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TSUNAMI AND DISASTER MITIGATION  
RESEARCH CENTER



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INTERNATIONAL GUEST SEMINAR  
CHARLES DARWIN UNIVERSITY, AUSTRALIA, 8 SEPTEMBER 2023

# PROGRESS OF **PREPAREDNESS** **AND MITIGATION** IN ACEH: **20 YEARS** AFTER INDIAN OCEAN TSUNAMI 2004

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# TSUNAMI RESULTED UNPRECEDENTED DAMAGE ALONG THE REGION OF ACEH AND NIAS



## Damage assessment

120.000	Houses destroyed
70.000	Houses damaged
14	Sea ports
120	Bridges
3.000 km	Roads
1.052	Government buildings
2.000	School buildings
114	Health centers
20.000 ha	Fish ponds
60.000 ha	Agriculture land
100.000	SMEs
167.228	Students lost their schools
2.500	Teachers died

- 167,000 dead or missing from tsunami
- 500,000 displaced from homes
- 50,000 were housed in barracks and 65,000 remained in tents
- 80,000 – 110,000 new houses are needed
- 25,000 families require some form of location, that between 15,000 and 50,000 ha of land are submerged or uninhabitable
- Approximately 10,000 households need resettling as their land became submerged/was ruined
- 80% of land documents lost, including almost all the cadastral index maps
- Destruction of much the physical evidence of property boundaries and witness evidence held in the minds of those who perished

(BRR Aceh Nias, 2009)



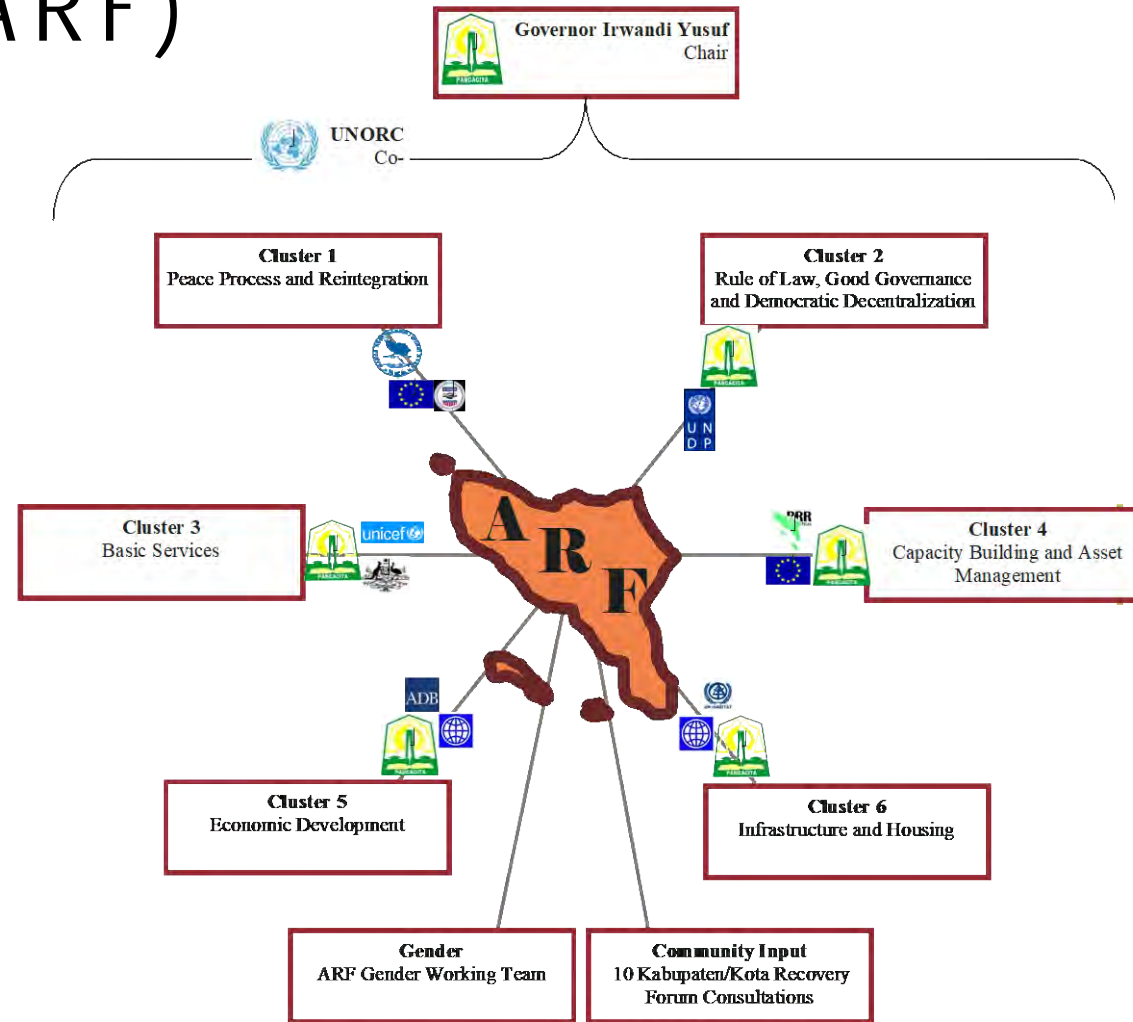
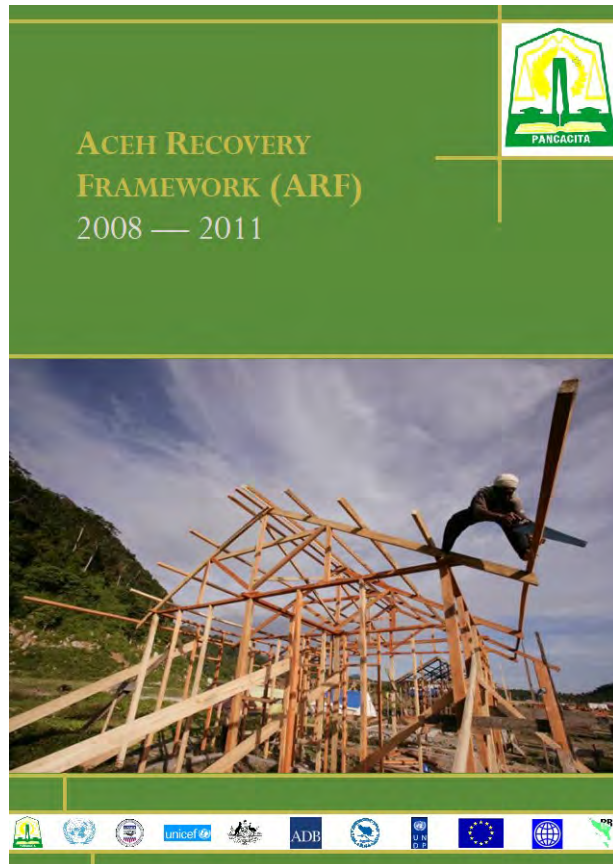
# BRR ACEH - NIAS (RECONSTRUCTION & REHABILITATION AGENCY)



