National workshop on MASAP's Transboundary adaptation projects

Identification of MASAP's transboundary adaptation projects and template for PINs

Bangkok, Thailand
14 March 2017

Content

- How to identify adaptation measures
- How to define transboundary adaptation measures
- A selection of projected changes & impacts in the LMB
- Next steps for today

How to identify adaptation measures?

- Adaptation is a specific response to the impacts – or threats of impacts – of climate change. It is not just a way to manage natural resources

- Adaptation is the process of adjusting to changes as they are experienced or in anticipation of the way in which they will impact people

- Adaptations can range from technical/infrastructural to a complete rethinking of development pathways (also called transformation)

How to identify adaptation measures?

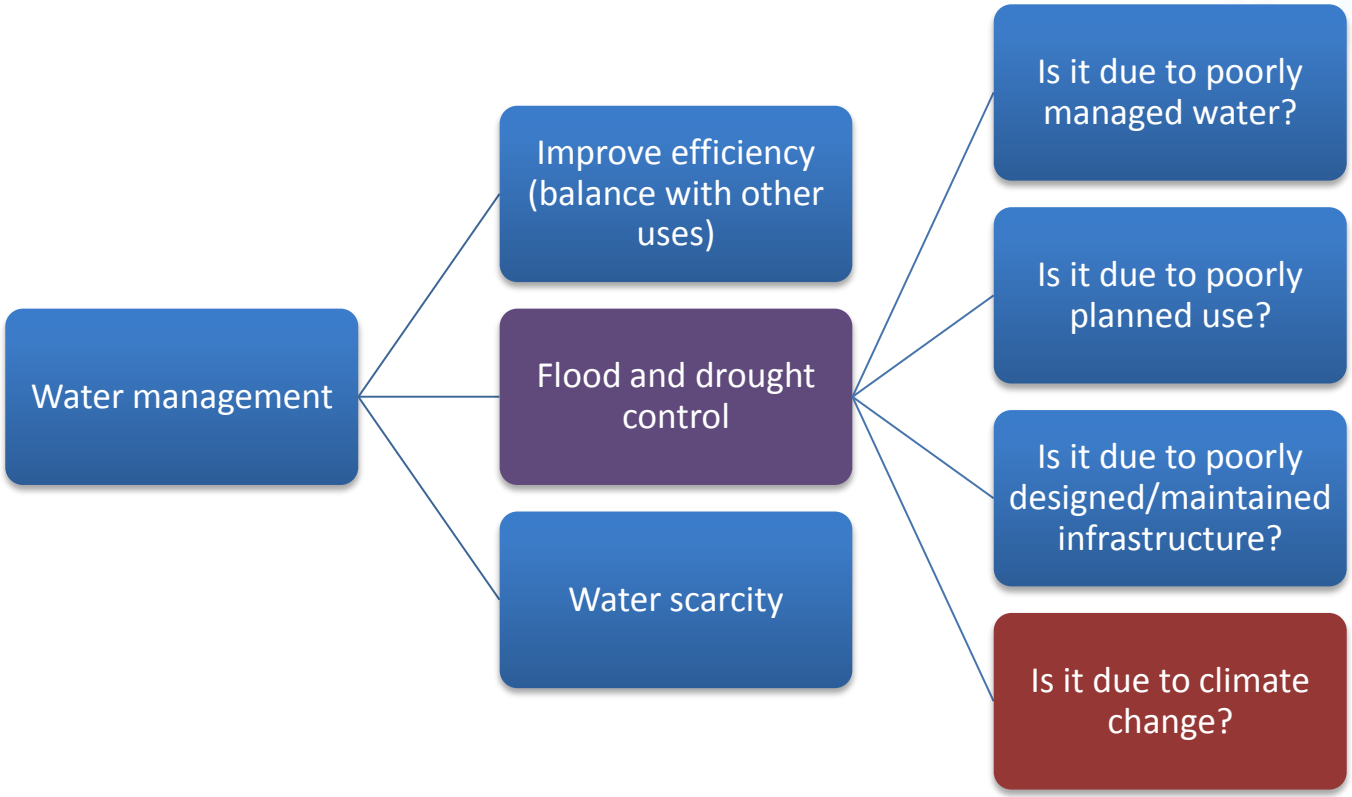
Ask key questions:

- Is the driver for the stress climate change?
- Is the situation made worse because of climate change?
- Are people worse off because of climate change?
- Is the strategy directly addressing the impacts (experienced or expected) of climate change?

