

# InaSAFE

A collaborative open source software development project

Indonesian Government - BNPB

Australian Government - AIFDR

World Bank - GFDRR



Australian Government

Geoscience Australia



WORLD BANK GROUP



**GFDRR**

Global Facility for Disaster Reduction and Recovery

# Acknowledgements

Colleagues at AIFDR & Geoscience Australia

Partners at World Bank & BNPB

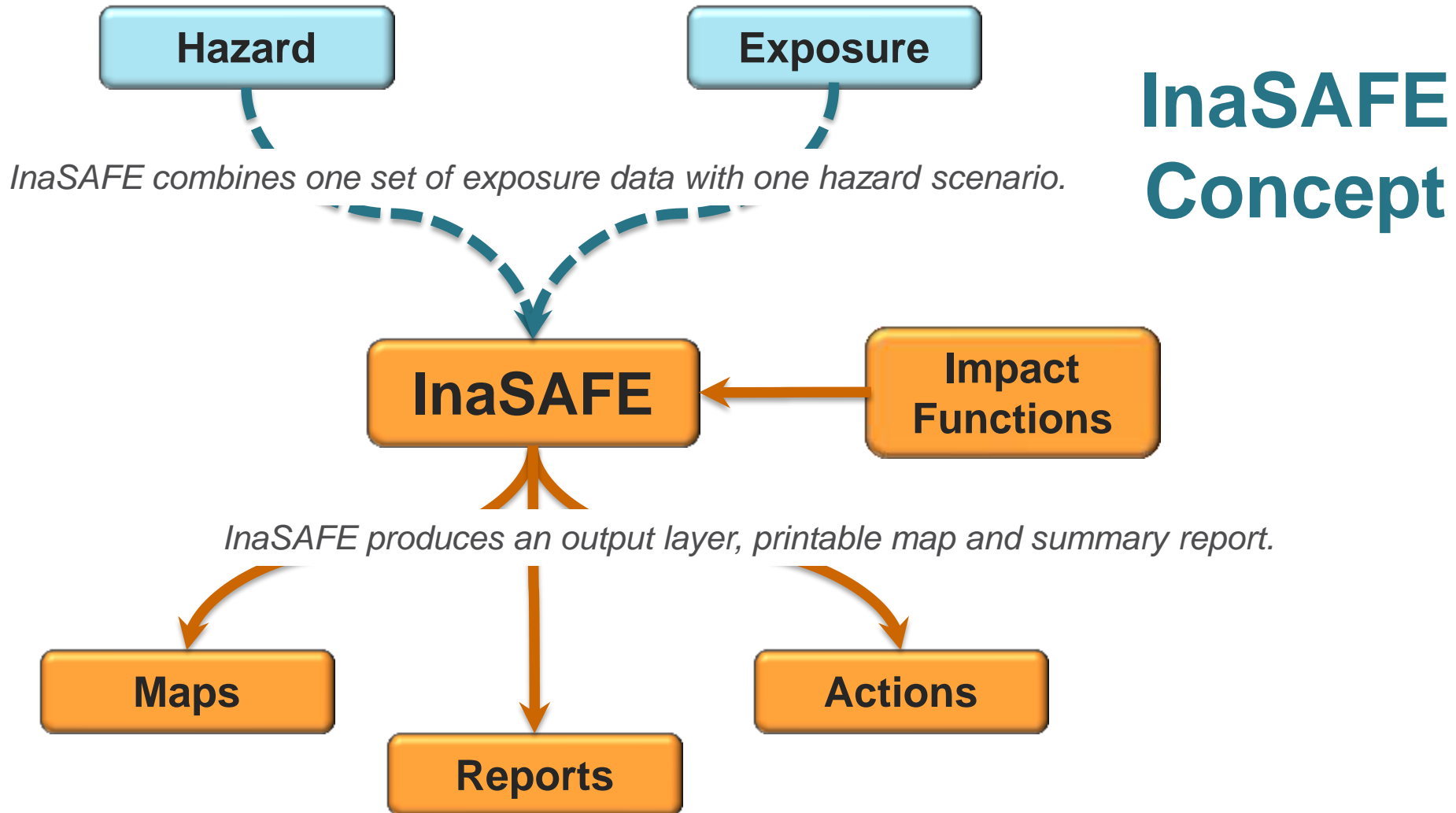
Open source enthusiasts at HOT OpenStreetMap & Kartoza



AUSTRALIA-INDONESIA  
FACILITY FOR  
DISASTER REDUCTION



InaSAFE is free software that produces realistic natural hazard impact scenarios for better planning, preparedness and response activities.



