# MOSQUE AS WARNING DISSEMINATION AND EVACUATION CALL

## (LESSONS LEARN FROM KUTA MANDALIKA)

**Eko Pradjoko, ST., MEng., PhD.**
**Study Center for Disaster Risk Management**
**Faculty of Engineering**

**Indian Ocean Tsunami Ready Workshop**
Tanjung Benoa, Bali - Indonesia
22-26 November 2022

In collaboration with

# CURRICULUM VITAE

Name : **Eko Pradjoko, ST., MEng., PhD.**
Education :
Bachelor, 1995, ITS Surabaya, Offshore Engineering
Master, 1999, IHE Delft Netherland, Coastal Engineering
Doctor, 2012, Tohoku University Japan, Coastal Morphology
Course / Training :
2016, DRR Training StIRRRD Programme, New Zealand
Job :
Lecturer & Researcher, Civil Eng. Dept., University of Mataram
Chairman of SCDRM, Faculty of Engineering, University of Mataram

# HAZARD : HISTORY of TSUNAMI DISASTER in WEST NUSA TENGGARA

## 1977 Sumba Earthquake

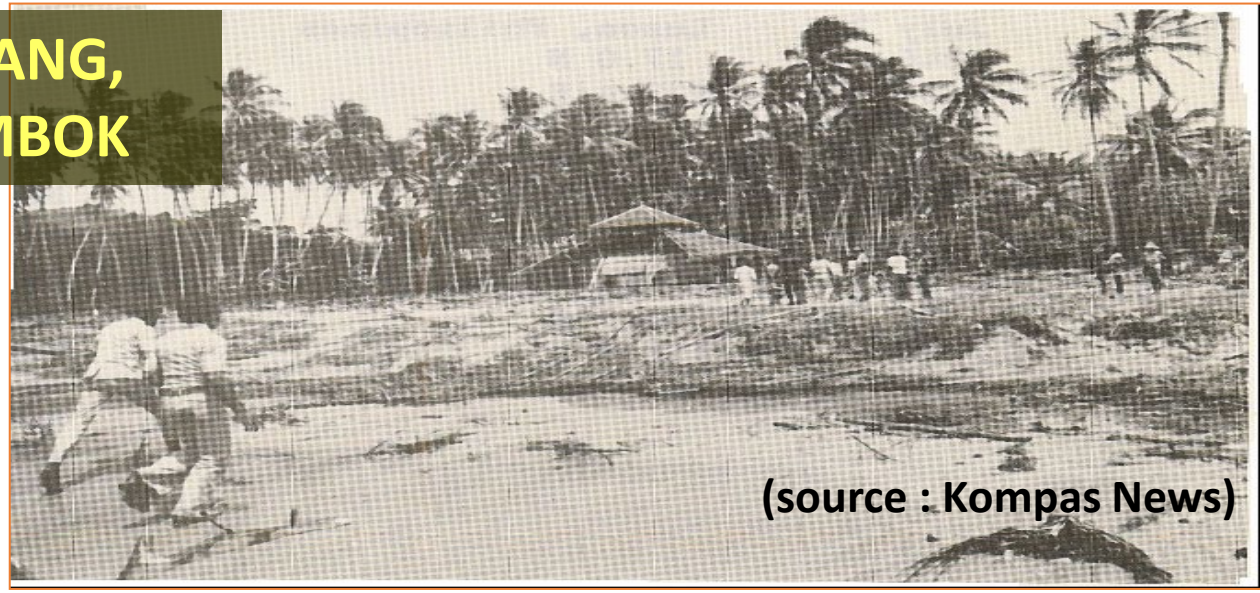
- August 19th, 1977 / 14:08 WITA
- Epicentre depth 33 km, Magnitude Mw 8.3
- Tsunami height :
  Kuta 3.8 ~ 5 m,
  Awang 3.8 ~ 4.2 m,
  Lunyuk 5 ~ 8 m
- Arrival time 5 ~ 20 minute
- Victims :
  Kuta 1 person
  Awang 20 persons
  Lunyuk 65 persons

(Nakamura, 1977; Kato and Tsuji, 1995)

