



# TSUNAMI AWARENESS IN INDONESIA

Khaerunnisa Ph.D

[khaerunnisa@uajy.ac.id](mailto:khaerunnisa@uajy.ac.id)

Brigitta Michelle S.T.

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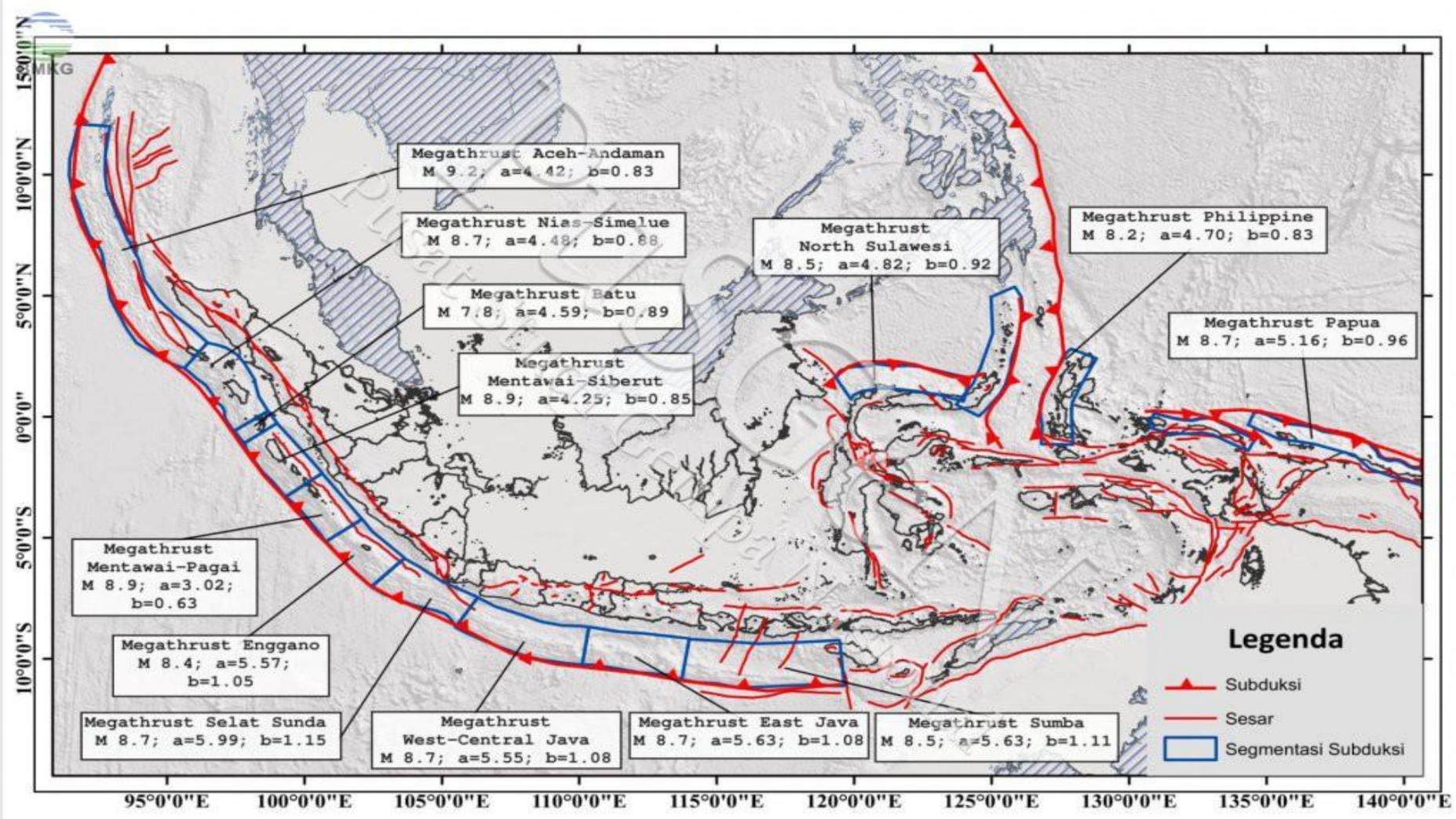
Tsunami  
Awareness in  
the Society

- Questionnaire  
Survey



# TSUNAMI IN INDONESIA AT A GLANCE

Picture source: [theatlantic.com](http://theatlantic.com)

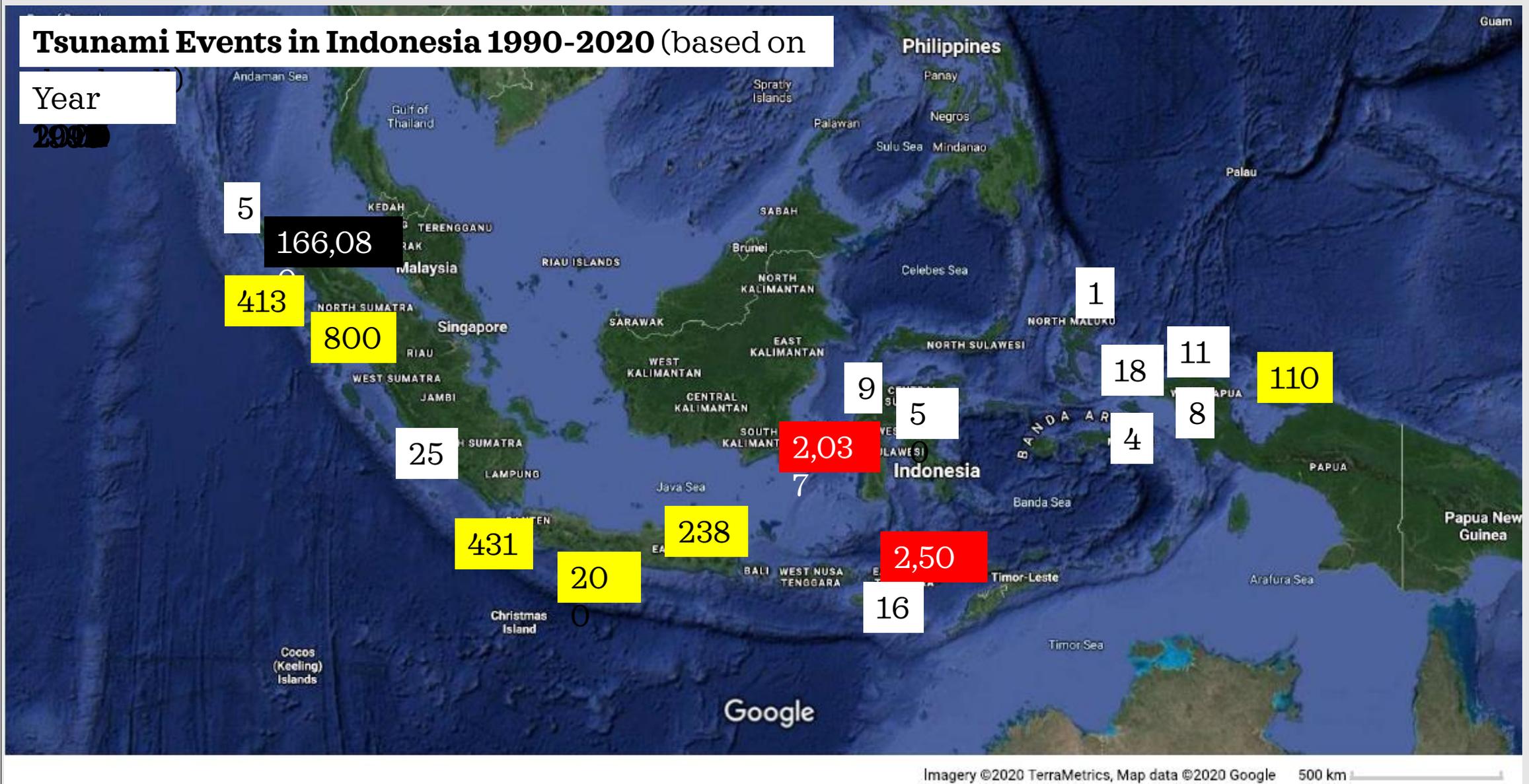


Indonesia is located at the confluence of three active earth plates, namely the Indo Australia plate, the Eurasian plate and the Pacific plate. This plate activity is the most frequent cause of tsunamis in Indonesia

