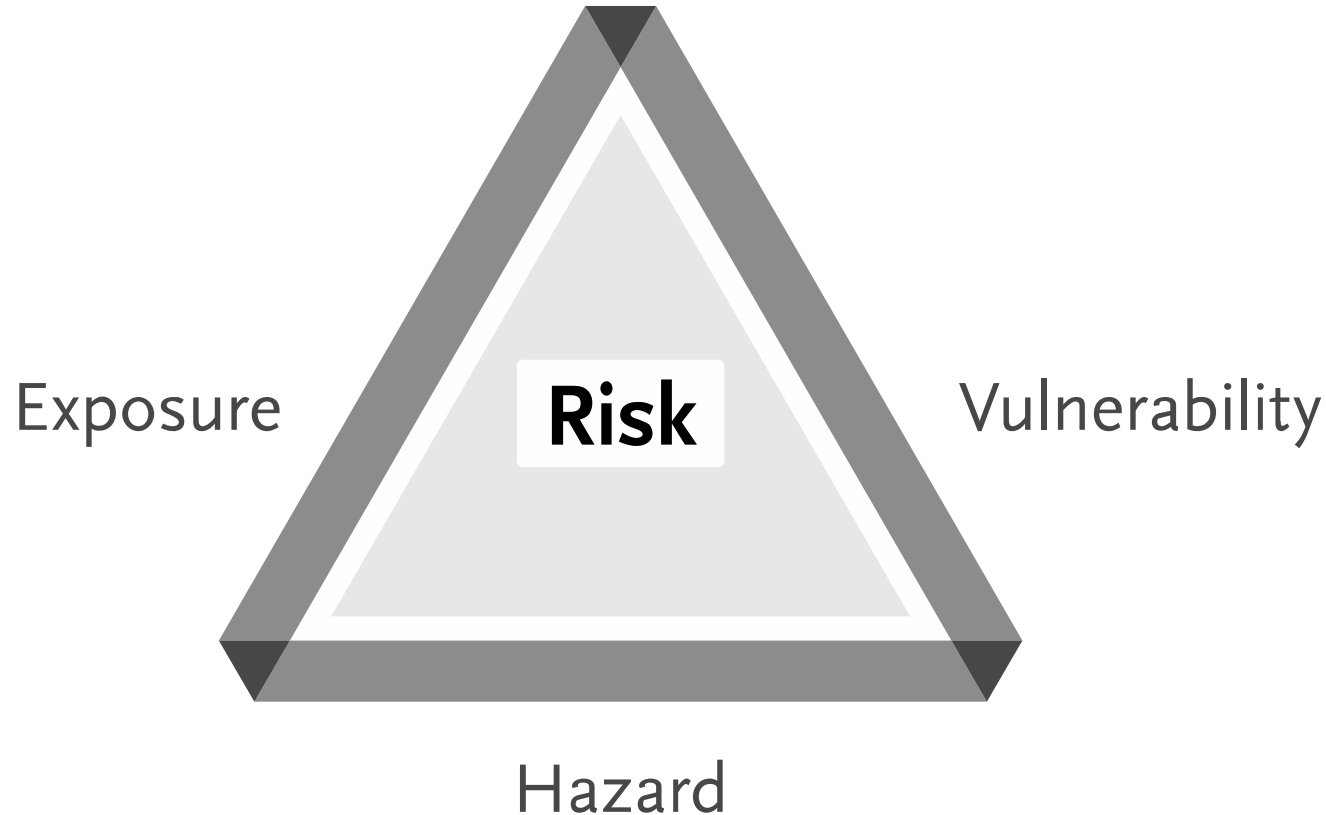
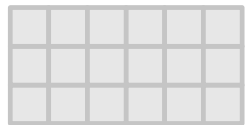
Is the composite of the impacts of ALL potential events (100's or 1,000's of models).



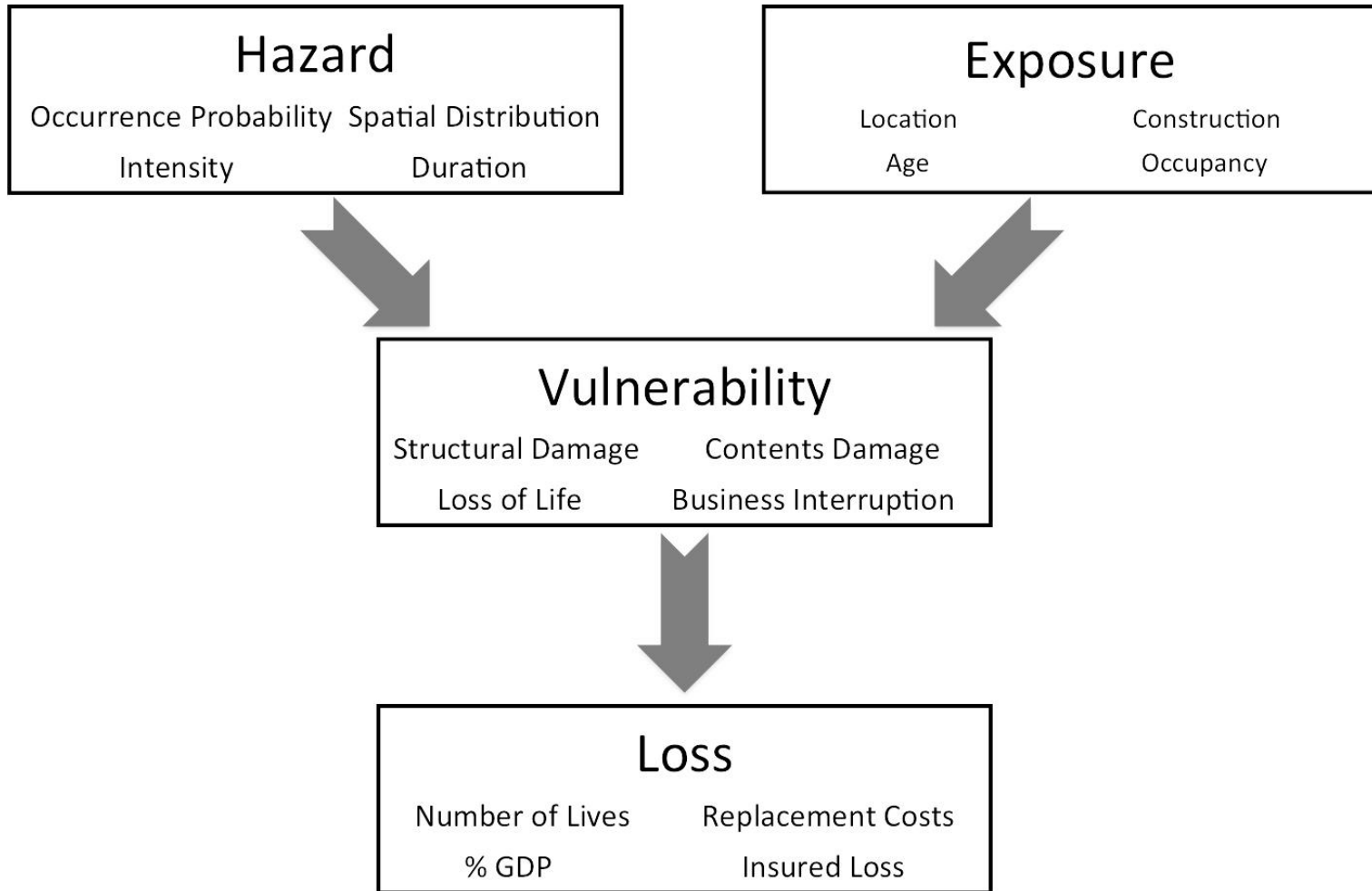
What Determines Impact and Risk?