The spectrum of responses

Business as usual	Climate Proofing	Mainstreaming	Stand-alone adaptation projects	Projects that are because of climate change	Resilient Development
No concern about climate change	Thinking about how infrastructure is designed to take climate change into account	Integrating climate change into entire approach	Identifying projects that help people deal directly with impacts of climate change	Projects that have appeared as a result of climate change, and offer new opportunities	Re-thinking development in light of climate change
Continue building with established risk estimates, not influenced by climate change	*Building a road with different material due to expected flooding* *Building a bridge high to take more flood water into account*	*Building a road and including a plan to resurface road every year, due to increased rainfall/flooding*	*Instead of building a road, building a bridge because the area is likely to be mostly or permanently flooded*	*Building a road in a location that was previously unpopulated or inaccessible, but has become populated because other areas are inundated*	*Asking:* *1.Should this road even be here?* *2. Given climate change, should we direct people in another direction instead?*

Why there are no 'generic' adaptation strategies?



How to define a transboundary adaptation measure?

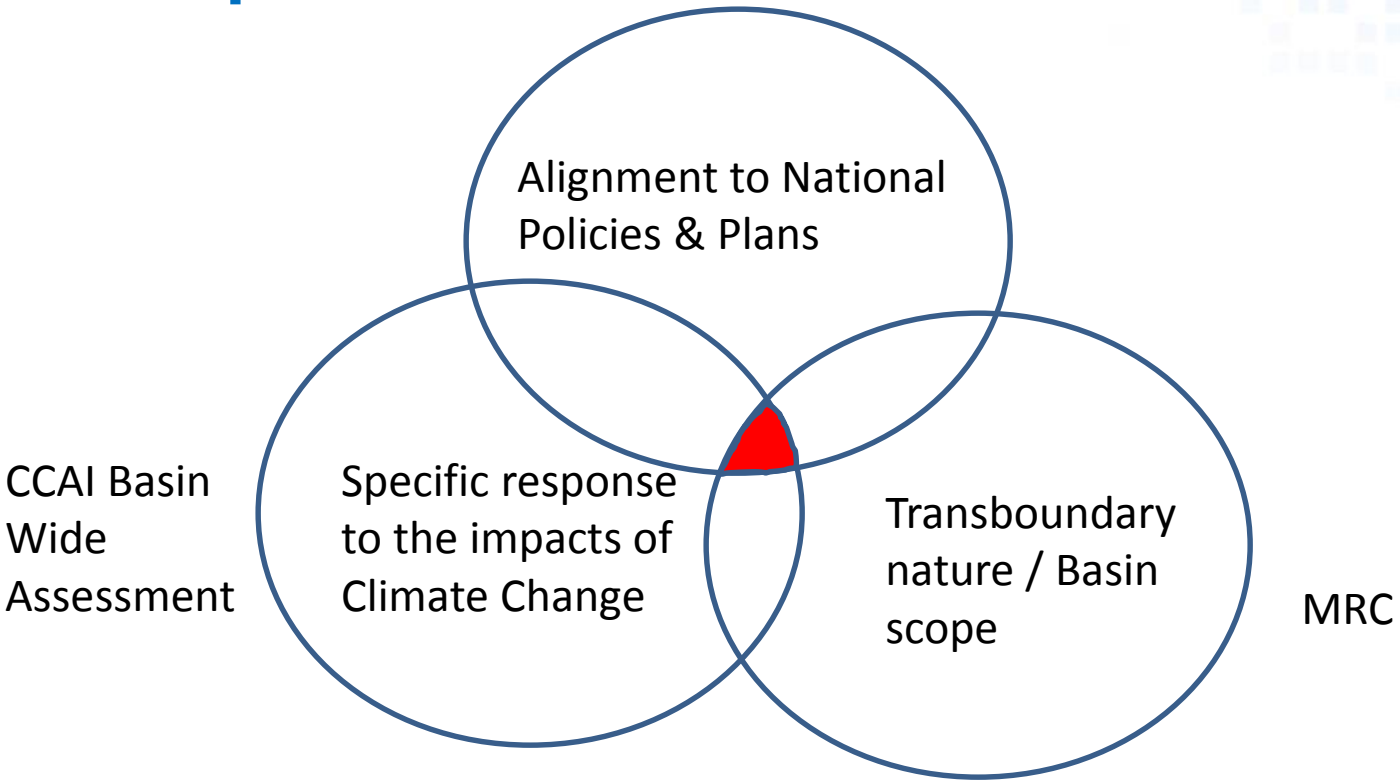
An adaptation measure which spatial scale (regarding scope, intervention and/or impacts) covers and benefits to more than 1 country.

