



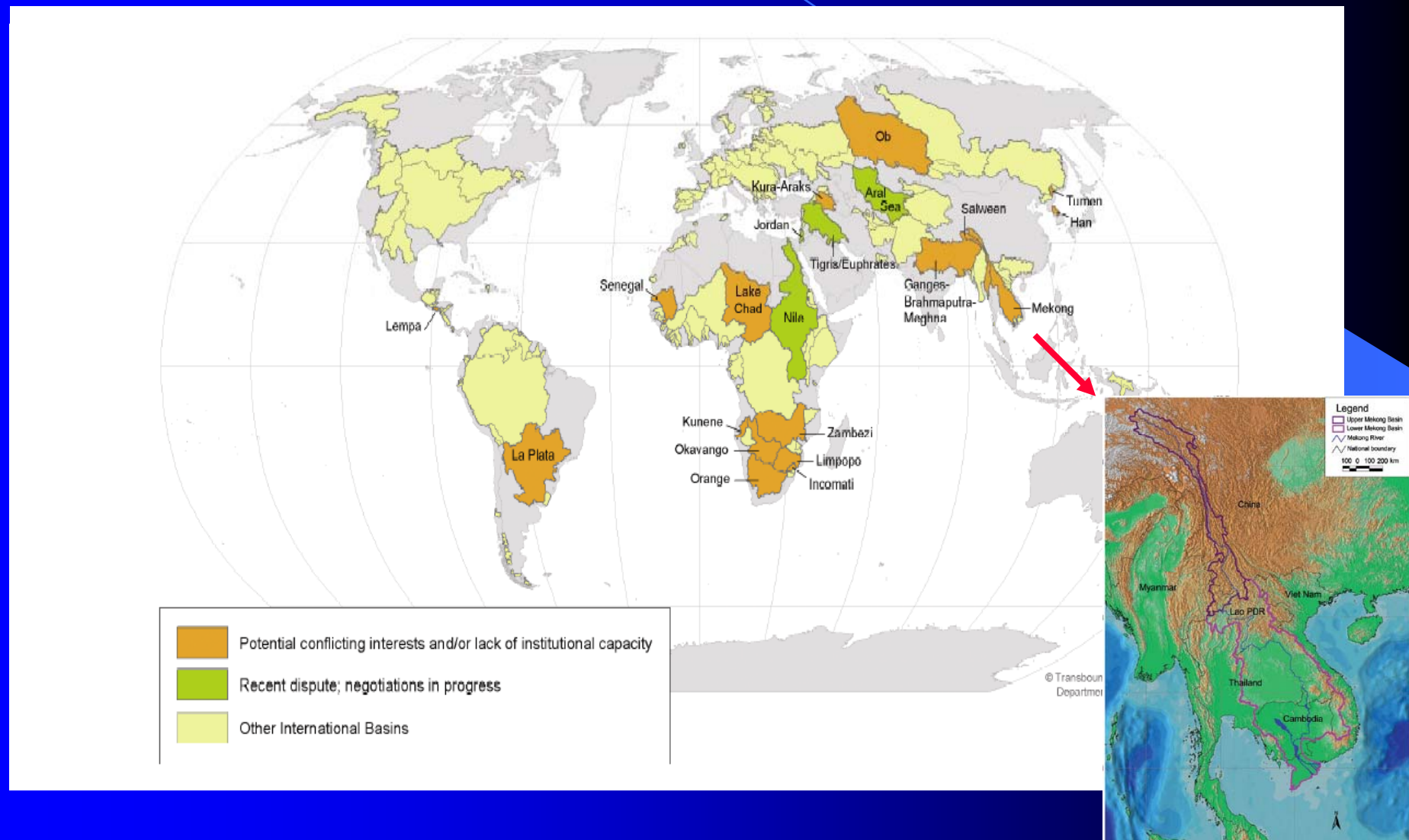
Development and Environment in Mekong River Basin

JUNIOR UNITED NATIONS ECO WORKSHOP

22-23 Nov. 2003

KAMOTO

Transboundary River Basins of the World





Mekong River Basin

Upper Mekong Basin (UMB)

185,000 km² (23%)

China, Myanmar

18% total flow

Lower Mekong Basin (LMB)

625,000 km² (77%)

Cambodia 86%

Lao PDR 90%

Thailand 37%

Viet Nam 20%

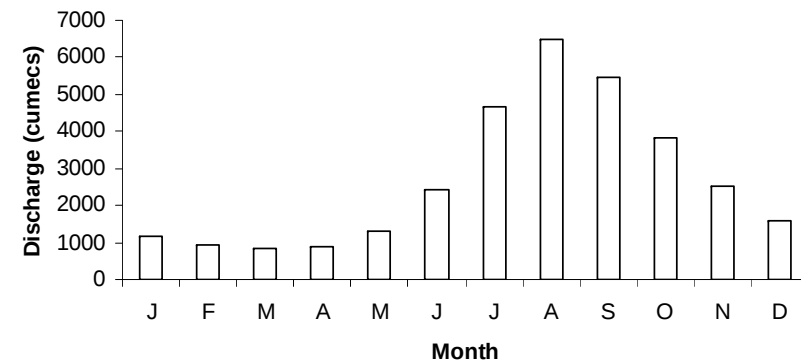
Mekong River Basin

Hydrology :

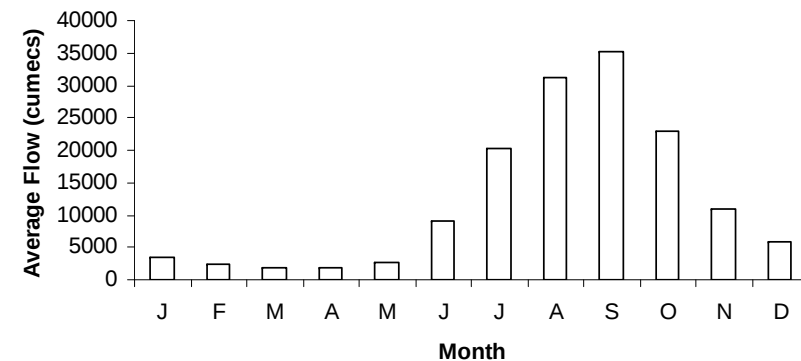
Seasonal flow pattern –
flows increase from
May to September in
Laos

Flows increase from June
to October in Cambodia

Average Monthly Flows - Chiang Saen



Average Monthly Flows - Phnom Penh



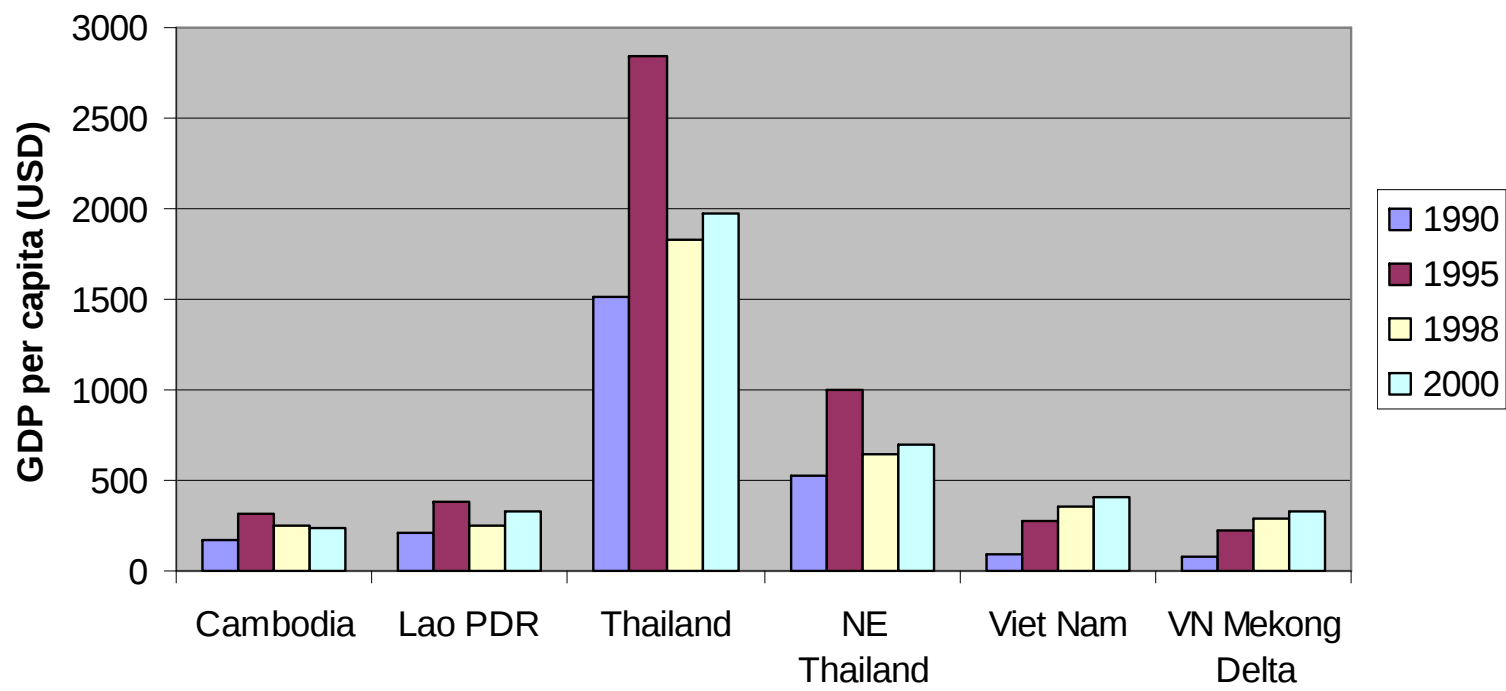
A photograph of a river valley with a village and boats. The image shows a wide river in the foreground, with a small village built on a hillside. Several colorful boats are moored along the riverbank. In the background, there are lush green mountains under a hazy sky.

“..the Mekong
River Basin and
the related natural
resources and
environment are
natural assets of
immense value...”

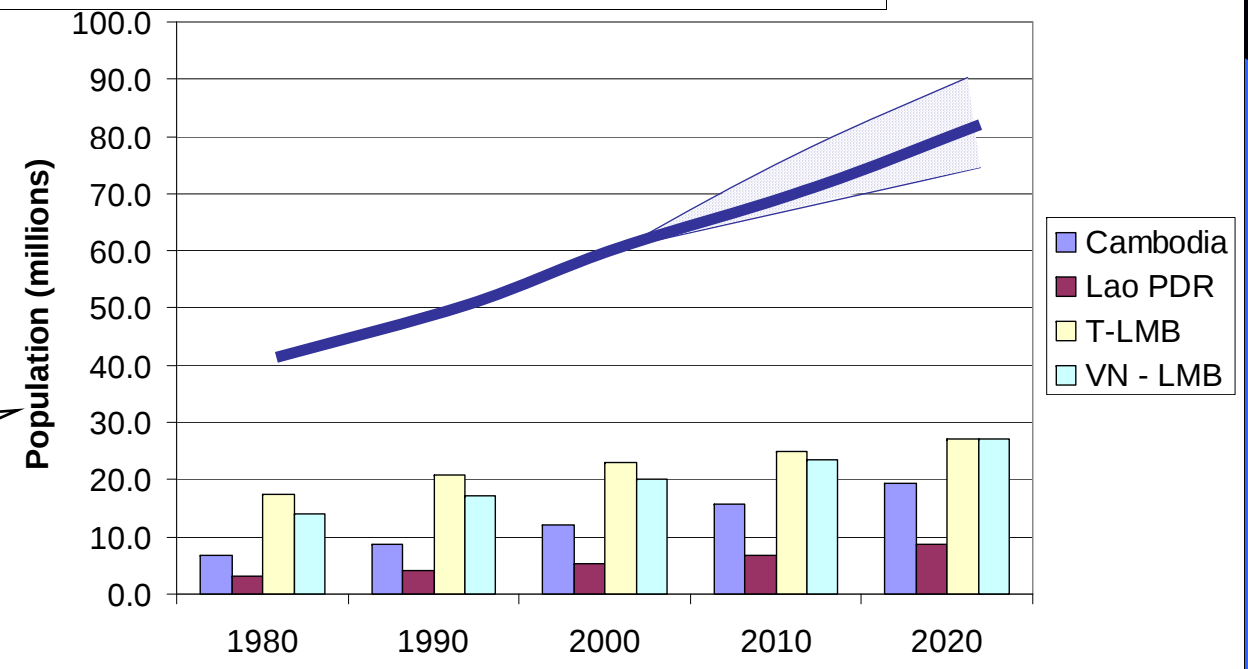
1995 Agreement



Source:
UNESCAP/
National govts

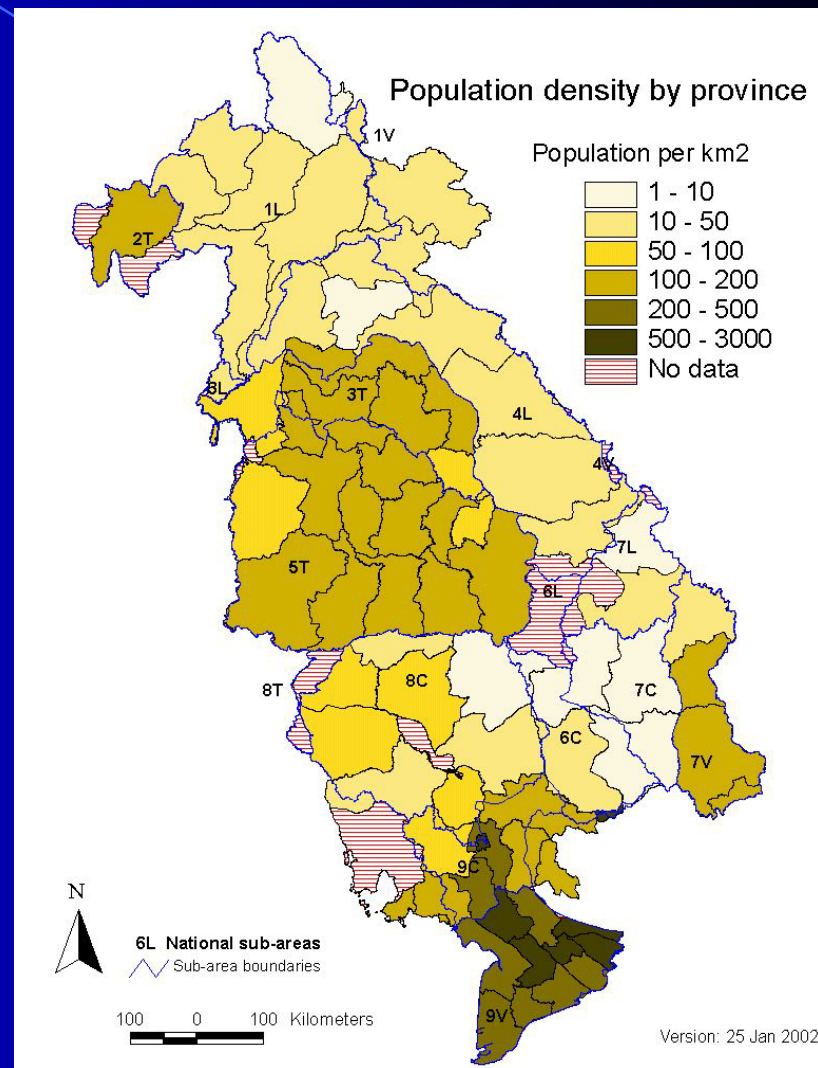


Population
growth



The Challenges: Growing Pressure on Natural Resources

- The **population pressure** is increasing.
- 50 million people in the Lower Mekong Basin will grow to 100 million in 2025
- More than 30% of the population live in extreme poverty
- 50 – 80% of people in Lao PDR and Cambodia are without access to safe water and proper sanitation.
- More than 80% of the people live a subsistence life relying on water-related resources for food.