- Established on April 16, 2005 through Regulation in Lieu of a Law (Perpu) No. 2/2005 issued by the President of the Republic of Indonesia
- **Mission** : to restore livelihoods and strengthen communities in Aceh and Nias by designing and overseeing a coordinated, community-driven reconstruction and development program implemented according to the highest professional standards.
- **Role** : As the lead Government agency responsible for post-tsunami rehabilitation and reconstruction, coordinating agency to ensure transparency, accountability, and speed in the reconstruction of Aceh and Nias, deliver necessary humanitarian assistance for tsunami affected displaced families, provide guidelines for housing policy, provide design and implementation of a barrack decommissioning plan.



# ACEH RECOVERY FRAMEWORK (ARF)



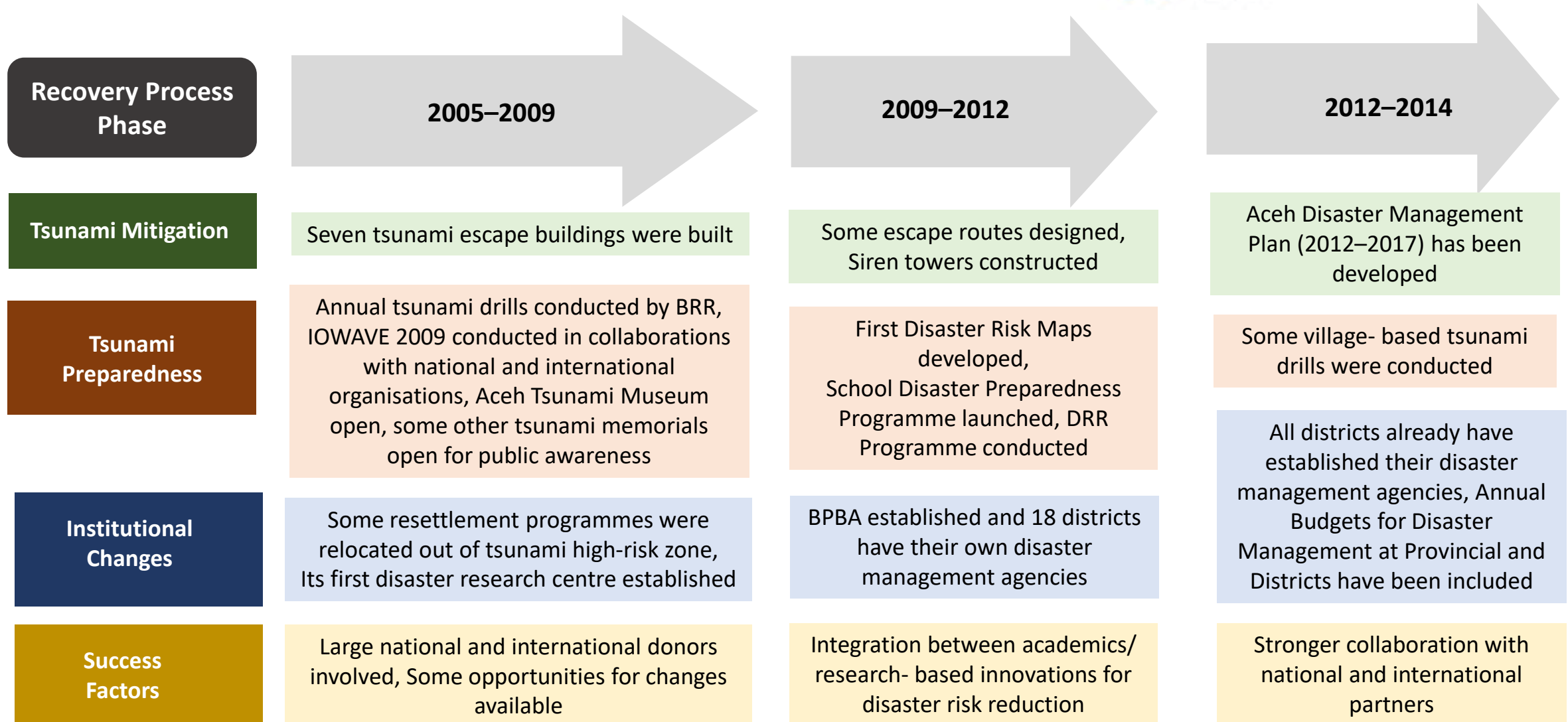
# ACEH SUSTAINABLE RECONSTRUCTION AGENCY (BKRA)



