



PREP-1: Easily understood tsunami evacuation maps are developed

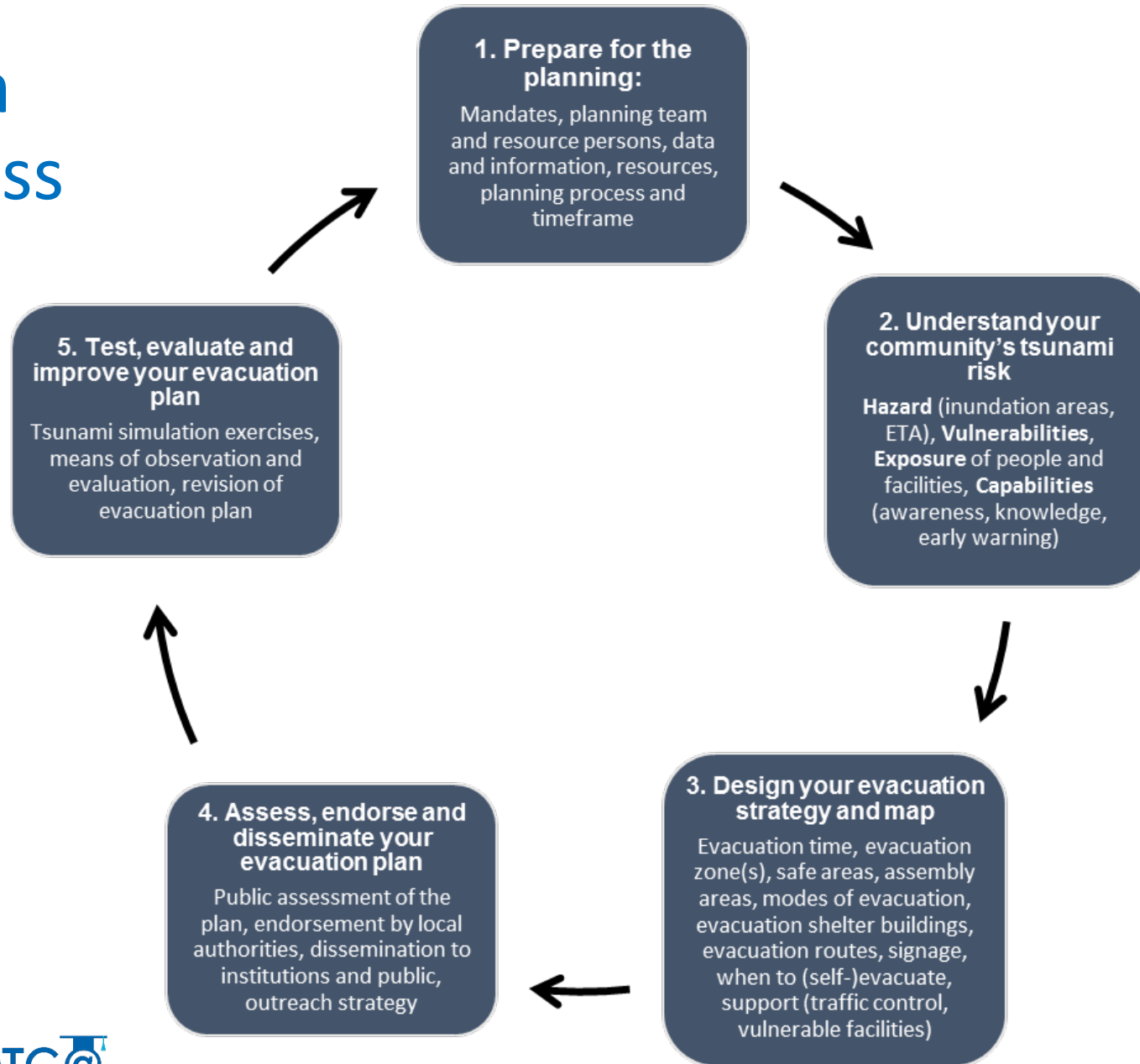
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Indian Ocean Tsunami Ready Workshop
Tanjung Bena, Bali - Indonesia
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Acknowledgment
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The Evacuation Planning Process