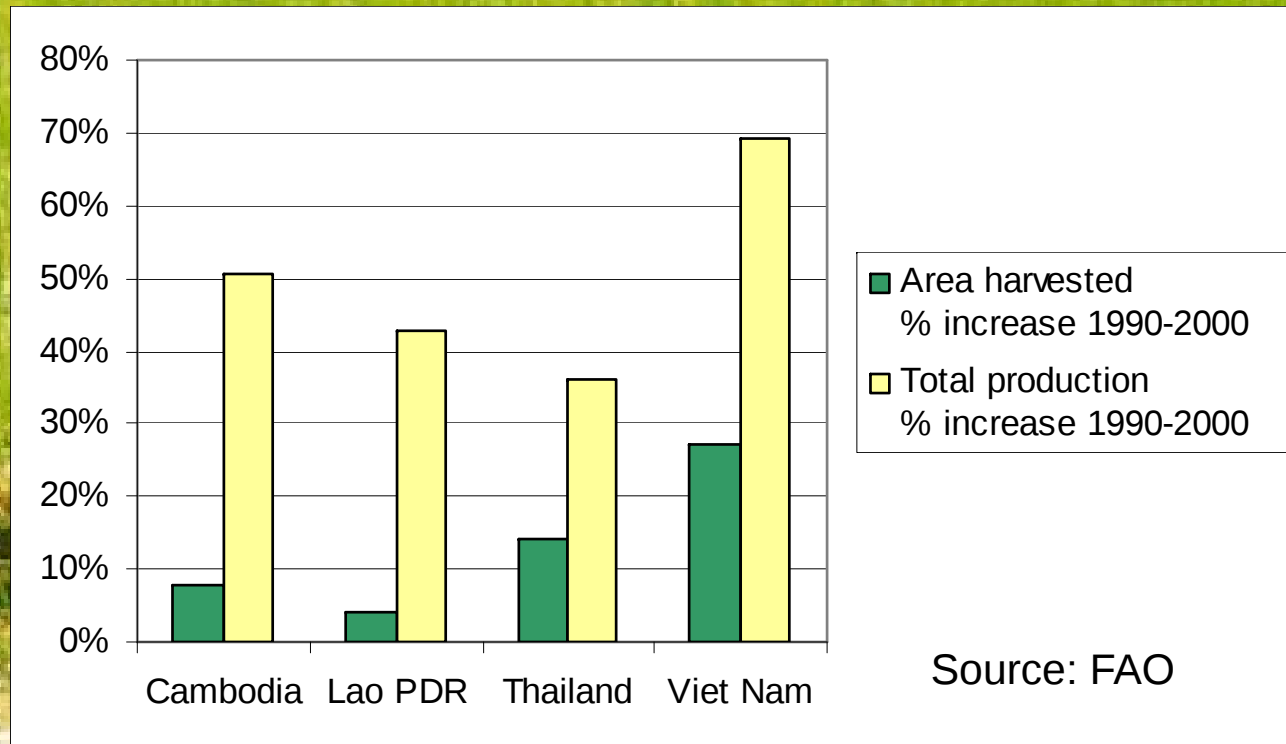


Subsistence and commercial fisheries

- 1.5 – 2 million tonnes / year



Changes in rice paddy production - 1990 to 2000



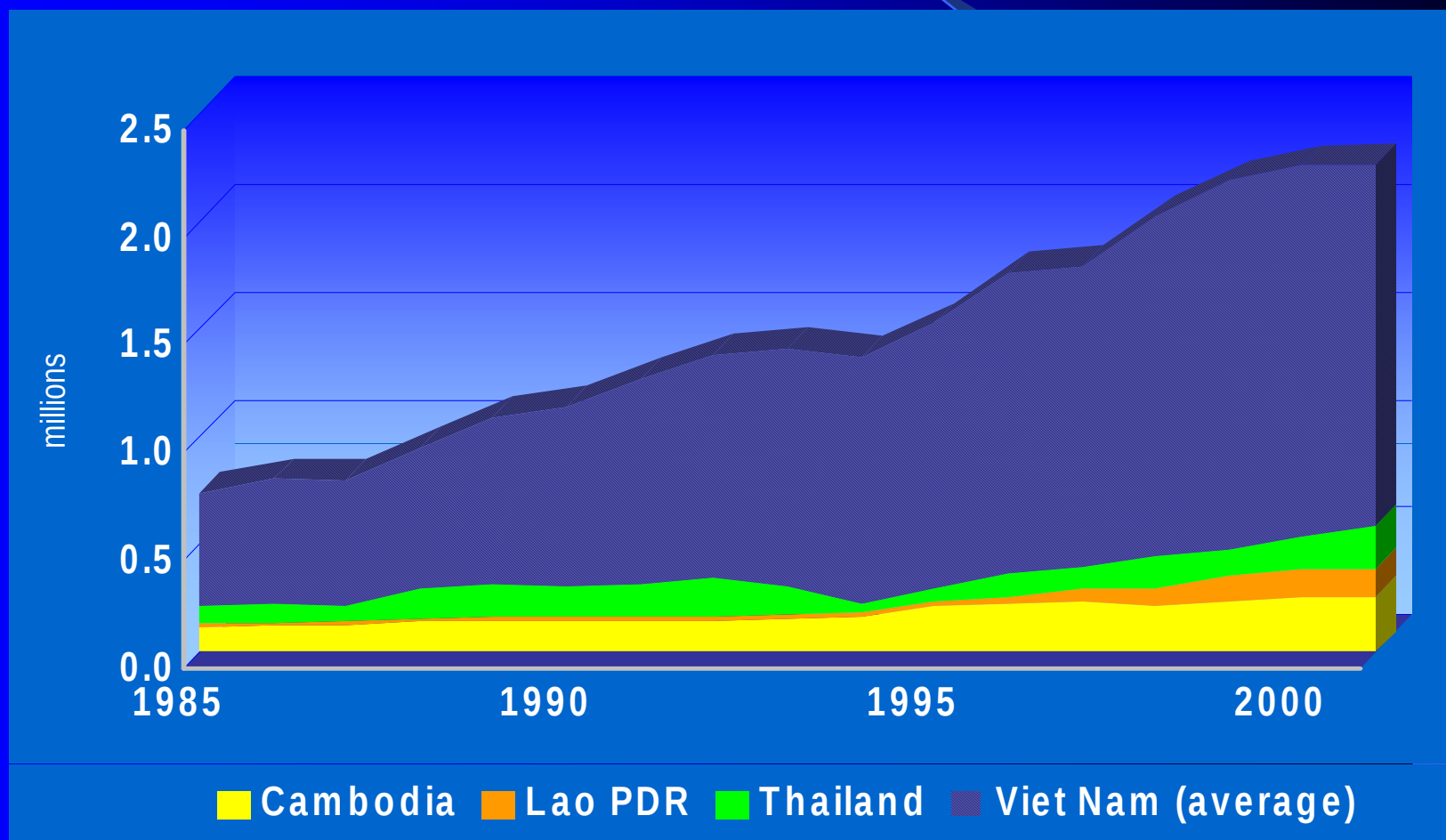
Source: FAO



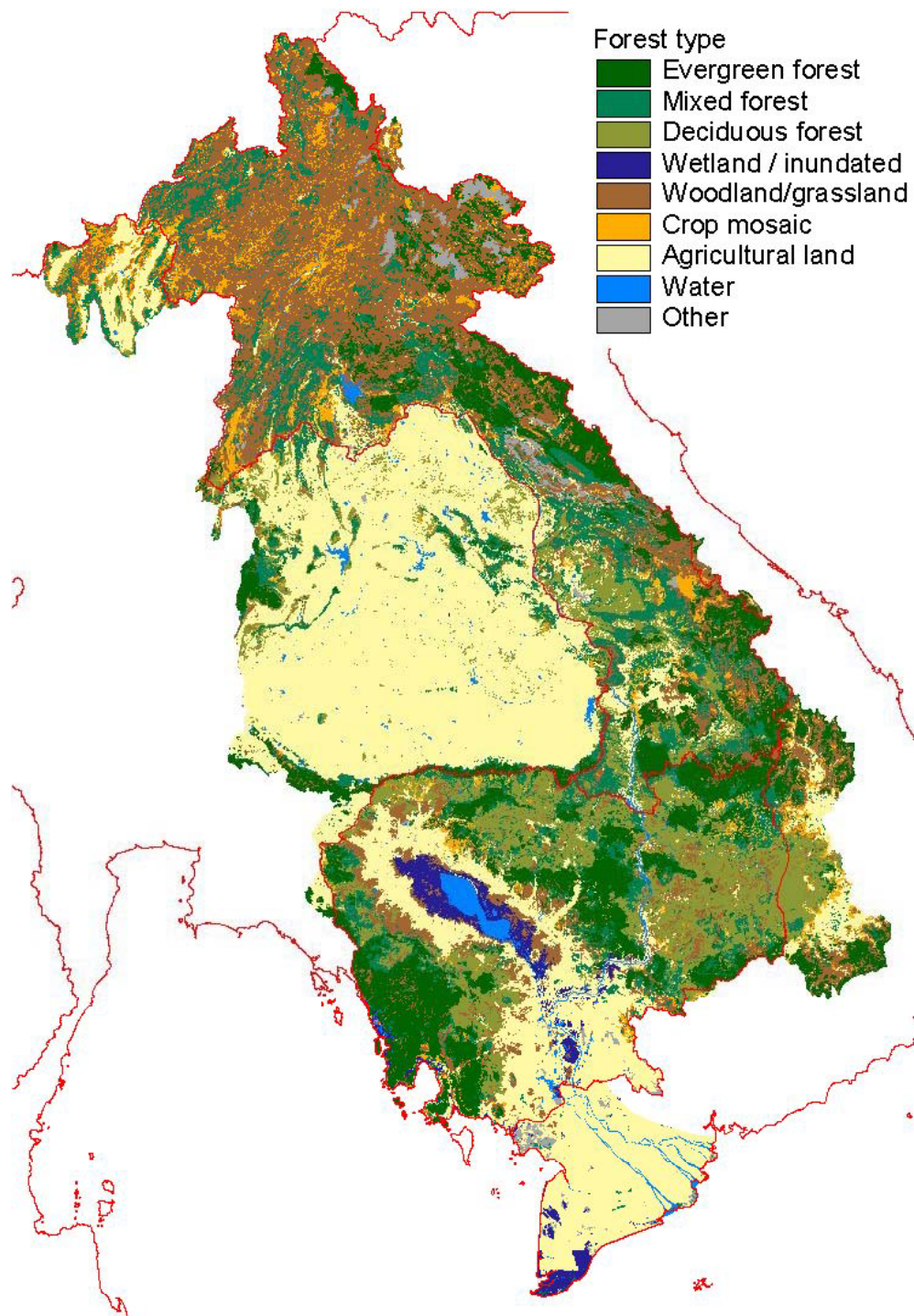
Irrigation growth



Estimated dry season average irrigated areas (ha)







Land Use Change

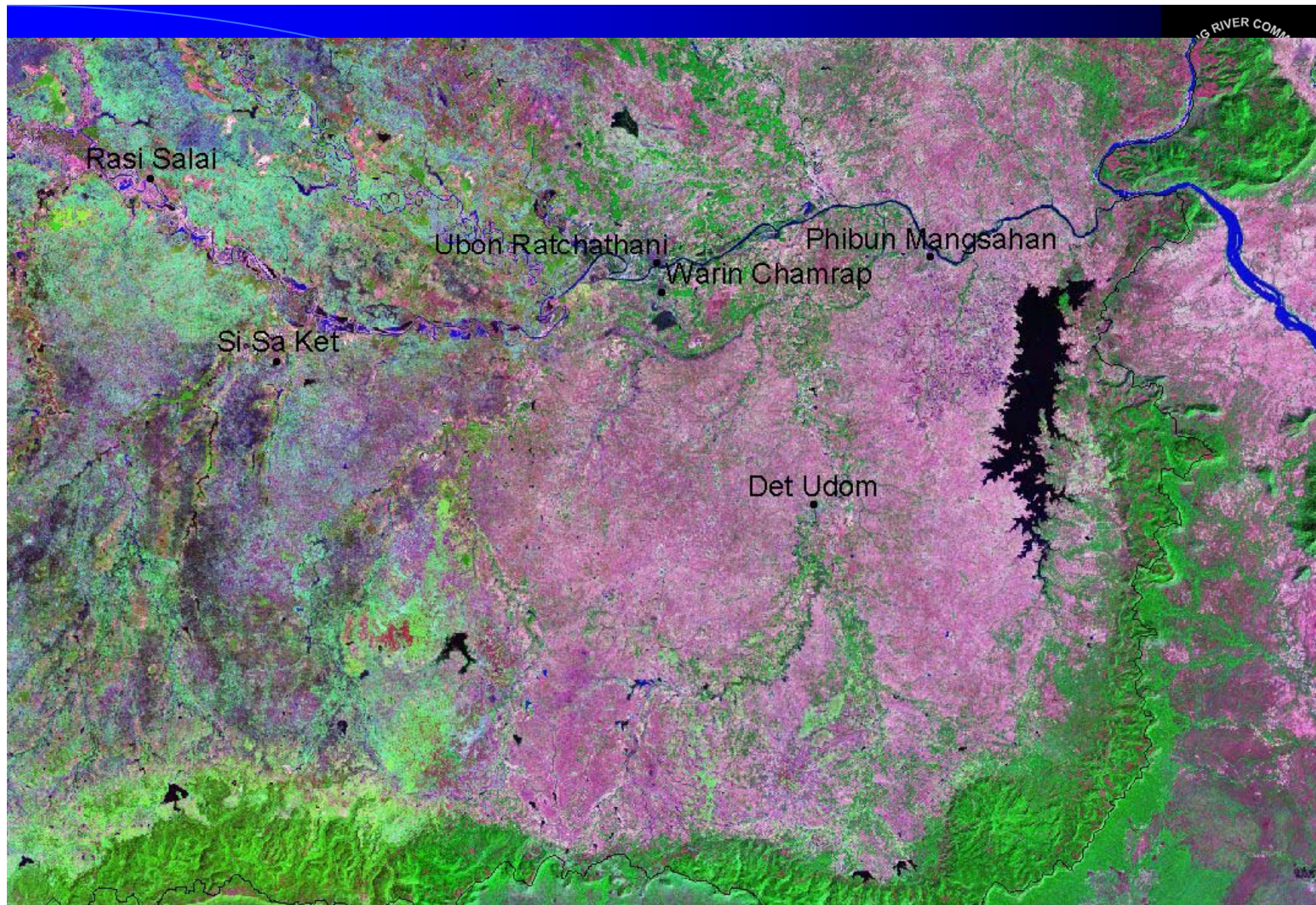


LandUse in the Lower Mekong Basin in 1997

Land Cover	Lao PDR	Camb odia	Thaila nd	Viet Nam	Delta (1)	Highlan ds(1)
Forest	40%	54%	16%	21%	0%	43%
W/G	42%	15%	3%	13%	0%	25%
Agriculture	14%	23%	79%	57%	84%	29%
Wetland/water	1%	5%	1%	5%	10%	0%
Other	2%	0%	0%	2%	4%	0%

