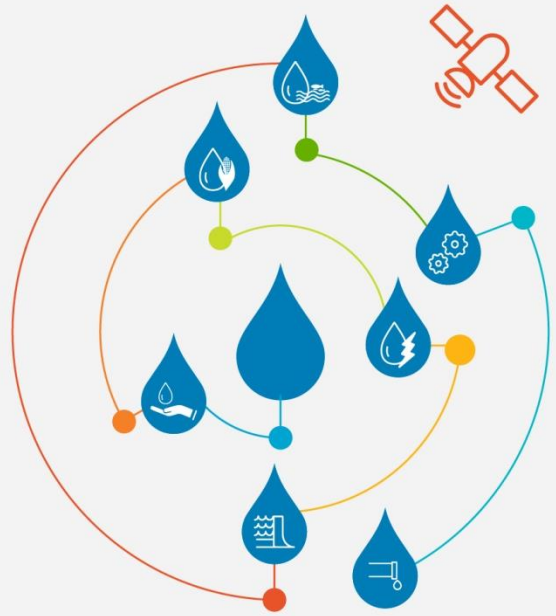
Reducing Pollution and Preserving Environmental Flows in the East Asian Seas

Implementation of Integrated River Basin management in ASEAN Countries



Aimee Gonzales

PEMSEA Executive Director

On behalf of PEMSEA and UNDP

4 October 2018

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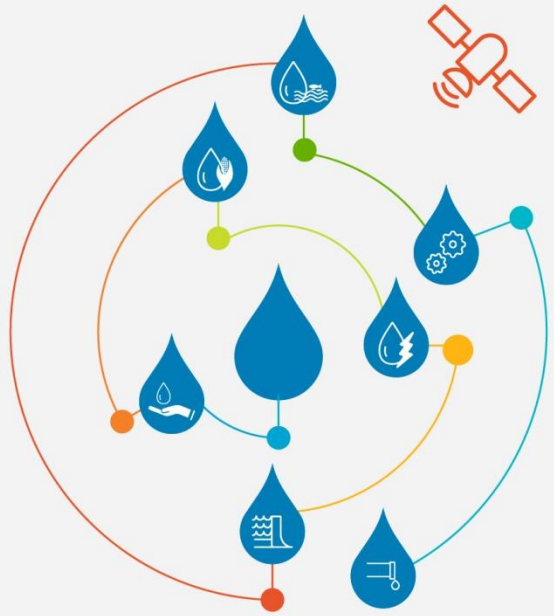
Critical Role of Coasts and Oceans in East Asia

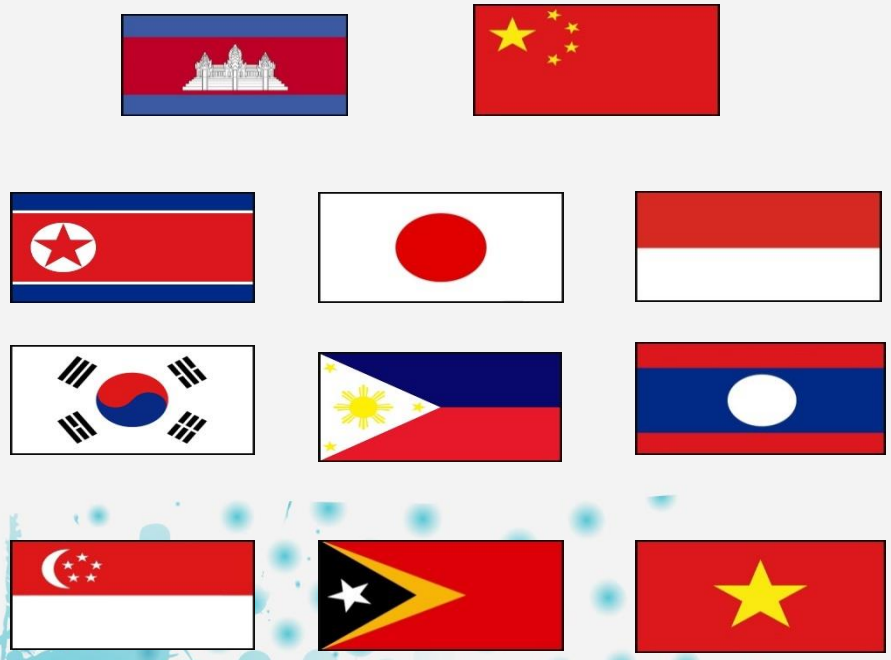
- 7 million km^2 / 235,000 km of coastline / 1.5 billion residents
- 1/3 of all coral reefs and mangroves, highest levels of biodiversity for coral reef fish, mollusks, mangroves and sea grass species
- 9 of the world's mega-cities (population more than 10 million), dozen other cities more than 5 million residents
- Marine and coastal industries comprise 15-20% of GDP in some East Asian countries
  - 83% of the world's aquaculture products
  - Over 32 million tons of annual fish catch
  - 9 of the 10 busiest container ports
  - 4 of the top 5 shipping economies