- Risk = f(climate, exposure, vulnerability)

1.



Generic Risk/Impact Model



OPEN SOURCE

Why Open Source and Open Data?

- Cost:
 - No barrier to entry and no barrier to scale up, easier sustainability
 - Capacity Building:
 - More resources to spend on capacity building working with student and research projects in partnership with universities and on developing user and developer communities
 - Collaboration:
 - Facilitate local and international partnerships to collaborate on free and open source technologies: shared investments, code sprint, courses, etc...
 - Customization:
 - Easily adapted to each country: what the tool will do and how the tool will look like
-

OpenStreetMap

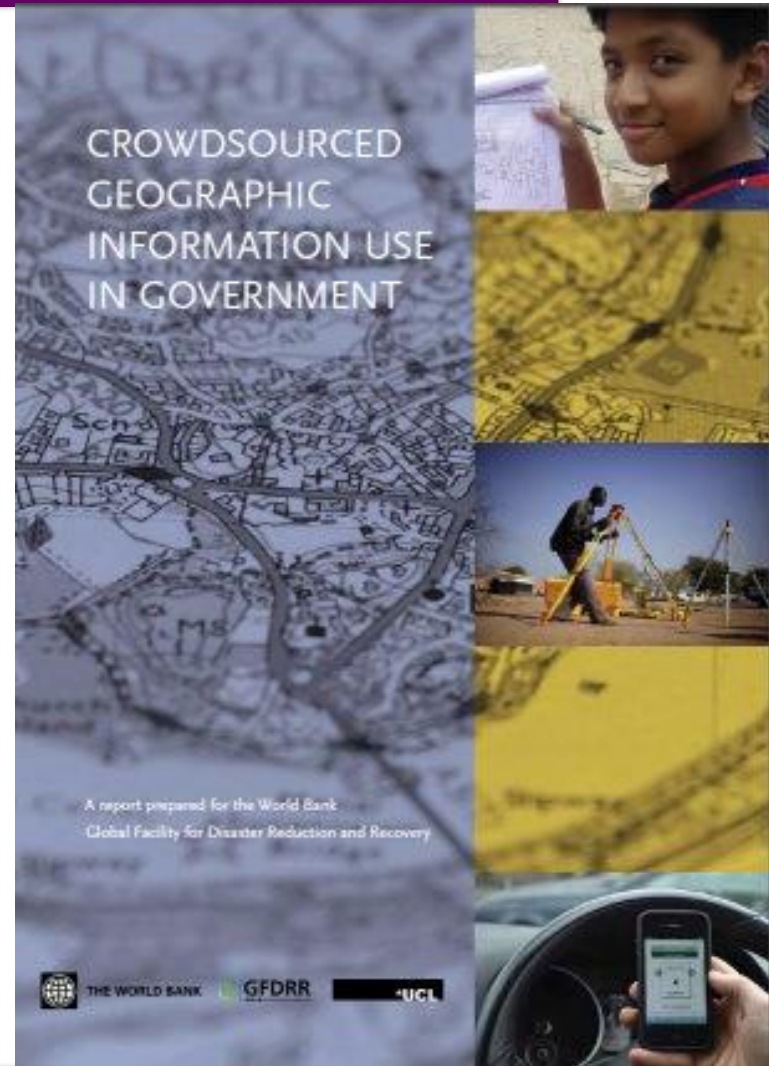
OSM: FOR OPEN EXPOSURE DATA

Why OpenStreetMap (OSM)