Scenario: in the event of a Flood in Jakarta, how many buildings will be affected?

## Hazard Data Sources

Universities  
Government Departments  
National Science Agencies  
Local Government  
Communities

*InaSAFE combines one set of exposure data with one hazard scenario.*

## Hazard Data

### Hazard Footprints

Volcanic Eruption – hazard zones  
Flood – flood prone areas

### Modelled Hazard Data

Earthquake – MMI (shakemap)  
Tsunami – maximum depth (m)  
Volcanic Eruption – ( $\text{kg}^2/\text{m}^2$ )  
Flood – depth maximum depth (m)

## Hazard Scenario

Hazard in InaSAFE refers to a single disaster scenario.

## Exposure Data Sources

OSM

World Pop

National Mapping Agency

National Statistical Agency

Local Government

Communities

*InaSAFE combines one set of exposure data with one hazard scenario.*

# Exposure Data

## Exposure Data

Population – number of people

Buildings – schools, hospitals

Roads – major, minor

Land use – agriculture, industry

## Vulnerability Attributes

Age, gender

Building type, construction style

Economic values

## Exposure

Exposure in InaSAFE refers to population count or structures.

In the event of a specific flood scenario, how many people will be affected & how many people may need to be evacuated.

**Flood**

**Population**

*InaSAFE combines one set of exposure data with one hazard scenario.*

# Impact Functions

**InaSAFE**

**Be affected or need evacuation**

*InaSAFE produces an map, report & action list.*

**Actions**

**Maps**

**Number of people affected x age x gender  
Minimum needs: rice, water, hygiene kits ...**

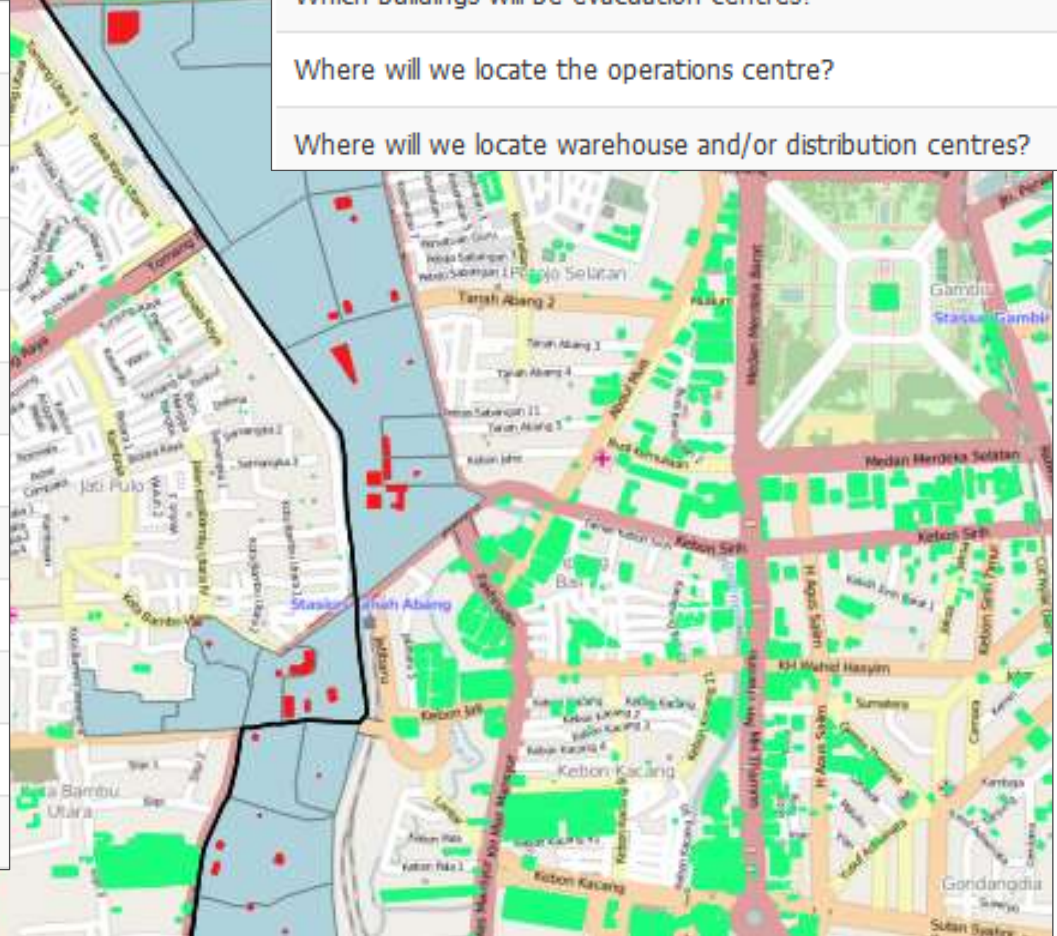
**Post processing**

InaSAFE can have multiple impact functions for each hazard or exposure data type.

# InaSAFE – Jakarta Flood



Breakdown by building type		
Clinic/doctor	25	184
Fire station	4	27
Government	97	696
Hospital	8	108
Other	3,924	26,667
Place of worship - islam	255	1,814
Police station	9	54
Residential	0	25
School	162	1,334
Sports facility	7	93
University/college	14	133



## Action Checklist:

Are the critical facilities still open?

Which structures have warning capacity (eg. sirens, speakers, etc.)?

Which buildings will be evacuation centres?

Where will we locate the operations centre?

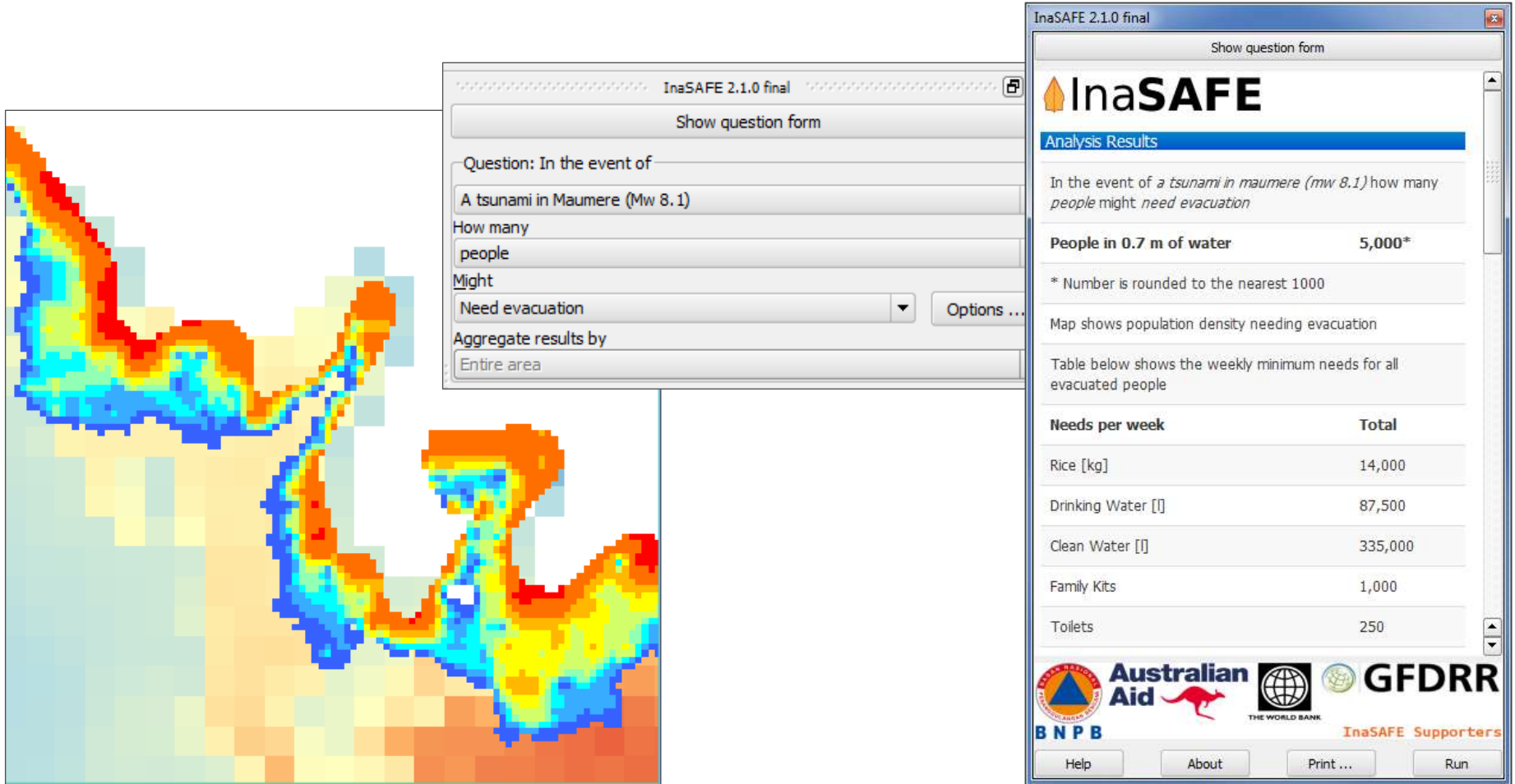
Where will we locate warehouse and/or distribution centres?

