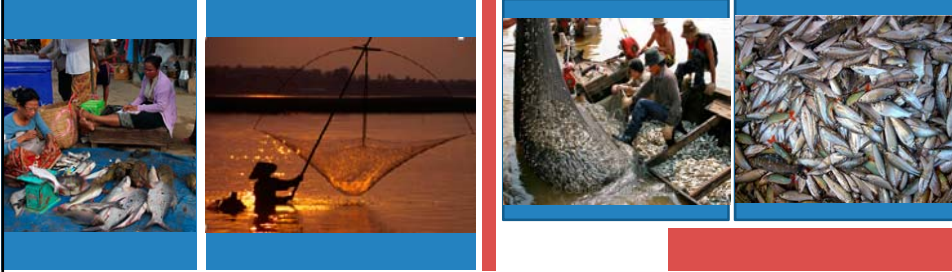


FISHADAPT Bangkok, 8 August 2016



Teasing out the impacts of climate change on fisheries in the Lower Mekong Basin

Ian G. Cowx

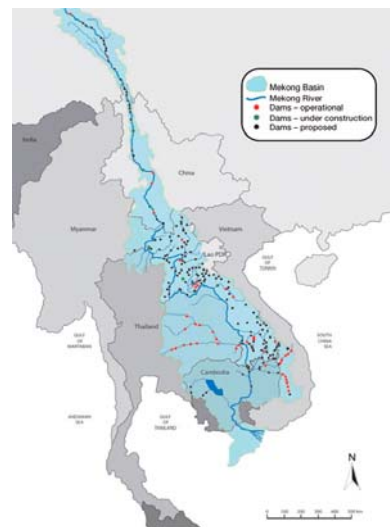
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Fisheries Institute
HIFI

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Outline

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- Importance of Mekong Fisheries
- Drivers of fisheries production
- Climate change scenarios
- Impact of other anthropogenic pressures on fisheries LMB
- Adaptation strategies

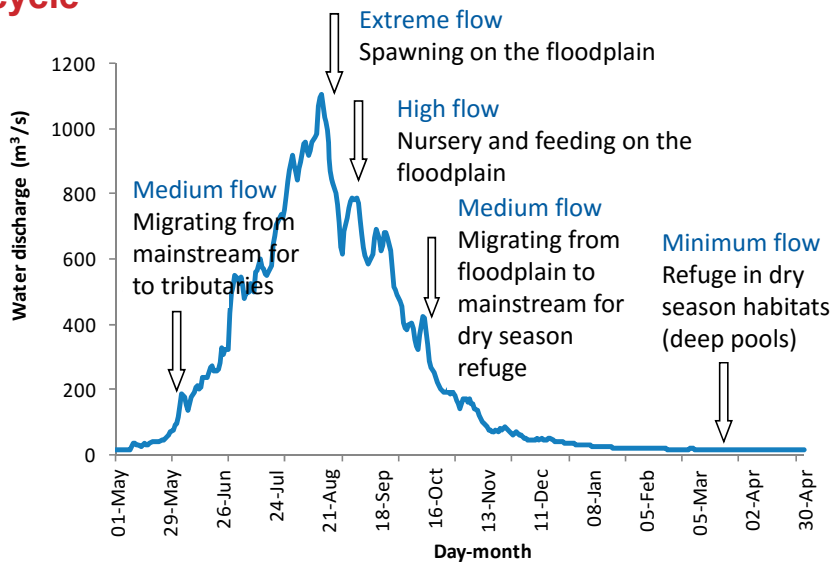


Fisheries of the lower Mekong Basin



- ⇒ Total first-sale value is **US\$7.0 billion** per year
- Per capita consumption average is about **46 kg/person/year**
- ⇒ 200+ species; 30+ of high commercial importance
- ⇒ More than 50% of total fish catch in the lower Mekong basin (about 1.3 million tonnes worth US\$2.5 billion) dependent on migratory fish
- ⇒ **Fish production dependent on fish migration (all seasons of year) and extent of flooding**