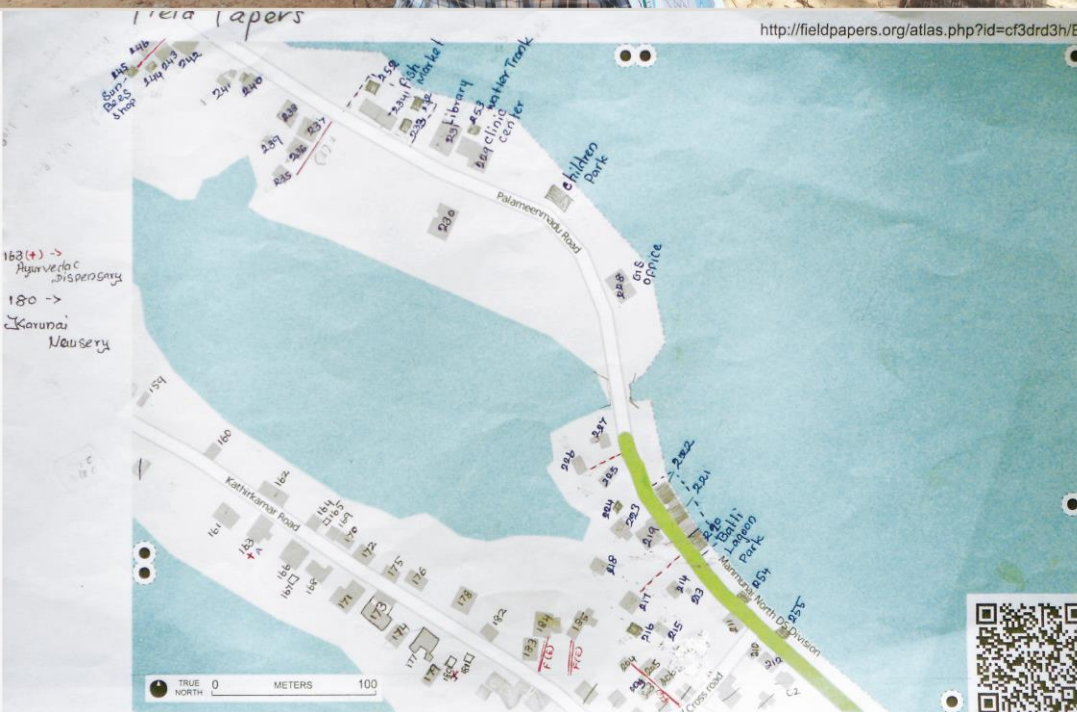
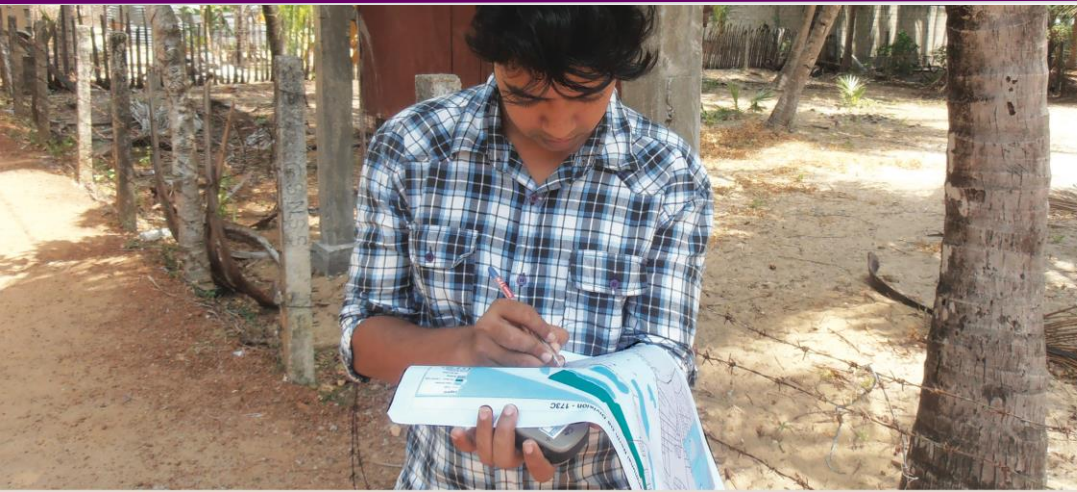
- Possible to access richer and more detailed data
 - Data can get corrected and be kept up to date
 - Open source tools for online or offline mapping
 - A common platform for uploading and hosting data with free and open access
 - An active global community of users
 - Resources for growing a community: training materials, communication platforms
-

Examples of OSM use in government

- New York City
- Natural Resources Canada
- US National Park
- Ordnance Survey, UK
- Trimet, Portland, US
- Sri Lanka Survey Department



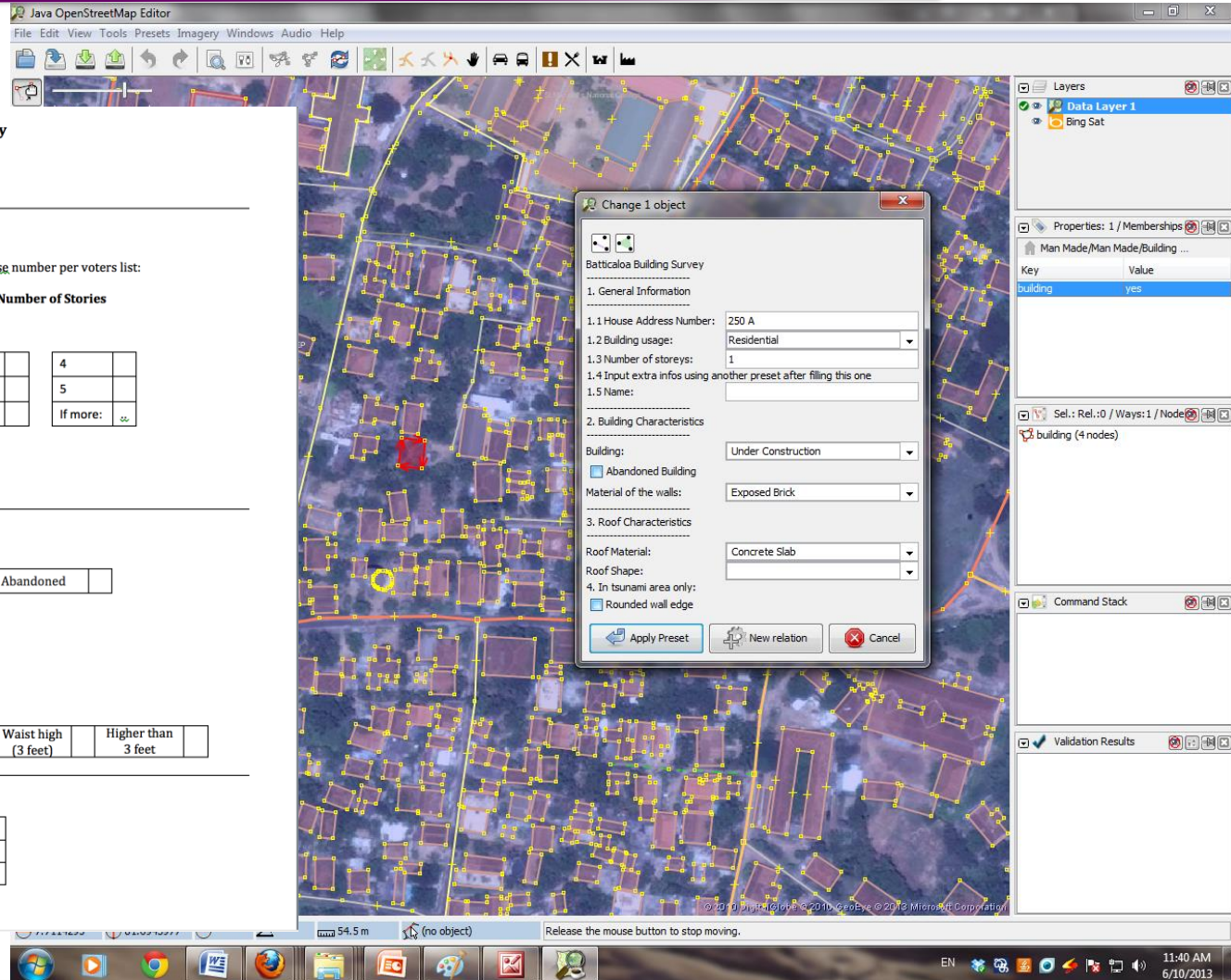
Community Mapping In Sri Lanka: Data Collection To Digital Availability