Priority given to measure with basin scope

Examples :

- Protection of a climate endangered species which ecological niche spreads over countries W and Z . *Intervention is transboundary but scope is not basin wide*
- Reduction of flooding risk in the Mekong floodplains by using the Tonle Sap as a storage. *Intervention is national, scope and impacts are basin wide*
- Improved regional forecasting services. *Scope is basin wide*
- Review of intra-basin water-uses in NE Thailand. *Intervention is national, scope and impacts are basin wide*

How to define a transboundary adaptation measure?



transboundary adaptation projects

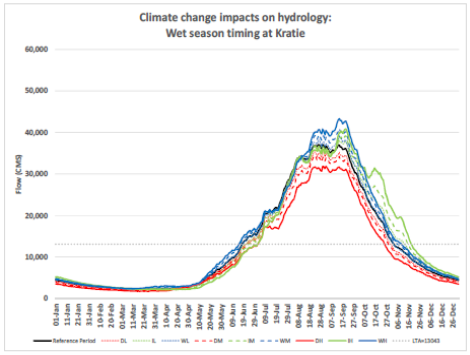
Projected changes in the LMB

- 9 future climate scenarios considered :3 carbon emissions scenarios (RCP 2.6, RCP 6.0 and RCP 8.5) * 3 GCM seasonal patterns of climate change ('wetter overall', 'drier overall' and 'increased seasonality')
- Sea level rise projection scenarios
- Basin wide development scenarios (BDP2)

LMB Projected impacts hydrology

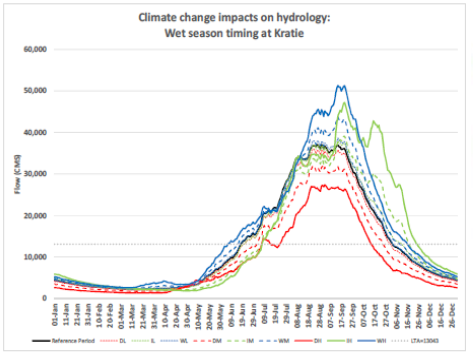
- GW recharge
- Reservoir regulations
- Forecasting, …

River flows and water levels in the wet and dry seasons may increase or decrease dramatically, depending on the scenario.
Changes in river flow, water level, wet season duration and peaks, and dry season minimums are simulated.
Pattern of groundwater recharge is similar: annual groundwater recharge change ranges from -33% to +12% by 2060 (given a baseline annual average total of 365 mm).

