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Identifying and Valuing the Benefits: the Experience of Mekong River Basin

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Start of a new era of Mekong Cooperation: 1995 Agreement

- Cooperate in ***all fields***…hydropower, irrigation, navigation, fisheries, flood control…
- Development of ***full potential of sustainable benefits*** for all Member Countries.....through formulation of a Basin Development Plan
- ***Prevent harmful effects*** on the environment and the ecology

The Agreement is about cooperation on balancing basin development and protection. <u>The Basin Development Plan is a primary instrument for this cooperation</u>

Structure of presentation

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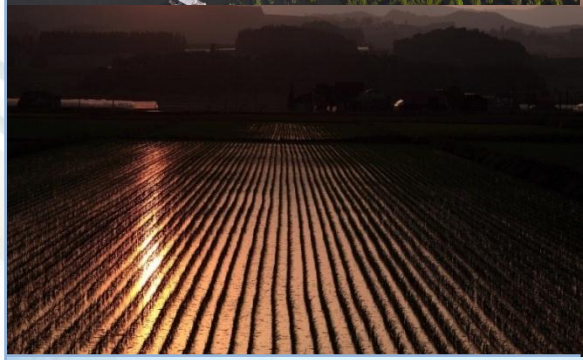
1. The Mekong Basin
2. Previous Work: a cumulative impact assessment (benefits and costs) of the basin countries' national water resources development plans
3. Current work: Distribution analysis of benefits and costs
4. Conclusions



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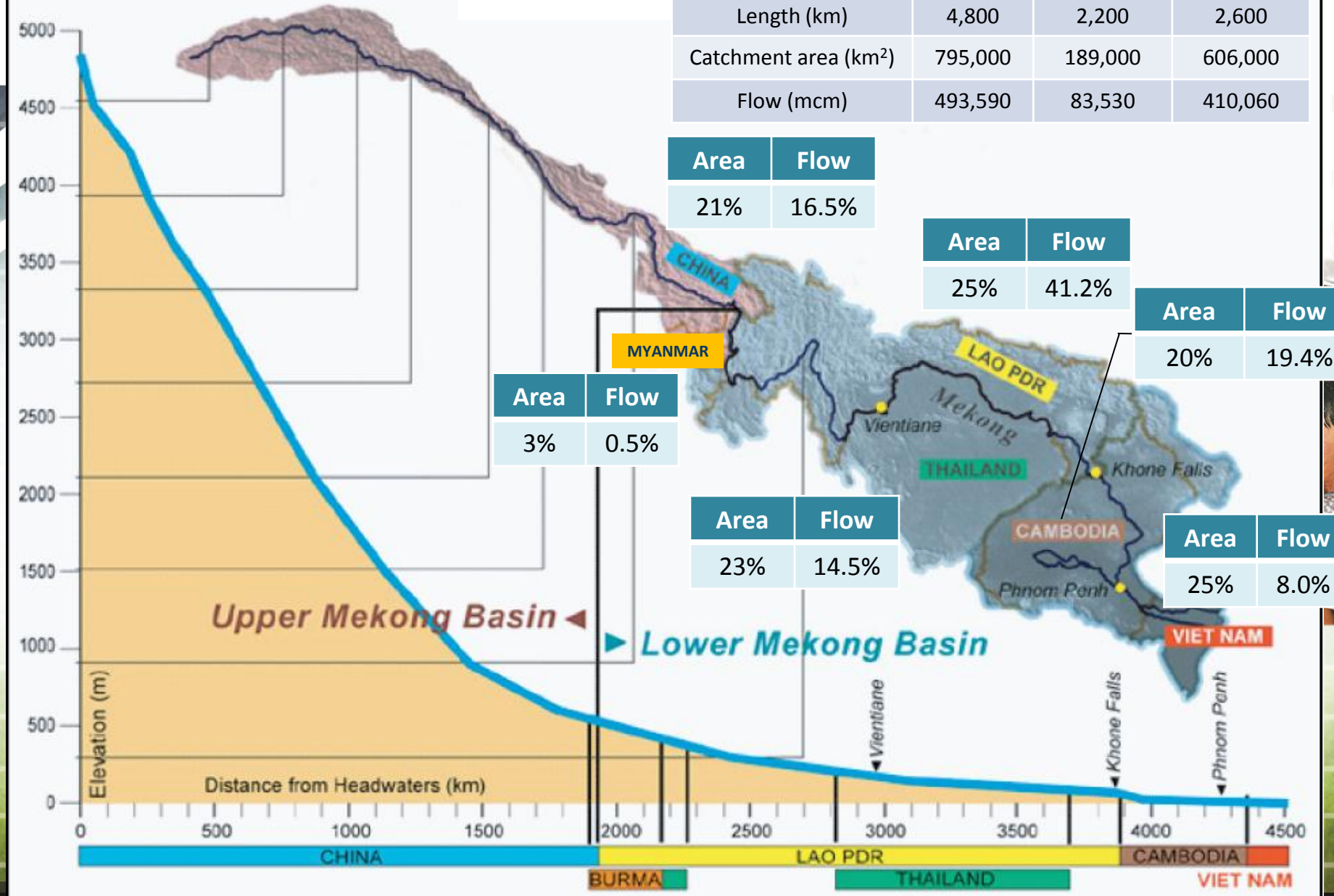
The Mekong River Basin

8th largest and 12th longest river of the world

Physical Characteristic	Total	Upper MK	Lower MK
Length (km)	4,800	2,200	2,600
Catchment area (km²)	795,000	189,000	606,000
Flow (mcm)	493,590	83,530	410,060



Source: Presentation on flow contribution to the Mekong Mainstream (1985-2000-using DSF), The 7th Meeting of the Technical Working Group, 3-5 October 2007

Limited water resources development so far

- The Mekong's water resources are still largely undeveloped: most water is used in the most downstream end of the Mekong Basin: the Viet Nam Delta

- Overall, the status of the water and related resources in the Mekong Basin is still good

- The hydrological regime of the mainstream can be considered to be in, or very close to, its natural state

- **But this is changing…..for economic growth, poverty reduction, and for food and energy security of an increasing population**

Government set to double public investment in 2009

Finance Minister announces plan to spend US$1 billion mainly targeting transport, infrastructure and irrigation projects

PNH POST Feb. 26 '09

BY CHUN SOPHAL

FINANCE Minister Keat Chhon announced Wednesday that the government would spend around US$1 billion this year on public investment. He said the money would be focussed mainly on transportation, infrastructure and irrigation.

