Cambodia • Lao PDR • Thailand • Viet Nam

For sustainable development

UNFCCC Regional Expert Meeting on Loss and Damages

Bangkok– Thailand 27-29 August, 2012

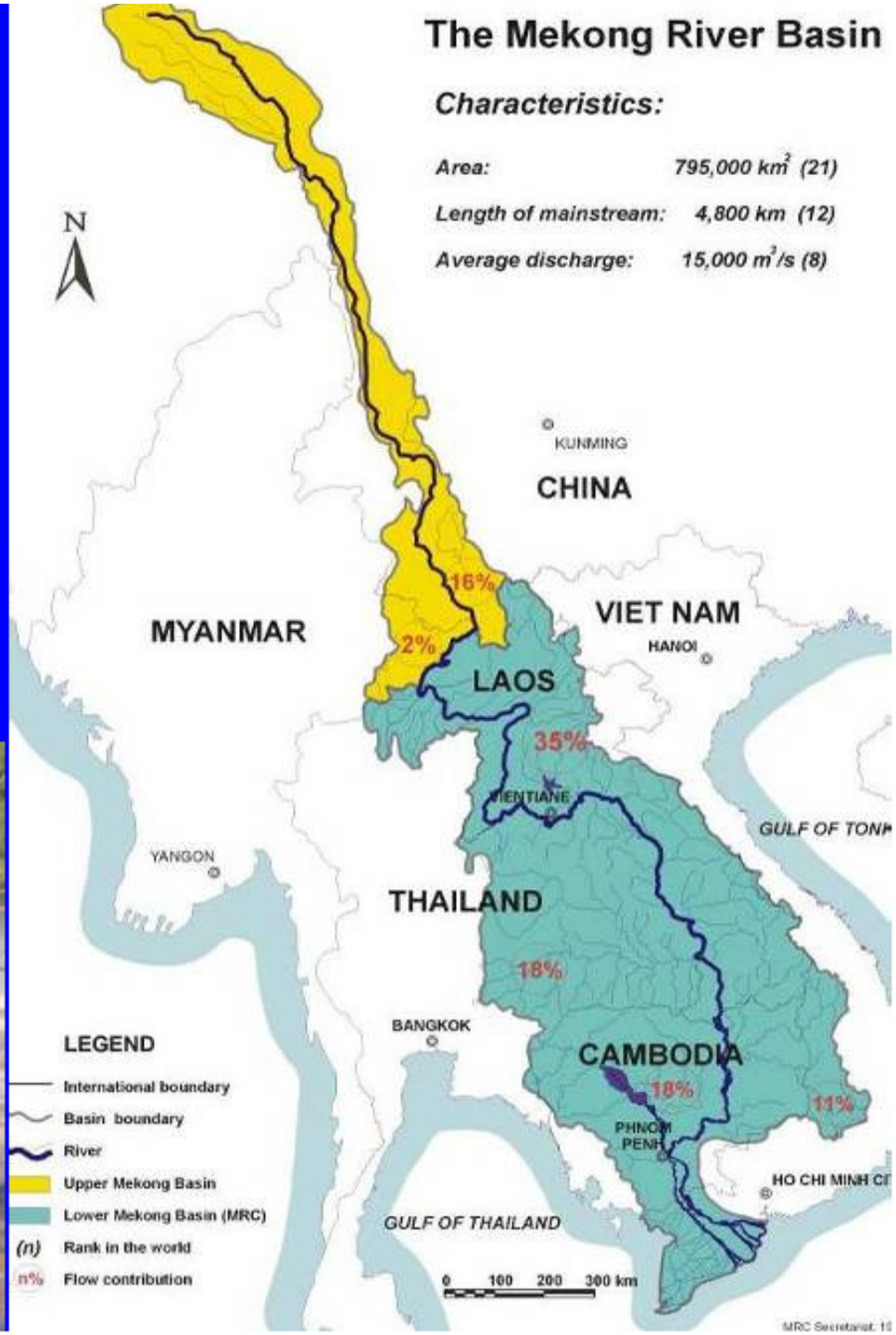
Damage Assessment in a large River Basin
The Mekong Experience

Phan Nguyen& Anthony Green Mekong River Commission

Contents

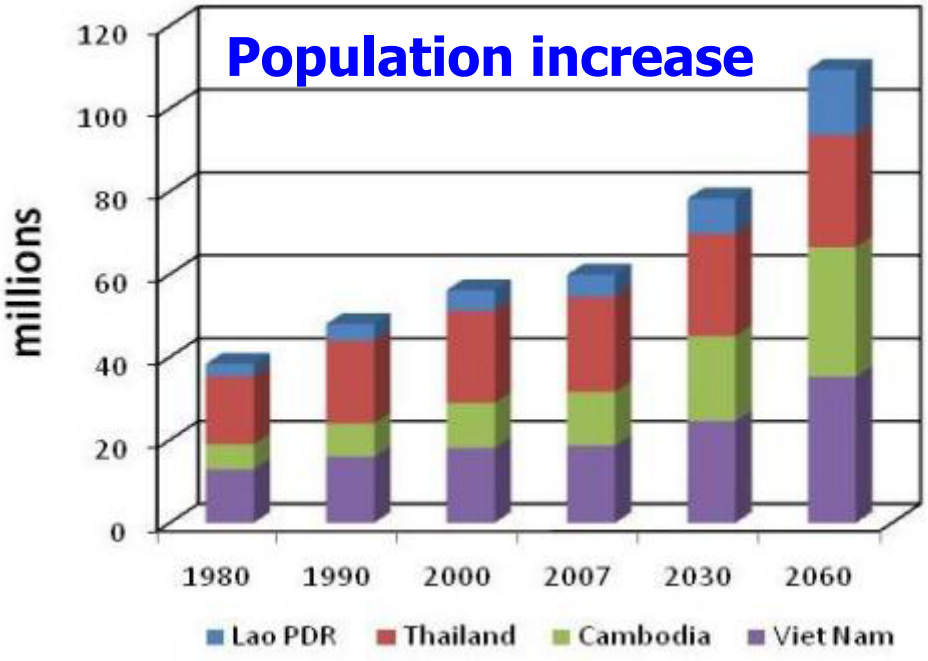
1. Features and vulnerabilities
2. Influence of Changing Climate
3. Damage Assessment and Predictive Modelling System