Link between fisheries and hydrological cycle

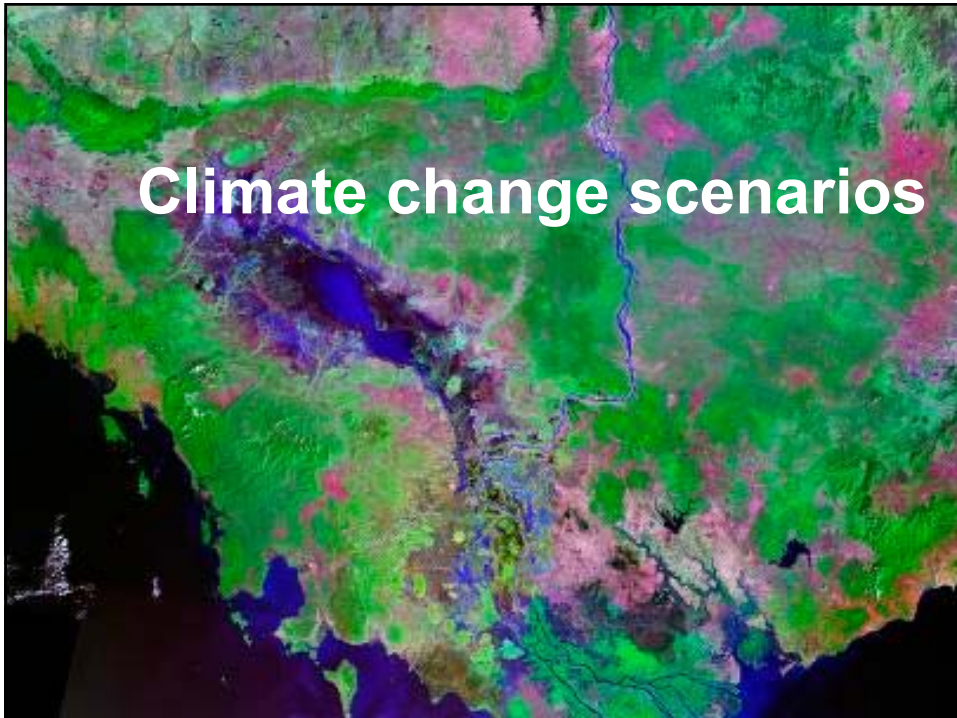
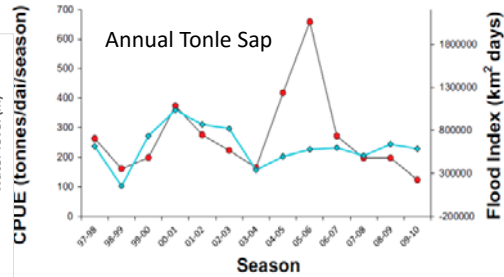
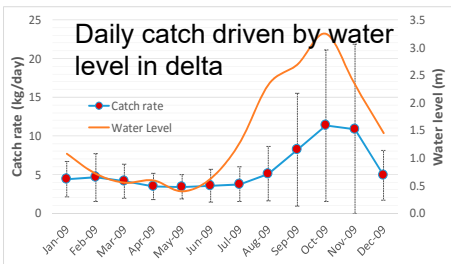
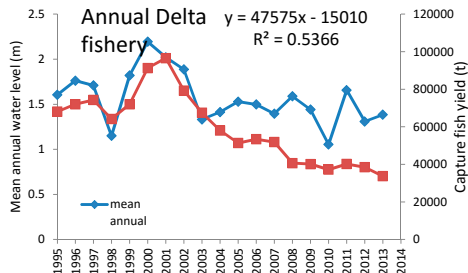


Drivers of fish production



Water level and flooding

- Water level and extent of flooding key drivers of fish production
- Shifts in fisheries productivity due to changes in hydrological patterns