Keat Chhon, who is also a deputy prime minister, said during a review of the United Nations Development Assistance Framework that the public investment total would be double that of last year.

"I hope that we can also discuss the implementation and achievements of the important and ongoing UN reforms intended to ensure that the UN delivers as one," Keat Chhon said.

Wednesday's joint review between the government and the UN officials – described in a UNDAF press release as "frank, open and lively" – was designed to assess how well the 23 UN agencies, funds and programs in Cambodia were helping the Kingdom meet its development goals.

Keat Chhon said the review provided a good opportunity to identify new challenges and emerging risks, thereby helping to ensure that UN support remains effective.

Keat Chhon, deputy PM and finance minister, at a UN review Wednesday. HENG CHIVOAN

Douglas Broderick, the UN's resident coordinator, said the UN's duty was to be a good facilitator in addition to a financial backer.

"As the world economic crisis deepens, it is more important than ever that the UN be a stronger partner and continue to give voice to the poorest of the poor," Broderick said.

The UNDAF guides the UN's development work in Cambodia. The UN focuses its efforts on four key areas: agriculture and rural poverty; capacity building and human resources development; development of the national strategic development plan; and good governance and human rights. ■

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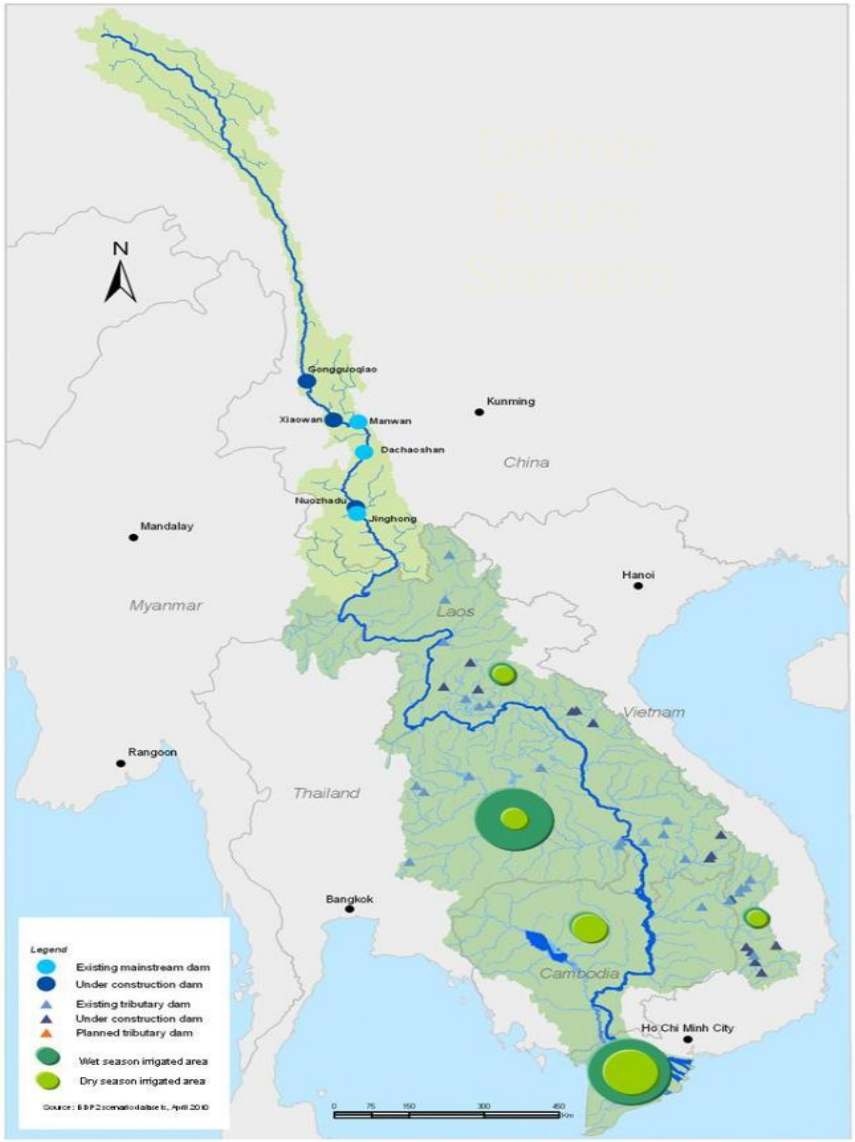
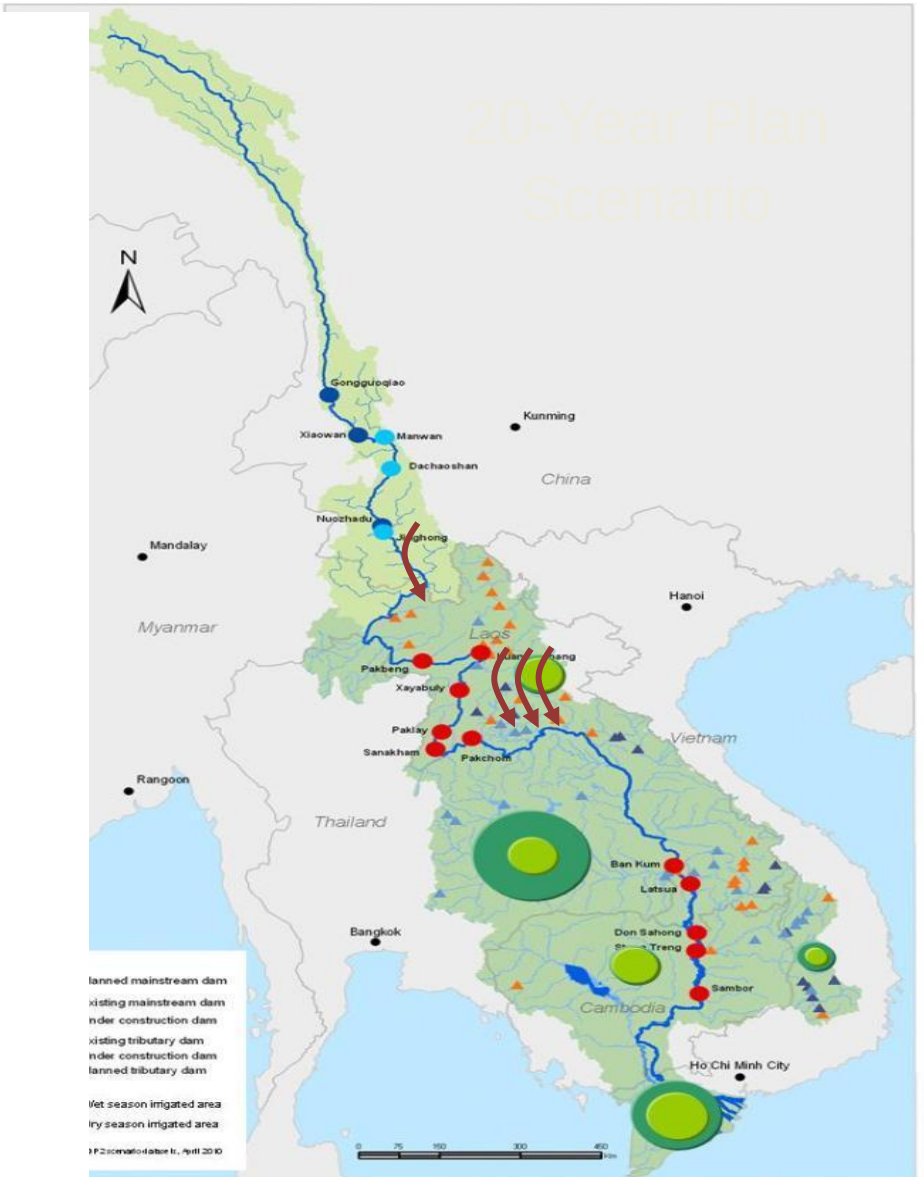
The hydropower cascade on the Lancang in PR China in the Upper Mekong Basin