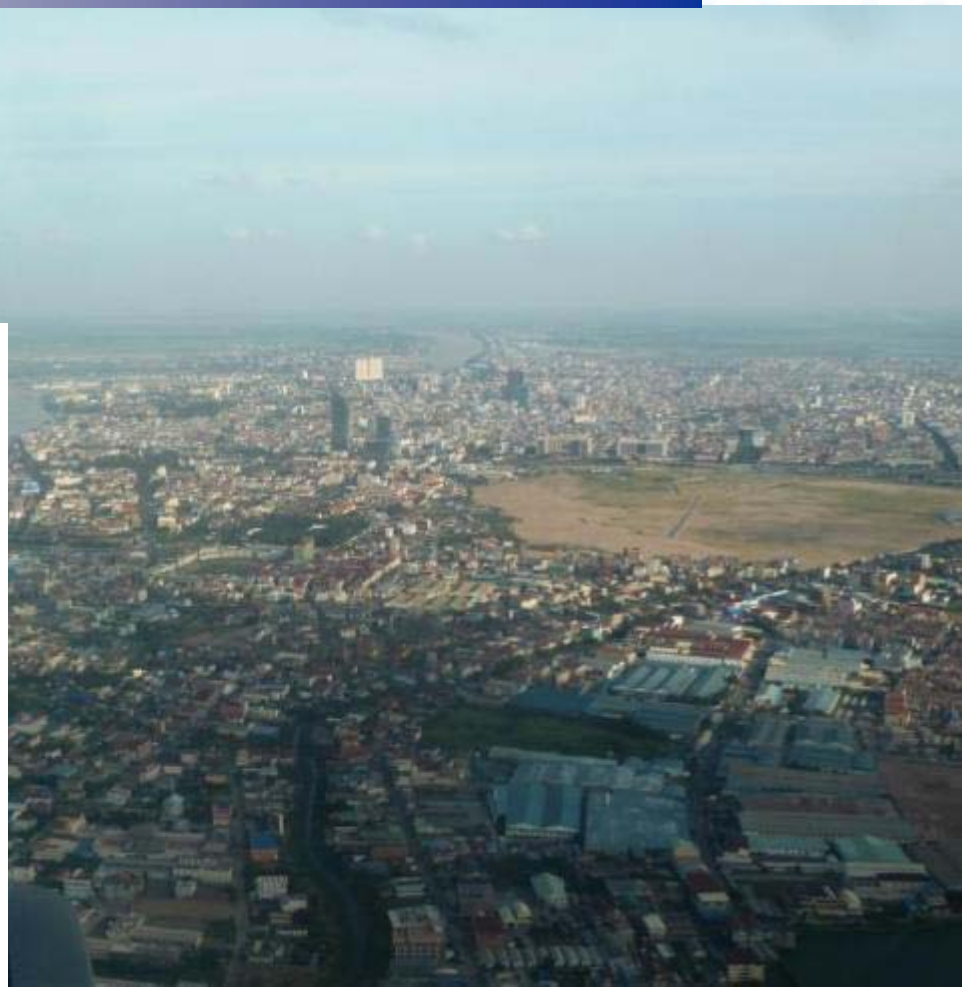
- Mekong is one of world's longest rivers (4,800 km), a home for about 60 million people shared by six countries.
- Major water usage: Hydropower; irrigation
- Climate change in the Mekong River Basin must be considered and assessed in transboundary and regional development context, including the influence and impacts from upstream.



2 Rapidly Growing Capital Cities Phnom Penh and Vientiane

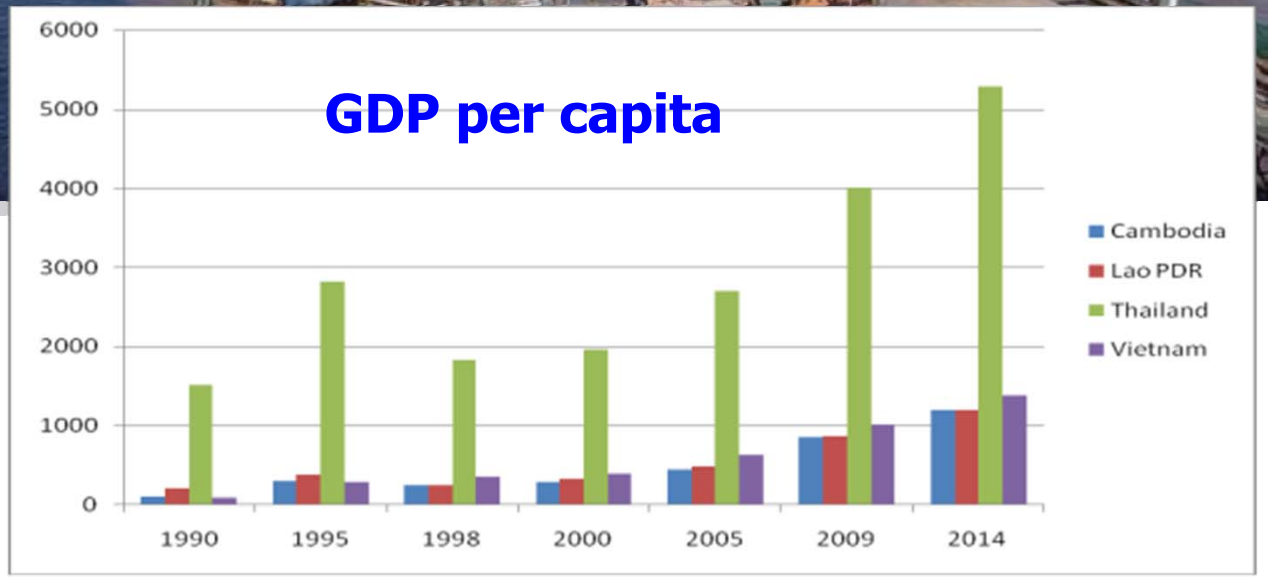
+Major Cities in tidal area (HCM, Can Tho)



