Disclaimer

This report was compiled by an ADRC visiting researcher (VR) from ADRC member countries.

The views expressed in the report do not necessarily reflect the views of the ADRC. The boundaries and names shown and the designations used on the maps in the report also do not imply official endorsement or acceptance by the ADRC.


AP


South Fork Dam Breaks, Pennsylvania, 1889

Problem caused by Angat Dam

Problem caused by Angat Dam

Problem caused by Angat Dam

Problem caused by Angat Dam

Problem caused by Angat Dam

Problem caused by Angat Dam

BASED FROM THE DIFFERENT SCENES YOU JUST WATCHED IT IS MY PRIVILLAGE TO PRESENT TO YOU

MY RESEARCH PAPER

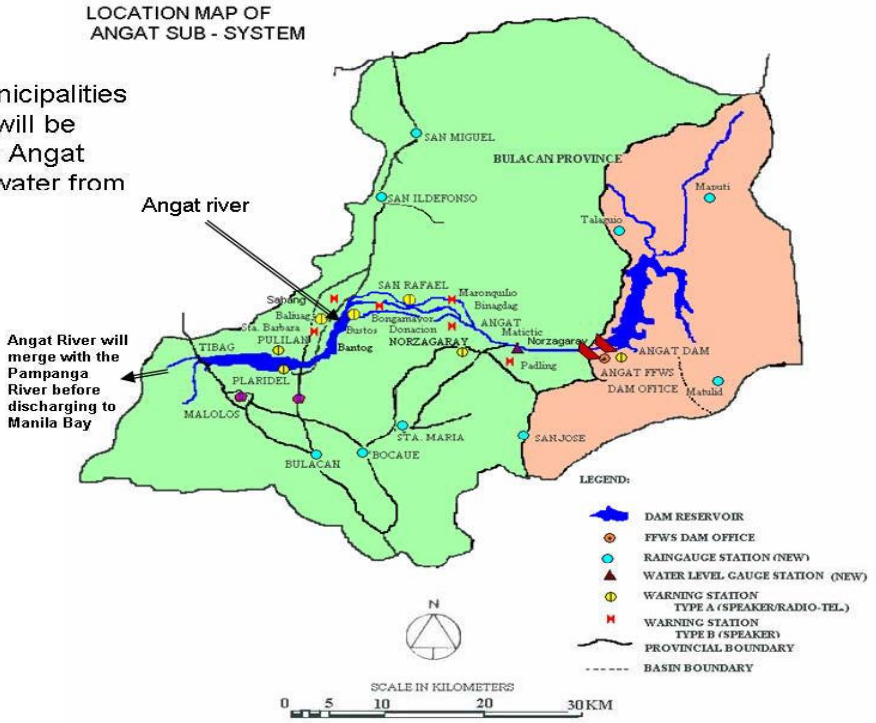
A Comprehensive Study on the Applicability of Japanese Dam Technologies to the Alarming Condition of Angat Dam in Bulacan, Philippines

Ameerha P. Ortega
ADRC Visiting Researcher

Map of Angat Dam

The following municipalities in BULACAN will be affected when Angat Dam release water from its spillways:

1. Norzagaray
2. Angat
3. San Rafael
4. Bustos
5. Baliuag
6. Pulilan
7. Plaridel



- Norzagaray, Bulacan, Philippines

The Angat Dam

Location	Barangay San Lorenzo, Norzagaray, Bulacan, Philippines	Impounds	Angat River
Construction	November 1961	Length	568 meters
Opening date	October 16, 1967	Height	131 meters
Construction cost	Php 315.344 Million	Width (base)	550 meters
Operator	NAPOCOR	No. of Gates	3

