



PetaBencana . id

Reducing Risk Together



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01 | OVERVIEW

1.1 Yayasan Peta Bencana (Disaster Map Indonesia Foundation)

Yayasan Peta Bencana supports the residents of Indonesia in reducing risk from disasters and increasing emergency response times, by providing free real-time information and transparent communication between government and local agencies, first responders, and residents.

The foundation is committed to democratizing decision support tools; ensuring that all residents have access to the information they need to coordinate individual and collective actions for safety, while also providing first responders with tools for evidence-based emergency response, alleviates confusion, minimizes losses, supports coordination, and improves community resilience.

In our commitment to supporting disaster preparedness and building resilient communities, the foundation is actively involved in engaging in co-research partnerships and training programs with various local communities, agencies, and universities across Indonesia.

The foundation advocates for the use of open source software and open data as fundamental tools and methodologies for mutual aid; supporting collaborative efforts for adapting to climate change.



1.2 Introduction

As cities become increasingly complex systems of people and interconnected infrastructure, extreme weather events and long term environmental changes pose new challenges for urban governance.

With intensifying weather events placing urban infrastructures under greater pressure, unanticipated and sudden failures of embankments, levees, and other defense infrastructures not only amplify destruction to surrounding areas, but also exacerbate the challenge for predicting and preemptively preparing for disasters. As extreme weather events occur at greater frequencies, placing the city's infrastructures under increasing strain and resulting in unforeseeable disasters, real-time information is critical for timely and informed decision making in order to minimize loss and improve safety.

Our question is simple:

How can the use of open source software and open data help residents adapt to climate change?

FIG 1.2 (Right): In 2013, widespread flooding in Jakarta was caused by an infrastructure failure



“Information is the most important resource in a disaster.”

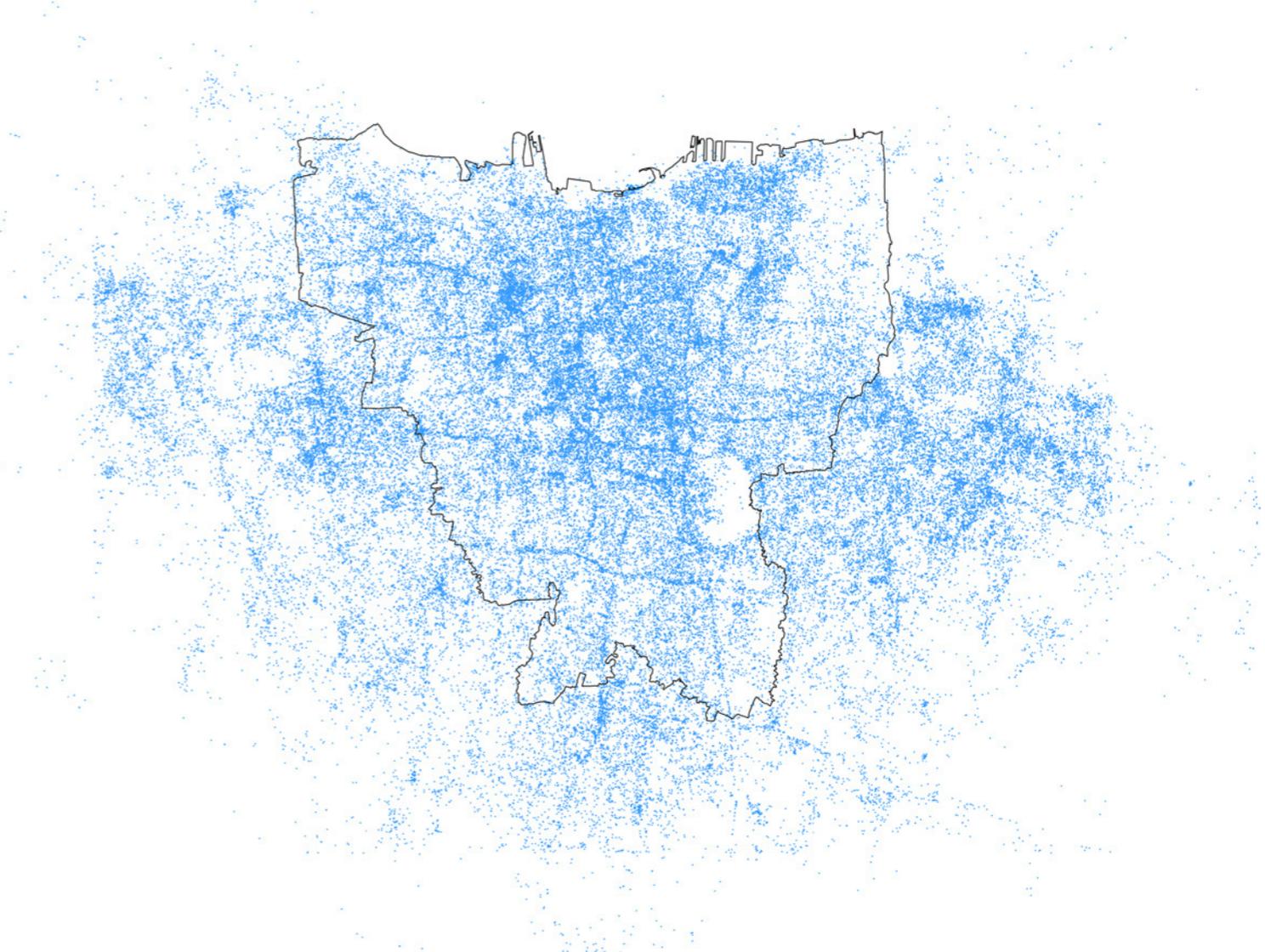
- Harlan Hale, OFDA Regional Advisor, USAID

Although rapidly urbanizing megacities are often thought to be “data scarce,” digital media networks have provided new channels through which residents are able to distribute information in real-time, allowing the city’s inhabitants to self-organize during emergency situations. With some of the highest concentrations of social and digital media usage in the world, Indonesian residents actively use their social media networks to gather and share information about disaster events; warning their communities about rising flood waters, congestion, and resource availabilities through social media.

A Twitter #DataGrant revealed that over a period of 6 months during the 2013/2014 monsoon season, Jakarta’s residents sent over 150,000 tweets about flooding. The active use of social media to coordinate response demonstrates that while there may be a lack of traditional formal data, a wealth of data exists in less traditional outputs; these networks could be leveraged as critical dimensions of disaster management infrastructure.