# Tsunami Events in Indonesia 1990-2020 (based on

Year

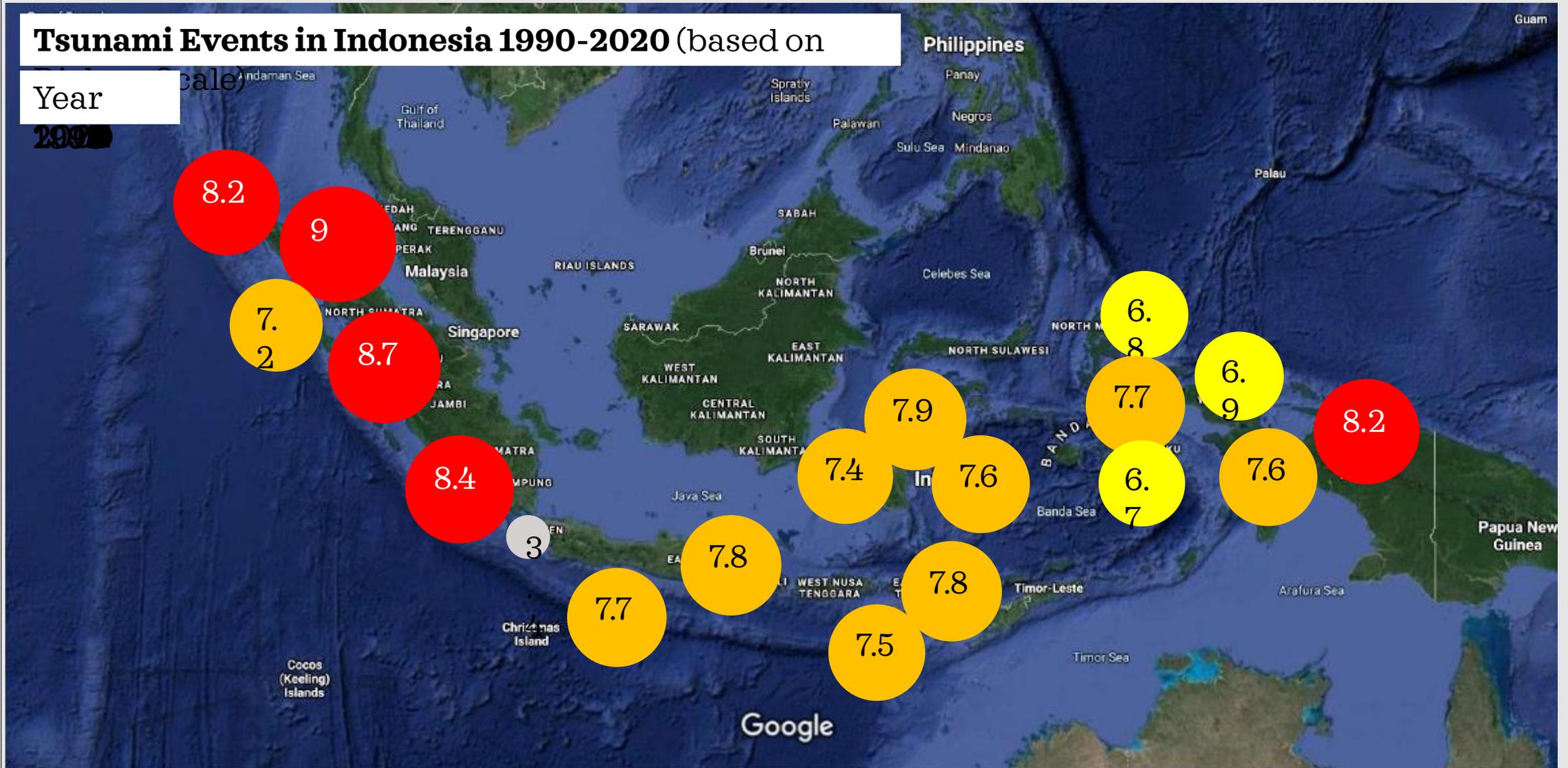
2020



# Tsunami Events in Indonesia 1990-2020 (based on

Year

2004



Imagery ©2020 TerraMetrics, Map data ©2020 Google 500 km

# Number of Tsunami Events 1990-2020

## 2010-2019 (4)

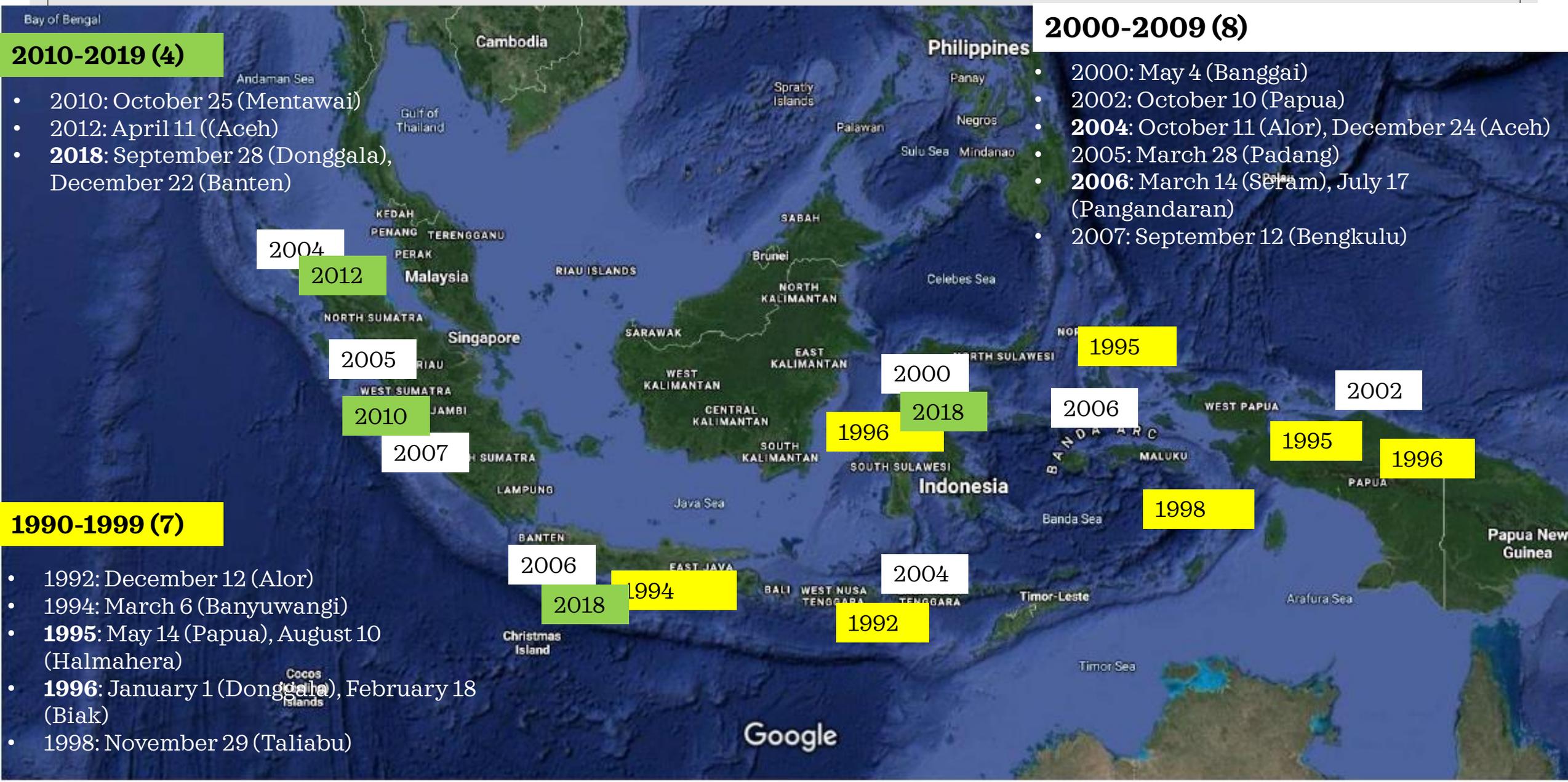
- 2010: October 25 (Mentawai)
- 2012: April 11 ((Aceh)
- **2018**: September 28 (Donggala), December 22 (Banten)

## 2000-2009 (8)

- 2000: May 4 (Banggai)
- 2002: October 10 (Papua)
- **2004**: October 11 (Alor), December 24 (Aceh)
- 2005: March 28 (Padang)
- **2006**: March 14 (Seram), July 17 (Pangandaran)
- 2007: September 12 (Bengkulu)

## 1990-1999 (7)

- 1992: December 12 (Alor)
- 1994: March 6 (Banyuwangi)
- **1995**: May 14 (Papua), August 10 (Halmahera)
- **1996**: January 1 (Donggala), February 18 (Biak)
- 1998: November 29 (Taliabu)



# Tsunami Repetitiveness in Indonesia since 1945 (based on area)

**Legend**

-  Tsunami After Year 2000
-  Tsunami Before Year 2000

**Sulawesi: 6**  
(1967, 1968, 1969, 1996, 2000, 2018)  
• Donggala: 2  
(1996, 2018)

**Papua: 5** (1979, 1995, 1996, 2002, 2011)

**Maluku Islands: 4** (1965, 1995, 1998, 2006)

**Sumatra: 5**  
(2004, 2005, 2007, 2010, 2012)  
• Aceh: 2 (2004, 2012)

**Java: 3** (1994, 2006, 2018)

**Nusa Tenggara: 5** (1977, 1979, 1982, 1992, 2004)  
• Alor: 2 (1992, 2004)

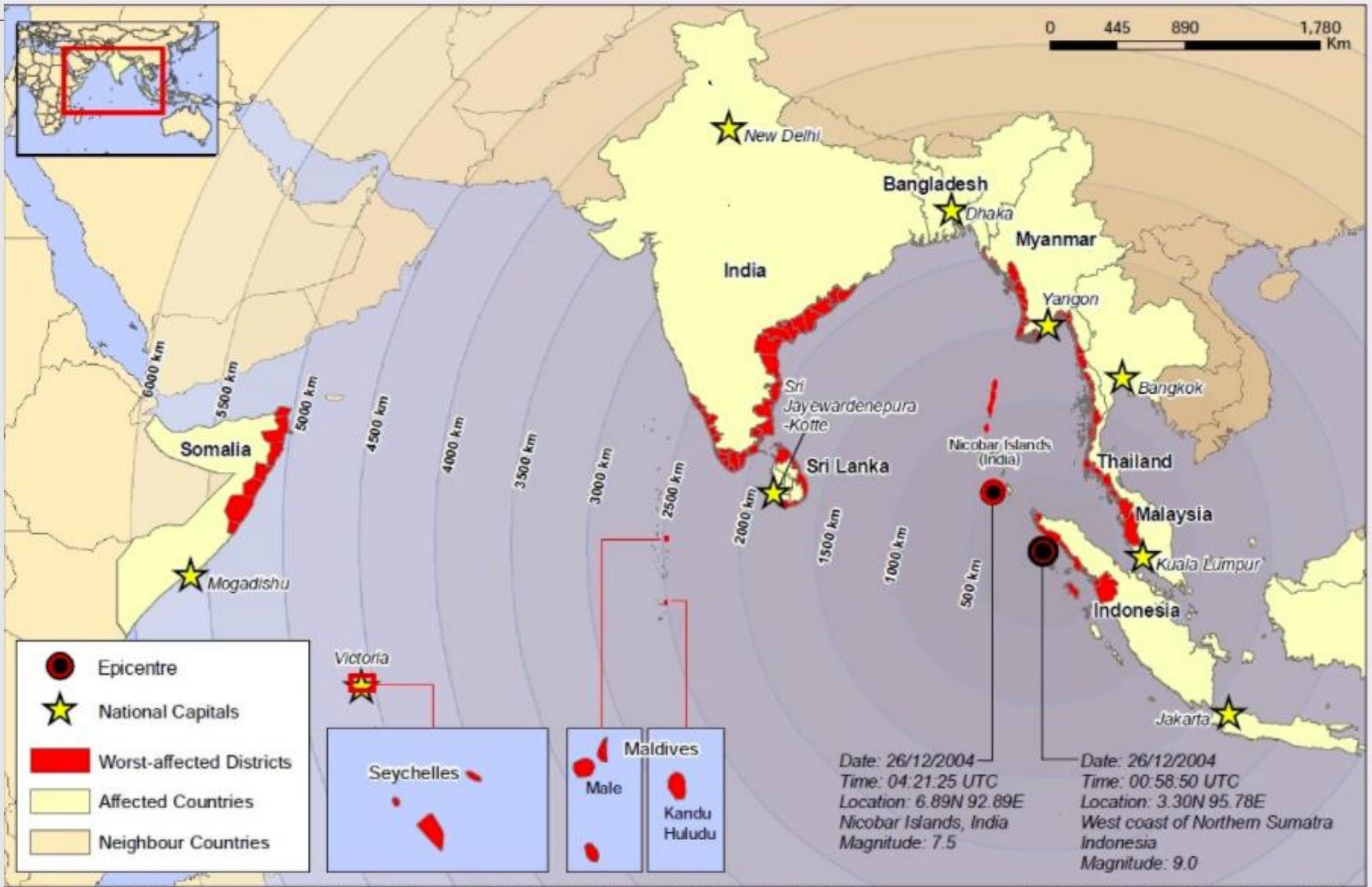
Google Earth  
Image Landsat / Copernicus  
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

2000 km

# Tsunami Risk in Indonesia

- Based on the results of the risk assessment, the total number of people exposed to the risk of the tsunami disaster in Indonesia is 4,102,406 people in all provinces in Indonesia with a potential loss of up to Rp. 879 Trillion (62.2 Billion USD)

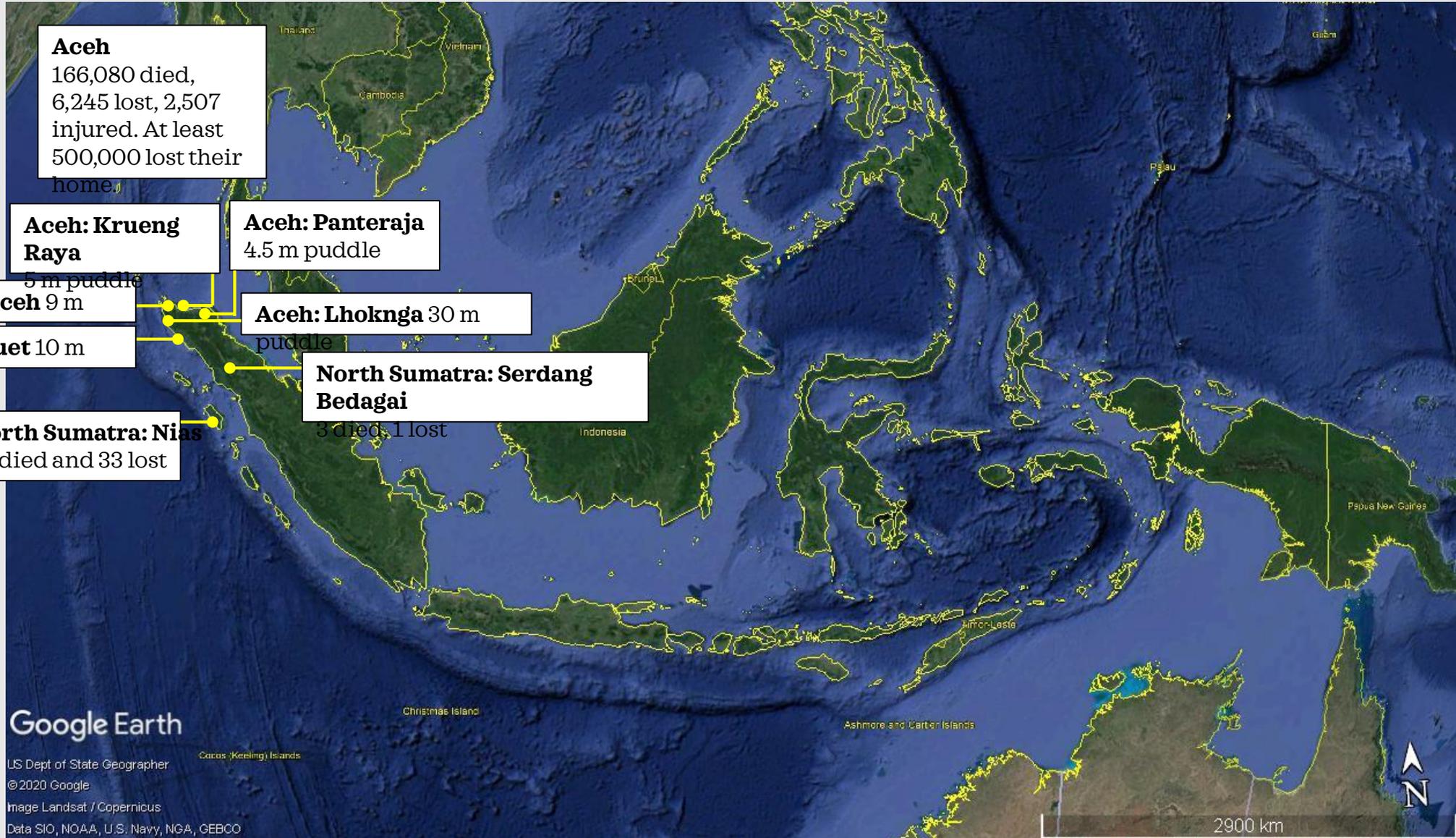
<https://bnpb.go.id/documents/buku-renas-pb.pdf>



The names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Produced by the ReliefWeb Map Centre - UN OCHA  
Updated 03 January 2005

# 2004 Indian Ocean Tsunami: Impact Map



(Triyono et al., 2019)

# 2004 Indian Ocean Tsunami: Comparison



**Before the Tsunami (Google Earth Pro)**



**After the Tsunami (Google Earth Pro)**



**In 2020 (Google Earth Pro)**

68,000 ha land was destroyed because of the tsunami  
(Tempo.co, 2005)

# 2004 Indian Ocean Tsunami:

## Gampong Kajhu



**Gampong Kajhu Map**  
(Google Maps)



**Disaster-resilient Coastal Village in Gampong Kajhu**  
(aceh.tribunnews.com)



**Gampong Kajhu Tsunami**  
(mongabay.co.id)



**Gampong Kajhu**  
(aceh.antaranews.com)

**Tsunami Impact:** Only 15% villagers were safe from the tsunami (Ferdiansyah, 2018)

**Projects:** Disaster-resilient Coastal Village (Destana) encourages active participations from the villagers. Trainings are provided by local government and NGO. (Saroji et al., 2016)



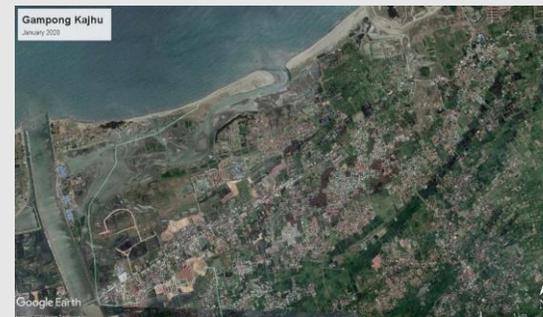
**Gampong Kajhu Before the Tsunami**  
(Google Earth Pro)

Saltwater ponds for shrimps



**Gampong Kajhu in 2009**  
(Google Earth Pro)

Villagers still stay in their villages although facing high risks from tsunami. Rebuilt was helped by Indonesian Red Cross and IOM (Bonasir, 2014).