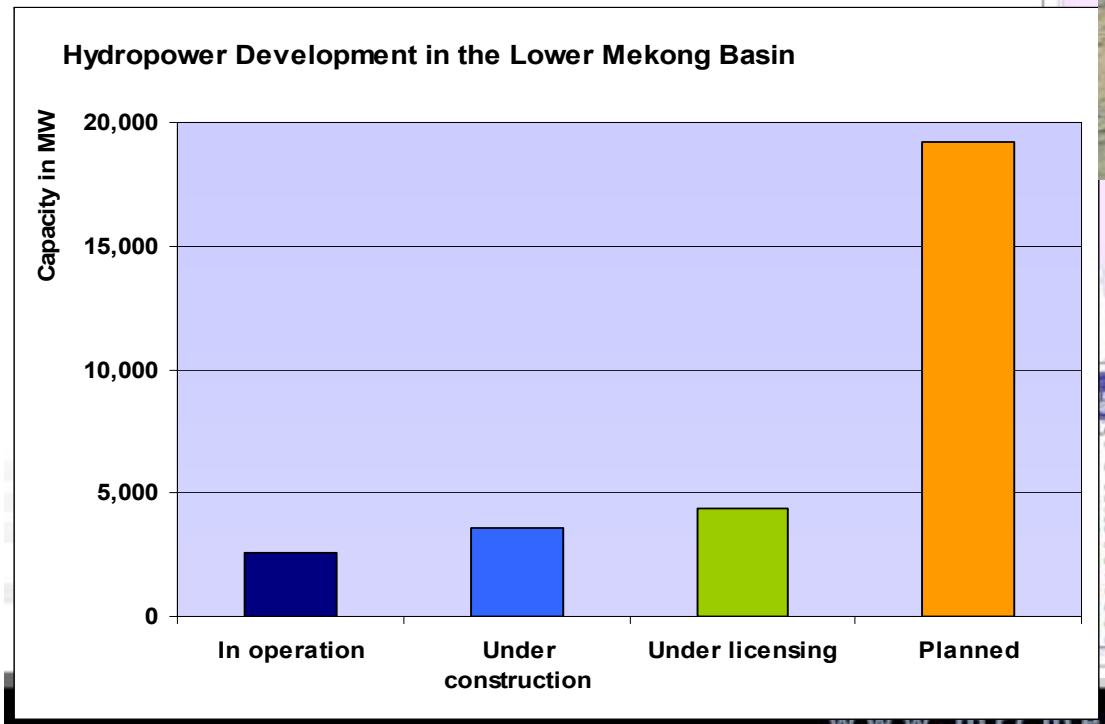


Fast Pace of Infrastructure Development

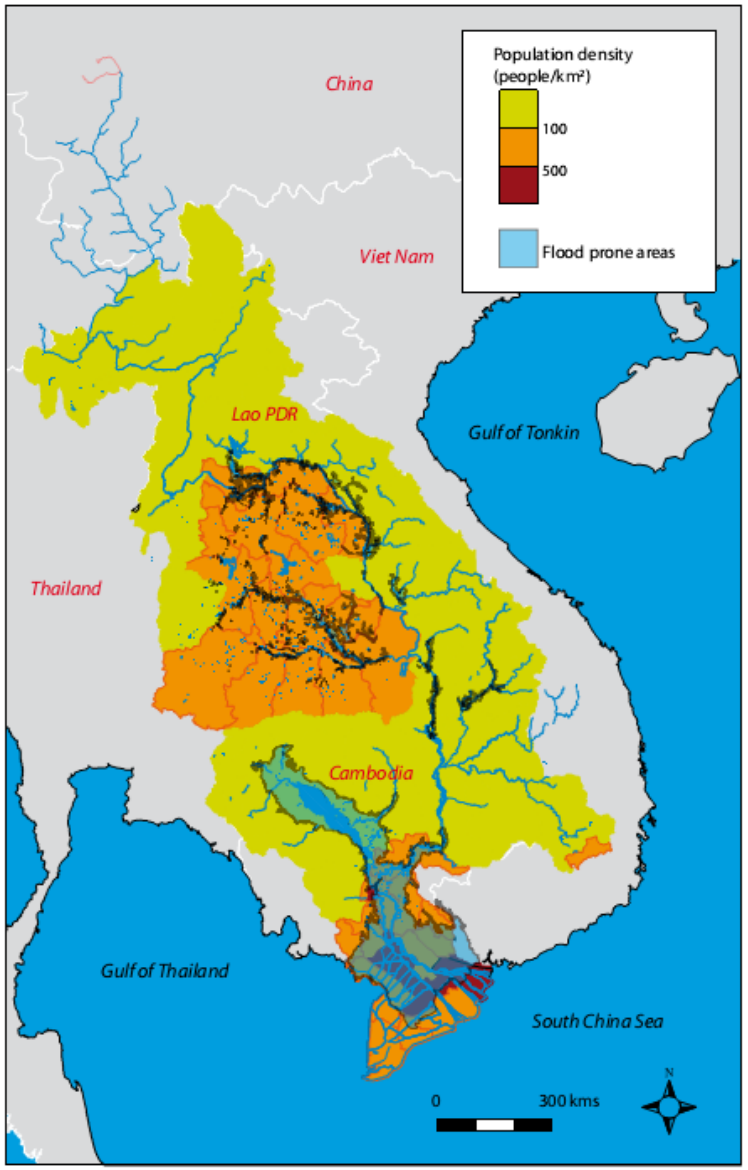
- Roads
- Bridges
- Irrigation
- Aquaculture
- Commercial
- Industry
- Communications



Infrastructure:
Hydropower –
130+Large Projects Planned or under construction including 2 largest in China



Significant Flood & Climate Risks



Significant Flood Benefits

- **Fisheries: Annual Yield of Inland Fishery C:$608m L: $212m T:$900m VN: $880m Total $2.6bn**
- **Flood Recession dependent Agriculture:**
- **$4.5bn**