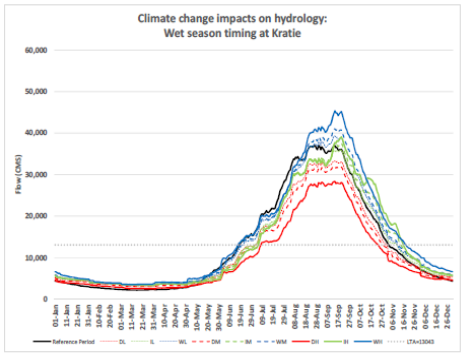


2030, climate change scenarios

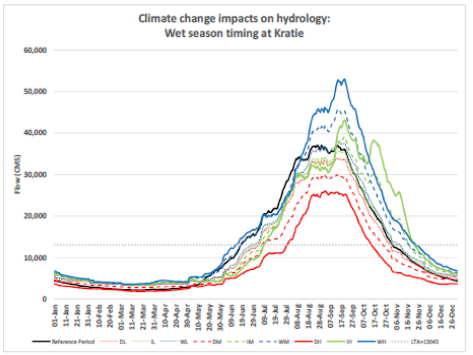
		2030		2060	
		CS	CS + DS	CS	CS + DS
River flow	Annual	-18%	-25%	-34%	-38%
		2%	1%	1%	1%
		9%	17%	22%	28%
	Dry season	-21%	-6%	-41%	-29%
		6%	27%	6%	24%
		25%	46%	50%	60%
	Wet season	-17%	-29%	-33%	-40%
		1%	-5%	0%	-5%
		9%	11%	22%	22%
River level	Annual	-0.93	-1.03	-1.92	-1.94
		0.04	0.30	0.03	0.26
		0.42	1.02	0.99	1.41
	Dry season	-0.73	-0.05	-1.56	-0.89
		0.14	0.94	0.11	0.85
		0.50	1.40	0.91	1.60
	Wet season	-1.13	-2.00	-2.29	-2.99
		-0.08	-0.42	-0.18	-0.48
		0.56	0.65	1.25	1.22
Wet season timing	Onset	-2	-1	-11	-4
		4	16	3	17
		15	20	20	42
	Offset	-8	-10	-19	-19
		4	8	6	7
		16	16	22	21
	Duration	-23	-30	-38	-61
		2	-6	0	-4
		9	17	25	25
Flood	Peak flow	-14%	-23%	-26%	-30%
		6%	1%	4%	3%
		17%	22%	38%	43%
	Peak level	-1.17	-2.10	-2.40	-2.78
		0.48	0.14	0.35	0.27
		1.31	1.72	2.63	3.11
	Volume (Date)	-17%	-29%	-33%	-40%
		1%	-5%	0%	-5%
		9%	11%	21%	22%
	Volume (Threshold)	-25%	-37%	-44%	-55%
		4%	-5%	2%	-4%
		12%	18%	30%	33%
Drought	1-day flow	-21%	17%	-42%	-13%
		0%	53%	-5%	56%
		8%	62%	19%	65%
	7-day flow	-21%	18%	-41%	-12%
		0%	53%	-5%	56%
		8%	62%	19%	65%
	30-day flow	-21%	16%	-41%	-13%
		-1%	51%	-6%	54%
		10%	60%	22%	67%
	1-day level	-0.63	0.32	-1.35	-0.43
		-0.01	1.03	-0.15	1.10
		0.19	1.34	0.42	1.38
	7-day level	-0.62	0.41	-1.34	-0.39
		-0.01	1.14	-0.12	1.18
		0.20	1.34	0.42	1.39
	30-day level	-0.61	0.37	-1.33	-0.39
		-0.03	1.10	-0.16	1.14
		0.22	1.31	0.48	1.40



2060, climate change scenarios



2030, climate change and development scenarios



2060, climate change and development scenarios

Projected hydrological impacts at Kratie monitoring station under three model scenarios (wetter, drier, increased seasonality) and three emissions scenarios (RCP2.6, RCP4.5, RCP8.5) with and without development impacts to 2030 and 2060.

LMB Projected impacts flood regime

- EWS
- Resilient design housing
- Flood evacuation path
- Urban planning, …

- Significant variation between sub areas
- Vietnam delta suffers highly (combination of increased upstream flows and sea level rise)
- High change in the uppermost Sub Areas 1L,2L and 1T
- Population and assets at risk have been quantified

SubArea code	Base Q100 flooded area (ha)	2060 Medium Change 2060	Increase ha	Increase (%)	2060 Extreme Change (ha)	Increase ha	Increase (%)
1L	686544	760636	74,092	11%	1011116	324,572	47%
2T	251428	294352	42,924	17%	349864	98,436	39%
3L	36692	39652	2,960	8%	50940	14,248	39%
3T	1057364	1120356	62,992	6%	1167192	109,828	10%
4L	1747908	1866540	118,632	7%	1813868	65,960	4%
5T	2130520	2271400	140,880	7%	2495784	365,264	17%
6C	65288	75168	9,880	15%	75448	10,160	16%
6L	346152	397544	51,392	15%	409996	63,844	18%
7C	483812	547244	63,432	13%	604152	120,340	25%
7L	287992	317632	29,640	10%	368156	80,164	28%
7V	362568	394100	31,532	9%	457972	95,404	26%
8C	445396	488172	42,776	10%	514768	69,372	16%
9C	2725368	2916940	191,572	7%	3019068	293,700	11%
10C	1112800	1155220	42,420	4%	1227048	114,248	10%
10V	2327380	3013920	686,540	29%	3180604	853,224	37%
11C	176696	200352	23,656	13%	226660	49,964	28%
11V	422264	437936	15,672	4%	435572	13,308	3%
16M	16028	17360	1,332	8%	22240	6,212	39%
26M	19632	21124	1,492	8%	27060	7,428	38%
SUM	14,701,832	16,335,648	1,633,816	11%	17,457,508	2,755,676	19%

Change in 1:100 year Flood Extent by Sub Area using composite of all models

LMB Projected impacts : fisheries

- Stocking
- Habitat connectivity
- Catch regulations, …

Projected impacts on fisheries could be positive or negative depending on the scenario, although with those dependent on flood zone habitats likely to experience greater changes than those in rice paddy habitats. Only minor impacts on aquaculture productivity are expected due to a significant number of provinces being unaffected by salinity intrusion.

