

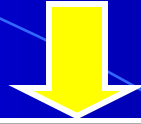
MEKONG RIVER COMMISSION

FLOOD MANAGEMENT & MITIGATION PROGRAMME

- 1. Summary Overview FMMP 2004-2010**
- 2. Expectations FMMP 2011-2015**
- 3. Challenges of the Workshop**

**International Workshop re: “People’s Centered Approach in
Flood- and Land Management in the Mekong Basin”
23-25 Feb. 2011 Luang Prabang, Lao PDR**

YEAR 2000 Flood



Flood Management and Mitigation Strategy 2001

- *Provide Technical Products & Services*
- *Address & facilitate the Resolution of Transboundary Flooding Issues*
- *Deliver Capacity Building & Technology Transfer to Member Countries*



Flood Management and Mitigation Programme 2004

“ People’s suffering and economic losses due to floods are prevented ...,while preserving the environmental benefits of floods”

C1: Establishment of a RFMMC

C2: Structural Measures & Flood Proofing

C3: Mediation of Transboundary Flood Issues

C4: Flood Emergency Management Strengthening

C5: Land Management

- Maintain flood tools, data and knowledge

- Produce accurate regional forecast and timely and effective dissemination

C1 Regional FMM Center

C2 Structural Measures

- Reduce the vulnerability of people to the negative impacts of floods

- Establish management capacity for development and refinement of implementation plan

and Flood Proofing

C5 Land Management

Strengthen the national capacity in more effective land management by using reliable flood-related information

FLOOD MANAGEMENT PROGRAMME

Mekong River Commission



November 2002

C3 Enhancing Cooperation

C4 Flood Emergency Management Strengthening

Strengthen the national capacity of flood emergency management by providing a series of the training courses

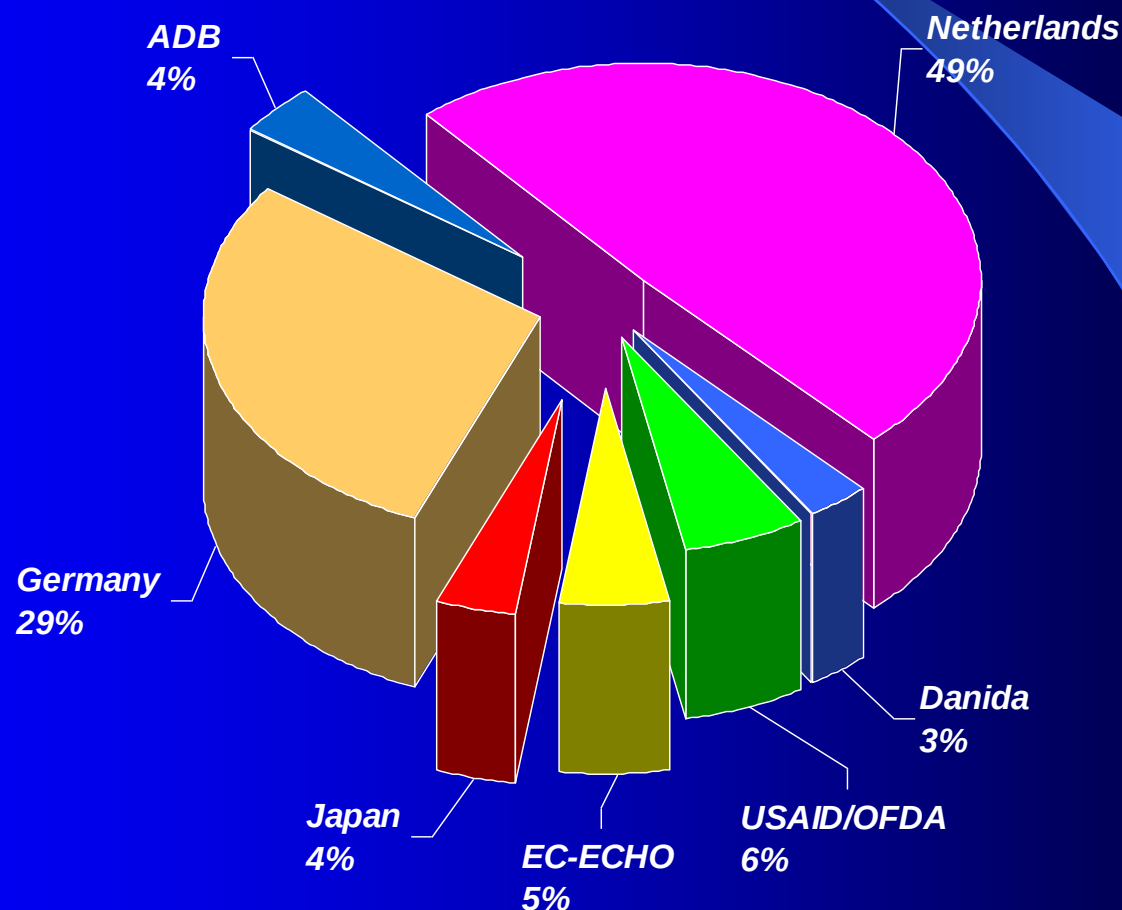
People's suffering and economic losses due to floods are prevented, minimised, or mitigated, while preserving the environmental benefits of floods...



FMMP 2004-2010: DONORS AND BUDGET

Budget Value: USD 26.5 M

USD 17.5 M Direct Funding + USD 8.0 M in Services



COMPONENT 1

Establishment of the Regional Flood Management and Mitigation Centre (RFMMC)

MRC Flood Forecasting System

MRC Flash Flood Guidance System

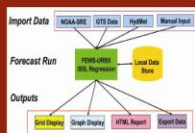


MRC FLOOD FORECASTING SYSTEM

Forecasting Platform



Mekong FFS User Interface



Mekong FFS Operation (Stand Alone)



FEWS Client-Server system

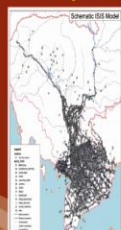
The client server system allows users to interact with the system via RFMMC's network, synchronizing their database with the central database (PostgreSQL), run the system and view the results on the central database on their own machines.

Models

The Unified River Basin Simulator (URBS) is a hydrologic conceptual runoff routing model that enables the simulation of catchment storage and runoff response in the river and stream network. This system consists of a set of URBS models, covering over 740,000 km² of the entire Mekong River Basin.



URBS Schematization for Lower Mekong River Basin



ISIS, as a part of the MRC's Decision Support Framework (DSF), is a generic 1D model for the simulation of unsteady flow in channel networks. The model within the FEWS environment starts at Stung Treng. The extent of downstream boundaries of the model are beyond the influence of the flood flow, namely to the sea boundaries at the mouths of the Mekong.

Data



Data Availability in the RFMMC: NOAA-SRE and TRMM GTS, HYCOS, ARNIP & HyMet (Near real time rainfall & water levels)



For additional information please contact:
Regional Flood Management and Mitigation Centre
P.O. Box: 823, # 578 National Road #2,
Sangkat Chak Angre Krom,
Khan Meanchey, Phnom Penh, Cambodia
Telephone: (855-23) 425 383 Facsimile: (855-23) 425 383
E-mail: floodforecast@mrcmekong.org

BACKGROUND

Implementation of the MRC Flash Flood Guidance (FFG) System for the Lower Mekong Basin is funded by the USAID Office of U.S. Foreign Disaster Assistance (DA), partnered with National Oceanic Atmospheric Administration (NOAA), and Hydrologic Research Center (C) under the Asia Flood Network Program.

Development, implementation and testing of system beta (bias correction, soil moisture, flash flood guidance), development, implementation and testing of ingest procedures for acquiring satellite and in situ precipitation data, regional and national trainings for operators on hydrologic is of system components, on the use and maintenance FFG software system, on product retrieval, and interpretation, use and validation of system products.