1. Prepare for the planning

- First step is to establish the planning team, identify resource persons, data and information requirements
- The overall workplan and timeframe for evacuation planning should be agreed
- Resources (money and time) need to be allocated
- Timescale will depend on the size and complexity of the community being considered. A small village will take much less time than a coastal city, which can take months



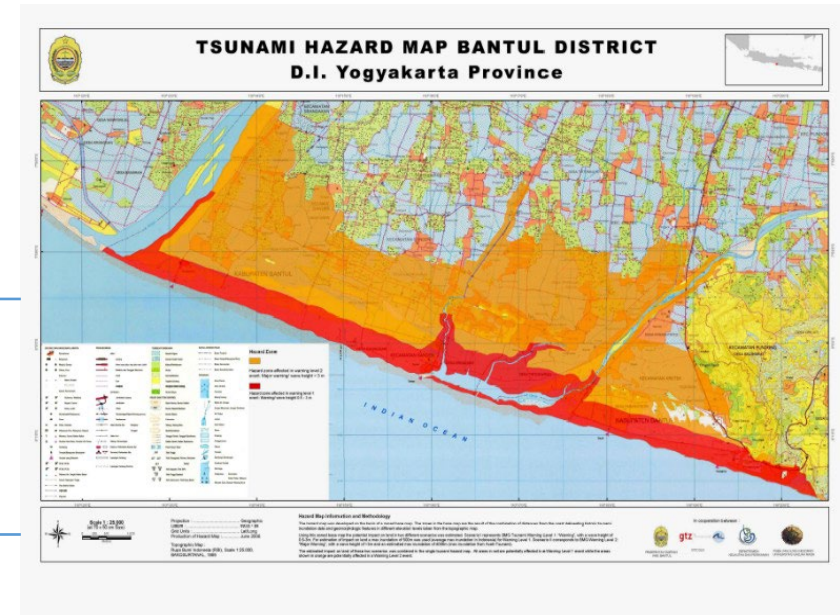
2. Understand your community's tsunami risk profile

The tsunami hazard zone is identified from the inundation map (ASSESS-1). Estimates of tsunami wave arrival times based on “worst-yet-credible” case scenarios are crucially important because it affects how quickly people need to evacuate and therefore when evacuation orders need to be issued

The vulnerabilities and exposure of people and facilities must be assessed. This includes identifying vulnerable facilities such as schools and hospitals

The capabilities of the target community should be assessed in terms of their awareness and knowledge of their risk

Existing early warning systems should be assessed. If no early warning systems exist or if the warning time is too slow then the community will have to rely on natural warning signs and know how to respond



3. Design your evacuation strategy and map

Evacuation strategy is fundamental to the whole planning process

Important to know how long it will take to evacuate people and decide if it is possible to bring everybody out of the evacuation zone in time. If not, then other strategies such as vertical evacuation should be considered

Knowing when to evacuate is also a key question in the strategy. How does the community know when they must evacuate? Do they wait for an official evacuation order? How will this be conveyed?

Designation of evacuation routes, safe areas, assembly points, nodes of evacuation etc should be assessed by experts in this field, including scientists, town planners, NGOs and the private sector



4. Assess, endorse and disseminate your evacuation plan

The evacuation map should be presented to the public and feedback should be invited. People in the local community are likely to know their area best and will be able to advise if the plan is realistic and feasible

The plan and map should then be endorsed by local authorities and disseminated to the public and other institutions

The map can be displayed on billboards, in shops, restaurants and hotels in coastal locations. Flyers and public service messages can also be used

An outreach strategy should be devised to ensure that all sectors of the community are aware of the evacuation plan and map



5. Test, evaluate and improve the evacuation plan

Conduct regular exercises and drills to test that the evacuation plan and map are effective and to identify areas for improvement



Evacuation map of Gwadar for a hypothetical tsunami from extreme rupture along the Makran Subduction Zone

Why this map?