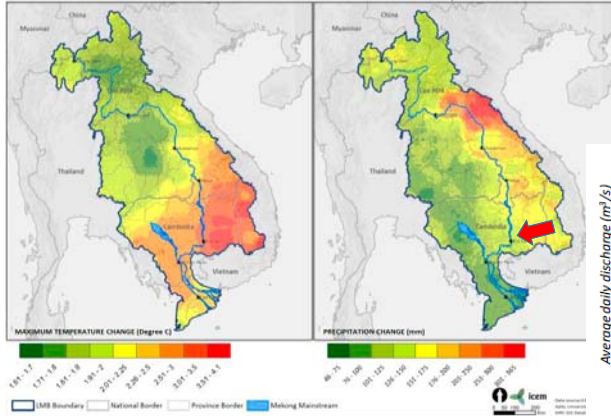


Climate change

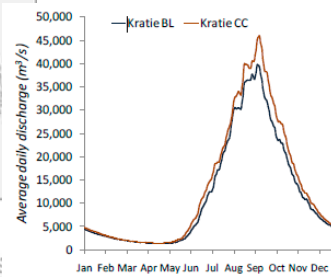
Predicted effects of climate change in Lower Mekong Basin

Temperature

Precipitation



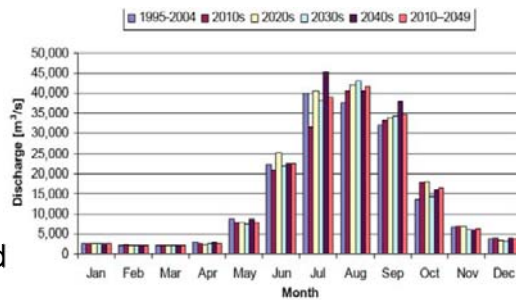
Predicted shift in daily discharge at Kratie



Climate change - hydrology

Alteration of flood cycle

- Potential greater rainfall in monsoon season in Viet Nam Highlands altering flooding magnitude, duration and extent in LMB
- More extreme flooding cycle.
- 3-10% increase in wet season flows
- 2-6% reduction in dry season flows

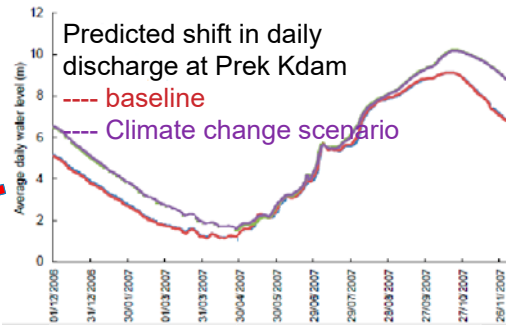
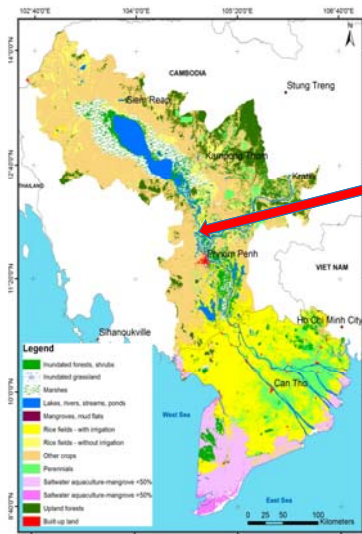


Total average daily discharges simulated by VIC model for Mekong at Kratie for baseline period (1995-2004) and future



Source: TKK & SEA START RC 2009 [<http://users.tkk.fi/u/mkummu/water&cc>]