**Gampong Kajhu in 2020**  
(Google Earth Pro)

**Current status:** Listed as one of the best 100 best villages in Indonesia (Kementerian Desa Pembangunan Daerah Tertinggal dan Transmigrasi, 2018)

# 2004 Indian Ocean Tsunami: Deli Serdang



**2004 Tsunami Impact Map**  
(en.wikipedia.org)



**Madani Foster Home in Deli Serdang**  
(facebook.com)

**Projects:** Madani foster home was built in Deli Serdang to house children who lost their parents in the tsunami (detikNews, 2005)



**Deli Serdang in 2009**  
(Google Earth Pro)



**Deli Serdang Map**  
(id.wikipedia.org)



**Installing WRS NewGen and Mapping Soil Vulnerability in Deli Serdang**  
(sumut.antaranews.com)



**Deli Serdang in 2020**  
(Google Earth Pro)

**Tsunami Impact:** At least 51 people died in Deli Serdang and Nias (Media Indonesia, 2019)

**Projects:** In 2020, WRS NewGen was installed in Deli Serdang (Juraidi, 2020a). The government also mapped soil vulnerability in Deli Serdang to mitigate risks (Juraidi, 2020b). Shelter zones for tsunami are also chosen from existing buildings such as mosques and halls.

**Current status:** Became more populated. Opened Kualanamu International Airport in 2013.

# 2004 Indian Ocean

## Tsunami: Nias



**Nias Map**  
(id.wikipedia.org)



**Sirombu Market Relocated**  
(travel.detik.com)



**Sirombu Market Destroyed**  
(gemaniasbarat.wordpress.com)



**Nias Evacuation Drill**  
(bnpb.go.id)



**ITSS**  
(ugm.ac.id)

**Tsunami Impact:** At least 51 people died and 33 people lost in Nias

**Projects:** Evacuation drills have been done throughout the years in Nias (Yanuarto, 2020). An early warning systems based on radon gas concentrations and groundwater levels is developed by UGM (Ika, 2020).



**Nias in 2012**  
(Google Earth Pro)



**Nias in 2020**  
(Google Earth Pro)

**Current status:** Nias is a tourist destination. Some beaches are now filled by coral rocks caused by 1 to 2 m land elevation from the tsunami. (Yordan et al., 2017)

# Post 2004 Tsunami: Present Condition



**2004 Tsunami Impact Map**  
(en.wikipedia.org)

241 people died in North Sumatra (Deli Serdang, Serdang Bedagai, Nias)  
(detikNews, 2005a)



**Sirombu Market Destroyed**  
(gemaniastbarat.wordpress.com)



**Sirombu Market Relocated**  
(travel.detik.com)

Sirombu Market in Nias was destroyed and relocated  
(Bangkit, 2011)



**Mangrove Planting in Sedang Bedagai**  
(goodnewsfromindonesia.id)

After the tsunami, 10,000 mangrove trees were planted in Cermin Beach  
(Anggraeni, 2018)



**Madani Foster Home in Deli Serdang**  
(facebook.com)

Madani foster home was built in Deli Serdang to house children who lost their parents in the tsunami (detikNews, 2005b)  
In 2020, WRS NewGen was installed in Deli Serdang (Juraidi, 2020)

# 2004 Indian Ocean Tsunami: Serdang Bedagai



**Serdang Bedagai Map**  
(en.wikipedia.org)



**Mangrove Planting in Serdang Bedagai 1**  
(goodnewsfromindonesia.id)



**Serdang Bedagai Tsunami**  
(sumut24.co)

**Tsunami Impact:** In Cermin Beach, the tsunami was 4 meter height and killed 3 fishermen, 1 lost. (Media Indonesia, 2019).



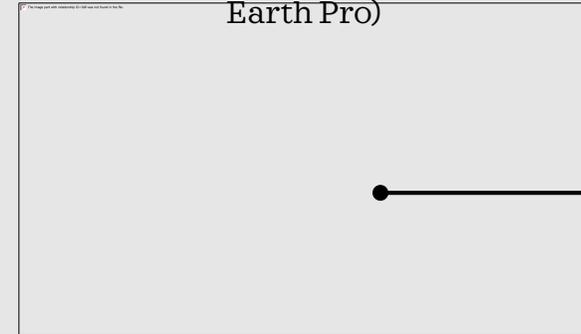
**Mangrove Planting in Serdang Bedagai 2**  
(goodnewsfromindonesia.id)

**Projects:** After the tsunami, 10,000 mangrove trees were planted in Cermin Beach (Anggraeni, 2018)



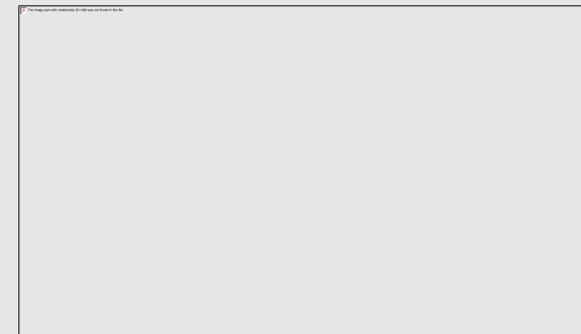
**Cermin Beach in 2002** (Google Earth Pro)

Before the tsunami, the beach was kept mostly natural.



**Cermin Beach in 2005** (Google Earth Pro)

Reclamation after the tsunami



**Cermin Beach in 2020** (Google Earth Pro)

**Current status:** Beaches have been built towards the years and become more populated.

# Post 2004 Tsunami: Before the Indian Ocean



**Before the Tsunami** (Google Earth Pro)



**Aceh Map** (en.wikipedia.org)



**Aceh Before the Tsunami** (arup.com)

Aceh is the westernmost province of Indonesia and was the closest point of land to the epicenter of the 2004 Indian Ocean earthquake and tsunami. It covers the area of 58,376.81 km<sup>2</sup> and inhabited by around 5 million people (BPS, 2019)

# Post 2004 Tsunami: After the Indian Ocean

Tsunami 2004



After the Tsunami (Google Earth Pro)



After Tsunami (Source: dw.com)

## December 26, 2004

- 9 SR, 5-30 m far field type tsunami (tsunami that have propagation of up to 1,000 km) (Pratama, 2018)
- **166,080 people died** and 2,507 were seriously injured (Triyono et al., 2019)
- A tsunami early warning system has now been built along the waters between Indonesia and Thailand

# Post 2004 Tsunami: Present

Condition



**Aceh 2020** (Google Earth Pro)



**Malahayati Port Rehab**  
([dishub.acehprov.go.id](http://dishub.acehprov.go.id))



**Tsunami Escape Building**  
([national.tempo.co](http://national.tempo.co))



**Aceh Besar Breakwater** ([antarafoto.com](http://antarafoto.com))

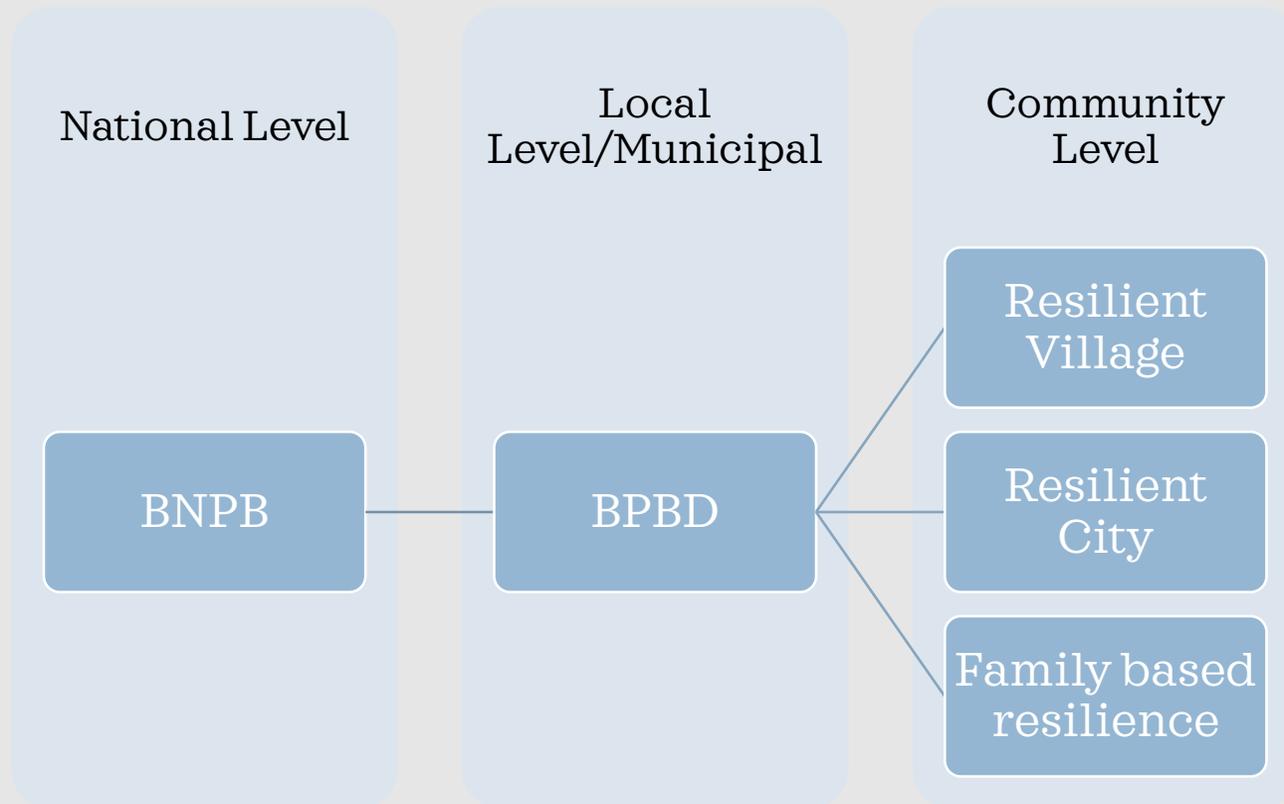
The background features a gradient from light grey at the top to dark grey at the bottom, overlaid with horizontal wavy lines. A dark grey rectangle is positioned on the left side, containing the text.

# TSUNAMI AWARENESS PROJECTS

Background

Structural and non structural  
projects

# Mainstreaming DRR in National Medium Term Development Plan



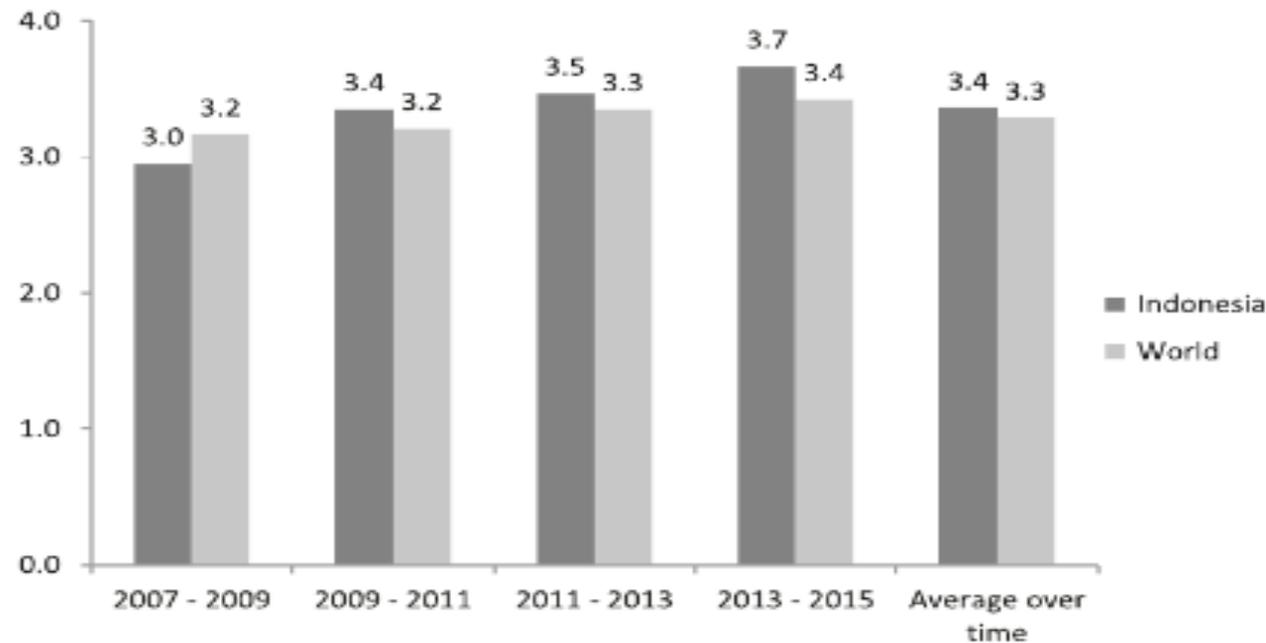
There is already a mandate from Law No. 27/2007 to include disaster risk assessment in regional development planning. Hence it is not clear how much should be invested in disaster risk reduction at the regional level.