BENEFITS OF THE SYSTEM

- Addresses all flash flood prone basins over large areas
- Early awareness of impending local flash flood threats for all potentially vulnerable areas
- Provide rapid assessments of the potential of flash floods allowing improvement of the early warnings for the occurrence of a flash flood
- Allow for the more rapid mobilization of response agencies (rather than a system that provides detailed forecasts of the magnitude - which add uncertainty and complexity to warning development)
- Responsible national line agencies can establish criteria for issuing warnings/alerts based on flash-flood guidance and flash flood threat
- System is a diagnostic tool used to indicate the likelihood of flooding of small streams over large regions
- System uses bias-corrected satellite-based and in-situ gauge precipitation estimates and real time soil moisture estimates to produce flash flood threat



MRC FLASH FLOOD GUIDANCE SYSTEM

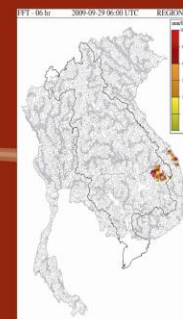
System for Flash Flood Alerts and Warnings



Basin Delineation



- 6,372 sub-basins
- Mean basin area 182 km²
- Std. Dev. Basin area 140 km²
- Mean channel length 25 km

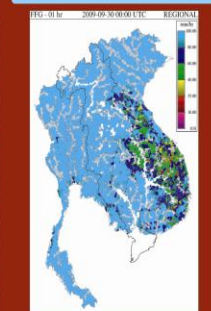


Example Regional Flash Flood Threat Product (Ketsana Storm on 29/09/2009)

MRCFFG System Design Overview



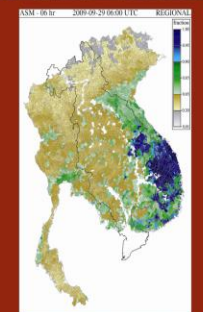
MRCFFG System base node is at the RFMMC - products, information and data sent to other 4 countries via internet



Example One-hour Flash Flood Guidance (Ketsana Storm on 29/09/2009)

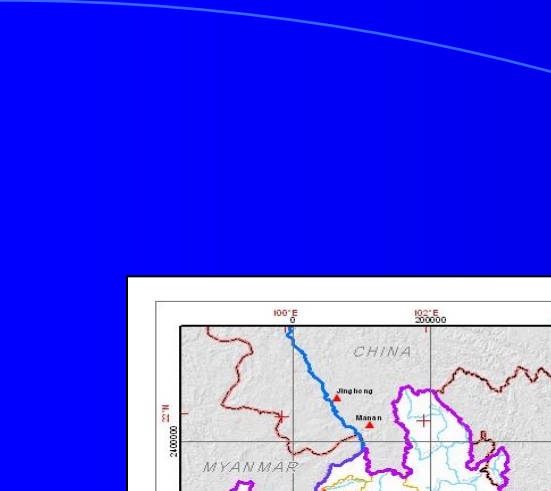
- Flash Floods - a flood that rises and falls quite rapidly with little or no advance warning, usually as the result of intense rainfall over a relatively small area
- Flash Flood Guidance - estimate of rainfall of a given duration (4 hours) over a given small watershed that is just enough to cause bank full flow at the outlet
- Flash Flood Threat - rainfall of a given duration in excess of the corresponding Flash Flood Guidance value

FFG System User Interface



Example Soil Moisture in six hours (Ketsana Storm on 29/09/2009)

For additional information please contact:
Regional Flood Management and Mitigation Centre
P.O. Box: 823, # 578 National Road #2,
Sangkat Chak Angre Krom,
Khan Meanchey, Phnom Penh, Cambodia
Telephone: (855-23) 425 383 Facsimile: (855-23) 425 383
E-mail: floodforecast@mrcmekong.org



**Forecast accuracies
for 1-5 days based
on current mean
absolute error**

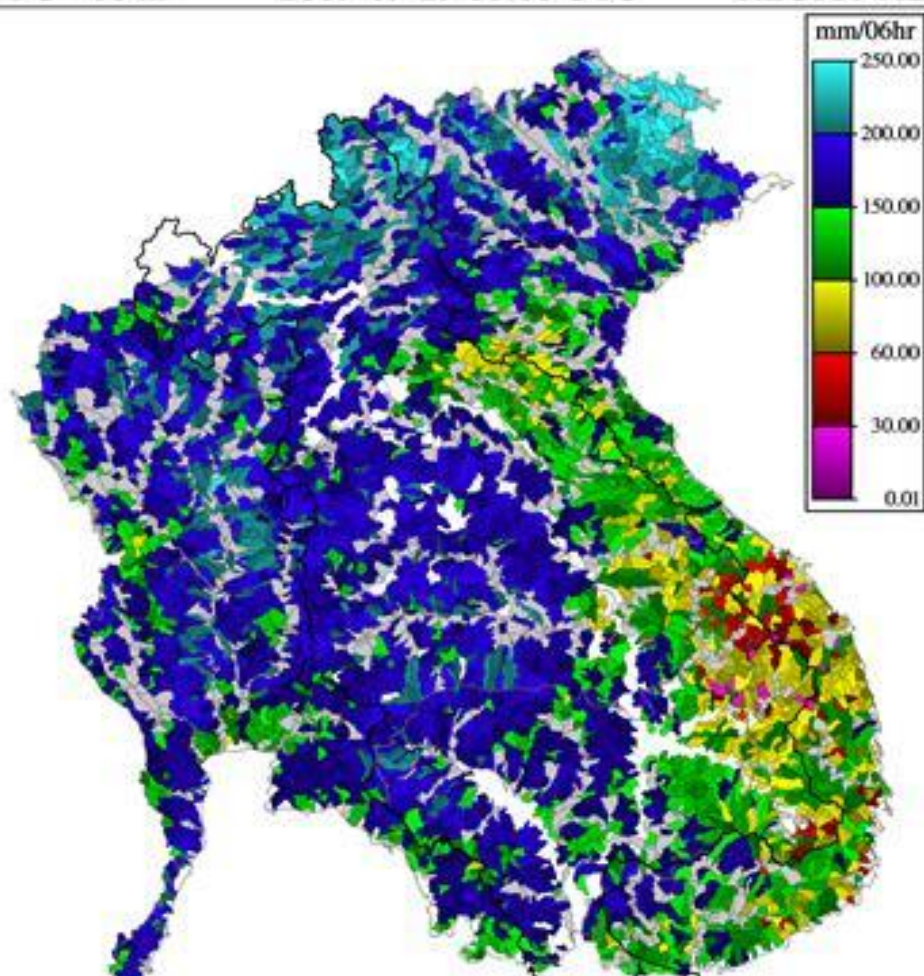


**ISIS 1D
hydrodynamic
model**

Station	Lead Time (days)									
	1	2	3	4	5	6	7	8	9	10
Chiang Saen	0.25	0.5	0.75	1.0	N/A	N/A	N/A	N/A	N/A	N/A
Chiang Khong						N/A	N/A	N/A	N/A	N/A
Luang Prabang.						N/A	N/A	N/A	N/A	N/A
Chiang Khan	0.1	0.25	0.5	0.75	1.0	N/A	N/A	N/A	N/A	N/A
Vientiane						N/A	N/A	N/A	N/A	N/A
Nong Khai						N/A	N/A	N/A	N/A	N/A
Paksane	0.1	0.25	0.5	0.75	1.0	N/A	N/A	N/A	N/A	N/A
Nakhon Phanom										
Thakhek										
Savannakhet	0.1	0.25	0.5	0.75	1.0	N/A	N/A	N/A	N/A	N/A
Mukdahan										
Khong Chiam										
Pakse	0.1	0.25	0.5	0.75	1.0	N/A	N/A	N/A	N/A	N/A
Phnom Penh Port										
Prek Kdam										
Neak Luong	0.1	0.25	0.5	0.75	1.0	N/A	N/A	N/A	N/A	N/A
Tan Chau										
Chaktomouk										
Koh Khel	0.1	0.25	0.5	0.75	1.0	N/A	N/A	N/A	N/A	N/A
Chau Doc										