Source: MRC Land Cover Dataset

(1):Viet Nam W/G : Woodland/grassland



20 0 20 Kilometers

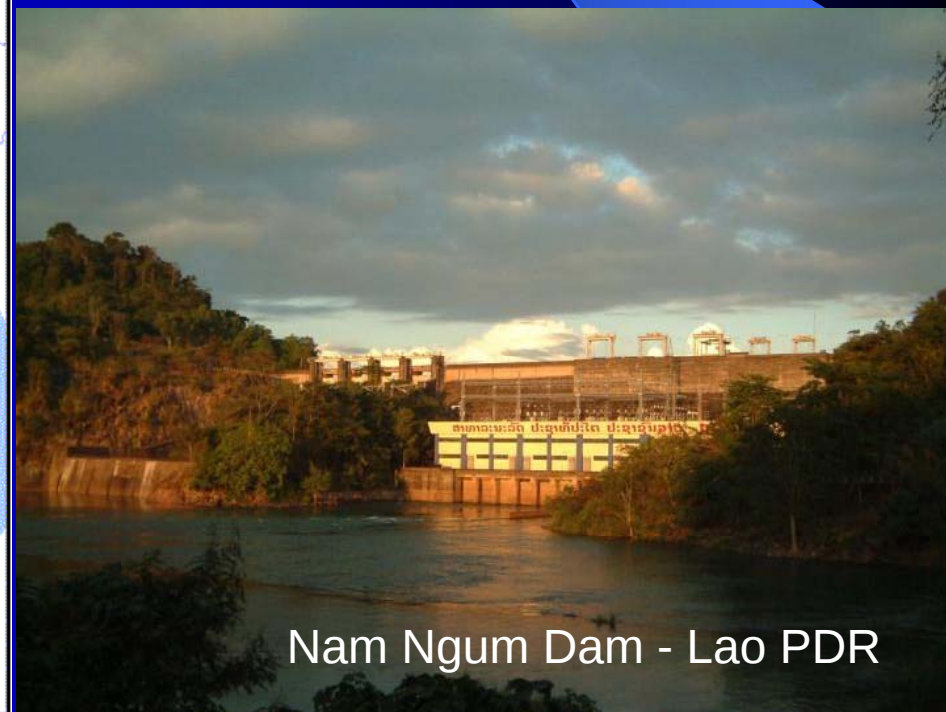
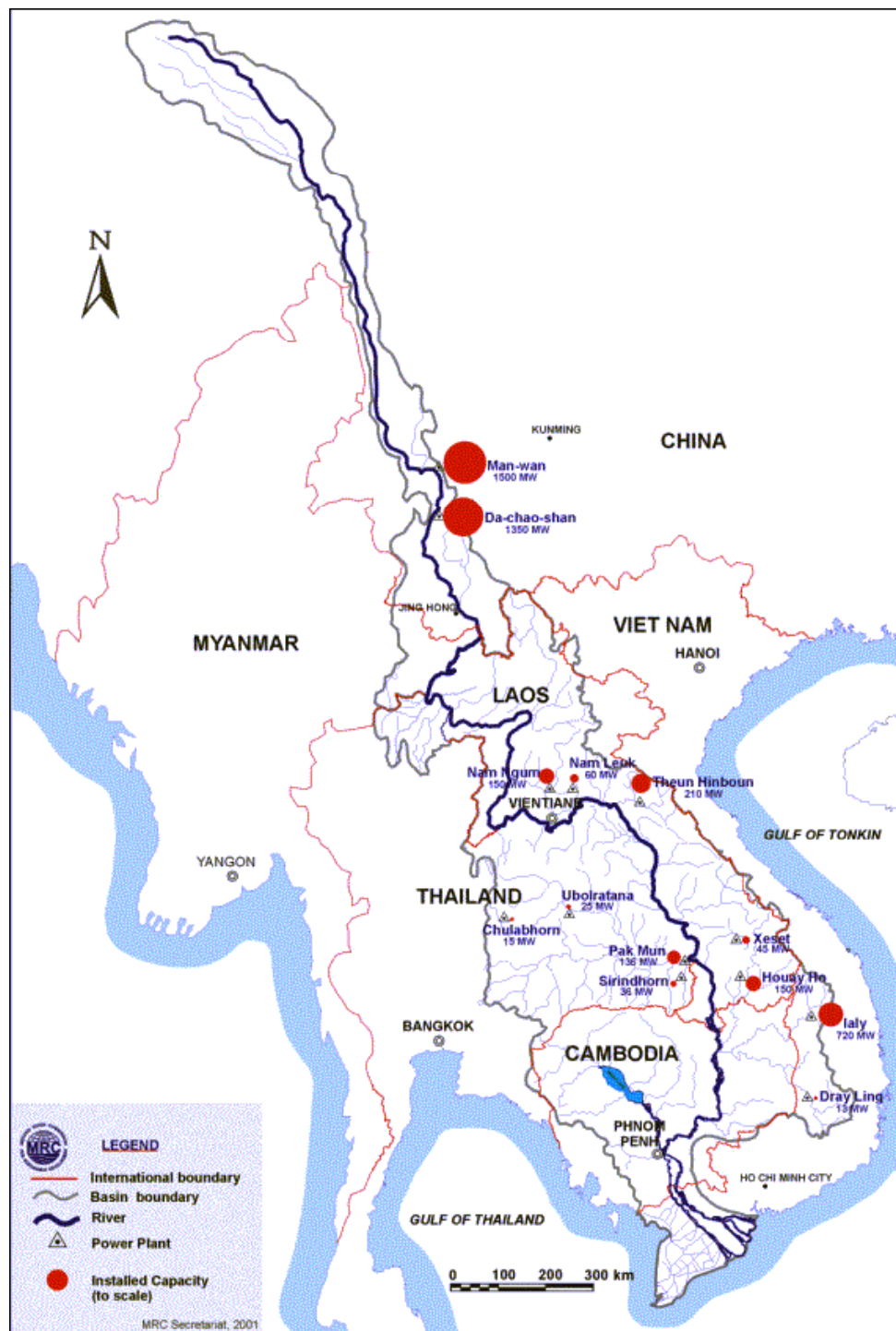
Southern Korat Plateau

Hydropower

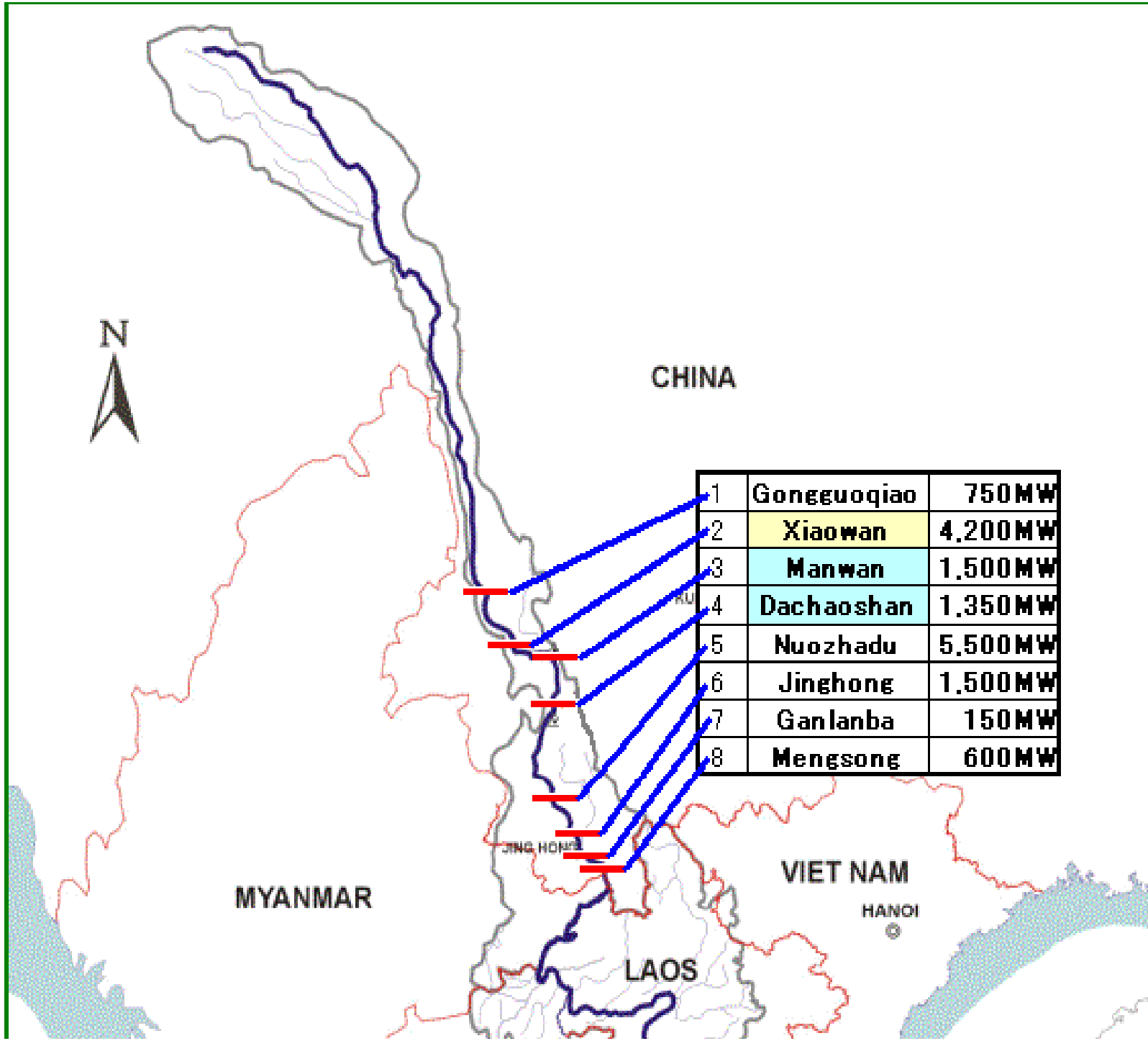
Total installed capacity:

LMB: 1800 MW

UMB: 2850 MW



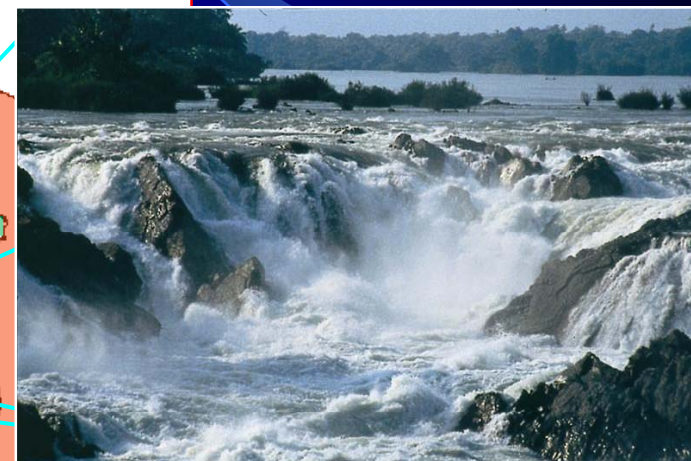
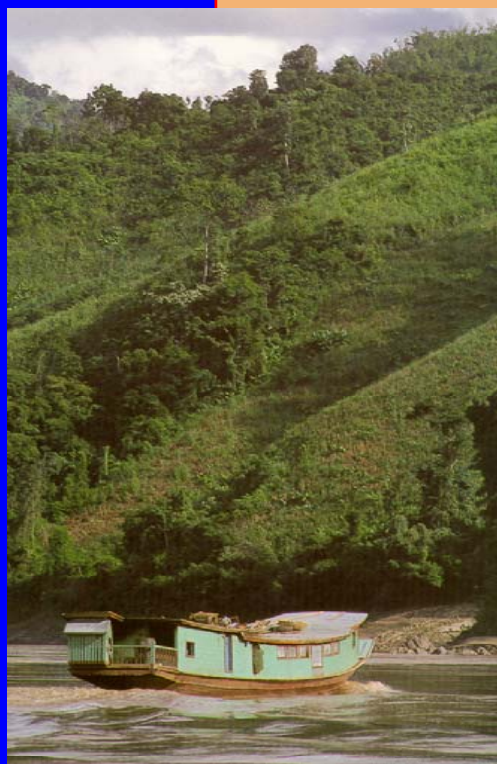
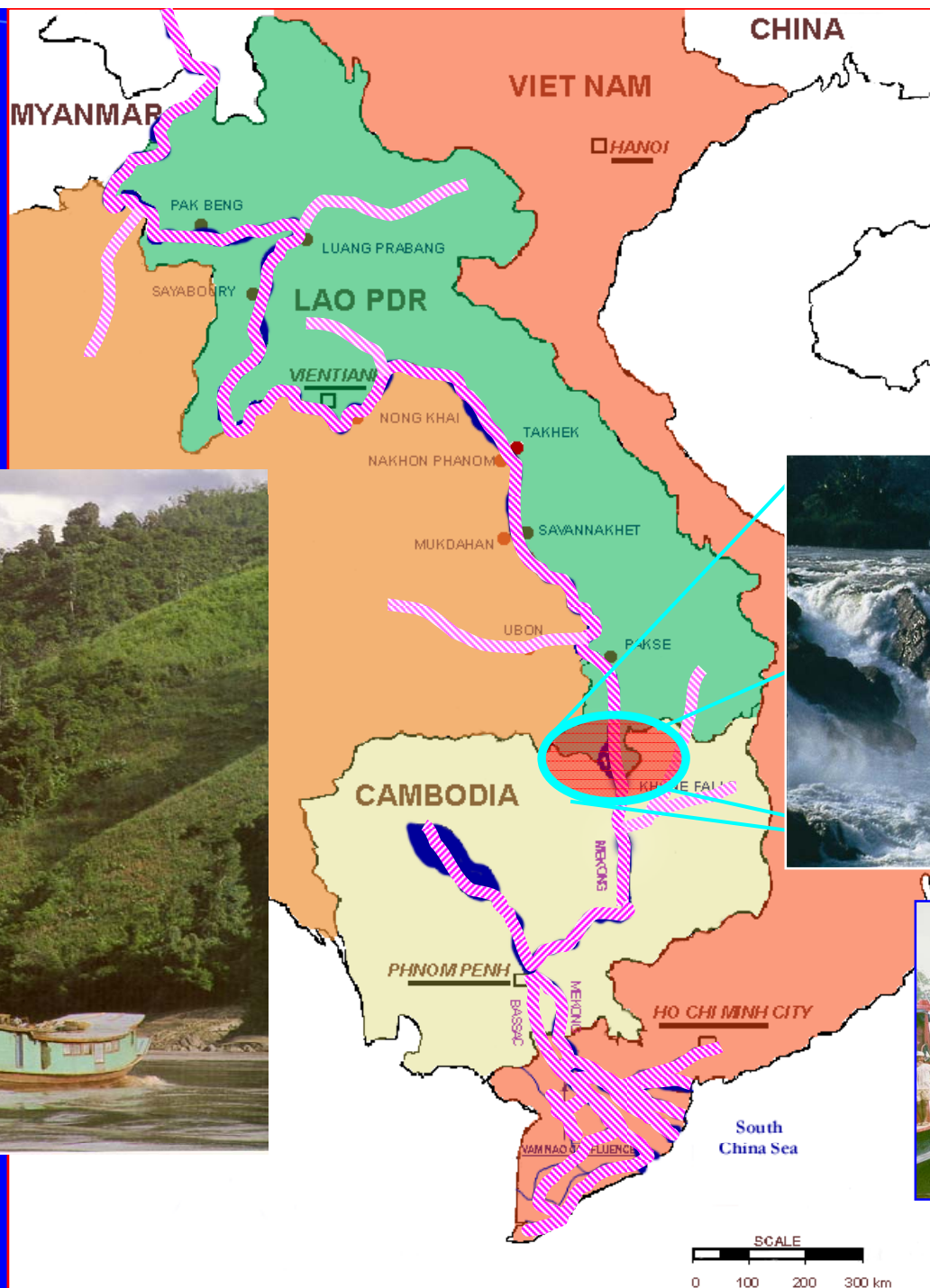
Nam Ngum Dam - Lao PDR

