PECC International Project 2007-2009: Issues related to water management in island territories, coastal regions and isolated communities

How to maintain essential services running in the case of earthquakes or tsunamis

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Question to be addressed

- How to maintain essential services running in the case of earthquakes or tsunamis; what are the policies set up by Japan to face natural disaster?

Risks for Water Services

- Meteorological Disasters
  - Cyclone/typhoon, flood, drought, snowstorm, sandstorm, tornado
- Geological Disasters
  - Earthquake, tsunami, landslide, volcanic eruption
- Accidents
  - Oil spill, bush fire at water source
  - Waterborne disease outbreak
  - System failure, power failure

Hashimoto Action Plan

- Water and Disaster Working Group
  - Objective 1: Establish, with unified political will, a clear-cut global-level target that articulates the direction for global actions for reducing the loss of life and livelihood caused by water-related disasters
  - Objective 2: Provide adequate safe water and sanitation during and after disasters

Japanese Context

- Typhoon, rainstorm (monsoon rain) and earthquake are the most devastating natural disasters
- Physical damage to water facilities by other disasters, e.g. volcanic eruption, tsunami, snowstorm, is not significant

Damages by Typhoon & Heavy Storm

- Road collapse, lightning strike, power outage are the major causes of interruption
- Approx. 10 events interrupt water supply 30-100 days that affect 100,000 people annually

Year	2003	2004	2005	2006
No. of Disasters	4	10	13	13
Population affected	59,079	168,057	137,368	71,089
Total days of stop	N.A.	99	72	35

Source: Y. Magara: Risk Assessment and Management of Water Supply Business

Damages by Earthquake

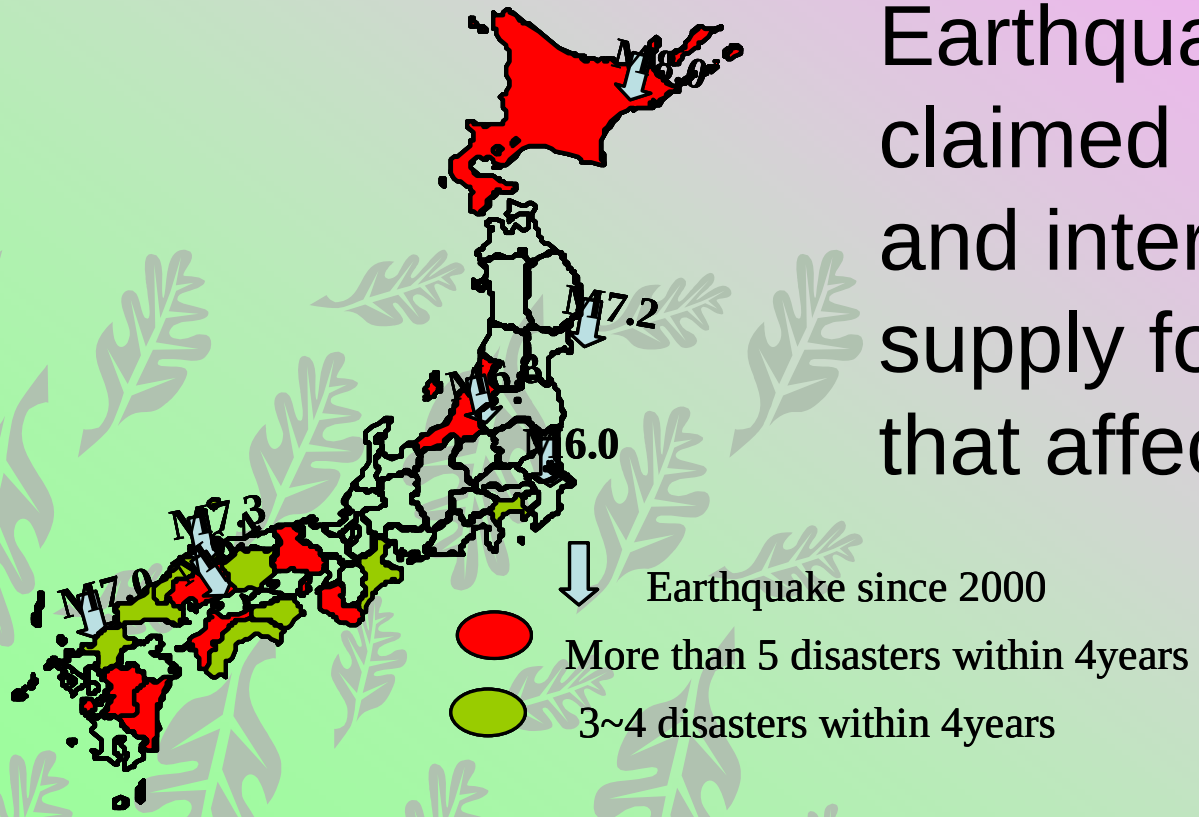


Figure 2 Earthquakes and disasters in recent years

- Hanshin-Awaji Earthquake in 1995 claimed 5000 lives and interrupted water supply for 9 weeks that affected 900,000 people that cost 600 billion yen

Japanese Policies

- Revision of building standards (concrete structure)
- Replacement to quake-resistant piping material
- Earthquake-proofing indicators under Water Supply Business Guidelines
  - Quake-resistant treatment facility, pumping station, service reservoir, pipeline, chemical stock, stand-by power generator, fuel stock, etc.