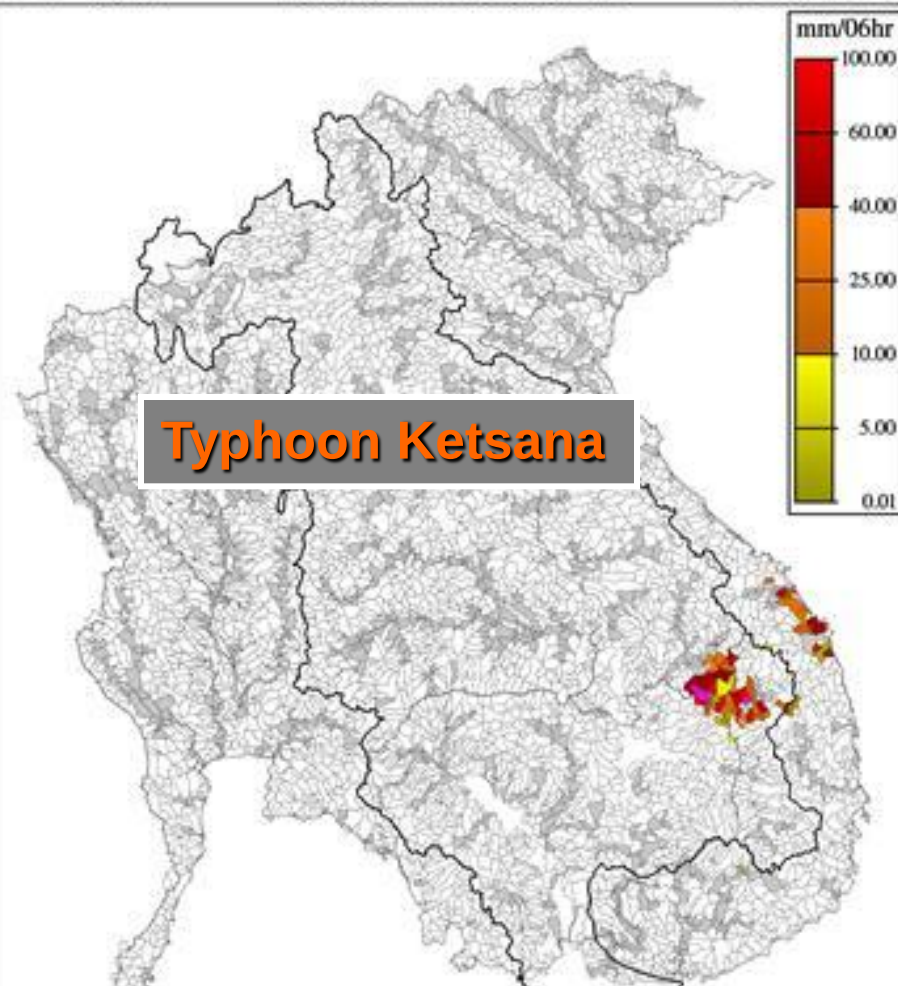
**Mekong FFS provides daily flood forecasts for 22 forecast
stations in the mainstream via www.mrcmekong.org**

FFG - 06 hr 2009-09-29 06:00 UTC REGIONAL



“Flash Flood Guidance” (FFG) can show potential critical flash flooding

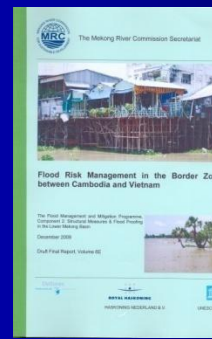
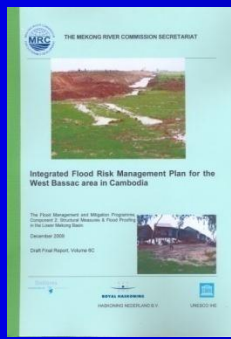
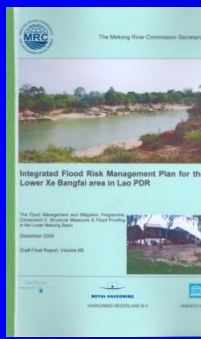
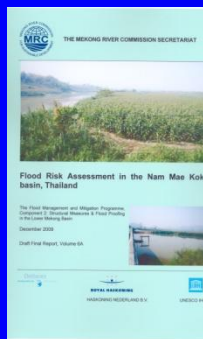
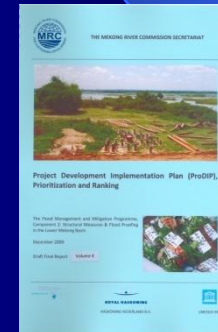
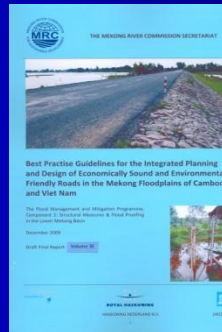
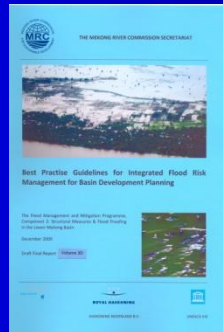
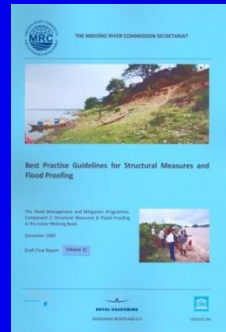
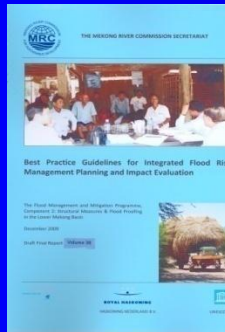
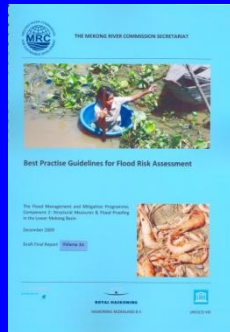
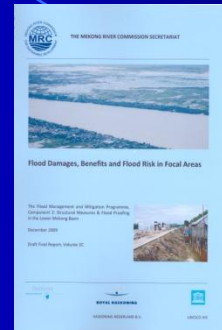
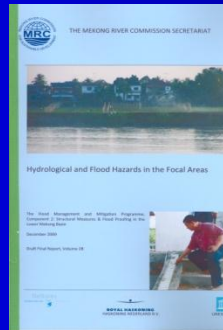
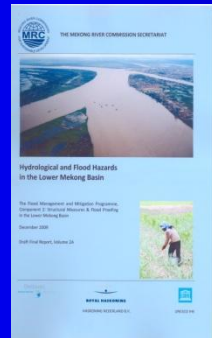
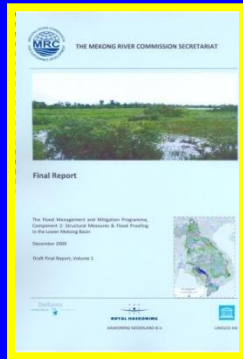
FFT - 06 hr 2009-09-29 06:00 UTC REGIONAL



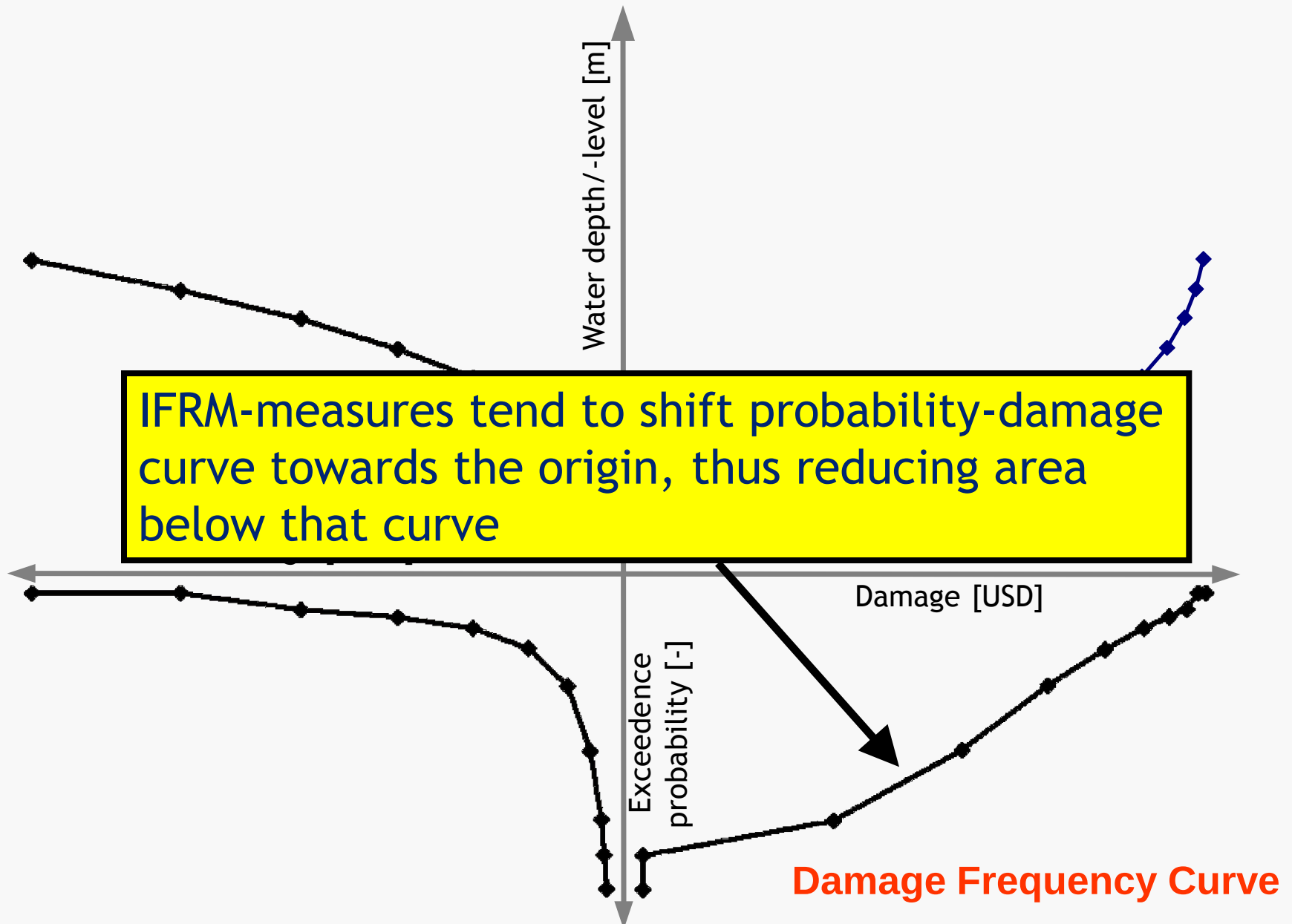
MRC FFGS can identify “Flash Flood Threat” (FFT) in some areas