How can we transform the noise of social media into actionable insights? How can we register the participation of residents on social media into a meaningful framework that supports actionable responses, by filtering through the posts, tweets, and messages on social media, in order to get critical, verified, geotagged situational information to agencies that have the capacity to respond?

FIG 1.3 (Right): There were over 150,000 geolocated tweets about flooding in Jakarta during 2013/2014 monsoon season



1.3 PetaBencana.id

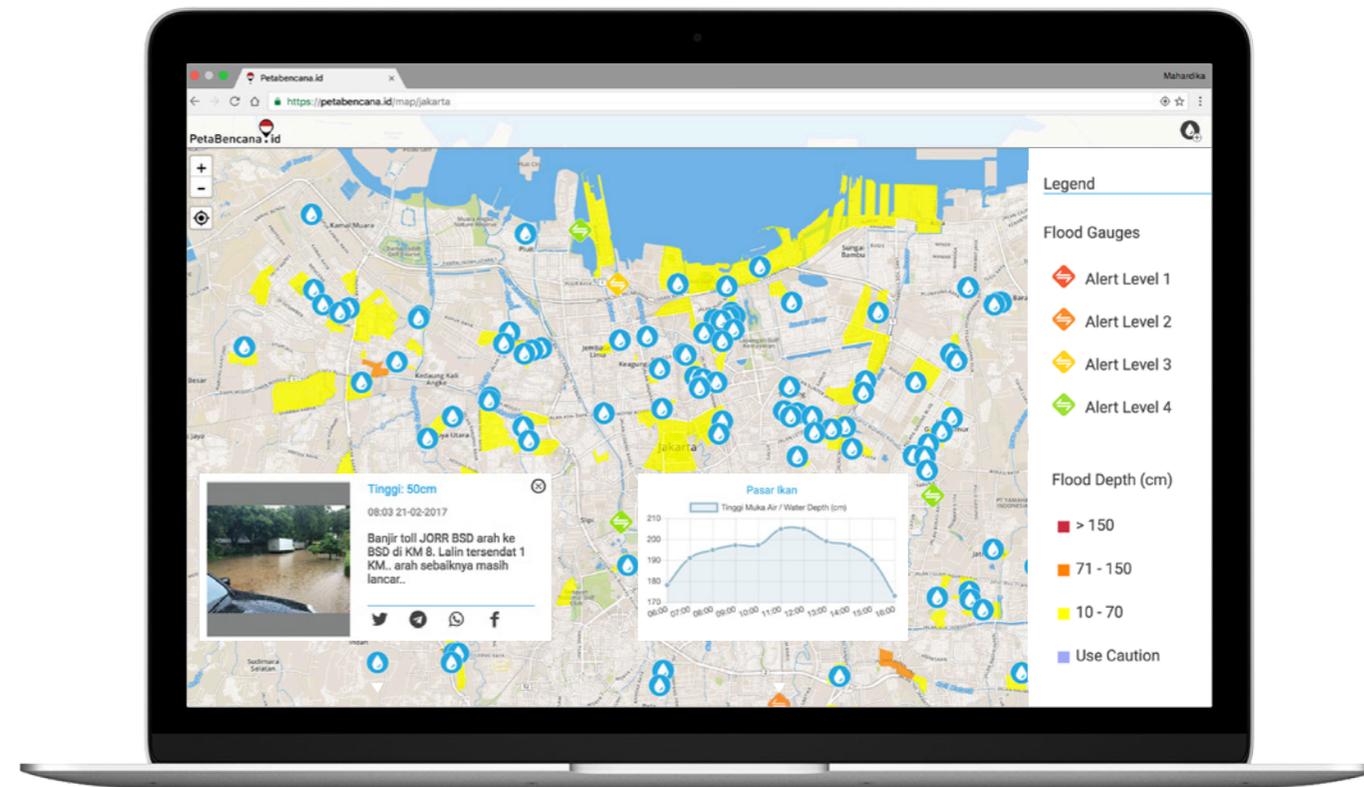
Powered by CogniCity Open Source Software, PetaBencana.id (previously PetaJakarta.org) is a free web-based platform that produces megacity-scale visualizations of disasters in real time, using both crowd-sourced reporting and government agency validations.

The platform harnesses the heightened use of social media and instant messaging during emergency events to gather and filter confirmed situational updates from residents at street level. CogniCity Open Source Software is able to filter through reports in a manner that removes the need for expensive and time consuming data processing, by engaging in AI-assisted conversations with residents through humanitarian chat bots over social media.

These verified crowd-sourced reports are displayed alongside relevant emergency data from local and government agencies. The flood map displays additional information about hourly river water levels, and locations of flood-affected areas as they are input by government emergency management agencies onto the map in real-time.

By providing immediate situational information for residents, first responders, and municipal agencies, PetaBencana.id enables users to make decisions about safety and navigation, and increases response times during disaster scenarios.

The transparent interface develops a framework for two-way communication; as the same platform supports peer-to-peer sharing and is transparently monitored by government agencies and first responders, PetaBencana.id promotes an ethic of information sharing and co-management.