Analog To Digital Conversion



Adding Attributes and Features



Building Characteristics Survey

Ds Division Name: Manmunai North

GN name:

1. General information:

1.1 References

Map Building ID: _____ House Address Number (if visible): _____ House number per voters list: _____

1.2 Building usage

| | | | |
|-------------|--------------------------|------------|--------------------------|
| Residential | <input type="checkbox"/> | School | <input type="checkbox"/> |
| Commercial | <input type="checkbox"/> | Hospital | <input type="checkbox"/> |
| Industrial | <input type="checkbox"/> | Religious | <input type="checkbox"/> |
| Utility | <input type="checkbox"/> | Government | <input type="checkbox"/> |

1.3 Number of Stories

| | | | |
|---|--------------------------|------------|--------------------------|
| 1 | <input type="checkbox"/> | 4 | <input type="checkbox"/> |
| 2 | <input type="checkbox"/> | 5 | <input type="checkbox"/> |
| 3 | <input type="checkbox"/> | If more: ∞ | <input type="checkbox"/> |

Other specify:

1.4 Type of usage (do no collect for regular houses): ...

1.5 Name of the building (do not collect for regular houses): ...

2. Building characteristics:

2.1 Check only if applicable:

| | | | | | |
|-------------------------|--------------------------|--------------------|--------------------------|-----------|--------------------------|
| Roof without wall (hut) | <input type="checkbox"/> | Under construction | <input type="checkbox"/> | Abandoned | <input type="checkbox"/> |
|-------------------------|--------------------------|--------------------|--------------------------|-----------|--------------------------|

2.2 Principal material of construction of the walls:

| | | | |
|----------------------|--------------------------|-------------------|--------------------------|
| Plastered | <input type="checkbox"/> | Tin Sheet | <input type="checkbox"/> |
| Exposed Brick | <input type="checkbox"/> | Clay wall / Mud | <input type="checkbox"/> |
| Exposed Cement Block | <input type="checkbox"/> | Gadjan / Palmyrah | <input type="checkbox"/> |

Other specify: ...

2.3 Foundation height:

| | | | | | | | |
|----------------------------|--------------------------|-------------------------|--------------------------|------------------------|--------------------------|-----------------------|--------------------------|
| Normal (1 foot or less) | <input type="checkbox"/> | Knee high (1.5 feet) | <input type="checkbox"/> | Waist high (3 feet) | <input type="checkbox"/> | Higher than 3 feet | <input type="checkbox"/> |
|----------------------------|--------------------------|-------------------------|--------------------------|------------------------|--------------------------|-----------------------|--------------------------|

3. Principal material of construction of the roof:

| | | | |
|-------------------|--------------------------|--------------------------|--------------------------|
| Clay/ Ciment Tile | <input type="checkbox"/> | Permanent Zink Sheet | <input type="checkbox"/> |
| Asbestos | <input type="checkbox"/> | Tin Sheet/Temporary Zink | <input type="checkbox"/> |
| Concrete slab | <input type="checkbox"/> | Gadjan/Palmyrah/Straw | <input type="checkbox"/> |

Other specify: ...

If applicable, number of faces for the main roof: _____

Sri Lanka Community Mapping Example

Before



2nd May 2013

After



4th May 2013



**FOR HOSTING OPEN SPATIAL
DATA**

Online Geospatial Data:



- Free and Open Source
- User and developer community
- Support
- Simple online tools to:
 - Search for data in the catalog
 - Collaborate and share data
 - Manage users and rights
 - Manage metadata
 - Standard compliant

A screenshot of the MASDAP (Malawi Spatial Data Portal) website. The page features a green satellite-style map of Malawi at the top. Below the map, there is a section titled "Welcome to MASDAP" with a "Get Started" button. Further down, there are four small thumbnail images representing different data layers. The website has a dark header with the MASDAP logo and navigation links like "Layers", "Maps", "Documents", and "People". At the bottom, there is a footer with the PCRAFI logo and text describing the Pacific Catastrophe Risk Assessment & Financing Initiative.