- Taken over the role of BRR at the provincial level
- Provide policy and strategic direction on continuing reconstruction efforts in concert with local and national governments
- Perform activities until 31 December 2009, when all remaining reconstruction activities, and related fund disbursements and utilization, will be completed.
- The coordinating secretariat for completion of the reconstruction at the Ministry of Finance will monitor and evaluate the finalization of overall reconstruction activities consistent with the revised master plan

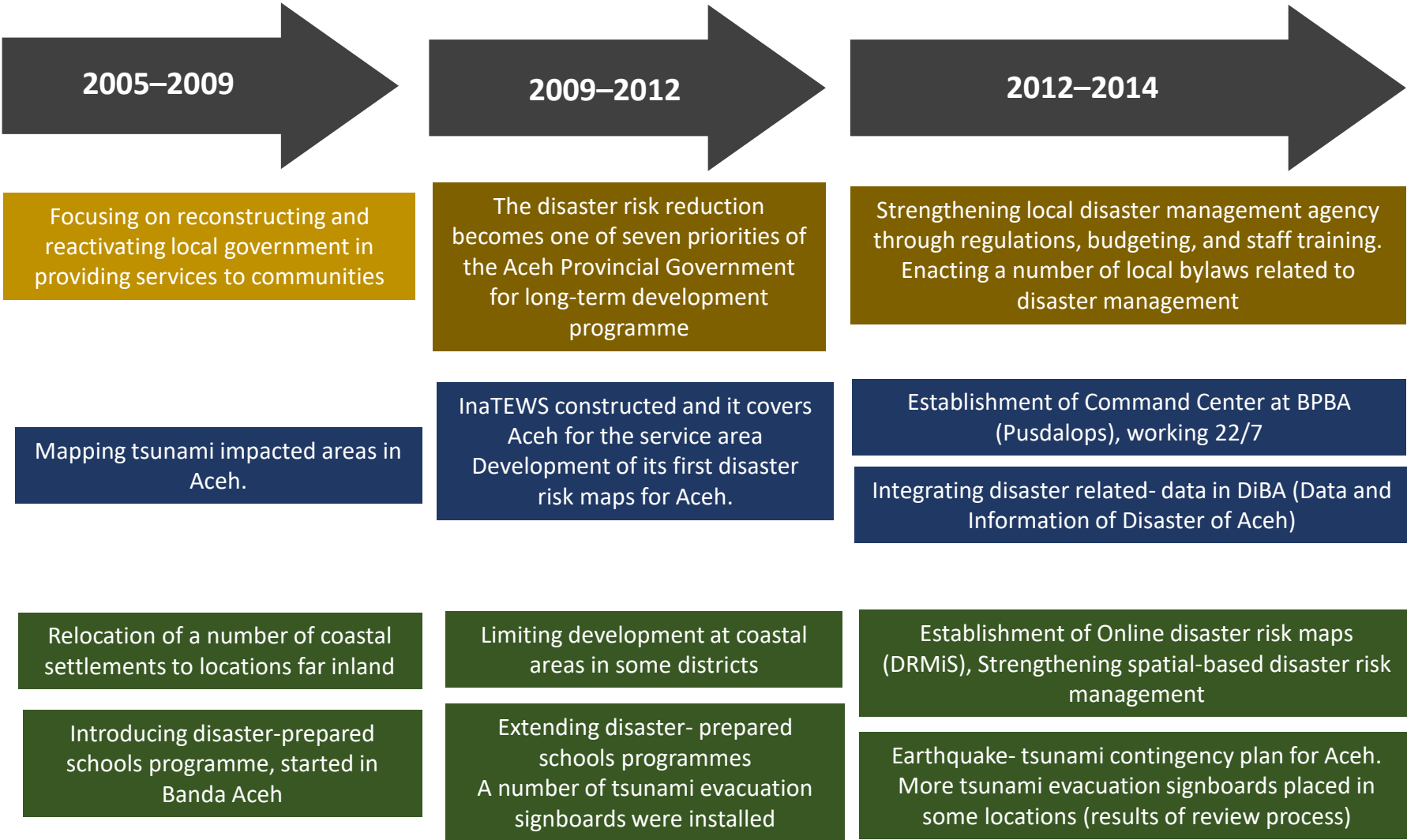


# PHASES OF THE TSUNAMI RECOVERY PROCESS IN ACEH

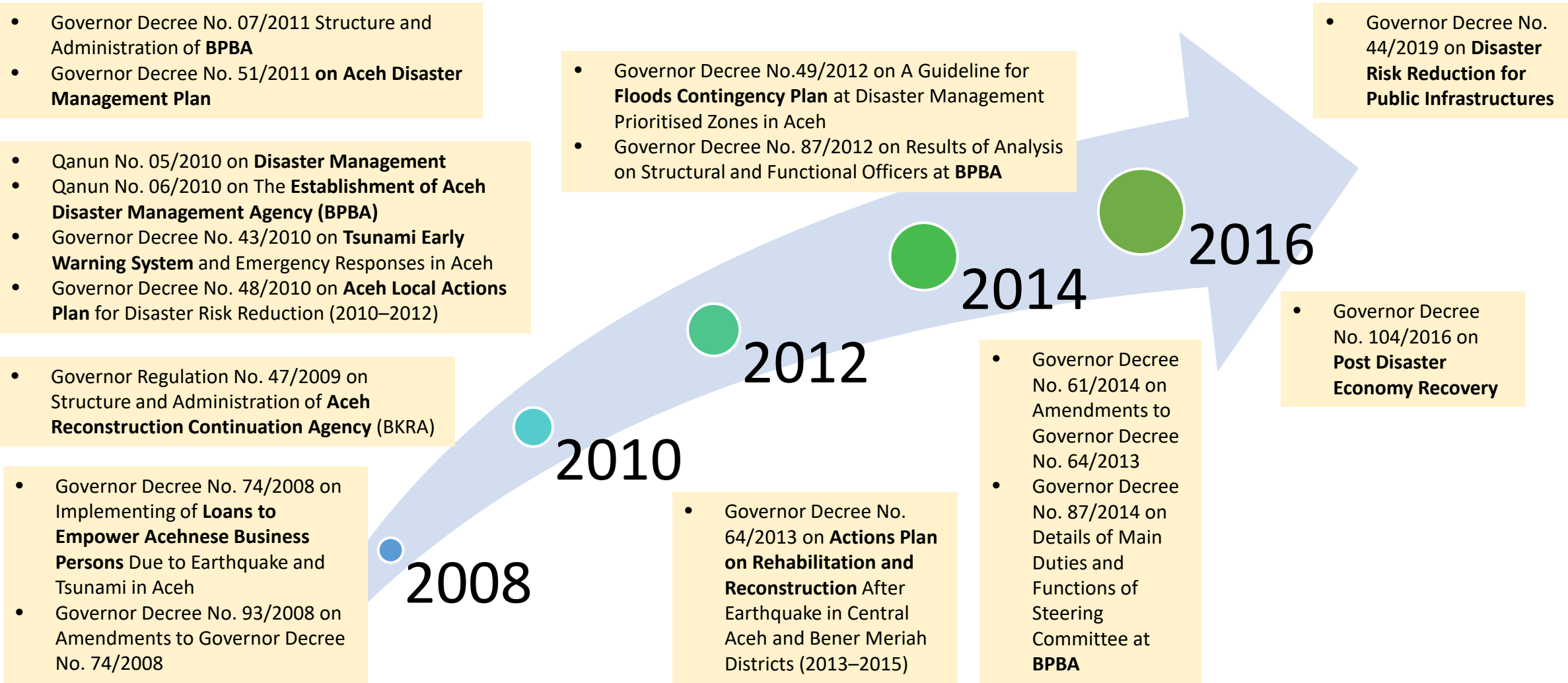