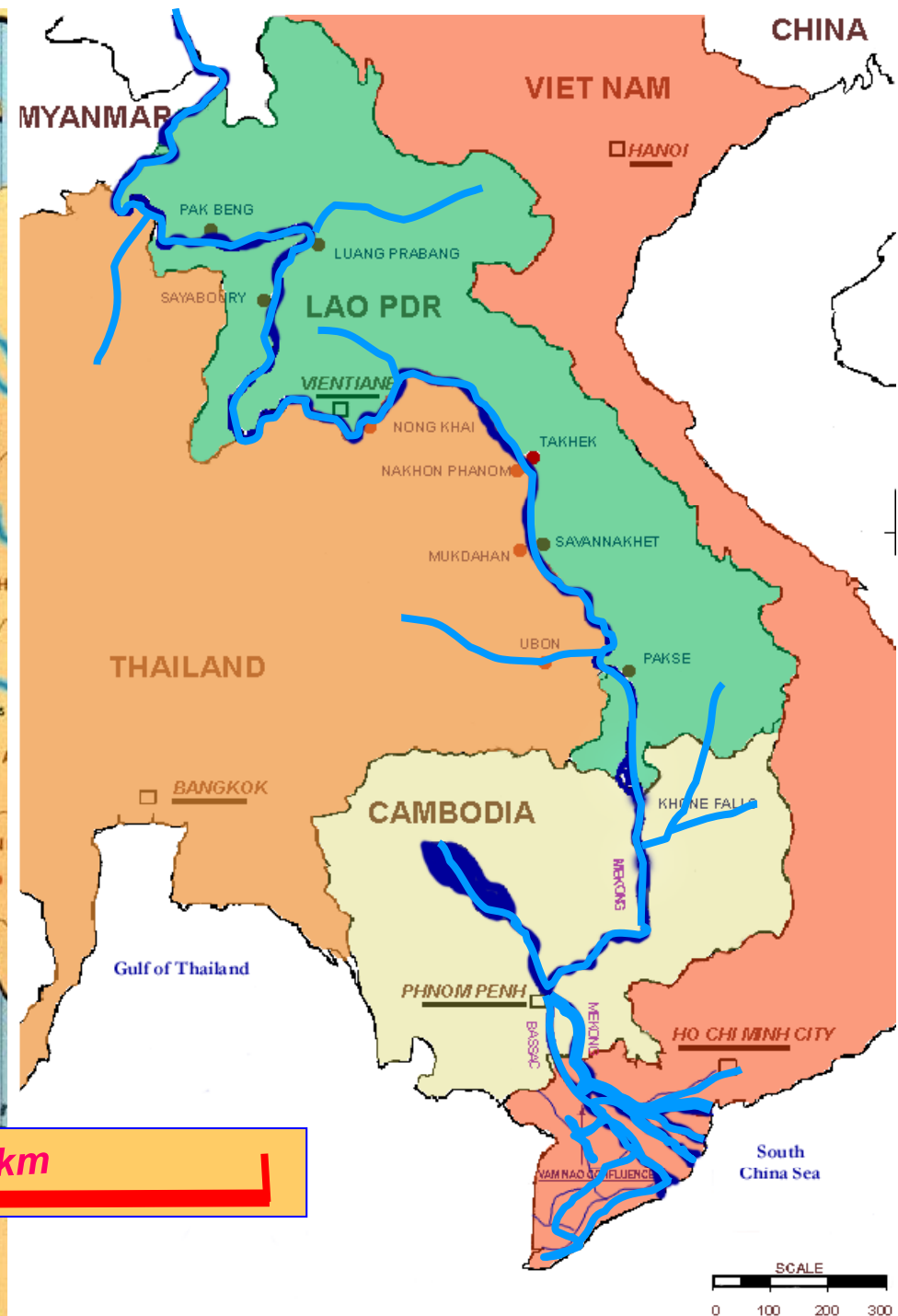


Existing and Planning Dams in LMB



Inland Water Transportation

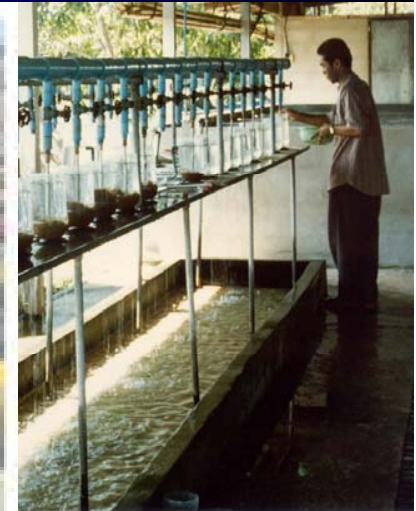






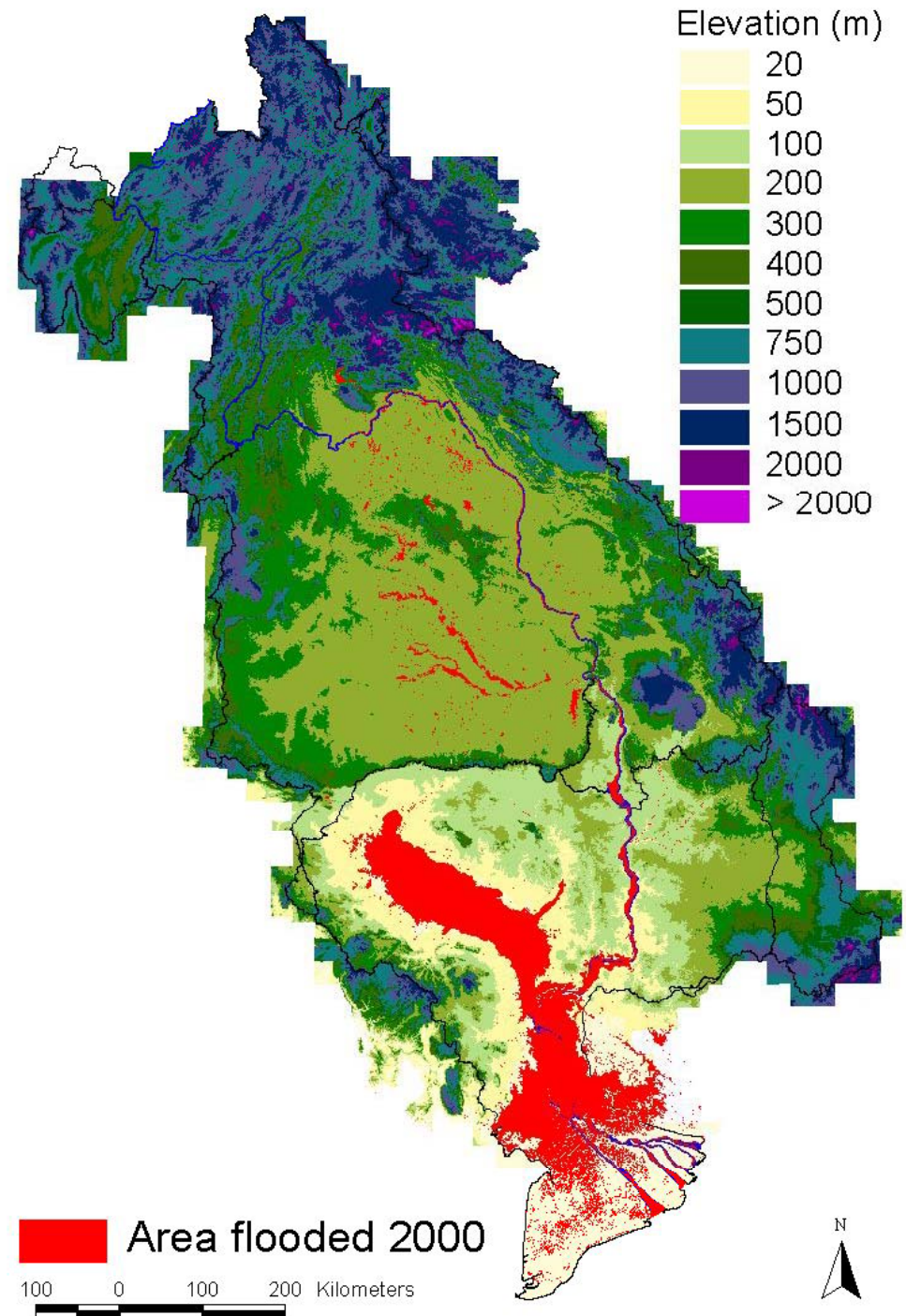
Industrial and urban development

- Rapid growth of urban centers
- Agro-processing industries
- Aquaculture
- Pollution threat



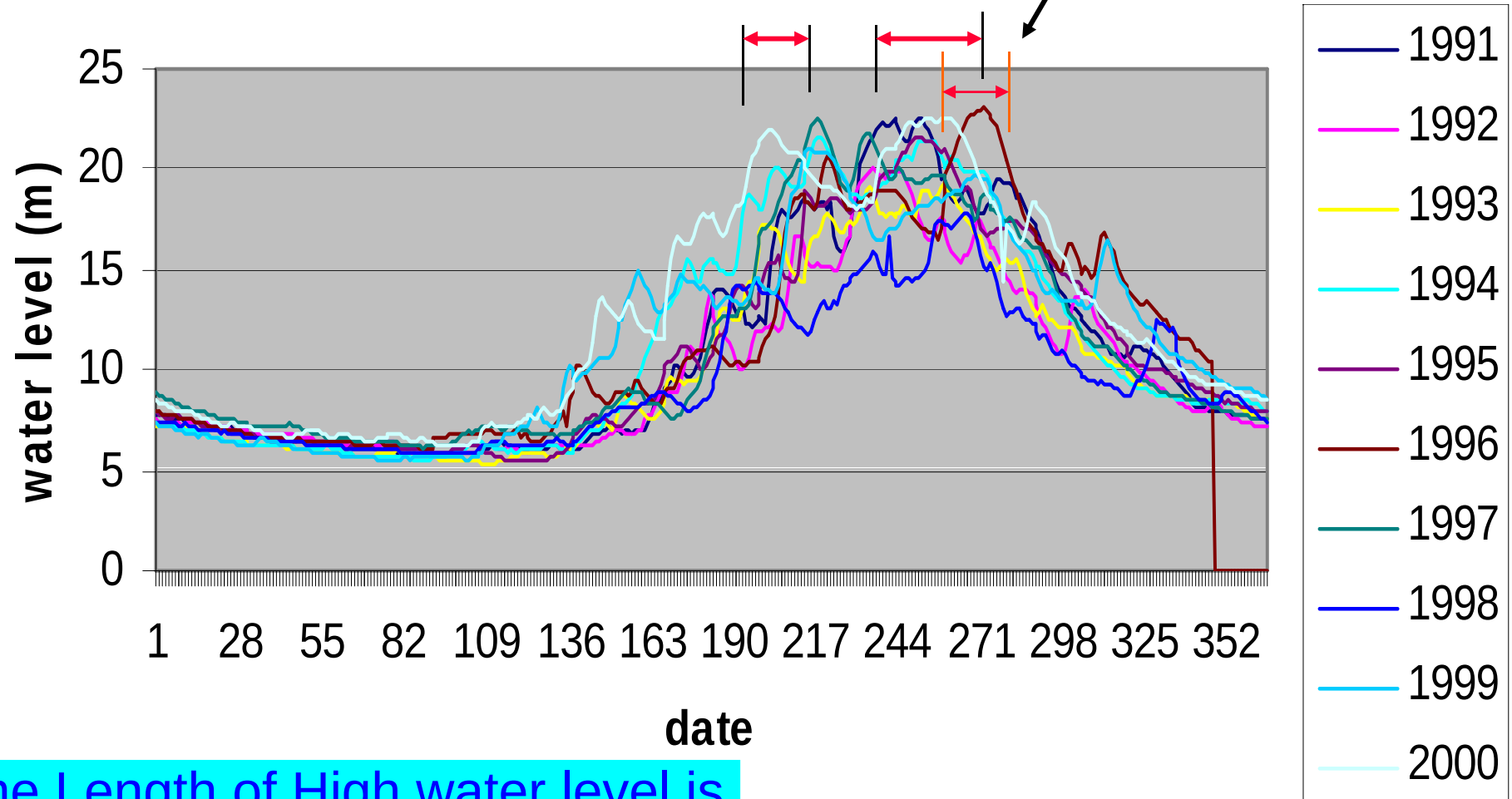
Flooding

- Environmental significance of flooding (wetlands, fisheries)
- 2000 flood
 - 800 people died
 - \$400 million damage
- Impacts of land use change, climate change?



People want to know
the receding date

water level at Kratie



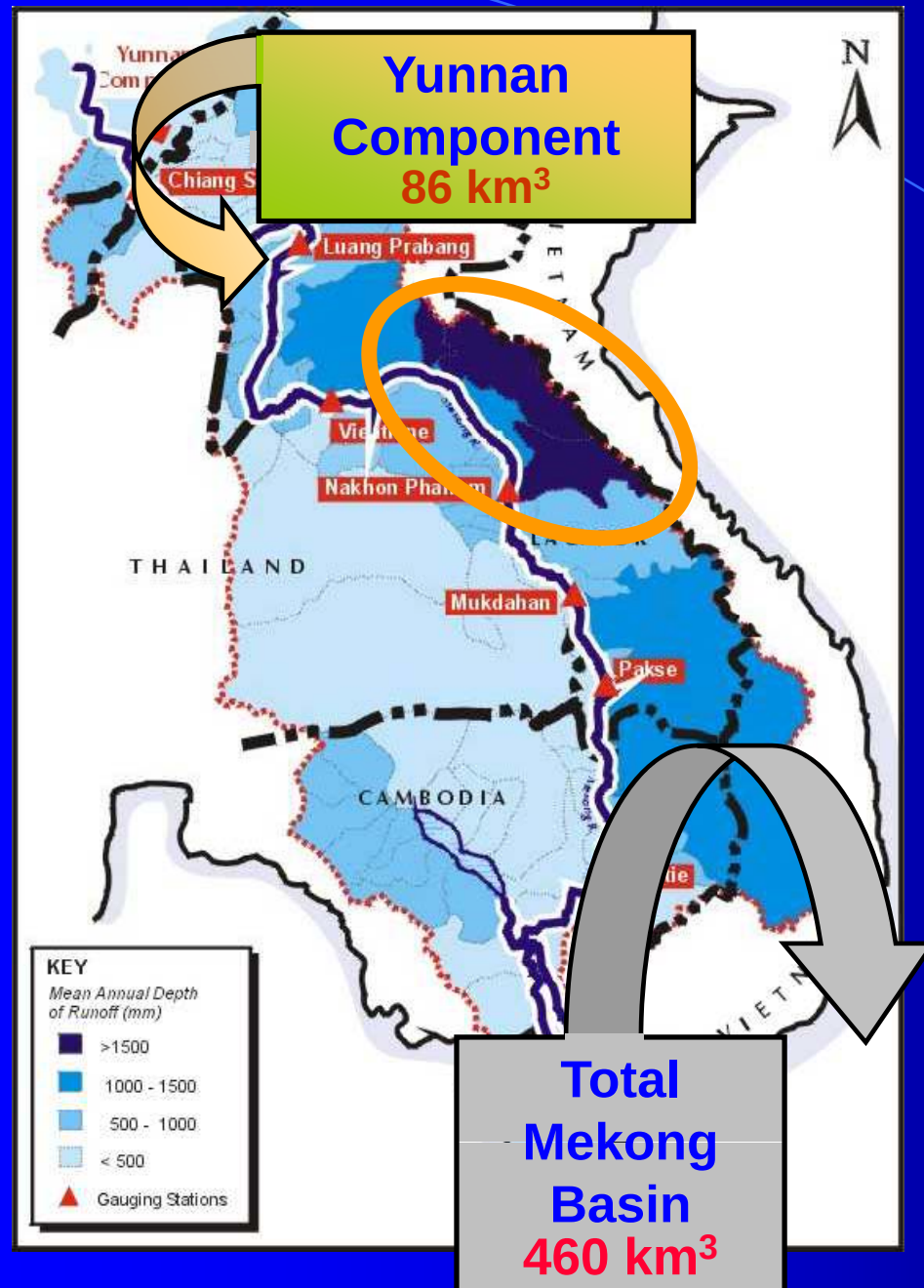
The Length of High water level is
as important as the peak level

Goals of the Mekong Agreement in 1995

- Equitable sharing of Mekong water
- Maintaining ecological balance
- Social and economic well-being
- Cooperation and interdependent growth