This condition, supported by a democratic system in the election of regional leaders and regional autonomy, has made the application of DRR in regional development planning dependent on the **good will of the policy makers.**

# Level of progress in HFA in Indonesia

4

R. Djalante et al.



**Fig. 1.2** Indonesia's level of progress in HFA priority areas (out of five) compared to the rest of the world (Modified from BNPB 2011a, 2013, 2015, PreventionWeb 2016)

# Community Level Tsunami awareness in Indonesia

Buoy, Alat Pendeteksi Tsunami di Indonesia Rusak dan Hilang Dicuri

Vesa Alicia - Selasa, 2 Oktober 2018 | 12:44 WIB



- Lack of maintenance for tsunami EWS. Budget for maintenance is only available for 70 out of total 170 sensors in Indonesia (Lin & Henschke, 2018)
- Some EWS are insignificant. For example, in Palu the sensor is 200 km away from the beach and can only detect 6 cm wave rise (Lin & Henschke, 2018)

# Nationally Mandated Program : Destana (Village Resilience Programs)



**Java Destana Expedition in 2019**  
(idntimes.com)



**Destana Training in Aceh**  
(aceh.tribunnews.com)



**Destana Training in West Java**  
(jabarekspres.com)

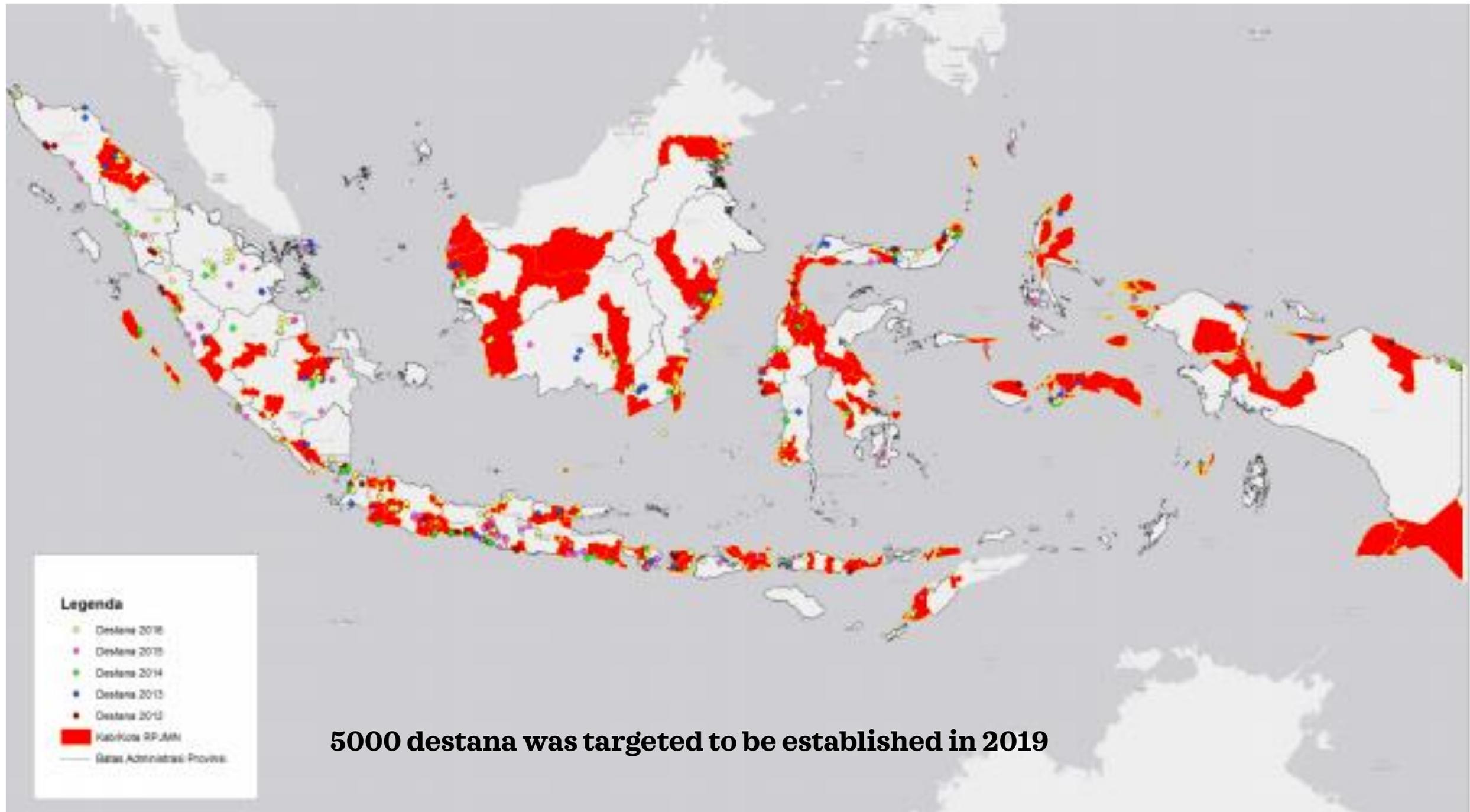


**Destana Training in Central Java**  
(jateng.tribunnews.com)

Disaster-resilient Villages/ sub-districts (Destana) is a government program to train villages/ sub-districts throughout Indonesia to be **self-sufficient** in disasters by developing mindset to **adapt, mitigate, and recover** (Regulation Of The Head Of The National Disaster Management Agency Number 1 Year 2012)

Destana output:

- Strengthening mitigations
- **Mapping disaster-prone regions**
- Creating mitigation **rules and regulation**
- **Strengthening people's knowledge** about disasters and mitigations
- Encouraging **active participation** for mitigations from villagers (SNI 8357:2017 Disaster-resilient Villages)





# EKSPEDISI DESTANA TSUNAMI

- Regional JAWA : 12 Juli - 16 Agustus 2019 -



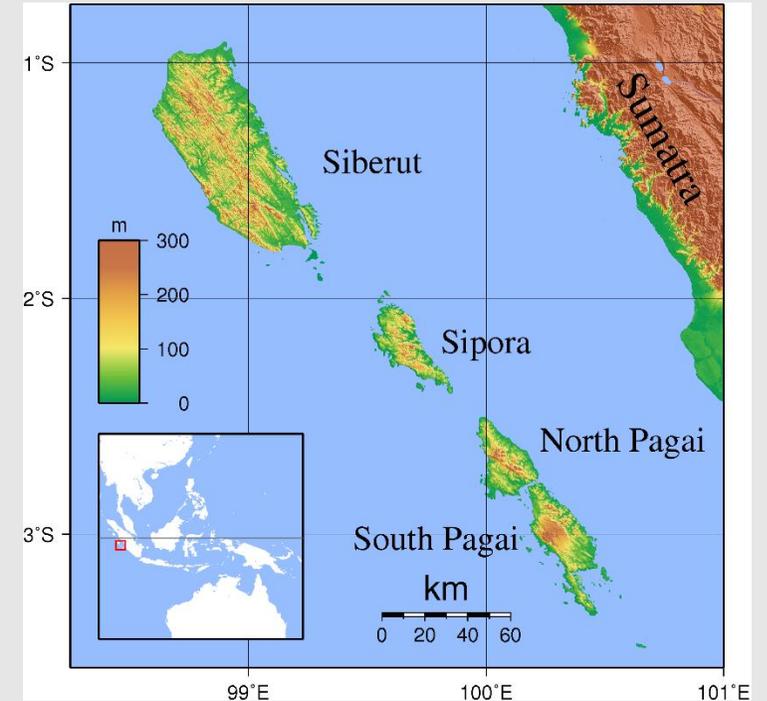
didukung oleh :



# Trans Mentawai Project: Background Tsunami Event (before the 2010 tsunami)



**Macaronis Mentawai Surf Resort Before the Tsunami** (Google Earth Pro)



**Mentawai Map** (commons.wikimedia.org)



**Macaronis Mentawai Surf Resort** (takaitu.id) **Surfing in Mentawai** (macaroniresort.com)

Mentawai Islands cover the area of 6,011.35 km<sup>2</sup> and had a population of 76,173 at the 2010 Census. The islands are famous for surfing; hence they become international tourist destinations.

## Local Government initiated Programs: Trans Mentawai Project



**Macaronis Mentawai Surf Resort After the Tsunami** (Google Earth Pro)



**After Tsunami** (viva.co.id)

### October 25, 2010

- 7.7 SR, **6-12 m tsunami earthquake** (Triyono et al., 2019)
- “Tsunami earthquakes” are strange in that they happen almost entirely in the soft, weak section of the fault so they create a much larger tsunami than expected. (Sahakian, 2020)
- **456 people died** and concrete construction buildings collapsed under the tsunami (Triyono et al., 2019), and 15,000 more were displaced or left homeless (Sahakian, 2020).

# Local Government initiated Programs: Trans Mentawai Project

## ZONA PERMUKIMAN BARU

- Zona permukiman baru yang ditetapkan dalam RTRW
- Arahkan relokasi permukiman Desa Sikakap

## ZONA PERMUKIMAN BARU

- Zona permukiman baru yang ditetapkan dalam RTRW
- Zona ini merupakan kawasan yang direncanakan aman dari bahaya tsunami
- Arahkan relokasi permukiman Desa Silabu dan Betumonga
- Zona sudah direncanakan jaringan jalan baru

## PUSAT KEC. SIKAKAP BARU

- Pemindahan pusat kecamatan Sikakap yang awalnya di desa Sikakap dipindah ke Desa Taikako
- Sesuai dengan peraturan bupati Kepulauan Mentawai nomor 2 tahun 2018



## PUSAT KEC. PAGAI UTARA BARU

- Pemindahan pusat kecamatan Pagai Utara diarahkan ke bagian barat yang lebih aman dari area tsunami

## ZONA PERMUKIMAN BARU

- Zona permukiman baru yang ditetapkan dalam RTRW
- Zona ini merupakan kawasan yang direncanakan aman dari bahaya tsunami
- Arahkan relokasi permukiman di Desa Sikakap



Sikakap Port Masterplan



Sikakap Port is protected by the embankment



Sikakap Port Entrance



Clearance for Trans Mentawai

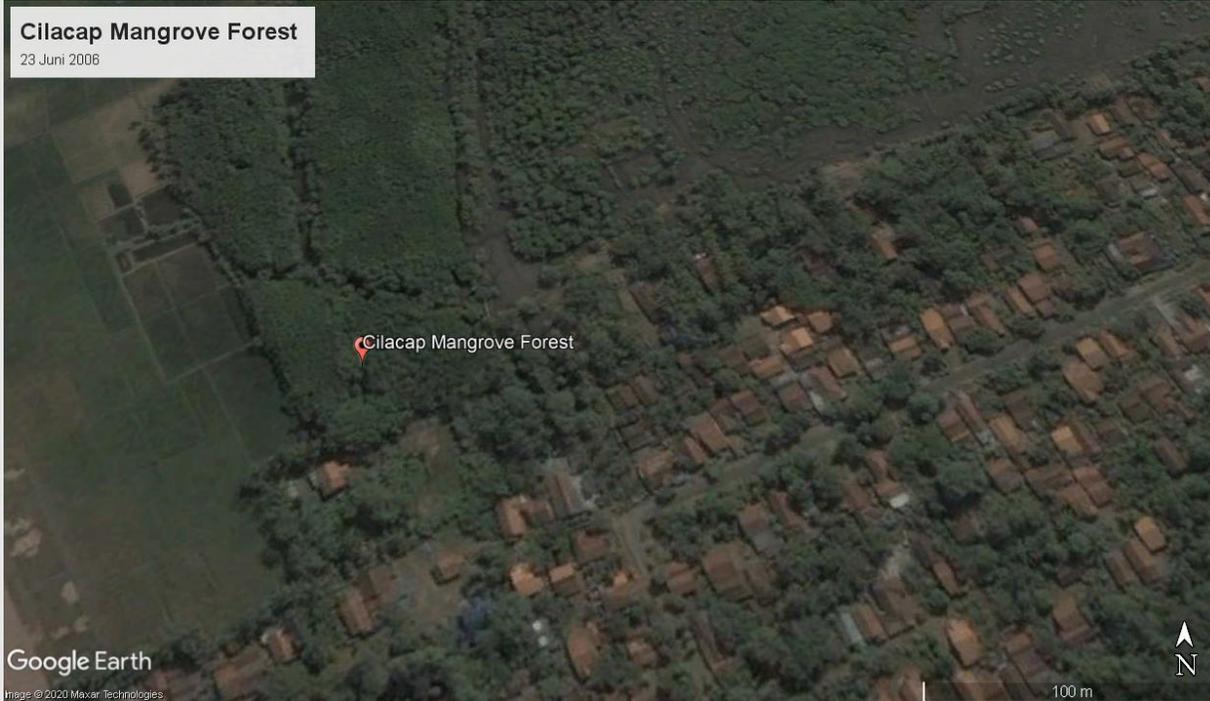
(mentawaikita.com)