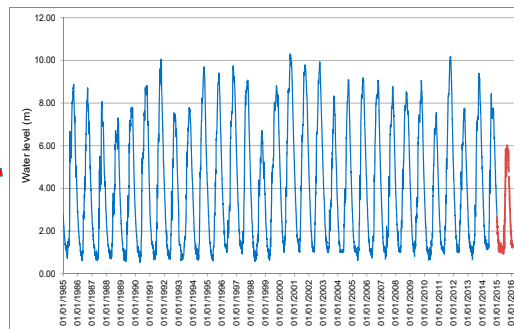
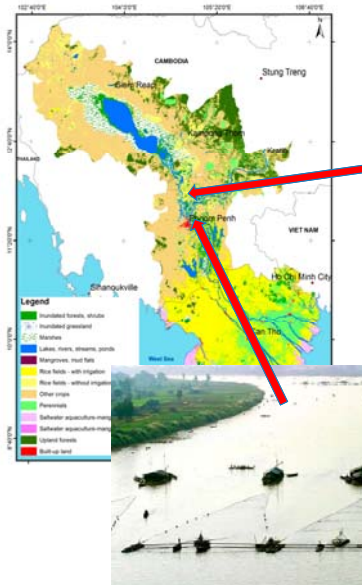
Climate change – fish production



= +10% increase in fish production

	Predicted change in fish yield (t)
Mekong delta	+ 65,000
Cambodian floodplain	+ 44,300
Tonle Sap	+ 30,200
Total change	+ 139,500

2015 El Niño



Annual water level in Tonle Sap, Cambodia –red indicates current el Niño year

Severe reduction in flood peak and duration

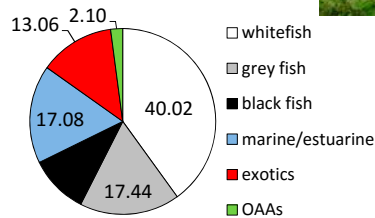
Tonle Sap dai fishery closed early in November (2015) rather than February/March

Other external pressures on Mekong fish and fisheries



Major threats to inland fisheries

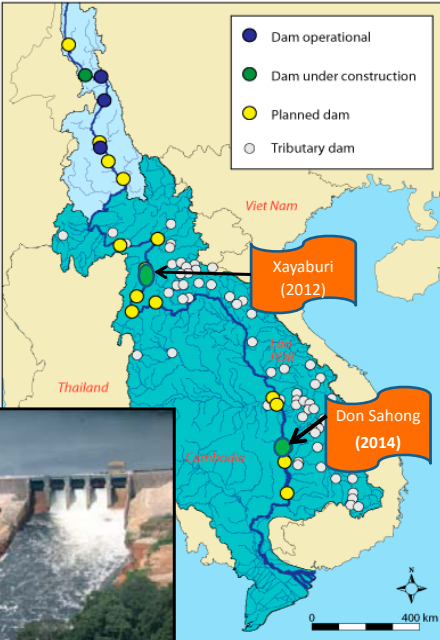


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Hydropower dams

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- ❖ 9 planned dams on LMB (mainstream) – two under construction.
- ❖ 23 existed dams (> 20 MW) on tributaries
- ❖ Many more tributary dams are projected or under construction


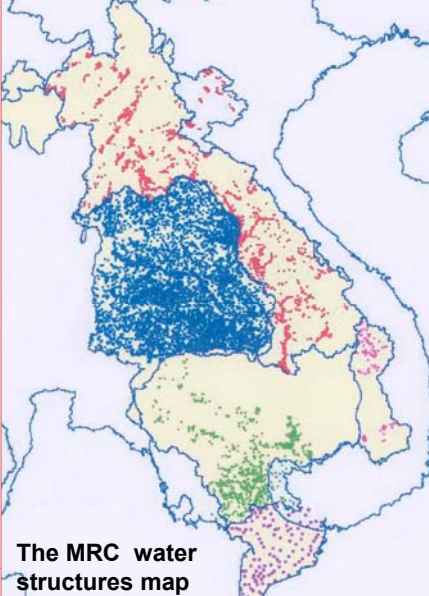




Floodplain & basin connectivity

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It isn't just about damming rivers.....!

