12th MRC-US Exchange Visit

9 December 2024

Growing Challenges and Opportunities with Hydropower - Moving towards more data sharing, coordination (of the current cascade dams) - and Joint development between Thailand and Laos?

Challenges

AVOID, MINIMISE AND MITIGATE ADVERSE TRANSBOUNDARY IMPACTS / ENHANCE THE PNPCA IMPLEMENTATION FOR HYDROPOWER

Strategic Priority #1: Integrate sustainable hydropower considerations into project–level planning, preparation, design, implementation and operation activities

Outcome 1.1 Improved sustainability of individual hydropower projects in the Mekong basin

Outcome 1.2 Benefits optimised and potential adverse impacts of hydropower operations minimised through adaptive management of existing hydropower projects and updated designs for Mekong specific impact mitigation

Outcome 1.3 Improved effectiveness of the PNPCA and related MRC Procedures process and outcomes for hydropower projects

MANAGEMENT OF HYDROPOWER CASCADE OPERATION

Strategic Priority #2: Enhance cooperation on processes for operational coordination and management of HP cascades

Outcome 2.1 Hydropower project information is shared with MRC for all notified mainstream and tributary projects

Outcome 2.2 Implementation of cooperation mechanisms for information sharing and coordination of LMB cascade operations support power production management, environmental management, flood and drought mitigation and community safety

Outcome 2.3 China and Myanmar exchange pertinent information on operational coordination and related scientific studies of hydropower to improve sustainability of UMB/LMB HP

ENERGY SECURITY AND ECONOMIC BENEFITS / CLIMATE CHANGE OPPORTUNITIES AND RISKS

Strategic Priority #3: Enhance regional information sharing and cooperation on water and energy plans to capture economic and energy security benefits and reduce transboundary social and environmental risks

Outcome 3.1 Net benefits of national hydropower and integrated renewable energy development plans, regional power system integration and hydropower's role in climate change mitigation are maximised and balance basin scale water, energy, food, environment and livelihood security

Outcome 3.2 Practical and tangible mechanisms/options further developed for equitable sharing of basin resources for hydropower and related developments based on past MRC studies/reports

SOCIAL IMPACTS

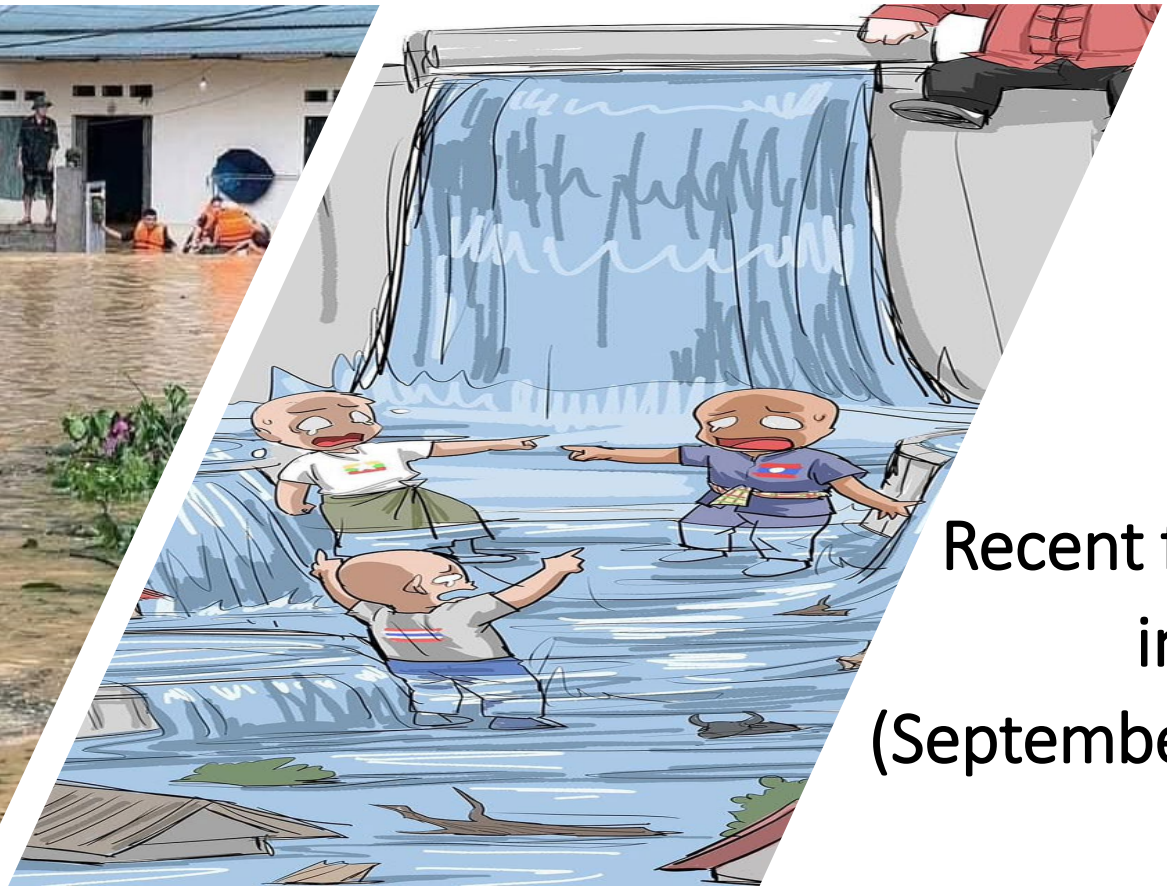
Strategic Priority #4: Enhance the livelihoods of hydropower project affected river–based communities, particularly women and children and ethnic minorities

