



Mekong River Commission

THE FLOOD MANAGEMENT AND MITIGATION PROGRAMME 2011-2015

**UNDER THE REGIONAL FLOOD MANAGEMENT AND MITIGATION CENTER
PHNOM PENH**

PROGRAMME DOCUMENT

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EXECUTIVE SUMMARY

Up until the Year 2000 Flood, MRC flood management activities were essentially limited to the provision of mainstream flood forecasts along the Mekong River. Following the devastation caused by the Year 2000 Flood, the MRC Council instructed the Secretariat to prepare a flood mitigation and management strategy (FMM Strategy). After a comprehensive consultative process with the four Member Countries, the Strategy was published and approved by the Council in 2001. Building on this Strategy, the flood management and mitigation programme (FMMP) of MRC was developed in 2004 and implemented over the next six years (FMMP 2004-2010). This Programme, which consisted of five components and produced some 92 'products'¹ to assist Member Countries to better manage flood risk in the Lower Mekong Basin (LMB), is currently drawing to a close.

This programme document presents the design of an ongoing phase to FMMP 2004-2010, namely FMMP 2011-2015, to be implemented by the Regional Flood Mitigation and Management Centre (RFMMC), which is housed in a purpose-designed building constructed in Phnom Penh under FMMP 2004-2010. The programme document identifies the technical, institutional, organizational and financial needs to enable RFMMC to implement FMMP 2011-2015².

The main achievements of FMMP 2004-2010 can be summarized as follows:

- The establishment of a fully operational RFMMC, complete with flood forecasting systems, staff and equipment. The improved flood forecast and broadened flood related information on the flood pages on the MRC website have been very much appreciated by its users. The Annual Mekong Flood Forums have been considered valuable by local, regional and international organizations and agencies for its achievements in sharing flood related information;
- The development of five sets of best practise guidelines (BPGs) that address various aspects of flood risk management at the national level. There were also created opportunities for investment banks to consider some example flood risk management plans for further development and investment;
- Flood management and mitigation knowledge, capacities and skills in addressing trans-boundary flood issues have been strengthened at the national agency level, in educational institutes and in National Mekong Committees, while administrative and technical tools have been developed, tested, applied with outcomes documented. Knowledge and skills have been built through innovative pilot studies, applying administrative and technical tools within the framework of the 1995 Mekong Agreement.
- Flood preparedness and emergency management in the MRC Member Countries has been strengthened through targeted capacity building and training programmes at national, provincial, district and commune levels. Annually-updated flood preparedness plans have been embedded in provincial and district administrative systems; best practices have been documented and shared with MRC Member Countries.
- The development and use of flood probability information has been demonstrated for better land management.

RFMMC is now a permanent physical centre of the Mekong River Commission Secretariat (MRCS), referred to as the Office of the Secretariat in Phnom Penh (OSP). Under FMMP 2004-2010, RFMMC provided a home for a number of FMM activities, including the core river basin management responsibilities of flood forecasting and the provision of flood warning information. In designing FMMP 2011-2015, MRC has decided that FMM functions during 2011-2015 should *support the operation and key functions* of the established RFMMC, and not be treated simply as a follow-on to FMMP 2004-2010.

¹ These 'products' are the 'outputs' of FMMP 2004-2010. In passing, it is noted that most Bureaux of Meteorology/Flood Forecasting Centres refer to their 'outputs' as 'products'. This terminology has been adopted in this Report, where a FRM product is any tool, process or piece of data or information that assists with the management of flood risk.

² The FMMP 2011-2015 Programme Document has been drafted by design mission members Dr. Bert L.M. van Woersum, Dr. Chris Joy and Dr. Nguyen Ngoc Thuy in a consultative process with the MRC Member Countries, relevant MRC programmes, the MRC Secretariat and FMMP.

RFMMC will implement a second 5-year Programme of FMMP - namely FMMP 2011-2015. FMMP 2011-2015 comprises 'a number of outputs and activities for implementation in the period 2011-2015, to enable the continuation and development of RFMMC's operations, and to provide support to the FMM activities of MRC Member Countries'. The five outcomes to be achieved by FMMP 2011-2015 are as follows:

- IFRM principles are incorporated in the regional basin plan and strategy and in national (long-term) strategies and planning processes.
- Flood forecasting, impact assessment, modelling, monitoring and knowledge management (and drought monitoring and forecasting) are occurring on a routine, year-round, basin-wide basis.
- Member Countries and Dialogue Partners address trans-boundary issues, differences and disputes in an efficient, effective and coordinated way.
- The ability of relevant national line agencies and NMCs to use IFRM knowledge and principles to better manage flood risk is strengthened.
- The transition of RFMMC to a financially sustainable and professionally capable institution is initiated.

These outcomes have been translated into outputs, activities, indicators and risks in the comprehensive design and monitoring framework developed for FMMP 2011-2015.

FMMP 2011-2015 will address both technical and non-technical aspects of flood management and mitigation; the concept of IFRM embodies both structural and non-structural risk management measures, including land-use management, flood forecasting and warning, and flood emergency management at both regional and community levels. The IFRM process also looks at the impact of floods on the socio-economic standing of flood-prone communities with the aim of improving community resilience. Another fundamental tenant of the IFRM process is the need to examine all flood risk management measures to determine the best 'mix' to manage flood risk in individual areas. The situation in many flood-prone areas in the LMB will require specific combinations of measures, such as land-use controls, flood proofing, flood emergency planning, and community based flood risk management (incorporating flood education, financial measures and flood preparedness plans). The IFRM process enables all these issues to be addressed in a coordinated and logical way.

FMMP 2011-2015 encompasses both (i) operational FMM functions (such as flood forecasting) and (ii) development & services FMM functions (to develop better operations tools and systems, to provide FMM services to MCs). As such, FMMP 2011-2015 represents RFMMC's contribution to the MRC Council-endorsed MRC Strategic Plan and IWRM-based Basin Development Strategy for the Lower Mekong Basin. This RFMMC/FMMP 2011-2015 Programme Document is an integral part of the 2011-2015 MRC Strategic Plan. The FMMP 2011-2015 Design and Monitoring Framework including the programme objective, outcomes, activities, outputs, risks and indicators all fit within the broader MRC framework. The FMMP 2011-2015 Programme Objective is that basin management and development in the Lower Mekong Basin 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.

The FMMP 2011-2015 is designed for the implementation of a comprehensive set of interrelated development & support functions and defines the required institutional structure and management framework. The functions undertaken by RFMMC depend on the priorities of Member Countries and the opportunities that exist for external funding of FMMP 2011-2015.

The estimated total cost of FMMP 2011-2015 (ie operations functions and development & services functions) is USD 13 – 15 M over the five-year period 2011 to 2015. It is expected that FMMP 2011-2015 will be implemented progressively, depending on the identified priorities by the Member Countries and the availability of funding. Recommendations have been given regarding the order in which activities should be undertaken in the case of funding shortfalls.

FMMP 2011-2015 engages with a large number and variety of stakeholders, from ministries to local communities. Stakeholders have different skills and resources and their interests often differ. A proper identification of the various stakeholders and a clear definition of their respective roles in FMMP 2011-2015 will be undertaken to ensure effective implementation of the programme. In addition, FMMP 2011-2015 will clearly identify target beneficiaries for the delivery of various FMMP 2011-2015 products.

Target beneficiaries can also substantially differ in their need and capacity to use the various products. It is crucial to be fully aware of the end-users of products and their capabilities when defining roadmaps to implement FMMP 2011-2015.

The NMCs and their Secretariats are national focal points for the implementation of FMMP 2011-2015. Line Agencies are key actors in the implementation of all technical aspects of FMMP 2011-2015, along with all dedicated national partners dealing with flood management and mitigation, such as National Centres for Flood Forecasting, Disaster Management Agencies and other relevant Line Agencies.

A detailed roadmap will be prepared to guide change management during the RFMMC transition process that is to occur under FMMP 2011-2015. The main lines of such a roadmap, as well as the implementation approaches for the period 2011-2015, have been described in this document. Line Agencies need to be actively involved in advancing the implementation arrangements for FMMP 2011-2015 and to increase their responsibilities in this regard. The roadmap for the Center may well include a broader picture of RFMMC's 'operations' by exploring synergies through the integration of regional responsibilities with other MRC programmes, eg the Drought Management Programme.

The draft final FMMP 2011-2015 Programme Document was approved during the 33rd Meeting of the MRC Joint Committee on 25-26 March 2011 in Sihanoukville, Cambodia.

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LIST OF ABBREVIATIONS

ADB	Asian Development Bank
AIP	Agriculture and Irrigation Programme (MRC)
AMFF	Annual Mekong Flood Forum (FMMP)
APL	Adaptable Programmatic Loan
ARI	Average Recurrence Interval
ASEAN	Association of Southeast Asian Nations
BDP	Basin Development Plan (MRC)
BPG	Best Practices Guidelines
BMU	Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit
CEO	Chief Executive Officer (MRC Secretariat)
CBFRM	Community Based Flood Risk Management
CBFRERM	Community Based Flood Risk & Emergency Response Management
CCAI	Climate Change Adaptation Initiative (MRC)
CCDM	Commune Committee for Disaster Management (Government of Cambodia)
CCFS	Climate Change Flood Scenario
CCS	Climate Change Scenario
CNMC	Cambodian National Mekong Committee
CSA	Canadian Space Agency
CSO	Civil Society Organization
CTA	Chief Technical Advisor
DANIDA	Danish International Development Assistance
DDMFSC	Department of Disaster Management and Flood and Storm Control
DHRW	Department of Hydrology and River Works (Cambodia)
DM	Disaster Management
DMH	Department of Metrology and Hydrology (Lao PDR)
DMP	Drought Management Programme (MRC)
DOM	Department of Meteorology (Cambodia)
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DTM	Digital Terrain Model
DWR	Department of Water Resources (Thailand)
ESD	Environment Sustainable Development
EIA	Environmental Impact Assessment
EP	Environment Programme (MRC)
EUR	Euro(s)
FAR	False Alarm Ratio
FAS	Finance and Administration Section (MRC Secretariat)
FAU	Finance and Administration Unit (FMMP)
FF	Flood Forecasting/Flood Forecasts
FFE	Flood Forecasting Expert
FFEWS	Flood Forecasting and Early Warning System (FMMP)

FFGS	Flash Flood Guidance System (FMMP)
FINAID	Department for International Development Cooperation of the Ministry of Foreign Affairs of Finland
FME	Flood Management Expert
FMM	Flood Management and Mitigation
FMMP	Flood Management and Mitigation Programme (MRC)
FPM	Flood Preparedness Manual
FPP	Flood Preparedness Programme
FRM	Flood Risk Management
FRR	Flood Risk Reduction
FVA	Flood Vulnerability Assessment
FW	Flood Warning
GDP	Gross Domestic Product
GIS	Geographic Information System
GMS	Greater Mekong Sub-region (ADB)
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GOL	Government of Lao PDR
HMS	Hydro-Meteorological Services (Vietnam)
HRC	Hydrologic Research Center (US)
HYCOS	Hydrological Cycle Observing System
HYMOS	Hydrological and Meteorological Operating System
ICCS	International Cooperation and Coordination Section (MRC Secretariat)
ICBP	Integrated Capacity Building Programme (MRC)
IRBM	Integrated River Basin Management
IFME	International Flood Management Expert
IFRM	Integrated Flood and Risk Management
IHE	See UNESCO/IHE
IKMP	Information and Knowledge Management Programme (MRC)
IRR	Internal Rate of Return
ISH	Initiative on Sustainable Hydropower (MRC)
ISIS	Software package for river modeling
IWRM	Integrated Water Resources Management
JAIF	Japan ASEAN Integration Fund
JC	Joint Committee (MRC)
JICA	Japan International Cooperation Agency
LA	Line Agency
LMB	Lower Mekong Basin
LNMC	Lao National Mekong Committee
MA95	Mekong Agreement 1995
MDG	Millennium Development Goal
MONRE	Ministry of Natural Resources and Environment
MOU	Memorandum of Understanding
MOWRAM	Ministry of Water Resources and Meteorology (Cambodia)