Balanced development, based on
understanding of the resource



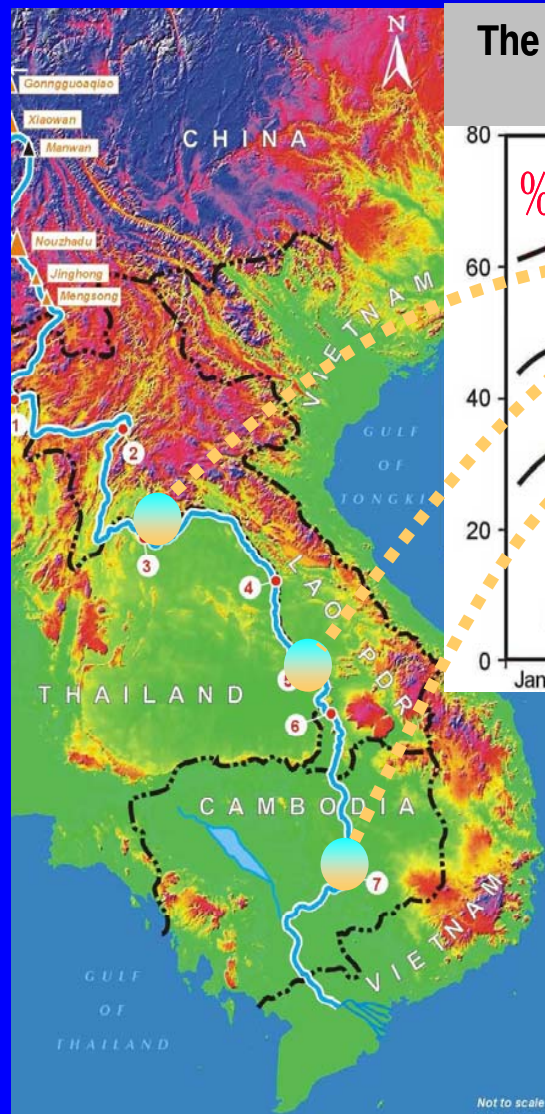


Lower Mekong water balance

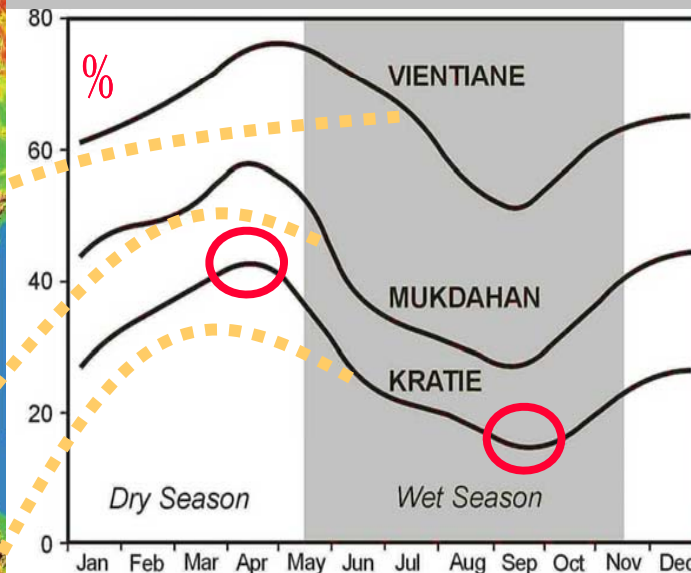
Average annual inflow from China into the lower Mekong basin is 86 km³.....

.....which is less than 20% of the total Mekong mean annual flow of 460 km³

The largest proportion of total flow is contributed by the major left bank tributaries in Laos



The % contribution of flow from China to average monthly flow at ...



Potential impacts of river regulation in Yunnan are different in wet and dry seasons

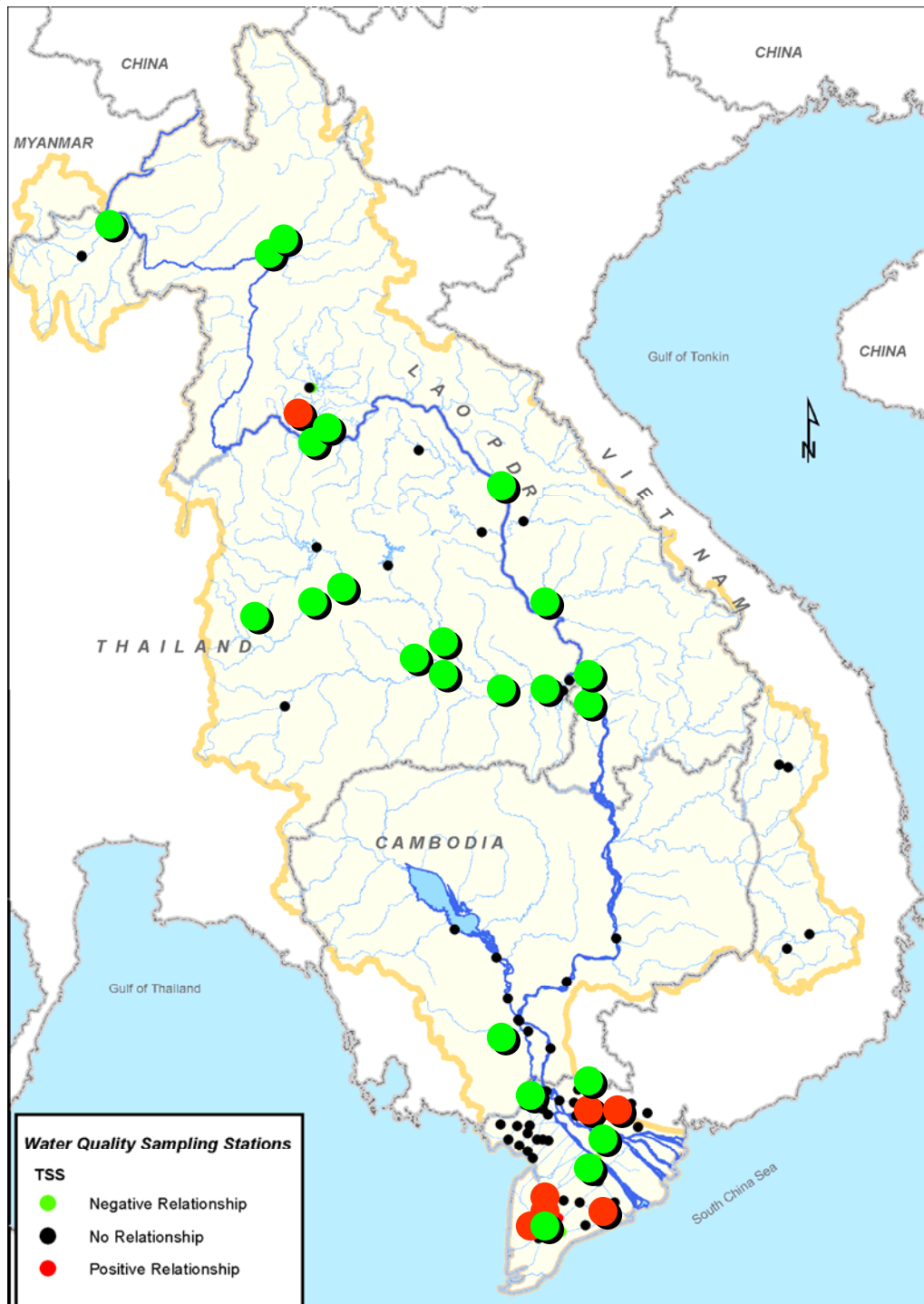
Flow from China dominates the dry season hydrology of the Lower Mekong

Flood season flows mostly originate within Laos and the lower basin

Water quality monitoring

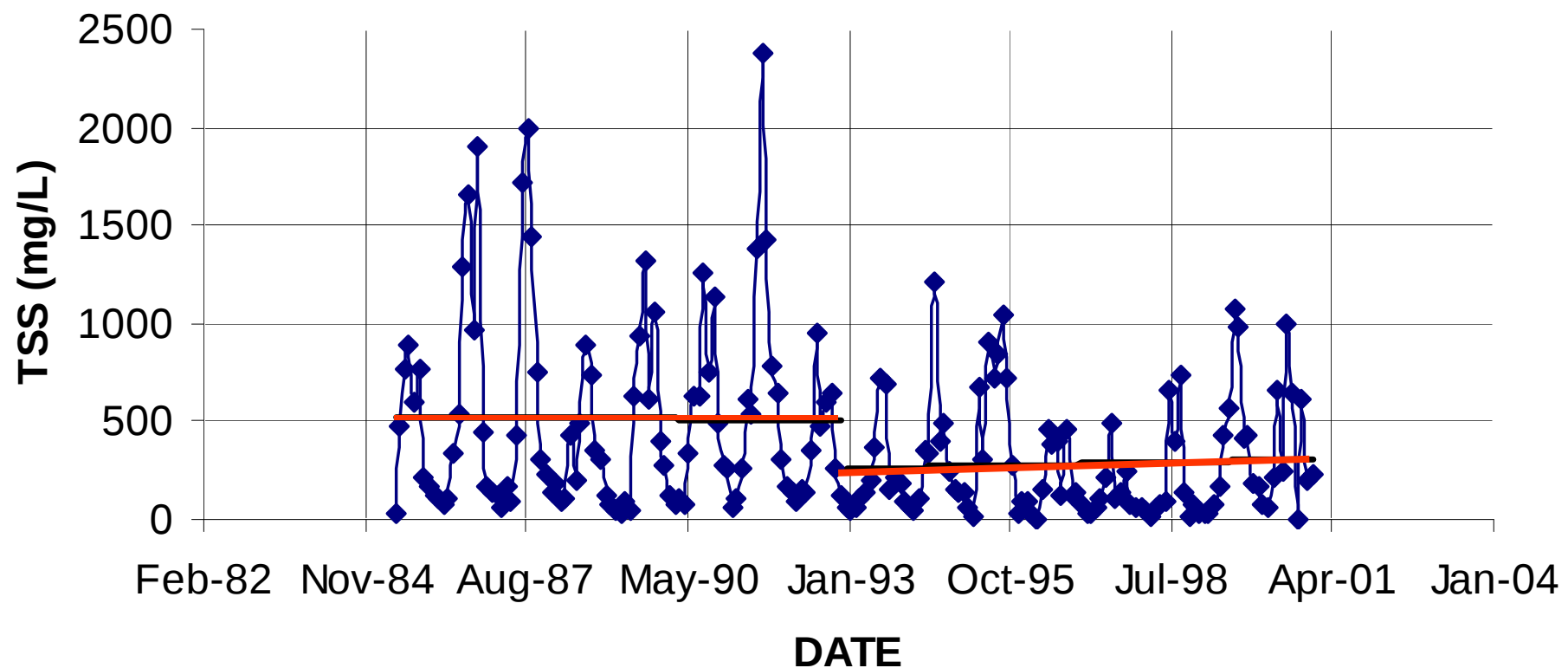
Trends in total suspended sediment (TSS) in the Lower Mekong Basin

- Negative
- Positive



TSS before and after filling Manwan Dam

TSS at Chaeng Saen (1985-1992)



Patterns of flow are already changing

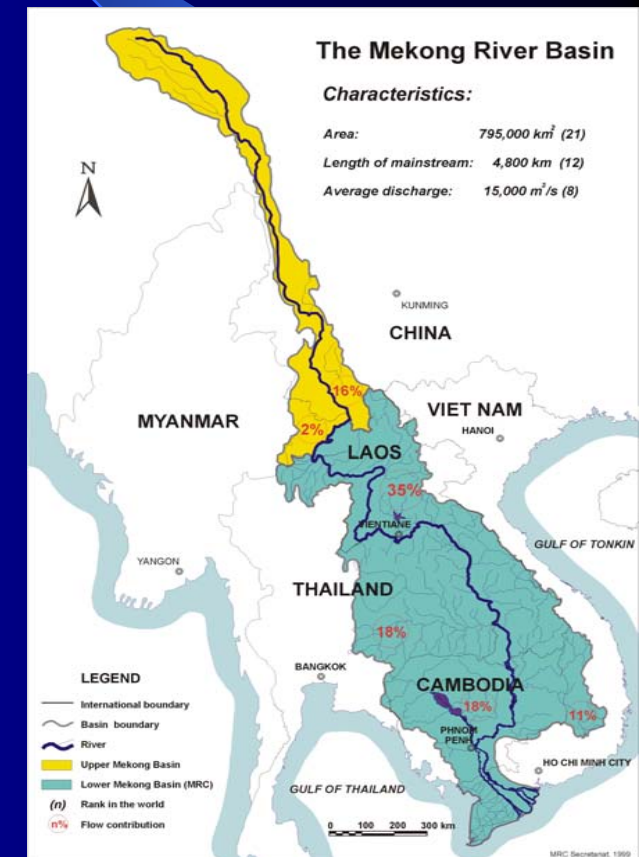


	Chiang Saen	Mukdahan	Pakse
January	Light Pink	Light Pink	Light Green
February	Light Green	Light Green	Light Green
March	Light Green	Light Green	Light Green
April	Light Green	Light Green	Light Green
May	Light Green	Light Green	Light Green
June	Light Pink	Light Pink	Light Pink
July	Light Pink	Light Pink	Light Green
August	Light Pink	Light Pink	Light Green
September	Light Pink	Light Pink	Light Pink
October	Light Pink	Light Pink	Light Pink
November	Light Pink	Light Pink	Light Pink
December	Light Pink	Light Pink	Light Pink

Regional planning



- Rules for Water Sharing (WUP)
- Basin Development Plan - coordinating water resources development at national and regional levels
- Coordination with regional initiatives (eg Greater Mekong Subregion / ADB)
- Dialogue with China and Myanmar on issues relating to the Upper Basin

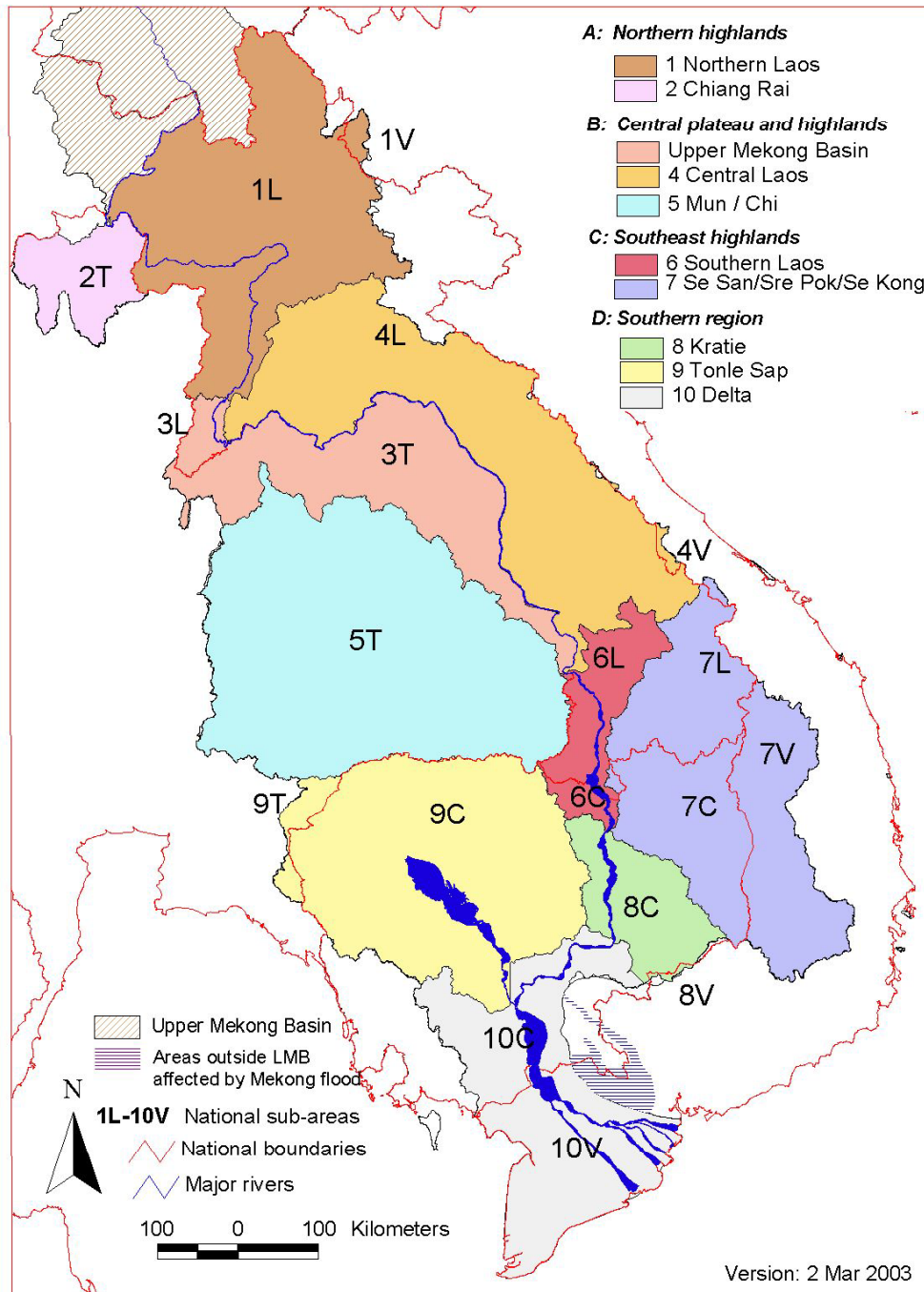


Basin Development Plan

BDP aims to ensure coordination of development activities in the Mekong Basin at national and regional levels