Influence of changing climate on river regime

Flash Floods

Bank Erosion

High River Floods

Poor Drainage

Drought/saline intrusion

River Temperature O_2 WQ

Sea Level Rise

Navigation

Changes in Basin

Population demographic and economic

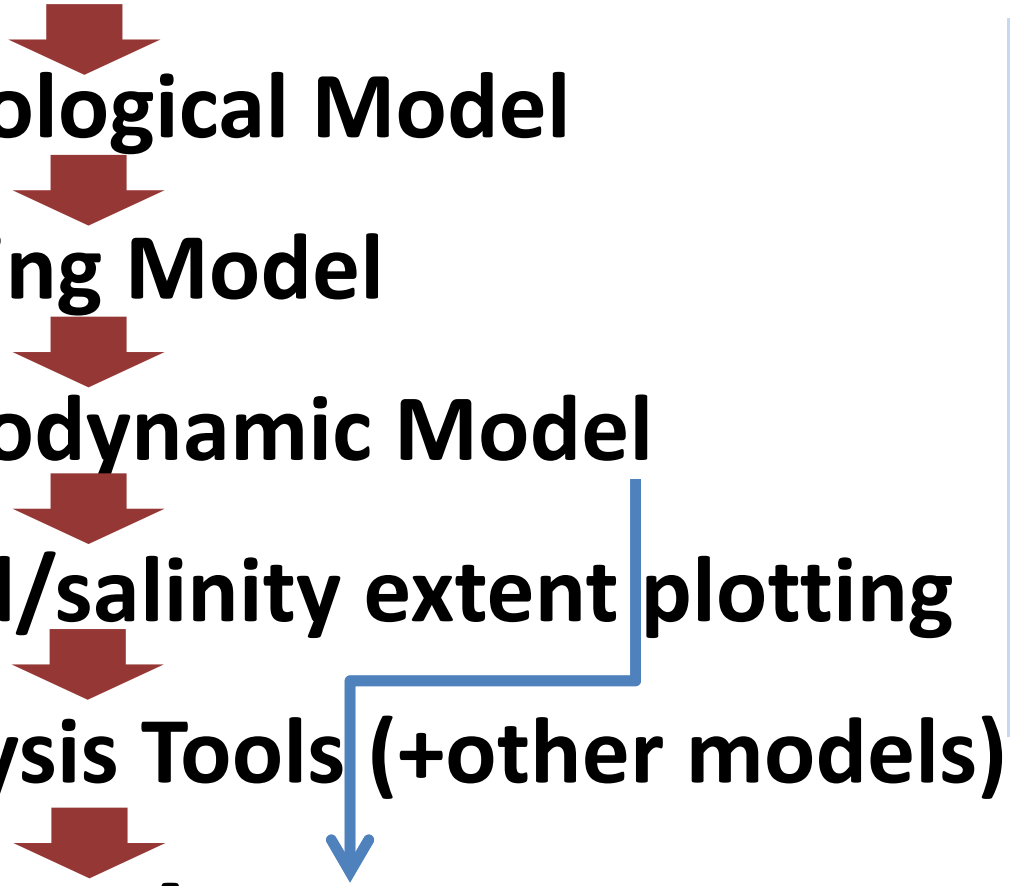
Environmental Concern

Changing Climate

Development

MRC Modelling System

Climate Data – *Downscaled & Bias Corrected*



MRC Modelling System – Models Reviewed and Agreed by member countries

MRC Modelling System

MRC Decision Support Framework (DSF)

Knowledge Base

Planning and monitoring data such as:

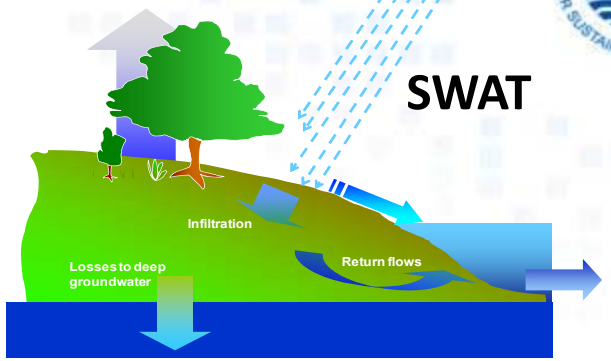
- Climate
- hydrological records
- physical data
- socio-economic and environmental data
- scenario description data
- simulation model input data
- simulation model results