Benefits from Angat Dam

- **Contributes electrical power**

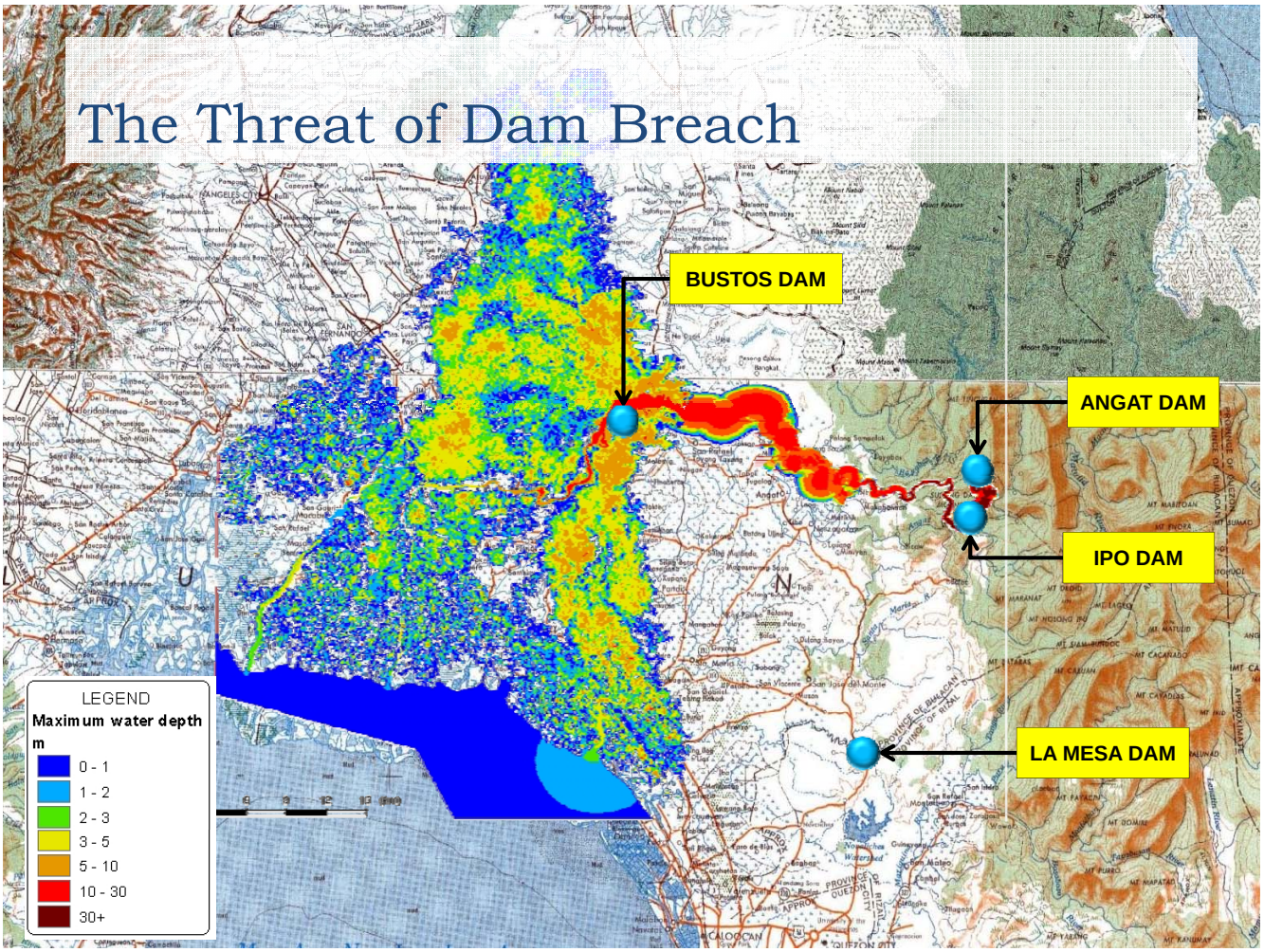
Benefits from Angat Dam

- **Supplies 97% of water in Metro Manila**

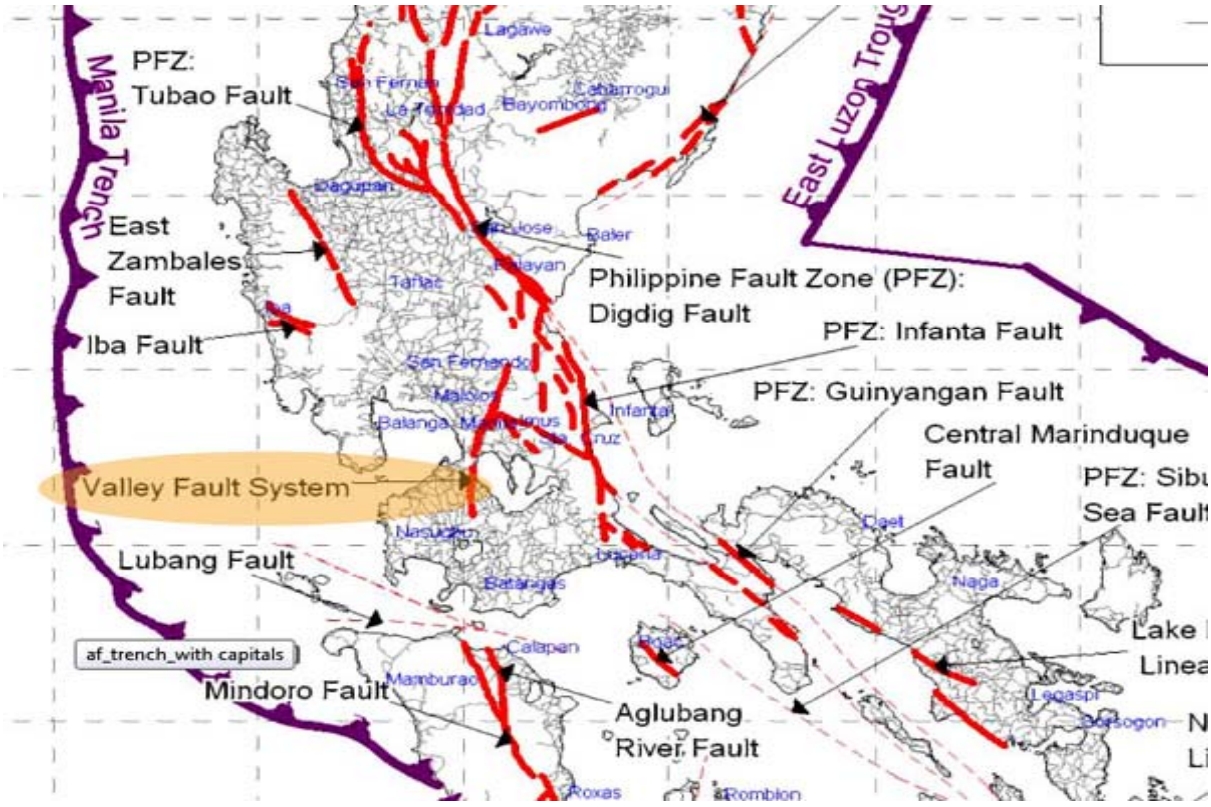