# HAZARD : HISTORY of TSUNAMI DISASTER in WEST NUSA TENGGARA

LUNYUK, SUMBAWA

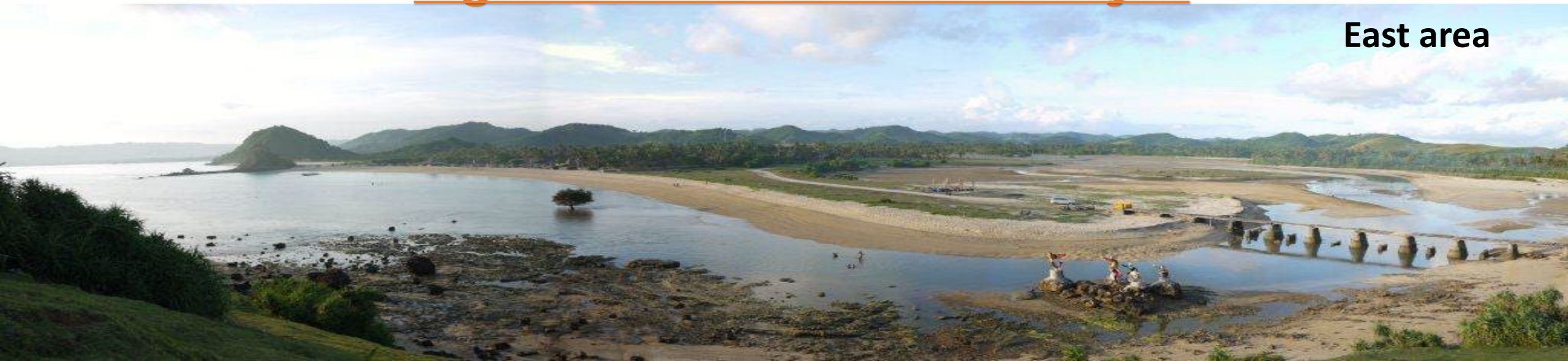
AWANG, LOMBOK



(source : Kompas News)

# VULNERABILITY : GENTLE SLOPE (Coastal of Kuta)


**High Level Tsunami Vulnerability !!!**



# VULNERABILITY : GENTLE SLOPE (Coastal of Kuta)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# VULNERABILITY : POPULATION & RAPID DEVELOPMENT


| | | |
|---|---|---|
| 1 | Jumlah Laki-laki : | 4653 Jiwa |
| 2 | Jumlah Perempuan : | 4663 Jiwa |
| 3 | Jumlah L+P : | 9316 Jiwa |
| 4 | Jumlah KK : | 2810 KK |
| 5 | Kepadatan Penduduk | 198,92 per km |
| 6 | Jumlah Penduduk Usia ( >= 60 Tahun) | 548 Jiwa |
| 7 | Jumlah Balita dan Anak (Usia 0-12 Tahun) | 2.445 Jiwa |
| 8 | Jumlah Disabilitas | 8 Jiwa |

Kuta, 31 Desember 2021
Kepala Desa Kuta

MIRATE

# VULNERABILITY : POPULATION & RAPID DEVELOPMENT


**High Level Tsunami Vulnerability !!!**

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# CAPACITY : DISASTER RESILIENCE VILLAGE

**The Head Regulation of National Disaster Management Agency no. 1 / 2012 : General Guidelines of Disaster Resilience Village**

**Collaboration**
**Many Stakeholder**

**NGO**

**KUTA MANDALIKA Disaster Resilience Village**

KEMENTERIAN SOSIAL REPUBLIK INDONESIA

Palang Merah Indonesia

BMKG

BNPB

# CAPACITY : TSUNAMI EVACUATION DRILL in 2015

**BNPB - BPBD Prov. NTB - JICA**







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# CAPACITY : COMMEMORATION of 40 YEARS 1977 SUMBA EARTHQUAKE in 2017

Proverb by Japanese Physics Scientist
Dr. Torahiko TERADA (1878-1935)

「天災は忘れた頃にやってくる」

"Natural Disasters will hit us by the Time people have forgotten about it"