- Participatory basin planning process
- Short list of high priority projects with regional significance

BDP subareas

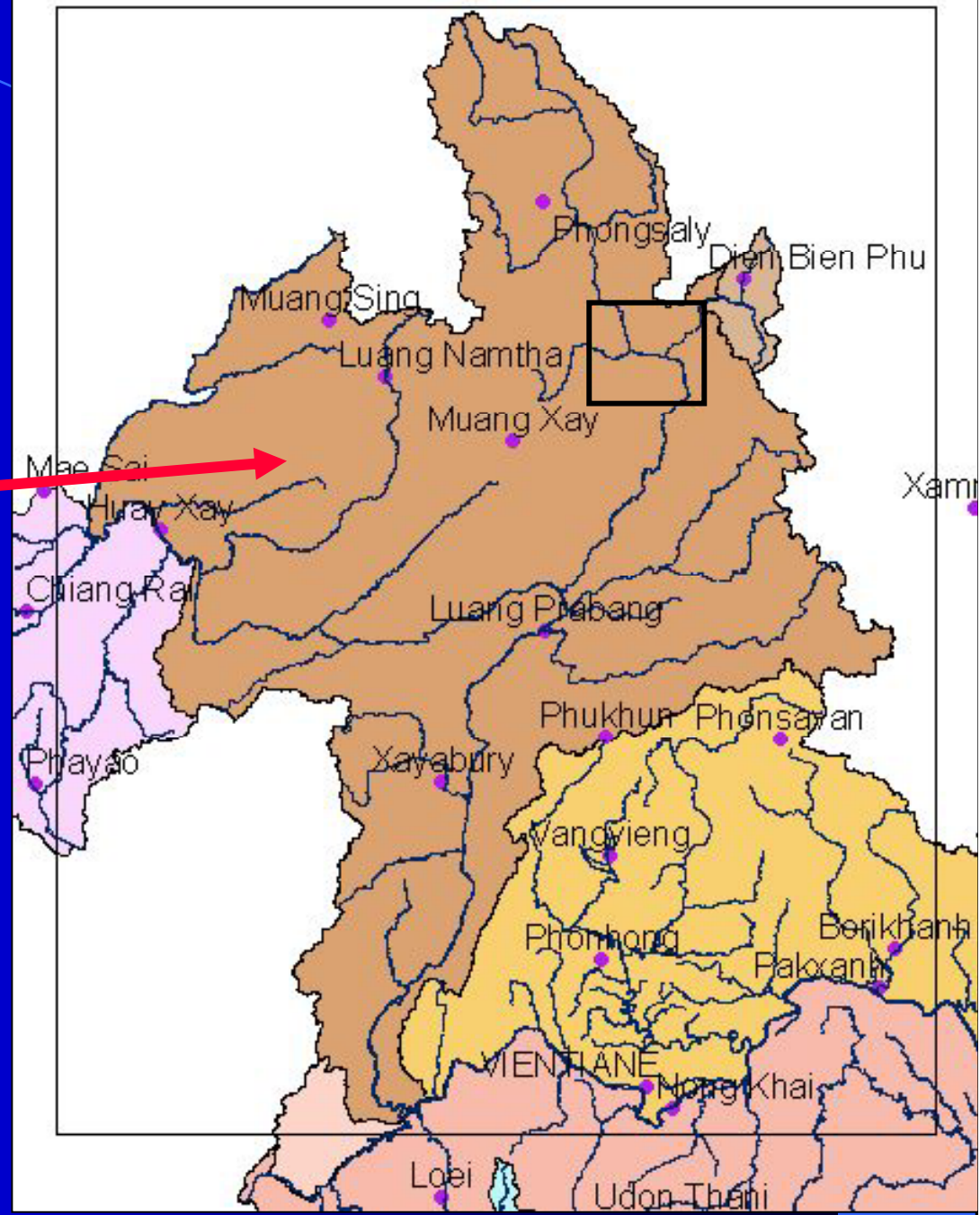
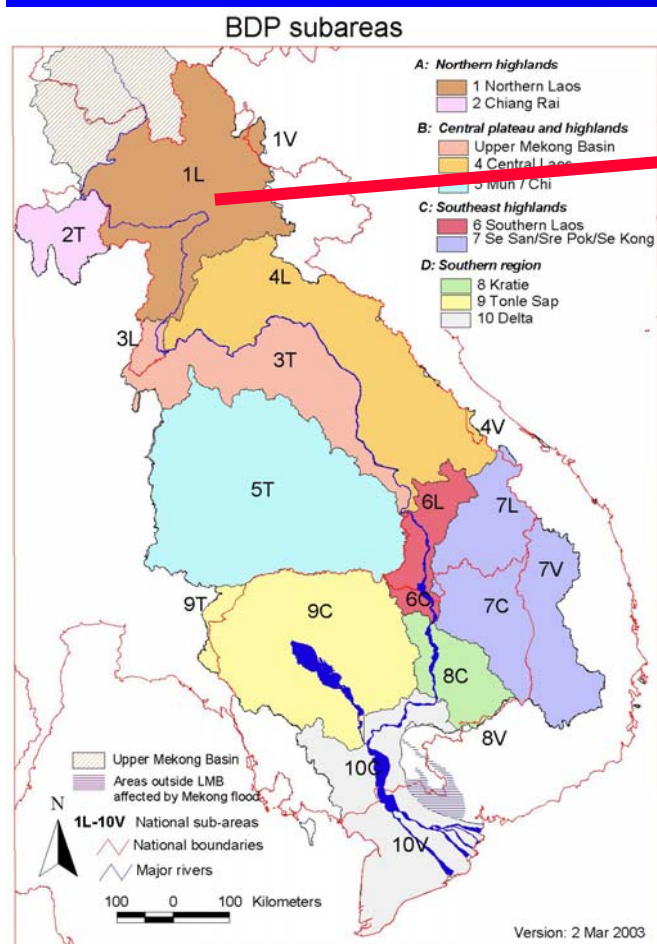


Sub-areas for BDP

- 10 sub-areas, based on catchments and administrative units
- Reflect the diversity of planning issues in the LMB
- Regional strategies from local issues

Northern Lao PDR

1L



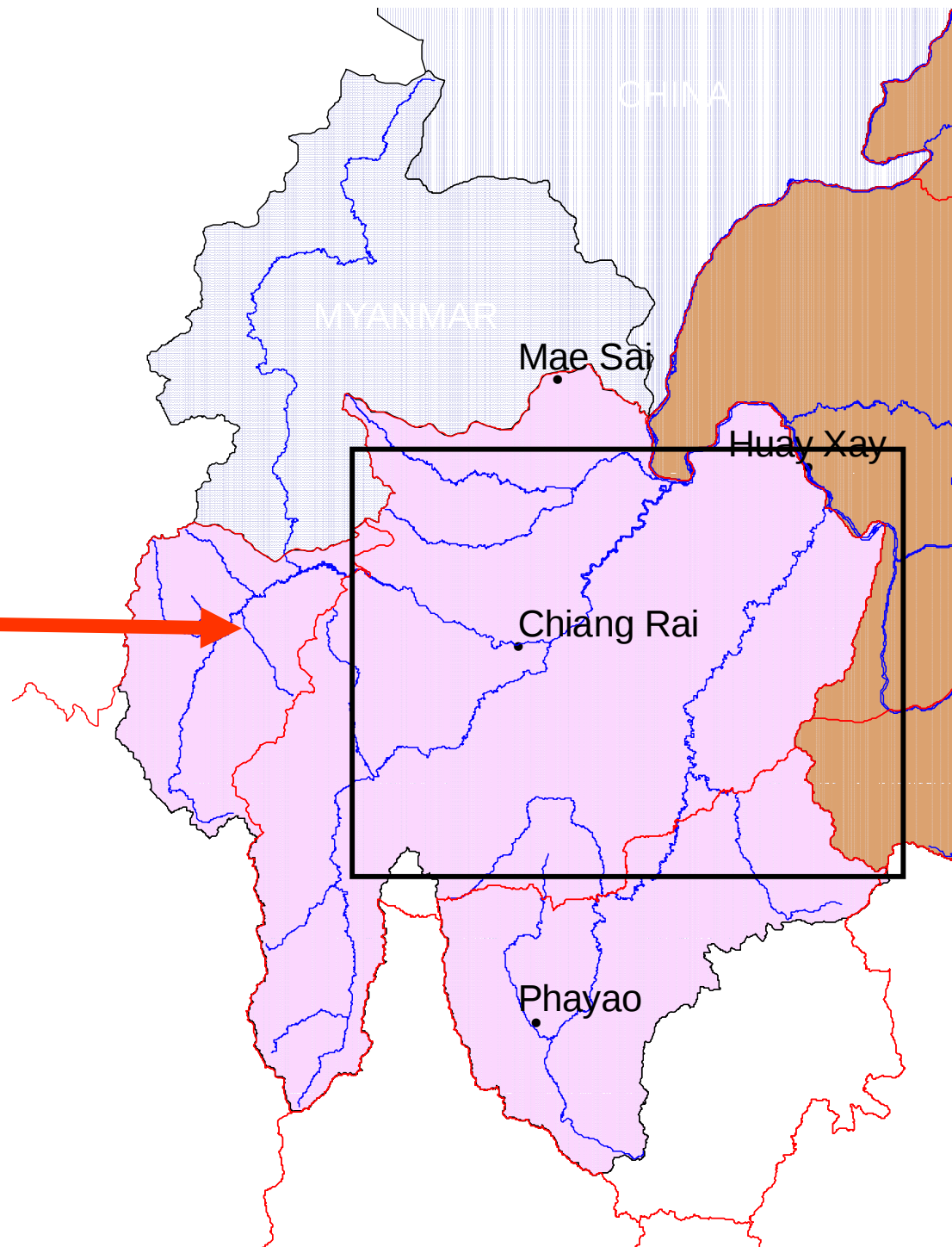
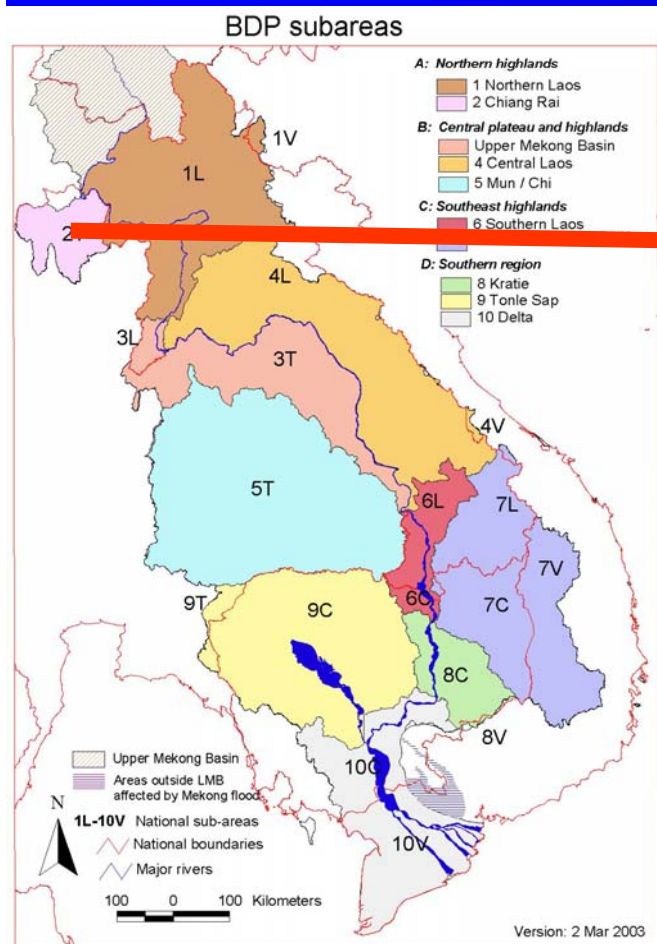