Hazard: Jakarta Flood January 2013 – BPBD DKI Jakarta

Exposure: Buildings - OSM

# InaSAFE – Maumere Tsunami

InaSAFE is free software that produces realistic natural hazard impact scenarios for better planning, preparedness and response activities.



Hazard: Maumere Tsunami Inundation Model – AIFDR (25m)

Exposure: Population Model – WorldPop (100m) | Buildings - OSM



# InaSAFE – Success Factors



Developed iteratively with specific target audience

Informs decisions that were already being made



Free and open source



Combines scientific data with local knowledge and local data



Easy to use!

Codifies government regulations

# InaSAFE – Future (Indonesia)



## BNPB:

- Risk assessment tools
  - Response tools
  - Recovery tools
  - Policy tools
- Indonesian data - population



## Local users:

- Risk assessment tools
  - Economic impacts and livelihoods
- Tools to get their data into InaSAFE
  - Other hazards - landslide

# InaSAFE – Roadmap 2014

Metadata standardisation

Wizards for:

- function driven analysis
- Data driven analysis

User input to:

- minimum needs, post processors & aggregation
- Analysis extent

Scoping of new impact functions such as:

- polygon land use analysis – economic impacts
- Damage & Loss Assessment – social impacts
- road network analysis – evacuation routes

# Summary

## AIFDR:

- is a partnership between the governments of Australia and Indonesia (BNPB)
- activities are focussed on disaster risk reduction and capacity building at the national and community levels

## InaSAFE:

- is free open source software
- does not include data and is not a hazard modelling tool

## The technology:

- brings natural hazard science to disaster managers and the community
- is relevant to disaster preparedness, response & recovery ..

# InaSAFE – Real Time Earthquake



**BADAN NASIONAL  
PENANGGULANGAN BENCANA**

Webmail | Intranet | Website Lama

Cari

BERANDA
PROFIL
PERKEMBANGAN BENCANA
PROSEDUR BENCANA
POLISI
KEKAWAN






Geospasial



Data Informasi Bencana



Peta-tanda Bencana

**BERITA TERKANYU** Ayo! Berita >

**STATUS GUNUNG TANGKUBANPERAHU DITURUNKAN DARI WASPADA MENJADI NORMAL**  
OLEH ADMIN • 18 March 2013 08:12

Kepala PVBMB Badan Geologi, Surono, telah mengirimkan perkembangan aktivitas Gunung Tangkubanperahu di Kab-Bandung Barat dan Kab Subang, Prov Jawa Barat kepada BNPB. Berdasarkan hasil pengamatan kegempaan, deformasi, visual, pengukuran gas, suhu kawah dan tanah serta analisis data, maka terhitung mulai Senin (18 Maret 2013) pukul 16:30 WIB status Salangrapiya -->