Outcome 4.1 Improved and gender–equitable local development for riparian communities adversely affected by HP projects in a transboundary context

INFORMATION GAPS

Strategic Priority #5: Complete targeted studies to fill knowledge gaps or enhance analysis tools, to support sustainable hydropower development and management

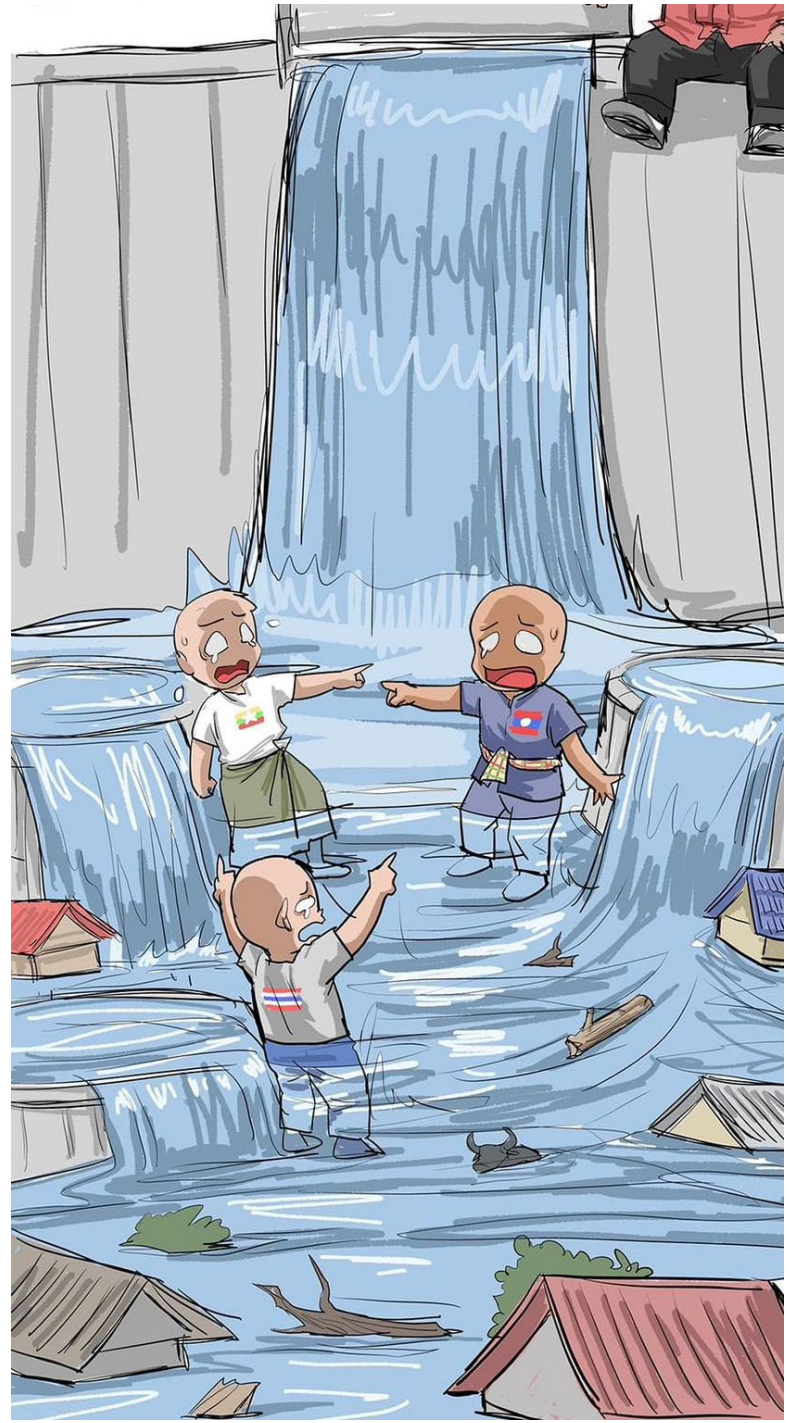
Outcome 5.1 Targeted studies fill knowledge gaps and facilitate regional assessment and dialogue on above SP#1 to #4