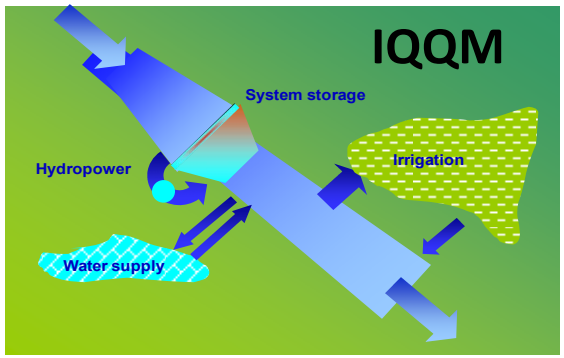
Basin Simulation Modelling Package

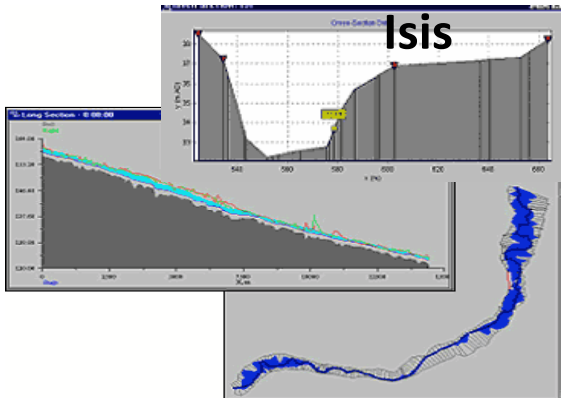
- *SWAT*
- *IQQM*
- *ISIS*

Impact Analysis Tools

Reporting Tools

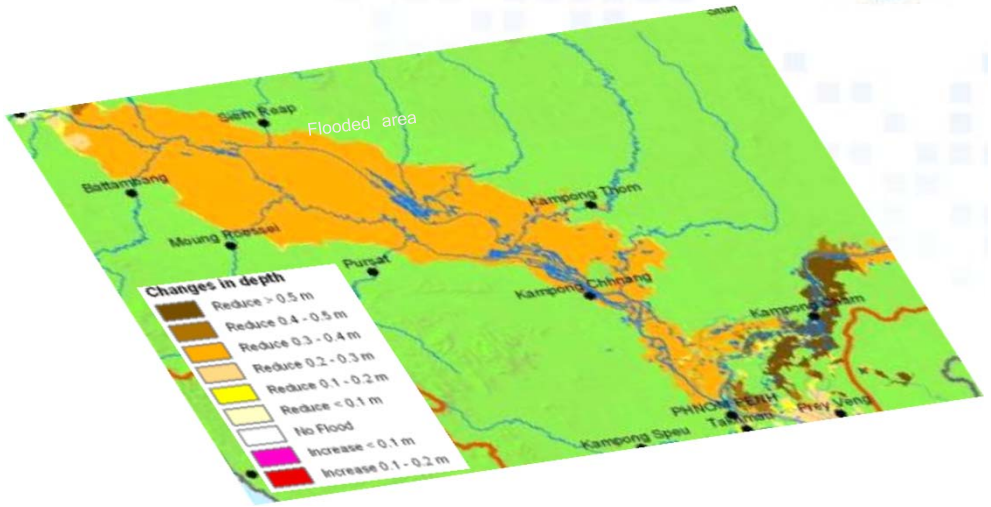


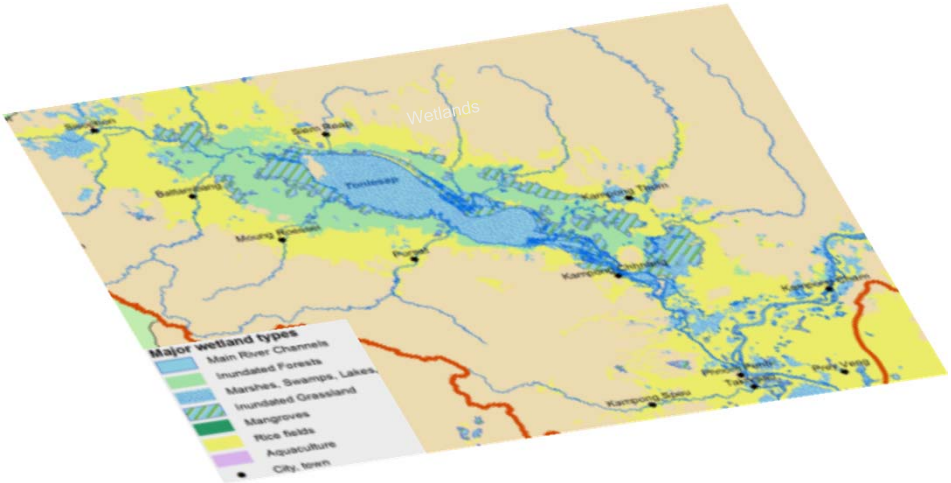


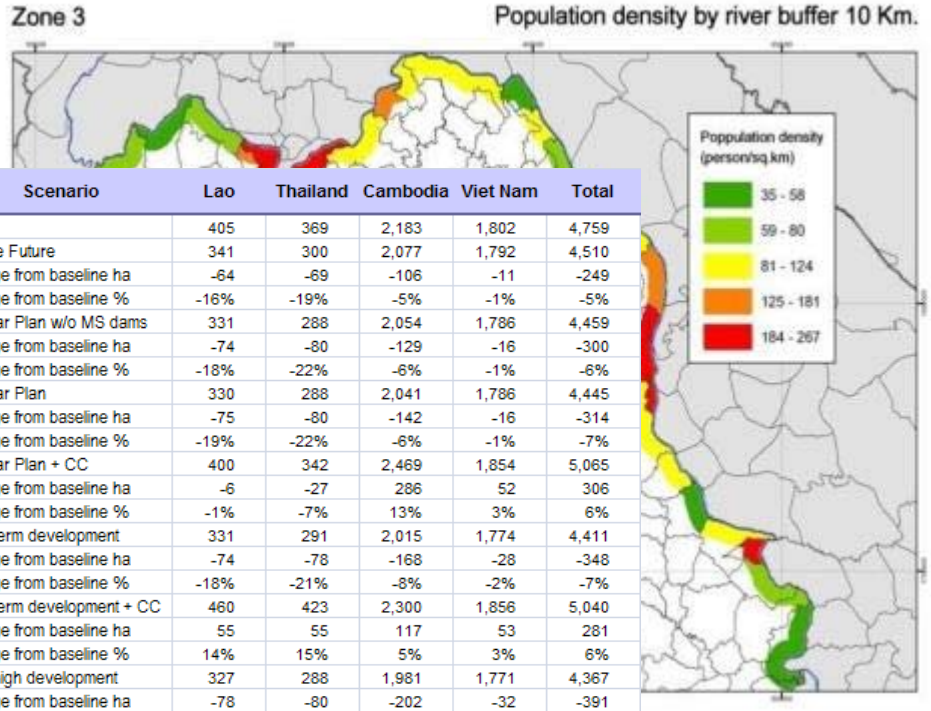


MRC Modelling System

Plotting and GIS for spatial integration and quantitative assessment



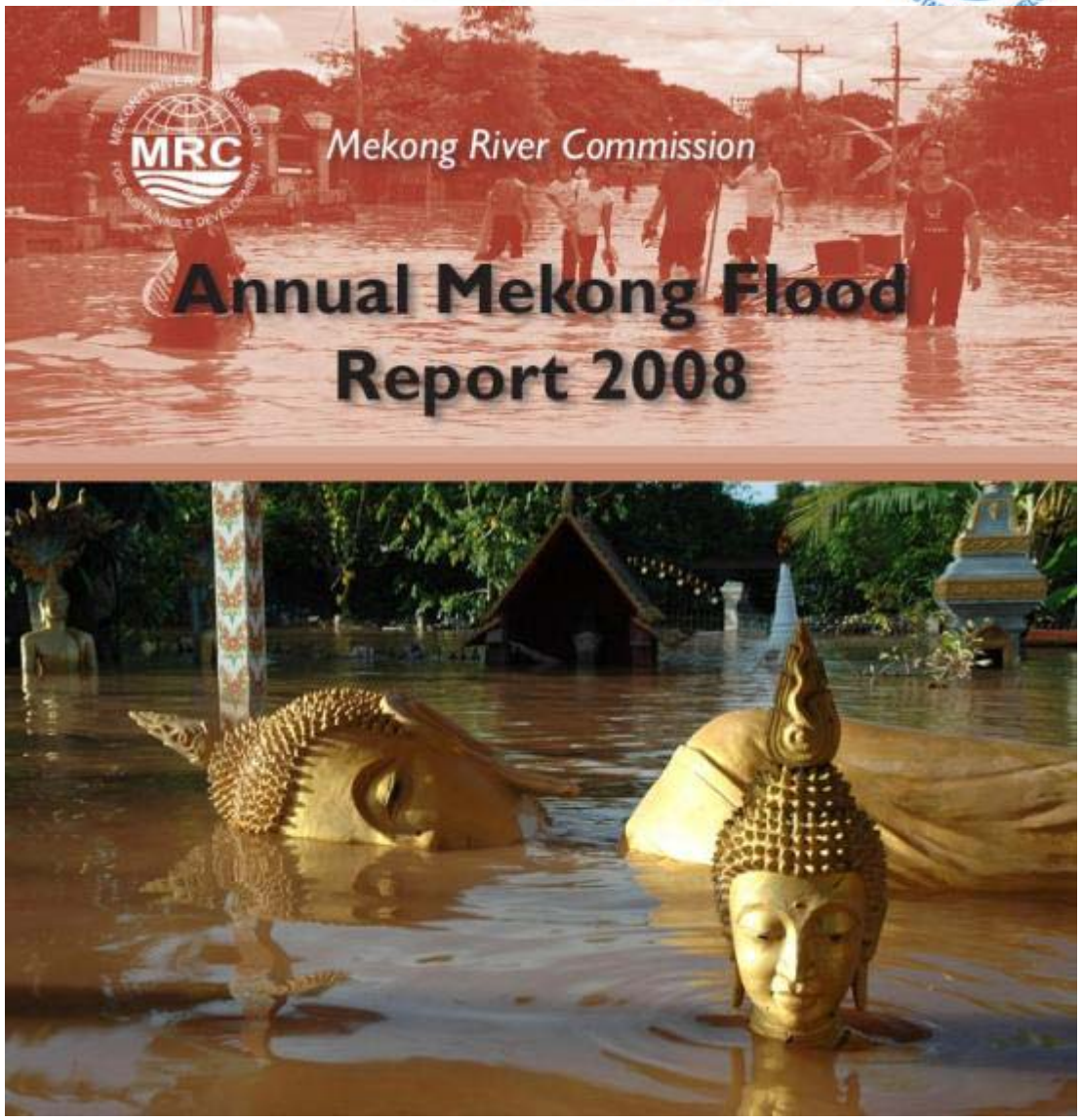




Scenario	Lao	Thailand	Cambodia	Viet Nam	Total
BS	405	369	2,183	1,802	4,759
Definite Future	341	300	2,077	1,792	4,510
Change from baseline ha	-64	-69	-106	-11	-249
Change from baseline %	-16%	-19%	-5%	-1%	-5%
20-year Plan w/o MS dams	331	288	2,054	1,786	4,459
Change from baseline ha	-74	-80	-129	-16	-300
Change from baseline %	-18%	-22%	-6%	-1%	-6%
20-year Plan	330	288	2,041	1,786	4,445
Change from baseline ha	-75	-80	-142	-16	-314
Change from baseline %	-19%	-22%	-6%	-1%	-7%
20-year Plan + CC	400	342	2,469	1,854	5,065
Change from baseline ha	-6	-27	286	52	306
Change from baseline %	-1%	-7%	13%	3%	6%
Long term development	331	291	2,015	1,774	4,411