Water resources development is accelerating in the Lower Mekong Basin





Completed work:

Assessment of Basin-wide Development Scenarios:

Cumulative impact assessment **of the countries' national water resources development plans**

The benefits and costs

Balancing development and protection

Cumulative impact assessment of national plans

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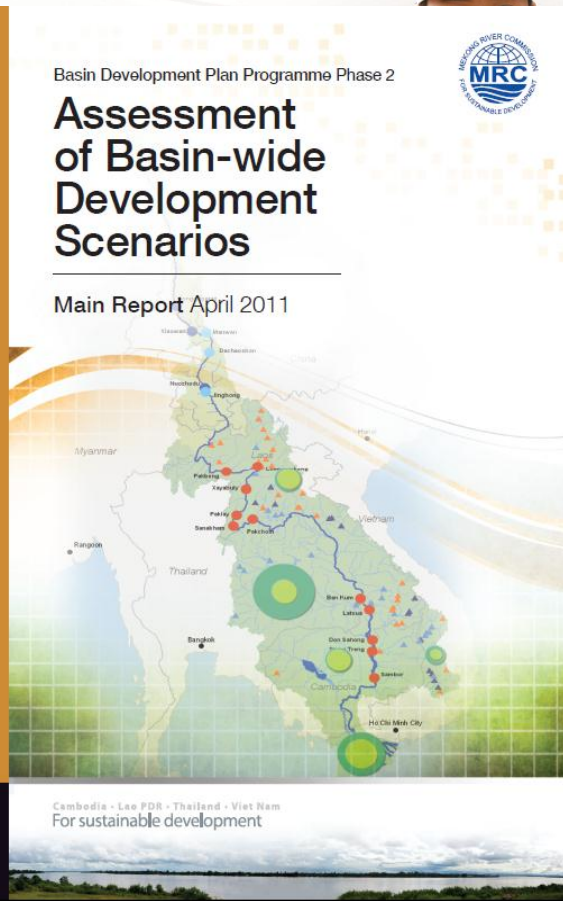
- **cumulative impact assessment** of the basin countries' **national water resources development plans** (*irrigation, hydropower, water supply, flood control, etc*), with and without climate change impacts (reported in 14 volumes)
- If the plans go ahead, what are the transboundary benefits, impacts and risks in 5, 20 and 50 yrs?
- The assessment demonstrated the considerable **nexus between water, energy, food, environmental and climate security**



Assessment approach

Scoping and formulation

Collection of input data

Modelling of hydrological changes

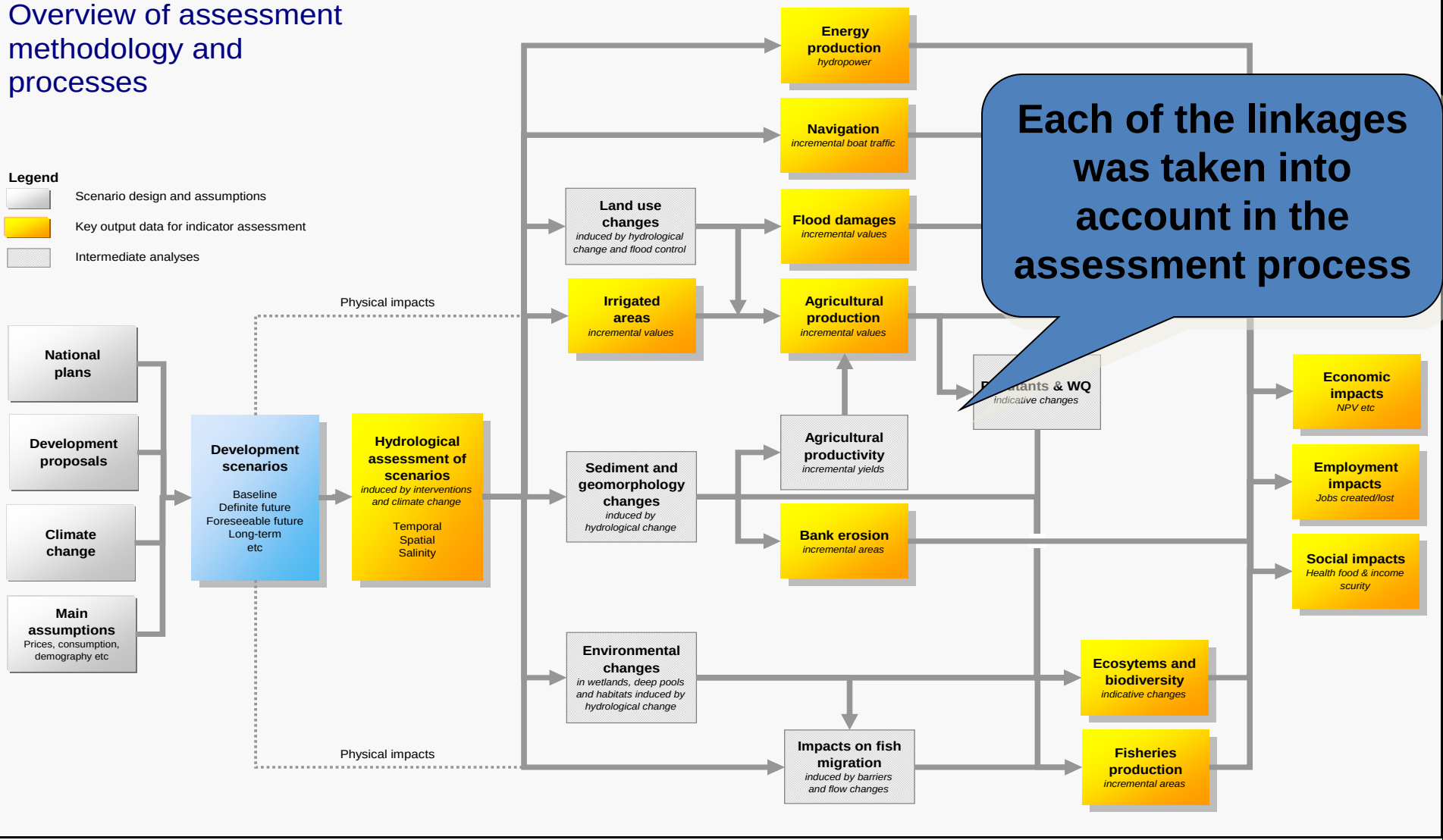
Assessment of transboundary environmental, social and economic impacts