(Continued)

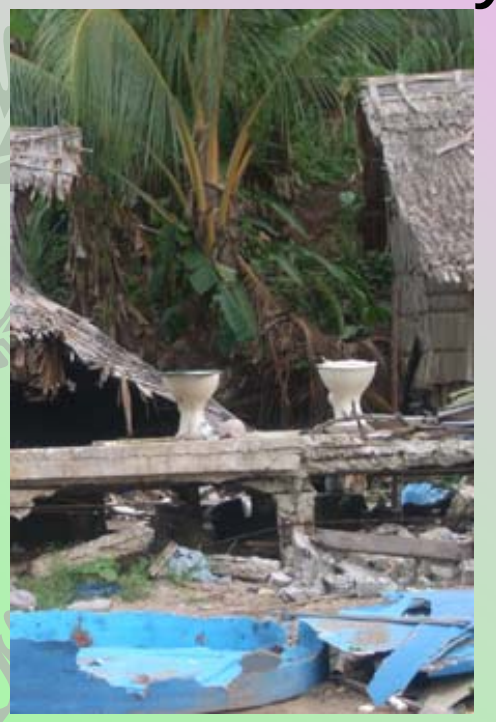
- Alternative water supply (e.g. groundwater) to critical facilities (e.g. hospital) during and after disaster
- Regional mutual agreement for quick restoration and recovery among neighboring water authorities
  - Emergency water supply, emergency repair, provision of material and equipment for repair, dispatch engineers and their food, camping gear, etc.

Reality 1: Indonesia

- Indonesian major cities suffer from frequent flooding and subsequent gastro-intestinal disease outbreak
- Uncontrolled solid waste disposal causes blockage of storm drainage network
- Appropriate solid waste management is the solution for better sanitation

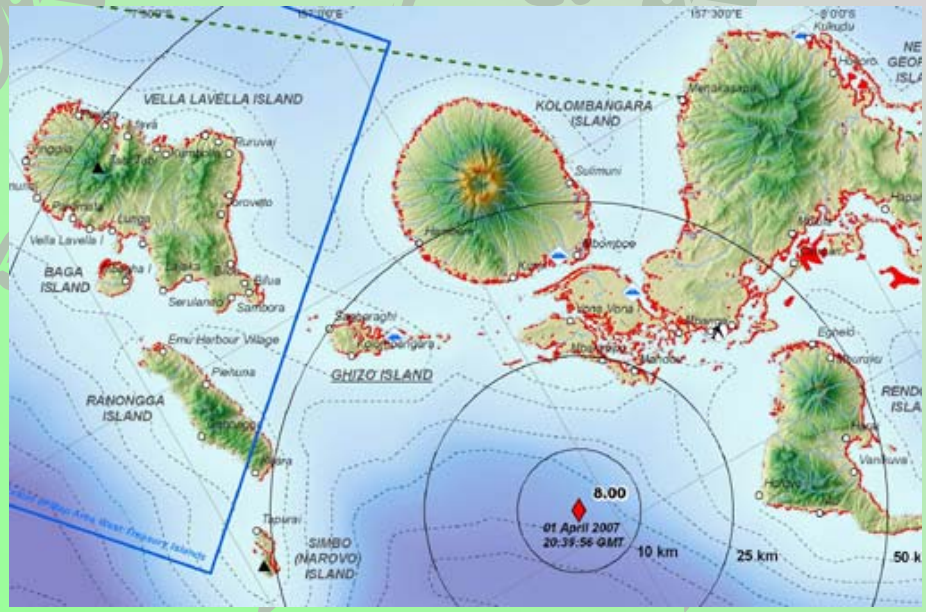
Reality 2: Solomon Islands

- M8 earthquake and subsequent tsunami in 2nd April claimed 52 lives
- More than 3000 houses destroyed



Reality 2 (continued)

- Most villages located along the coast hit by tsunami
- Villagers evacuated to higher ground where no water available



Reality 3: Thailand

- Alternative water source: People switch the water sources based on the needs and the availability
  - Rainwater: drinking, etc.
  - Groundwater: cooking, shower, etc.
  - River water: laundry, irrigation, etc.
  - Piped water: emergency stand-by
- Piped water is least preferable option because of its cost

Suggestion

- Local solution differs between countries and communities
- Be sensible to people's reality
  - Alternative water source
  - Water problem is not always water issue
- Rephrase the question
  - From: How to maintain essential services running
  - To: How to reach the affected people