**Trans Mentawai** is needed because so far access has only relied on waterways (Sagurung, 2020). It is targeted to be **393.5 km** long (Jannah, 2018),

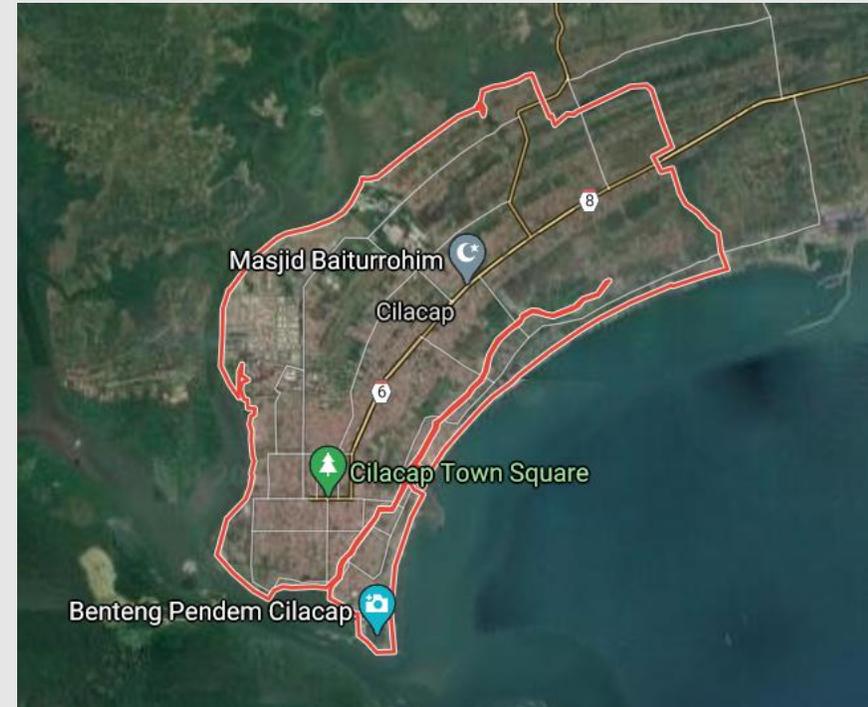


Gambar 5.6. Skema Konsep Wajah Kota Pantai (*water front city*) sebagai Gerbang Masuk Pagai Utara

# Cilacap Mangrove Forest: Symbiotic Approach between Tourism and Infrastructure



**Cilacap After the Earthquake** (Google Earth Pro)



**Cilacap Map** (Google Maps)



**After the Earthquake 1**

(thephenomena.files.wordpress.com)



**After the Earthquake 2**

(jabar.tribunnews.com)

## August 17, 2006

- 7.7 SR
- 40% people didn't feel the earthquake before the tsunami came. 40% felt a faint earthquake and only less than 20% felt a strong earthquake (Muhari, 2016)
- **664 people died** (Triyono et al., 2019)

# Eco-Tourism approach for Better Tsunami Resilience: Mangrove Forest Cilacap



**Before the Tsunami** (Google Earth Pro)



**After the Tsunami** (Google Earth Pro)



**After the Tsunami 1**  
(dara.co.id)



**After the Tsunami 2**  
(harapanrakyat.com)

## August 17, 2006

- **3-8 meter tsunami earthquake**
- Tsunami earthquakes create bigger tsunami magnitudes than they should have been (Muhari, 2016)
- Tsunami from tsunami earthquakes is more difficult to be predicted than a usual tsunami event

# Mangrove Forest: A symbiosis approach for **DISASTER** resilience



**Cilacap Mangrove Forest Satellite View**  
(Google Earth Pro)



**Mangrove Seeding by Local Communities**  
(mongabay.co.id)

Local government has coached 11 **villages to be resilient towards disasters** and is planning to broaden the scope (BNPB, 2012).



**Cilacap Mangrove Forest 1**  
(kompasiana.com)



**Cilacap Mangrove Forest 2** (travelingyuk.com)

Cilacap Mangrove Forest serves as both a **conservation** area and a **tourist destination**.

# Hutan Kota Palu: Trauma Healing Post 2018 Tsunami



**Before the Tsunami** (Google Earth Pro)



**Palu Map** (en.wikipedia.org)



**Ponulele Bridge Before the Tsunami** (travel.okezone.com)

Palu covers an area of 395.06 km<sup>2</sup> inhabited by 367,600 people (2015 census). It is located in Sulawesi, an island with the most frequent tsunami disasters in Indonesia since 1945 (6 times)

# Hutan Kota Palu: Palu right after the tsunami



After the Tsunami (Google Earth Pro)



Ponulele Bridge After Tsunami (bbc.com)

## September 28, 2019

- 7.4 SR, 2-7 m tsunami
- **2,037 people died**, 671 people were missing, 152 people were buried, 4,084 people were injured and 67,310 houses were damaged (Triyono et al., 2019)
- The earthquake damaged the electricity and communication networks. This means that many people did not receive a tsunami warning (Lin & Henschke, 2018)



Ponulele Reconstruction  
(liputan6.com)



Village Reconstruction  
(instagram.com)

## Hutan Kota Palu: Moving the Crowd Trauma Healing



**Kamboana Palu Urban Forest 1**



**Kamboana Food Stall** (sultengterkini.com)



**Kamboana Palu Urban Forest 2**

(radarsulteng.id)

Kamboana Palu Urban Forest now becomes one of the main tourist attractions in Palu because the beach attractions were destroyed by the 2018 tsunami (Sandhi, 2019). This place serves as **a green space and a recreational place** that facilitates sports such as skateboarding, futsal, basketball, ATV. There is food stall surrounding the area.

# Tsunami Education Park



**Aceh Tsunami Educational Park 1**  
(nelva-amelia.blogspot.com)



**Aceh Tsunami Educational  
Park 2**  
(nelva-amelia.blogspot.com)



**Aceh Tsunami Educational Park 3**  
(nelva-amelia.blogspot.com)

It is the first tsunami educational park in Indonesia and covers the area of 4,500 m<sup>2</sup>. There are tsunami simulation equipment, photos after the tsunami, open theater, playground (Yurnaldi, 2008).

# Tsunami Museum



Aceh Tsunami Museum (dialeksis.com)

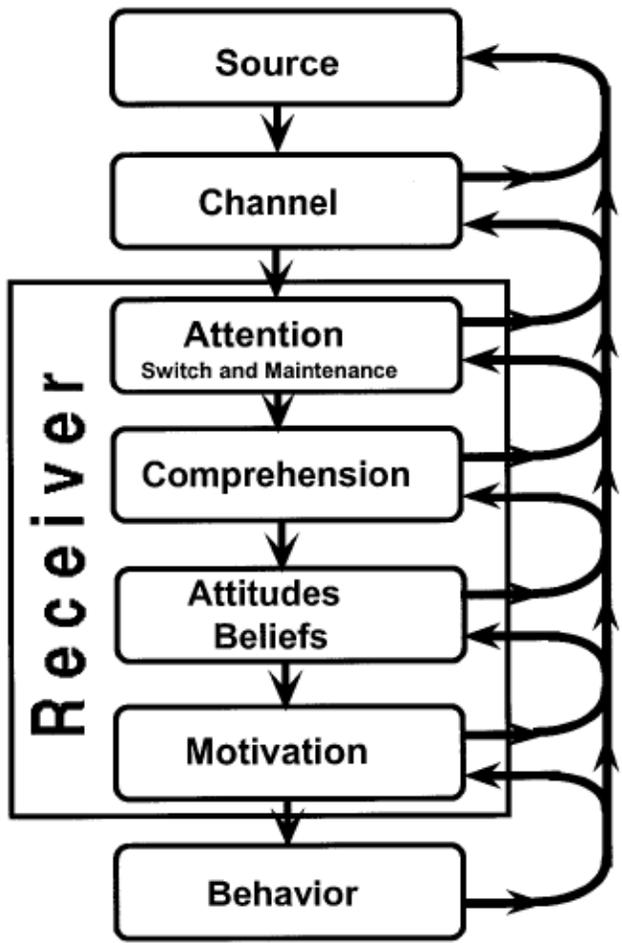


Aceh Tsunami Museum Interior (urbane.co.id)



Aceh Tsunami Museum Entrance (urbane.co.id)

The museum serves as **a monument, an educational center, and a memorial center** for the 2004 tsunami. The entrance recreates the ambience of terror faced by the tsunami victims. The museum also serves as an **escape hill** for future tsunami events.



**Communication-Human Information Processing (C-HIP) model** (Conzola & Wogalter, 2001)



**Tsunami Education from Govt**  
(Rosdiyani, 2020)



**Tsunami Education Using Theater Play** (Putra, 2019)



**Tsunami Education Using Game**  
(Prima et al., 2020)



**Tsunami Simulation**  
(Sambah et al., 2017)



**Tsunami Education Park**  
(bandaacehkotamadani.wordpress.com)



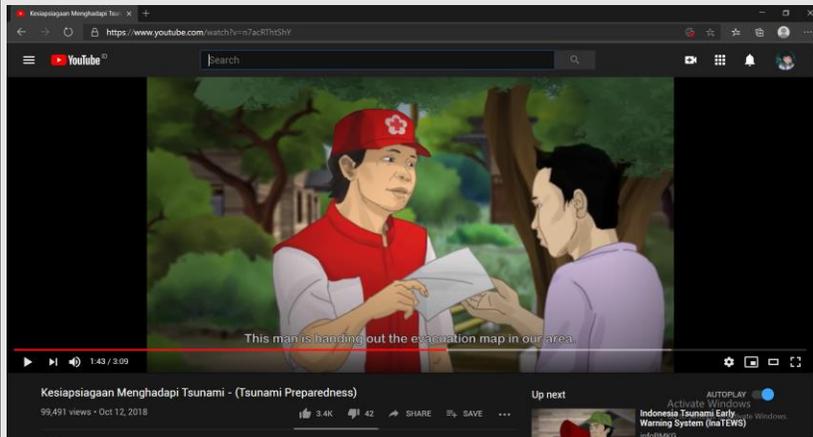
**Tsunami Museum** (dialeksis.com)



**Tsunami Education on TV**  
(youtube.com)



**Tsunami Preparedness Game**  
10,000+ installs (play.google.com)



**Govt Video** (youtube.com)



**TANGGAP TANGKAS TANGGUH** Menghadapi Bencana



**Asal kata TSUNAMI**

Kata tsunami berasal dari bahasa Jepang, “tsu” berarti pelabuhan dan “name” berarti gelombang sehingga secara umum diartikan sebagai gelombang/ombak yang besar di pelabuhan.

Tsunami dapat diartikan sebagai gelombang laut yang disebabkan oleh gempabumi dengan pusat di bawah laut, letusan gunungapi bawah laut, longsor di bawah laut, dan atau hantaman meteor di laut.

**Tsunami**

7

**Govt Guidelines** (BNPB, 2012)

**TIPS TSUNAMI**

**Pra Bencana**

- Pembangunan Sistem Peringatan Dini Tsunami.
- Tsunami Early Warning System

**Saat Bencana**

- Pada umumnya di Indonesia didahului dengan gempabumi besar dan sulet laut.
- Terdapat selang waktu antara waktu terjadinya gempabumi sebagai sumber tsunami dengan waktu tiba tsunami di pantai.
- Gelombang air laut datang secara mendadak dan berulung dengan energi yang sangat kuat.
- Di Indonesia tsunami terjadi dalam waktu kurang dari 40 menit setelah gempabumi besar di bawah laut.

**Setelah Bencana**

- Pembangunan tempat evakuasi (debet) di sekitar daerah pemukiman, penanaman tembok penahan tsunami dan penanaman mangrove pada garis pantai yang berisiko tsunami.
- Malaporkan secepatnya jika mengetahui tanda-tanda akan terjadinya tsunami kepada petugas yang berwenang maupun institusi terkait.

**Govt Poster** (bnpb.go.id)

# Tsunami Training and Simulations



**Tsunami Education from Government** (Rosdiyani, 2020)



**Tsunami Simulation** (Sambah et al., 2017)

# Cultural approach for inheriting a w a r e n e s s



- Only 3 out of 70.000 people died from the 2004 Indian Ocean tsunami

## **Smong, simeulue**

One example of smong story

This is a story full of wisdom. In ancient times the seventh year your grandfathers experienced it they tell this story in order to become a life experience. it was Friday, still including morning. suddenly there was an earthquake. the people were so strong that they could not stand up and after the sea had receded, and the fish floundered on the beach, attracting people to collect them. not long after, a large wave appeared from the middle of the ocean toward the land. people shout smong smong smong! However, many people were unable to escape to the top of the mountain.

<https://theconversation.com/smong-cerita-lisan-simeulue-yang-selamatkan-penduduk-dari-amukan-tsunami-terdahsyat-105388>

# Flores Tsunami Monument: Before the Tsunami



**Babi Island Before the Tsunami (Google Earth Pro)**



**A Flores Village (travel.tribunnews.com)**



**Flores Map (lavalontourinfo.com)**

Flores Island is one of the Lesser Sunda Islands, a group of islands in the eastern half of Indonesia. The population was 1,831,000 in the 2010 census and the largest town is Maumere. The name Flores is the Portuguese word for "Flowers".