02 | CIVIC CO-MANAGEMENT

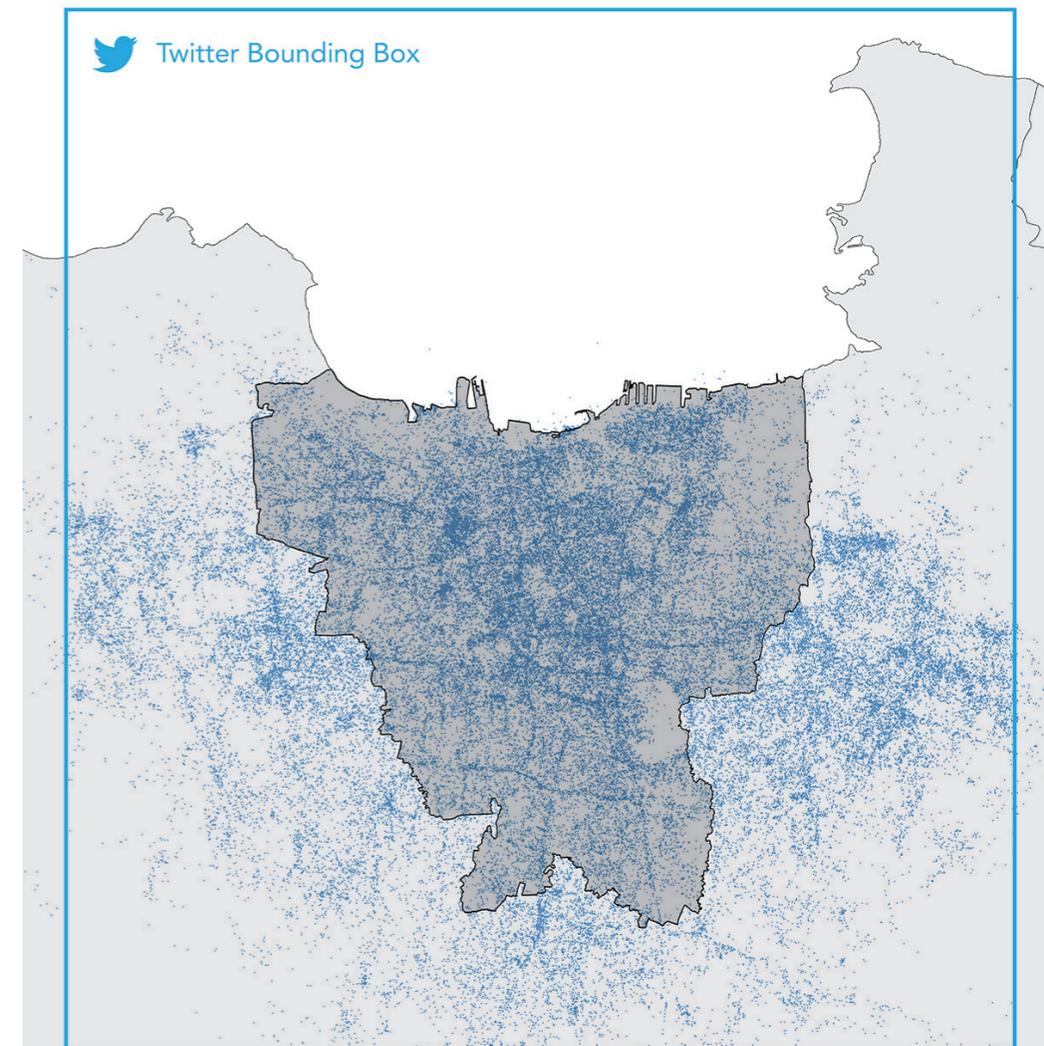
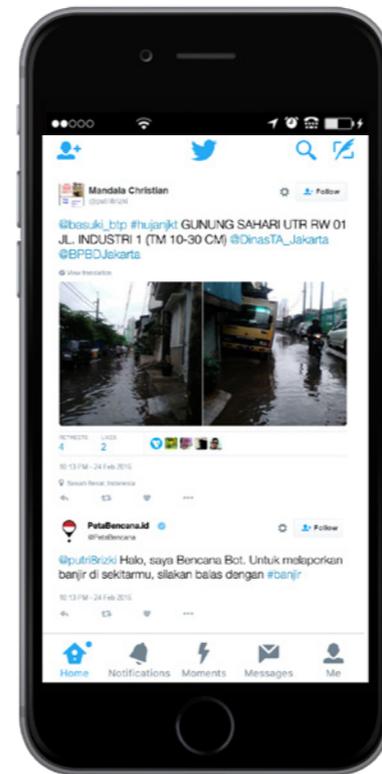
2.1 Crowdsourced Reports

Harnessing the active use of social media as an information sharing platform among residents during disaster events, CogniCity gathers crowdsourced reports from multiple platforms in order to display this real-time situational data on the map.



2.1.1 Humanitarian Chatbots

CogniCity facilitates the process of resident Twitter reporting by programmatically sending “invitation tweets” to users in designated geographic areas who use the keyword “flood” or “banjir.” This invitation message invites users to confirm their situation by completing a report card.



Users familiar with the platform can receive a report card by:



Tweet “flood” or “banjir” to @petabencana

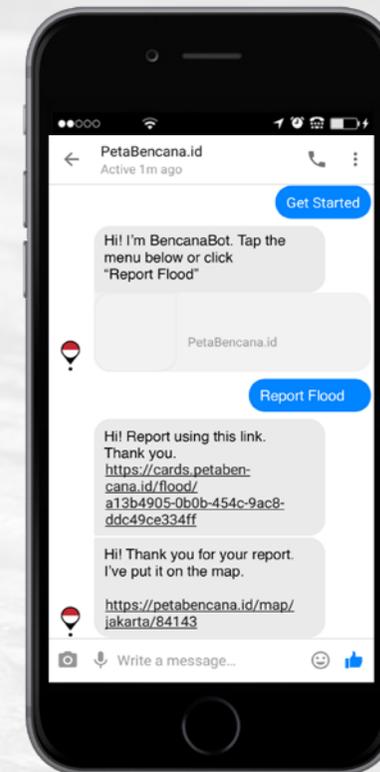
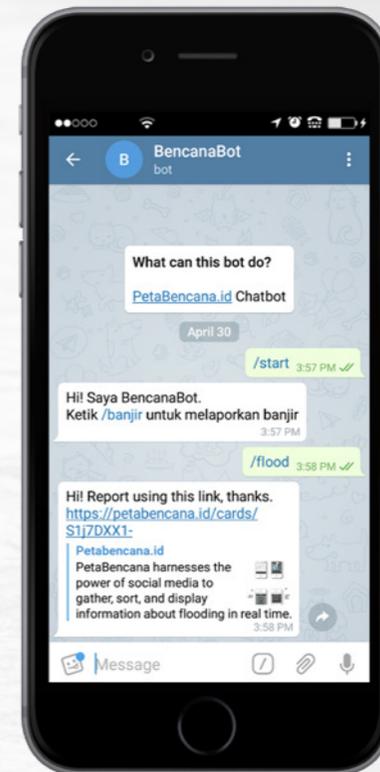
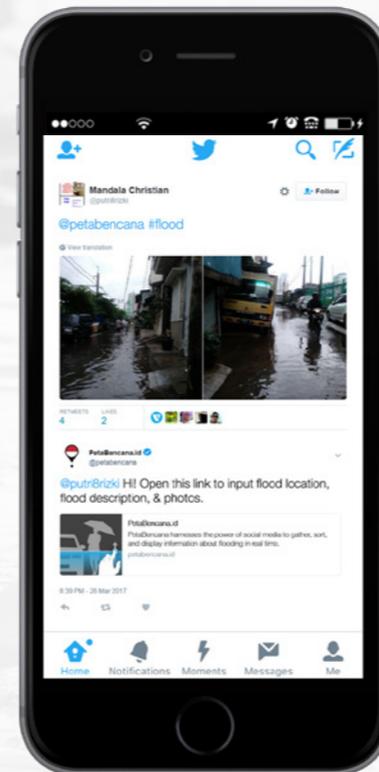