MRC	Mekong River Commission
MRCs	Mekong River Commission Secretariat
NCDM	National Committee on Disaster Management (Cambodia)
NDMO	National Disaster Management Office (Lao PDR)
NFFC	National Flood Forecasting Center
NFU	National Flood Unit (MRC Flood Programme)
NGO	Non-Governmental Organization
NMC	National Mekong Committee
NRM	National Resource Management
NSS	National Support Staff
NTS	National Technical Staff
NTG	National Task Group
OEB	Operations Expenditure Budget
OFDA	Office of Foreign Disaster Assistance (US)
OPD	Operations Division (MRC Secretariat)
OSP	Office of the Secretariat Phnom Penh
OSV	Office of the Secretariat Vientiane
PCDM	Provincial Committee for Disaster Management (Government of Cambodia)
PIP	Programme Implementation Plan (FMMP)
PIU	Project Implementation Unit
PMS	Performance Management System (MRC)
POD	Probability of Detection
ProDIP	Projects Development Implementation Plan (FMMP)
PRRR	Preparation, Response, Relief, Recovering
RBM	River Basin Management
R&D	Research and Development
RDE	Royal Danish Embassy (Hanoi)
RFMMC	Regional Flood Management and Mitigation Center (FMMP)
RNE	Royal Netherlands Embassy (Hanoi)
RPS	Riparian Professional Staff
SC	Steering Committee
SEA	Strategic Environmental Assessment (of BDP)
SSARR	Stream-flow Synthesis and River Regulation (FMMP)
SP	Strategic Plan
TNMC	Thai National Mekong Committee
TB	Trans-boundary
TMD	Thai Meteorological Department
TOT	Training of Trainers
TOR	Terms of Reference
TSD	Technical Support Division (MRC Secretariat)
TSU	Technical Support Unit
TWS	Tropical Weather System
UN	United Nations

UNESCO	United Nations Educational, Scientific and Cultural Organization
UNESCO/IHE	Institute for Water Education (Delft, The Netherlands)
USAID	United States Agency for International Development
URBS	Unified River Basin Simulation Model
USD	United States Dollar(s)
VNMC	Vietnam National Mekong Committee
VRSAF	Vietnam River System and Plains Model
WAD	Waterways Administration Division (Lao PDR)
WMO	World Meteorological Organization
WUP	Water Utilization Programme (MRC)
WWF	World Wildlife Fund

1. INTRODUCTION

1.1 BACKGROUND

After the devastating floods of 2000 and 2001 the Member Countries of the Mekong River Commission (MRC) entered into discussions to take drastic steps towards the reduction of damages to infrastructure, economic losses and the loss of lives and livelihoods as a result of extreme floods. The Mekong River Commission's Joint Committee and Council endorsed the Flood Management and Mitigation Strategy in 2001, which was followed by the implementation of a dedicated Flood Management and Mitigation Programme (FMMP) in 2004. The FMMP 2004-2010 Programme is supported by a large number of development partners. In May 2009 a Joint Review Mission, funded by the Royal Danish Embassy and the Royal Netherlands Embassy, Hanoi, Viet Nam, was undertaken to assess the relevance, effectiveness and efficiency of the FMMP 2004-2010 Programme and to address future challenges.

The Mekong River Commission is completing by the end of 2010 the implementation of the FMMP 2004-2010. The MRC is taking up the formulation process for FMMP 2011-2015 within the framework of its Strategic Plan 2011-2015. This formulation process is characterized by a participatory approach in which the Member Countries, all its stakeholders and beneficiary groups fully participate during all steps of the formulation process during various rounds of well prepared national consultations (for details see chapter 1.5, the formulation process).

After Round 1 of the national consultations in Cambodia, Lao PDR, Thailand and Viet Nam, country reports have been produced in August 2010 for each of the four countries identifying, assessing and prioritizing major FMMP related issues. These country reports have been sent to the respective countries for comments. The country reports have been used to provide important input to the design of FMMP 2011-2015 as elaborated in this Formulation Document.

An Interim Report of the Formulation Mission was formulated and discussed in September 2010 and provides the backbone of the final Formulation Document. The Interim report was discussed during Round 2 of national consultations in September 2010.

This Draft Final Formulation Document shows that RFMMC/FMMP 2011-2015 is fully embedded in the MRC Strategic Plan 2011-2015, which is not so surprising as the Declaration of the 1st MRC Summit in Hua Hin, Thailand stresses the need for Flood Management and Mitigation services and capabilities for the MRC.

Ref.: "Intensifying efforts to effectively manage the risks from flood, drought and sea level rise including establishment of forecasting and warning systems across the whole basin".

The design and monitoring framework as indicated in Annex No. 1 defines outcomes, outputs, activities, indicators as well as means of verification, assumptions and risks. The relationship between MRC Strategic goals and FMMP 2011-2015 goals have been made very explicit to show that FMMP 2011-2015 is an integral part of MRC.

1.2 MRC MANDATE AND FMMP CORE FUNCTIONS

1.2.1 The Mandate - 1995

The 1995 "Mekong Agreement on the Cooperation for Sustainable Development of the Mekong River Basin" (MA95) outlines the legal mandate of the Mekong River Commission. The Member Countries, by signing the Agreement, committed

'to cooperate in all fields of sustainable development, utilization, management and conservation of the water and related resources of the Mekong River Basin...in a manner to optimize the multiple-use and mutual benefits of all riparians and to minimize the harmful effects that might result from natural occurrences and man-made activities'.

Under this Agreement, the Mekong River Commission was created as the institutional framework for cooperation in the Lower Mekong River Basin, including extending cooperation with upstream Dialogue Partners China and Myanmar.

The scope of MRC's work is defined in the first three articles of the Mekong Agreement which outline areas of cooperation related to coordinated and/or joint planning for balanced and socially just development in the Mekong River Basin, and which oblige the signatories to protect the environment and maintain the ecological balance of the Mekong River Basin.

Article 1 of MA95, 'Areas of Cooperation', identifies an *implicit responsibility* of MRC to facilitate flood management in the LMB. 'Flood control' is listed as one of the activities to be managed for the

'mutual benefits of all riparians and to minimize the harmful effects that might result from natural occurrences and from man-made activities'

Thus, management of 'natural' flood risk and any 'man-made' activities that increase flood risk sit squarely on MRC's agenda of 'cooperation'.

1.2.2 MRC Flood Management and Mitigation Strategy- 2001

Up until the Year 2000 Floods, MRC flood management activities were essentially limited to the provision of mainstream flood forecasts³ along the Mekong River. Following the devastation caused by these floods, the MRC Council instructed the Secretariat to prepare a flood mitigation and management strategy (FMM Strategy). After a comprehensive consultative process with the four Member Countries, the Strategy was published and approved by the Council in 2001 (MRC, 2001a).

The Strategy investigation found that MRC has *no mandate* to actually manage flood risk *per se* in the LMB, and that its activities in relation to flood management and mitigation are limited to the following three roles;

- (i) The *provision of technical products and services* to assist Member Countries with flood management, a key product being flood forecasts;
- (ii) *Addressing differences and facilitating the resolution* of water and related issues, specifically trans-boundary flooding issues; and
- (iii) *Capacity building and technology transfer* to the MRC Member Countries.

Under FMMP 2011-2015 two additional roles regarding IFRM have been added in line with the MRC Strategic Plan 2011-2015:

- (i) To define a regional IFRM strategy⁴ and country specific roadmaps; and
- (ii) To influence strategies to include IFRM in national and lower level plans⁵.

The FMM Strategy indicates a focus on *regional and trans-boundary* flood issues. National and local flood impacts, ie impacts generated and experienced solely within a single country, remain that country's responsibility. MRC's role is to support national agencies and NGOs with *supplementary services that are of relevance at the regional level and with respect to trans-boundary issues*.

Thus, *activities* focussed on the management of *regional and trans-boundary flood risk issues*, constitute specific 'core' activities of the MRC in relation to flood risk management and mitigation.

1.2.3 Flood Management and Mitigation Programme 2004-2010

A recommendation of the FMMS 2001 was that MRC embark on a fully-fledged flood management and mitigation programme. To this end, such a programme was designed (MRC, 2004a) and commenced operations in 2004-05. This programme (FMMP 2004-2010) consisted of five components (see MRC, 2004b to 2004f), each of which addressed many elements (activities and tasks) and produced a number of 'products' (ie, outputs). In fact, FMMP 2004-2010 developed nearly 100 products (see Annex No. 4 for details). Table 1.1 shows the five components of FMMP 2004-2010, together with their immediate

³ Such forecasts were derived from regression relationships between upstream and downstream water levels.

⁴ The concept and principles of integrated flood risk management (IFRM) are explained in Annex 2.

⁵ Outcome 1 and related outputs and activities in the design and monitoring framework.

objectives. FMMP 2004-2010 was comprehensively reviewed in 2009 (van Woersem and Joy, 2009), which provides a foundation for this report and the formulation of FMMP 2011-2015.

Table 1.1 FMMP 2004-2010 Components and Immediate Objectives

FMMP Component		Immediate Objective
C1	Establishment of a Regional FMM Centre	A regional FMM centre maintaining the (national and regional) availability of important flood-related tools, data and knowledge; producing accurate regional forecasts with a suitable lead time and a timely and effective dissemination; and providing accurate, well documented and consistent tools for basin-wide flood risk assessment and trans-boundary impact analysis.
C2	Structural Measures and Flood Proofing	A reduced vulnerability of people living in the Mekong Basin to the negative impacts of floods; Management capacity established for the development and refinement of the Implementation Plan'
C3	Enhancing Cooperation in Addressing TB Flood Issues	Enhance mediation and coordination capacity of the MRC in issues of non-compliance in trans-boundary flood management. Cooperation and capacities of the MRC in addressing and resolving differences in trans-boundary flood issues are strengthened.
C4	Flood Preparedness and Emergency Management Strengthening	Emergency management system in riparian countries are (sic) more effectively dealing with Mekong Floods.
C5	Land Management	Institutional, land management, human resources and technical support being available to (sic) sustainable land management, and improved land-use planning integrated into floodplain management and mitigation (sic) in the LMB in the Mekong floodplains is more effective, using reliable flood-related information.

1.2.4 MRC Strategic Plan – 2011-15

The MRC Strategic Plan 2011-2015 defines four categories of 'core' functions, as shown in Table 1.2:

- (i) Administrative functions (MRCS) – 'Core-A';
- (ii) River Basin Management functions (all programmes) – 'Core-RB';
- (iii) Capacity Building functions (MRCS and all programmes) – 'Core-CB'; and
- (iv) Consulting and Advisory Services functions (all programmes) – 'Core-CAS'.

The administrative functions are *not relevant* to FMMP 2011-2015, whereas the other three categories of core functions are *relevant* to FMMP 2011-2015.

The 2nd MRC Core Function - River Basin Management (RBM) - is crucial for FMMP with special reference to the fourth Sub-Function under RMB - Forecasting, Warning and Emergency Response. Other RBM sub-functions are also important for FMMP. The third MRC core function - Capacity Building and Tools Development is also crucial for FMMP.

The core functions of MRC clearly refer to regional and trans-boundary activities, with special reference to capacity building. These core functions have major consequences for the formulation of key and other functions of FMMP 2011-2015.