40



***We Remember,***
***We Alert,***
***We Ready !!!***

# CAPACITY : TRAINING of VILLAGE DISASTER ALERT TEAM in 2018 - 2021


Sekolah Lapang Gempabumi BMKG, 2021

Team Training BNPB, 2020


SPAB Workshop BNPB, September 2021


BMKG goes to School, 2021

Logistics Training APAD Indonesia 2022


Volunteer Training Sosial Service, 2018

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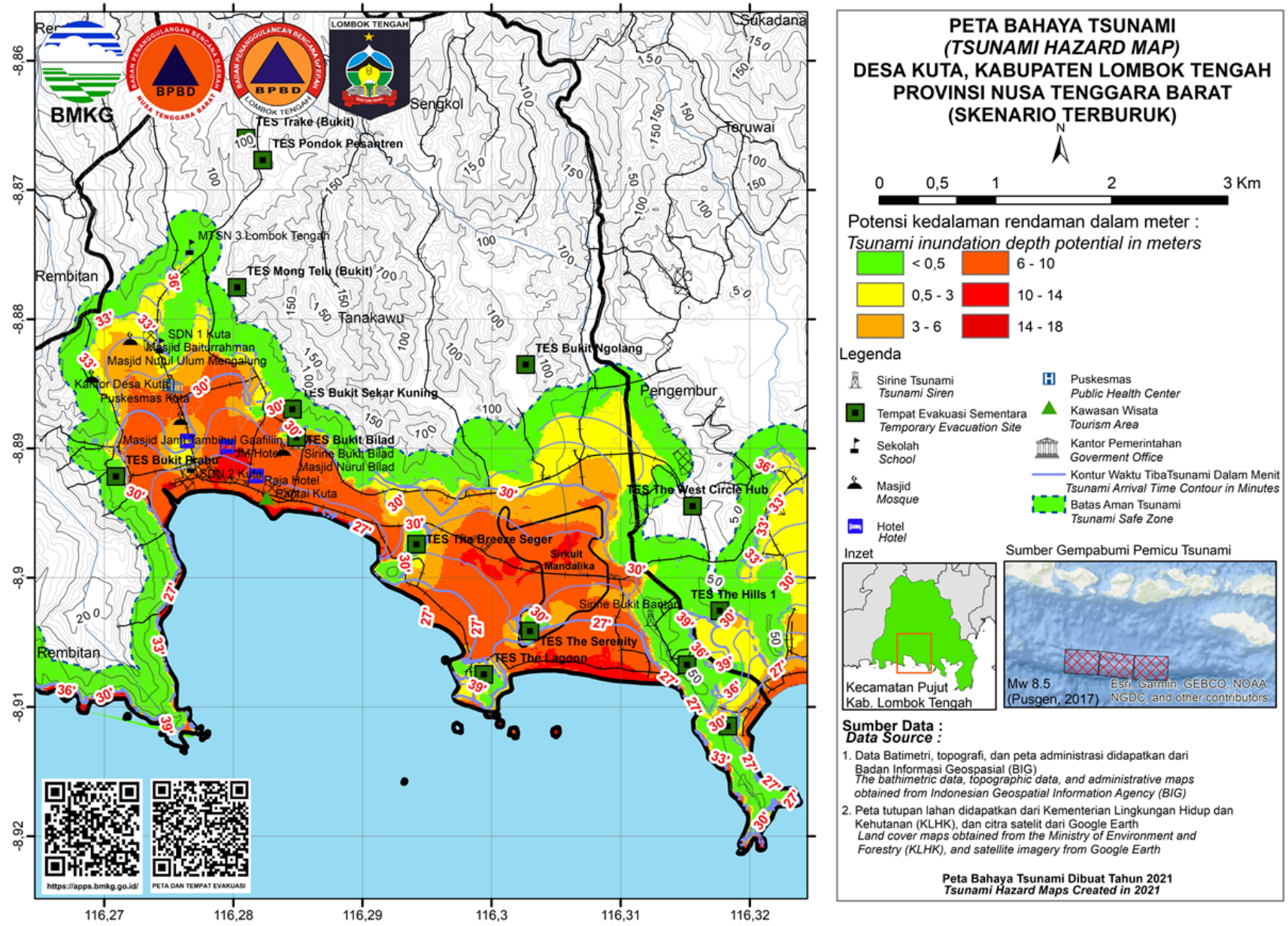
# CAPACITY : ENHANCEMENT of DISASTER RESPONSE EQUIPMENT in 2020