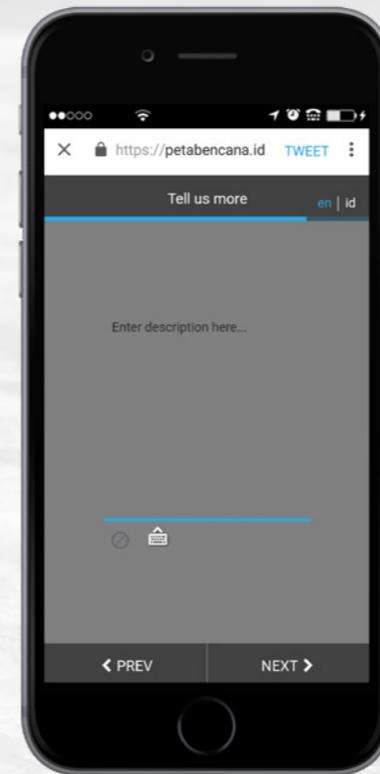
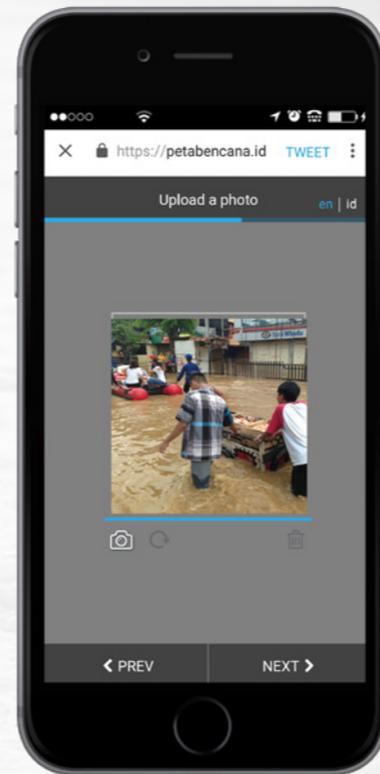
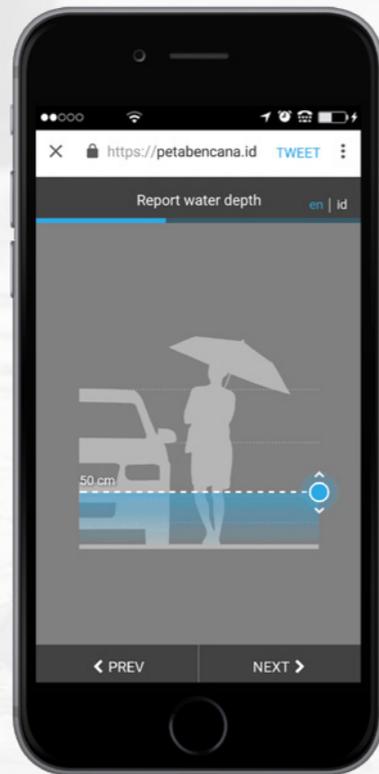
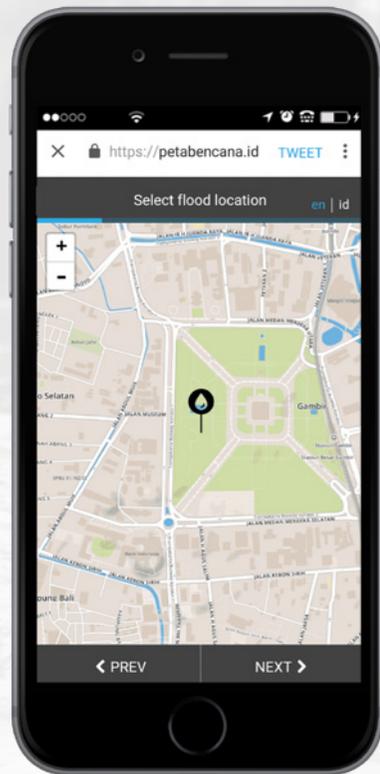
Telegram text “/flood” or “/banjir” to @bencanabot



Text the PetaBencana.id bot on Facebook Messenger

Link to How to Report Video: <https://www.youtube.com/watch?v=EfJRa9sF89Y>





2.1.2 Report Cards

The report cards allow users to submit accurate reports in four simple steps, enabling anyone to easily contribute structured information to the map. Users are asked to: confirm their location, input the flood height, submit a photo, and briefly describe the situation.