[Tweet](#) (0) [Like](#) (0)


**BERITA TERKANYU**



Gempabumi berkekuatan 5.5 SR dengan kedalaman 100 Km pada tanggal 2013-03-18 jam 10:54:36 WIB, berpusat di koordinat 131.05,-6.3 (148 km BaratLaut MALLUKUTENGGARABRT), dengan dampak nihil

**3 MENINGGAL DAN 1.153 RUMAH TERENDAM BANJIR DI SUMENEP DAN BANGKALAN, MADURA**  
OLEH ADMIN • 18 March 2013 07:40

Hujan deras yang hampir setiap hari turun di Madura menyebabkan banjir. Pada Jumat (15/3) pukul 13:30 Wib banjir terjadi di Desa Panggung, Kec. Pragasari, Kab Sumenep, Madura, Provinsi Jawa Timur akibat meluapnya sungai. Dua stawi Pondok pesantren Panggung bernama Nurul Kholifa (16 thn) dan Maryam (14 thn) tenggelam terasat arus sungai dan meninggal.




**Perkiraan Dampak Gempa**

**BNPB**

M 5.5 18-Mar-13 10:54:36

Bujur 131°30.00'E Lintang 6°18'0.00"S Kedalaman 100.0 km  
Berjarak 3.29 km, -116.43° WSW dari Tual

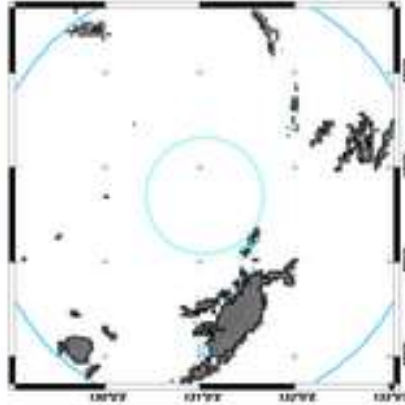


Waktu berlalu sejak kejadian 13 menit

**Perkiraan banyak penduduk yang terdampak untuk setiap tingkatan MMI**

Intensitas	II	III	IV	V	VI	VII	VIII	IX
Penduduk terdampak (x 1000)	2	241	0	0	0	0	0	0


Getaran Dirasakan: Lemah Lemah Agak Lemah Sengang Kuat Sangat Kuat Keras Sangat Keras



**Kota Terdampak**

Nama	Terdampak (x 1000)	Intensitas
Tual	39	II

**Perkiraan kematian : 0 - 100**



**Kepadatan penduduk**

- 5000-10000
- 100-1000
- 10-100
- 1-10

Perkiraan dampak ini dihasilkan secara otomatis dan hanya memperhitungkan penduduk dan kota yang terlintas oleh lingkaran getaran lemah. Perkiraan berdasarkan data getaran dari BMKG, data kepadatan penduduk dari anspop.org, informasi tempat dari gmmamam.org dan perangkat lunak yang dikembangkan oleh BNPB. Batasan pada perkiraan getaran lemah, data populasi, dan data nama tempat mungkin mengakibatkan kesalahan representasi pada situasi tanah yang ditunjukkan di sini. Oleh karena itu keputusan tidak seharusnya diambil semata-mata hanya berdasarkan informasi yang ditunjukkan di sini dan seharusnya selalu diperlukan konsultasi dengan sumber informasi lainnya. Perhitungan kematian menggunakan asumsi bahwa tidak terjadi kematian pada level getaran di bawah 4 MMI, jumlah kematian kurang dari 50 dibulatkan.

Didukung oleh Australia-Indonesia Facility for Disaster Reduction, Geoscience Australia, dan GFDRR.