Benefits from Angat Dam

- **Irrigates 28,000 hectares farmlands of Bulacan & Pampanga**

The Threat of Dam Breach



The Threat of Dam Breach

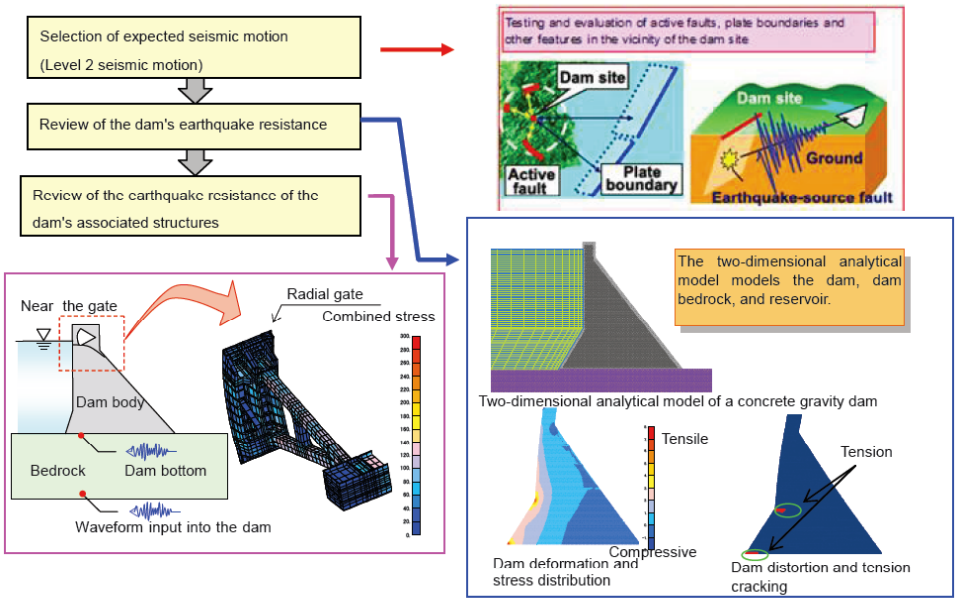


adopting . . .