Evaluation and discussion of preferred scenarios

- Based on **the concept of IWRM** that holds the promise of reconciling goals of economic efficiency, social equity, and environmental sustainability
- Build new databases and used **transparent data sets**, **proven models and impact analytical tools** and a **multi-disciplinary expert team**
- **Stakeholder participation has been carried out along the whole process** at sub-area, national and regional levels
- The scenarios were assessed on **hydrological changes** and **r**esults fed into the assessment of the **transboundary economic, social and environmental impacts**
- The results were discussed at national level and broader stakeholder
- Scenarios that are beneficial to all LMB countries and sustainable from a basin perspective, were considered as **preferred scenarios**

Integrated approach

Overview of assessment methodology and processes



Hydrological changes and physical impacts caused by interventions were assessed for their environmental and economic impacts and thence their social impacts

Sustainable development	Primary objectives	Specific development objective	Assessment criteria
Economic	1	**Economic development**	
	1.1	**Increase irrigated agricultural production**	Incremental area
			Crop production
			Net economic value
	1.2	**Increase hydropower production**	Installed capacity
			Power generated
			Net economic value from generation
			Net economic value from purchased
	1.3	**Improve navigation**	Navigable days by class
			Net economic value
	1.4	**Decrease damages by floods**	Average area flooded annually to max 1.0m depth
			Average area flooded annually > 1.0m depth
			Net economic value of flood damage
	1.5	**Maintain productivity of fishery sector**	Annual average capture fish availability
			Annual average aquaculture production
			Net economic value of capture fish
Environment	2	**Environmental protection**	
	2.1	**Maintain water quality and acceptable flow conditions**	Total pollutant discharge
			Water quality conditions
			Average flow in March
			Average wet season peak daily flow
			Average flow volume entering Tonle Sap
			Forest, marshes and grasslands flooded at Tonle Sap
			Net economic value
	2.2	**Maintain wetland productivity and ecosystem services**	Are of wetlands (forest, marshes, wetland)
			Net economic value
	2.3	**Manage salinity intrusion in the Mekong delta**	Area within delta within threshold level of salinity
			Net economic value
	2.4	**Minimize channel effects on bank erosion and deep pools**	Area at risk to erosion
			Net economic value
			Functioning deep pools
			Induced geomorphological changes
	2.5	**Conservation of biodiversity**	Status of river channel habitats
			Flagship species
			Unaffected environmental hot spots
			Biodiversity condition
			Incremental net economic value of habitat areas
Social	3	**Social development**	
	3.1	**Maintain livelihoods of vulnerable resource-users**	No. of people affected
			Severity of impact on health, food and income security
	3.2	**Increased employment generation in water related sectors**	Incremental number of people engaged in:
			Agriculture
			Fisheries
			Water-related service industries
			Tourism
Equity	4	**Equitable development**	
	4.1	**Ensure that all four LMB countries benefit from the development of water and related resources**	Total net economic value
			No. of people affected vulnerable to changes
			No. of jobs generated
			Overall environment impact

Broad range of assessment criteria

Comprising 12 specific development objectives within **economic, environmental and social spheres**

A total of 42 assessment indicators have been identified and assessed within the framework

In addition, equity is evaluated

Result: “synergies” and “trade-offs”