Table 1.2 MRC Core Functions⁶

Categories	Description	Examples of Functions
Secretariat Administrative and Management Functions.	Functions of a routine and recurrent nature that provide for the management and administration of the Secretariat and support to MRC governance processes as well as support to non-technical processes under the 1995 Mekong Agreement.	Governance of the MRC Financial and administrative management Personnel management International cooperation Communications
River Basin Management Functions.	Functions of the MRC through which it routinely engages in water resources development and management issues at different scales in the Mekong Basin.	Data acquisition, exchange and monitoring Analysis, modelling and assessment Planning support Forecasting, warning and emergency response Implementing MRC Procedures Promoting Dialogue and Coordination Reporting and Dissemination
Capacity Building and Tools Development Functions.	Functions providing for continuous capacity building at the MRCS, NMC Secretariats and line agencies and maintenance, and updating of data holdings, processing capacity and analytic capability.	Capacity building for Member Countries and MRCS across all themes State of the art tool development
Consulting and Advisory Services Functions.	Functions that make available the technical expertise, databases, modelling capacities, and expert networks of MRCS to support studies and assessments commissioned by others for sustainable water resources development, both at the project level, and at the basin wide and cumulative level.	Consulting services Commissioned studies Expert advice

1.3 LESSONS LEARNED AND REFLECTED IN PROJECT DESIGN

The Joint Danish-Netherlands Review Mission undertaken in April/May 2009 assessed the progress, products and quality of the operations and implementation of FMMP 2004-2010 (van Woeseem and Joy, 2009). The review Mission concluded that the implementation of FMMP 2004-2010 was properly conducted, products were produced in line with the design documentation, and that the quality of the implementation was up to standard. The Review Mission also defined some of the major challenges ahead, the most important ones being completion of products and the uptake of completed products by the end-users. The five programme components under FMMP 2004-2010 were relatively independent due to the fact that different Donors could individually fund these components.

Table 1.3 summarizes the major lessons learnt from FMMP 2004-2010 in the fields of programme design and approach, implementation at country level, and capacity development. Moreover, this table indicates in which manner the lessons learnt have been taken into consideration in the design for FMMP 2011-2015.

1.4 ADDED VALUE OF THE RFMMC

After the year 2000 Flood, the MRC Council instructed the MRC Secretariat to develop the FMM Strategy and to develop the FMM Programme with the support of international consultancy companies. A series of national and regional consultations and workshops was conducted to identify countries' needs. Apart from the numerous awareness raising, skills and capacity building elements and the design of a range of pilot interventions, a vision was embraced by all Member Countries to embed capabilities regarding flood management and flood mitigation in a permanent infrastructure, the Regional Flood Management and Mitigation Centre (RFMMC).

⁶ As defined in Annex 3 of the Strategic Plan.

Table 1.3 Lessons Learned from FMMP 2004-2010 taken up in FMMP 2011-2015 Project Design

FMMP 2004-2010 Lessons	Reflected in FMMP 2011-2015 Design
<p>Programme Design and Approach</p> <p>Approach and design influenced by Year 2000 flood and broad Donors interest</p> <p>Consequently, five individual programme components designed as “stand-alone”.</p> <p>No prioritization required as all components funded by different Donors.</p> <p>No clear understanding and agreement on the responsibilities of FMMP, NMCs and LAs.</p> <p>Fragmented M&E due to funding of the programme component by different Donors.</p> <p>Location in Phnom Penh complicated coordination with other MRC programmes.</p>	<p>Approach and design elaborated in a participatory manner together with national stakeholders and lead agencies from the very first moment in the formulation process onwards.</p> <p>A core programme with additional interrelated activities.</p> <p>Major role of national stakeholders and lead agencies in the prioritization of products and the programme.</p> <p>Full agreement on the roles and responsibilities of various parties through the signing of MOUs.</p> <p>Awareness amongst MRC management regarding need for coordination and collaboration between MRC programmes.</p>
<p>Implementation at Country Level</p> <p>Limited insight into the product chain from production to the end users.</p>	<p>Clear insight into the product chain through the elaboration and agreement on roadmaps for key products including responsibilities, time frame and milestones.</p>
<p>Capacity Development</p> <p>Capacity building not systematically pursued as programme components were funded and implemented through different Donors.</p> <p>No clear understanding and agreement regarding the responsibilities of Line Agencies for capacity building of the provincial, district and community levels.</p> <p>No FMMP Coordinator for capacity development as FMMP 2004-2010 consisted of five fairly independent components.</p>	<p>Priorities for capacity building indicated by the individual NMCs.</p> <p>Appointment of a capacity building coordinator under FMMP 2011-2015.</p>

At the time all MRC Member Countries expected that such a Center would provide equal benefits to each country. However, every year the flood season brings a different flood that affects the various countries in different ways. Flood issues in each of the MRC Member Countries are of a different nature and magnitude.

FMMP implemented the RFMMC as defined by the Council-approved design documentation. This led to a logical initial focus on the Cambodian floodplain and the Vietnam Mekong Delta. Flood forecasting information for the Mekong mainstream has a different level of usefulness, urgency and added-value for each of the MRC Member Countries. Upstream countries generally provide much of the data used for forecasting purposes; the resulting flood forecasts are generally most needed by the downstream countries.

However, the introduction of the flash flood guidance system (FFGS) and the overriding concept of integrated flood risk management have brought a better balance in terms of usefulness, urgency and added-value of the RFMMC for the individual Member Countries.

During the 1st MRC Summit, held in Hua Hin, Thailand on 5 April 2010, the leaders of the MRC Member Countries marked the reduction of flood risk and flood risk management as matters of priority.

The FMMP 2011-2015 programme provides on the one hand an opportunity to further enhance the balance between countries; and on the other hand, with reference to the MRC Strategic Plan 2011-2015, it allows for country-specific interventions, thereby enabling the Center to address an issue, which is a problem in a weakness in one country, but not in another.

MRC, striving to become a world-class international river basin organization, recognizes that the RFMMC is an integral part of the MRC and based on similar standards⁷. The achievements in building-up FMM knowledge and capabilities under a USD 27 million programme, supported by seven Donor organizations in the period 2004 – 2010, are positive according to the 2009 external joint Donor review mission. Herewith, the MRC has created a sound foundation to gradually develop the RFMMC into a world-class regional flood center, but a number of major challenges remain.

⁷ The MRC Member Countries could also consider allowing the RFMMC under FMMP 2011-2015 to explore options for providing FMM services to non Government agencies and private sector. FMM services, for instance in terms of providing flood maps indicating the flood risk (potential damages/year) for banking sector, could for instance be offered to the banking sector in the member countries. Such services would cover part of the annual operational expenses of the RFMMC.

The rationale for establishing a permanent Regional FMM Center, which was approved by MRC Council and Joint Committee in 2004, is described in Box No. 1.

The fact that an operational Regional Flood Management and Mitigation Center has been established by the MRC Member Countries demonstrates to the population and communities living in the LMB, as well as the international community, that the management and mitigation of negative impacts of floods in the Lower Mekong Basin has been given high priority by the Member Countries. FMMP 2004-2010 has delivered a large number of quality outputs for the Member Countries. The frequent 'hits' on the MRC website in the recent years, especially during periods of tropical depressions and tropical storms, have demonstrated a good level of quality (accuracy and lead time) and reliability. Notwithstanding the achievements of many products by FMMP 2004-2010, the RFMMC routinely provides a limited range of generally good quality products and services to the Member Countries. RFMMC, with the support by FMMP 2011-2015, needs to broaden the range its range of routine products and services, so it can cover not only the general needs, but also address the more specific requirements of individual Member Countries. During the upcoming Strategic Plan period, FMMP 2011-2015 will be instrumental in furthering and strengthening the regional recognition of the RFMMC and its practical value to Member Countries.

1.5 DEVELOPMENT PARTNERS AND FLOOD MANAGEMENT

For the Mekong countries, floods strongly affect socio-economic development and have huge consequences related to poverty and food security. There is a need for water resource managers, policy-makers, and the private sector to change course from a 'traditional' flood management approach towards a approach fully integrated with water resource management, ie IFRM. With growing population pressure in flood-prone areas, combined with increasing climate variability, climate change, and currently inadequate natural resource management, there is increasing challenge to address floods in a sustainable manner. While floodwaters are an essential water resource in many countries, and floodplains hold many benefits for society for economic development, floods cause of loss of life, livelihoods and property, and thus can be a hindrance to the socio-economic development of nations. Therefore, an integrated approach to flood management is necessary to balance development opportunities on flood plains against flood risk. An important aspect of integrated flood management strategy is coordinating the needs of different stakeholders. Flood management for the Mekong basin must simultaneously address the problems of the poor flood-plain dwellers and the future development of agriculturally fertile land that is prone to frequent flooding. This requires that each sector of the economy take a role in the ways floods are managed, jointly with all national ministries, agencies and the affected provinces and communities.

Currently, the Mekong River Commission (MRC) receives (grant) funding support from many country governments through their development agencies. These countries include Australia, Belgium, Denmark, European Commission, Finland, France, Germany, Japan, Netherlands, New Zealand, Sweden and USA. Apart from their direct support to MRC, these countries also support development banks and international organizations such as Asian Development Bank (ADB), World Bank, and ASEAN. The MRC also has relationships with many other partners and institutions. It works with these different partners under jointly funded projects, under formal Memoranda of Understanding (MOU) or in a research capacity.

The Development Partners who are actively involved in flood management in the LMB include:

1. The US Agency for International Development, through its Office for Foreign Disaster Assistance, collaborates with MRC on operations and research in meteorology, hydrology, flood management, capacity building of emergency personnel in MRC Member Countries, development programmes in Mekong river basin, dissemination of flood preparedness, forecasting and warning information to community level. Under FMMP 2004-2010, OFDA provided valuable support for the improvement of flood forecasting and warning in the MRCS and Member Countries. As early as 2003, OFDA/NOAA introduced village level flood forecasting and warning system in Cambodia. In 2006 OFDA/HRC introduced the Flash Flood Guidance System (FFGS) to MRCS. RFMMC will need future back-up support from OFDA/HRC for its FFGS.

Box No. 1 Rationale for Establishment of RFMMC

“The MRC Flood Management and Mitigation (FMM) Strategy provides the basis for a much stronger future involvement of MRC in regional flood management.

In various national and regional workshops organized during the FMM Strategy formulation and during the First Annual Flood Forum held in April 2002, the establishment of a Regional Flood Management and Mitigation Center was considered a high priority.

The establishment of such a center was also one of the major recommendations of the International Expert Meeting organized by MRCS in February 2002.

Flood forecasting and warning has been mainly dealt with on a national basis.

To differing degrees, riparian line agencies do not share data and information sufficiently well enough to meet even domestic water management and flood forecasting purposes; therefore the Regional FMM Center will be the vehicle for sharing data between agencies within and between the riparian countries.

It will provide on-the-job-training for officials from the Member Countries, Moreover, by building consensus among the riparian countries on a variety of standards such as data collection, exchange, storage, and quality assurance, RFMMC can assure that the data are comparable, and basin wide.

With RFMMC serving as a center of excellence in flood forecasting and data, and information archiving, it can assist the riparian counterpart line agencies to achieve a common level of capacity and performance.

An extremely important task of integrated flood management is the generation and dissemination of information, in particular in relation to flood forecasting and warning. Information in itself does not solve flood and disaster management problems; however management problems cannot be properly addressed and solved without adequate information.

Considering the multiple uses of floods, this project will address new technological development, the use of information on many aspects of flood management, and issues of information access and dissemination.

Data collection, processing and dissemination require substantial organization and allocation of resources.

By reducing the gaps between information needs and information availability, a contribution can be made to effective and more efficient flood management.

Starting in July 2001, MRCS has issued daily flood reports through the Internet.

The reports were compiled from information received from line agencies in the Member Countries. In the 2002 flood season MRC continue to broadcast three-day forecasts with improved telemetering equipment that can transmit data directly to computer terminals in the Secretariat in Phnom Penh.

The RFMMC, when operational, will, in cooperation with line agencies in the Member Countries, and if possible in all the six riparian countries, intensify and harmonize data collection and processing, and assume responsibility for the flood reporting.

During the national FMM workshops held in August-September 2002, all Member Countries supported the component and the proposed activities to be carried out.

The support was reconfirmed at the Regional Workshop held in October in Phnom Penh.”

Source: Component 1 Document, Final Version, November 2004 under “Summary, page ii”, “Justification”.