Change from baseline ha	-74	-78	-168	-28	-348
Change from baseline %	-18%	-21%	-8%	-2%	-7%
Long term development + CC	460	423	2,300	1,856	5,040
Change from baseline ha	55	55	117	53	281
Change from baseline %	14%	15%	5%	3%	6%
Very high development	327	288	1,981	1,771	4,367
Change from baseline ha	-78	-80	-202	-32	-391
Change from baseline %	-19%	-22%	-9%	-2%	-8%

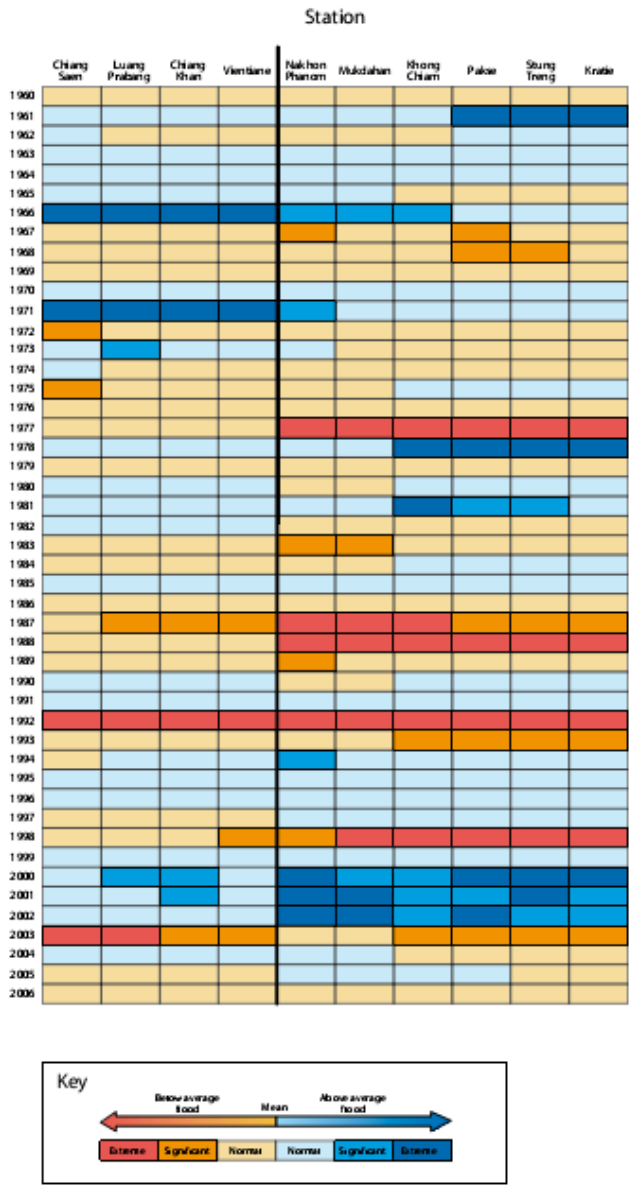
Damage and Loss Estimation

- Yearly Data Compilation in consistent form for floods since 2005
- Drought and climate monitoring reports future activities for CCAI



Damage and Loss Estimation

- Monitoring of flood extents and water levels
- Catchment and river monitoring in drought



Loss Relationships

- **Direct Losses**

Loss of life/injury, property, commercial, agriculture

- **Indirect Losses**

Health, income loss, relocation, prevention measures, economic impacts

- Top Down Estimation – infrastructure,
- Bottom up – Areas of Crop Affected, Housing Damages

Loss Relationships

- **Surveys in focal area**

District/provincial officials, Household Surveys, Business Survey, Focus Group Meetings