COMPONENT 2

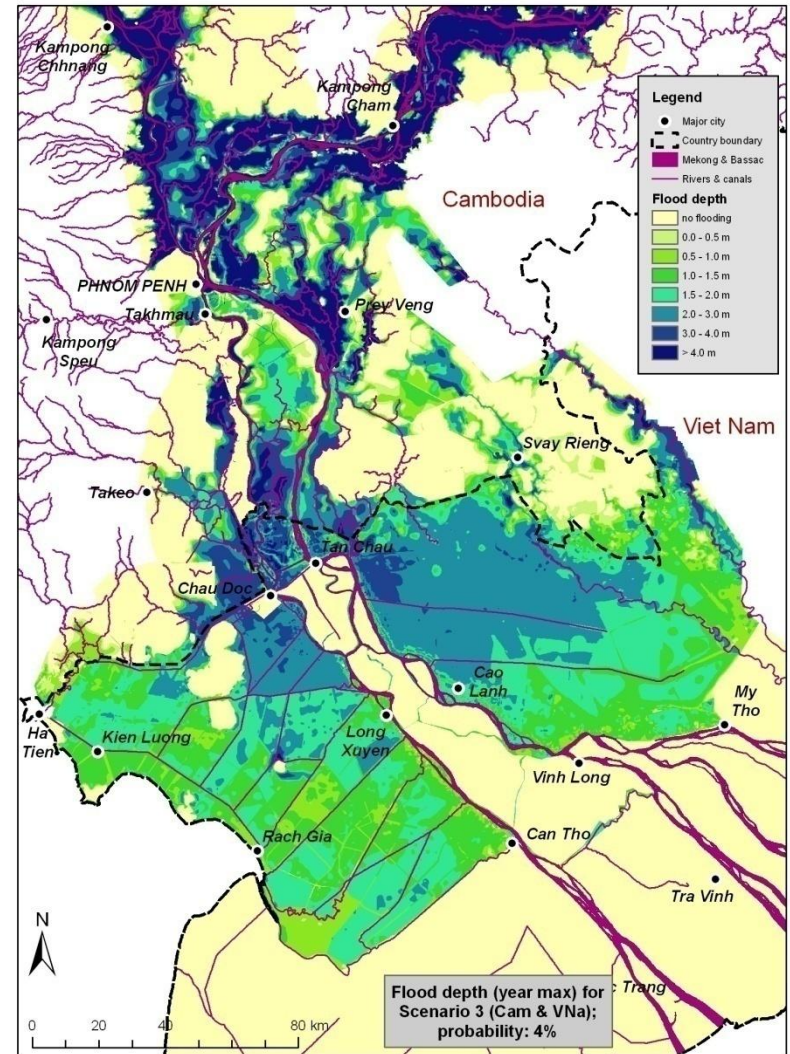
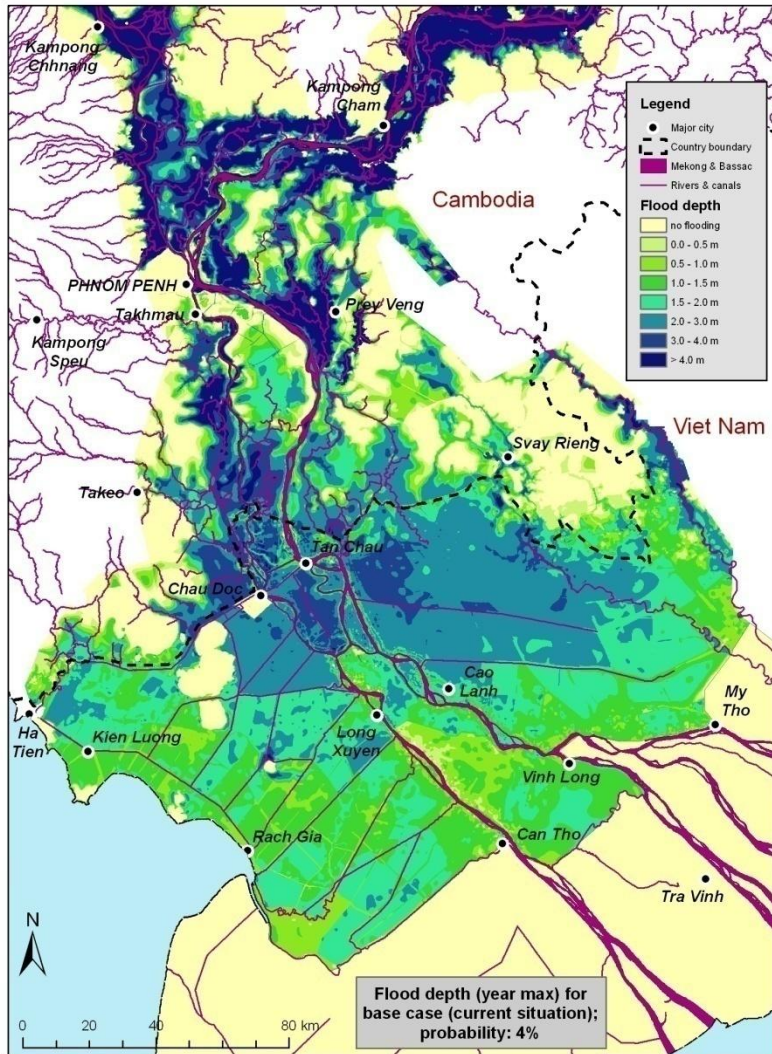
STRUCTURAL MEASURES & FLOOD PROOFING



EFFECT OF FLOOD RISK MANAGEMENT MEASURES

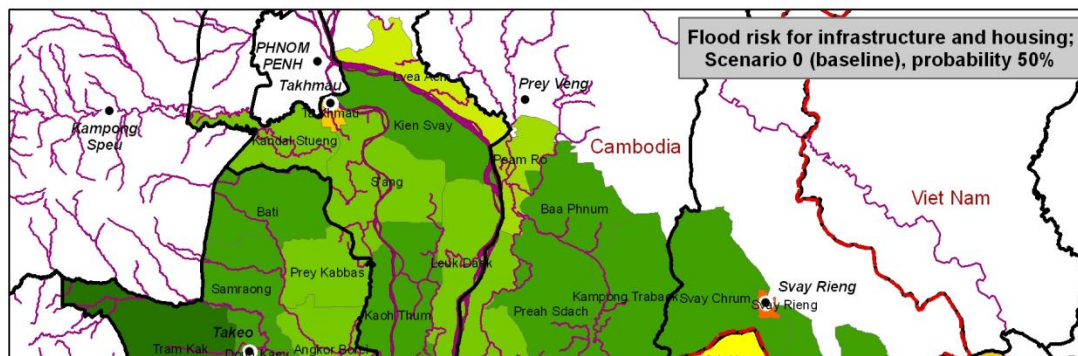
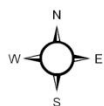