# Flores Tsunami Monument: 1992 Tsunami



**1992 Flores Tsunami Map**  
(en.wikipedia.org)

## December 12, 1992

- 7.8 SR, **26.2 m tsunami**
- **2500 people died** (Triyono et al., 2019) and more than 1,000 buildings were destroyed and severely damaged (Nirarta, 2018)
- Babi Island is said to be the epicenter of the earthquake. The tsunami caused a marine fault with a length of 100 meters and a depth of 10-20 meters (Wilibardus, 2020)
- Babi Island was not inhabited and is now inhabited by 30 families.



**After Tsunami** (kumparan.com)



**Babi Island Now 1**  
(deyuken-aimere.blogspot.com)



**Babi Island Now 2**  
(liputan6.com)

# Flores Tsunami Monument: After the Tsunami



**Babi Island in 2019** (Google Earth Pro)



**Maumere Tsunami Monument in Flores**  
(thevoiceofflores.com)



**Maumere Tsunami Monument** (Google Earth Pro)



**Maumere Tsunami Monument at Night**  
(mycameraphone.com)

Built in a Maumere city park, this monument symbolises how the community has strengthened itself after the disaster (Rosary, 2016)

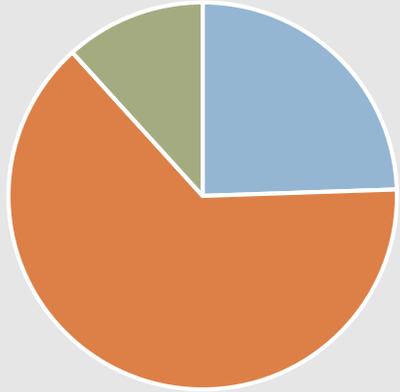
The Earthquake and Tsunami drill is delivered by utilizing local song for tsunami drill and awareness rising



TSUNAMI  
AWARENESS  
SURVEY

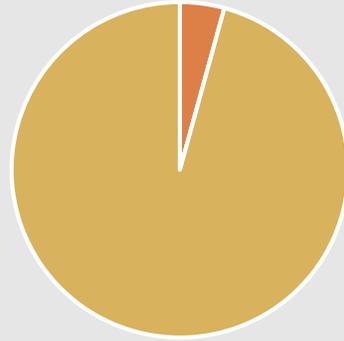
# Hazard Assessment

Is your area prone to tsunami?

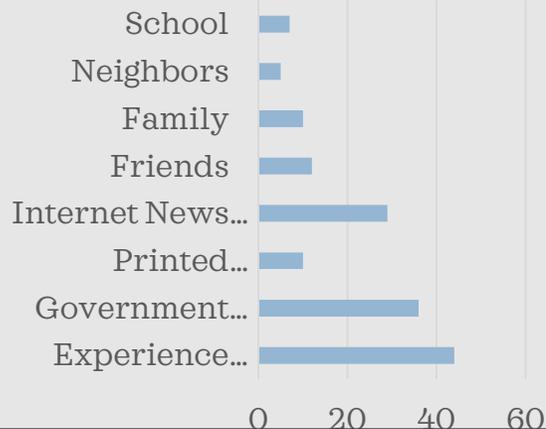


■ Yes ■ No ■ Don't know

Have you ever experienced a tsunami?



■ Yes ■ No



Majority of respondents know whether they live in tsunami-prone area or not from experience or history of past tsunamis, followed by government website and internet news page.

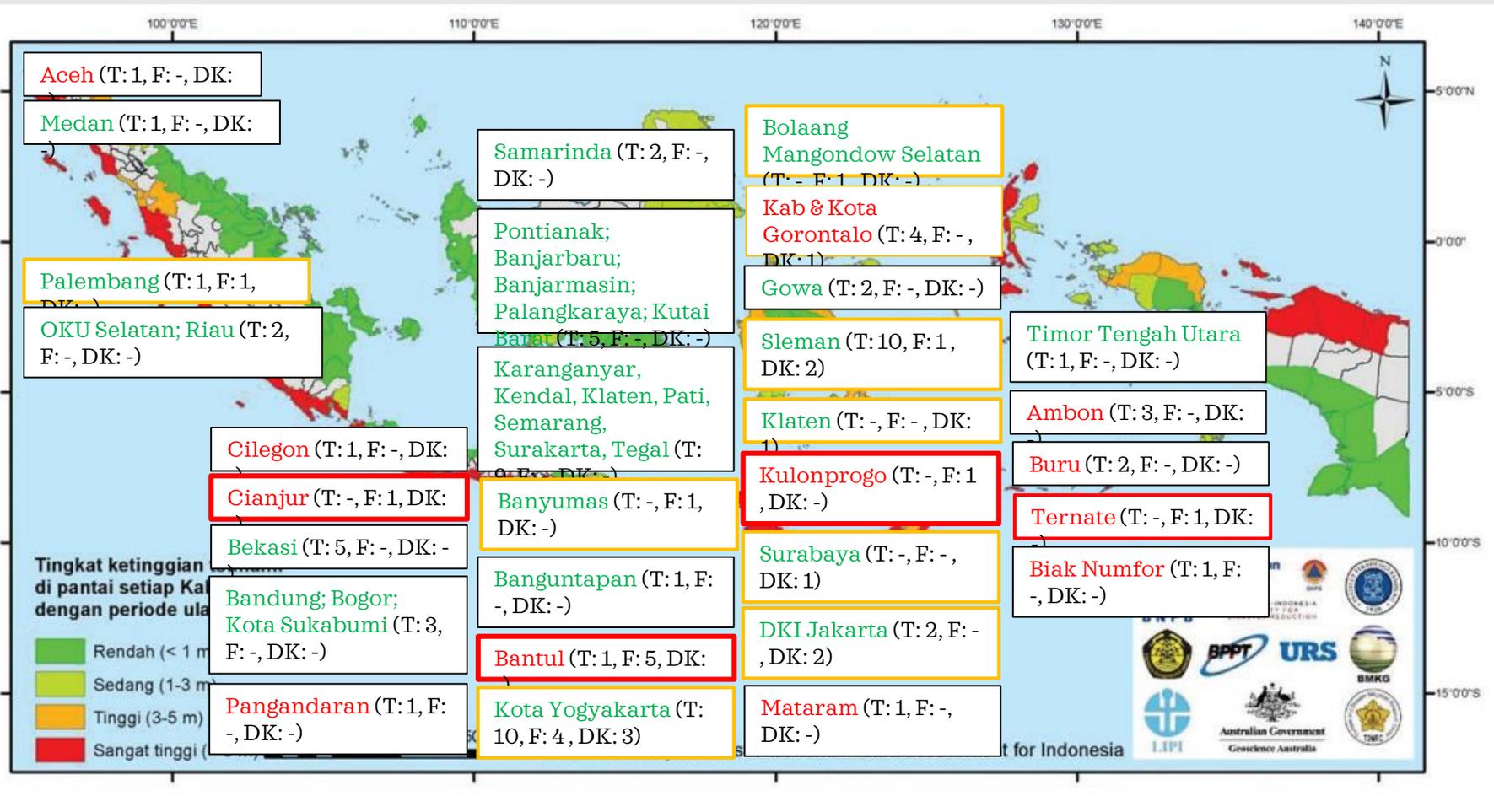


## Tsunami in Palu

(channelnewsasia.com)

Some respondents experienced tsunamis, in: 1996, 2004, 2006 (3), 2018

The danger and occurrence of tsunami grab their **ATTENTION** to learn more about tsunami

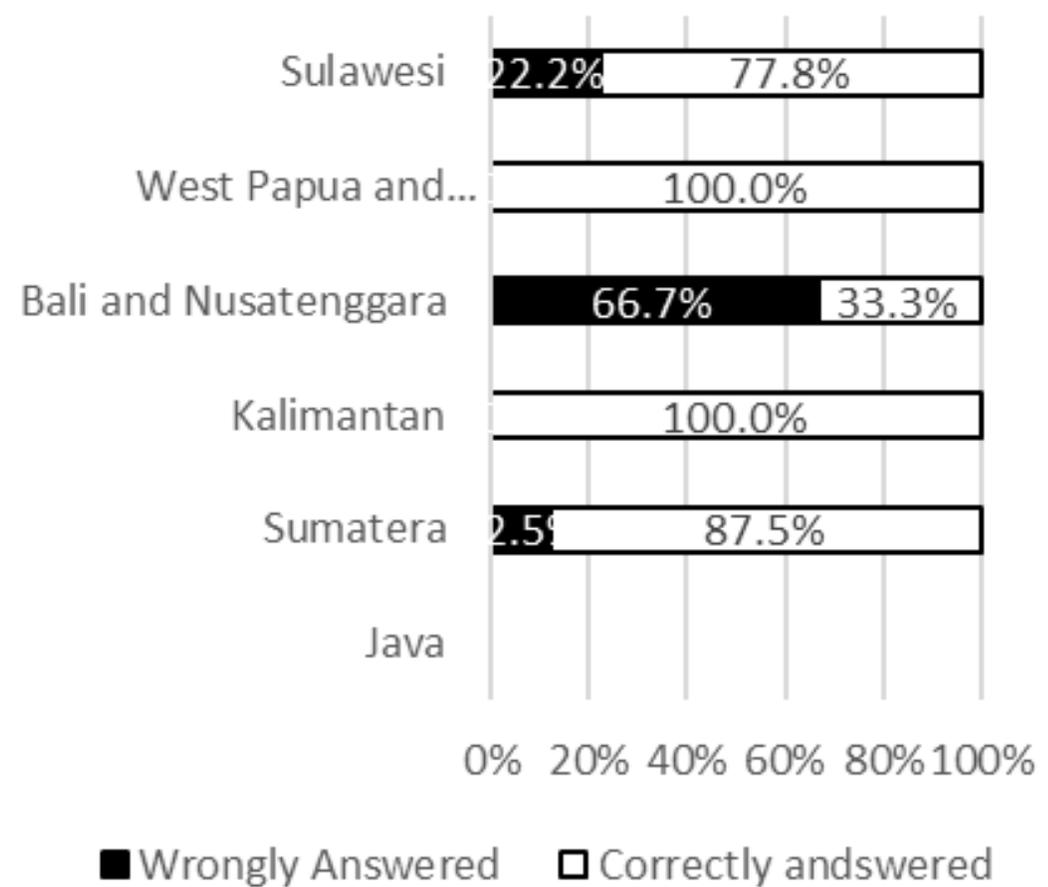
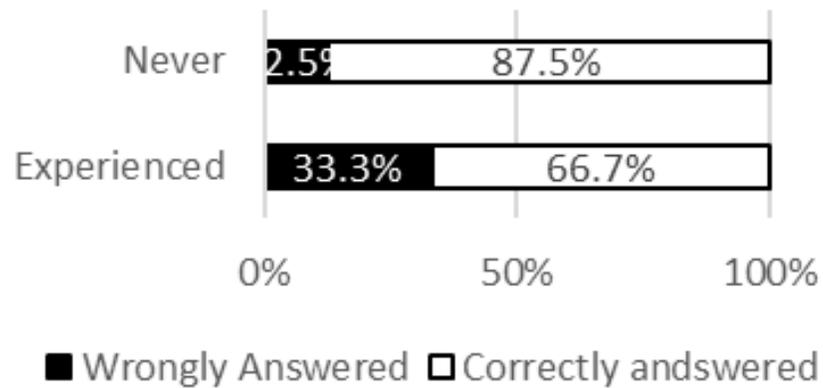
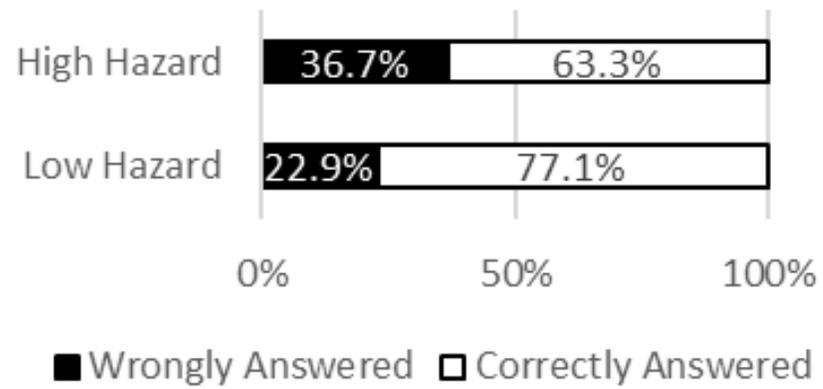


**Tsunami Map (BNPB, 2012)**

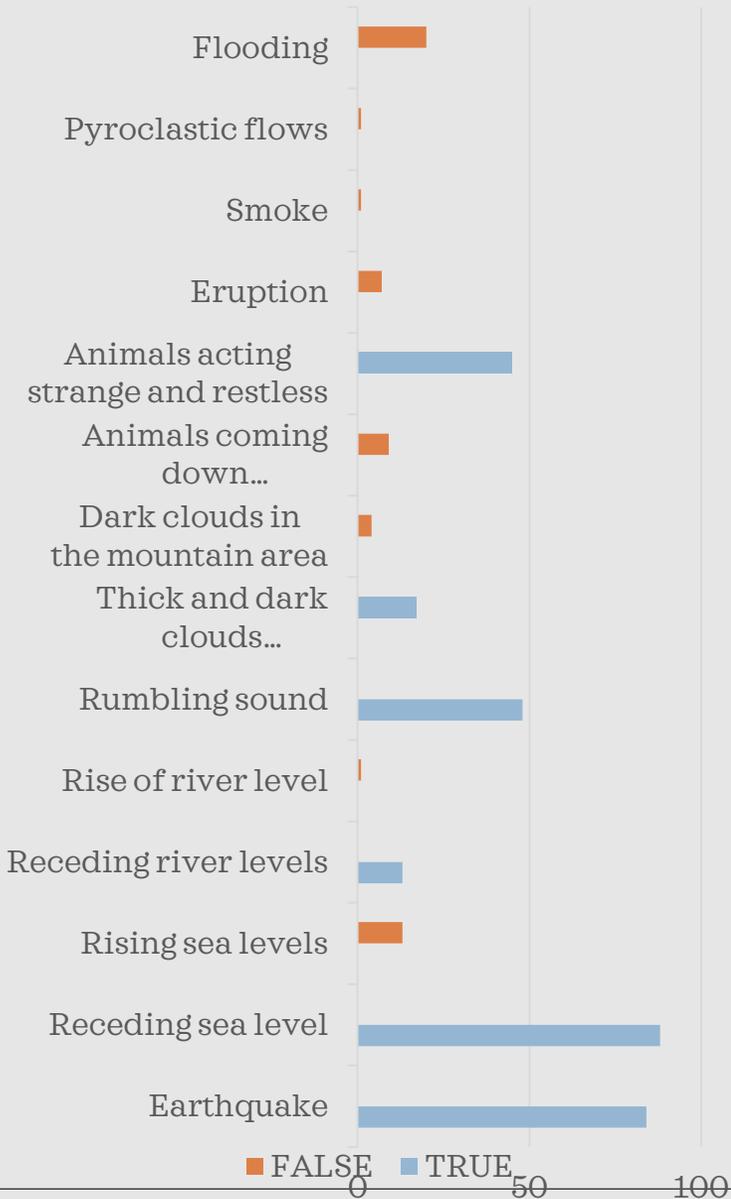
After receiving information that grabs their attention, do they **COMPREHEND** its message?