- **Loss Categories**

Grouped to 3: a) Infrastructure & Relief

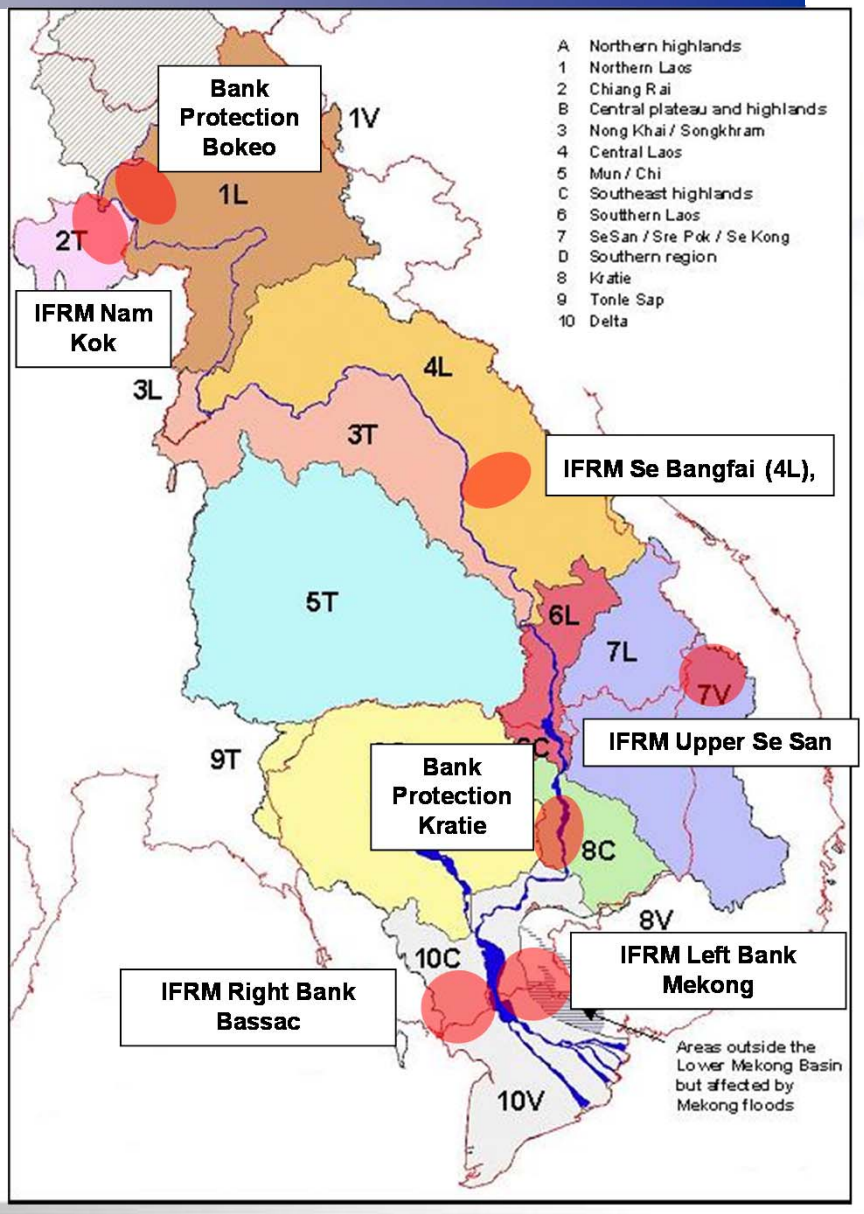
b) Housing and Commercial Property

c) Agriculture and Aquaculture

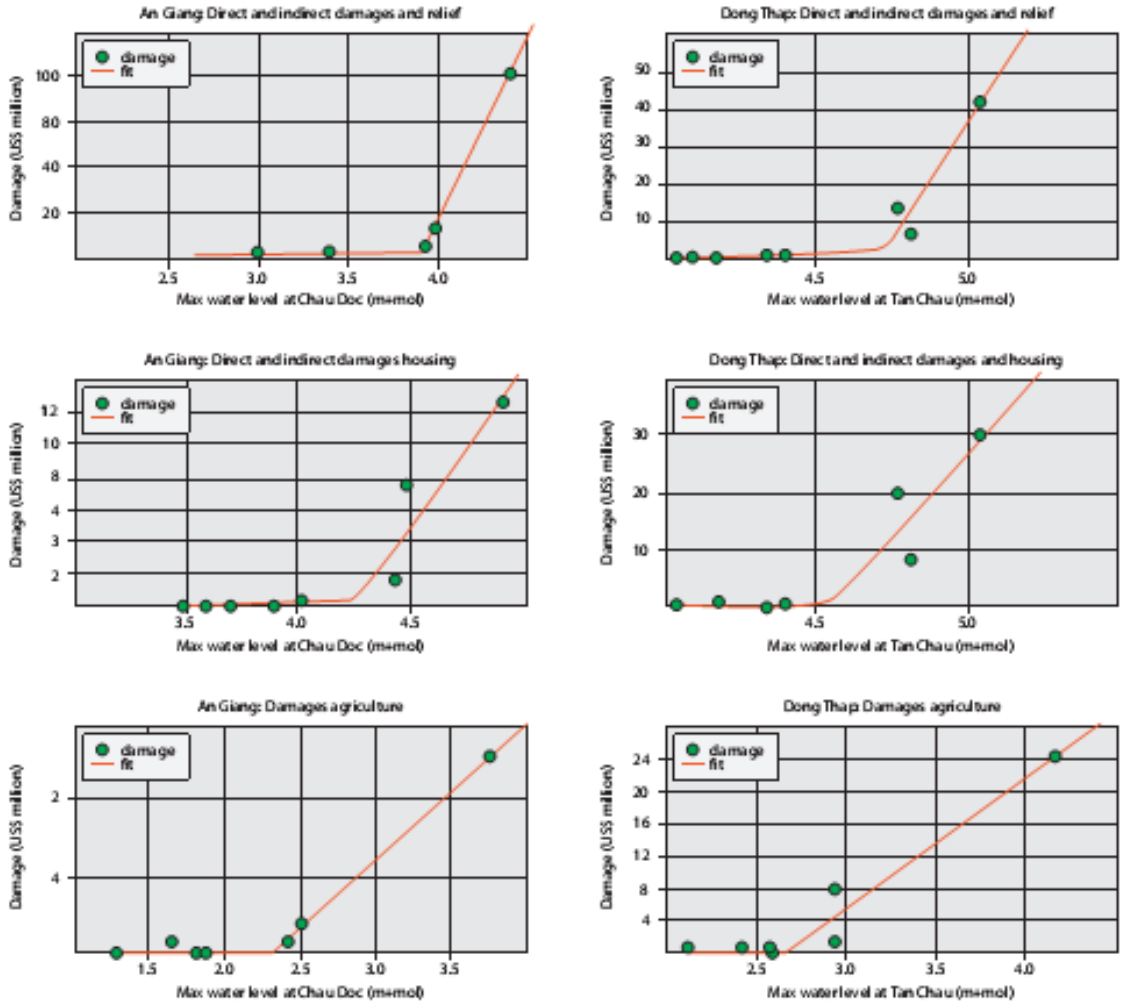
Flood Levels – related to model simulation for particular year