Flood Hazard Maps for Base-Case and for a Future Scenario (at 4% probability of exceedance)



Flood Risk Map Base-Case

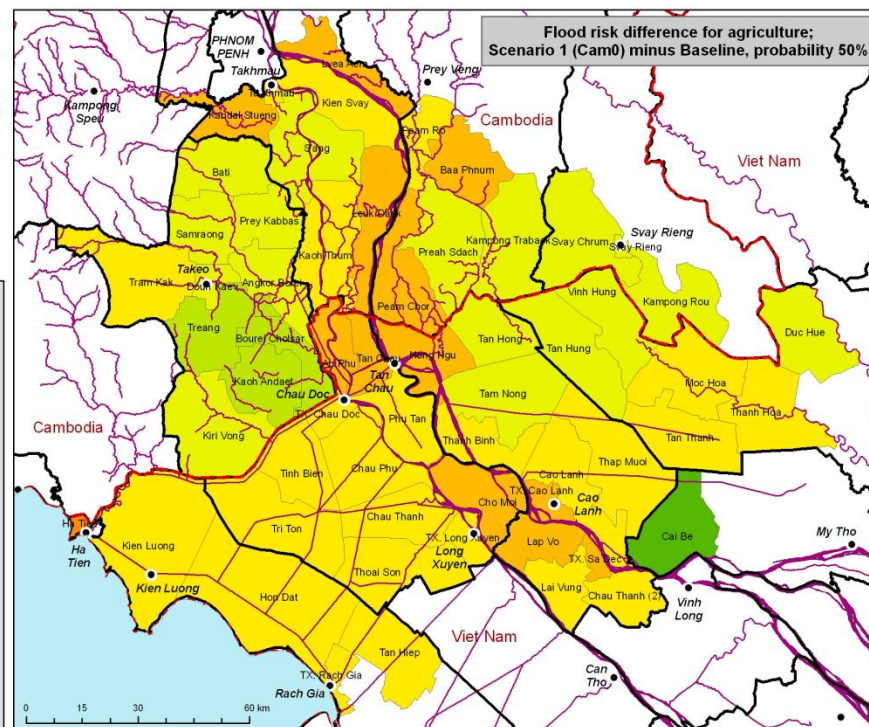
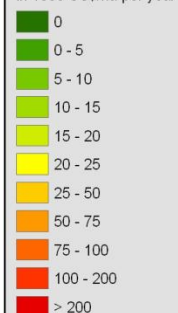
Map Difference in Flood Risk (at 50% probability of exceedance)



Legend

- Major city
- Country boundary
- Provinces
- Mekong & Bassac
- Rivers & canals

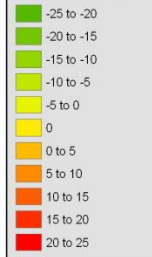
Risk per district
in 1000 US\$/ha per year



Legend

- Major city
- Country boundary
- Provinces
- Mekong & Bassac
- Rivers & canals

Risk diff per district
in 1000 US\$/ha per year



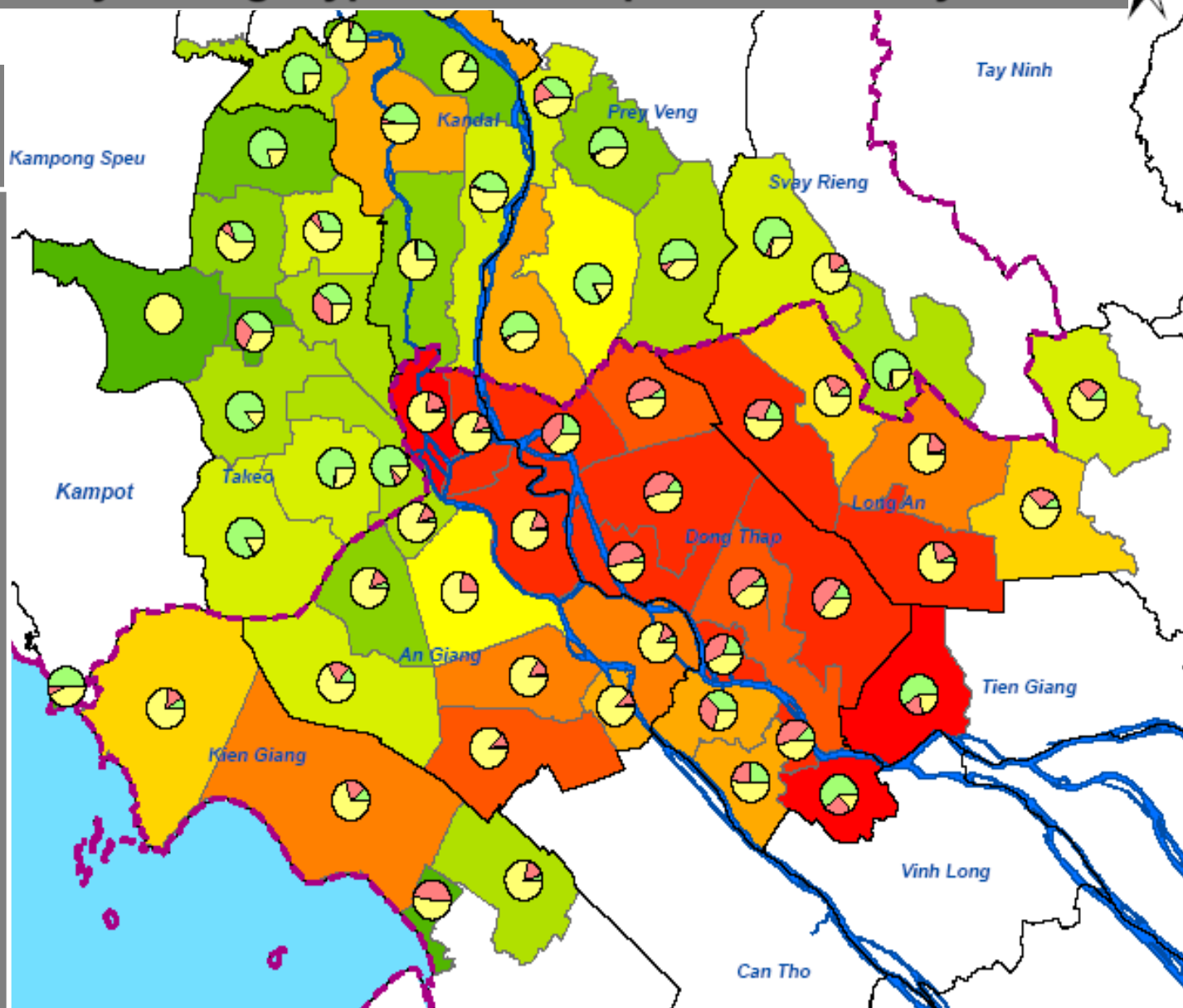
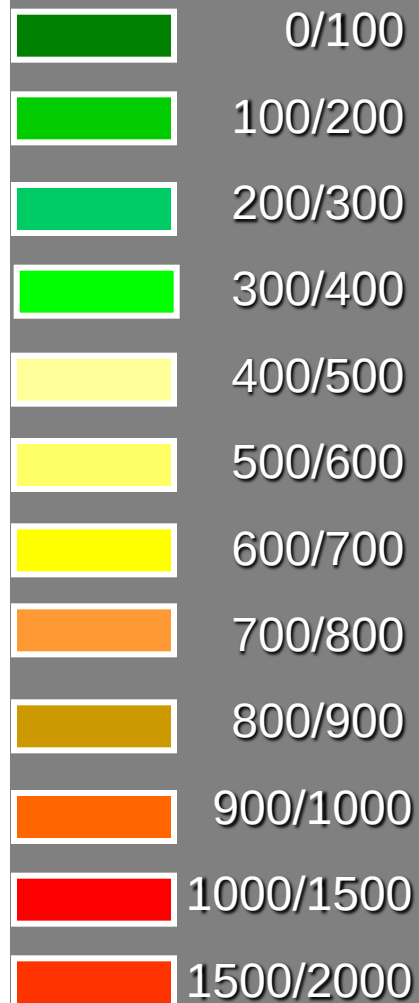
Flood Risk Assessment and Management