Scenario description	Change from baseline (%)		
	Flood zone	Rice paddies	Total
Baseline	-	-	-
Scenarios with no development			
2030			
Wetter overall 4.5	2	0	0
Drier overall 4.5	-5	1	-1
Increased seasonality 4.5	2	0	0
Wetter overall 8.5	6	-1	2
Drier overall 8.5	-8	2	-2
2060			
Wetter overall 4.5	9	-2	2
Drier overall 4.5	-5	1	-1
Increased seasonality 4.5	4	-1	1
Wetter overall 8.5	14	-3	4
Drier overall 8.5	-13	2	-4
Scenarios with development			
2030			
Wetter overall 4.5	6	-1	2
Drier overall 4.5	-18	3	-5
Increased seasonality 4.5	-10	2	-3
Wetter overall 8.5	9	-2	2
Drier overall 8.5	-23	4	-6
2060			
Wetter overall 4.5	5	-1	1
Drier overall 4.5	-8	1	-2
Increased seasonality 4.5	5	-1	1
Wetter overall 8.5	15	-3	4
Drier overall 8.5	-16	3	-5

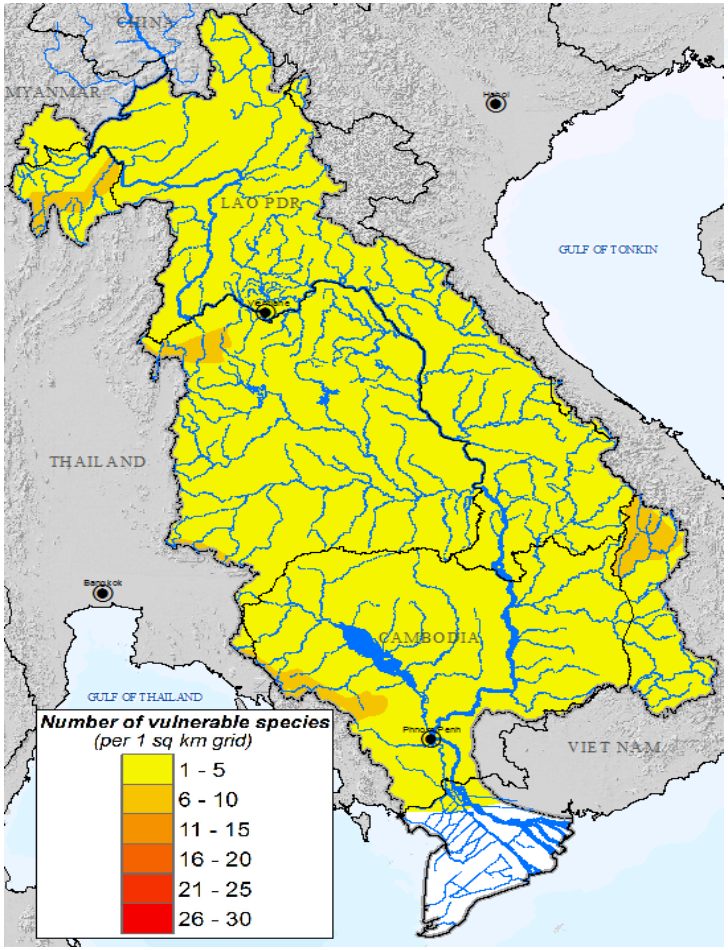
Changes in total fish yields as a function of shifts in habitats for three modelled scenarios (wetter overall, drier overall, and increased seasonal variability), two resource concentration pathways (RCP4.5 and RCP8.5), to 2030 and 2060. Results are given for climate change impacts only and for climate change and development impacts together

Similar assessment on aquaculture

LMB Projected impacts biodiversity

- Ecological corridors
- Awareness and capacity
- …

Vulnerability of amphibians, birds, fish, mammals, reptiles and plants have been assessed in the LMB with a specific methodology, providing the total number of CC vulnerable species from the different categories and under the different scenarios. The methodology to identify the most sensitive zones for each species is under finalization.