The map is intended to serve those who need to assess current status in Pakistan. It can be used to guide people to safety and to reduce people's level of concern. It is intended to be used by disaster management agencies, local governments, and NGOs. It is not intended for use in land-use planning.

What does the map show?

The map identifies such areas and possibilities that can be used by the state to minimize in case of a tsunami event. In the present scenario, the tsunami generated by a possible shift of the ocean floor during a hypothetical tsunami with a magnitude of 7.7.

Why choose such a large rupture?

The largest rupture ever occurred in the history was generated during the 1945 Makran earthquake of magnitude 7.7. But within history it is rarely that a rupture of such magnitude occurred. It was said by the Chairman Joint National Institute for Coastal and Marine Science, Islamabad, Pakistan, that the 1945 Makran earthquake was the largest ever recorded in the world. The rupture was 100 km long and 100 m wide. It is important to plan for a rupture of such magnitude to ensure that the population is safe from a tsunami.

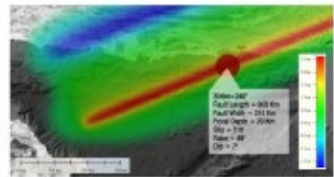


Fig. 1. Rupture area of the 1945 Makran earthquake. The rupture length is 100 km, fault width is 100 m, and depth is 100 m.

What happened in 1947?

Thousands of people were killed in the 1947 Makran earthquake. The rupture was 100 km long and 100 m wide. It is important to plan for a rupture of such magnitude to ensure that the population is safe from a tsunami.

What are the steps for generating results?

- The map identifies evacuation routes which are based on severity levels as generated by computer simulations that take into account:
 - The simulation begins with determination of the rupture area from a hypothetical earthquake of magnitude 7.7. This rupture is consistent with current estimates of this area on the basis of the 1945 Makran earthquake. The rupture area is defined by the 1945 Makran earthquake (Smith et al., 2012). For simplicity, the rupture area is defined by the 1945 Makran earthquake.
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- Depending upon the severity level, routes are generated to take the population to safety. The routes are generated based on the severity level. The routes are generated based on the severity level.

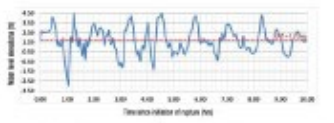
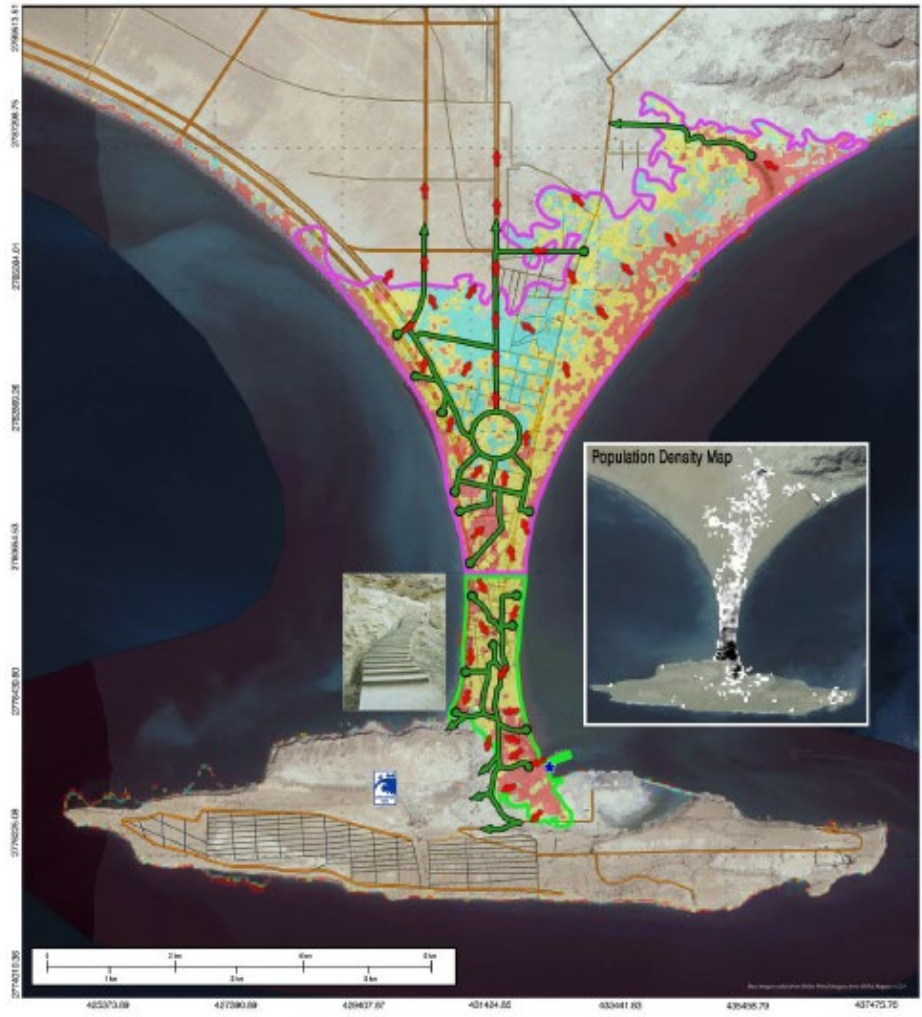