Flood Risk in the Border Zone Districts of Cambodia and Vietnam by damage type for return period of 1/100yrs

in the
Vietnam

by damage type

District Risk in USD/ha



COMPONENT 3

Enhancing Cooperation in Addressing Trans-boundary Flood Issues, Differences and Disputes

Information

- List of TB Flood Issues
- Sets of international, regional and national “Best” Practices, Instruments and Case Studies

Awareness and Skills

- Common understanding about mandate and options;
- Better awareness, knowledge and skills re: Conflict Management and Resolution

Toolbox

- List of tools needed for facilitating Addressing Issues, Differences and Disputes
- Administrative Tools
- Technical Tools

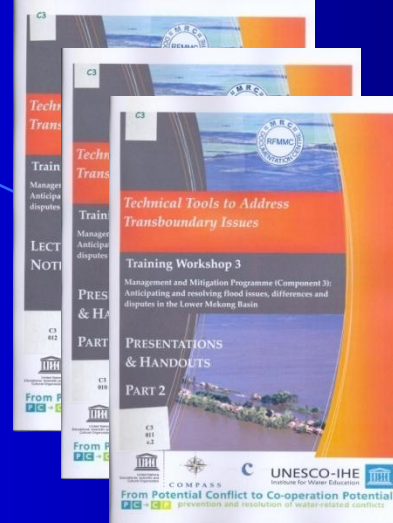
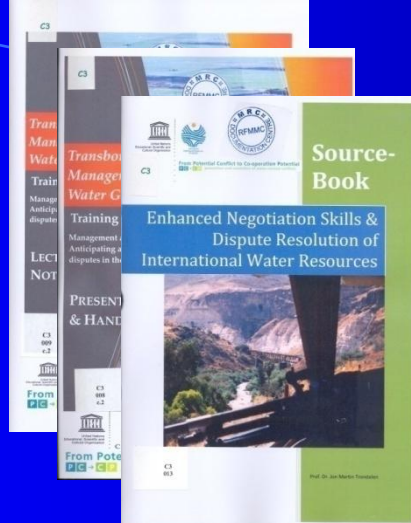
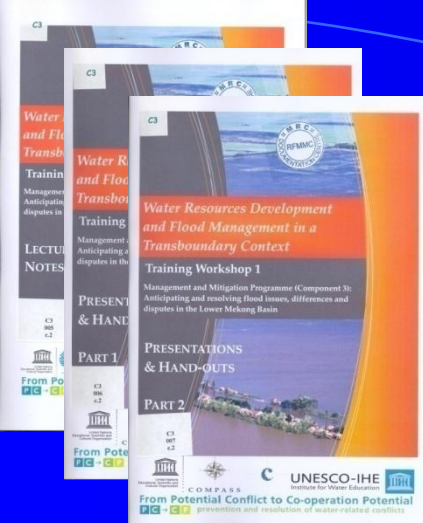
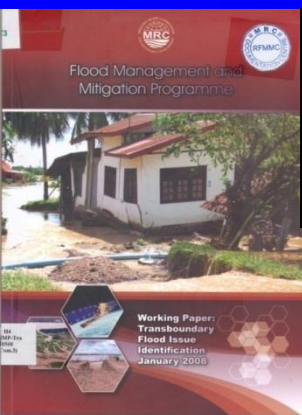
Training materials Capacity Building Programmes I & II

4 National Reports “*Identification of Transboundary Flood Issues at National Level*” and Regional compilation “*Transboundary Flood Issue Identification*”, Jan. 2008 (Working Paper)

Explanatory Manual of LA MA95 (+Pocket Version), Dec.2010

“*Legal Aspects of the Mandate of the 1995 Mekong Agreement for Enhancing Cooperation in Addressing Transboundary Flood and Related Issues*”, Oct. 2007 (Working Paper)

Identification of
Transboundary Flood
Identification of
Transboundary Flood
Identification of
Transboundary Flood
Identification of
Transboundary Flood
Issues at National
Level
(Vietnam)





EUROPEAN STUDY TOUR

7-17 SEP 2009



MEKONG STUDY TOUR

8-11 MAR 2009

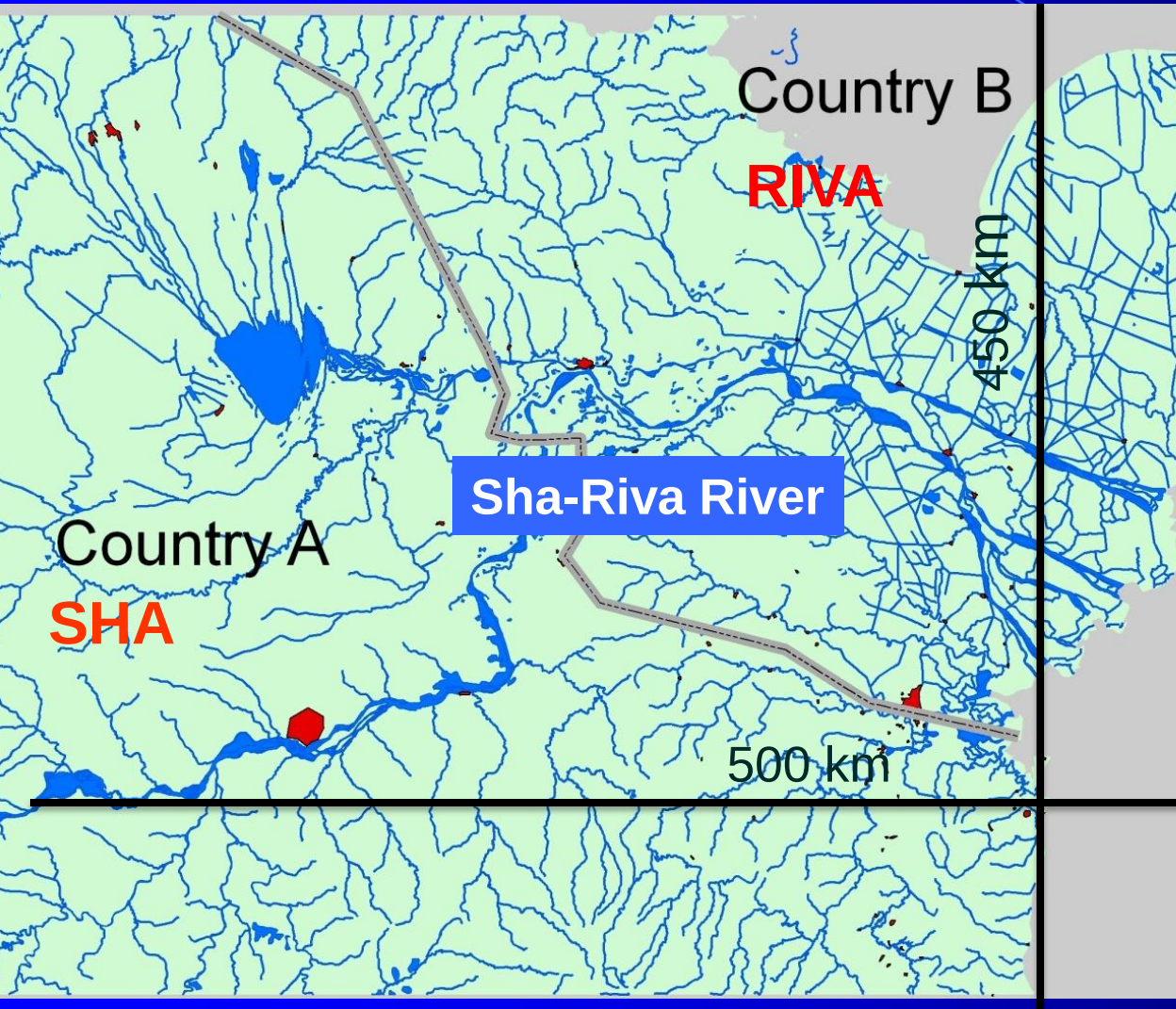


CHINA STUDY TOUR

12-17 OCT 2009



The “SHA-RIVA” PILOT STUDY



The Sha-Riva region measures about 500 x 450 sq km.

The River Shariva plays an important role, with important functions for agriculture, ecology, navigation, hydropower (upstream), etc.

The upstream county is relatively rich due to natural resources, the downstream country is relatively poor.

The Shariva River causes annual floods and flood events.