PEMSEA's mission



To foster and sustain healthy and resilient oceans, coasts, communities and economies across the Seas of East Asia through integrated management solutions and partnerships.

Country Partners



Non-Country Partners

- ASEAN Centre for Biodiversity
- Coastal Management Center (CMC)
- Conservation International (CI) Philippines
- International Center for the Environmental Management of Enclosed Coastal Seas (EMECS)
- IOC Subcommission for the Western Pacific (IOC/WESTPAC)
- International Ocean Institute (IOI)
- International Petroleum Industry Environmental Conservation Association
- International Union for Conservation of Nature – Asia Regional Office
- Korea Environment Institute
- Korea Institute of Ocean, Science and Technology
- Korea Maritime Institute
- Korea Marine Environment Management Corporation
- Marine Biodiversity Institute of Korea
- Northwest Pacific Action Plan
- Ocean Policy Research Institute
- Oil Spill Response Limited
- Plymouth Marine Laboratory
- PEMSEA Network of Local Governments for Sustainable Coastal Development
- UNDP/GEF Small Grants Programme
- UNDP/GEF Yellow Sea LME Project (YSLME)
- UNEP Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities (UNEP/GPA)

Marine Litter is a looming international crisis

150 MILLION TONS

of plastic in the ocean right now and growing by 8 million tons every year

within that, a **45% REDUCTION**

In plastic leakage is possible by improving waste management and recycling in China, Indonesia, The Philippines, Vietnam and Thailand

$26 TRILLION

in Asia needed for infrastructure improvement from 2016 through 2030 (ADB)

currently only **< 5%**

of the region's needs are being allocated by the 100 largest Asian institutional investors (only $65 billion)

SOURCES: Ocean Conservancy, Ellen Macarthur Foundation, and Asia Development Bank

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The Economic Costs of Marine Litter

APEC 2011 covering 21 economies:

US$1.26 billion per year - economic cost of damage.

US$1500 per ton of waste - average cost of clearing up plastic waste

US$100-$20,000 per ton of waste - cost of individual clean-ups depending on the type of waste and method.

An underestimate as these do not include costs related to intangible costs of any social and ecological impacts.