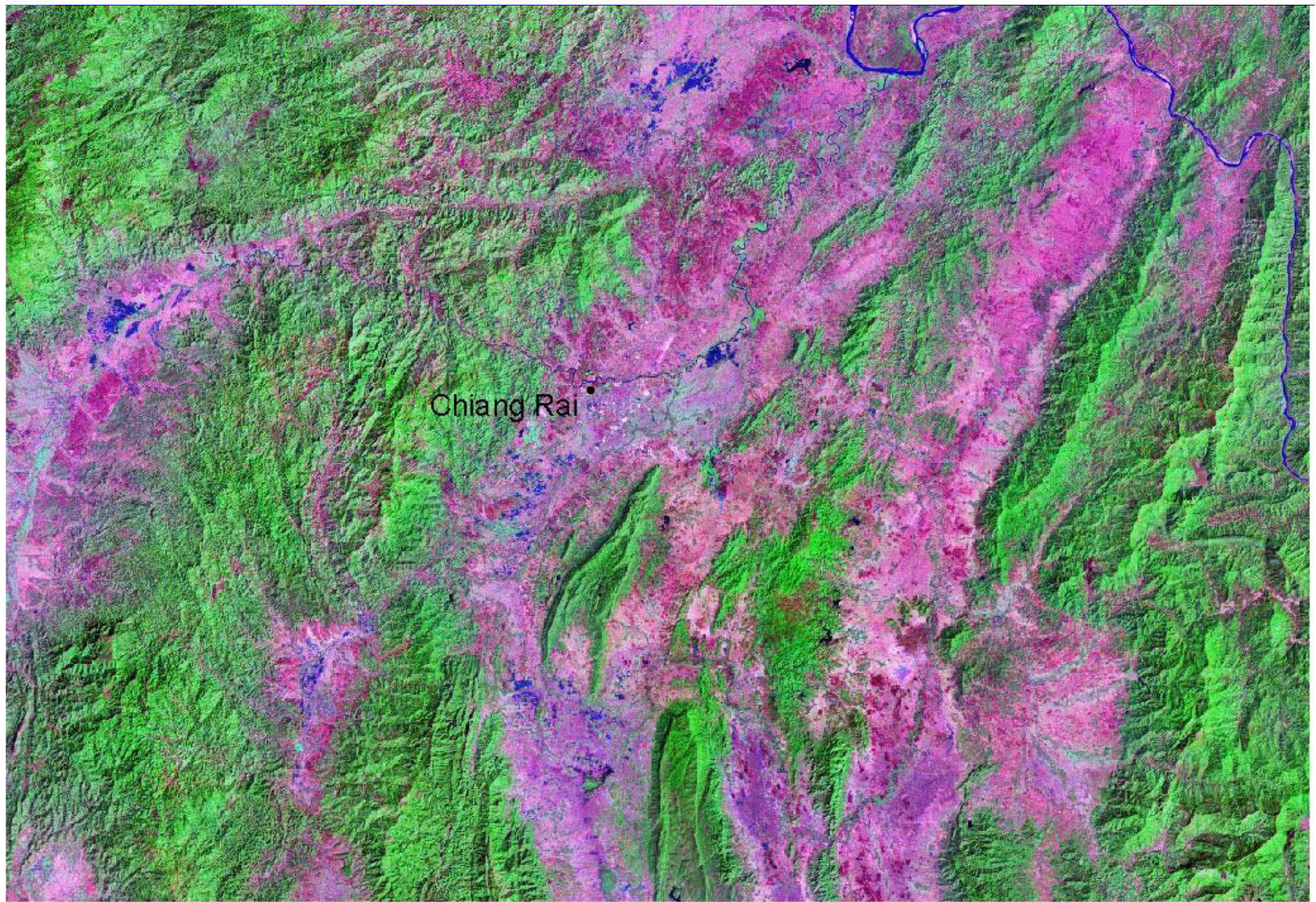
5 0 5 10 Kilometers

Nam Ou and Nam Pak

Chiang Rai

2T





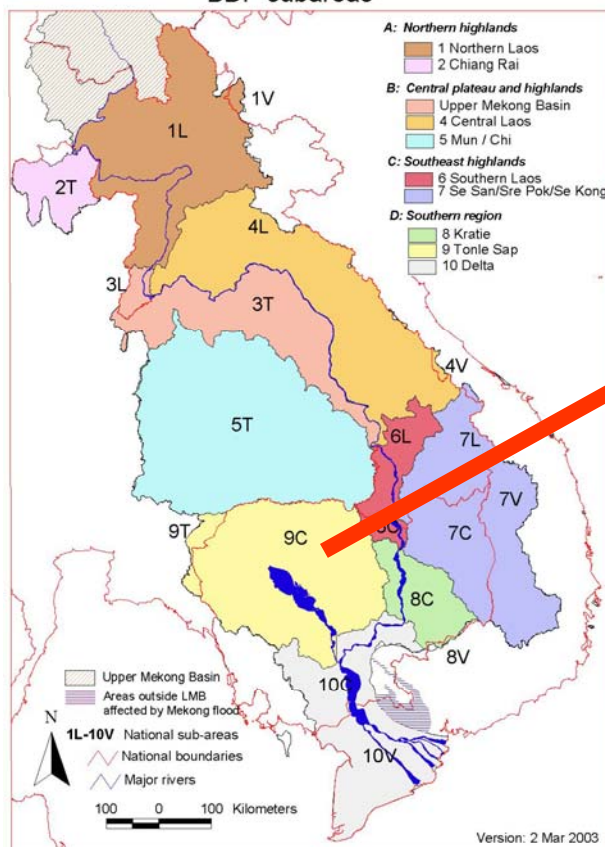
10 0 10 20 Kilometers

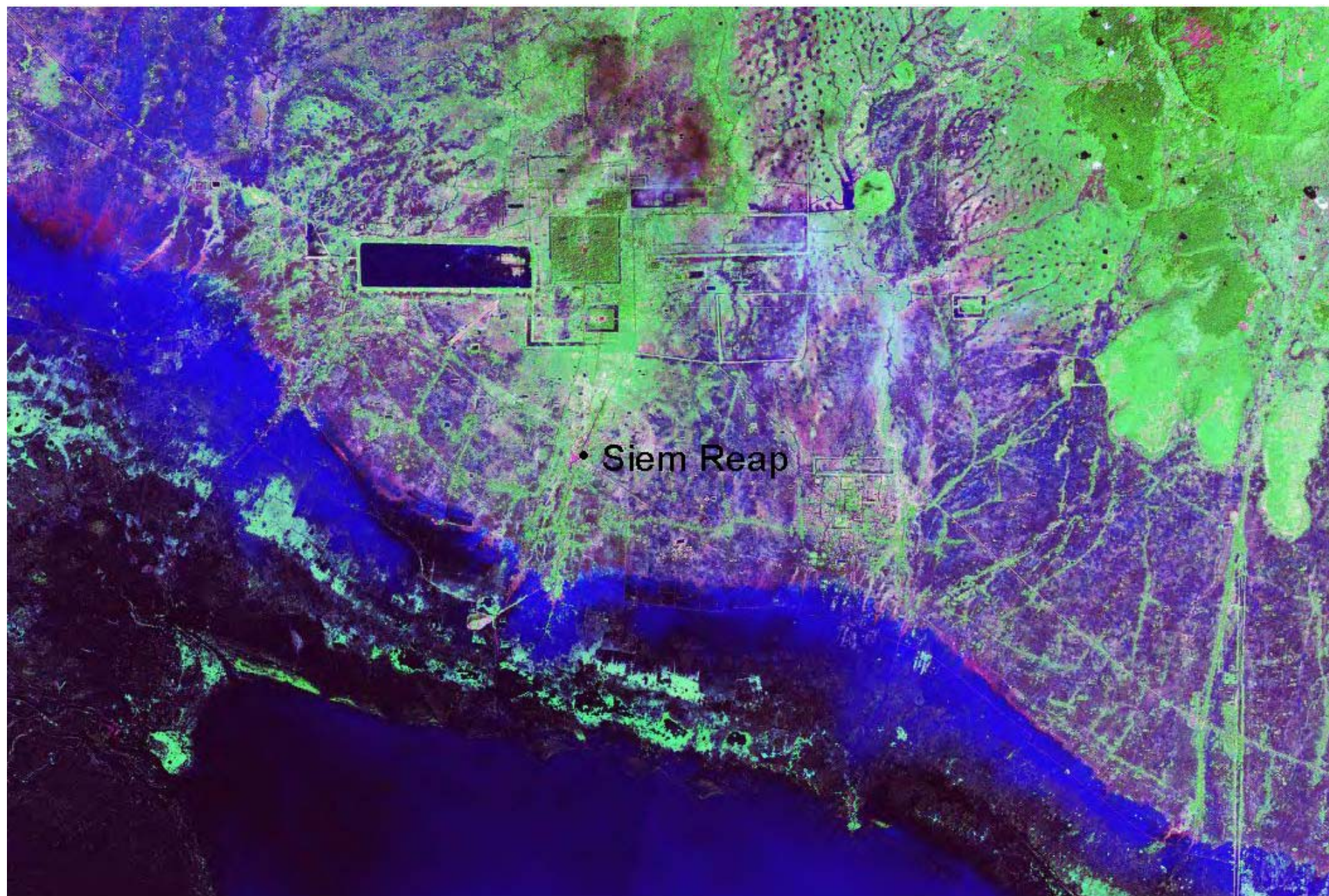
Chiang Rai region

Tonle Sap

9C

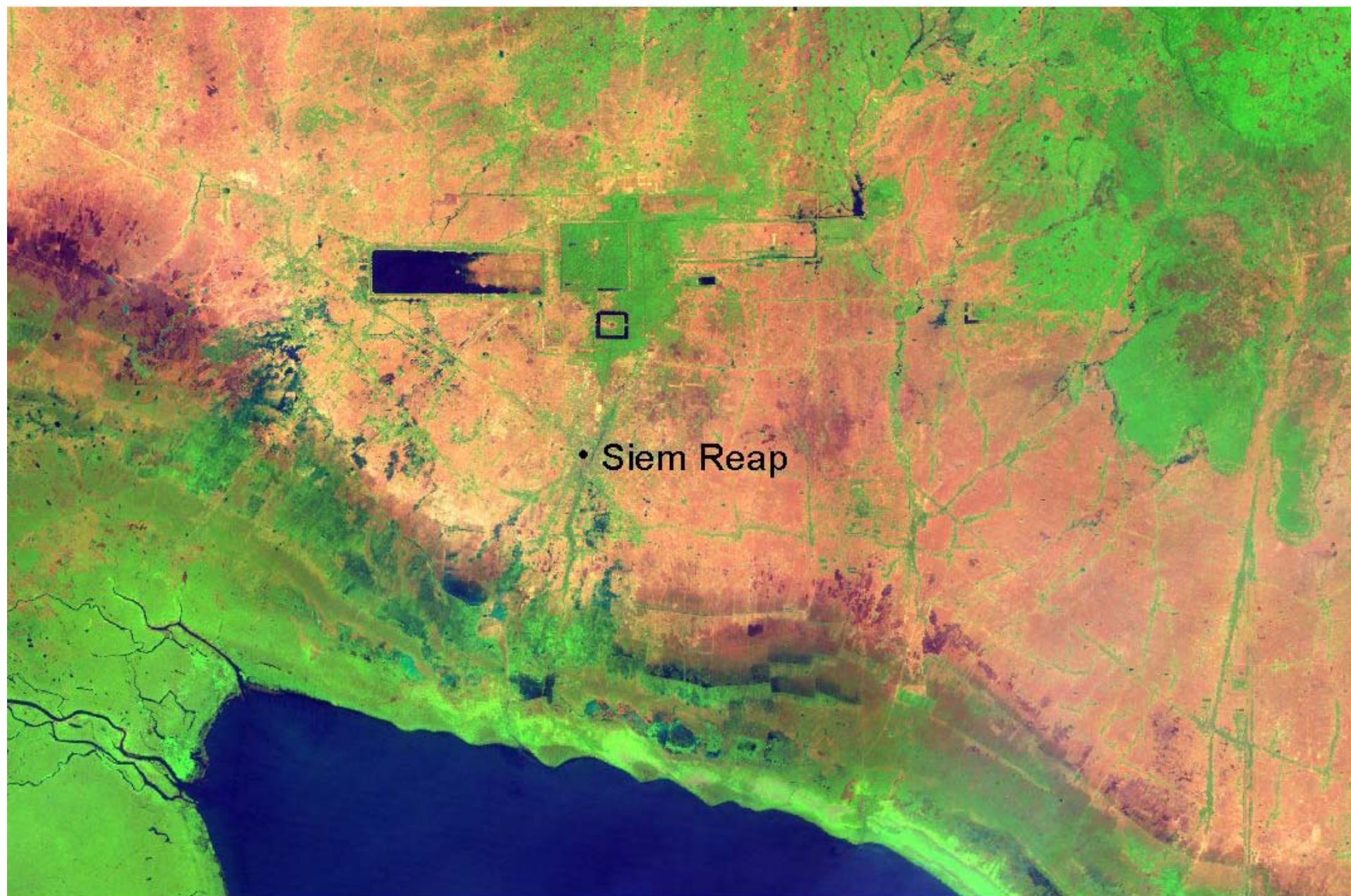
BDP subareas





5 0 5 10 Kilometers

Siem Reap - wet season



• Siem Reap

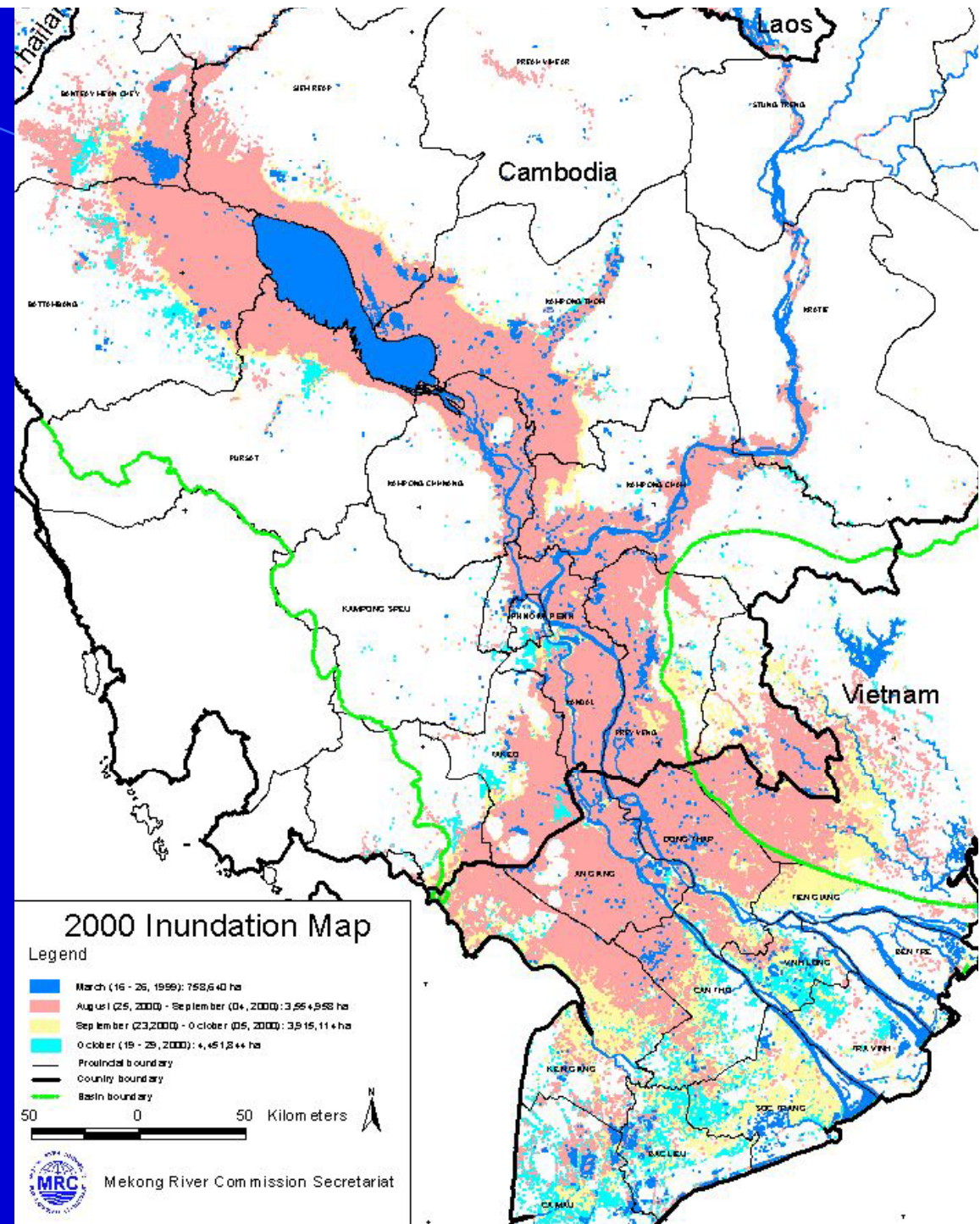
5 0 5 10 Kilometers

Siem Reap - dry season

Mekong River Basin

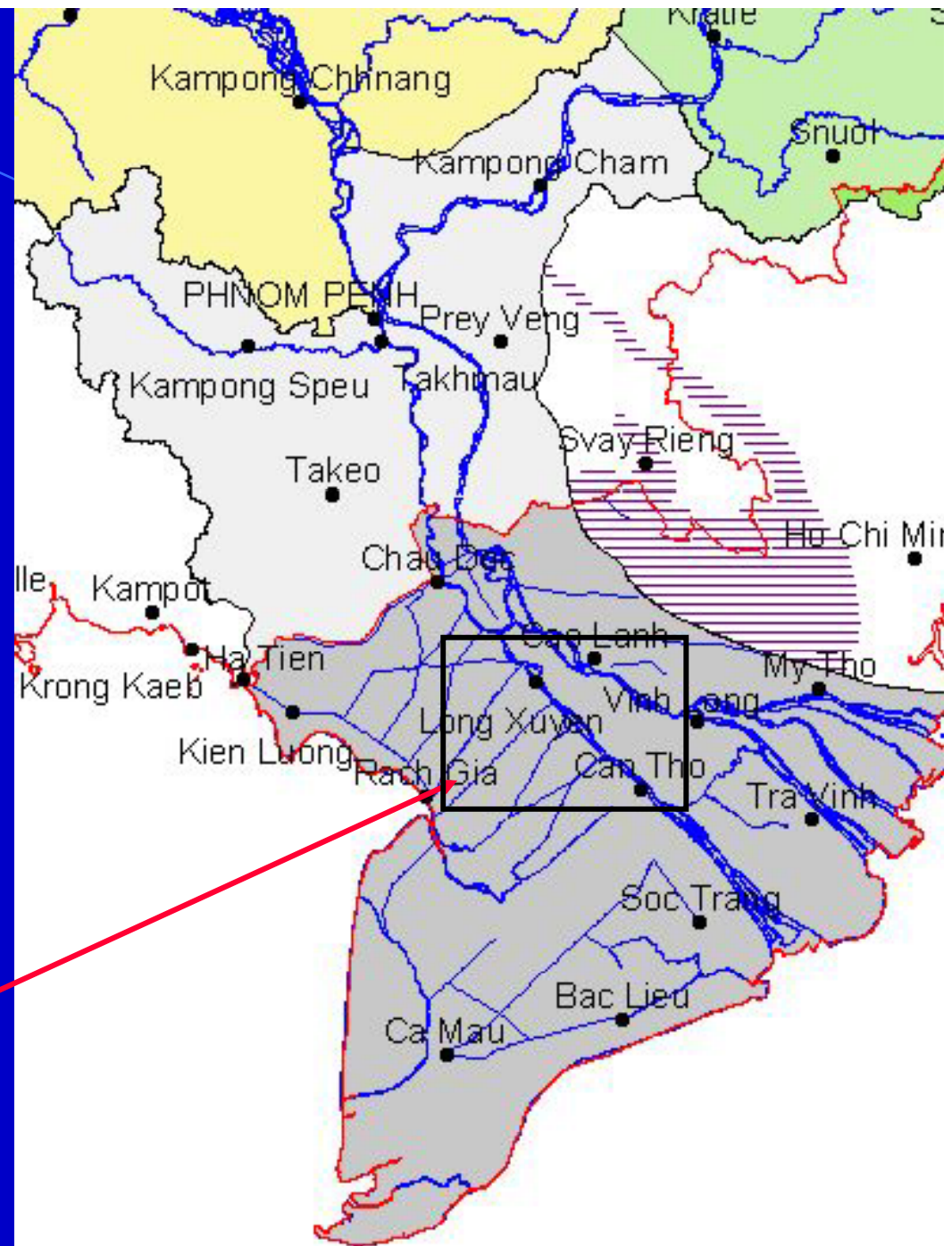
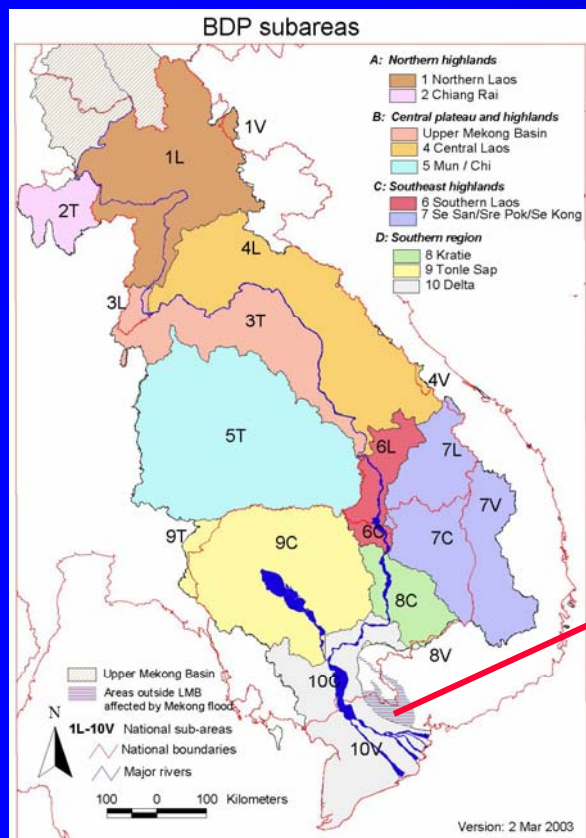
But floodplain river wetlands are part of a single system – connected by the annual flood

- Dry season area $250\text{--}300 \times 10^3$ ha
- Wet season area $1,300 \times 10^3$ ha



Mekong Delta

10V

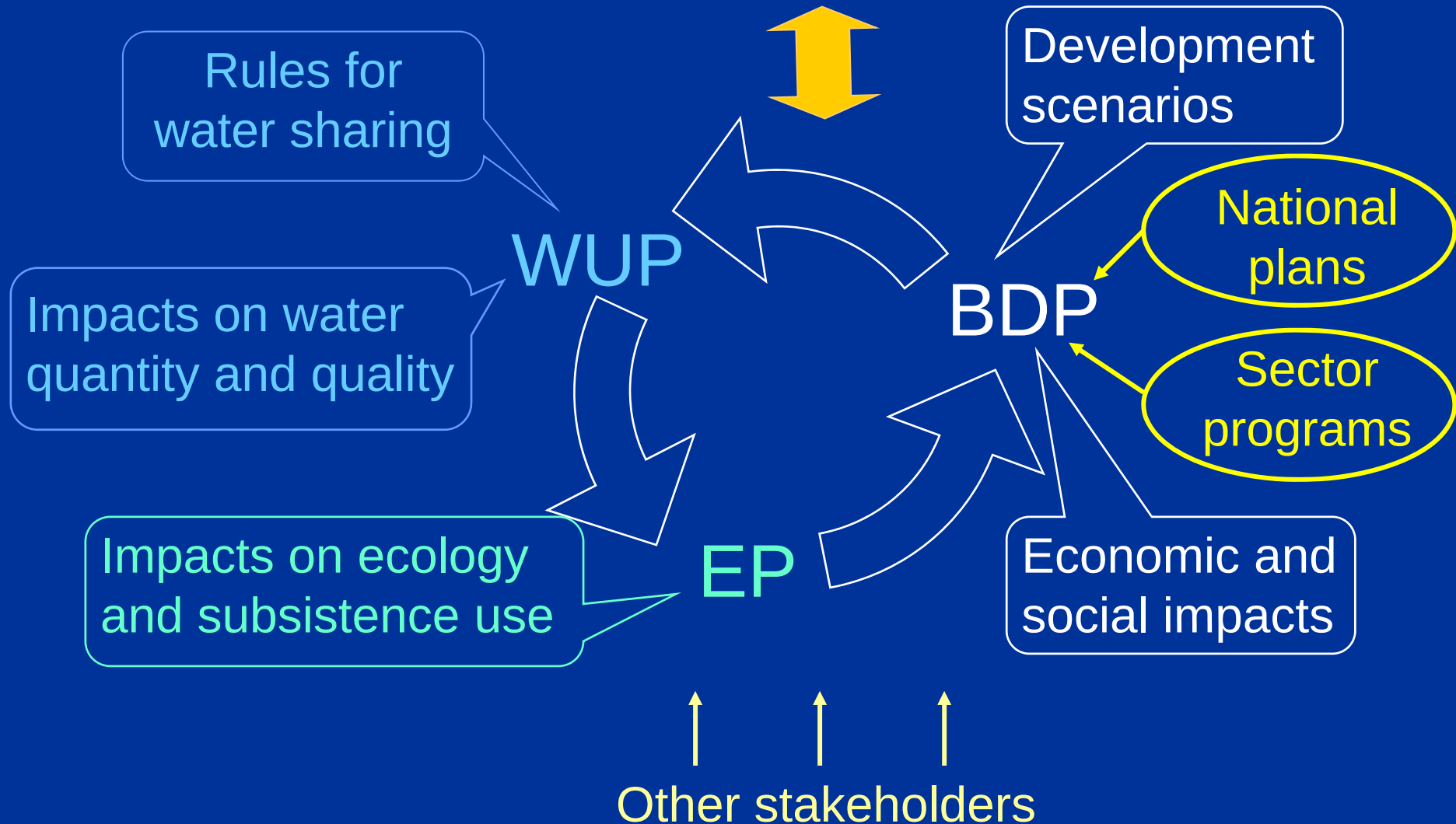




5 0 5 10 Kilometers

Can Tho - Mekong Delta

Decision makers (national governments)



Mekong Biodiversity



IUCN