**BNPB - BPBD Kab. Loteng - Unram**

# CAPACITY : HAZARD KNOWLEDGE

## Tsunami Hazard Map

- Based on worst scenario

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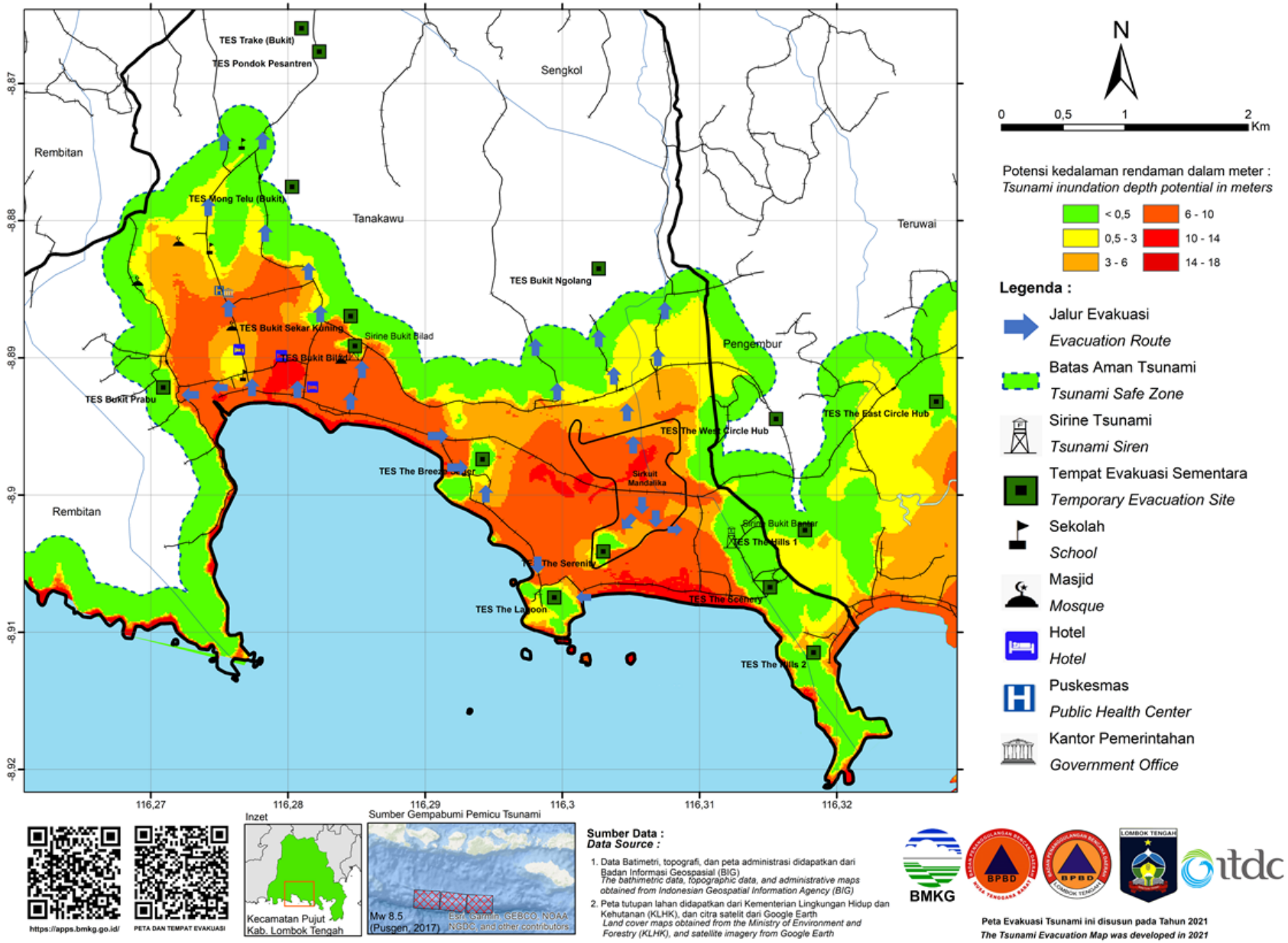
# CAPACITY : ALERTNESS