General Approach to Economic Assessment

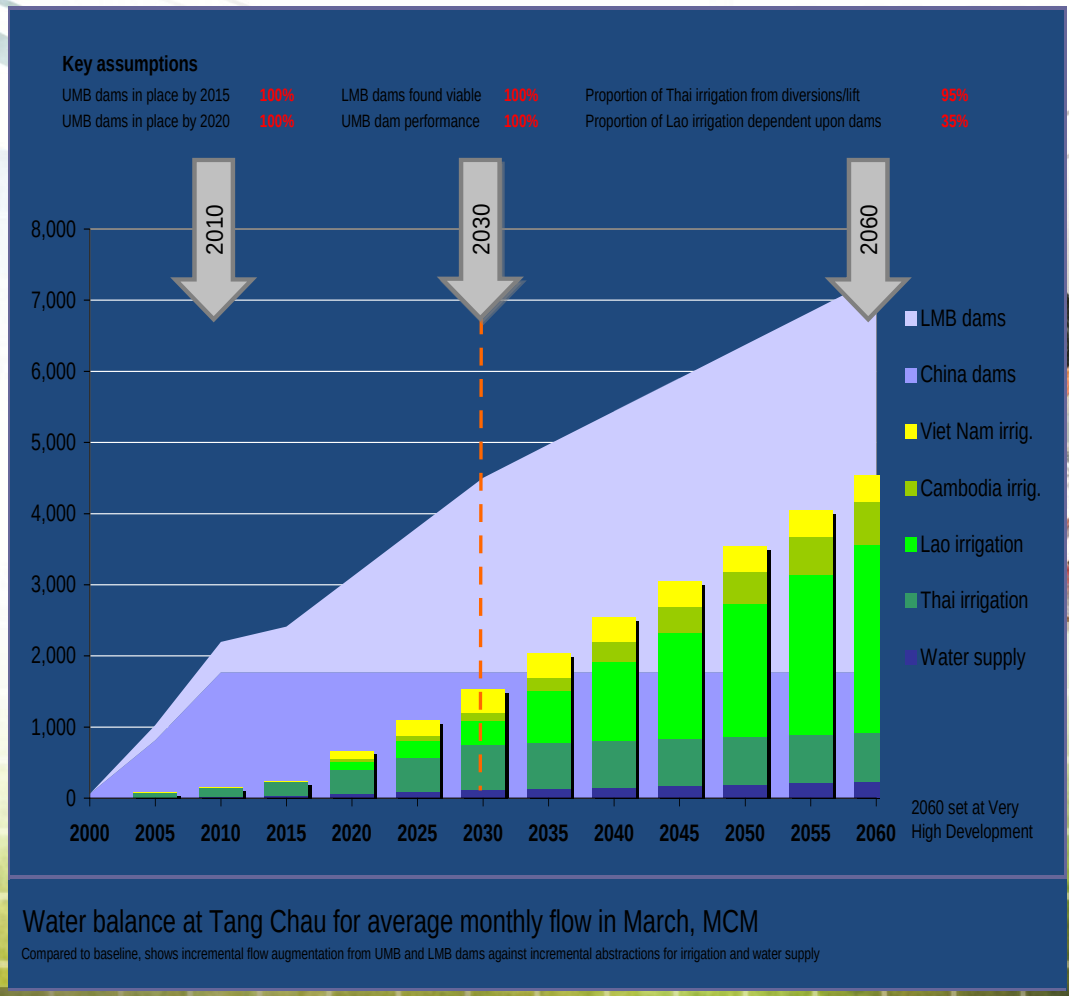
- **Economic Growth:** net present value (NPV) of incremental net economic benefits and losses for each development scenario to reflect contribution to LMB economy
- **Equity:** economic benefits distributed between LMB countries as well as sectors (agriculture, environment, fisheries, etc.) to indicate main beneficiaries from water resources development
- **Employment:** impact on number of jobs and livelihoods created and lost due to interventions under each development scenario
- **Risk and Uncertainties:** sensitivity analysis to assess impact of change with respect to expected benefits and costs as well as economic losses

Economic analysis

- Economic valuation of benefits has been based on an opportunity cost approach for commodities with direct use value (eg energy, crops and fish).
- Alternative valuation methods had to be used for some environmental benefits and losses (eg contingent valuation and benefit transfer)
- The annual incremental benefits and cost streams of each scenario has been based on contrasting the "future with" and future without" development situations over a 50 year period
- Then the NPV was calculated for each sector (agriculture, fisheries, navigation, environment, energy etc.) and for the scenario as a whole, using an appropriate discount rate

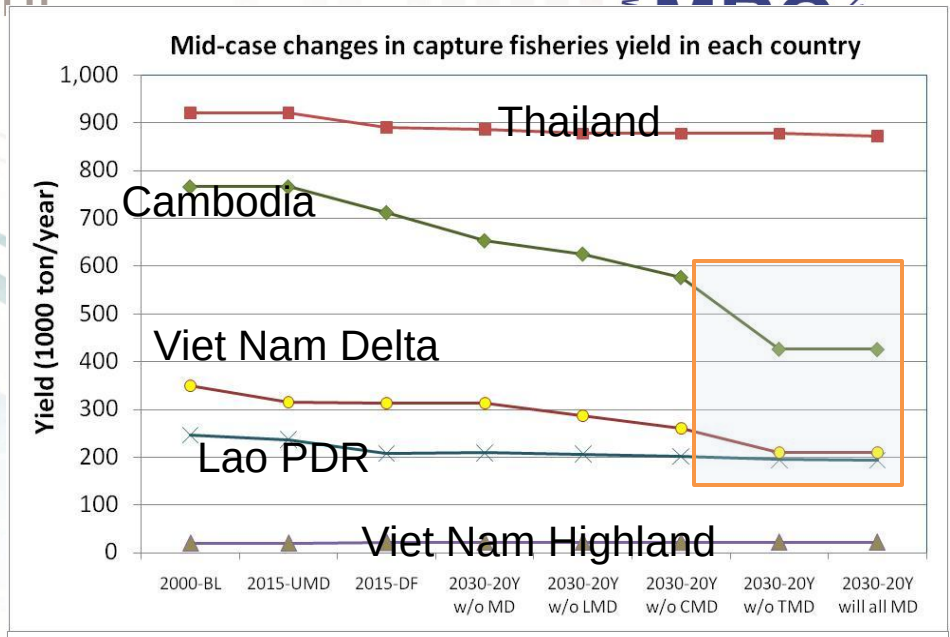
Example 1: "Synergy" between hydropower and irrigation development plans (20-year plan scenario)