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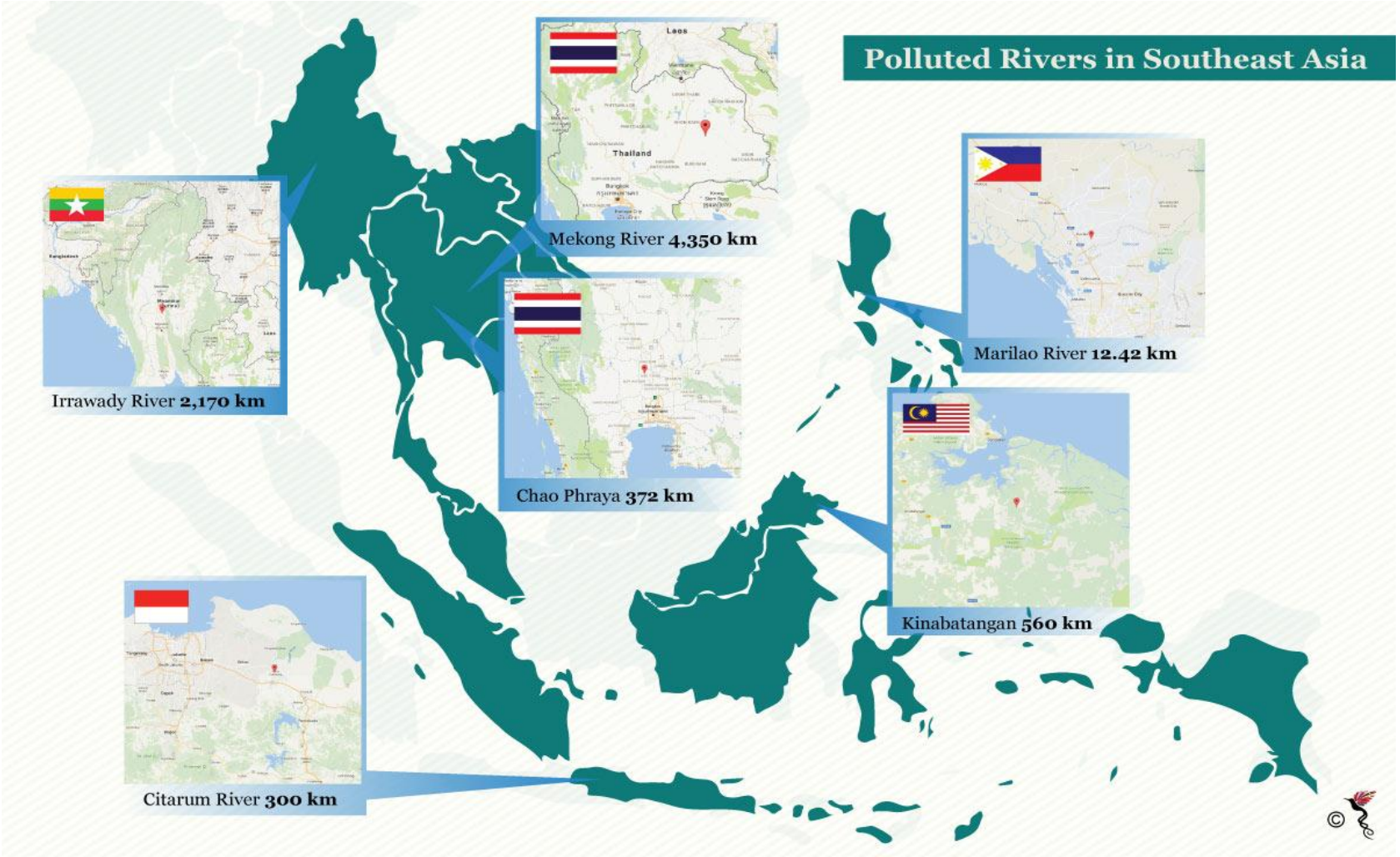
The most polluted rivers in Southeast Asia



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Source-to-Sea Approach

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GEF-UNDP-ASEAN-PEMSEA Initiative

Reducing Pollution and Preserving Environmental Flows in the East Asian Seas through the Implementation of Integrated River Basin management in ASEAN Countries

Objective: To improve integrated water resources management (IWRM), reduce pollution loads from nutrients and other land-based activities, sustain freshwater environmental flows and reduce climate vulnerability through demonstrations and replications, planning and strengthening of integrated river basin management (IRBM) in 7 countries

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Integrated River Basin Management Initiative

Participating Countries and Partners

- Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Vietnam
- ASEAN Working Group on Water Resources Management
- ASEAN Secretariat
- PEMSEA
- UNDP
- GEF

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Common Issues in River Basins

Urbanization

- Uncontrolled urban development, especially construction on the coastal area

Water

- Unsustainable hydropower development & operation; Competing & overuse of available water sources; Flooding

Sewerage

- Untreated sewerage discharge; Toxic & pathogenic discharges from industry, residential, commercial and mining sectors

Solid waste

- Non recycling of waste; Untreated disposal of waste into environment or dumpsites; Uncontrolled disposal and discharge of plastics into rivers, lakes and oceans

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Overall Strategy for Project Development and Implementation