MASDAP Layers Maps Documents People Search... Sign in

Malawi Spatial Data Portal

Welcome to the BETA version of MASDAP, a public platform for GIS Data to support development in Malawi

[Learn more](#)

Welcome to MASDAP

MASDAP is a web-based data sharing tool launched in November 2012, managed by the National Spatial Data Center (in the Department of Surveys), in collaboration with the National Statistics Office and a number of technical Ministries.

[Get Started](#)



Powered by [GeoNode version 2.0](#) | [Developers](#) | [About](#)

Language: [English](#)



PCRAFI

PCRAFI

PACIFIC CATASTROPHE RISK ASSESSMENT & FINANCING INITIATIVE

Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) is a joint initiative of SOPAC/SPC, World Bank, and the Asian Development Bank with the financial support of the Government of Japan, the Global Facility for Disaster Reduction and Recovery (GFDRR) and the ACP-EU Natural Disaster Risk Reduction Programme, and technical support from AIR Worldwide, New Zealand GNS Science, Geoscience Australia, Pacific Disaster Center (PDC), OpenGeo and GFDRR Labs.

[Explore Layers](#)

[Explore Maps](#)

The Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) aims to provide the Pacific Island Countries (PICs) with disaster risk modeling and assessment tools. It also aims to engage in a dialogue with the PICs on integrated financial solutions for the reduction of their financial vulnerability to natural disasters and to climate change. The initiative is part of the broader agenda on disaster risk management and climate change adaptation in the Pacific region.

The Pacific Disaster Risk Assessment project provides 15 countries with disaster risk assessment tools to help them better understand, model and manage their exposure to disaster risk. The project is funded by the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI), a joint initiative of SOPAC/SPC, World Bank, and the Asian Development Bank with the financial support of the Government of Japan, the Global Facility for Disaster Reduction and Recovery (GFDRR) and the ACP-EU Natural Disaster Risk Reduction Programme, and technical support from AIR Worldwide, New Zealand GNS Science, Geoscience Australia, Pacific Disaster Center (PDC), OpenGeo and GFDRR Labs.

Disaster Reduction Programme, Applied GeoScience and Technology Division, SPC | [OGC Services](#) | [About](#)

Language: [English](#)

Example GeoNodes

The image displays two overlapping web pages. The top page is the Ebola GeoNode homepage, featuring a dark header with navigation links (Layers, Maps, Documents, People, Groups) and a search bar. The main content area has a world map background with the text: "Welcome to Ebola GeoNode. This is a partnership platform for sharing geospatial data, analysis and maps related to the Ebola emergency response. The platform is intended to minimize the time that GIS analysts spend locating up-to-date data. Users are able to make maps on the fly, view metadata, and access the reports behind GIS layers. Curators are working to ensure that the layers are recent, clean, useful, and legally and technically open. Request to Join the Mailing List. To contribute data, you will need a user account: Request Account by Email. Need help Getting Started?" Below this are three icons: a diamond for "58 Layers", a location pin for "7 Maps", and a document for "GeoNode al geospatial data". Each icon has a brief description and a button ("Explore Layers", "Create maps"). The bottom of the page features a green navigation bar with logos for INGC, moz-adapt, and various categories like Vulnerability, Adaptation, Data, and Tools. The bottom-right page is the Haiti Data website, with a red header and navigation menu. It includes a search bar, a "BIENVENUE" section with a description of the site's purpose, a "Catégories" section with a "Géographie" dropdown menu, and a map of Haiti showing various data layers. The bottom of the Haiti Data page has a language selector set to "Français".

Ebola GeoNode

Layers Maps Documents People Groups Type your search here ... Sign in

Welcome to Ebola GeoNode

This is a partnership platform for sharing geospatial data, analysis and maps related to the Ebola emergency response. The platform is intended to minimize the time that GIS analysts spend locating up-to-date data. Users are able to make maps on the fly, view metadata, and access the reports behind GIS layers. Curators are working to ensure that the layers are recent, clean, useful, and legally and technically open.

[Request to Join the Mailing List](#)

To contribute data, you will need a user account: [Request Account by Email](#)

[Need help Getting Started?](#)

58 Layers

Click to search for geospatial data published by other users, organizations and public sources. Download data in standard formats.

[Explore Layers »](#)

7 Maps

Data is available for browsing, aggregating and styling to generate maps which can be shared publicly or restricted to specific users only.

[Create maps »](#)

GeoNode al geospatial data

Haiti Data

ACCUEIL COUCHES CARTES DOCUMENTS PERSONNES RECHERCHER PARTENAIRES Se connecter

BIENVENUE

Le but de ce site est de faciliter le libre accès à l'information géo-spatiale d'Haïti, les données et les sources de connaissances, encourageant les autres à partager et les utiliser pour le développement d'Haïti. [En savoir plus](#)

Besoin d'aide [Pour Commencer](#)

Catégories [Découvrez des couches](#) [Découvrez des cartes](#)

Géographie Couches concernant les frontières, l'altitude, l'imagerie de base, les eaux intérieures, les océans, et plus encore.

int le biote, , l'agriculture, zeres et des lieux.

int la climatologie, , l'atmosphère et oscientifique.

int le transport, la e, l'économie, la ociété, les services incore.

Langue Français

InaSAFE: A QGIS PLUG-IN

QGIS



DISCOVER QGIS

FOR USERS

GET INVOLVED

DOCUMENTATION

English

Time until feature freeze 2015/01/23 12:00:00 UTC 0d 0h 0m
Time until next release 2015/02/20 12:00:00 UTC 4d 15h 8m

QGIS

A Free and Open Source Geographic Information System



Create, edit, visualise, analyse and publish geospatial information on Windows, Mac, Linux, BSD (Android coming soon)

For your desktop, server, in your web browser and as developer libraries

Download Now

Support QGIS

InaSAFE – Using data to inform decisions

- Black Duck software announced that InaSAFE was one of the top 10 “open-source rookies of the year” in 2012.
- Make it easy to generate realistic disaster scenarios for use in contingency planning
- More aware of the risks that we face; and be better coordinated and less surprised when a disaster strikes.