# ACHIEVEMENTS AND CHALLENGES IN IMPLEMENTING THE HFA



# DISASTER MANAGEMENT-RELATED REGULATIONS





# SPATIAL PLANNING REGULATIONS



Area of the Regulation	Regulation Number	Duration of the regulation implementation	Tsunami Zonation	Designated Evacuation Roads/Shelters	Limiting Development in tsunami-prone area	Tsunami Mitigation-Based Spatial Planning
Aceh Province	No. 19 Year 2013	2013–2033	Δ	Δ	Δ	✓
Banda Aceh	No. 4 Year 2009	2009–2029	✓	✓	✓	✓
Aceh Besar	No.4 Year 2013	2012–2032	✓	✓	⊗	✓
Sabang	No. 6 Year 2012	2012–2032	✓	✓	⊗	✓
Aceh Jaya	No. 9 Year 2014	2014–2034	✓	✓	⊗	✓
West Aceh	No. 1 Year 2013	2012–2032	✓	✓	⊗	✓
Simeulue	No. 2 Year 2014	2014–2034	✓	✗	⊗	✓
South Aceh	No. 11 Year 2016	2016–2036	✓	✓	⊗	✓
Pidie	No. 5 Year 2014	2014–2034	✓	✓	⊗	✓
Bireuen	No. 7 Year 2013	2012–2032	✓	✓	⊗	✓