1. Priority river basins/coastal areas are designated as demonstration/ learning sites

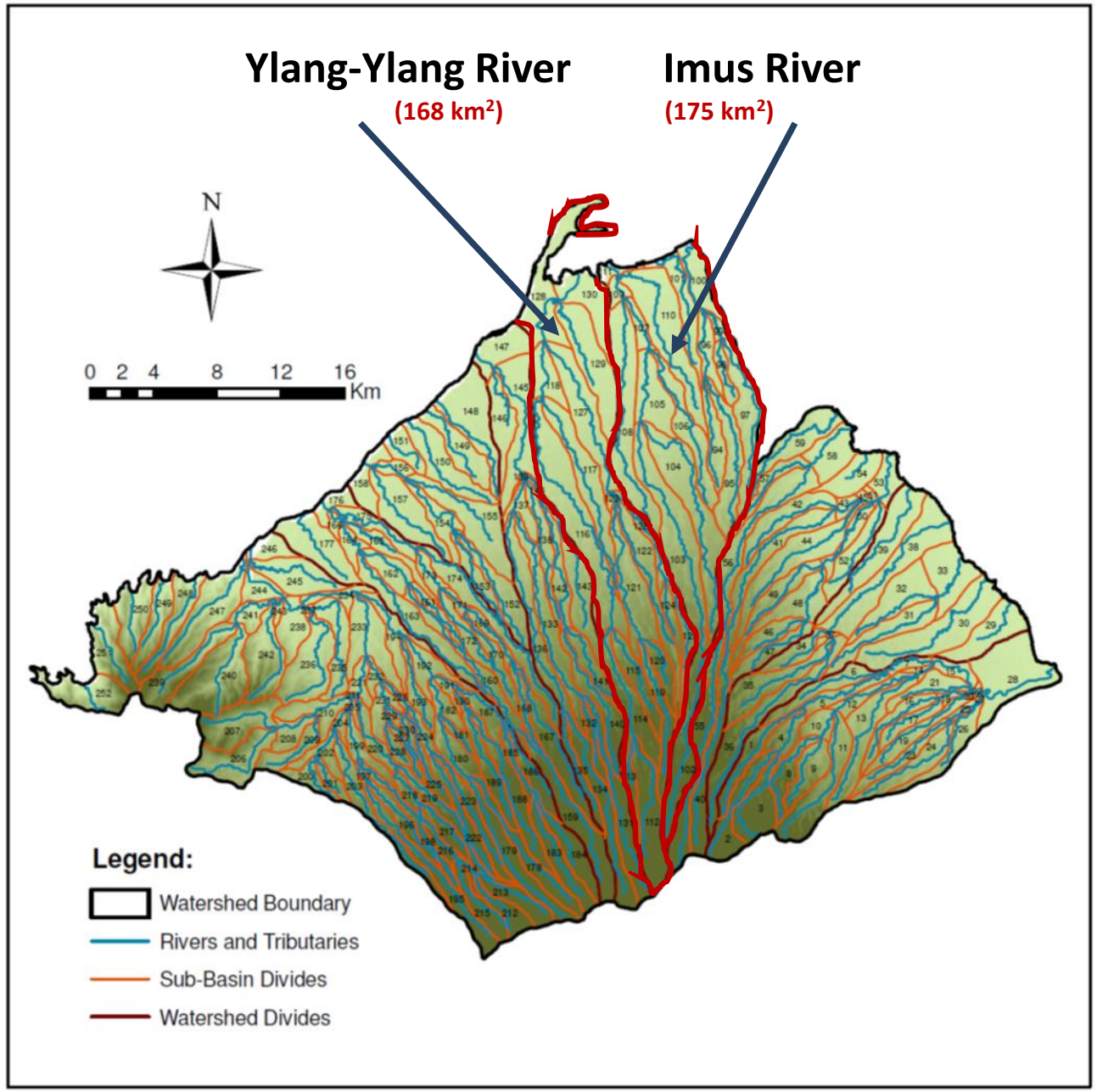
2. National IRBM pilot project proposal

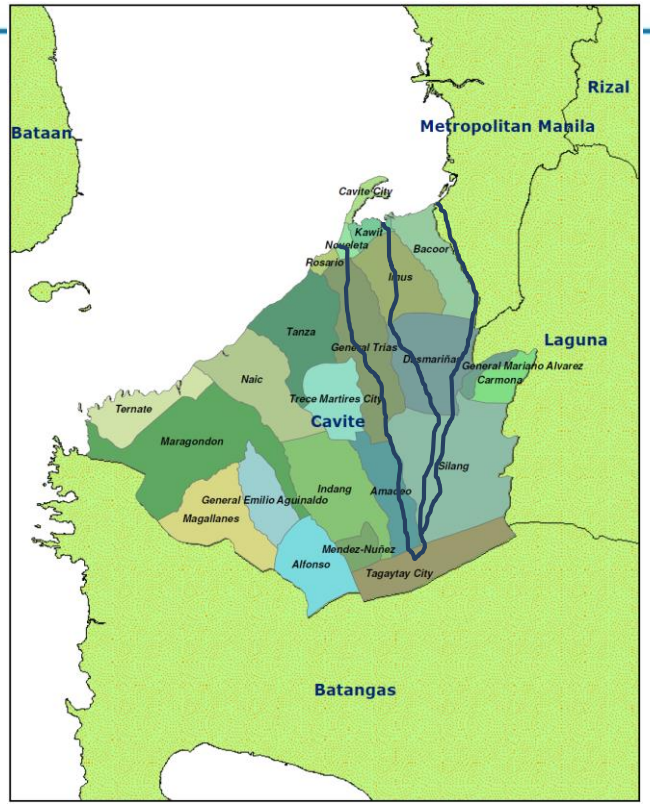
3. ‘Learning by doing’ approach

4. Good practices and lessons captured and shared

Potential Infrastructure Development Projects in the GEF/UNDP IRBM Project

Country	Project Site	Potential Infra Development Projects
Cambodia	• Kampong Bay River (Kampot City)	• Solid waste management/plastics recycling/alternative energy • Pollution reduction/sewage and sanitation • Water supply/water treatment • Hydropower plant operation/environmental flows optimization
Indonesia	• Ciliwung River (Depok City)	• Solid waste/plastics recycling/alternative energy • Pollution reduction/sewage and sanitation
Lao PDR	• Nam Tha River (Luang Namtha Province)	• Rehabilitation of banana/rubber plantation • Reforestation of cultivated/mining sites • Hydropower plant operation/environmental flows optimization
Malaysia	• Kedah River (Alor Setar City)	• Hydropower plant operation/environmental flows optimization • Pollution reduction/sewage and sanitation • Reforestation
Myanmar	• Myit Ma Hka-Bago Rivers (Bago City)	• Integrated solid waste recycling plant • Sewage treatment plant
Philippines	• Imus Ylang-Ylang Rivers (Cavite Province) • Pasac Guagua Rivers (Pampanga Province)	• Solid waste management/plastics recycling/alternative energy • Pollution reduction/sewage and sanitation • Water supply/conservation and security
Vietnam	• Vu Gia-Thu Bon Rivers (Danang and Hoi An)	• Solid waste management/plastics recycling/alternative energy • Pollution reduction/sewage and sanitation • Water supply/security • Hydropower plant operation/environmental flows optimization