## Evacuation Route Map

- Based on worst scenario



# CAPACITY : ALERTNESS

## Dissemination Map and Sign

| No | Uraian | Jumlah | Lokasi |
|---|---|---|---|
| 1 | Papan Informasi bahaya tsunami | 6 | Pantai Kuta (4), dan Sirkuit Mandalika (2) |
| 2 | Rambu Arah Evakuasi | 7 | ⍰ Sekitar Pantai Kuta Mandalika<br>⍰ Sekitar Jalan Pariwisata<br>⍰ Sekitar Jalan Raya Kuta |
| 3 | Titik Kumpul | 4 | ❑ SDN 2 Kuta<br>❑ Depan Kantor Desa Kuta<br>❑ Masjid Kuta (Tsunami Evacuation Shelter) Bukit Bilad<br>❑ Bukit Prabu |


***Tsunami Evacuation Shelter (TES)* Bilad Hill**


**Information boards in Mandalika Circuit**


**Tsunami Hazard sign in Kuta Beach**


**Tsunami Evacuation Direction sign in Kuta Beach**


**Assembly Point sign in SDN (Primary School) 2 Kuta**

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# CAPACITY : ALERTNESS

## Dissemination Map and Sign



BMKG

LOMBOK TENGAH

QR- KONSINA DESTA

QR- Code Komunitas Siaga Tsunami Desa Kuta
*(Tsunami Ready Community Kuta Village)*

**Scan Me**

@konsina_desta

QR-Code Komunitas Siaga Tsunami Desa Kuta (Tsunami Ready Community Kuta Village)

Aplikasi Info BMKG (Info BMKG apps)

Peta Bahaya Tsunami & Peta Evakuasi Tsunami Desa Kuta (Tsunami Hazard Map & Tsunami Evacuation Map Kuta Village)

Aplikasi Info BMKG (Info BMKG apps)

Peta Bahaya Tsunami & Peta Evakuasi Tsunami Desa Kuta (Tsunami Hazard Map & Tsunami Evacuation Map Kuta Village)


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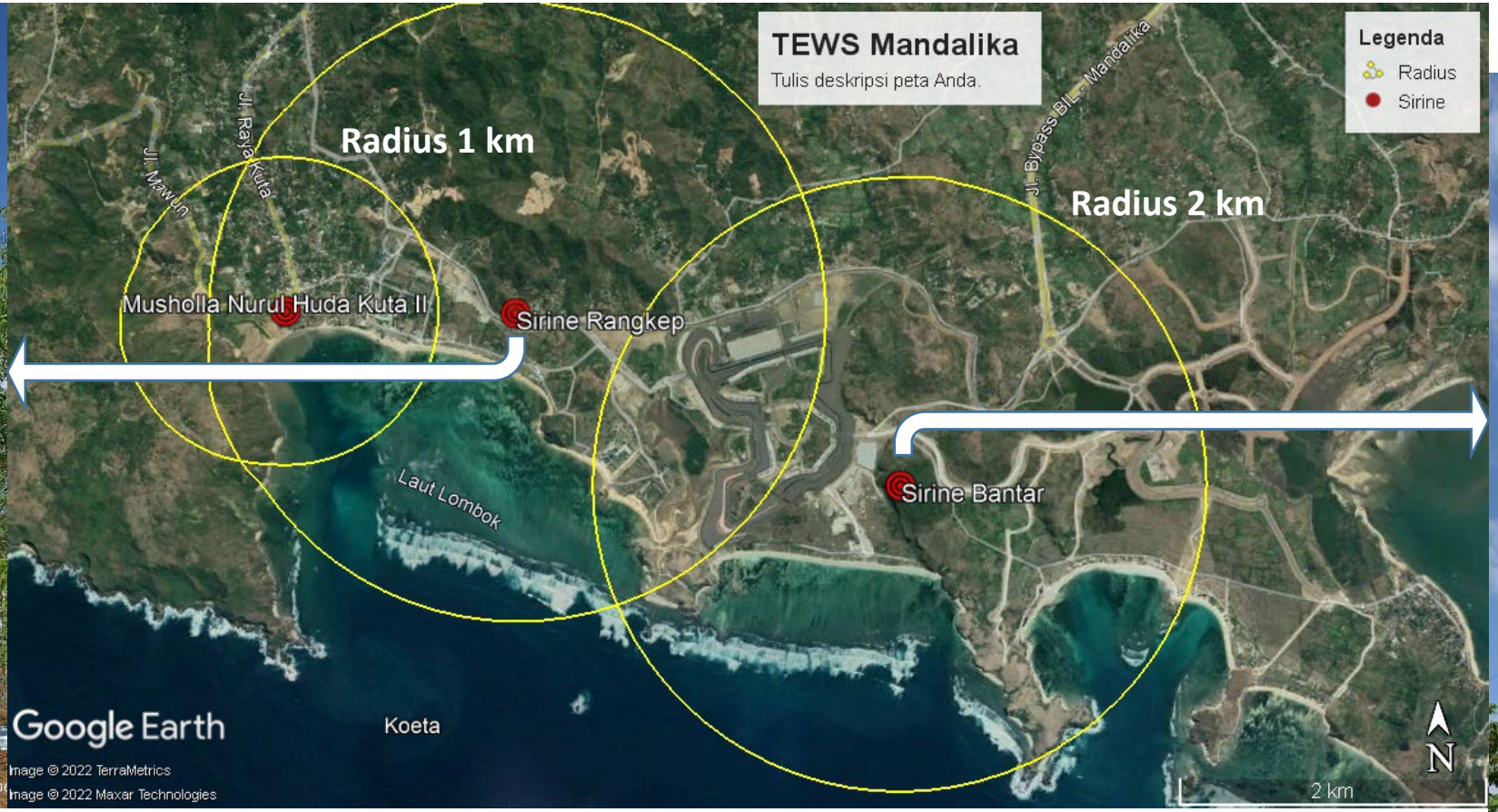
# CAPACITY : ALERTNESS