**Note:**

Δ = Scales of maps in the spatial planning are not intended for these purposes

✓ = Yes

✗ = No

⊗ = indirectly/partially

# POPULATION IN BANDA ACEH

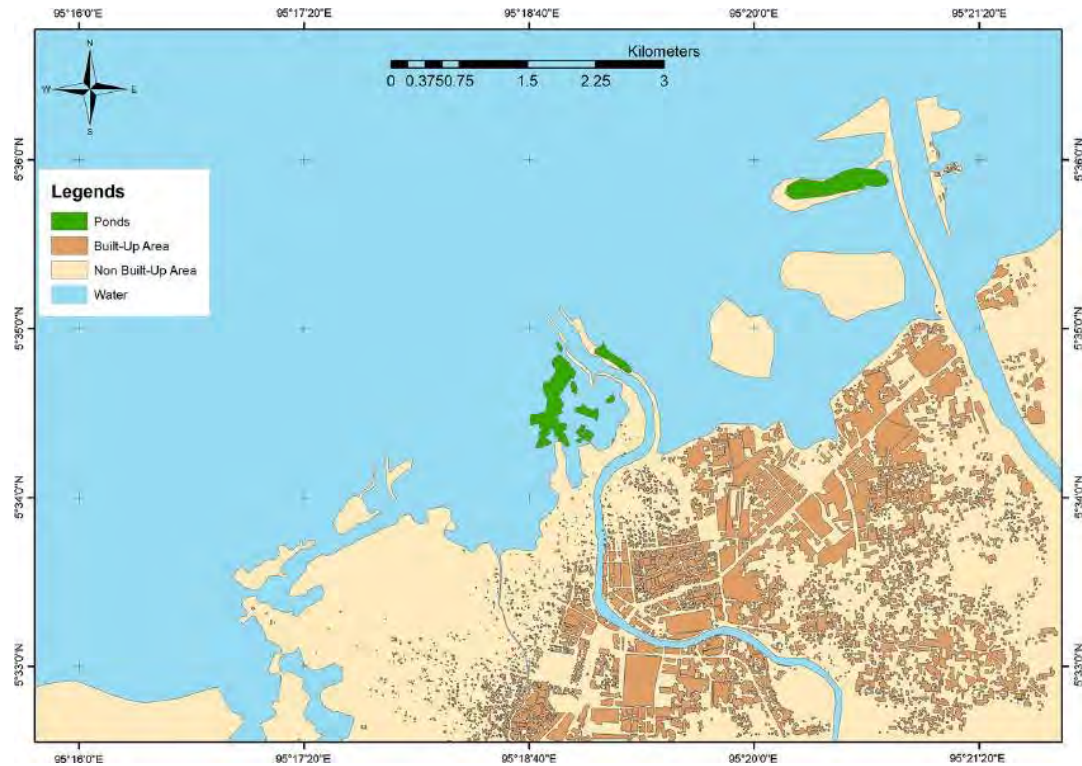
Sub District	2020	2015	2010	2006	2005	2004	2001
Kuta Raja	15,520	12,872	10,433	3,013	2,978	21,632	17,467
Meuraxa	26,860	19,040	16,484	2,320	2,221	34,592	27,468
Baiturrahman	32,510	35,363	30,377	33,657	33,582	37,715	33,399
Kuta Alam	42,500	49,706	42,217	35,088	35,033	54,718	52,824
Jaya Baru	25,930	24,561	22,031	12,395	12,340	21,305	20,902
Syiah Kuala	32,960	35,817	34,850	25,473	25,418	32,590	26,401
Banda Raya	25,220	23,034	20,891	24,272	24,257	23,995	17,563
Lueng Bata	24,330	24,660	23,592	19,339	19,284	19,232	13,477
Ulee Kareng	27,250	25,250	22,571	22,823	22,768	19,319	13,722
<b>Total</b>	<b>252,890</b>	<b>250,303</b>	<b>223,446</b>	<b>178,380</b>	<b>177,881</b>	<b>265,098</b>	<b>223,223</b>

: Totally destroyed during Tsunami 2004  
 : Severely destroyed during Tsunami 2004  
 : No major damages and no impact during Tsunami 2004