Fig. 2. Tsunami wave height (m) versus distance (km). The wave height is approximately 1.5 m at 0 km and increases to approximately 3.5 m at 10 km.



Severity Levels

- High
- Medium
- Low

Legend

- Direction of population towards evacuation route
- North bound evacuation region
- South bound evacuation region
- Evacuation route towards safety zone

What are the main findings?

The main findings of the study are that the population of Gwadar is at risk from a tsunami generated by a rupture of magnitude 7.7. The population of Gwadar is at risk from a tsunami generated by a rupture of magnitude 7.7. The population of Gwadar is at risk from a tsunami generated by a rupture of magnitude 7.7.

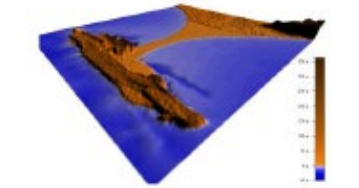


Fig. 3. 3D representation of the topographic map of Gwadar.

Who supported the mapping?

The mapping was supported by Oxfam GB, under a disaster resilience project of the 2008-2010 Economic and Social Commission for Asia and the Pacific.

Acknowledgments

We thank Oxfam GB for supporting the project and the staff of Oxfam GB for their support and guidance. We are grateful to Oxfam GB and the staff of Oxfam GB for their support and guidance.