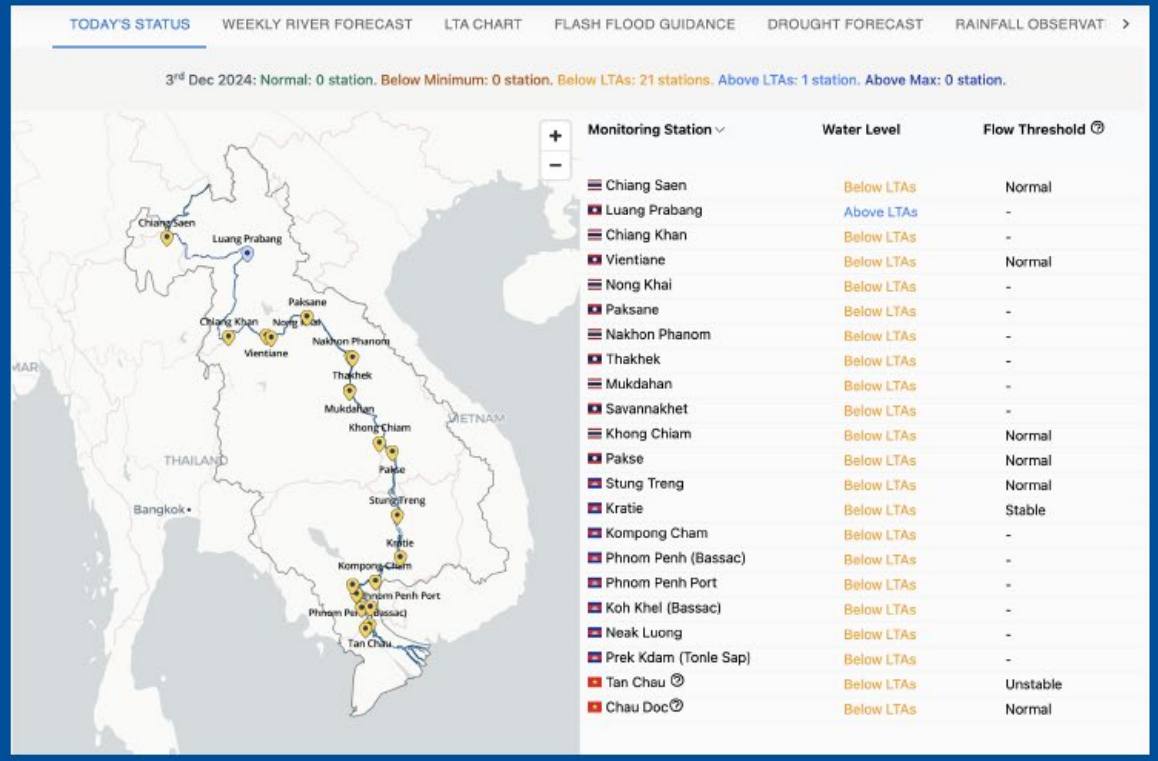
Recent flooding incidents (September 2024)

TYPHOON YAGI (SEP 2024)

- The strongest storm to hit Southeast Asia in 30 years, causing heavy rainfalls, severe flooding and landslides
- Resulted in over 600 deaths and thousands of missing people.
- Infrastructure affected, including transportation and communications. A bridge in Phu Tho province in Viet Nam collapsed on Sept. 9, killing several people
- Thousands of homes were damaged or destroyed, including 237,000 in Vietnam, more than 50,000 in China, 12,000 in the Philippines and 8,000 homes in Thailand.
- Total economic losses of more than $16 billion.