2. The *Canadian Space Agency* (CSA) and Natural Resources Canada work in partnership with MRCS on Earth Observation and Geometrics Support for Flood Management and Environmental Monitoring in the Mekong River Basin. CSA/Hatfield⁸ have been exploring possibilities of providing images during the peak flood period in the LMB. It is expected that future cooperation will facilitate the practical application of satellite imaging for flood information and warning services by the RFMMC.
3. The *European Commission* (EU) has assisted with capacity building for the planning and implementation of flood preparedness programmes at provincial, district and commune levels in the Lower Mekong Basin (Phase I to IV). EC has funded four pilot projects which have been extremely valuable for improving the province, district and community based flood preparedness and emergency management. These interventions can be leveraged by mainstreaming lessons learned into appropriate national agencies for disaster management, which is proposed under FMMP 2011-2015.
4. *UNESCO/IHE Institute for Water Education Cooperation* collaborates with MRC on short courses, degree training for riparian country professionals, technical support and quality assurance as well as mapping institutional capacity and capacity building of local institutions. UNESCO/IHE has been instrumental in developing two phases of capacity building to address regional trans-boundary flood issues. The next step is embedding this material in national knowledge centers, which is proposed under FMMP 2011-2015.
5. The *World Meteorological Organization* (WMO) collaborates with RFMMC on operations and research in meteorology, hydrology, flood management, and water resources and in improving flood forecasting and warning systems. WMO has been supportive of the expansion of the hydrologic network in the Mekong River Basin and in capacity building for IFRM. The future continuation of this cooperation is considered valuable for the RFMMC.
6. *World Wide Fund for Nature* works with MRC on cooperative arrangements at the national, and Mekong Basin levels in the areas of watershed management, sustainable use of natural resources and other water-related resources, promotion of renewable energies, and flood management and mitigation solutions. WWF has cooperated with RFMMC in the design, construction and maintenance of roads in floodplain areas of the LMB, specifically addressing ways to maintain the natural flow and the environmental benefits of floods. Its inputs have been useful and cooperation over 2011-2015 is expected to continue.

1.6 FORMULATION PROCESS FOR FMMP 2011-2015

The preparation process of FMMP 2011-2015 has gone through a comprehensive participatory preparation process, as indicated in Table 1.4. This has been a somewhat tortuous process involving a major rewrite and refocus of the programme document. The initial approach was ‘product-based’, as ‘products’ were the outputs of FMMP 2004-2010. In conjunction with Member Countries, products were reviewed for usefulness and completion; it was found that a number of products required additional work before they were ready for use; it was also found that the ‘delivery chain’ from the RFMMC to the end-users was weak, and that considerable added-value could be realized by addressing these issues. This led to a programme document that was inconsistent with the programme documents of other MRC programmes. Hence, a decision was made to reshape the FMMP programme document to bring it into line with other programmes. This has resulted in some confusion because of changes in terminology and emphasis.

The draft final FMMP 2011-2015 Programme Document was approved during the 33rd Meeting of the MRC Joint Committee on 25-26 March 2011 in Sihanoukville, Cambodia.

⁸ Hatfield Consultants in aquaculture, fisheries management, environmental impact assessment, habitat assessment, GIS, and related environmental fields (Vancouver, Canada)

Table 1.4 Key Events and Methods Followed in the Formulation and Preparation of FMMP 2011-2015

Date	Event	Key Decision Points
Feb 2008	4 th FMMP Steering Committee meeting	FMMP was requested to draft a Concept Note on the future operations of RFMMC including various options for the organization, management and staffing.
Jun 2009	7 th FMMP Steering Committee meeting	The concept note on the future development and operations of RFMMC after 2010 (version 8) was found acceptable as a “working document” for the formulation of the continuation of FMMP. It was recommended to incorporate two remaining points; (i) providing stronger rationales for RFMMC to be an umbrella for FMMP 2011-2015 and (ii) incorporating performance indicators for RFMMC core functions.
Apr/May 2009	Joint Danish-Netherlands Review Mission FMMP 2004-2010	Conclusions and major recommendations made for FMMP 2011-2015.
Nov 2009	MRC Council Meeting in Hua Hin, Thailand	Decision on the co-chairing of MRCS
Dec 2009	Concept Note on Future Operations Regional Flood Management and Mitigation Centre, Phnom Penh, Cambodia, version 9	This version includes options, incorporated requests made by earlier FMMP Steering Committee meetings and accommodates the proposal on MRC Permanent Location endorsed by the MRC Council during the MRC Council meeting on 24-26 November 2009
Apr 2010	1 st Mekong Summit in Hua Hin, Thailand	Consensus reached about a more frequent provision of water level data by the MRC MCs, and especially from China to the RFMMC. The Summit incorporated in its statement that flood risk reduction is high priority for the MRC Member Countries.
May 2010	MRC Secretariat-Donor meeting	To initiate discussions on the continuation of FMMP. During this meeting the Netherlands Government suggested to formalize a Bridging Period until 31 December 2011 for which an additional funding would be made available by the Netherlands Government.
May 2010	Pre-Formulation Mission Meetings in all four Member Countries between NMCs and RFMMC core staff.	To further discuss the Concept Note on the future development and operations of the RFMMC as well as the explanation of the participatory preparatory process for the formulation of FMMP 2011-2015.
Jul 2010	National Consultations between the FMMP 2011-2015 formulation mission and all four NMCs	Based upon three preparatory notes as well as questions raised in a power point presentation discussions were held with stakeholders as well as the leadership in all four Member Countries on the following issues; (i) MRC goals and related FMMP 2011-2015 goals; (ii) core functions of MRC and FMMP; (iii) problems and needs; (iv) specific lessons from FMMP 2004-2010; (v) organizational issues, various options; (vi) MRC contributions to RFMMC in future and; (vii) any other issues.
Jul 2010	Questionnaires regarding the state of affairs of FMMP 2004-2010 products (and relevance and suggestions for future), priorities for new products under FMMP 2011-2015 and priorities for capacity building were distributed to NMCs	Filled in questionnaires were sent to formulation mission for analysis and for inclusion in the country specific reports and the draft formulation report.
Aug 2010	Country reports sent to RFMMC and NMCs for comments	Summary of findings during the 1 st national consultations on all relevant issues. Analysis of assessments made regarding existing products, new products and capacity building.
End of Aug 2010	Draft Interim report FMMP 2011-2015 sent to RFMMC, MRC and NMCs for discussion 2 nd half of September 2010	Table of Contents in conformity with MRC requirements. Goals, outputs, activities, assumptions, risks and means of verification defined for FMMP 2011-2015 including relations to MRC goals 2011-2015. Programme design, implementation strategy and institutional framework and finance.
Sep 2010	Second round of national consultations between formulation mission, FMMP/RFMMC, NMCs and MRCS	To discuss and decide on the log frames, result frameworks, FMMP 2011-2015 product priorities, the organizational framework, the roadmap for the transition process and the finance.
Oct 2010	Agreement on Bridging Period 2011 with Royal Netherlands Embassy (RNE) in Hanoi	Funding of the core functions of FMMP/RFMMC during the year 2011 will enable FMMP/RFMMC to properly prepare for the formulation and funding for FMMP 2011-2015.
Oct 2010	Finalization Formulation Report by the Formulation team	All comments made during the 2 nd round of national consultations will be taken into consideration in the final report.
Mid Nov 2010	1 st Regional consultation	To discuss how to finalize the draft Programme Document. Structural adjustment.
Mar 2011	2 nd Regional consultation	To reach consensus on draft final FMMP 2011-2015 Programme Document.
Mar 2011	33 rd Meeting of the MRC Joint Committee	Approval of Flood Management and Mitigation Programme Document for 2011-2015.

1.7 COMPARISON OF LOGFRAMES

Table 1.5 compares elements of the logframes used in the draft report of October 2010 and in the current draft report. The original logframe was designed to address five MRC Strategic Goals through 12 FMMP Outcomes, 48 FMMP Outputs and 118 FMMP Activities. The current logframe was simplified to bring it into line with the approach of other MRC Programmes, and addresses only one MRC Strategic Goal through five FMMP Outcomes, 15 FMMP Outputs and 36 FMMP Activities. What has happened to the missing outcomes, outputs and activities? The elements of the current logframe are broader in scope than those of the earlier logframe; specific elements in the earlier logframe into broader packages of elements in the current logframe. For example, the original logframe had some 118 activities; these are reduced to 36 activities in the current logframe. This has been achieved by treating many of the activities of the original logframe as sub-activities in the current logframe. Thus, when the 36 activities of the current logframe are 'expanded', the total number of 'activities' (including sub-activities) is 70. The 'missing' 48 activities of the original logframe have been merged into other activities in the current logframe.

Table 1.5 Comparison of Logframe Representations, October 2010 and March 2011 Draft Reports

Item	October 2010 Draft Report	March 2011 Draft Report
MRC Strategic Goals	5	1
FMMP Specific Goals	12	None
FMMP Outcomes	12	5
FMMP Outputs	48	15
FMMP Activities	118	36 (70)

It is stressed that all technical 'products' and capacity building courses agreed to in earlier discussions are included in the current programme document. Table 1.6 shows summary details of the number of 'products' and capacity building courses to be developed/delivered under FMMP 2011-2015.

Table 1.6 Technical Products and Capacity Building Courses Included in FMMP 2011-2015

Item	Technical 'Products'	Capacity Building Courses	Total
Existing (From FMMP 2004-2010)	37	10	47
New	8	6	14
Total	45	16	61
'Key'	30	8	38
'Supplementary'	15	6	21
'Additional'	-	2	2
Total	45	16	61
Priority 1	37	16	53
Priority 2	1	-	1
Priority 3	7	-	7
Total	45	16	61

2. CONTEXT AND RATIONALE

2.1 REGIONAL RELEVANCE AND DEVELOPMENT CHALLENGES

The past 50 years have seen a sharp rise in large-scale disaster. In the Asia and Pacific region, water related disaster, more than other types, have increased in frequency. The scale and impact of the damage they inflict have also become more serious. Economic damage resulting from water-related disasters has increased in the recent decades. It is common belief that water-related disasters are expected to intensify with the climate change in the many years to come.

The Mekong region and the Mekong water issues are very complex. Each of the four LMB countries is currently dependent on the resource in different ways and to different degrees. Each country perceives its future water-related opportunities and risks in very different ways. Arguably, Cambodia is potentially most at risk in case of unsustainable management of the river, and that would affect in particular its poor population, which depend on local fisheries for 40-70 percent of its protein intake, and on flood protection. Lao PDR on the other hand suffers much less from floods and still has many sites potentially suitable for hydropower. All four LMB countries would be affected, in negative and positive ways, by changes in water use in Yunnan. Technical and financial capacities are also distributed unevenly between the countries. All water in the river currently serves an economic or social purpose, thus, shifting water uses to other activities inevitably will have impacts on current users.

What seems to be abundantly clear is that economic growth in the region will continue at rapid pace, and this development will exert strong influence on the water system and its current users. Because of the high inter-dependencies, uncoordinated or unilateral water development can cause serious harm to the other riparian interests, to the environmental values, and, indeed, to other communities in the own country. Yet, the Mekong basin has major development opportunities, which in many cases can be optimized or come to fruition only, and contribute to the wealth of the region and of each individual country, if the countries cooperate. Thus, Mekong management requires addressing cross-border challenges, but, within each country, cross-sectoral ones as well, and it raises the need for proper IWRM policies and for river-based management at country level.

New opportunities are available for improved flood management and mitigation. MRC is already pursuing such opportunities, with its recently implemented real-time water level monitoring (covering both its Member Countries and Yunnan), and the MRC flood predictions published daily on the internet are widely applied. Also, MRC supplies boundaries data for more detailed food predictions for sub-basins that are undertaken by national agencies. There is an attractive potential for further development. New forecasting and risk and impact assessment technologies have been implemented in other large river basins, in Southeast Asia and elsewhere, with proven advantages. The MRC Member Countries have accumulated a vast expertise in flood management, which can be consolidated, disseminated, and further developed by a continuous dialogue. The MRC is in a unique position to contribute effectively to improved flood management at the regional level.