THE WORLD BANK



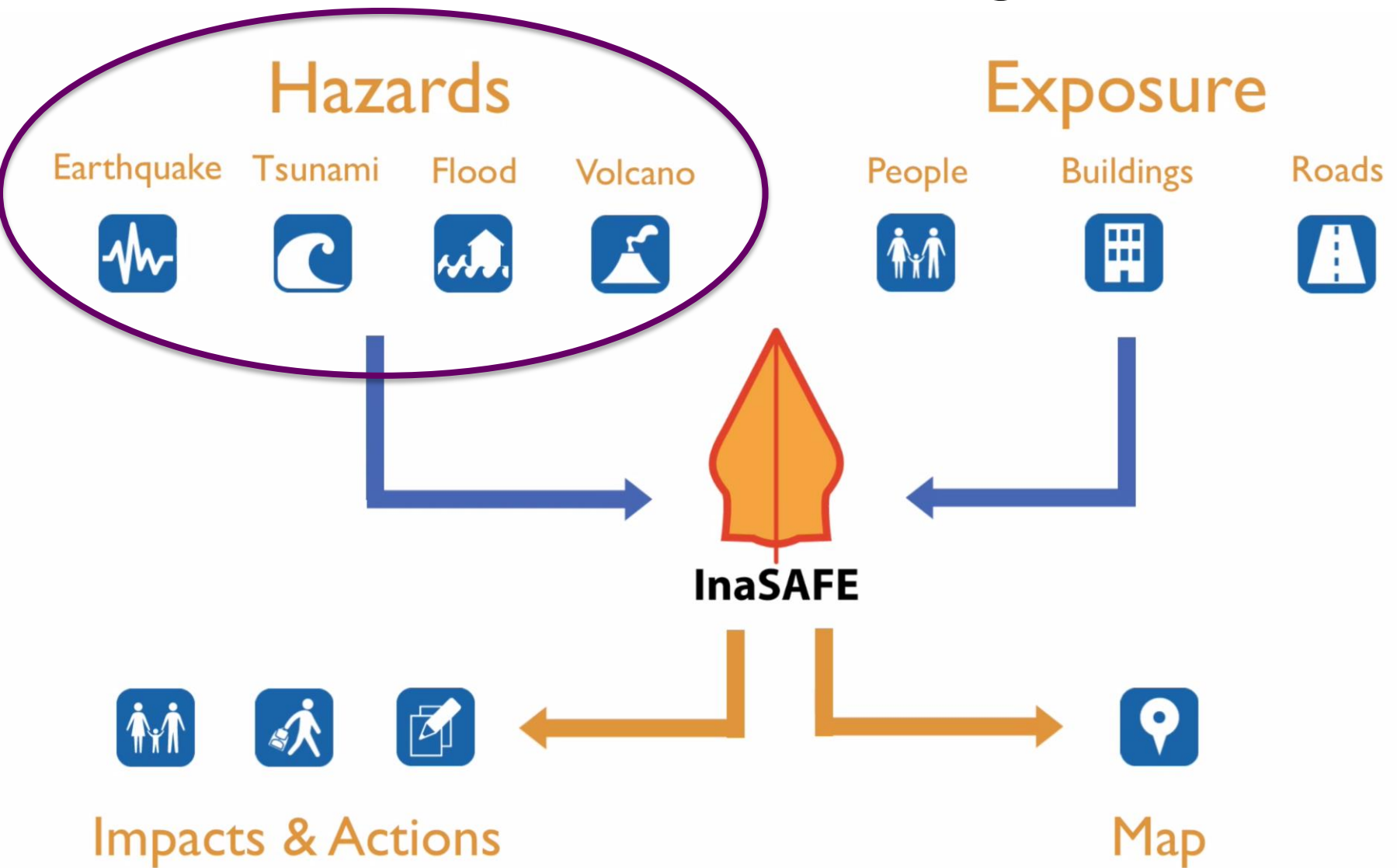
GFDRR
Global Facility for Disaster Reduction and Recovery