COMPONENT 4



FLOOD EMERGENCY MANAGEMENT STRENGTHENING

Core Areas of Intervention

Flood Preparedness Programs Development and Implementation

Priority Activity Implementation to facilitate Flood Preparedness and Emergency Management

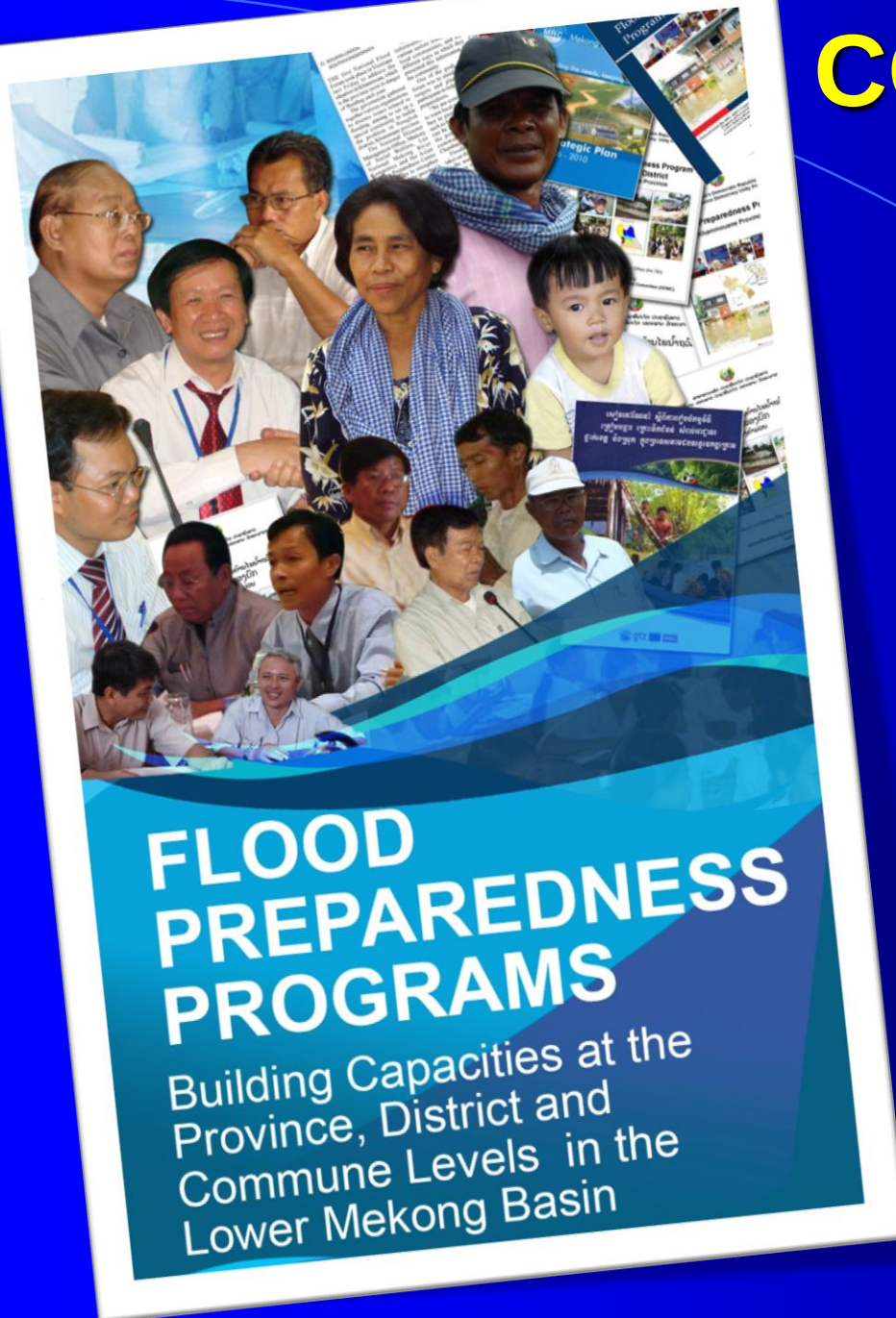
Capacity Building for Flood Risk Reduction

Flood Awareness and Education

Flood Knowledge Sharing and Documentation

Integration of Flood Risk Reduction into local development planning process

Trans-Boundary (Province to Province) Joint Planning and Information Exchange



BẢNG THÔNG TIN VỀ LŨ LỤT Năm 2009

Xã An Hoà, huyện Tam Nông, tỉnh Đồng Tháp
Dân số: 10.203 người
Diện tích: 2.630 ha

Mức nước báo động trên sông Tiền tại Tân Châu (m)	Cấp 1	3,60
	Cấp 2	4,20
	Cấp 3	4,80

Ngày/tháng		Mức nước sông Tiền tại Tân Châu (m)	Mức nước nội đồng tại xã (m)	Diện tích đất bị ngập (ha)
Hôm qua	17 / 08	3 12	2 17	
Hôm nay	18 / 08	3 15	2 22	
Ngày mai	19 / 08			
Ngày mốt	20 / 08			

Dự án: Quản lý lũ lụt và Giảm nhẹ thiên tai
Học phần 5: Quản lý đất đai
Giai đoạn 2: Tại Campuchia, Lào, Thái Lan, Việt Nam
Tổ chức tài trợ: Chính phủ Đức
Cơ quan thực hiện:
Ủy hội sông Mê công Quốc tế
Cơ quan Hợp tác Kỹ thuật Đức
Ủy ban sông Mê công Việt Nam
Đài Khí tượng Thủy văn khu vực Nam Bộ

Project: MRC-Flood Management & Mitigation Programme (FMMP)
Component 5: Land Management
Phase 2: Cambodia, Lao PDR, Thailand, Viet Nam
Funded by: Germany
Executed by:
Mekong River Commission (MRC)
German Technical Cooperation (GTZ)
Viet Nam National Mekong Committee (VNMC)
Southern Regional Hydro-Meteorological Center (SRHMC)



gtz

Partner for the Future
Worldwide
on behalf of:



Federal Ministry
for Economic Cooperation
and Development



Village Flood Information Billboard

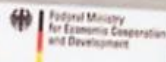




Thank you for your attention

When the Mekong Rises

A Documentary Film on
Flood Emergency Management Strengthening in the Lower Mekong Basin
Flood Management and Mitigation Programme (FMMP)



2. Expectations FMMP 2011-2015

MEKONG RIVER COMMISSION

FLOOD MANAGEMENT AND MITIGATION PROGRAMME 2011-2015

“SUPPORT PROGRAMME”

TO

**THE REGIONAL FLOOD MANAGEMENT AND
MITIGATION CENTER (RFMMC)**

MRC DESIGN FRAMEWORK

1. MRC Strategic Plan 2011-2015:

- Focus on MRC core functions (regional / trans-boundary responsibilities, capacity building & training, technology transfer, technical products & services)

2. MRC Result Based Management System:

- No longer Outputs / Products, but Outcomes (what sustainable change did it generate?)

Classification of FMMP 2004-2010 and FMMP 2011-2015 Outputs / Products

Flood Risk Management functions, activities and Outputs / Products are:

KEY: mandated by the 1995 Mekong Agreement, first ranked in importance

SUPPLEMENTARY: also mandated by MA95, but ranked second

ADDITIONAL: lie outside MA95 mandate, but are needed by the MCs

Ecologically Sustainable Development
Natural Resource Management



River Basin Management.

1. Flood Behaviour.
2. Flood Risk and Hazard.
3. Impact of Structural Works
4. Impact of Land-use Changes.
5. Impact of new Infrastructure.
6. Flood Forecasting



1. Impact of Land Use Changes.
2. Impact of New Infrastructure.
3. Land-use Controls.



1. Impact of Land-use Changes.
2. Appropriate B & D Controls



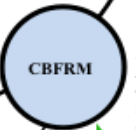
1. Impact of Structural Works.
2. Evacuation Planning.
3. Impact of Land Use Changes.
4. Impact of New Infrastructure.



1. CBFMR Response and Recovery Activities.
2. Floodproofing of Infrastructure.
3. Floodproofing of Buildings



- 1 Flood Warning.
2. PRRR Plans.
3. Evacuation Planning.
4. Liaise with CBFMR.



1. Flood Warning.
2. Flood Response Plans (Modelling).
3. Evacuation Planning (Modelling).
4. Liaise with Emergency Management.
5. Flood Education.
6. Financial Measures.



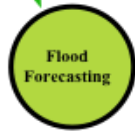
1. Emergency Grants.
2. Loans.
3. Flood Insurance.