2.1.3 Local Applications

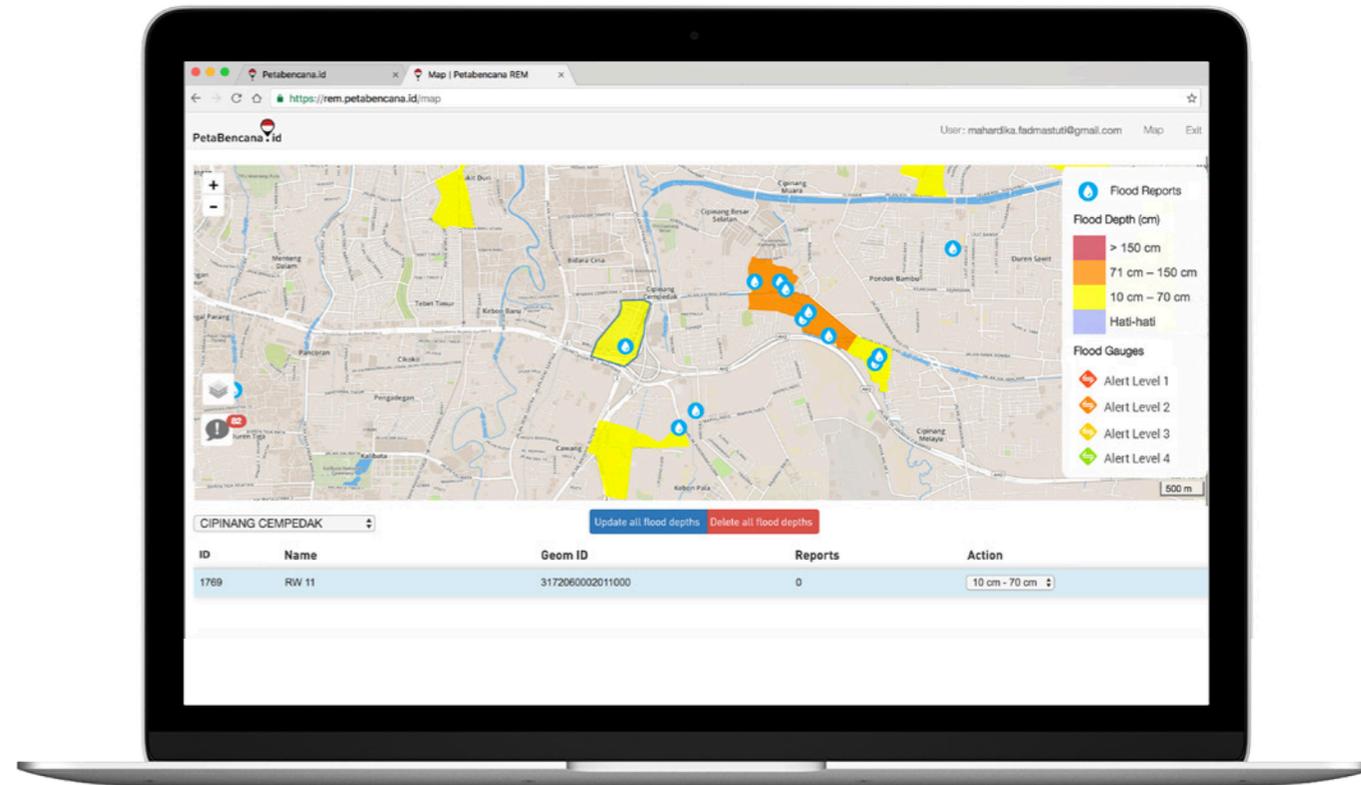
PetaBencana.id also partners with other local platforms that gather relevant flood data through crowdsourcing. In Jakarta, these include the SmartCity application Qlue, and the Detikcom citizen journalism platform Pasang Mata. Reports are shared with CogniCity via an open API.





2.3 Optional Tools: Risk Evaluation Matrix

As an optional platform extension, CogniCity's Risk Evaluation Matrix (REM) can facilitate even greater information sharing and data coordination among residents and government agencies. REM allows emergency operators to input flood height data derived from various sources including flood reports from PetaBencana.id users, government field officers, and NGOs. REM helps the emergency services alert residents to the locations of flooded areas and on the severity of the disaster.





04

COLLABORATIVE CO-RESEARCH

4.1 System Design as Collaborative Co-Research

The design and development of PetaBencana.id and the CogniCity OSS that underpins the public platform follows a sustained, iterative, collective, and multidisciplinary methodology of co-research involving the widest variety of stakeholders including disaster risk management agencies, government managers, scientific researchers, industry partners, and resident groups.

In developing frameworks to support community resilience through careful ethnographic studies, the foundation is actively involved in engaging in co-research partnerships and training programs with various local communities, agencies, and universities across Indonesia.



4.2 Community Engagement

With our primary commitment to **“Reducing Risk Together”**, the foundation is necessarily committed to community engagement events and programs that promote and support mutual aid.

During one such event, the foundation transformed the heavily traversed Sudirman-Thamrin road in Jakarta with an anamorphic street art installation. Every Sunday morning in Jakarta, main roads in the center of the city are closed off to vehicles for the weekly Car Free Day event, making way for thousands of walkers, joggers, bikers, and skaters. Peta Bencana took this opportunity to launch a preparedness event for the 2017/2018 monsoon season; as passers-by stopped to take selfies with the street art installation, they were reminded to continue to share their selfies with PetaBencana.id during the monsoon season, and contribute to real-time community flood-mapping.

Link to event video: <https://www.youtube.com/watch?v=JydtV2yJK3w>



The screenshot shows a Twitter profile for Sutopo Purwo Nugroho with 10.3K tweets. The tweet, posted 4 hours ago, reads: "Ondel-ondel saja ikut selfie foto 3D di car free day. Mosok kamu nggak sih? #carfreeday #CFDI #elshintaweekend @RadioElshinta @okezonenews @republikaonline @SINDOnews @temponewsroom @kumparan @liputan6dotcom @kompascom @mediaindonesia @". The tweet has 2 replies, 2 retweets, and 4 likes. Below the tweet is a photo of two people in traditional Ondel-ondel costumes on a street with a 3D street art installation. A second tweet by the same user, posted 5 hours ago, is partially visible at the bottom.





Peta bencana

banjir
@Petabencana



MOST RECENT
#banjir

 **luthfi.rafi**
Car Free Day B... > Follow



37 likes

luthfi.rafi Lumayan dapet kitkat #cfd
#Raniir #Databencana



BPBD DKI Jakarta
104.5K Tweets

Tweets Tweets & replies Media

 **BPBD DKI Jakarta** @BP... · 4h

Hello tweeps, yuk sempatkan mampir ke mural siaga banjir dalam kegiatan #SelfiesSaveLives di Care Freeday (Meetpoint : patung sudirman) bersma BNPB dan Petabencana.id

#Mulaidinikenalibencana #banjir
#BudayaSadarbencana
#SiapUntukSelamat cc:
@Sutopo_BNPB @petabencana



8 8

05 | AWARDS & ACHIEVEMENTS

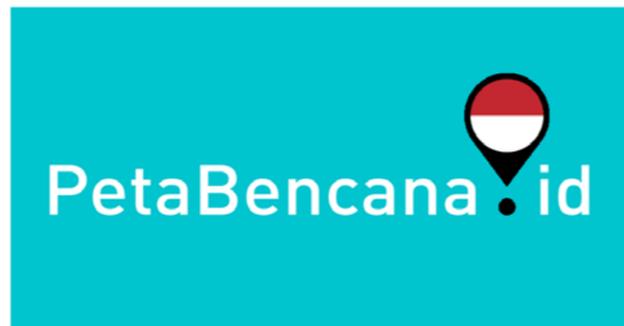


2018

Award

Prix Ars Electronica

PetaBencana.id was awarded a 2018 Prix Ars Electronica Honorary Mention. Recognized as the “world’s most time-honored media arts competition”, the prize awards projects that are radically different and socially impactful. In 2018, the Prix Ars Electronica received 3,046 entries from 85 countries. PetaBencana.id was one among 12 projects that received honorable mentions for the Digital Communities category.