LESSONS LEARNT FROM YAGI



Not enough monitoring and forecasting stations to cover the Mekong (only 22 forecasting stations)

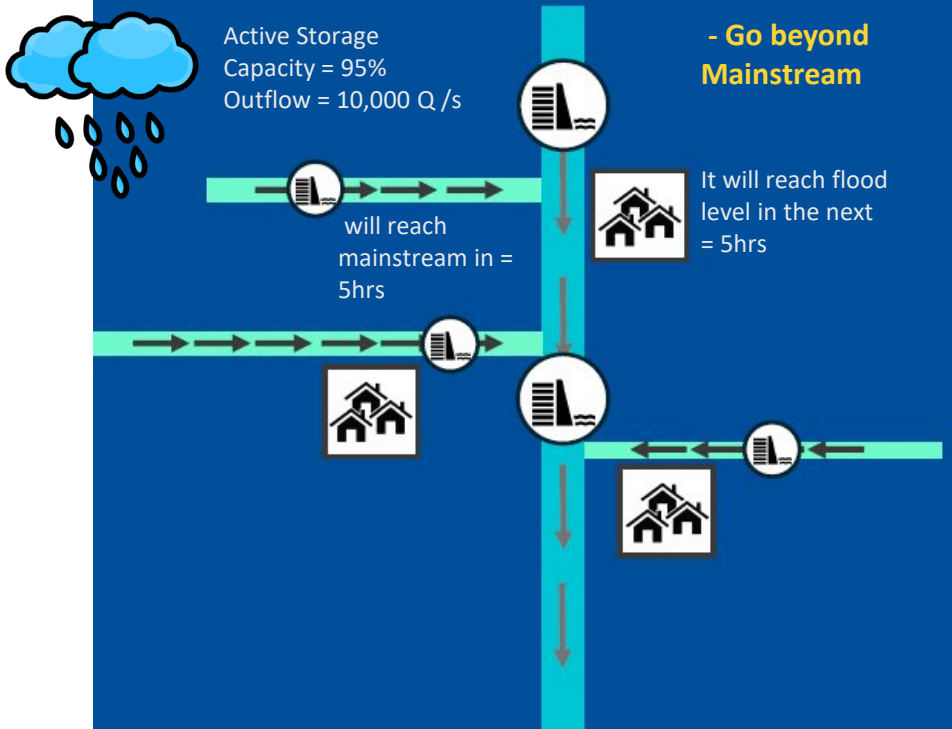
The stations are not at the low elevation area, giving inaccurate warnings