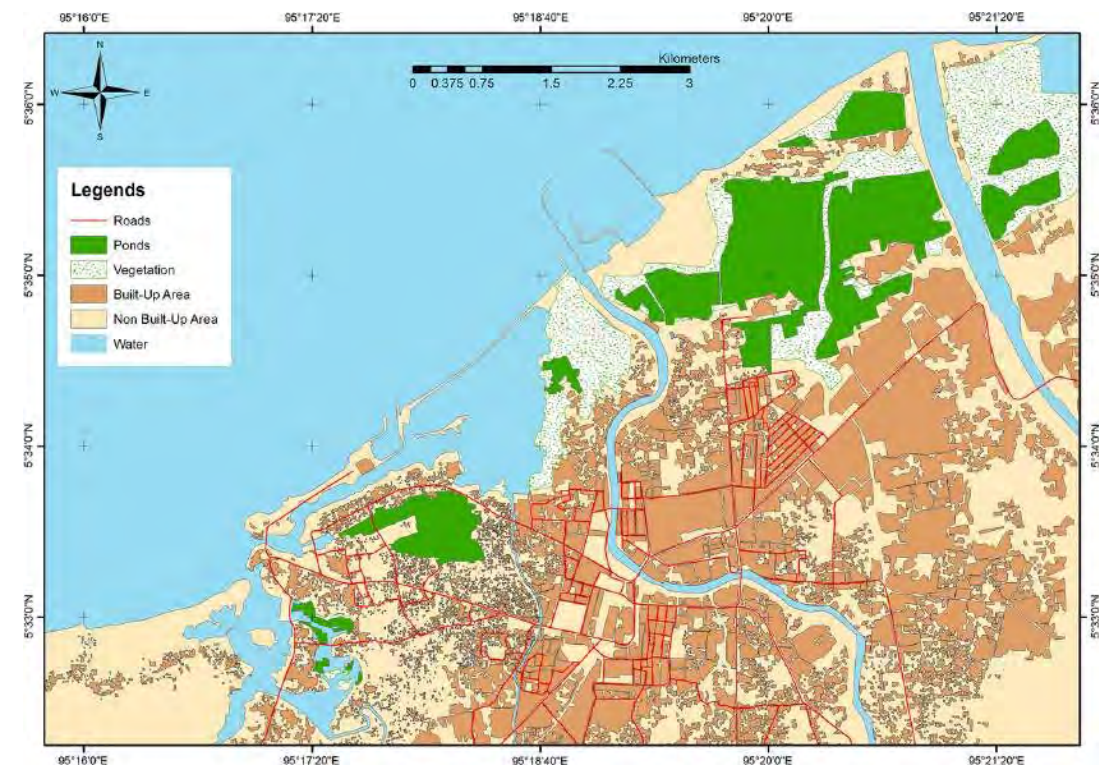


(Syamsidik et. Al., 2017)

# CHANGES OF THE LAND USE IN BANDA ACEH DUE TO THE 2004 TSUNAMI



March 2005 aerial images

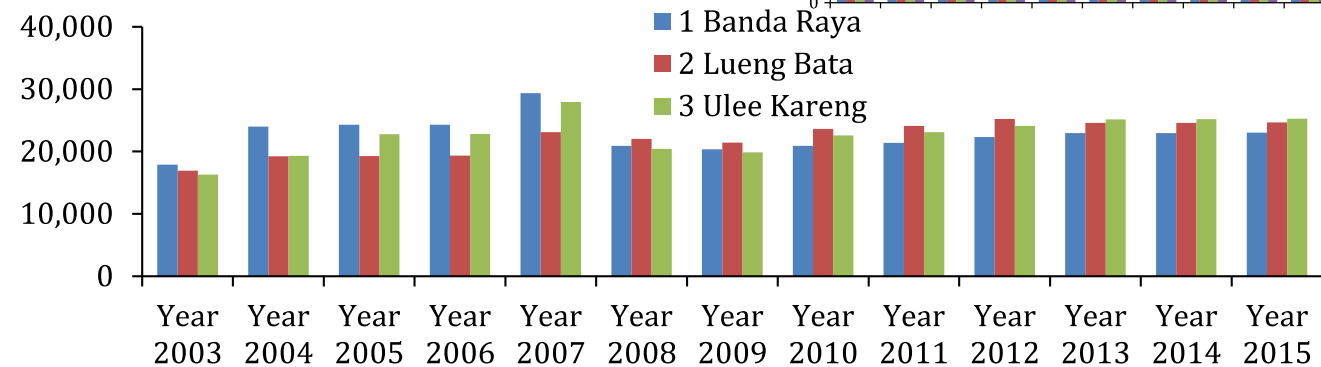
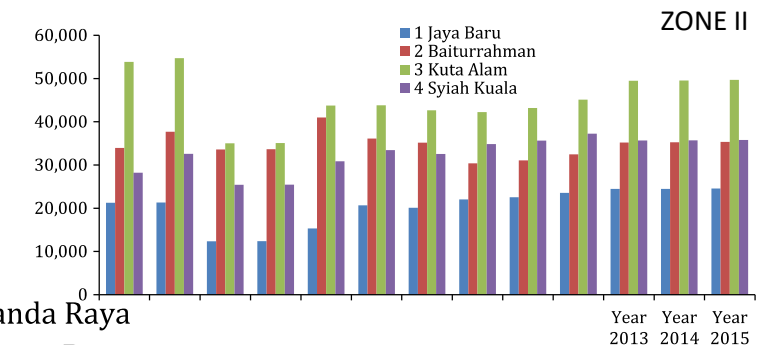
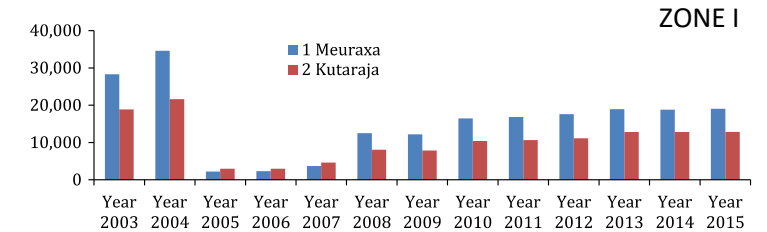