Do the respondents actually know about the danger of tsunami in their area?

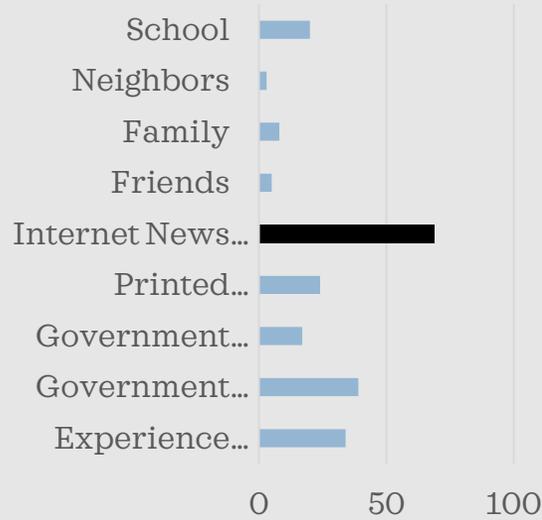
Area **dangerous (red)** safe **(green)** (True: -, False: -, Don't Know: -)



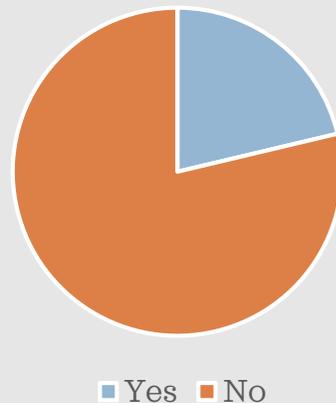
Signs of a tsunami coming



Informants Percentage



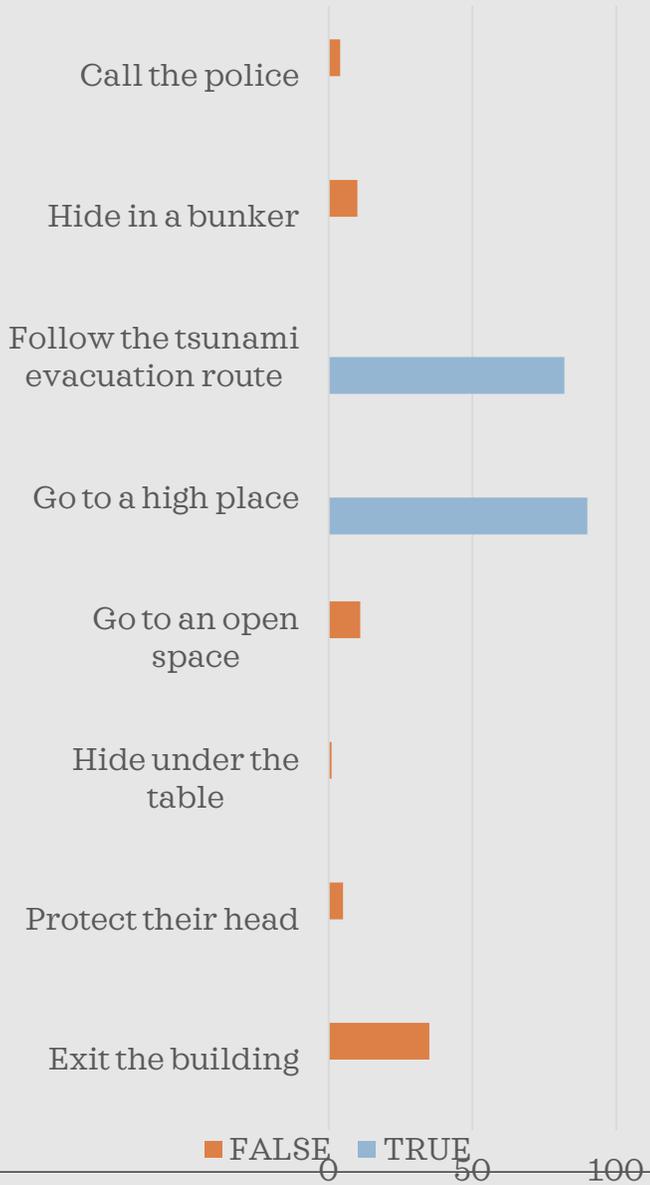
Received any trainings about tsunami signs?



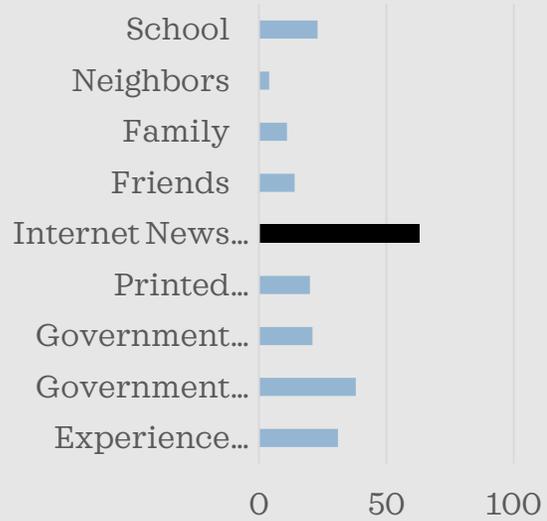
There are still some misunderstandings about tsunami signs, especially mixed with eruption signs. Some people don't know other signs of tsunami

- a. Most only received training once
- b. **Most received training provided by government organizations**
- c. Respondents started receiving trainings since 2000 (mostly in 2012, 2019, and 2020). **Most feel their knowledge increased (scale 3 out of 4) because they now know tsunami signs**

### Actions after a tsunami warning

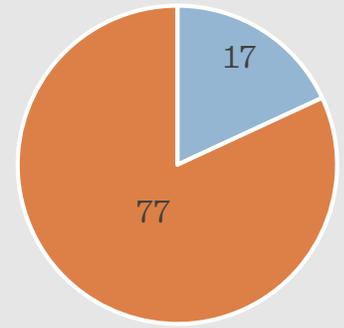


### Informants Percentage



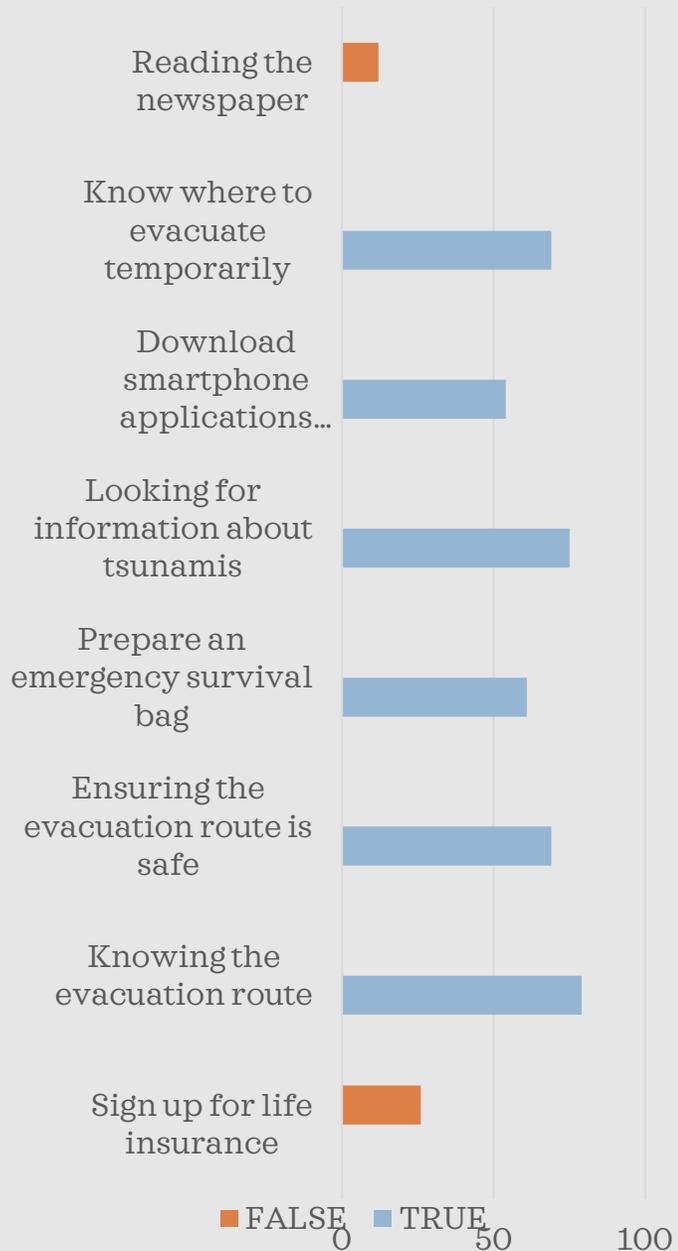
There are still some misunderstandings about what to do in a tsunami

### Received any trainings about what to do in a tsunami?

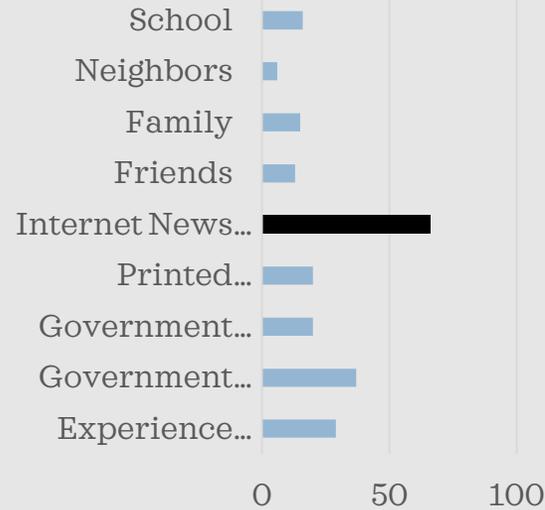


- a. Most only received training once
- b. Most received training provided by government organizations**
- c. Respondents started receiving trainings since 2000 (mostly in 2012, 2019 and 2020). **Most feel their knowledge greatly increased (scale 4 out of 4)** because they now know what to do in a tsunami

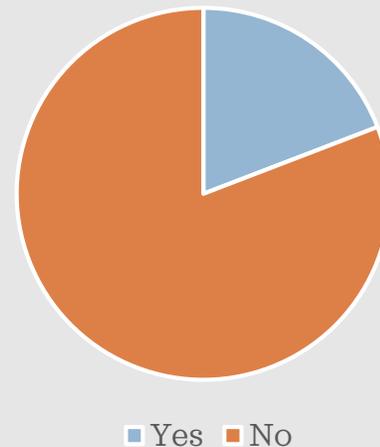
## Actions to reduce tsunami risks



## Informants Percentage



## Received any trainings about reducing tsunami risks?

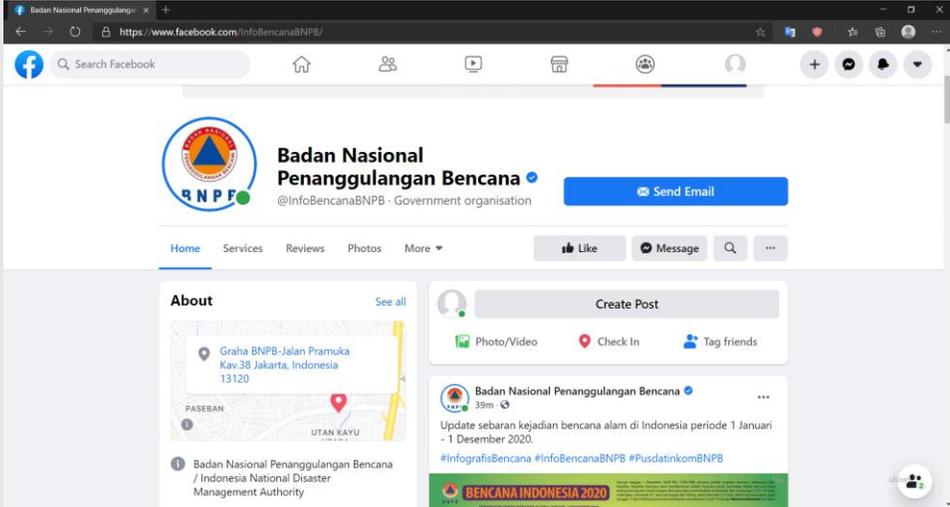


## Comprehension

There are still some misunderstandings about what to do to reduce tsunami risks, although not much