Focus Areas

- 5 Flood Areas, 2 Erosion
- Carried out in2008 focussed on 2006/7 flood event
- Used to refine the administrative figures available for direct loss

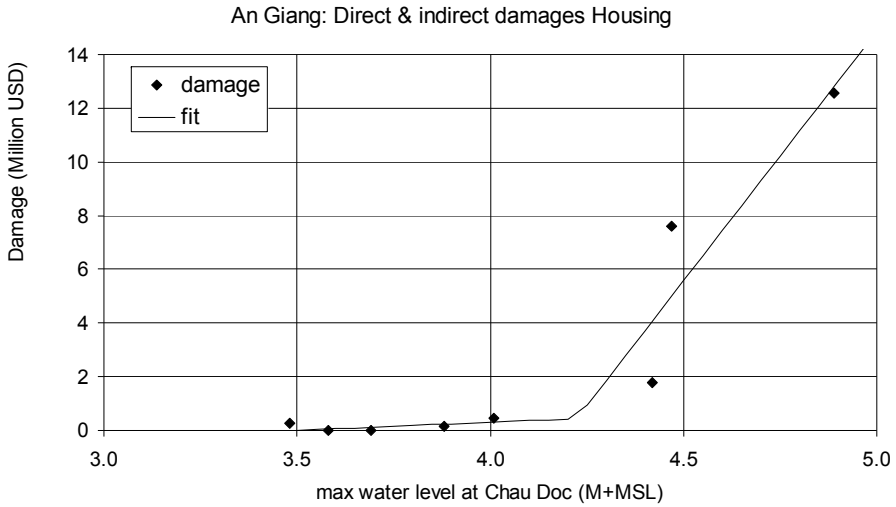


Depth Damage Curves



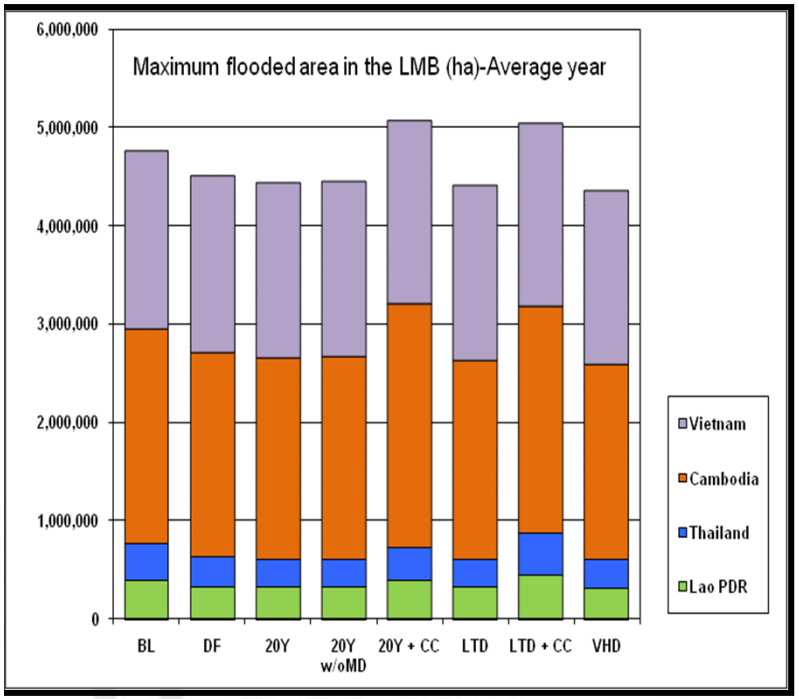
Depth Damage Curves

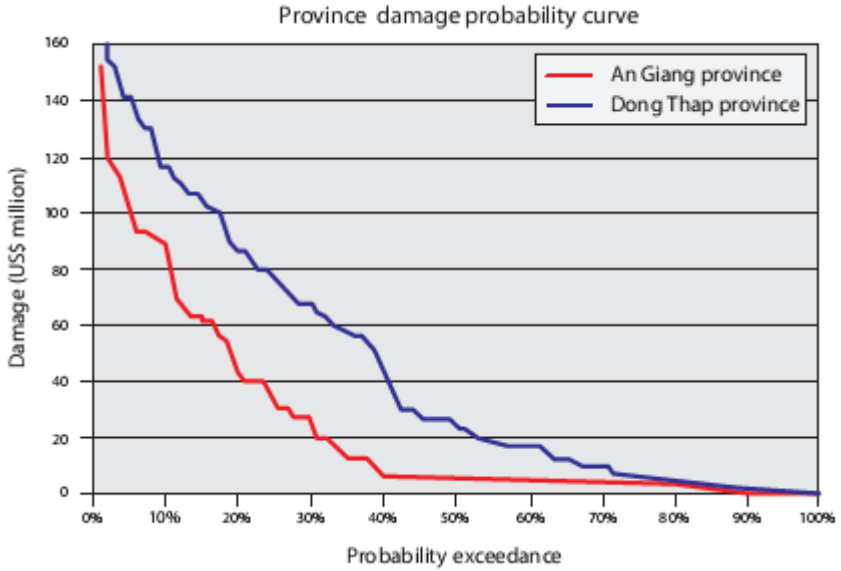
- Damage Curves relate to a threshold



Calculating Damages and NPV

- **Mean Damages – Use with Modelling System to simulate ≈100 years**
- **Predict Changes with Development with and without climate change**





Damage and Loss Estimation

➢Issues for Climate Change Application

1. River Basin perspective is needed for transboundary rivers;
2. Socioeconomic survey of those affected by flood and drought is desirable
3. To get changes in frequency of flood and drought damage including extreme events – need long time series and better data from GCMs

Damage and Loss Estimation

➢Issues for Climate Change Application

4. Proportion of indirect to direct losses will vary with level of development;
5. Economic Development will change damage estimates significantly for future condition in basins such as the Mekong;
6. Need to consider likely future developments (such as hydropower) together with future climate but can become complex.

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THANK YOU

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