aerial images in 2015



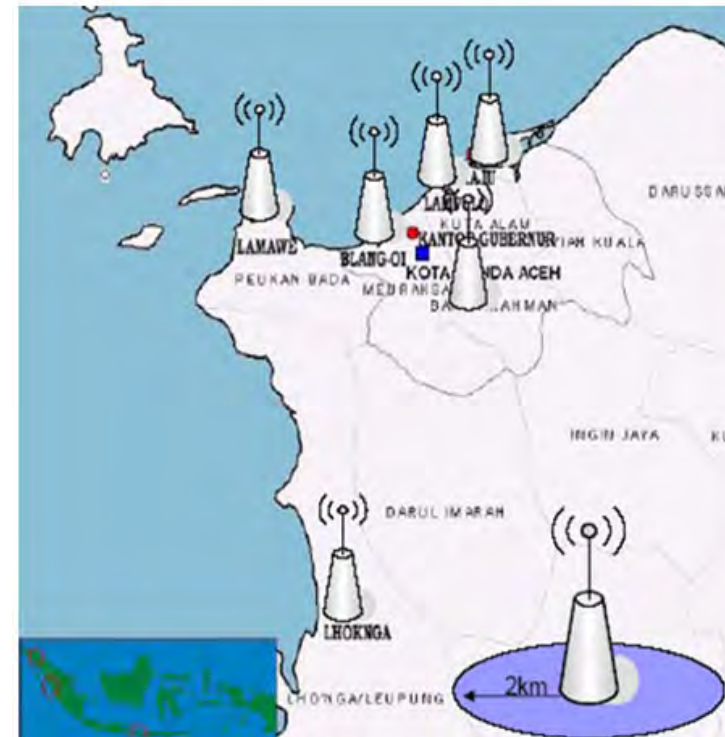
# RETURN MIGRATION IN BANDA ACEH

- Tsunami risks were only a minor concern when community members decided on a new place to live
- The return migration proved that the tsunami risk was no longer relevant as a migration push factor
- Banda Aceh is now facing the challenge of building ample evacuation facilities for its people and raising community awareness of the tsunami hazards.

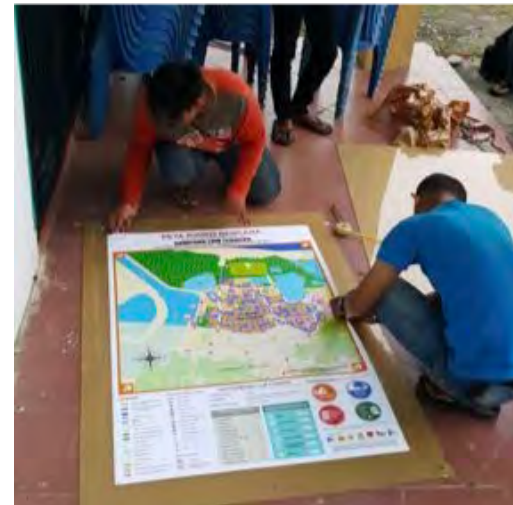


# TSUNAMI EARLY WARNING SYSTEM

- Aceh Governor Regulation Number 43 of 2010 Concerning Early Warning and Emergency Management Systems for Tsunami Disaster in Aceh
- **Siren activation function tests** → ensure this system continues to function
- Every 26th day of each month at 10 AM, it is sounded twice for a duration of 45 seconds.
- Before sounding the siren, BPBA and BMKG Geophysics Aceh Besar conduct socialization to the local community → **not to panic** and **not to be afraid** when they heard the sound of the siren



# DISASTER RESILIENCE VILLAGE/ DESTANA





# INFRASTRUCTURE RESILIENCE





# SCHOOL BASED EDUCATION AND AWARENESS



# INTERGENERATIONAL KNOWLEDGE TRANSMISSION (IKT)

- Cases of Smong → Illustrating IKT's success in saving lives during tsunami hazards.
- Part of the socialization process that involves the transmission of values, knowledge, and skills from generation to generation.
- Engaging teaching and learning strategies that fulfill adaptive goals to shape human behaviour.