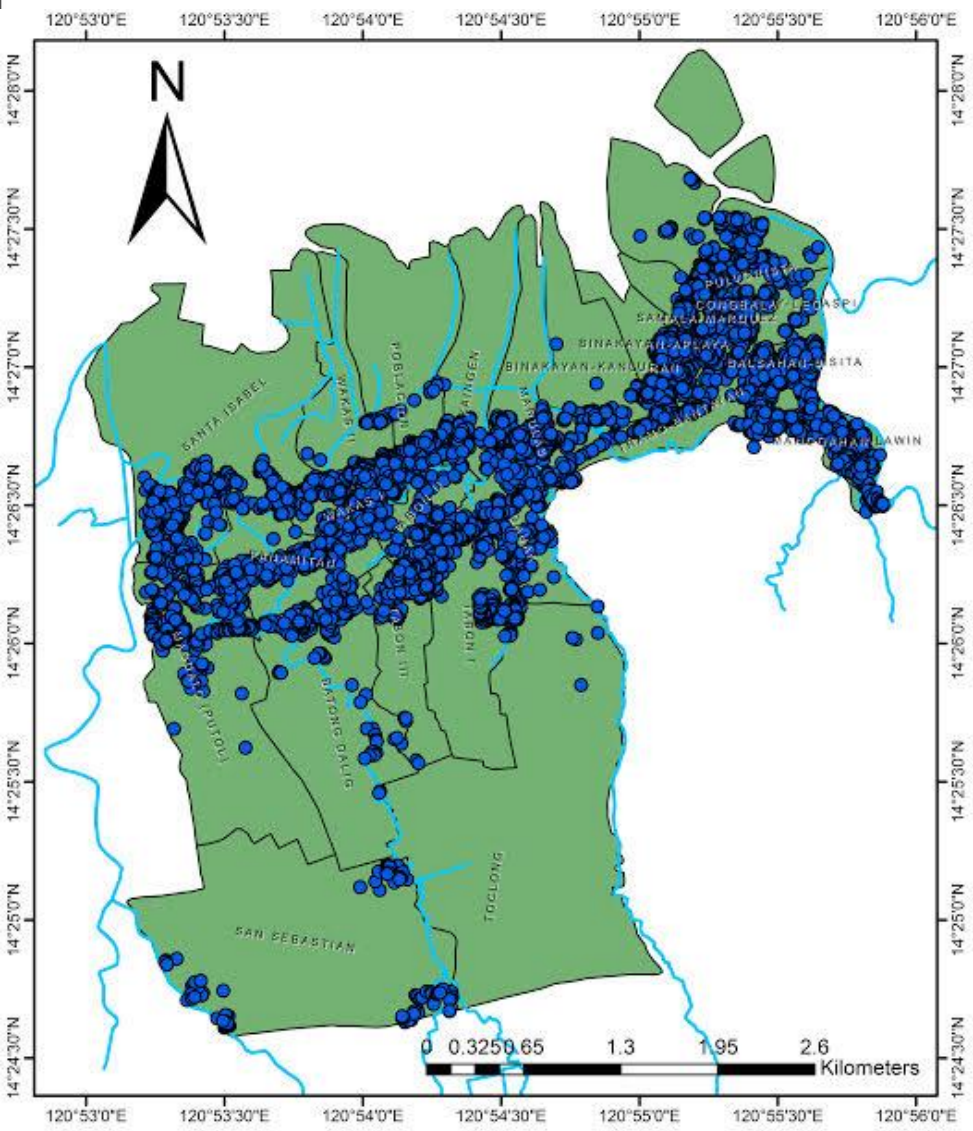
River Basin Area: 343 km2

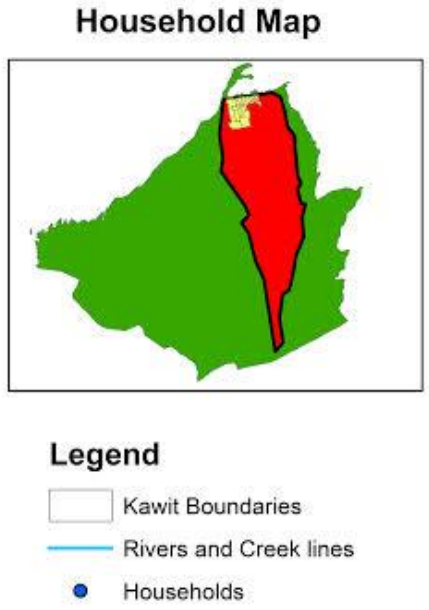
River Basin/Coastal Population: ~1,500,000

Major Issues:

1. Cavite's Provincial Development and Physical Framework Plan (PDPFP) 2008-2013 identified **the annual depletion of ground water and the pollution of major rivers** as among the issues concerning water supply sources.

2. **Water abstraction** in a number of areas in the Province has already **reached critical points** causing **decreased groundwater levels** and resulting in **groundwater mining** as well as **salt-water intrusion** in coastal areas.