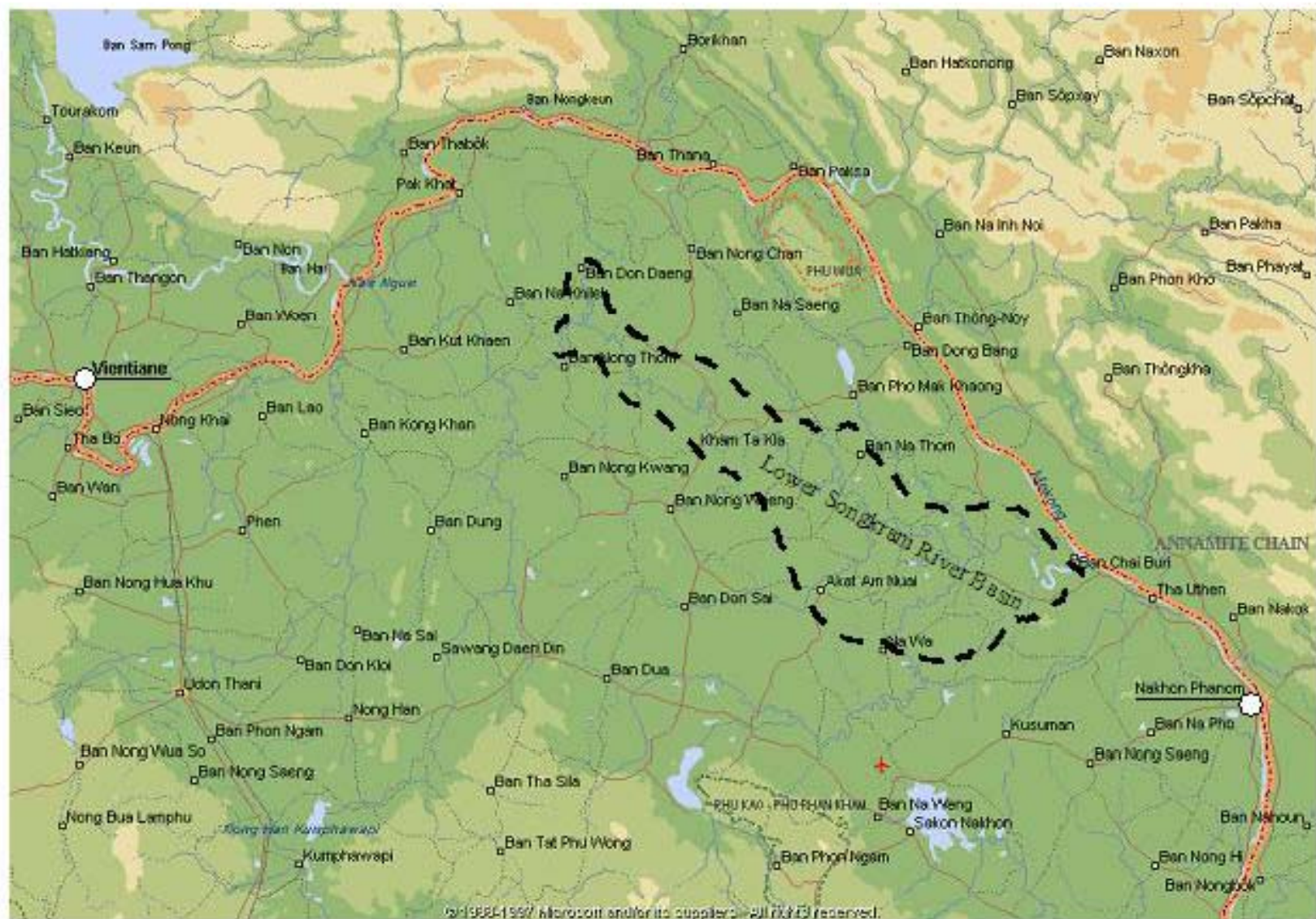
The world Conservation Union



Biodiversity highlights

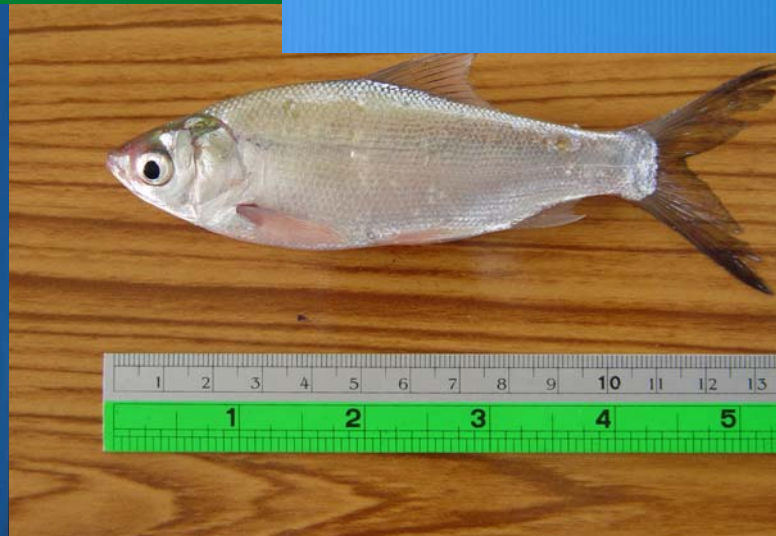
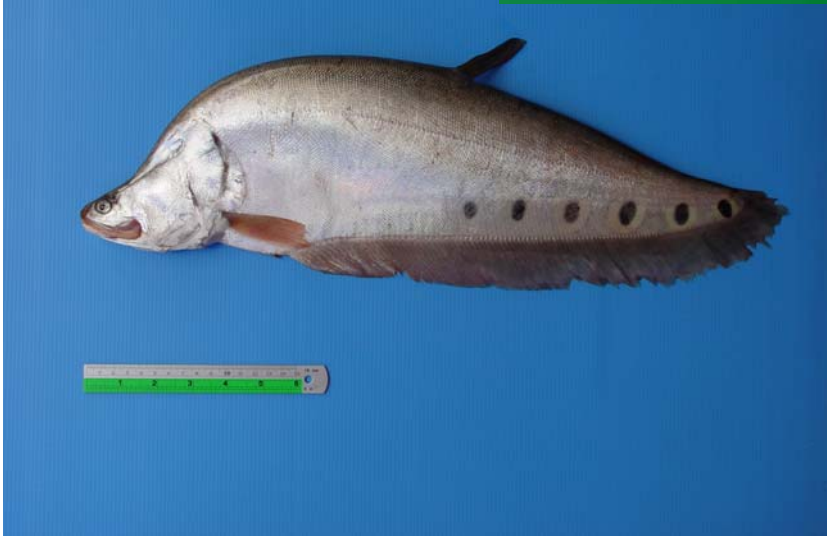
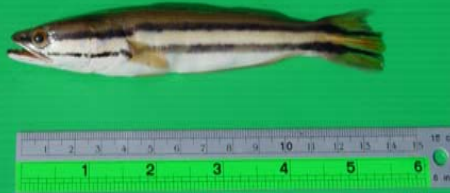
- Biodiversity of international significance
- Numerous **globally-threatened** species:
 - Irrawaddy Dolphin,
 - Sarus Crane,
 - Siamese Crocodile, and
 - Giant Catfish and others.
- Diversity of the river fauna 3rd next to Amazon and Congo
- **> 1,300 species of fish**
- Wetland biodiversity contributes to livelihoods and national economic indicators





Fish photo

- Identify 130 species
- Taken Photo 70 species



Vegetation in Pa Bung Pa Tam

Identify > 200 Species

- Food for fish
- Food for Human-
Vegetable, Mushroom
- Medicines
- Wood, fire wood



Food for community



Mushroom



Fruit



Bamboo in Pa Bung Pa Tam

Flooded forest



Bamboo shoot



Vegetable



Meeting the
needs
Keeping the
balance