# ROLE OF HIGHER EDUCATION



University Network for Disaster Risk Reduction (UNDRR)



Higher Education Consortium on Disaster



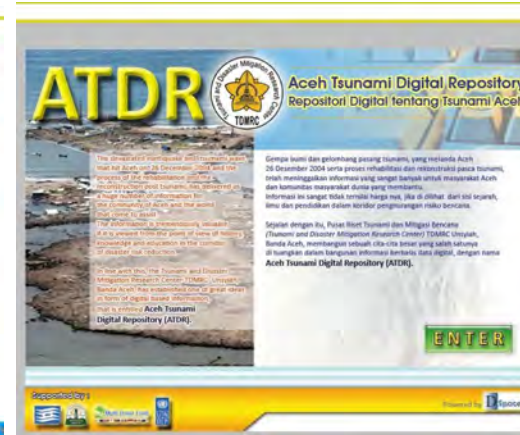
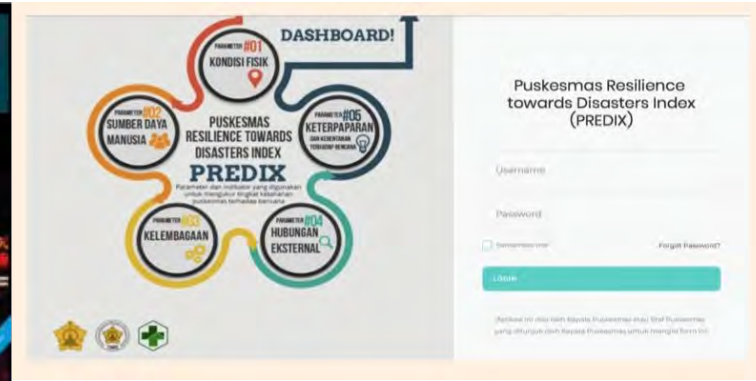
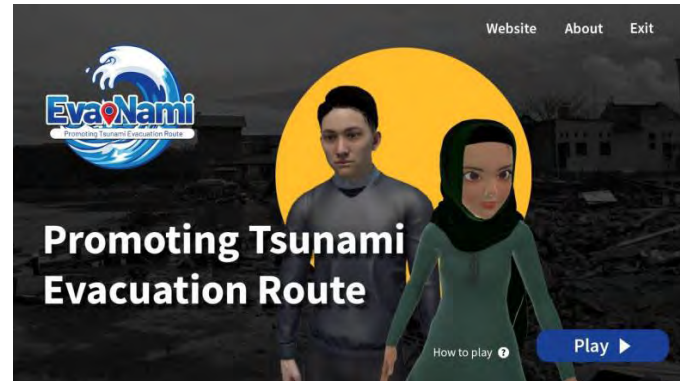


# TSUNAMI AND DISASTER MITIGATION RESEARCH CENTER (TDMRC)





# INNOVATIVE RESEARCH PRODUCTS





# ADVOCACY



## Serah Terima Dokumen Pengelolaan Garis Pantai Kota Mataram Sebagai Upaya Adaptasi dan Mitigasi Bencana Pantai dan Kenaikan Muka Air Laut

Ditribukan Oleh: Bidang 1 Pada: Sep 07, 2021

Kota Mataram selain merupakan ibukota Provinsi Nusa Tenggara Barat, juga merupakan salah satu kota terpenting di kawasan Tengah Indonesia. Sejak zaman awal, kota Mataram dan Provinsi NTB secara keseluruhan telah memegang peranan penting pada tata kehidupan masyarakat dan peradaban di kawasan ini (Wacana dkk, 1991). Di sisi lain, ancaman bencana yang juga merupakan satu diantara tantangan pembangunan di Indonesia memerlukan perhatian serius terutama untuk kawasan pantai yang semakin rawan terhadap dampak kenaikan muka air laut yang disebabkan oleh perubahan iklim. Mataram secara fisik telah terdampak oleh bencana erosi pantai yang masih menjadi masalah sampai saat ini. Berjalan sebagai kota pesisir, masyarakat pantai kota Mataram juga telah menyadari akan pentingnya upaya adaptasi dan mitigasi bencana pantai. Dengan demikian, fasilitas vital kota Mataram seperti Terminal BSM, pemangrove hutan, dan tempat wisata. Erosi pantai yang terus berlangsung memusnahkan garis pantai untuk terus bergerak masuk hingga mencapai tingkat yang signifikan dengan timbulnya masyarakat. Pemusnahannya ini masih menjadi pekerjaan rumah bagi Pemerintah Kota Mataram, terlebih lagi perubahan iklim dapat memperburuk kondisi pantai yang rawan. Selain itu, banjir rob juga terdapat telah menjadi bencana tahunan yang dialami oleh masyarakat pesisir yang juga terancam dapat diperparah oleh kenaikan muka air laut. Terpapar oleh


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