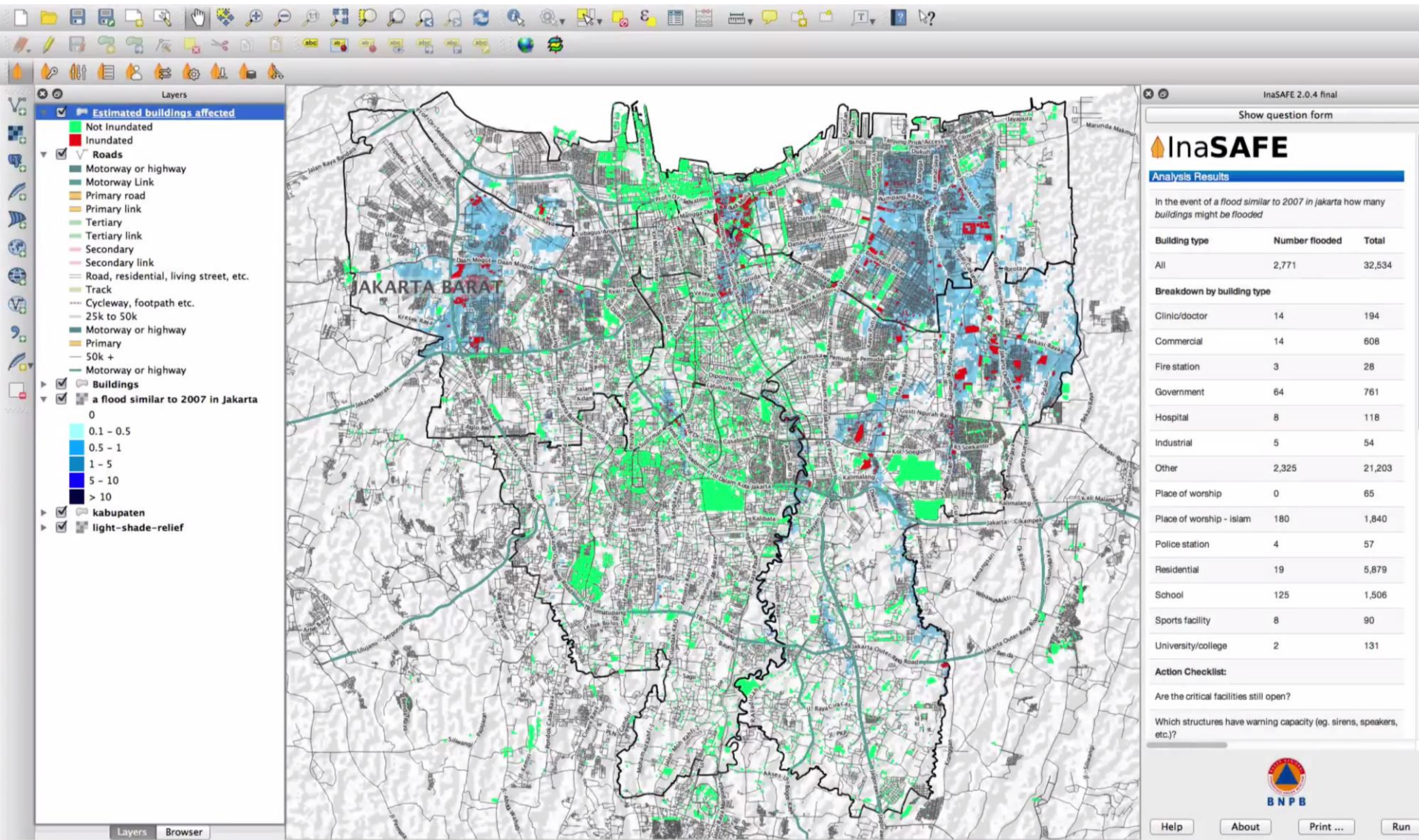
BNPB



InaSAFE – A QGIS Plug-in



InaSAFE Calculation for Jakarta



CONCLUDING COMMENTS

Ownership Leads To Action

Decision Makers:

- Local Governments
 - Disaster managers
 - Ministry of Finance
 - Business owners
 - Donors/multi-laterals
 - Citizens
-

Other Efforts Of Relevance

- DEWETRA – CIMA Foundation
 - The DEWETRA platform is a real-time integrated system for hydro-meteorological and wildfire risk forecasting, monitoring and prevention. The system is based on the rapid availability of different data which help establish up-to-date and reliable risk scenarios.