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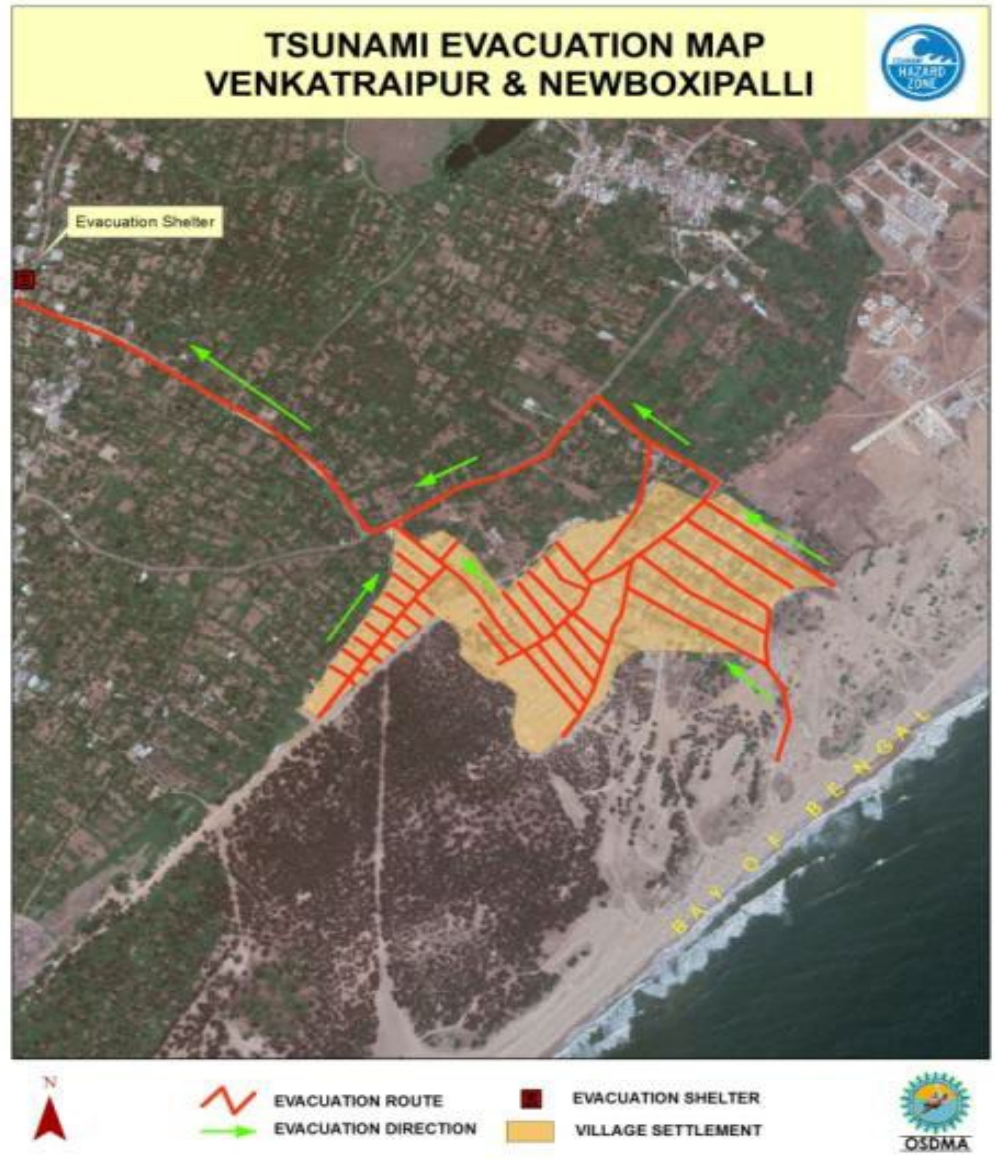
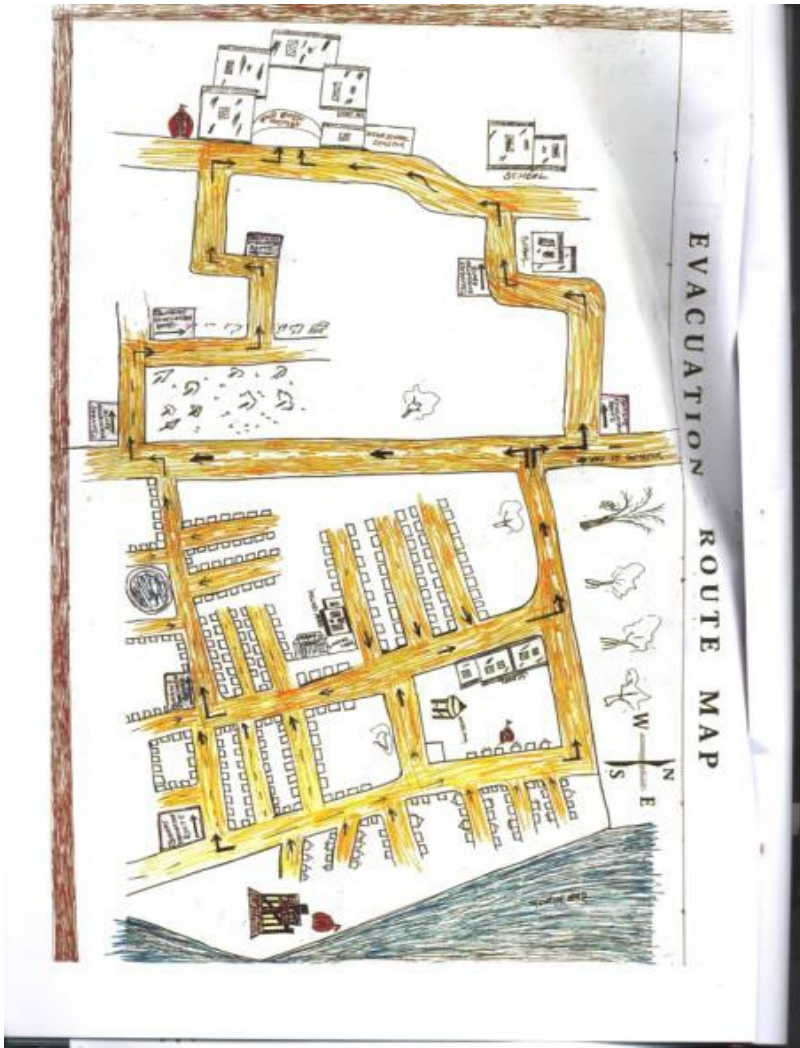
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Project Information
 Universal Tsunami Resilience (UTR)
 Oxfam GB
 UTR 2040 - 41 (90°S - 90°N - Southern Hemisphere)
 Date: August 2015