3. The **present water supply and distribution systems** covering the Province of Cavite are no longer able to meet the present and future aggregate demand for water. **The predicted shortfall is 51 million liters per day by 2020.**

4. The **planning, development, and provision of water supply are de-linked from sewerage and septage facilities.**

Water Quality Status 2012-2015

Water Quality Status:	IMUS RIVER				
	2012	**2013**	**2014**	**2015**	**DENR Criteria for Class C Water**
BOD	12	9.5	9.7	13	7 mg/L
Chlorides	759.7	761.1	698.5	1813	350 mg/L
DO	4.5	6	5.7	5.7	minimum of 5 mg/L
Phosphate	2.169	1.105	1.225	1.585	0.5 mg/L
Total Coliform	160,000	247,578	164,586	95,021	5000MPN/100mL
Fecal Coliform	160,000	104,722	72,073	55,825	200MPN/100mL
	YLANG YLANG RIVER				
	2012	**2013**	**2014**	**2015**	**DENR Criteria for Class C Water**
BOD	13.2	6.8	34.9	122	7 mg/L
Chlorides	413	433	600	2120	350 mg/L
DO	6.1	6.1	5.5	5	minimum of 5 mg/L
Phosphate	0.809	0.699	0.977	1.609	0.5 mg/L
Total Coliform	160,000	44,349	22,274	209,572	5000MPN/100mL
Fecal Coliform	126,400	17,379	11,328	112,336	200MPN/100mL
	RIO GRANDE RIVER				
	2012	**2013**	**2014**	**2015**	**DENR Criteria for Class C Water**
BOD	4.8	6.6	9.6	8	7 mg/L
Chlorides	18.6	17.2	25.6	29	350 mg/L
DO	6.57	6.38	5.63	5.3	minimum of 5 mg/L
Phosphate	1.281	0.83	0.846	1.04	0.5 mg/L
Total Coliform	146200	-	-	-	5000MPN/100mL
Fecal Coliform	127100	-	-	-	200MPN/100mL