## Tsunami Hazard Evacuation Call




**BNPB – BMKG - BPBD Kab. Loteng - Unram**

# TSUNAMI HAZARD EVACUATION CALL

## Hardware

Consist of :

- 4 speaker units @ 50 watt
- amplifier unit 250 watt
- control unit
- communication unit
- electric power unit
- tower structure 12 m height.



Warning system can be activated by :

1. Long distance with GSM technology
2. Long distance with radio frequency
3. On site manually

# TSUNAMI HAZARD EVACUATION CALL

## Hardware

Long distance activator equipment by using radio frequency in Regional Disaster Management Agency of Center Lombok District



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# TSUNAMI HAZARD EVACUATION CALL

## Activation Flow

- Integrate with BMKG system (Bantar Hill)


BPBD Kab. Loteng Operations Control Center (Pusdalops)

Activation signal

Mosque


Handy Talky in VHF

Handy Talky in VHF

Rangkep / GWT Hill

Activation signal relay

Handy Talky in VHF

Bantar Hill

# TSUNAMI HAZARD EVACUATION CALL

## SOP Activation and Dissemination

- Authority of Tsunami Warning Activation is in Regional Disaster Management Agency of Center Lombok District (BPBD Kab. Loteng) as **main priority**.
- Kuta Village Disaster Alert Team as **backup priority**.
- SOP Activation Call need legal protection from government


# TSUNAMI HAZARD EVACUATION CALL

## Monitoring and Maintenance

- System trials is every date of 26th and time of 10:00 AM.
- System should be ready for 24 hours / 7 days but always be hoped not be activated.