India

Indonesia

Tsunami Evacuation Procedure

1. If you feel an earthquake - protect yourself
 - Don't panic!
 - Drop, cover and hold!
2. After an earthquake, be aware that a tsunami may follow
 - Move away from the beach immediately as a precaution measure!
 - Look for more information through TV and Radio!
3. After a strong and prolonged earthquake, evacuate immediately!
 - Don't wait for an official warning, leave the **RED ZONE** immediately if possible or look for shelter in higher buildings
 - If you are around Pratama Street, look for shelter in one of the hotels with higher floors
 - As a visitor in a hotel, please follow the instructions of hotel staff
4. The sound of the siren is the official call for evacuation
 - If the siren sounds, follow the evacuation procedure as indicated above (No. 3)!

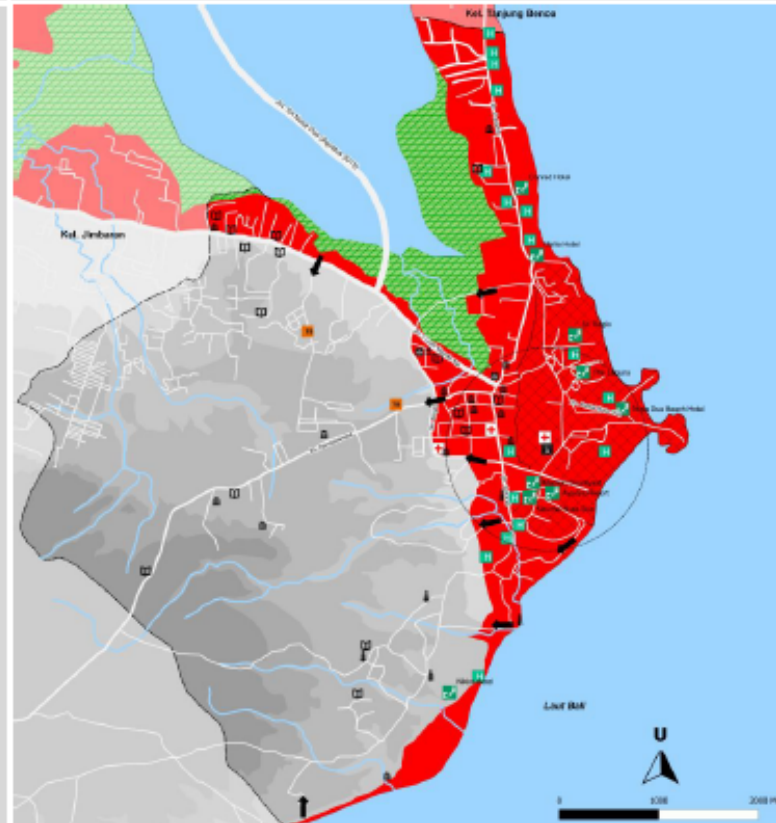
Be aware that the siren may not be heard in all areas.