HONORARY MENTION
PRIX ARS ELECTRONICA 2018

PRIXARS

“ PetaBencana.id is recognized by Ars Electronica for demonstrating the latest developments in social software, building community action and interaction, strengthening the role and ability for civic participation, and promoting social innovation as well as cultural and environmental sustainability through internet technology.

”

2017

Award

ISIF Asia
(Information Society
Innovation Fund)

PetaBencana.id was awarded the 2017 Internet for Development Award, from the Information Society Innovation Fund (ISIF Asia). The award recognizes projects that excel in employing innovative internet-based approaches for positive change, and that demonstrate promising strategies for the future of the Internet.

isif  asia

2017 Awardee

ISIF Asia Internet for Development Award 2017

AWARDS 2017

1 Innovation Initiative Selected

INTERNET FOR DEVELOPMENT

Democratizing Decision Support:
PetaBencana.id Platform for Equitable
Disaster Resilience
Yayasan Peta Bencana
Indonesia

36
Nominations
received from
13 economies



Yayasan Peta Bencana, Indonesia "Democratizing Decision Support: PetaBencana.id Platform for Equitable Disaster Resilience"

“
...an outstanding group that demonstrate the very high standards of I4D (Internet for Development) and R&D (Research and Development) in the Asia Pacific region

”

2017

Award

THE NEW ART FEST '17
Outstanding
Art in Society Award

Peta Bencana's two-channel, immersive film production, *The Same River Twice*, was exhibited at The New Art Fest at the National Museum of Natural History and Science in Lisbon, Portugal, where the project was awarded an 'Outstanding Art in Society' Award.

“ *The project displays innovative processes of crowd sourcing urban data, and its usefulness to help risk and damage control resulting from climate events.* ”



2017

Award

ASIA GEOSPATIAL Excellence Award

The National Disaster Management Agency of Indonesia (BNPB) received the 2017 Asia GeoSpatial Excellence Award for their implementation of PetaBencana.id. The award recognizes the application of geospatial technologies to strengthen resident engagement.

“ Our Jury believes that PetaBencana.id demonstrates the power of geospatial information and technology in impacting the lives of people at grassroots level and strengthening disaster preparedness, thereby highlighting its role as a tool in socio-economic development. ”



2017

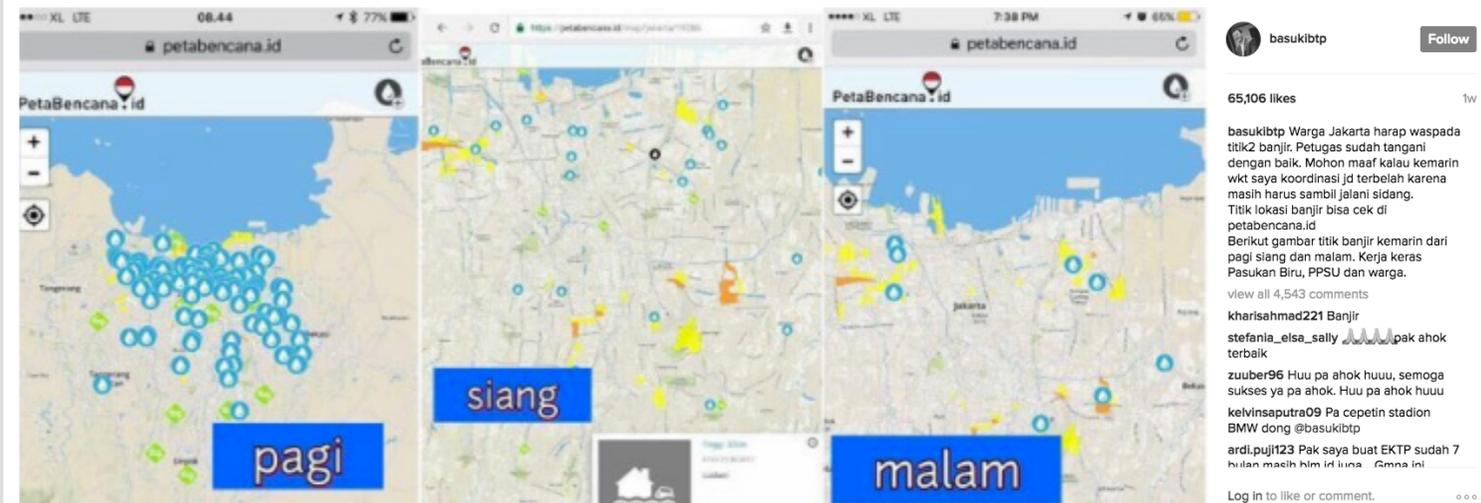
Media Feature

JAKARTA GOVERNOR via Instagram & Metrotv

The governor of Jakarta, Basuki Tjahaja Purnama, posted annotated screen captures of Petabencana.id to his Instagram account during the 2017 monsoon season, calling for residents to check the map in order to stay informed. In a story about the Governor's social media usage, MetroTV News described how emergency management agencies were able to respond to the flooding situation immediately because of the platform.

“
Jakarta citizens, be cautious of flooded areas. Check the locations of flooded areas on PetaBencana.id. Here are some screenshots of yesterday's flood, in the morning, afternoon, and evening.

”



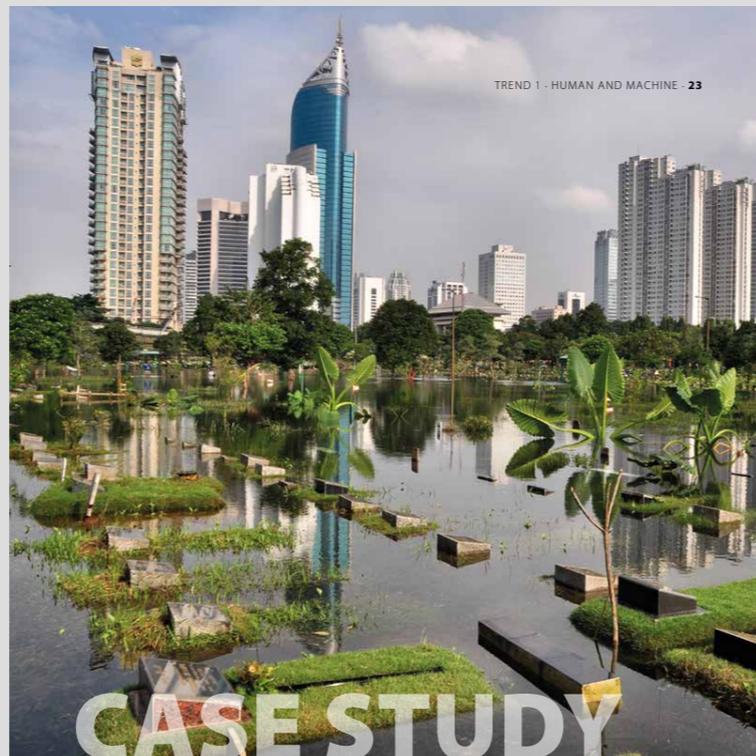
2017

Featured Case Study

OECD

Organisation for
Economic Co-operation
and Development

PetaBencana.id is featured as a case study in OECD's report on innovative governance practices. The report commends the unintrusive integration of the platform into the National Disaster Management Agency's existing disaster risk management information ecosystem, representing a major advance on the agency's previous information dissemination systems.