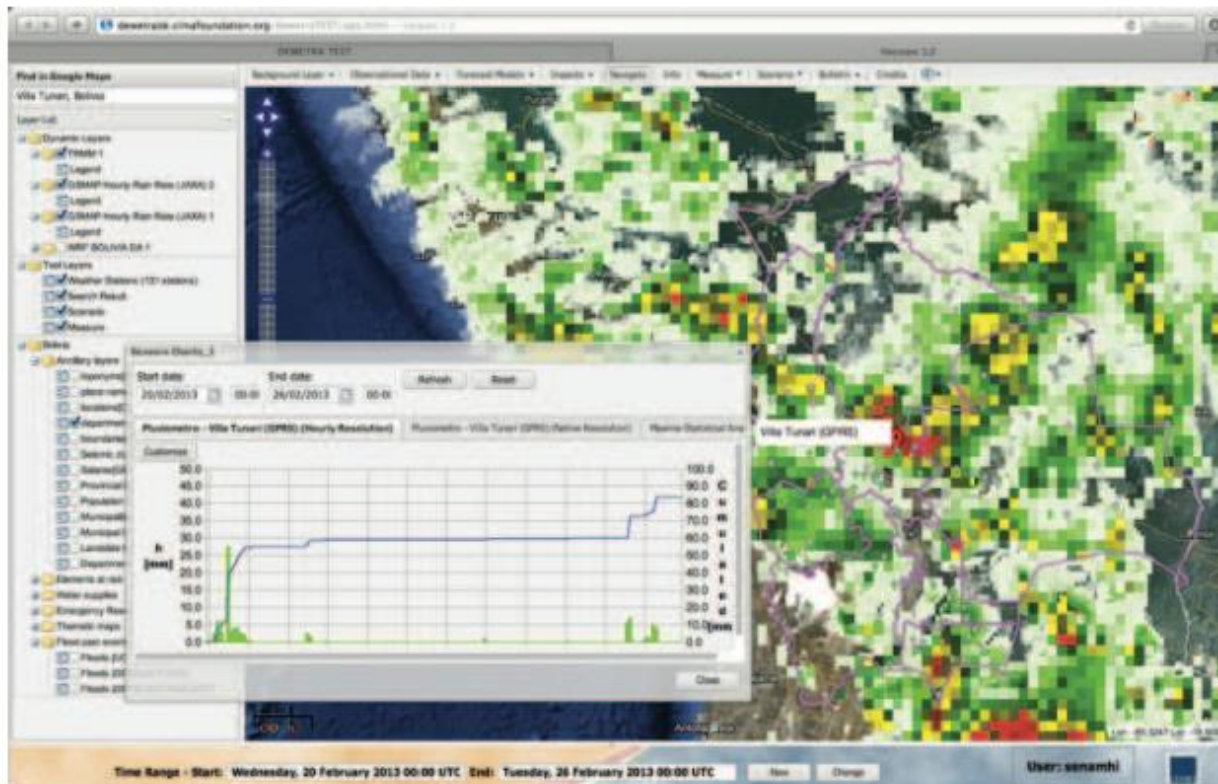


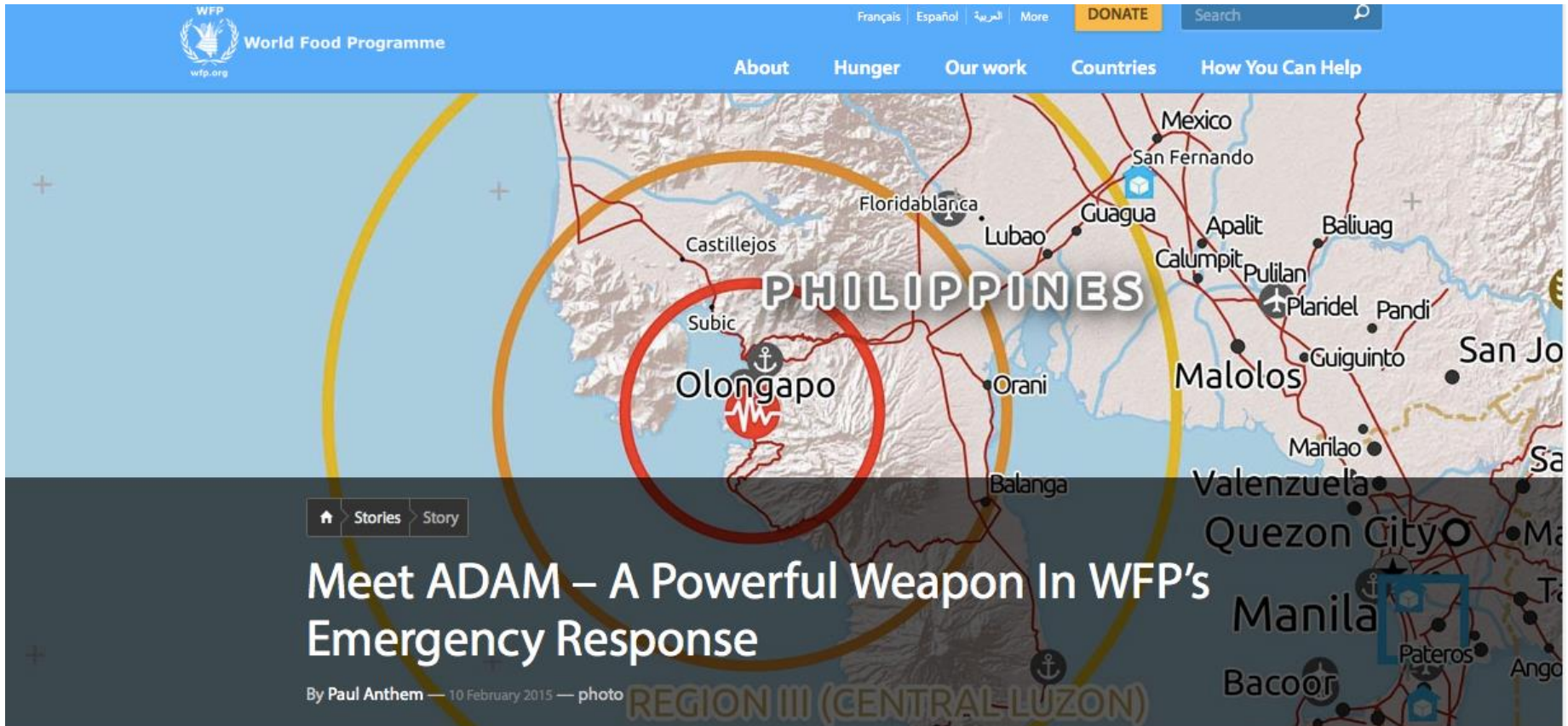
Figure 3. Multiple source rainfall observation on the Dewetra platform from February 25, 2013 00:00 to February 26, 2013 00:00, Bolivia. Cumulated rainfall map generated from TRMM (Tropical Rainfall Mission Measuring) data and automated weather station at Villa Tunari, Bolivia.

Other Efforts Of Relevance

- RASOR – Rapid Analysis of Spatialization of Risk
 - The Rapid Analysis and Spatialisation Of Risk (RASOR) project will develop a platform to perform multi-hazard risk analysis... RASOR overlays archived and near-real time very-high resolution optical and radar satellite data, combined with in-situ data for both global and local applications....
 - RASOR uses a scenario-driven query system... Managers can, for example, determine the extent of flooding in a given area and assess risk to Critical Infrastructure Systems in terms of the residual functionality of a given system (e.g. energy, transport, health)... RASOR allows managers to use real scenarios when determining new mitigation or prevention measures, and integrate new, real-time data into their operational systems during response activities.
 - But, will it be open source?
 - End users have been involved in conceiving the RASOR tool, and will shape its ultimate outcome through the in-depth development of requirements, a User Workshop and a dedicated Service Validation activity and Service Level Agreements (SLA) that demonstrate the viability of a commercial RASOR service to be offered at the conclusion of the project.
 - Also involves CIMA Foundation, Deltares, EUCentre, GFDRR, et al.
-

Other Efforts Of Relevance

- World Food Programme



The image is a screenshot of the World Food Programme (WFP) website. At the top, there is a blue navigation bar with the WFP logo and the text "World Food Programme" on the left. On the right, there are links for "Français", "Español", "العربية", and "More", a yellow "DONATE" button, and a search bar. Below the navigation bar, there are menu items: "About", "Hunger", "Our work", "Countries", and "How You Can Help". The main content area features a map of the Philippines. A red circle highlights the location of Olongapo, with a red anchor icon and a red heartbeat line symbol. Other cities labeled on the map include Mexico, San Fernando, Guagua, Apalit, Baliuag, Pulilan, Plaridel, Pandi, San Jo, Malolos, Marilao, Valenzuela, Quezon City, Manila, Bacoor, Pateros, Ango, Balanga, Orani, Lubao, and Castillejos. The text "PHILIPPINES" is written in large white letters across the map. Below the map, there is a dark grey banner with the text "Meet ADAM – A Powerful Weapon In WFP's Emergency Response" in white. To the left of this banner, there are navigation buttons for "Stories" and "Story". Below the banner, it says "By Paul Anthem — 10 February 2015 — photo". At the bottom of the map area, the text "REGION III (CENTRAL-LUZON)" is visible.

A newly launched alert system has the potential to dramatically speed up WFP's [response](#) in the aftermath of an emergency.