Vu Gia – Thu Bon River Basin

Da Nang City and Quang Nam Province, Viet Nam

River Basin Area: 10,350 km2

River Basin/Coastal Population: 2,533,971

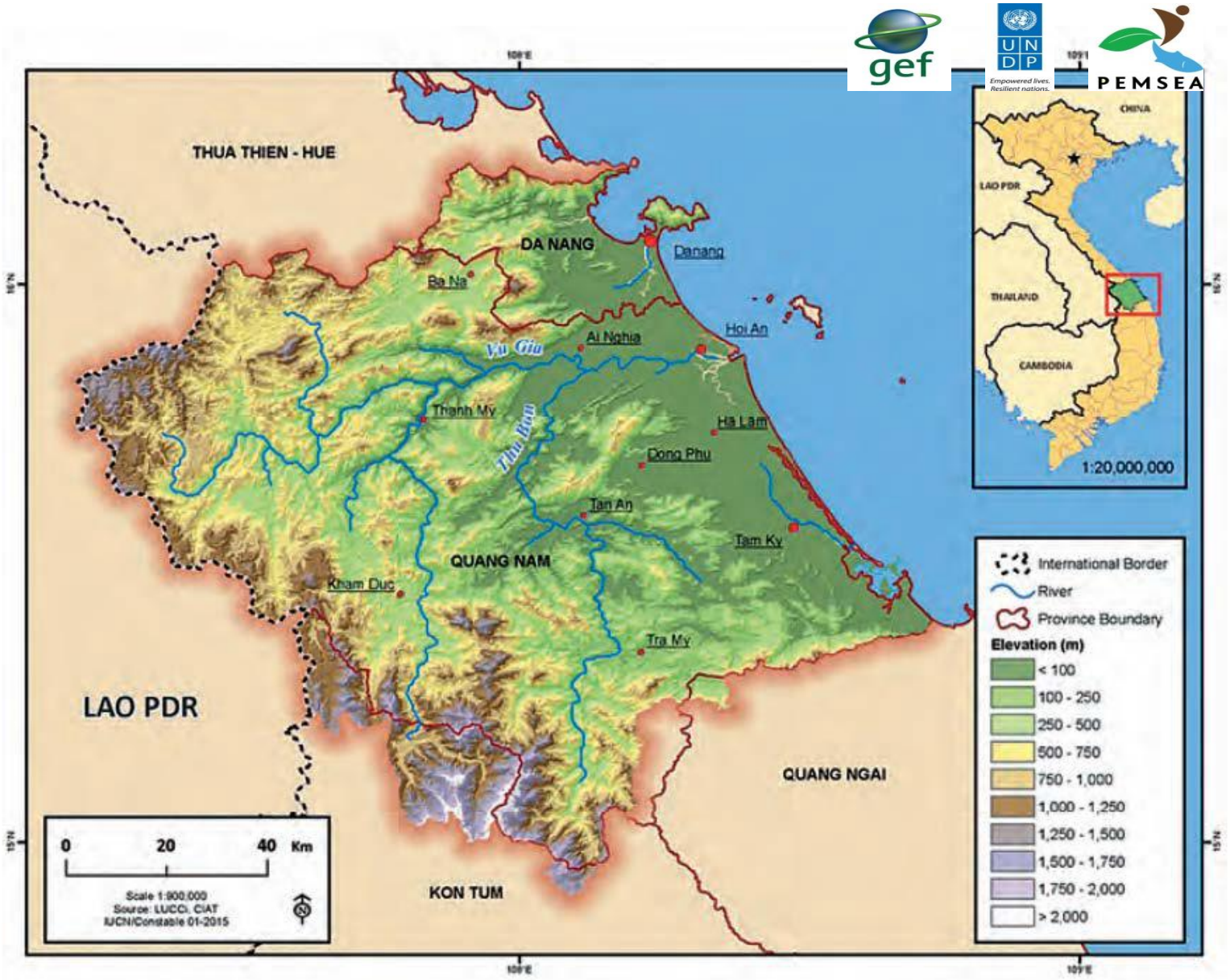


Figure 3: Map of Vu Gia - Thu Bon river basin and Da Nang – Quang Nam coastal zone [13]

Threats and Hazards to Sustainable Development of Vu Gia – Thu Bon River Basin and the Da Nang City and Quang Nam Coastal Area

1. **Impairment of fresh water source** for agriculture and fresh water supply of the urban areas

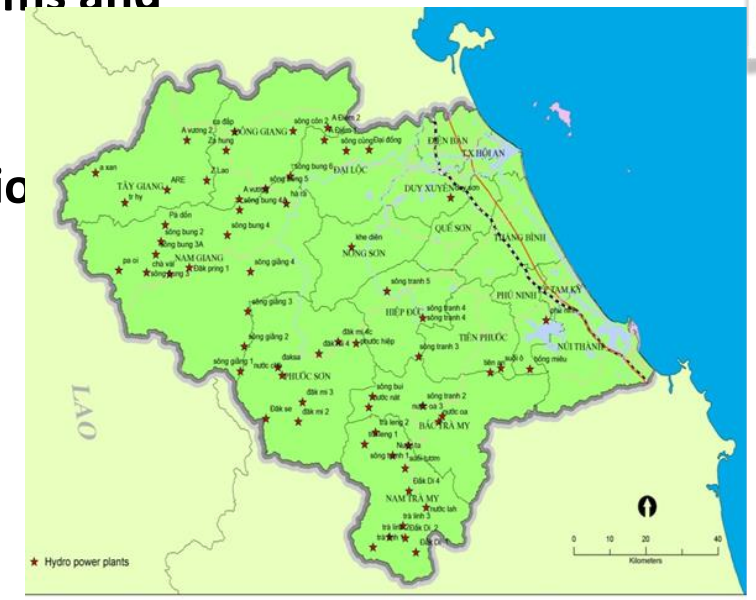
2. **Salt intrusion** from the sea into the river and swampland delta

3. **Degradation of important coastal ecosystems and resources**

4. **Erosion, siltation and riverbank destructio**

5. **Natural disasters and climate change**

Gold mining in upstream area



Hydro power plants planning in Quang Nam province

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