PetaBencana.id – Indonesia

SUMMARY

"Selfies save lives" This is the motto of *PetaBencana.id*,¹¹ a tool that combines data from hydraulic sensors with citizen reports over social media and civic applications, including via Twitter, to produce real-time flood maps in Jakarta – and soon, other cities in Indonesia. These web-based, publicly accessible maps now provide the best available flood information for the government and residents. *PetaBencana.id* started as *PetaJakarta*, which focused on only the city of Jakarta, but is now scaling to cover more cities in the country.

11. See www.petabencana.id.

“ ... since 2015 BNPB has used the platform as part of its daily emergency management operations, representing a breakthrough in information exchange with citizens.

”

2016

Example of Best Practice

THE FEDERAL Communications Commission

In 2016, the Federal Communication Commission of the United States recommended the pilot project, PetaJakarta.org, as the best model for a new disaster information crowdsourcing platform.

the Squawk Channel and other tellite-based communications sources approved by FEMA be dified in the Commission's EAS les?

80. The Commission also seeks mment on whether and how alert iginators use alternative alert strribution platforms, such as social edia and highway signs, to pplement their traditional alerting annels. What is the extent to which ergency managers at the federal, ite, and local levels currently leverage geted feedback during emergency uations to disseminate and gather formation? The Commission seeks mment on the extent to which social edia has served as a reliable and ective source of crowdsourced data out developing situations. To what tent have alert originators begun ing advantage of social media's wdsourced communications nctionality in order to establish a real- ne conversation with individuals and mmunities in crisis? Is the formation generated by social media affirms reliable enough to be trusted ergency managers, and if not, at challenges are involved? The mmission seeks comment on the ps that emergency managers rrently take to confirm the accuracy of wdsourced reports of emergency uations in order to act on, correct or rify, or otherwise respond to such ports. Are the platforms secure ough to be used in emergency uations? To what extent has the use social media platforms supplemented rt accessibility, either by providing nslations of alerts in languages other an English or by providing alerts in

81. Are there examples of best practices from the Commission's federal, state and local government partners for using crowdsourced information in an emergency situation? The Commission observes that the Peta Jakarta initiative in Indonesia may provide an example of how a government alert initiator can leverage crowdsourced data to increase the overall effectiveness of alerts. The Peta Jakarta project piloted a program that monitored Twitter for posts mentioning the word for "flood" during flooding season. The system would automatically respond to such messages, asking whether the user saw flooding, at which point the user could confirm their report either by turning geo-location on in their device settings, or by responding, in turn, with the word for "flood." Peta Jakarta then incorporated the results of this information-gathering process into a live, public crisis map that depicted in real time areas in the city that were affected by flooding. To what extent would it be possible to leverage this model as a best practice for automated crowdsourcing of reliable emergency response data, using regulated alerting platforms in the United States? To what extent is a similar model to the one utilized by Peta Jakarta feasible using EAS and/or WEA, in order to provide an authoritative source of information? The Commission observes that emergency managers used Twitter in a 2013 flood in Boulder, Colorado to prioritize deployment of satellite- and drone-based imaging platforms to the most severely impacted areas. To what extent could community feedback via EAS or WEA be similarly used to prioritize emergency managers' information gathering efforts?

“ To what extent would it be possible to leverage this model as a best practice for automated crowdsourcing of reliable emergency response data, using regulated alerting platforms in the United States? ”

2016

Media Feature

OPEN DATA INSTITUTE Showcase Award

The pilot project, PetaJakarta.org, was the recipient of the 2016 ODI Showcase Award. The award supports projects that demonstrate how open data can be used to benefit individuals, organizations, and society.

“

The map – and the software and data behind it – are shared openly, so can be integrated into systems from government agencies and NGOs tasked with responding to the flooding. This offers a practical solution for developing platforms of civic co-management in cities facing extreme weather events.

”



2015

Example of Best Practice

IFRC

International Federation
of Red Cross and Red Crescent
Societies

The 2015 World Disasters Report recognizes the role that local actors play in emergency situations. The pilot project, PetaJakarta.org, was recommended as a model for empowering local actors and changing the nature of community-level disaster response.



World Disasters Report

Focus on local actors, the key
to humanitarian effectiveness

www.ifrc.org
Saving lives, changing minds.

 International Federation
of Red Cross and Red Crescent Societies

“ *A tool that responds to the way
disasters actually unfold and the way
people really react, rather than predicted
or idealized projections of behaviour.* ”

2015

Example of Best Practice

PARLIAMENT
of AUSTRALIA

Standing Committee on
Infrastructures & Communications

In a deposition to the Standing Committee on Infrastructure and Communications of the Government of Australia, project co-director Dr. Tomas Holderness recommended PetaJakarta.org as model for transforming social media into actionable information for residents and decision makers. The project was commended for its ability to work and integrate data openly across multiple fields.



COMMONWEALTH OF AUSTRALIA

Official Committee Hansard

**HOUSE OF
REPRESENTATIVES**

STANDING COMMITTEE ON INFRASTRUCTURE AND
COMMUNICATIONS

**Smart information and communications technology in the design and planning
of infrastructure**

FRIDAY, 21 AUGUST 2015

EVELEIGH

BY AUTHORITY OF THE HOUSE OF REPRESENTATIVES

“

When we talk about disaster management, knowing when and where the flood is going to reach and aligning that with the information that you could provide through Twitter and layer the two together, then the capability of managing disasters of a great variation would be very useful.

”

2014

Grant

TWITTER #DataGrant

In 2013, PetaJakarta.org was selected as one of six recipients of the first Twitter Data Grant. The competitive program was launched by Twitter to connect researchers with Twitter data for real-world applications. The Twitter Data Grant map visualizes flood-related Tweets across Jakarta between November 2013 and February 2014.