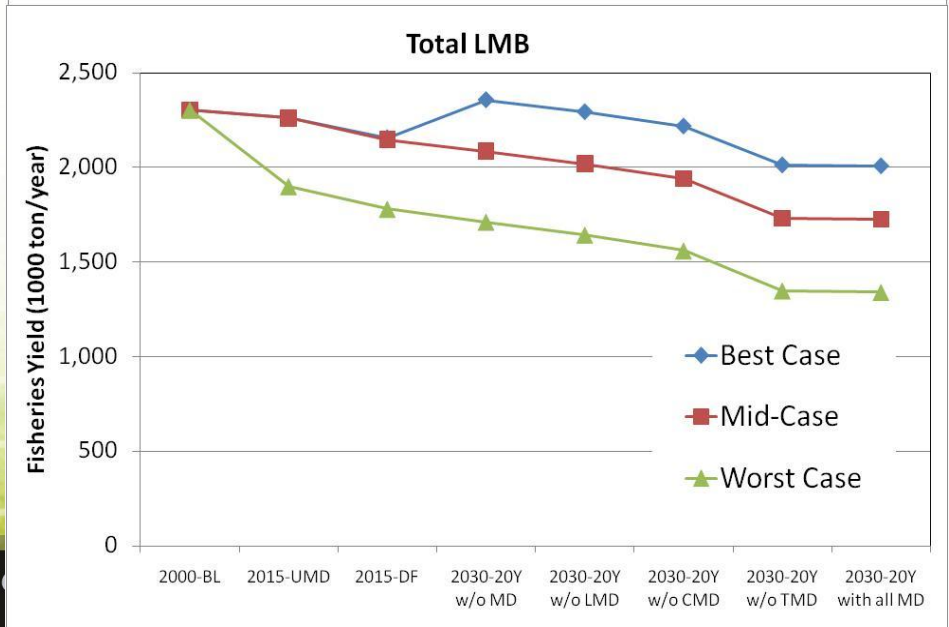
- In the next 20 years, the redistributed water from the wet to the dry season from hydropower development is sufficient for planned irrigation developments
- Transboundary benefit sharing in these two sectors amounts to US **$7 billion**
- **The natural dry season flow regime (which is used for a range of social and environmental purposes) can be protected through the PMFM**



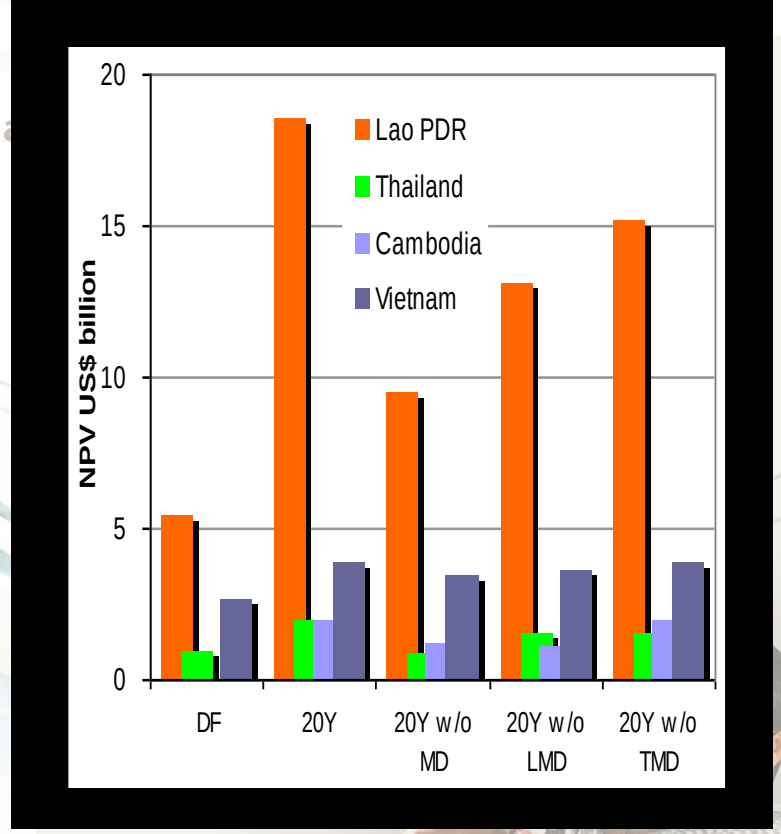
Example 2: "Trade-off" between hydropower development plans and capture fisheries

- Yield will either increase or decrease in rain-fed areas depending on management practice while in reservoirs, yield will increase
- Reduction will mainly happen in river-floodplain habitat due to many factors i.e. barriers, flow changes, habitat loss
- The lower of the planned eleven mainstream dams have the largest impact on capture fisheries.
- Regional capture fisheries net cost could amount to **US $2 billion** in the 20-year plan scenario