The Mekong River is different from most other major rivers by its extreme seasonal discharge fluctuations: very low flows in the dry season and vast flooding in the wet season which nourishes the basin's extensive wetlands such as the world famous Tonle Sap in Cambodia. Much of the annual flood pulse along the river downstream comprises imported water from upstream, so that disruptive flooding in Cambodia may occur while nearby fields at the same time are unproductive because shortage of the water for a long period of time.

Floods can occur anywhere in the LMB. Each year, the nature, location and severity of flooding differs across the basin, depending on the underlying characteristics of flood-producing rainfalls and other causative factors. This can best be demonstrated by four examples: the Floods of 2000, 2006, 2008 and the flash flooding of 2009 (see Box No. 2).

Year 2000 Flood:

The Year 2000 Flood caused severe mainstream flooding of extended duration across the Cambodian Lowlands and the Cuu Long Delta, coupled with widespread flash flooding across the LMB and minor mainstream flooding in the Upper, Middle and Lower River Reaches. The peak discharge and annual flood volume at Vientiane and Kratie were close to the median annual values; the average recurrence interval (ARI) of peak flood levels at Prek Kdam and Tan Chau were 100 years and 40 years respectively ('extreme' events).

Year 2006 Flood:

The Year 2006 Flood was characterized by the absence of mainstream flooding of significance throughout the LMB; at Vientiane, Kratie, Prek Kdam and Tan Chau, peak discharges, peak flood levels and annual flood volumes were all around 'normal' levels. Modest flash flooding caused by Tropical Weather Systems (TWSs) occurred in certain tributaries draining the Northern Highlands, Eastern Highlands and the Khorat Plateau.

Year 2008 Flood:

The Year 2008 Flood was different again, with severe Tropical Storm (TS)- induced mainstream and tributary backwater flooding along the Upper River Reaches of the Mekong River in Lao PDR and Thailand. Flooding along the reach of river between Luang Prabang and Vientiane was 'extreme'; peak discharges had an ARI of 30-40 years. The severity of mainstream flooding progressively declined downstream of Vientiane (Middle River Reach), falling to 'normal' at Khong Chiam and to significantly less than normal downstream of Stung Treng. Flooding was 'normal' across the Cambodian Lowlands and the Cuu Long Delta. There was some limited flash flooding in Cambodia and Viet Nam.

Year 2009 Flood:

In 2009, severe flash flooding occurred in the central part of the LMB in parts of all MRC Member Countries as a result of heavy rainfall from the tropical depression Ketsana.

Floods disrupt the life and well-being of affected peoples in the LMB, reducing agricultural production (typically rice), curtailing income, fostering sickness and disease, damaging public infrastructure and private assets, interfering with schooling and generally sustaining poverty. Despite these adverse effects, people continue to live in flood-prone areas because of the fertility of the floodplain and population pressure (population density in the Cuu Long Delta is some 450 persons/km²). Over time, the flood-prone peoples of the basin have learned (and in more recent years have been assisted by national governments) to 'live with floods'.

In general flood risks are increasing as a result of developments in the basin and especially the floodplains, in terms of infrastructure, land-use changes, and increasing population. MRC Member Countries over time have broadened and improved their sets of instruments to reduce these flood risks. Flood forecasting systems, warning and dissemination services are improved, while much work has been put into the enhancement of coping mechanisms at village and commune levels in the recent years. However, Member Countries are aware of the fact that the entire system of integrated flood risk management at the national level is complex and need further enhancement as the frequency of floods and the intensity of floods are expected to increase in the LMB. Regional cooperation through the MRC is considered relevant to enhance the basin wide assessing and understanding of the flood phenomena and to develop effective systems to support the MRC Member Countries in reducing floods risks for people living in the LMB. The FMMP and the RFMMC is considered an adequate instrument, contributing to this goal.

2.2 STAKEHOLDERS AND TARGET BENEFICIARIES

FMMP 2011-2015 does engage a large number and a high variety of stakeholders, from ministries to local communities. Stakeholders have different skills, resources and often differing interests. A proper

identification of the various stakeholders and a clear definition of their respective roles in FMMP 2011-2015 are required to ensure an effective implementation of the programme.

Moreover, it is essential to clearly identify and define the target beneficiaries for the delivery of various FMMP products. Target beneficiaries can also substantially differ for the various products. To properly define roadmaps, it is crucial to be fully aware of the end-users of the products. At the end, the effectiveness and relevance of a programme depends whether the products really reach the end-users and are being used by them. Table 2.1 summarizes the programme stakeholders, their interests and their roles, while Table 2.2 describes the role of the target beneficiaries as well as the potential programme benefits for this group.

Table 2.1 Programme Stakeholders

Stakeholder	Interest	Role
Ministry of Planning and Ministry of Finance for final decision making on funding.	Responsibility to ensure that IWRM and IFRM will receive sufficient funding.	Key player in the development process and therefore crucial for IWRM and IFRM as well. An often forgotten party by the "Water World".
Line agencies with mandates to manage Mekong water and related resources	Incorporate IWRM and IFRM in national policies and plans. Responsibility for programme implementation. Exercise responsibility for the development and use of tools and guidelines (national level)	Lead the regional and trans-boundary components. Coordinate with provincial and district entities. Coordinate trans-boundary components.
RBOs and national research and planning institutions with mandates to manage Mekong water and related resources	Exercise responsibility for the development and use of tools and guidelines.	Work with national provincial and district entities.
NMCs and NFUs	Fulfill their coordination roles in the preparation, implementation and monitoring & evaluation of FMMP 2011-2015.	Links between FMMP/RFMMC and stakeholders. Links between FMMP 2011-2015 components.
Provincial, district and local entities.	Identify felt needs. Implement national policies.	Link between local community and national level.
Local communities at project sites.	Focus on direct benefits from pilot activities. To ensure socio-economic programme benefits and to draw lessons from implementation.	Participate in needs assessment, planning, implementation and O&M.
Civil Society Organizations, international and national NGOs.	Ensure that local felt needs are brought to the attention of GO levels. Support implementation at various levels. Provide countervailing power. Critically assess benefits and opportunities for scaling up.	Represent the interests of the local community with special reference to the disadvantaged and the environment.
MRC, MRCS and other MRC programmes	Ensure that IFRM will be incorporated in the MRC- IWRM based approach. Support at the highest possible level the translation of FMMP technical capabilities into practical application in MCs.	Outline added value of inclusion of IFRM in the LMB basin-wide approach.
Development partners	Raise living standards and secure socio-economic benefits, environmental sustainability and political stability.	Programme funding and implementation.

Table 2.2 Target Beneficiaries

Target Beneficiaries	Justification	Potential benefits
Poor people with special reference to the most vulnerable, women and children	Fulfill national development priorities to alleviate poverty, address the gender gap, improve living standards and contribute to seek political harmony as well as to fulfill the priorities of the development partners.	Raised living standards with special reference to the poor and disadvantaged and improved health.
Line Agencies	Build capacity and strengthen their ability to mainstream and apply IFRM capabilities into the planning process at various levels.	Capacity built and FMMP technical capabilities used in planning and implementation of national policies.
National Flood Centers	Build capacity and strengthen their capacity to improve FF and FW.	Capacity built and FMMP technical capabilities used to improve national FF and FW. Improved FF and FW contributing to the loss of less lives, raised living standards and improved health.
RBOs	Build capacity and strengthen their ability to mainstream and apply IFRM capabilities into the planning and implementation process RBO level.	Capacity built and FMMP technical capabilities used in planning and implementation at RBO level.
Research and planning institutes	Build capacity and strengthen their ability to mainstream and apply IFRM knowledge into the curriculum of these institutes.	Capacity built and IFRM experiences included in the curriculum.
NMCs and NFUs	National entity to coordinate and implement FMMP developed capabilities.	Strengthened coordination and management capability including improved coordination between MRC programmes at national level.
National Decision Makers	Decision making process requires clear insight into the importance of IFRM.	Sector policies and programmes include IFRM and therefore are better in tune with requirements for sustainable development.

2.3 CROSS CUTTING ISSUES

2.3.1 Poverty Alleviation

The MRC Member Countries recognize that while poverty alleviation remains the national socio-economic goal and the main goal of water resources management in the Mekong Basin context, the MRC does not have a direct role in on-the-ground delivery of services to achieve this goal apart from specific areas such as fisheries-based livelihoods and the prevention of losses from floods.

Activities undertaken by Member Countries within their national legal framework and socio-economic national plans and policies are the primary means of providing direct pro-poor development support. The regional IWRM mandate of MRC would support the national planning and through this contribute to poverty reduction⁹.

MRC's work is strategically contributing to poverty reduction. This is e.g. reflected through FMMP's role in facilitating data sharing and exchange among the riparian countries and providing technical assistance and capacity building activities for forecasting and warning systems that help reduce losses of lives and assets caused by national disasters like floods. In fact FMMP is one of the MRC programmes that directly as well as indirectly impacts on poverty reduction.

FMMP as per definition has strong pro-poor impacts:

- Poor people are the most adversely affected by floods as they usually live in the most flood-prone areas. Appropriate FF is translated into effective flood warnings that directly benefit vulnerable communities.
- The poor do not get easily compensated for their flood losses as there are no mechanisms to help poor flood victims to recover from losses as quickly as possible.

⁹ MRC Strategic Plan 2011-2015

- Flood proofing measures and the emergency flood management strengthening address the poverty alleviation issues directly. Reliable and timely information on an upcoming flood and warning of its consequences may indirectly contribute to poverty reduction.
- Elderly people, women and children belong to the most vulnerable groups of society. Effective FF and FW reduce their vulnerability.

Member Countries expect the MRC to play a more explicit role in ensuring equity (for socially just, or equitable development) in water use or equitable sharing of benefits and risks in the context of the dynamic water-related regional development. This has emerged as one of the most crucial issues that need to be addressed with high priority in the Basin. In this respect the issue of equitable development with respect to being mutually beneficial to the LMB countries and their people the issue of IFRM is relevant in the sense of maximizing benefits of floods, minimizing negative aspects of flooding and mitigating measures with special reference to the poor section of the population.

2.3.2 Gender Considerations

Women-headed households are often the poorest and most vulnerable across the LMB. The MRC Gender Policy and Strategy aims at mainstreaming gender perspectives in all MRC development efforts, ensuring that all MRC programmes benefit women and men equally, and ensuring equal participation of men and women at all levels.

Men and women who are equal partners of the society play equally important roles in the FMM process. However, roles of women in FMM activities across the Mekong Basin differ from country to country and from place to place. There is a strong role for women to play in household and community decision-making concerning CB FMM. Gender issues are highly relevant and are considered directly in at least three main fields:

- (i) Land use management;
- (ii) Flood proofing of homes; and
- (iii) Community-based flood emergency management.

In addition, women play effective roles in disseminating flood warning information and motivating communities to take preventive and response actions before and during floods. It is expected that much of the strengthening of flood resilience at the community level will be through the efforts of women. It is noted that it is important to consider gender sensitivity during evacuation, and in the provision of accommodation and sanitation facilities.

In line with the MRC Gender Policy, more attention needs to be paid to equal opportunities for women in the institutional and technical components of FMM. Women need to be encouraged to participate in the information processing and modelling-related activities of the RFMMC, as well as in Member Countries. Gender equality is an integral part of FMMP 2011-2015 through the Programme's gender toolbox. Gender considerations (in particular women's concerns) will be taken on board through the ongoing work of flood vulnerability assessment in the LMB and in the further fine-tuning and application of BPGs developed under FMMP 2004-2010.

2.3.3 Environmental Governance and Climate Change

Environmental governance is the manner in which people exercise authority over nature¹⁰. The flow of information and data, institutional capacity and transparent decision making involving all stakeholders and cooperators have been identified as among the key indicators of enhanced trans-boundary environmental governance. These key issues are being addressed in FMMP 2011-2015. Environmental governance will be incorporated during the implementation of FMMP 2011-2015 by addressing issues of global environment (e.g. resilience to climate change), natural resources (e.g. wetlands ecosystems), local environmental quality, local competence, local awareness, living with floods, recognizing the benefits of floods as well as zoning and relocation (e.g. striking a balance between risk of living in endangered flood plains and socio-cultural stress management).