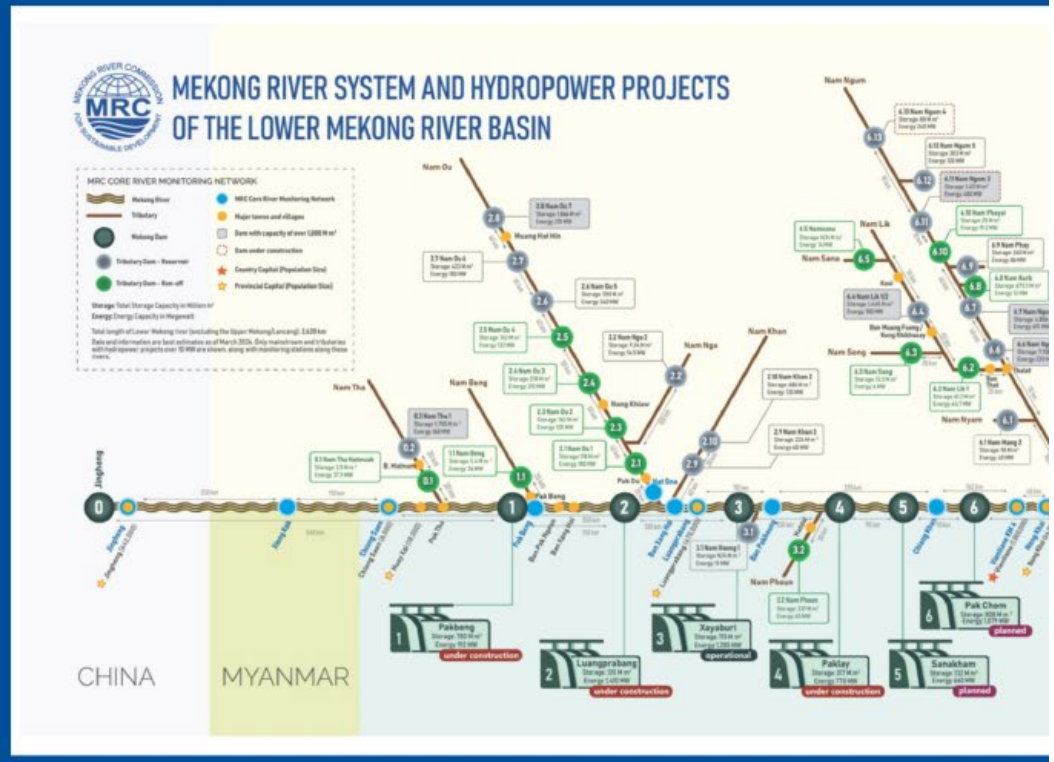
LESSONS LEARNT FROM YAGI

Need to manage the Mekong as the whole river network

- Go beyond Data sharing

- Go beyond Mainstream

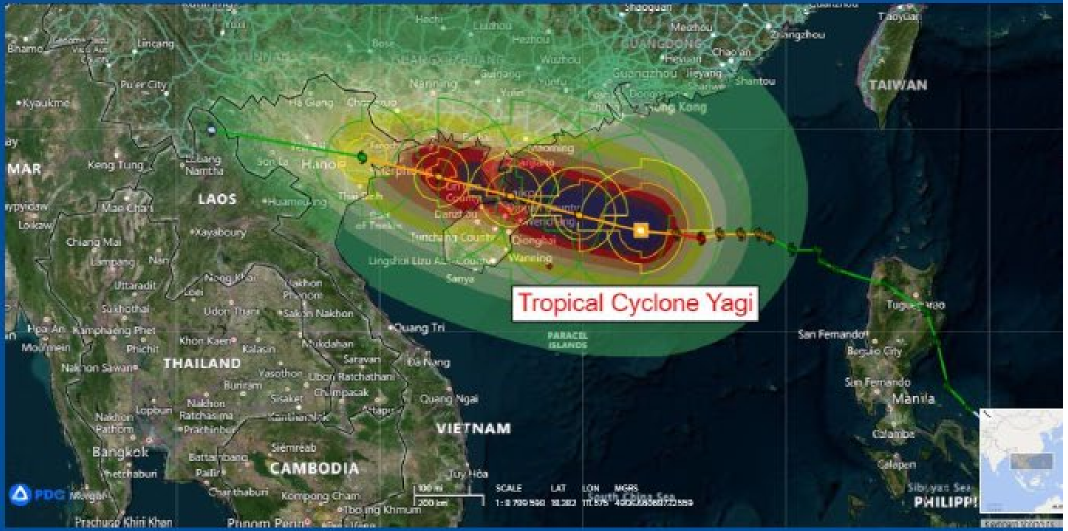




Weather+ Water+ Hydropower = Flow Coordination
(Combining Mainstreaming & Tributaries as ONE RIVER NETWORK)

LESSONS LEARNT FROM YAGI

We need more accurate weather impact forecasts and storm tracking

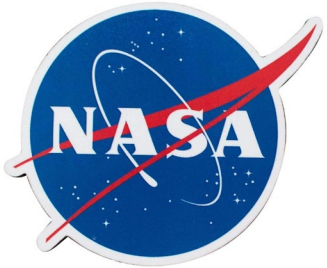


Opportunities

Strategic Partnership Opportunities

ONE **ASEAN** ONE **RESPONSE**

PDC | GLOBAL



Office for Space Technology
& Industry, Singapore

PHILLIPINES: TYPHOON MAN-YI (Advisory 27, 15 NOVEMBER 2024 23:00 PHT)

Joint Analysis of Disaster Exposure (JADE)

11.6 MILLION people living in affected areas

6.9 MILLION people living in worst affected areas

1.4 MILLION vulnerable people in worst affected areas

Affected areas experienced moderate wind damage or higher. Worst affected areas experienced widespread damage or higher. Vulnerable population is estimated based on pre-existing socio-economic conditions.

VULNERABLE POPULATION IN WORST AFFECTED AREAS BREAKDOWN

434,000 children (<15)

906,000 adults (15-64)

75,000 elderly (≥65)