Net economic benefits

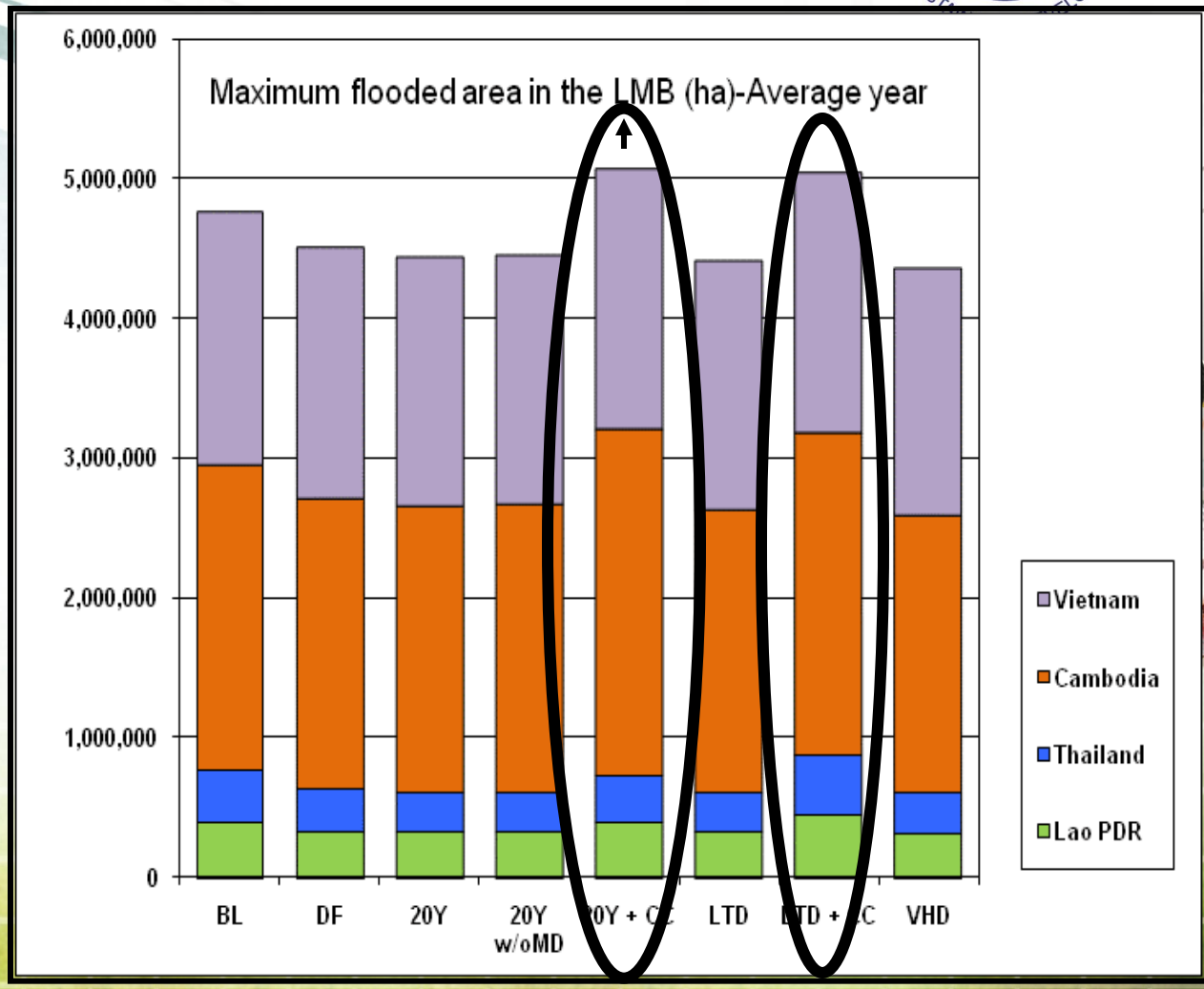


- The net economic benefits in the various 20-Year Plan Scenarios are large; hydropower development contributes most
- But there would be also significant benefits in irrigated agriculture, reservoir and rice field fisheries and some in navigation
- Main negative impacts are in loss of capture fisheries, wetland area production, biodiversity forests, and recession rice
- Lao PDR would gain considerably but Thailand, Viet Nam and Cambodia would also benefit, including as producers and consumers of electricity
- The economic benefits to Cambodia are relatively low due to the adverse impacts on capture fisheries and environmental hotspots, as well as a negative NPV of one of the proposed mainstream dams (benefits to Cambodia are considerably larger in the longer term scenarios due to expansion and intensification of irrigated agriculture)

Example 3: Synergy between climate change and environmental values

In the 20-year and long-term scenarios, climate change reverses the reduction of flooding caused by ongoing and planned development

Climate change would benefit environmental values (by $240 million), increase recession rice production (by $450 million) but all of this will be offset by increased flood damages (by $650 million)



Wide stakeholder engagement throughout the basin planning process and spent over 2 million US$

Event	No of meetings	Participants	Objective
MRC Joint Committee meetings	8 at the regional level	100	***Review and approval of scenario formulation and assessment***
National advisors	12 at the regional level	5	***Advisory, facilitation and mediation services***
Regional BDP stakeholder forums	Annually at the regional level	200-350	***Discussion of national positions at the regional level with wider stakeholders***
Regional Technical Working Group	9 at the regional level	40-60	***Technical validation of assessments***
National consultations	3 in each country	20-40	***Development of national policy and negotiation positions***
Joint Committee Working Group Meetings	5 at the regional level		***Discuss national positions at the regional levels and negotiate the Basin development Strategy***
Sub-area working groups	2 in priority sub-areas	20-30	***Data and information improvement***
Transboundary meetings	1 in the 3Ss basin	100	***Discussion of scenarios and improvement of transboundary cooperation***
Various meetings with MRC Programmes, interest groups (M-POWER, private developers, etc.)	6	20-100	***Discussion of assessment approaches, methodologies, tools, data, results etc.***

Basin Development Strategy (adopted January 2011)

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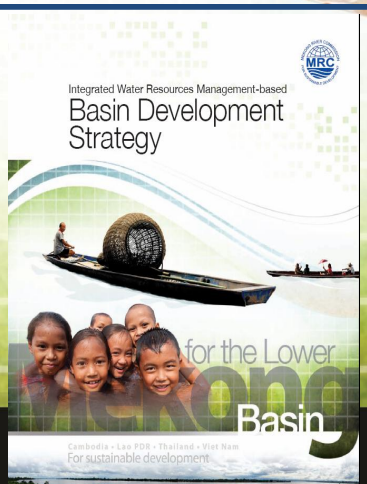
- Based on the assessment results of the basin-wide scenarios and the associated stakeholder consultations
- For the first time since the 1995 Mekong Agreement, the countries have arrived at:
  - An understanding of each other's water-related plans
  - discussed the likely transboundary benefits and costs of their plans
  - Developed a shared understanding of the water-related development opportunities and risks
  - Negotiated the IWRM-based Basin Development Strategy (BDS)
  - **Strategic priority: Options for sharing the potential benefits and costs of development**



Current work

Regional distributional analysis and consultations on possible regional benefit sharing mechanisms

Balancing development and protection

Concept

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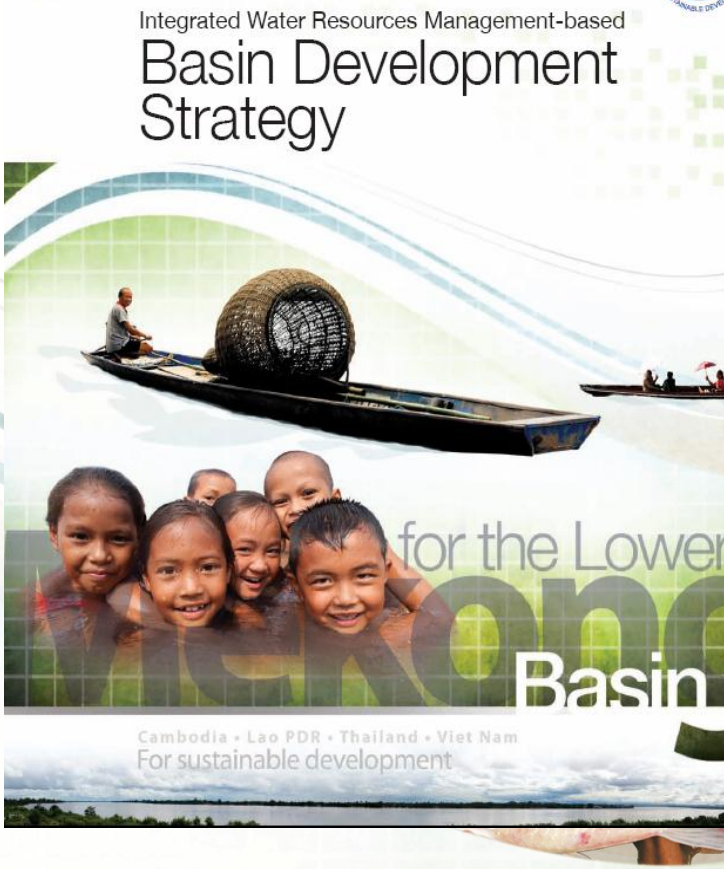
- Regional "benefit sharing" *should not be seen as being* about one country sharing the 'profits' it makes from using water with other countries

- It is about increasing cooperation and optimizing benefits (in the water-related sectors and possibly beyond) to enhance regional integration, trade and cooperation, and less about water allocation, and not about dividing profits



- The activity supports the implementation of the Mekong Basin Vision of "An *economically* prosperous, *socially* just and *environmentally* sound Mekong River Basin", which was reaffirmed by the Prime Ministers during the first MRC Summit in 2010.