Distribution maps of number of climate change-vulnerable amphibians in the LMB

LMB Projected impacts agriculture

- New crop variety
- Crop calendar
- Water efficiency
- Soil fertility, …

Projected impacts may be both positive and negative depending on the area concerned, but overall yields for some crops such as rice and maize may decline without changes in agricultural practice and technological improvements.

Sub-area	H2026-2035				H2046-2055				H2090-2099			
	RCP2.6	RCP4.5	RCP6.0	RCP8.5	RCP2.6	RCP4.5	RCP6.0	RCP8.5	RCP2.6	RCP4.5	RCP6.0	RCP8.5
10C	-1%	-1%	-2%	-3%	-1%	-2%	-2%	-4%	-2%	-3%	-4%	-10%
6C	0%	-1%	-1%	-2%	-1%	-2%	-2%	-5%	-2%	-3%	-4%	-13%
7C	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8C	0%	0%	-1%	-1%	0%	-1%	-1%	-1%	0%	-1%	-1%	-8%
9C	-1%	-1%	-2%	-5%	-1%	-3%	-4%	-12%	-3%	-9%	-12%	-34%
1L	-1%	-1%	-2%	-3%	-1%	-2%	-3%	-7%	-2%	-4%	-6%	-28%
3L	-4%	-7%	-9%	-12%	-6%	-11%	-11%	-20%	-9%	-14%	-19%	-32%
4L	-1%	-2%	-2%	-4%	-2%	-3%	-4%	-9%	-2%	-5%	-7%	-17%
6L	-1%	-2%	-3%	-5%	-2%	-3%	-5%	-13%	-3%	-7%	-12%	-26%
7L	0%	0%	0%	0%	0%	0%	0%	-1%	0%	-1%	-1%	-2%
2T	-3%	-5%	-6%	-7%	-4%	-6%	-6%	-13%	-4%	-9%	-12%	-25%
3T	-2%	-3%	-4%	-6%	-3%	-5%	-6%	-15%	-5%	-10%	-14%	-23%
5T	-3%	-7%	-9%	-19%	-6%	-13%	-15%	-27%	-11%	-21%	-27%	-36%
10V	0%	-1%	-1%	-2%	-1%	-1%	-2%	-4%	-1%	-3%	-4%	-14%
7V	0%	-1%	-1%	-2%	-1%	-1%	-1%	-3%	-1%	-2%	-3%	-5%

Average changes in projected rice yield (wet and dry season combined) for each climate change scenario and sub-area.

Synthesis

Flood
Crop yield – drought

- *GW recharge*
- *Reservoir regulations*
- *Forecasting & EWS*
- *Resilient design housing*
- *Flood evacuation path*
- *Urban planning*