BREAKDOWN OF KEY NEEDS

2.97 BILLION calories per day

4.88 MILLION square meters of shelter

4.24 MILLION litres of water per day

HOSPITALS EXPOSED

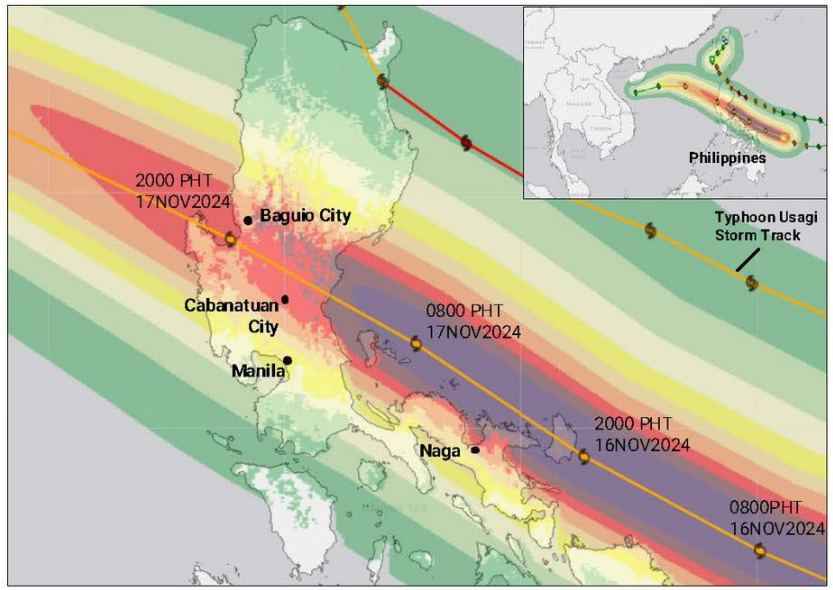
115 hospitals

SCHOOLS EXPOSED

177 schools

COST TO REBUILD IN WORST AFFECTED AREAS

US$ **33.04 BILLION**



- Catastrophic damage
- Severe damage
- Widespread damage
- Moderate damage
- Minor damage; power out
- Trees down; some power loss
- Broken Branches
- Large trees sway
- Small trees sway

	PEOPLE LIVING IN AFFECTED AREAS	PEOPLE LIVING IN WORST AFFECTED AREAS	VULNERABLE PEOPLE IN WORST AFFECTED AREAS	AGE BREAKDOWN FOR POPULATION IN WORST AFFECTED AREAS			
				0-4 years	5-14 years	15-64 years	65+ years
Cabanatuan City, Nueva Ecija	320,000	320,000	72,161	33,600	64,640	204,800	16,960
Baguio City, Benguet	380,000	295,000	10,267	30,975	59,590	188,800	15,635
Dagupan City, Pangasinan	219,000	215,000	32,819	22,575	43,430	137,600	11,395
San Jose City, Nueva Ecija	155,000	155,000	34,953	16,275	31,310	99,200	8,215
Urdaneta City, Pangasinan	141,000	141,000	21,523	14,805	28,482	90,240	7,473

PDC | GLOBAL

Manage the Mekong as a whole river network

What do we need to put in place:

Data:

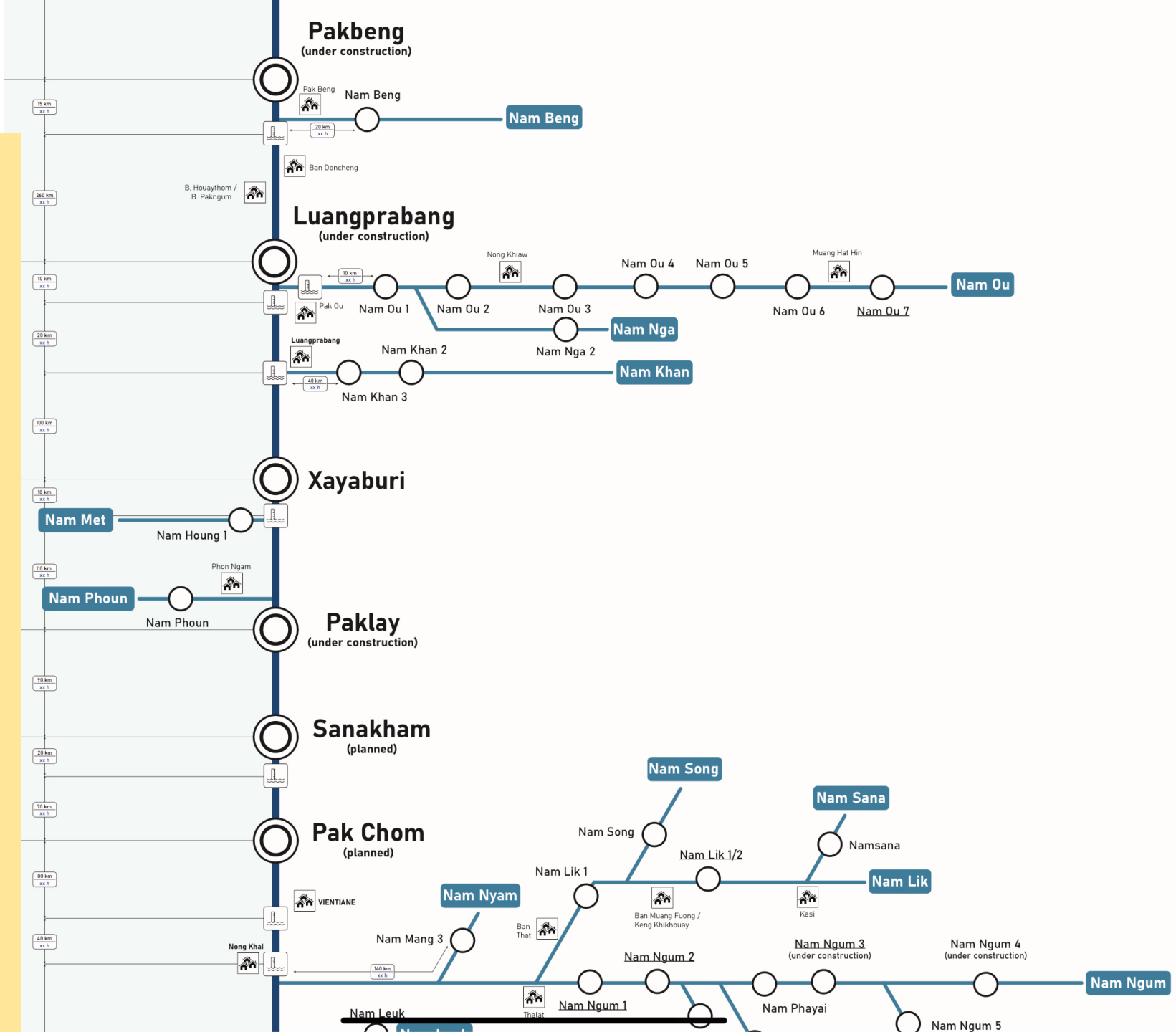
- Data center (Hydropower operations, mainstream & tributaries)
- Expand forecasting stations & update low elevation area
- Integrate Tributaries and Mainstream monitoring & forecasting data analytics

Tools:

- Setup digital twin software (flood map simulation, digital water level, flow management)
- Setup Situation Room linking regional and nation communication system
- Setup Impact-based forecasting
- Transition from Manual to Telemetry – Hardware to Software

Cooperation:

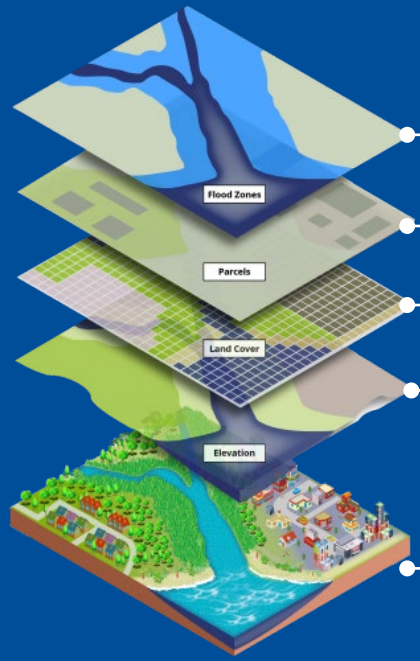
- Partner with Space & Satellite Agencies
- Partner with Disaster Response Agencies
- Joint Forecasting and Monitoring
- Joint Notification with China



The Next Decade of Innovation

Waterverse

Using 3D Data Visualization and Digital Twin technology for river flood & drought simulation at prone areas.



- Weather Radar
- Community Data Collection (i-report)
- Land Use & Land Cover
- Real-time Water Level Monitoring Stations / Hydropower operations / Soil moisture / Water Quality/ Biotelemetry / Ecological Health / Social
- Digital Twin