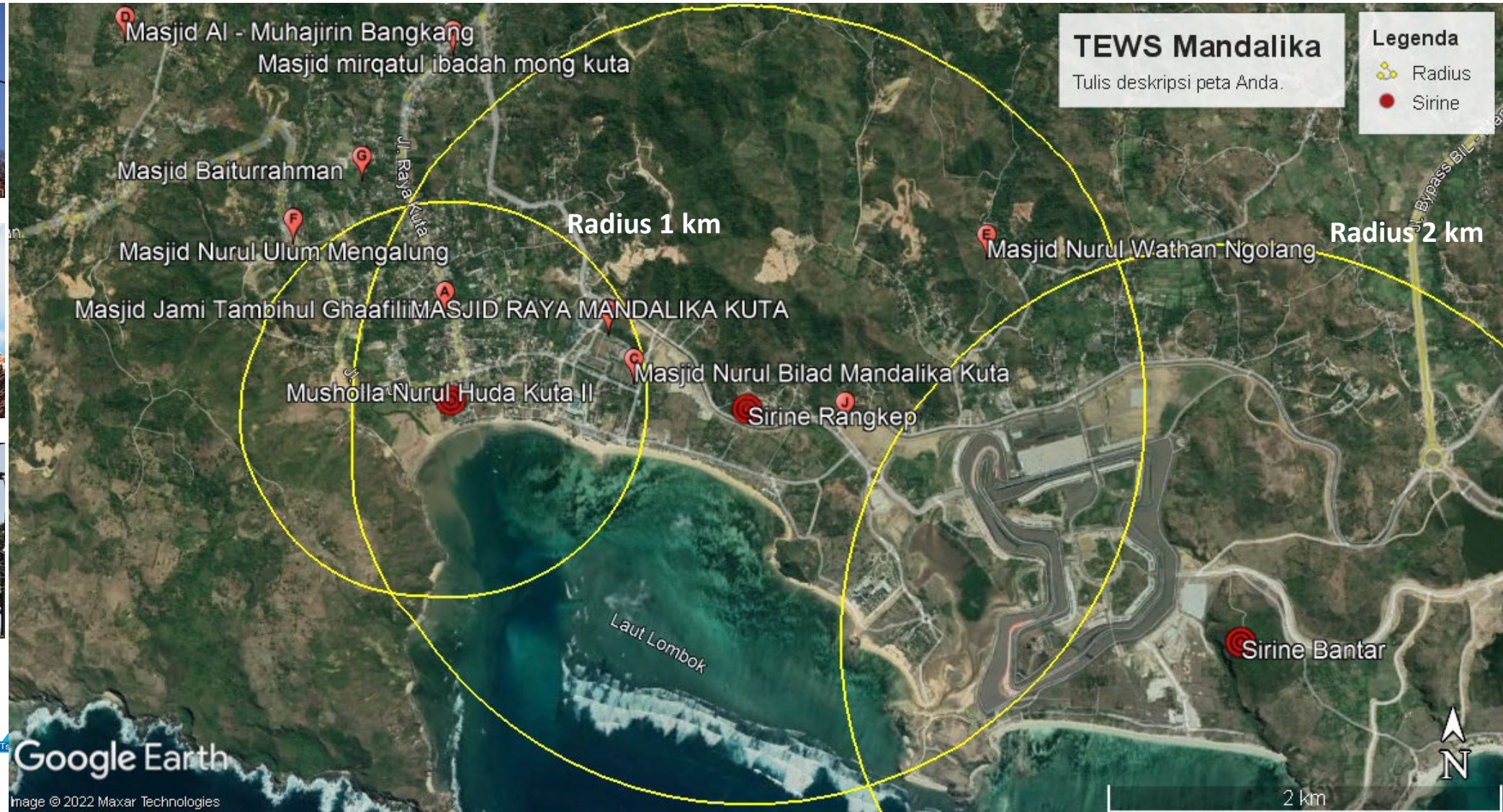

# TSUNAMI HAZARD EVACUATION CALL

## Issues :

- Sound range limited
- Natural disturbance (wind, topography)
- Harsh environment (coastal, corrosive)
- Structural and electrical equipment cost
- Electrical equipment durability
- Maintenance and safety

# TSUNAMI HAZARD EVACUATION CALL

## Siren at Mosque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# TSUNAMI HAZARD EVACUATION CALL

## Siren at Mosque

- ❖ Prototype in Musholla Nurul Huda, Kuta II.
- ❖ Sound system has been available in mosque.
- ❖ Less cost, just add control and power system.
- ❖ Increasing sound range.
- ❖ Better maintenance and safety.


*We Remember,*
*We Alert,*
*We Ready !!!*

**MATUR TAMPI ASIH**
**TERIMA KASIH**
**THANK YOU**

**Indian Ocean Tsunami Ready Workshop**
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