After the first tsunami wave, more waves are likely to come!

Wait for an official "All Clear" message before leaving shelter

*Please note that BTDC has its own procedure

Tsunami Evacuation Map for Benoa Peta Evakuasi Tsunami di Kelurahan Benoa



Legend/ Legends		
■ Tsunami Risk Zone Zona Bahaya Tsunami	Siren Girena	Community Hall Bale Banjar
■ BTDC Area Kawasan BTDC	Public Vertical Evacuation Building Bangunan Evakuasi Vertikal Umum	Hindu Temple Pura
■ Safe Zone/Zone Aman	Hotel with 3 Floors (or more) Hotel bertingkat 3 atau lebih	Traditional Market Pasar
■ Height of 25 m Ketinggian 25 m	Assembly point Titik Berhimpun	Street Network Jaringan Jalan
■ Height of 30 m Ketinggian 30 m	Hospital RS/Puskesmas	River/Sea Sungai/Laut
■ Height of 50 m Ketinggian 50 m	School Sekolah	Administrative Border Batas Administrasi
■ Height of 75 m Ketinggian 75 m	Village Office Kantor Kelurahan	Wanggunan Pura Banjar
■ Height of 100 m Ketinggian 100 m		
■ Height of 130 m Ketinggian 130 m		

December / Desember 2012

Further Information / Informasi lebih lanjut:
BPSD Kabupaten Badung
Jln Raya Raja Gempil, Mengwi
Tel. 0361-7811186

Prosedur Evakuasi Tsunami

1. Jika merasakan gempa bumi - lindungi diri anda
 - Jangan panik
 - Merunduk, berlindung dan berpegangan
2. Setelah gempa bumi, sadari bahwa tsunami mungkin terjadi
 - Segera tinggalkan daerah pantai sebagai langkah pencegahan awal
 - Carilah informasi lebih lanjut melalui TV dan Radio
3. Setelah gempa bumi yang kuat dan lama, Segera Evakuasi!
 - Jangan menunggu peringatan resmi, segera tinggalkan **ZONA MERAH** jika memungkinkan atau mencari tempat berlindung yang lebih tinggi
 - Jika anda berada di sekitar Jln. Pratama, segera berlindung di bangunan bertingkat 3/lebih
 - Jika anda pengunjung, ikuti arahan dari karyawan hotel
4. Bunyi sirene adalah panggilan resmi evakuasi
 - Jika sirene berbunyi, ikuti prosedur evakuasi seperti diatas (No. 3)!