- Flood & Drought Monitoring
- Impact-based forecasting
- Scenarios Assessment

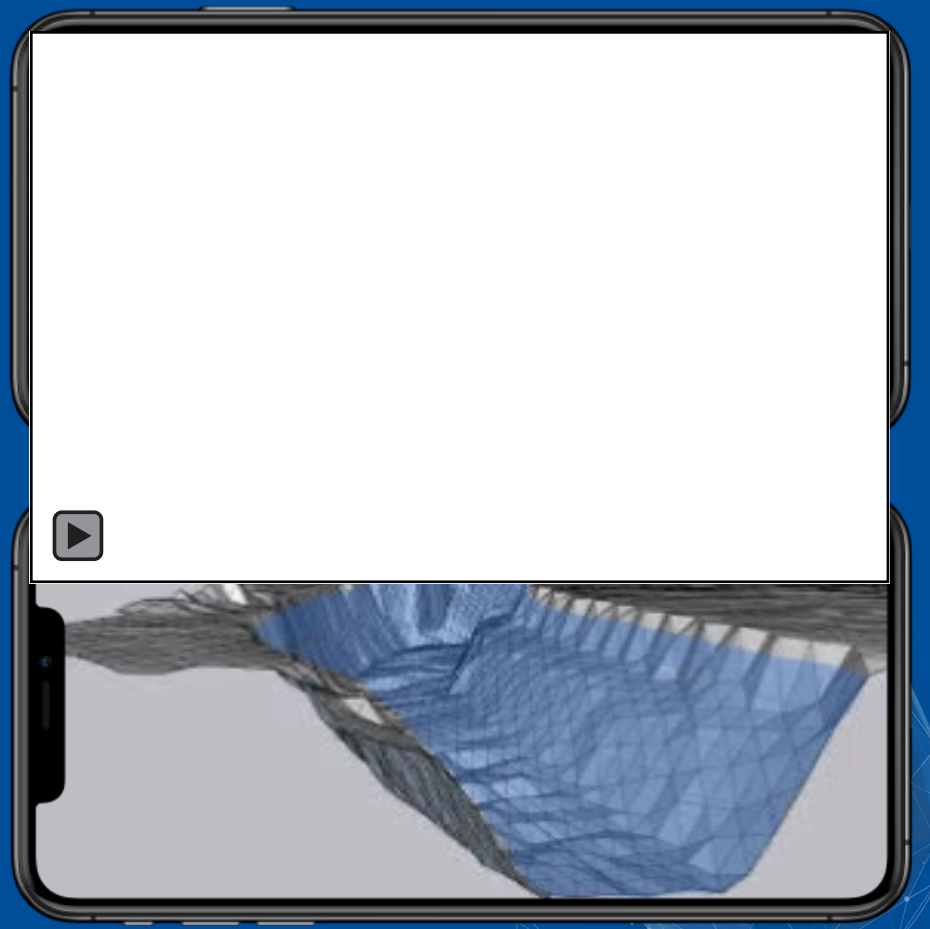
Waterverse

The Next Decade of Innovation

Waterverse

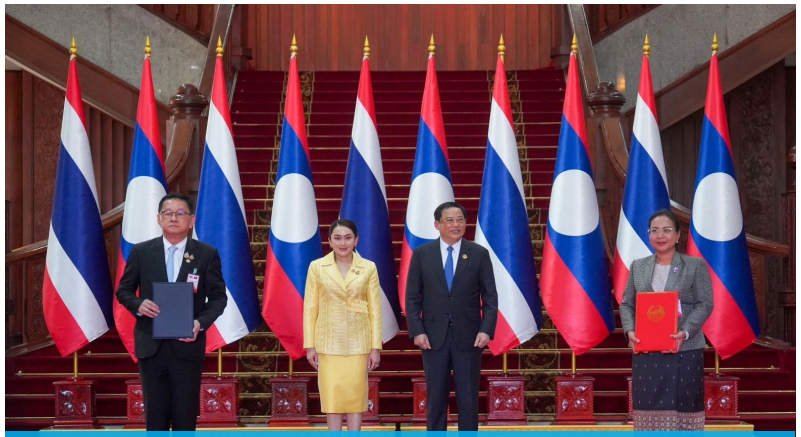
We need better flood map

We need flood inundation map forecast and actual



TAKING JOINT EFFORTS TO THE NEXT LEVEL

Joint Lancang-Mekong Survey



Joint Forecasting and Monitoring between Lao PDR and Thailand

Joint Sediment Monitoring with CWRC

Joint study with China

SCG

Joint Private Sector Research

Joint Community Research

Joint Study with developers and operators of key mainstream and tributary hydropower projects

9C9T Joint Project on F&D Management Phase III between Cambodia & Thailand

3S Joint Project

Joint Action Plan

Joint MOUs on navigation rules and regulations between Lao PDR and Thailand and Cambodia and Viet Nam

TAKING JOINT EFFORTS TO THE NEXT LEVEL

- Technical Support to Member Countries on PNPCA
  - Luang Prabang, Pak Lay, Pak Beng
  - Sanakham
  - Phou Ngoy
- Joint Projects –
  - Pak Chom, Ban Koum (Itaipu?)
  - Delta – Cambodia & Vietnam?

Thank you!