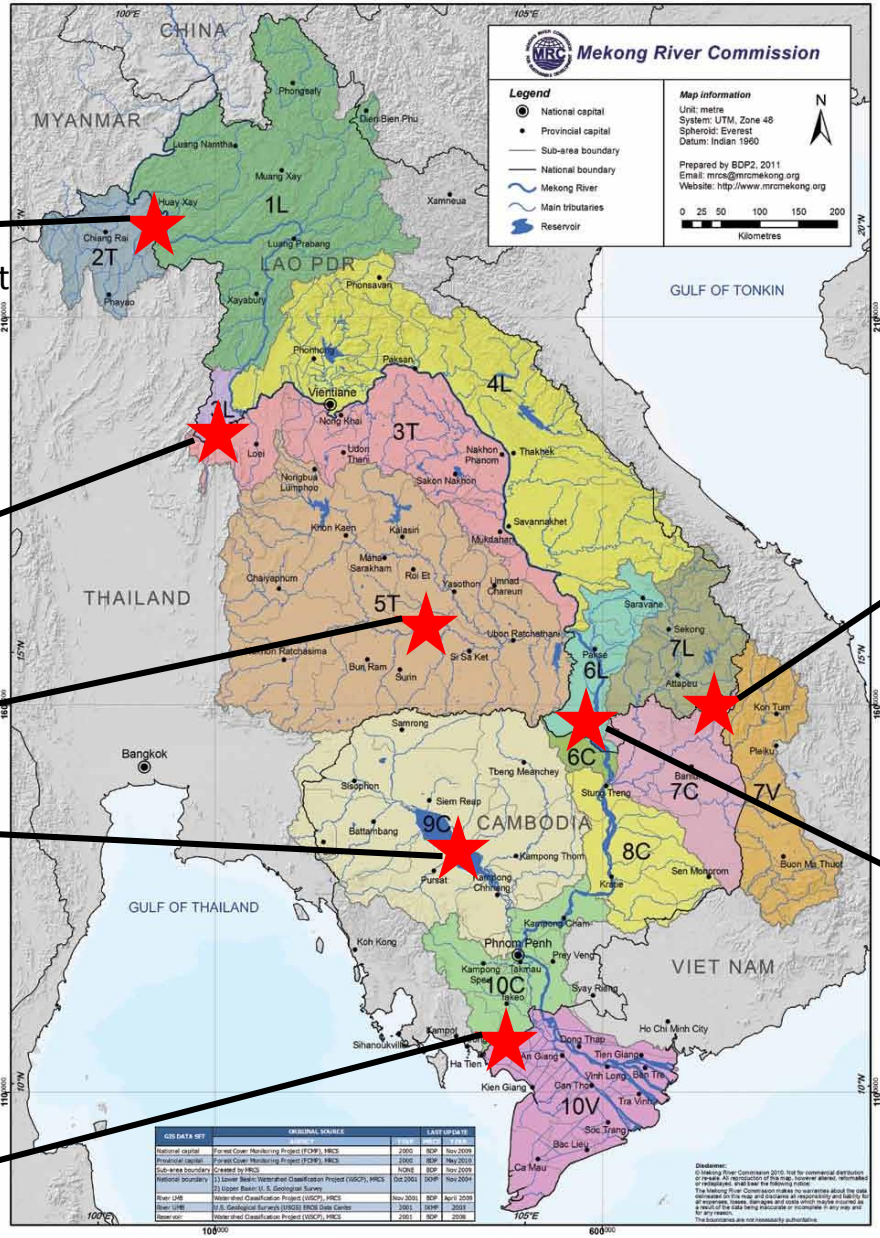
Flood
Crop yield – drought
Biodiversity

Crop yield – drought

Buffer
Biodiversity

- *Wetland protection*
- *Ecological corridors*
- *Awareness and capacity*
- *Bio-business*

Flood
Crop yield – drought
Biodiversity



- *New crop variety & calendar*
- *Bioengineering*
- *Rice-shrimp system*
- *Water efficiency*
- *Soil fertility*

Flood
Biodiversity

- *Fish stocking*
- *Habitat connectivity*
- *fish catch regulations*

Flood
Biodiversity

- *Global awareness*
- *Vector- & water-borne disease*

PIN template

1	Name of project
2	**Timeframe** of the project
3	**Location** of project and geographical scope
4	**Climate change issue** to be addressed
5	How the project seeks to **address the issue**
6	Expected benefits of the project (eg. reduction of CC impacts and vulnerability, environmental, social and economic benefits)
7	Description of project activities and timeline
8	Description on consistency/alignment of the project with national priorities and plans
9	Description on the consistency/alignment of the project with regional priorities and plans (including those of the MASAP)
10	Related activities in the project area(s) and coordination needed
11	Baseline condition/situation of the project areas (environment, social and economic conditions, adaptive capacity of targeted ecosystems or communities, etc.)
12	Expected outcomes / values added of the project to the baseline condition/situation (after the project is done)
13	Project's partners (with information about role, technical and financial capacities)
14	Involvement of Member Countries (with information about role, contribution and benefits of each MCs)
15	Estimated costs of the project
16	Suggested source of funding and co-financing
17	Potential risks
18	Justification for cost effectiveness (appropriateness between budget and expected results, good use of the money)
19	Contact person: name, organization, address, email

Next Steps for today

- Discuss status/scope/adaptation relevance of the Thai national project of basin wide significance identified in the NIP “Review of intra-basin water-uses in NE Thailand Basin scope not considered at national level”
- Identify new ideas for adaptation projects with basin wide scope
- Identify new ideas for adaptation projects with transboundary dimension


Thank you for your attention!