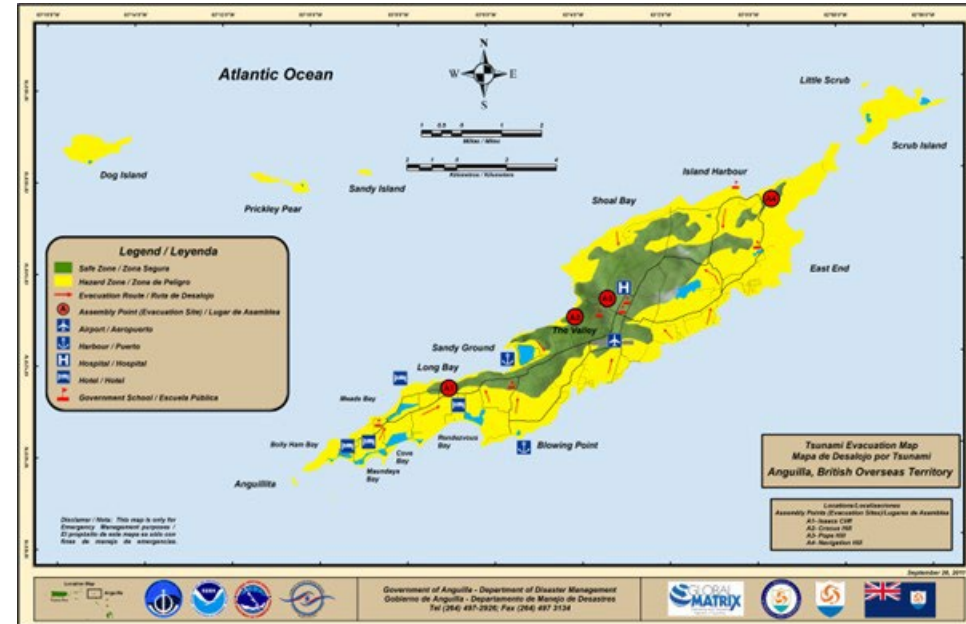
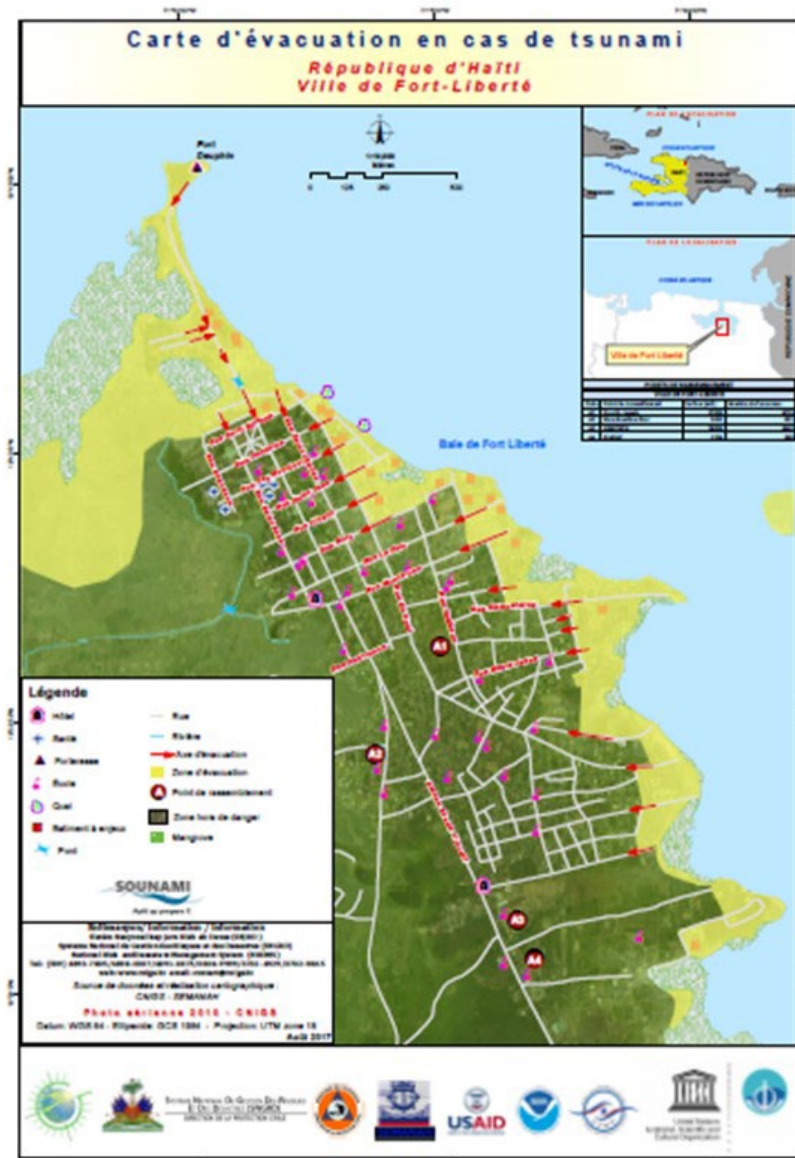
Sadari bahwa mungkin bunyi sirene tidak terdengar di semua area.

Setelah gelombang pertama datang, gelombang yang lain mungkin akan menyusul.

Tunggu pemberitahuan resmi "Tsunami telah berakhir" sebelum meninggalkan tempat perlindungan

*Catatan: Ada prosedur khusus di area BTDC

Haiti



Anguilla



Puerto Rico

Trinidad & Tobago