Helping Jakarta track flooding in real time to save more lives

Tuesday, December 2, 2014 | By Mark Gillis (@mjgillis), Academic Partnerships [18:54 UTC]

The city of Jakarta, Indonesia suffers from widespread annual flooding during the monsoon season. According to BPBD DKI Jakarta, the emergency management agency of Jakarta, more than one million people in the city were affected by the Great Flood in January 2013. As weather patterns become more unpredictable, flooding is a serious problem for 28 million people living in the Greater Jakarta area, the second largest metro in the world. By leveraging Twitter's real-time information network, PetaJakarta.org (@petajkt) uses social data to help improve the lives of millions of people.

When the public infrastructure fails during floods, Jakarta residents experience cascading negative effects. If a single river lock fails, for example, it can wipe out one of the city's major thoroughfares and simultaneously knock a major transportation hub offline. City life can grind to a halt in a matter of hours after the first drops of rain fall. These cascading effects means real-time communications about what is happening is direly needed by the citizens and government of Jakarta.



 **Ebod**
@jang_ebod

 Follow

“ *By leveraging Twitter's real time information network, PetaJakarta.org uses social data to help improve the lives of millions of people.*

”

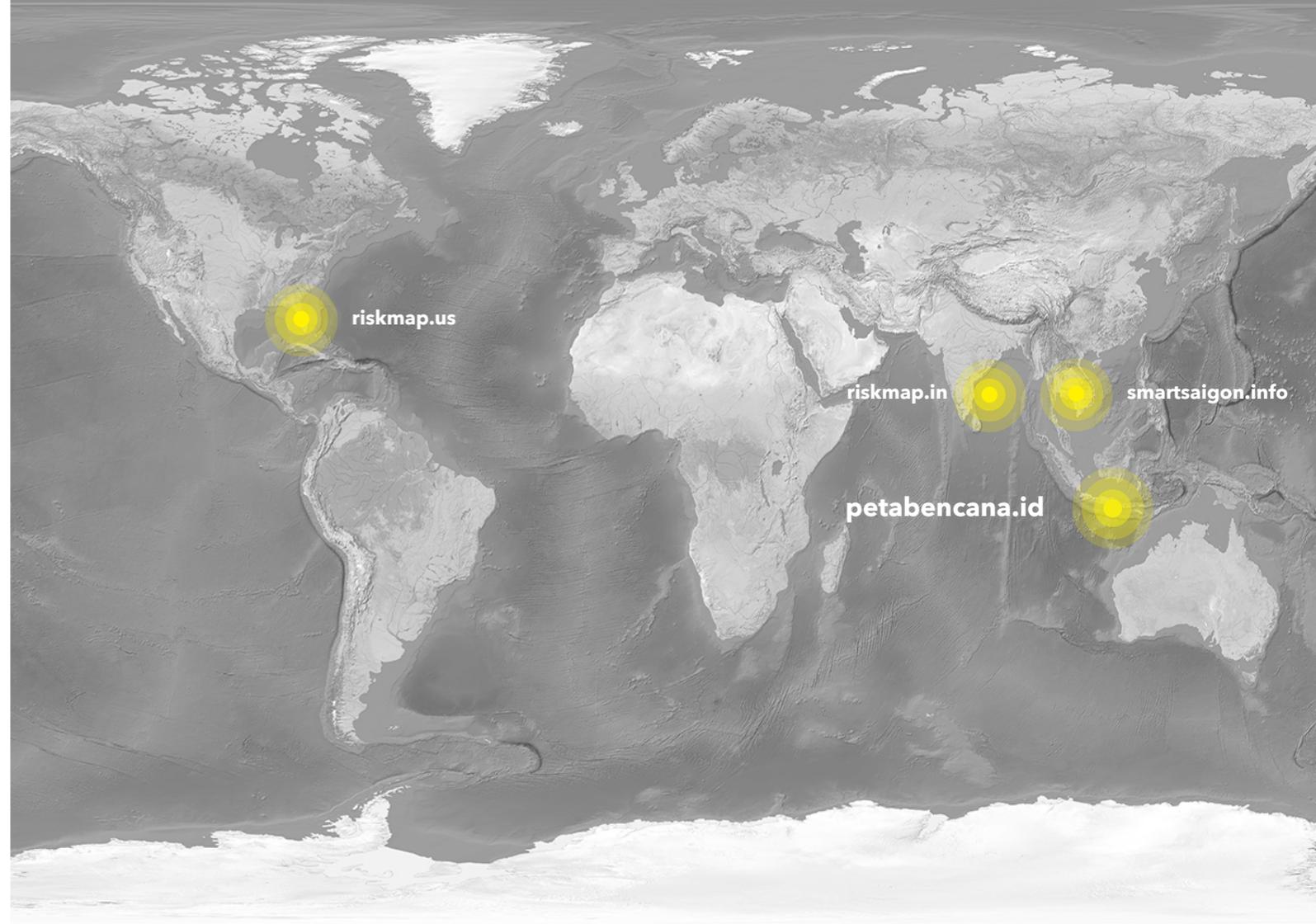
06

OPEN SOURCE FOR CLIMATE ADAPTATION

PetaBencana.id has proven the value of accessible, transparent data, in facilitating effective two-way communication and coordination between government agencies and residents; the platform has contributed to greater levels of trust, and has shifted the relationships between residents and government agencies who are now more willing and able to openly share verified information. However, the accessibility and transparency of data extends far beyond the platform itself. Peta Bencana Foundation is a strong advocate for the use of open source software and open data in supporting collaborative efforts for adapting to climate change. In making the data open, all users are enabled to inspect the software, review the system, and develop complementary tools and technologies that further enhance resilience.

The open source community provides a rich environment for knowledge exchange; supporting frameworks to build and expand upon networks of a diverse range of expertise, the sharing environment catalyzes research insights and propels capacities for the development of tools and methodologies for humanitarian aid. CogniCity OSS has already been adapted to develop risk maps in the United States, India, and Vietnam, and is currently being adapted to serve a wide range of additional geographies, as well as various domains of other applications.

The Peta Bencana foundation is excited to support this growing community, as partnering teams around the world continue to exchange ideas, and build and expand upon existing bodies of work in order to develop robust frameworks for climate adaptation.



RESEARCH PARTNERS



IMPLEMENTING PARTNERS



DATA PARTNERS



GRANTS & AWARDS



MEDIA FEATURES