Through the MRC Climate Change and Adaptation Initiative and other initiatives, global climate change impacts on the Mekong waters and related resources, and socio-economic impacts will be assessed. The

¹⁰ Nathan Badenoch, World Research Institute, Trans-boundary Environmental Governance: principles and practices in mainland and Southeast Asia, 2001

likely impact of possible future climate change on flood behaviour and flood risk in the LMB will be assessed under FMMP 2011-2015 with special reference to tools to assess such a likely impact.

2.4 COORDINATION OF FMMP AND OTHER MRC PROGRAMMES¹¹

2.4.1 Preamble

Land-use change and infrastructure developments on flood-prone land are both affected by flood risk and may affect flood risk. For example, a change in the use of flood-prone land from agriculture to commerce will increase flood risk (a more vulnerable land-use is then at risk); the construction of a road embankment may raise flood levels and so increase flood risk. Many MRC programmes are also influenced by and possibly influence land-use change or infrastructure development. Thus, there needs for coordination between the FMM activities of RFMMC and the activities of other programmes if potential changes to flood risk are to be effectively managed and integrated across programmes.

Under FMMP 2004-2010, possible changes to flood risk arising from inter-actions between the various MRC programmes were recognized and investigated. In particular, a framework for the development of Best Practice Guidelines for the Inclusion of IFRM Considerations in the Basin Development Programme was developed (Joy, 2007a). This report considered how the Basin Development Programme and other MRC Programmes influence flood risk, and in turn are affected by flood risk. A number of recommendations were made relating to the inclusion of IFRM considerations in all programmes (Table 2.3). The recommendations were largely developed in early 2007, and though somewhat dated now, they demonstrate the interactions between FMMP and other MRC programmes and the need to coordinate FRM efforts. A more detailed description of interactions between FMMP and other MRC programmes is given below.

2.4.2 Basin Development Programme

The Basin Development Programme 2006-2010 (BDP-2) is presently entering into the formulation of a follow-up phase for the period 2011-2015 (BDP-3).

The BDP-1 was completed in 2005, when FMMP had just been formalized and initiated. Under BDP-1 a number of flood management and mitigation initiatives had been identified for the BDP project list. The BDP also requested IFRM management guidelines for BDP. This request was integrated into the design of Component 2 “Structural Measures and Flood-Proofing” of FMMP 2004-2010. One of the products delivered under FMMP Component is the (draft) final report “Structural Measures and Flood Proofing in the Lower Mekong Basin”, May 2010, Volume 1. The report has 16 appendixes, one of which is titled: “Best Practice Guidelines for Integrated Flood Risk Management for Basin Development Planning”, May 2010, Volume 3D. The purpose of the BDP Guidelines is “to ensure that the basin development planning process identifies and addresses flood-related impacts and opportunities of potential development scenarios and development projects in a consistent fashion that is technically, socially, environmentally and financially responsible and effective”.

The BDP has requested FMMP to support the development scenarios for the Cambodian floodplain and the Viet Nam Mekong Delta taking into account the potential impact of sea level rising. This will require a framework commitment from Cambodia and Viet Nam to cooperate on these trans-boundary development scenarios, modelling inputs exclusive and inclusive of climate change, as well as sea level rising. Crucial for the development scenarios will be the trans-boundary flood risk considerations for which a wide variety and application of the hydrodynamic modelling tools for the Mekong delta will be required. Such an FMMP involvement must be well specified in outputs, activities, planning and costs involved.

¹¹ To be further elaborated by indicating where other MRC programmes relate to the specific FMMP 2011-2015 specific goals, outcomes and activities. See also attachment 3.9 to the background paper Core RBM functions of MRC.

Table 2.3 Recommendations for the Inclusion of IFRM Considerations in the Basin Development Programme and Other MRC Programmes

Programme	Recommendations
General	1. All land-use and other planning exercises associated with the use and development of flood-prone land should evaluate to a suitable degree of detail potential impacts on flood risk and flood behaviour across the floodplain.
	2. The IWRM Strategy of the MRC should include IFRM considerations as a basic cross-cutting issue.
	3. Any proposed dam in the LMB, no matter what its principal purpose, should be carefully checked at the planning and design stages for its likely impact on both upstream and downstream flood behaviour and in particular, on flood risk to downstream communities.
Basin Development Programme	4. BDP Guidelines to include FRM considerations should be developed according to IFRM considerations and principles.
	5. The BDP Guidelines to include FRM considerations need to address FMM issues in all MRC programmes.
Flood Management and Mitigation Programme	6. The BDP Guidelines in general and their capacity building elements in particular should be delivered as part of the FMMP.
	7. IFRM considerations should be used to coordinate and synchronise the various activities of the individual components of the FMMP to achieve maximum programme benefits.
Environment Programme	8. Likely changes to flooding behaviour associated with proposed new or upgraded land-use developments, infrastructure, structural flood mitigation works or development projects should be evaluated and the Environment programme informed.
	9. Likely environmental impacts of structural flood mitigation works need to be evaluated and the Environmental Programme informed.
Fisheries Programme	10. Likely changes to flooding behaviour associated with proposed new or upgraded land-use developments, infrastructure, structural flood mitigation works or development projects should be evaluated and the Fisheries Programme informed.
Navigation Programme	11. Likely changes to flooding behaviour associated with proposed improvements to navigation and transport infrastructure on floodplains should be evaluated and the Navigation Programme informed.
Agriculture, Irrigation and Forestry Programme	12. The impacts on flood behaviour of all new floodplain-based agricultural and irrigation developments need to be checked.
	13. The impact on flooding of any dam proposed for irrigation purposes needs to be checked, especially in relation to for the risk to downstream communities of dam release and dam-break flooding (See Recommendation 3 above).
	14. Logging operations should be conducted in a way that minimizes the risk of landslips.
Information & Knowledge Management Programme	15. Consideration should also be given to the need for, formulation and implementation of a MRC strategy for the monitoring and management of hydro-meteorological data at IKMP. An important aspect of this strategy will be the respective roles and responsibilities of the MRC and line agencies for the collection and use of data for flood warning purposes.

The Mekong Integrated Water Management (M-IWRM) Project has been developed as a continuation of the Water Utilization Programme (WUP-2). This project has gained substantial momentum through potential funding by the World Bank. M-IWRM is working on a support facility under APL-1 presently for which the project has requested FMMP to provide inputs. The World Bank considers providing support in the field of disaster risk reduction to Cambodia, Lao PDR and Viet Nam. Under APL-2 more support is envisaged. As was mentioned before in the relationship with BDP, also here RFMMC's involvement must be well specified in terms of outputs, activities, planning and costs involved. The BDP has requested IKMP's and FMMP's support to improve the flow monitoring on the MRC website during the dry-season within the framework of the Procedures for the Monitoring of Flows on the Mainstream (PMFM).

Reference is made also to the IWRM-based Basin Development Strategy for the Lower Mekong Basin. This strategy identifies a range of studies of strategic importance to inform both the development and management of the LMB. (Some of these studies have also been recommended by the BDP's SEA.) The following studies identified in the BDP Strategy have clear relationships with the FMMP 2011-2015:

- *Study No. 4:* "Detailed modelling of flood-related impacts upstream of Kratie to understand the impacts of flow changes on the different reaches upstream of Kratie, and how mainstream dams will impact on these", and
- *Study No. 5:* "Basin-wide and multi-sector study of the long term flood management options for the Mekong Delta to respond to growing pressures from land development, sea level rise, climate change, and upstream development plans."

BDP, IWRM-P and FMMP need to work together to specify cooperation modality and the roles and responsibilities of each Programme in addressing these issues.

2.4.3 Initiative on Sustainable Hydropower

The relationship between FMMP and the Initiative for Sustainable Hydropower (ISH) has been extremely modest. Only recently the FMMP has been interacting with hydropower expertise, which has been involved in the SEA, organized by the BDP-2. FMMP requested a list of completed hydropower projects in the LMB for the consideration of effects on the FMMP forecasting system.

2.4.4 Integrated Capacity Building Programme

The FMMP has been interacting with the ICBP in an ad-hoc manner. There has not been a structural relationship with exception of the involvement in the supporting the Junior Riparian Professional staff (JRPs) by offering internships within one or more FMMP components.

The FMMP interacted with ICBP for the structuring of the training and capacity building under Components 1, 2, 3 as well as 4 and 5. The availability of support from ICBP has been minimal due to capacity constraints within ICBP, which have more recently been solved. FMMP as a internal rule, has promoted that the material which has been developed within FMMP for training and capacity building should be made available to ICBP.

2.4.5 Environment Programme

The Environment Programme (EP) is located under the Environment Division in OSV. The relationship with EP has been extremely modest under FMMP 2004-2010.

However, the EP is responsible for the identification of potential climate change impacts in the Lower Mekong Basin and the integration of climate change into MRC's activities. The EP has initiated in 2009 the Climate Change Adaptation Initiative (CCAI), which goal is to clarify the climate change relevance for MRC and to integrate climate change components into the various climate change relevant activities of MRC programmes.

The CCAI has approached the FMMP to cooperate in the field of flood management, as flood management is considered a useful instrument in identifying eventual climate change impacts. In July 2010 the CCAI and FMMP have identified options for cooperation in carrying out a baseline study in pilot districts in the MRC Member Countries with respect to flood and drought vulnerability assessment, through incorporation of possible climate change effects. It is expected that CCAI and FMMP will jointly develop a work plan, which may also serve the ADB-ICHARM support to FMMP on flood vulnerability assessment in the Lower Mekong Basin (FVA-LMB).

2.4.6 Agriculture, Irrigation, Forestry Programme

There has been little interaction between FMMP and AIFP so far, with exception of the exchange of documents produced under Component 2 relevant for the relationship between floods and agriculture. As agriculture is depending on water and affected by floods, broader and more frequent interaction between the AIFP and FMMP is recommended.

2.4.7 Fisheries Programme

The Fisheries Programme Phase 2 (FP-2) is presently conducting the formulation of a follow-up phase (FP-3) over the period 2011-2015.

Apart from the fact that FMMP has made reference in the Annual Flood Report 2007 and 2008 to the relationship between floods and fisheries, there appears to be little information exchanged between the programmes. An exception was recently made with the final report of the "*Roads and Floods, Best Practice Guidelines for the Integrated Planning and Design of Economically Sound and Environmentally Friendly Roads in the Mekong Floodplains in Cambodia and Viet Nam*" Project, during which there was close interaction with FP in finalizing the report.

2.4.8 Drought Management Programme

The programme is presently located under IKMP of the Technical Support Division (TSD). The DMP was transferred to the Operations Division (OPD) by the end of 2010.

The Drought Management Programme has not received any funding from Donor Agencies yet. The MRC has made some limited fund available from the MRC Programme Reserve fund to activate the programme. Close cooperation between FMMP and DMP is envisaged. FMMP 2011-2015 has identified five activities which belong to the mandate of the DMP, but which can be undertaken by the RFMMC. To undertake this work, RFMMC/FMMP 2011-2015 and DMP need to work collaboratively and specify specific tasks and responsibilities for implementation of these five activities.

2.4.9 Navigation Programme

The Navigation Programme (NP) and FMMP have had only incidental contacts. The implementation of the Mekong HYCOS project for the definition of locations of water level recording stations formed an exception.

2.4.10 Information Knowledge Management Programme

The IKMP is also in the phase of formulating a follow-up phase 2011-2015, IKMP-2.

IKMP and FMMP have a very close relationship, as FMMP is dealing with data collection, data transfer, data storage, daily products for the MRC website, flood forecast modelling, flood modelling for the focal areas in the Lower Mekong Basin etc. etc. The relationship was tested during the identification of ISIS modelling discontinuities in a crucial phase of the Component 2 developments. As the CEO had made this into a priority activity, the IKMP, FMMP and the Component 2 consultant, acted effectively, so the problems could be solved in a satisfactory manner and within a reasonable timeframe.