THE JAPANESE DAM TECHNOLOGIES

The Japanese Dam Technologies

- Japanese dams have endured major earthquakes owing to Japanese dam technologies

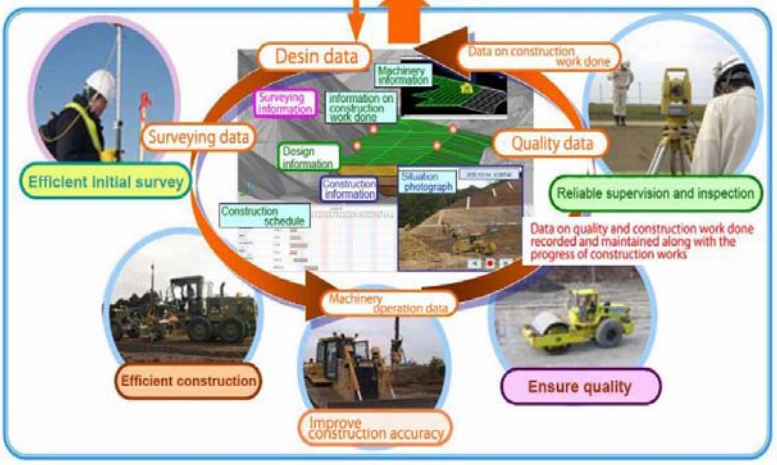


High durability & earthquake-resistance of dams can reduce LCC

The Japanese Dam Technologies

- High durability of dams together with speedy construction can reduce LCC

- Total Quality Management
  - ICT
  - Maintenance Programs
  - Systems to ensure a longer service life and their advantages



High durability & earthquake-resistance of dams can reduce LCC

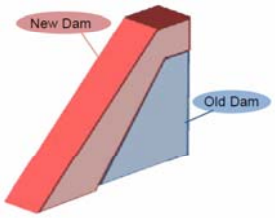
The Japanese Dam Technologies

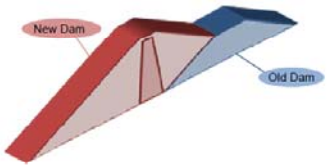
- Increase reservoir volume under operation
  - Raising the dam body

Before

After

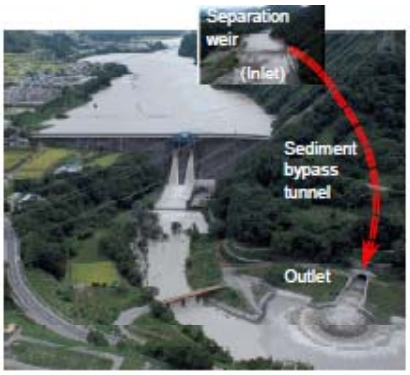
- Construction to enable more effective use of reservoir water under operation
  - Upgrading power plant
  - Increasing the volume of water supply and discharge capacity
  - Technologies used for construction

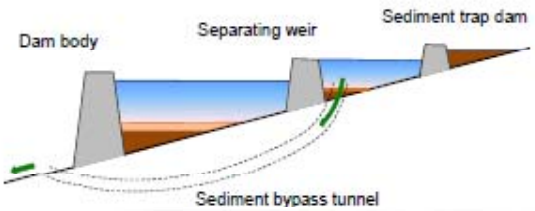


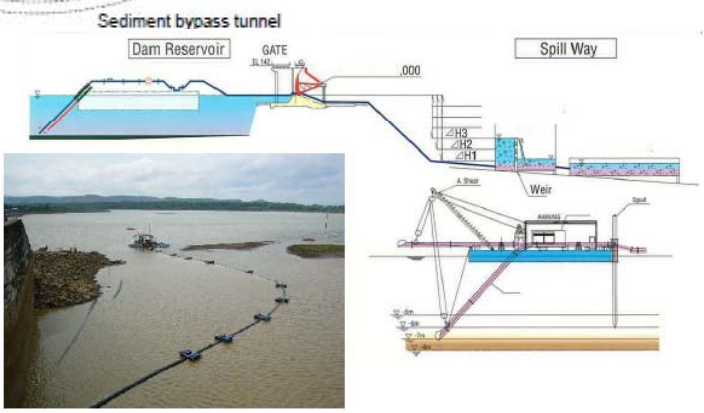


Upgrading Technologies to Effectively Use Existing Dams

The Japanese Dam Technologies







- Restoring dam function
  - Sediment bypass tunnel
  - Sediment suction techniques

Upgrading Technologies to Effectively Use Existing Dams

The Japanese Dam Technologies

- Conserving water quality in the reservoir

【Water aeration systems】(Fig.3-1)
A water aeration system installed in the reservoir circulates water, controls the growth of plankton, increases the amount of dissolved oxygen and thereby maintains and improves the water quality.