- a. Most only received training once
- b. Most received training provided by government organizations**
- c. Respondents started receiving trainings since 2000 (mostly from 2019 and 2020). **Most feel their knowledge greatly increased (scale 4 out of 4)** because they now know what to do in a tsunami

# Media for tsunami awareness education

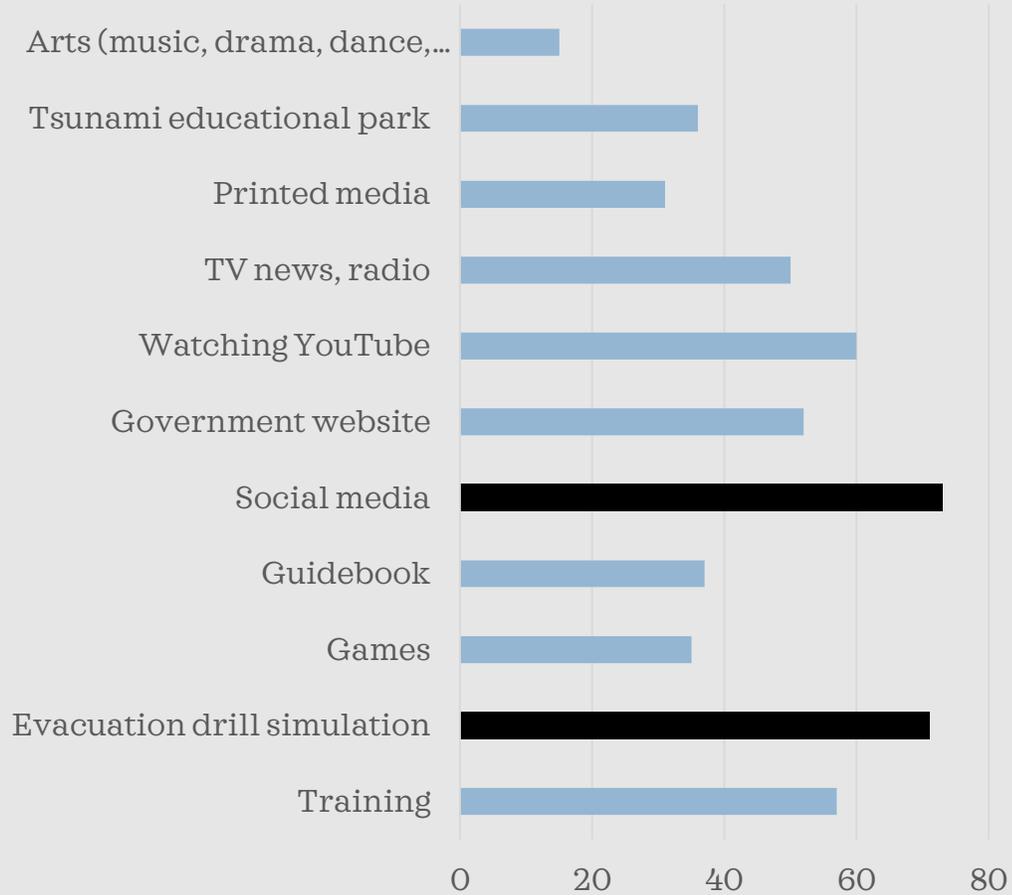


## Social



**Evacuation Drill Simulation**

(padangkita.com)



Social media and evacuation drill simulation are deemed the most effective media

# Reference

- Anggraeni, V. A. (2018). *10.000 Ditanam Sebagai Aksi Pencegahan Tsunami dan Manifestasi Rasa Syukur Terhadap Alam*. <https://www.goodnewsfromindonesia.id/2018/10/22/10-000-ditanam-sebagai-aksi-pencegahan-tsunami-dan-manifestasi-rasa-syukur-terhadap-alam>
- Bangkit, N. (2011). *Pelesir ke Nias Barat (3): Gerakkan Ekonomi Sirombu*. [https://travel.detik.com/dtravelers\\_stories/u-1660846/pelesir-ke-nias-barat-3-gerakkan-ekonomi-sirombu/4](https://travel.detik.com/dtravelers_stories/u-1660846/pelesir-ke-nias-barat-3-gerakkan-ekonomi-sirombu/4)
- Bonasir, R. (2014). *Mengapa warga Aceh kembali tinggal di zona rawan tsunami?* [https://www.bbc.com/indonesia/berita\\_indonesia/2014/12/141223\\_aceh\\_tsunami\\_zonasi](https://www.bbc.com/indonesia/berita_indonesia/2014/12/141223_aceh_tsunami_zonasi)
- detikNews. (2004). *Akibat Gempa-Tsunami, 33 Warga Pulau Nias Hilang*. <https://news.detik.com/berita/d-262413/akibat-gempa-tsunami-33-warga-pulau-nias-hilang>
- detikNews. (2005). *SBY Resmikan Rumah Penampungan Anak Korban Tsunami*. <https://news.detik.com/berita/d-505708/sby-resmikan-rumah-penampungan-anak-korban-tsunami>
- Ferdiansyah, F. (2018). *14 Tahun Berlalu, 45 Korban Tsunami Aceh Ditemukan*. <https://www.pikiran-rakyat.com/nasional/pr-01304608/index.html>
- Horspool, N., Pranantyo, I. R., Griffin, J., Latief, H., Natawidjaja, D., Kongko, W., Cipta, A., Bustamam, Anugrah, S. D., & Thio, H. K. (2013). *A National Tsunami Hazard Assessment for Indonesia*. Commonwealth of Australia. [http://luk.staff.ugm.ac.id/gempa/pdf/PTHA\\_Report\\_Final\\_EN.pdf](http://luk.staff.ugm.ac.id/gempa/pdf/PTHA_Report_Final_EN.pdf)
- Ibrahim. (2020). *Tingkatkan Kesiapan Hadapi Tsunami di Masa Pandemi, BMKG Gelar IOWave20*. <https://www.bmkg.go.id/berita/?p=tingkatkan-kesiapan-hadapi-bencana-gempabumi-dan-tsunami-bmkg-gelar-iowave20&lang=ID&s=detil>
- Ika. (2020). *UGM Develops Sophisticated Earthquake Detection Systems*. <https://www.ugm.ac.id/en/news/20129-ugm-develops-sophisticated-earthquake-detection-systems>
- Jannah, S. M. (2018). *Bangun Jalan Trans Mentawai, Pemerintah akan Libatkan TNI*. <https://finance.detik.com/infrastruktur/d-4259396/bangun-jalan-trans-mentawai-pemerintah-akan-libatkan-tni>

# Reference

- Juraidi. (2020a). *Alat peringatan dini gempa-tsunami dipasang di Deliserdang-Sumut*. <https://www.antaraneews.com/berita/1565904/alat-peringatan-dini-gempa-tsunami-dipasang-di-deliserdang-sumut>
- Juraidi. (2020b). *BMKG Deli Serdang lakukan mikrozonasi gempa bumi di Belawan*. <https://sumut.antaraneews.com/berita/311216/bmkg-deli-serdang-lakukan-mikrozonasi-gempa-bumi-di-belawan>
- Kementerian Desa Pembangunan Daerah Tertinggal dan Transmigrasi. (2018). *Daftar 100 Desa Terbaik Tahun 2018*. <https://bulelengkab.go.id/assets/instansikab/60/bankdata/100-desa-terbaik-di-indonesia-71.pdf>
- Lin, M. M., & Henschke, R. (2018). *Gempa, Tsunami dan Likuifaksi: Rangkaian Bencana di Palu yang Perlu Anda Ketahui*. <https://www.bbc.com/indonesia/indonesia-45832237>
- Media Indonesia. (2019). *27 Desember 2004: Tsunami Terjang Aceh, 7.000 Orang Tewas*. <https://today.line.me/id/v2/article/k3Zmzw>
- Muhari, A. (2016). *10 Tahun Tsunami Pangandaran, Tsunami Dahsyat Tanpa Isyarat Gempa*. <https://sains.kompas.com/read/2016/07/18/07294931/10.tahun.tsunami.pangandaran.tsunami.dahsyat.tanpa.isyarat.gempa?page=all>
- Nirarta, R. (2018). *Hari Ini Dalam Sejarah: Tsunami 36 Meter Terjang Flores Telan 2100 Nyawa*. <https://nusantaranews.co/hari-ini-dalam-sejarah-tsunami-36-meter-terjang-flores-telan-2100-nyawa/>
- Pratama, A. N. (2018). *14 Tahun Tsunami Aceh, Ini 5 Fakta yang Perlu Diketahui*. <https://nasional.kompas.com/read/2018/12/26/14241151/14-tahun-tsunami-aceh-ini-5-fakta-yang-perlu-diketahui?page=all>
- Rahmadi, D. (2018). *Kronologi Tsunami Banten Menurut BMKG*. <https://www.merdeka.com/peristiwa/kronologi-tsunami-banten-menurut-bmkg.html>
- Rosary, E. de. (2016). *Pembangunan Monumen Tsunami Maumere Bisa Menjadi Tempat Interaksi Warga*. <https://www.cendananews.com/2016/12/pembangunan-monumen-tsunami-maumere-bisa-menjadi-tempat-interaksi-warga.html>

# Reference

- Rosdiyani, T. (2020). Edukasi Kesiapsiagaan Bencana Meningkatkan Pemahaman Prosedur Penyelamatan Diri. *ABDIKARYA: Jurnal Pengabdian Dan Pemberdayaan Masyarakat*, 2(1), 1-7. <http://ejournal.lppm-unbaja.ac.id/index.php/abdikarya/article/view/1066>
- Sandhi, R. (2019). *Hutan Kota, Destinasi Baru yang Populer Pasca Bencana*. <https://radarsulteng.id/hutan-kota-destinasi-baru-yang-populer-pasca-bencana/>
- Sagurung, B. (2020). *Tahun Depan, Pemda Mentawai Dapat Dana Pembangunan Jalan Trans Rp 700 Miliar*. <https://www.mentawaikita.com/baca/3934/tahun-depan-pemda-mentawai-dapat-dana-pembangunan-jalan-trans-rp-700-miliar>
- Sahakian, V. (2020). *A New Way to Identify a Rare Type of Earthquake in Time to Issue Lifesaving Tsunami Warnings*. <https://theconversation.com/a-new-way-to-identify-a-rare-type-of-earthquake-in-time-to-issue-lifesaving-tsunami-warnings-123428>
- Saroji, Mahdi, S., & Srimulyani, E. (2016). Kajian Empiris Program Desa Tangguh Bencana (Destana) Terhadap Ketangguhan Masyarakat Pesisir dalam Menghadapi Bencana Tsunami: Studi Kasus di Dua Gampong Pesisir Kabupaten Aceh Besar. *Jurnal Ilmu Kebencanaan (JIKA)*, 3(4), 142–148.
- Supartoyo, Surono, & Putranto, E. T. (2014). *Katalog Gempabumi Merusak di Indonesia Tahun 1612 – 2014*. Pusat Vulkanologi dan Mitigasi Bencana Geologi.
- Triyono, R., Prasetya, T., Daryono, Anugrah, S. D., Sudrajat, A., Setiyono, U., Gunawan, I., Priyobudi, Yatimantoro, T., Hidayanti, Anggraini, S., Rahayu, R. H., Yogaswara, D. S., Hawati, P., Apriani, M., Julius, A. M., Harvan, M., Simangunsong, G., & Kriswinarso, T. (2019). *Katalog Tsunami Indonesia Tahun 416-2018*. <https://cdn.bmkg.go.id/Web/Katalog-Tsunami-Indonesia-pertahun-416-2018.pdf>
- Wilibardus, D. (2020). *Jejak Tsunami dan Serpihan Duka Warga Pulau Babi Sikka NTT*. <https://www.liiputan6.com/regional/read/4332831/jejak-tsunami-dan-serpihan-duka-warga-pulau-babi-sikka-ntt>
- Yanuarto, T. (2020). *BNPB dan Pemkab Nias Selatan Simulasi Geladi Evakuasi Peringatan Dini Tsunami*. <https://bnpb.go.id/berita/bnpb-dan-pemkab-nias-selatan-simulasi-geladi-evakuasi-peringatan-dini-tsunami>

# Reference

- Yordan, J., Pratiwi, S. I., Priyambodo, U., & Panji, A. (2017). *Hilangnya Ombak Cantik di Pulau Nias Pasca Gempa dan Tsunami Aceh 2004*. <https://kumparan.com/kumparansains/hilangnya-ombak-cantik-di-pulau-nias-pasca-gempa-dan-tsunami-aceh-2004/full>
- Yurnaldi. (2008). *Diresmikan, Taman Edukasi Tsunami Pertama di Indonesia*. <https://nasional.kompas.com/read/2008/04/30/14003785/diresmikan.taman.edukasi.tsunami.pertama.di.indonesia>.

Thank you very much