Earlier cooperation with IKMP has been less successful. The project “Flood Management Capacity for the Kok River Basin Chiang Rai, Thailand”, which originally was a FMMP Component 1 activity, was converted into a co-financing project between FMMP, and for which the lead was given to IKMP. Although the project was initiated by FMMP already in 2007, IKMP has not been in a position to present the final report yet.

The Review Mission report has recommended FMMP to create a position for a hydrologic/hydrodynamic modeller in order to create the capacity in FMMP for the application of the MRC modelling tools. FMMP has not initiated the creation of the position and selection of a staff as yet. However in consideration of the upcoming involvement in M-IWRM, CCAI and BDP-3, the FMMP has prepared the job description and terms of reference to initiate the creation of the position and selection of a modeller immediately after FMMP has sufficient funds in 2011 and following years, based on FMMP funding as well as through BDP-M-IWRM- and CCAI co-funding arrangements. IKMP is completing the testing of the automatic data transfer systems of the MRC Hydromet Network (ANHIP and HYCOS). FMMP and IKMP need close cooperation to improve the reliability of automatic data transfer and to gradually integrate automatic data transfer in the RFMMC’s flood forecasting and drought monitoring systems.

2.5 REGIONAL AND NATIONAL PRIORITIES

MRC Member Countries are all engaged in flood management and flood mitigation through their line agencies and disaster management organizations at the different levels of government. Each of the MRC Member Countries has its legal frameworks, has dedicated national policies and strategies on disaster management and mitigation. However, Member Countries are clearly at different levels of development; have therefore different realities in data collection and processing systems and different capacities to deal with floods; hydrological and meteorological services are at different stages of development, flood forecasting tools are different, there are different procedures and capabilities for flood warning, in flood preparedness and emergency management.

Awareness of flood risk assessment and management is different and the embedding of flood risk management principles in the various planning processes varies greatly. Communication between the different sectors at different levels of government varies in structure and effectiveness.

The national priorities in flood management and mitigation are summarized as flood risk reduction, as was expressed by the MRC Member Countries during the 1st MRC Summit in Hua Hin, Thailand in April 2010. Member Countries are working on the improvement of flood forecasting and warning, not limited to the mainstream but also at tributaries. Flash floods are considered a particular threat to rural population in

remote sub-basins and especially mountainous areas. Extension of the hydrologic network in especially Lao PDR and Cambodia is considered extremely relevant. Governments are also very much aware of the need to enhance the coping capabilities of communities through improved flood preparedness and enhanced emergency management capabilities. A particular weakness is the incorporation of flood risks in the planning processes, particularly in flood focal areas.

The MRC from a regional perspective aims at raising awareness about the relevance of flood risk assessment and management for the dedicated line agencies in the Member Countries, especially regarding the potential for basin-wide, especially trans-boundary, planning processes. Also the awareness regarding trans-boundary flood impacts is considered an important area of cooperation between the Member Countries. Increasing technical cooperation between the MRC Member Countries and the Dialogue Partners is considered extremely relevant for the enhancement of the flood management and mitigation at the various national and regional levels.

It is against this background not surprising that the MRC Member Countries strongly support a follow-up of the initiatives explored under FMMP 2004-2010 with FMMP 2011-2015 focussing on consolidation of achievements.

Table 2.4 summarizes existing policies, strategies and plans in IWRM Programmes and Disaster Management Programmes where IFRM considerations should be included.

Table 2.4 Overview of Existing Policies, Strategies and Plans Relating to IFRM, IWRM and Disaster Management in the LMB

Country	National Water Policy and Strategy	National Disaster Management Plan	Main Gaps in the Incorporation of IFRM in IWRM elements of the Policies
Cambodia	<p><i>Policy documents include:</i></p> <p>National Strategic Development Plan;</p> <p>Law on Water Resources Management; and</p> <p>- Strategy for Agriculture and Water.</p> <p><i>To ensure that present and future use of water is sustainable and effective, the Royal Government has defined the Nation's Water Vision for Cambodia as follows:</i></p> <p>Access for all to safe, adequate, and affordable drinking water, hygiene, and appropriate price;</p> <p>Provide sufficient water for agriculture, industry and economic activities;</p> <p>Tackle and minimize for all from the threat of loss of life and livelihood as a result of water related hazards; and</p> <p>Manage the water resources environment to insure water quality.</p>	<p>In 2002: Royal Cambodian Government issued Decree No. 2 02/040 on establishment of the NCDM.</p> <p>2006: Sub-decree No.61 the established of the CCDM.</p> <p>2007: Provincial Deika (Order) on the establishment of Disaster Management Commissions and establishment and functioning on the PCDM.</p> <p>2009: Royal Cambodian Government, NCDM and MoP launched the strategic National Action Plan for Disaster Risk Reduction 2008–2013 (SNAP-DRR)</p> <p>Current: Disaster Management Law has been drafted and is under review by the Ministry of Interior.</p>	<p>Flood protection, flood mitigation, forecasting and warning are components of policy.</p> <p>Absence of a national policy on disaster management in general;</p> <p>Absence of disaster management legislation;</p> <p>Lack of appreciation on disaster risk management institutions;</p> <p>Lack of understanding of the importance of database/information based decision making of the decision maker;</p> <p>Lack of appreciation and commitment to database and disaster information management promotion and use;</p> <p>Inadequate resources, manpower, professions and skills;</p> <p>Understanding by different stakeholder levels (politician, technical planner and workers) database.</p> <p>In general, the IWRM has been adopted as the main concept for managing the water resources. However the main constraints for implementing IWRM are still: (i) inadequate human resources capacity (ii) lack of coordination among concerned institution, and (iii) lack of financial resources to actually implement various interventions.</p>
Lao PDR	<p>In 1996, the GOL promulgated Law on Water and Water resources;</p> <p>In 2001, the Prime Minister issued its implementing decree 204/PM;</p> <p>In 2007, the Prime Minister issued Decree 149/PM establishing the Water Resources and Environment Administration (WREA);</p> <p>In 2008, WREA's National Water Resources Profile confirmed the needs to revise the 1996 Water and Water Resources Law to reflect modern IWRM principles and updated institutional arrangements; and</p> <p>In 2010, Draft National Water Resources Strategy and Action Plan for the Years 2011 to 2015 including its vision of coordinated and optimized development and use of water resources and minimal environmental and social impacts.</p>	<p>The current Country Programme Action Plan (CPAP) for 2007 to 2011 includes the development of national and local capacities to better prepare for and respond to disasters and ultimately strengthen capacities for disaster risk management as a priority activity. Lao PDR has committed itself to the Hyogo Framework for Action 2005-2015; and</p> <p>The existing mechanisms for disaster management in the country are the National Disaster Management Committee (NDMC) and its secretariat, the National Disaster Management Office (NDMO), which have the responsibility to develop national and local capacities for disaster risk management.</p>	<p>The inefficiencies in the water sector partly result from uncoordinated development of partner activities.</p> <p>Lao PDR lacks the capacity needed to implement IWRM approaches in an adequate manner. This has significantly limited the Government's ability to: (i) manage its own water resources developments in a strategic and balanced way to ensure acceptable trade-offs of economic, social and environmental impacts, and (ii) participate as an informed and equal partner in international negotiations that occur within the MRC. Given that large share of Mekong River flow originates in the Lao PDR, the potential is high for international disputes, as well as for internal inefficiencies if resources are not managed in an integrated way.</p>

Table 2.4 Overview of Existing Policies, Strategies and Plans Relating to IFRM, IWRM and Disaster Management in the LMB (Cont.)

Country	National Water Policy and Strategy	National Disaster Management Plan	Main Gaps in the Incorporation of IFRM in IWRM elements of the Policies
Thailand	<p>Five-year National Economic and Social Development plans since 1961. The 9th Plan (2002-2006) developed by Royal Thai Government concentrated on improving management, creating a balance between natural resource consumption and preservation, promoting sustainable use of the resources, promoting self-reliance developments, raising people's quality of life and becoming a foundation for development of the country. The Plan is focused on management of natural resources and the environment by enhancing participation of all sectors in society, employing effective, transparent as well as trustworthy regulations, and conducting practical research.</p>	<p>In 2002, Thailand established the Department of Disaster Prevention and Mitigation under the Ministry of Interior.</p> <p>To minimize impacts by natural disasters, with special emphasis on floods, the Department of Water Resources initiated the Water Crisis Management Center to provide flood information in river basins during periods of flood preparedness and crisis. The Center also acts as the coordinating mechanism among various concerned agencies.</p>	<p>The integrated water resources management principle has been incorporated into the water resources management process.</p> <p>Whilst quite advanced in the water sector, as compared to other Member Countries, Thailand's existing policies and strategies still lack of IFRM elements in its policies.</p>
Viet Nam	<p>Socio-economic Development Strategy for 2001-2010.</p> <p>Water Resource Development Plan to the year 2000 and Tentative Development Plan to 2010 (MARD, June 1998).</p> <p>Strengthening Environmental Protection in the period of National Industrialization and Modernization (Communist Party of Vietnam, Directive No.36/CT-TW, 1998).</p> <p>Strategy for Rural Agriculture Development in the Industrialization and Modernization Period to the year 2010 (MARD, July 2000).</p> <p>Agriculture and Rural Development Plan (2001- 2005) (MARD, August 2000).</p>	<p>National Strategy for Natural Disaster Prevention, Response and Mitigation to 2020 (SRV, November 2007)</p> <p>For the Mekong River Delta, a 'living with flood' approach has been adopted for natural disaster prevention, response and mitigation, ensuring safety for sustainable development; and taking initiatives to prevent storm, thunderstorm, whirlwind, salinity intrusion, drought at the same time.</p>	<p>Water sector has no overall integrated strategy and action plan at the national and regional basin level; IFRM is not explicitly included in the national strategy</p> <p>There is, however, a growing awareness of river basin management and the application of a participatory approach in the planning process and IWRM.</p>

3. OBJECTIVE AND PROGRAMME DESIGN

3.1 VISION AND MISSION

The Basin vision, as well as the MRC vision adopted in 1999, remain relevant to the formulation of FMMP 2011-2015. The MRC's mission has been formulated in accordance with the 1995 Mekong Agreement (MA95). The RFMMC vision and mission have been formulated in line with the broader MRC vision and mission.

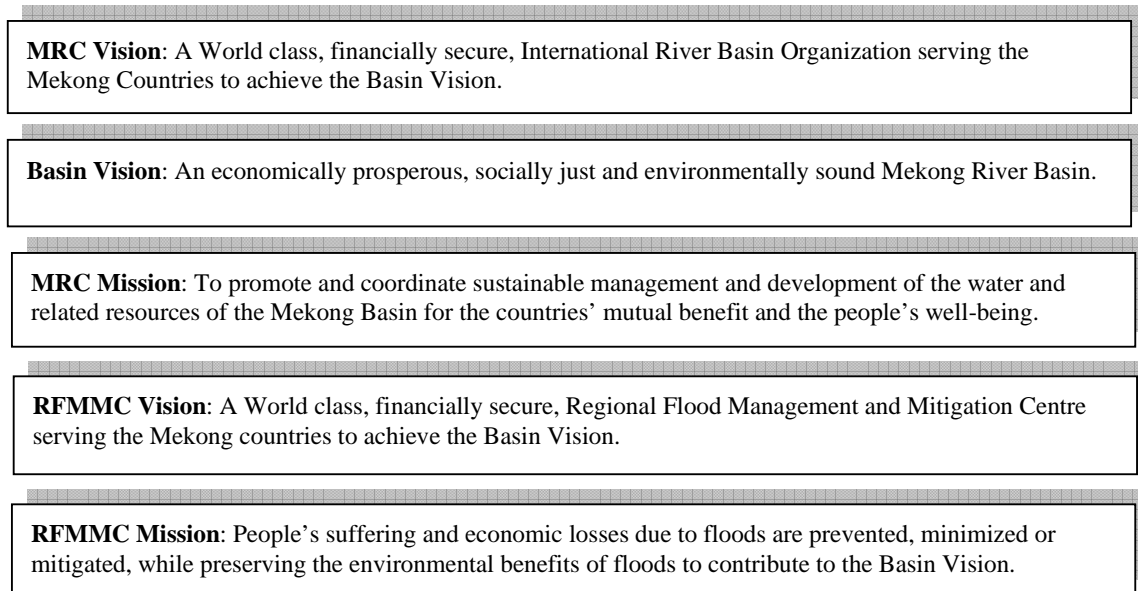


Figure 3.1 Vision and Mission Statements, MRC and RFMMC

3.2 FMMP 2011-2015 GOAL, OBJECTIVES AND OUTCOMES

The overall goal of the FMMP 2011-2015 is the same as the MRC Strategic Plan (SP) Goal:

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

IFRM is an integral part of IWRM. The objective of the FMMP programme responds to this goal by providing up-to-date flood risk management and mitigation practices aimed at reducing the negative impacts of floods, while maintaining the environmental benefits of floods. The Design Summary (Table 3.1), including program objective and outcomes, along with indicators used to monitor performance, provides a summary explanation of how this objective will be achieved. The full Design and Monitoring Framework is included in Annex No. 1.