【Dam aerator fountain 】(Fig.3-2)
An aerator fountain controls the surface water temperature to stop it getting too high and preventing excessive growth of phytoplankton.

【Floating islands and artificial reefs】(Fig.3-3)
A floating island is a floating body with planted shrubs and grass. The artificial reef prevents excessive growth of algae and keeps the dam water clean.

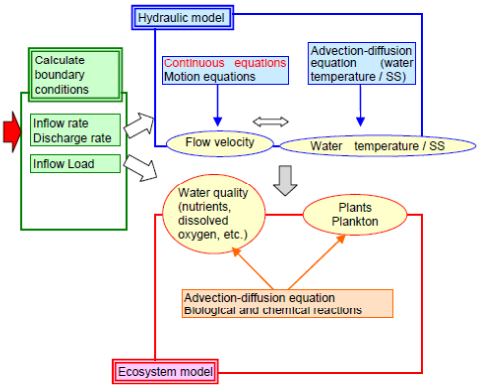
【Flow control barrier】(Fig.3-4)
A barrier installed at the reservoir tail end leads muddy water and nutrient-rich water down into the depths of the reservoir to prevent excessive algal growth.

Environmentally friendly technologies to conserve the environment & ecosystem

The Japanese Dam Technologies

- Conserving the ecosystems
  - Environment impact assessment
  - Fishway

Environmental factors	
Atmospheric environment	Air quality (dust)
	Noise
	Vibration
Water environment	Water turbidity due to sediment,water temperature, eutrophication, dissolved oxygen levels, hydrogen ion concentration (pH)
Animals	Important species and habitats need to be monitored
Plants	Important communities and species
Ecosystems	Ecosystems that characterize the local region
Scenic views	Important scenic viewing points and landscape resources
Waste, etc	By-products associated with construction



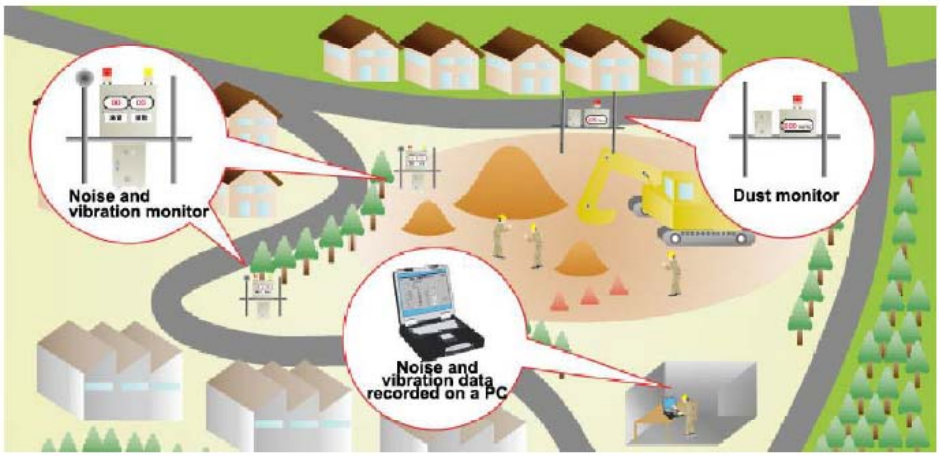
Biotope

Photos of the upper stream

Environmentally friendly technologies to conserve the environment & ecosystem

The Japanese Dam Technologies

- Monitoring for the water quality and environment during construction
  - Muddy water treatment
  - Environmental monitoring



Environmentally friendly technologies to conserve the environment & ecosystem

Conclusions:

1. Rehabilitate Angat Dam as soon as possible
2. Activities concerning DRRM must be given to DRRMC R-3 as lead agency
3. Enhance capability/preparedness of all sector not only government entities
4. Conduct periodic dam-break-drill
5. This study must have a follow-up study
6. Adopt Japanese dam technologies in Angat dam, Philippines

Filipinos are known for being resilient and
God loving people, we never stop praying…
we know, with people like you, we will succeed…

and even in the Midst of Tragedy, Disaster and Calamities

We Will Find Joy and Happiness ! ! !

Arigatou Gozaimashita (ありがとうございました)

Maraming Salamat Po!

Shukuriyyaa (شُكُرِيَّا)

Kaadinchhey La

təşəkkür edirəm

Thank You So Much

THE END

Credits:

- Video courtesy of YouTube
- Images from Google
- Maps courtesy of PHIVOLCS and Bulacan PDRRMC
- Japanese Dam Technologies Images