- Every dot is a registered water control structure
- Loss of connectivity = loss of productivity in floodplain/riverine fisheries

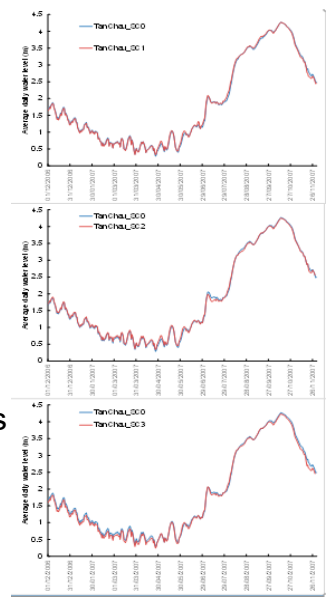



The MRC water structures map

Impact on Fisheries - hydropower



- Flows similar to current situation = marginal loss of fish production
- Possible impact of onset and offset and duration of flood pulse on fisheries
- No significant changes in wetted areas of different habitat types
- Biggest impact barrier effect of dams disrupting migration pathways
- 70% reduction is sediment delivery to delta



Impact on Fisheries - hydropower



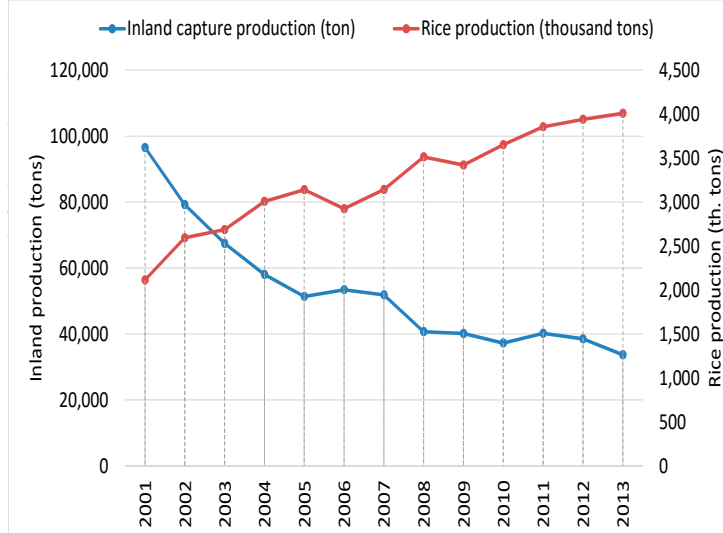
Indicator/Sub-indicator	Vietnam	Cambodia
Baseline Fisheries yield1 (t)	692,118	481,537
Baseline OAA yield1 (t)	160,705	105,467
Loss of fish due to reduced habitat flooding (t)	1172	52
Loss of OAA due to reduction in sediment loading and nutrients	222,747	21,012
Cumulative loss of fish adjusting for 100% whitefish loss due to barrier effects (t)	344,043-374,114	236,618-258,460
Cumulative loss of OAAs (t)	23,019	21,023
Total loss of capture fishery and OAA yield	367,062-397,133	260,642-279,483

Bottom line: 49.7 and 54% of fish will be lost in the Cambodian floodplain and Vietnamese delta

Impact on fisheries - rice production

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Rice farming areas (more crops): --> habitat degradation



Adaptation strategies

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Based on household surveys following hydropower development:

- Shift in livelihoods of fishing communities towards employment such as construction [but not agriculture]
- Shift in diets: Fish and OAs contribute about 70% of animal protein intake but drops to 54% and replaced by beef
- Fish farming not adopted because of high capital and operating costs

CONCLUSIONS

- Overriding influence on the capture fisheries of the Lower Mekong Basin will be the development of dams for hydropower
- Better understand links between hydrological and nutrient dynamics and fisheries production to improve Climate change impact assessment
- Better understand adaptation strategies of local fishing communities to climate change and other environmental degradation.
- Fisheries overlooked in policy framework: need to improve mechanisms to communicate importance of fisheries to livelihoods, local economies and food security and influence decision making – use ecosystem services approach