1. Preparation.
2. Response.
3. Relief.
4. Recovery



1. Flood Awareness & Readiness.
2. Flood Emergency Planning.



**FMMP 2004-2010
and FMMP 2011-
2015**

**support MRC
Member Countries
in strengthening
Integrated Flood
Risk Management
(IFRM)**

**knowledge and
skills**

Mix of Measures to address Flood Risks

Best strategy depends on hydrological and hydraulic characteristics of river basin:

1. Climatology
2. Basin characteristics
3. Socio-economic conditions

Preferred solution should adopt mix of measures that are flexible:

1. uncertainty
2. resilient and adaptable to changing conditions

Upstream measures should not compromise downstream users

Strategy	Options
Reducing Flooding	Dams and reservoirs
	Dikes, levees and flood embankments
	High flow diversions
	Catchment management
	Channel improvements
Reducing Susceptibility to Damage	Floodplain regulation
	Development and redevelopment policies
	Design and location of facilities
	Housing and building codes
	Flood proofing
Mitigating the Impacts of Flooding	Flood forecasting and warning
	Information and education
	Disaster preparedness
	Post-flood recovery
	Flood insurance
Preserving the Natural Resources of Flood Plains	Floodplain zoning and regulation

Design and Monitoring Framework FMMP 2011-2015

MRC Vision: A World class, financially secure, International River Basin Organization serving the Mekong Countries to achieve the Basin Vision.

Basin Vision: An economically prosperous, socially just and environmentally sound Mekong River Basin.

MRC Mission: To promote and coordinate sustainable management and development of the water and related resources of the Mekong Basin for the countries' mutual benefit and the people's well-being.

FMMP Vision: A World class, financially secure, Regional Flood Management and Mitigation Centre serving the Mekong countries to achieve the Basin Vision.

FMMP Mission: People's suffering and economic losses due to floods are prevented, minimized or mitigated, while preserving the environmental benefits of floods to contribute to the Basin Vision.

**MRC
Strategic
Goal 2011-
2015**

Member Countries apply basin-wide IWRM approaches in national water and related sector frameworks and development programmes

**FMMP
Objective
2011-2015**

Basin management and development in the LMB is guided by up to date flood risk management and mitigation practices aimed at reducing the negative impacts of floods, while maintaining the environmental benefits of floods

**FMMP
Outcomes
2011-2015**

Outcome 1:

MCs strengthen their basin planning strategy, their national policies, strategies and planning processes by incorporating IFRM principles

Outcome 2:

Operational basin-wide flood forecasting, impact assessment, modelling, monitoring and knowledge management (and drought monitoring and forecasting, DMP)

Outcome 3:

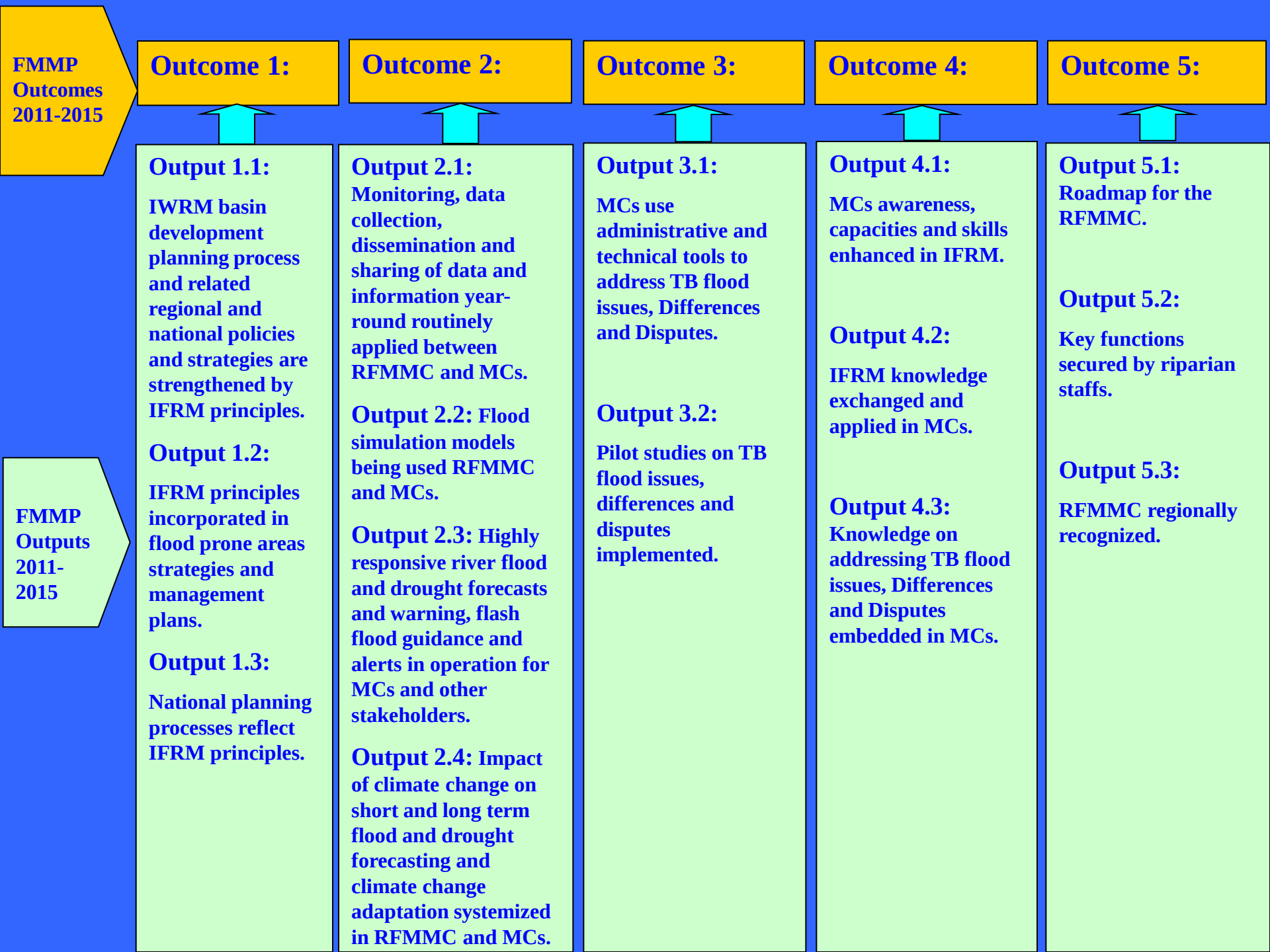
Efficient dialogue and coordination among MCs and dialogue partners in addressing Trans-boundary flood issues

Outcome 4:

Awareness raised, capacities and skills developed at level of relevant national line agencies and NMCs to apply IFRM knowledge

Outcome 5:

Transition to a financially sustainable and professionally capable RFMMC initiated



15 FMMP 2011-2015 Outputs/Products logically arranged under 5 Activity Groups



1. Implementation of IFRM Principles in the LMB
2. Collection, Management and Use of basin-wide flood related Data and Information
3. Management of Trans-boundary Flood Risks
4. Increasing IFRM Awareness and Capacity
5. Administrative Changes to RFMMC

BUDGET REQUIREMENTS FOR 2011-2015



1. Current Comprehensive Budget for performing the present Routine Functions of the RFMMC:
USD 3.3 M
2. Development Budget for enhancement of Capacities and improvement of Products & Services of the RFMMC:
USD 8.7 – 11.7 M

Total external funding needs: USD 12 - 15 M

3. Workshop Challenges

BROAD QUESTIONS

- How to develop leverage for FMMP 2011-2015 with the FMMP 2004-2010 products produced, knowledge and skills built?
- Way forward with “people centered” approaches?

Useful Responses for FMMP (1)

1. How to mainstream Flood Information for improved Land Management at National level?
2. How to mainstream Flood Preparedness and Emergency Management at National level?
3. How to sustain systems (i.e. annual updating of FPPs at particularly Province and District levels) in future?

Useful Responses for FMMP (2)

4. What is in your view the particular strength of the Regional level in supporting “peoples centered” approaches towards FP&EM at District and Commune levels?
5. How to effectively integrate the capabilities of Disaster/Flood Risk Reduction at Regional scale with those of the National, Provincial and District scales?
6. What specific role in the field of DRR/FRR would you assign to the Regional level in order to (be able to) effectively facilitate the National, Provincial and District levels?



Thank you for your attention