Worldwide experience

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- Most of the global experience in water-related benefit sharing is national-to-local.
- In addition, there are many examples of bilateral benefit sharing (including the Mekong Basin), which typically involve water transfers between two countries, flood control, or hydropower exports.
- **<u>As yet, there are relatively few examples of mature, multi-state, regional benefit sharing arrangements</u>**

Examples of TB benefits and costs

Sector	Potential transboundary benefits	Potential transboundary costs
Land use management and spatial planning	▪ Flood storage (such as on the Cambodian floodplains) ▪ Increase in wild fisheries	▪ None?
Hydropower development and operations	▪ Regional energy security ▪ Cross border energy trading ▪ Improved navigation ▪ Reduction of GHG emissions	▪ Rapid changes in flow regime due to operating rules could affect environmental assets, navigation and increase flood risks
Reservoir construction and operations (for hydropower, irrigation and/or flood management)	▪ Flood storage and reduced flood damages ▪ Increased dry season low flows and expansion of dry season agriculture, improved navigation, and reduction of saline intrusion in the Mekong Delta	▪ Reduction in wild fish productivity due to disconnection of migration routes ▪ Impacts on sediment transport affecting environmental assets
Flood protection	▪ Local benefits only	▪ Increased flooding elsewhere ▪ Impacts on sediment transport affecting environmental assets
Preservation and restoration of wetlands	▪ System biodiversity preserved ▪ Flood storage and reduced flood damages	▪ None

Examples of TB benefits and costs (cont.)

Irrigation development	▪ **Regional food security**	▪ **Potential water quality problems from runoff** ▪ **Reduced irrigation opportunities elsewhere**
Aquaculture development	▪ Regional food security	▪ Potential water quality problems from runoff ▪ Reduced abstraction opportunities elsewhere
Wild fisheries management	▪ Increased system fish production ▪ Reduction in social vulnerability	▪ None
Navigation improvements	▪ Increased river transport ▪ Increased trade and regional connectivity/integration	▪ Potential effect to spawning grounds and wild fisheries ▪ Potential sediment transport issues ▪ Increased risk of pollution accidents
Tourism	▪ Multi-country eco-tourism visits	▪ None?

Lots of work ahead…

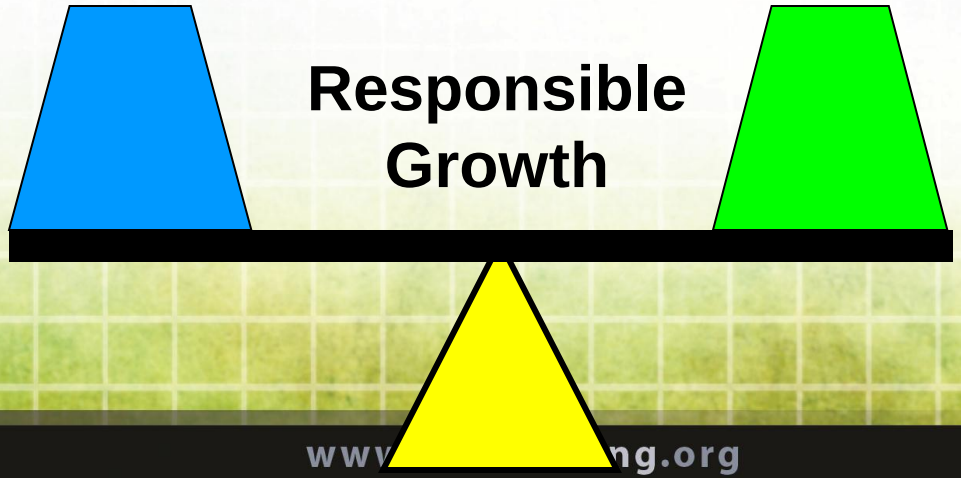
- The **regional distribution analysis** (ie all transboundary cost and benefit streams in all water related sectors, including those that occur - almost by 'default' - as a result of existing, ongoing and planned development) needs to be quantified as much as possible

- **Quantification of cost and benefit streams is an essential underpinning of successful regional discussions on benefit sharing**

- **How to quantify the benefits of transboundary cooperation through inter-governmental river basin organization (like MRC)?**
  - **Maximize benefits to sectors and countries?**
  - **Dialogue and negotiation?**
  - **Good relations?**
  - **Regional security? Regional integration? (trade, energy, food)?**
  - **Closing gaps of development?**




Conclusion



On the transboundary water, food and energy nexus

- The scenario assessment demonstrate that the Implementation of the **current national plans** of the basin countries' plans would create considerable transboundary synergies but also significant trade-offs

- The recently started work on **regional benefit sharing** aims at increasing the regional benefits and reducing transboundary impacts and risks by:

  - ✓ Coordinated national planning (and adapting national plans?)
  - ✓ Regional benefit sharing mechanisms?
  - ✓ Joint investment projects?
  - ✓ Water resources management and sector guidelines (for designing 'good' projects)

This could bring Mekong cooperation to the next higher level

- Communication & notification
- Information sharing
- Regional assessments

- Adapt national plans to mitigate regional costs
- Adapt national plans to capture regional gains
- Identify, negotiate & implement national investments that capture cooperative gains

- Joint institutions
- Joint project assessment & design
- Joint investment
- Joint ownership of assets

Dispute — Cooperation Continuum — Integration

Unilateral Action | Coordination | Collaboration | Joint Action

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MEKONG RIVER COMMISSION FOR SUSTAINABLE DEVELOPMENT

MRC

Thank you very much