The results chain for the FMMP 2011-2015 programme is illustrated in Figure 3.2, from the level of the MRC Strategic Plan Goal 2011-2015, the FMMP Objective 2011-2015 to the five FMMP outcomes which will collectively enable achievement of the objective, provided that the necessary outputs for each outcome are achieved and are delivered.

Table 3.1 Summary Design of the FMMP 2011-2015 with Outcomes, Indicators, Sources of Data and Risks

Design Summary	Indicator	Source of Data	Risk
PROGRAMME OBJECTIVE			
Basin management and development in the Lower Mekong Basin 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.	<p>Joint Committee, Council and Member Country line agencies recognize the influence and value of flood risk management and mitigation practices in reducing the negative impacts of floods</p> <p>Trans-boundary and basin wide flood management and mitigation issues are addressed and effectively solved</p>	<p>JC and Council meetings minutes.</p> <p>Progress reports.</p>	<p>MCs are insufficiently committed to flood management and mitigation within the context of their basin management and development process.</p>
OUTCOMES			
1. IFRM principles are incorporated in the regional basin plan and strategy and in national (long-term) strategies and planning processes	<p>National IFRM strategies developed.</p> <p>National Water Acts and relevant laws include IFRM considerations.</p> <p>National Basin Development Strategies incorporate IFRM considerations.</p> <p>Improved coordination mechanisms for national IFRM.</p> <p>National IFRM responsibilities clarified.</p>	<p>National strategy documents.</p> <p>Legislative documents.</p> <p>National and local basin development and disaster management policies and plans.</p> <p>MOUs between ministries and agencies.</p> <p>National strategy documents.</p>	<p>Lack of a 'lead party' in each of the MCs to emphasize and "sell" the relevance of IFRM (no 'champion').</p>
2. Flood forecasting, impact assessment, modelling, monitoring and knowledge management (and drought monitoring and forecasting) is occurring on a routine, year-round, basin-wide basis.	<p>The extent to which accurate and relevant FF and FW information is delivered and used by MCs.</p> <p>The extent to which Flood simulation models are developed, disseminated and used by MCs and MRC.</p> <p>The extent to which Monitoring, collection, management, dissemination and sharing relevant flood related data improved by MC and MRC.</p> <p>Extent to which likely impact of possible future climate change on flood behaviour and flood risk assessed.</p> <p>The extent to which 'Whole of Year' analysis of hydro-meteorological data are provided to and used by MRC's DMP</p>	<p>Annual flood forecasting reviews.</p> <p>MRC website.</p> <p>Feed back surveys.</p> <p>MOU between FMMP and MCs on the use of flood simulation models.</p> <p>Reports on the use of flood models.</p> <p>MOU between FMMP and MCs on flood related data.</p> <p>MOU between FMMP and MCs regarding CC methodology.</p> <p>Annual data reports.</p> <p>'Whole of Year' hydro-meteorological statistics incorporated in other programmes.</p>	<p>Lack of support from National Disaster/Flood Management Agencies.</p> <p>Lack of flood forecasting input data available/or made available.</p> <p>Inadequate data available for model development.</p>

Table3.1 Summary Design of the FMMP 2011-2015 with Outcomes, Indicators, Sources of Data and Risks (Cont.)

Design Summary	Indicator	Source of Data	Risk
OUTCOMES			
3. Member Countries and Dialogue Partners address trans-boundary flood issues, differences and disputes in an efficient, effective and coordinated way.	<p>The number of and extent to which MCs administrative and technical tools to address TB flood issues, differences and disputes are used</p> <p>The extent to which pilot studies on TB have been implemented</p>	<p>Cooperation agreements.</p> <p>Records of discussions between stakeholders.</p> <p>Reports on joint initiatives, design implementation and management of trans-boundary projects</p>	Lack of commitment by MCs, provinces and districts to trans-boundary cooperation.
4. The ability of relevant line agencies and NMCs to use IFRM knowledge and principles to better manage flood risk is strengthened.	<p>The extent to which MCs awareness, capacities and skills have been enhanced</p> <p>The extent to which knowledge has been exchanged and applied.</p> <p>The extent to which knowledge on TB issues is embedded in MCs</p>	<p>Capacity building programme and needs assessment.</p> <p>Training impact assessment.</p> <p>M&E of capacity building and training programme.</p> <p>Flood Forum Proceedings.</p> <p>Publications.</p> <p>Cooperation agreements.</p> <p>Records of discussions between stakeholders.</p> <p>Opinion surveys on awareness, capacities and surveys.</p>	Trained staff does not retain their job functions for an adequate time period.
5. The transition of RFMMC to a financially sustainable and professionally capable institution is initiated.	<p>The extent to which the road map for RFMMC is agreed upon</p> <p>Number of core riparian staff appointed</p> <p>The extent to which RFMMC is regionally recognized</p>	<p>Minutes of Joint Committee and Steering Committee.</p> <p>Contracts.</p> <p>Feed back surveys.</p>	Lack of real commitment to the RFMMC from MCs.

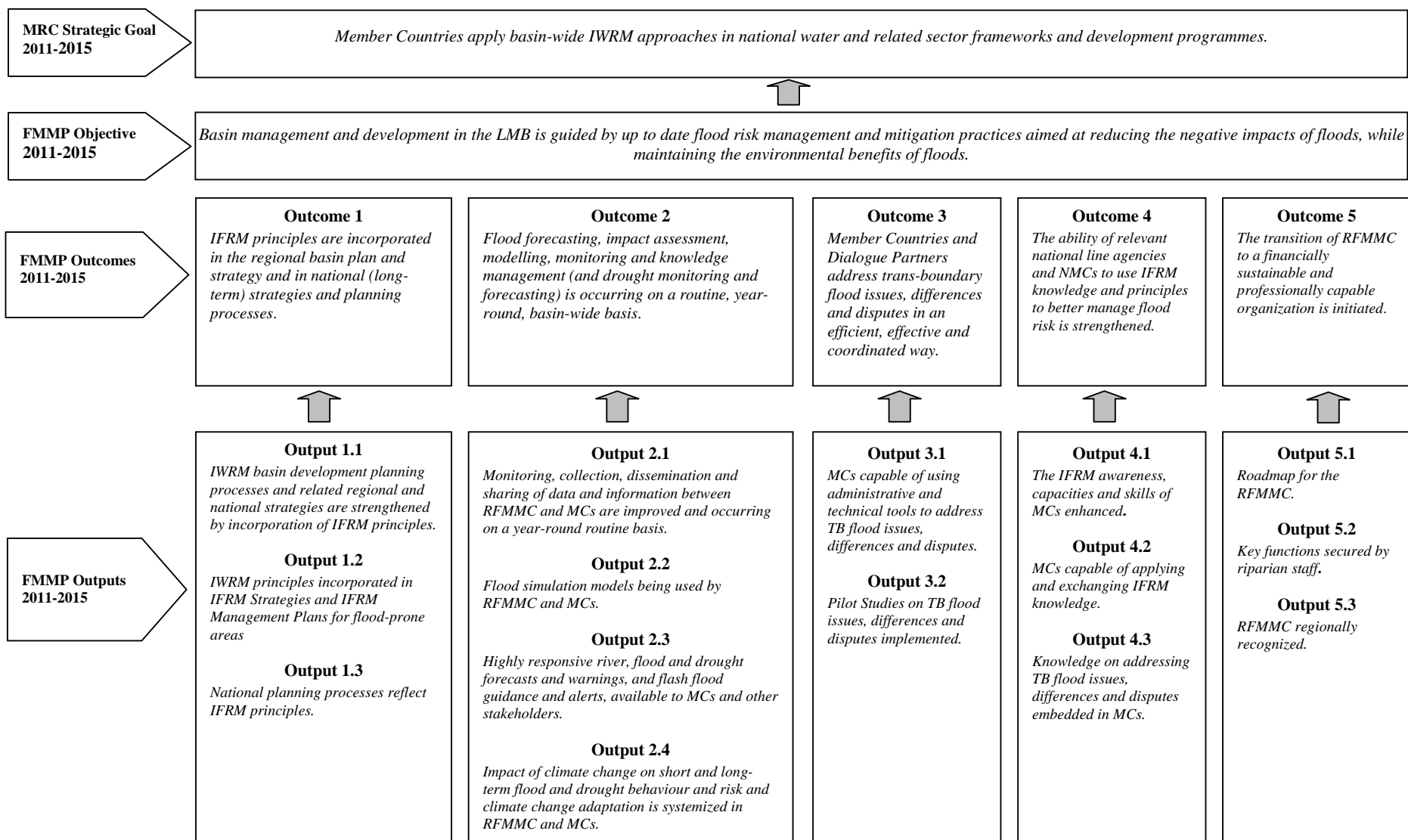


Figure 3.2 MRC Goal and FMMP 2011-2015 Objective, Outcomes and Outputs

3.3 OUTCOMES, OUTPUTS AND ACTIVITIES

Outputs expected under FMMP 2011-2015 are described in Annex No. 1 (see Volume 2), including indicators. Table 1.3 is a summary table showing the various outputs for each outcome and the various activities for each output. In total, FMMP 2011-2015 comprises 15 outputs and 39 activities.

3.3.1 Outcome No. 1: IFRM Considerations Reflected in Development Strategies and Plans

IFRM is aimed at better managing the controlled, residual and future risks of flooding in the LMB (see Annex No. 2 for an explanation of these risks). Any change to land-use in flood-prone areas has the potential to affect or be affected by flood behaviour and flood risk. Major infrastructure projects, such as road and railway embankments, major water storages and floodplain reclamation, affect flood behaviour and residual flood risk. A significant residual flood risk currently exists in the LMB, principally across the Mekong floodplains of Cambodia and the Cuu Long Delta of Viet Nam. This flood risk will inevitably intensify in the future through population growth (future risk). Proposed future water resource developments in the LMB, especially the construction of hydropower dams, have the potential to reduce flood risk. It is important for FMMP 2011-2015 to collaborate with BDP concerning future likely developments in the LMB (including upstream dams) that have the potential to affect flood risk.

To manage flood risk effectively, it is necessary to adopt an 'integrated' approach that considers the three flood risks, five risk management measures, the four ancillary risk management measures, and involves all stakeholders, along with the need to adopt consistent programmes at all levels of government, and the need to assess the impacts of likely future developments on flood behaviour and flood risk. IFRM is a planning process that identifies and weighs all these factors. As such, it is an essential component that needs to be embedded in MRC's Basin Development Planning process and related national sector strategies.

The inclusion of Integrated Flood Risk Management considerations in regional and national planning processes will be achieved through the formulation of regional and national IFRM strategies. An important element of this process is the preparation and delivery of IFRM capacity building courses. To this end, a number of BPGs prepared under FMMP 2004-2010 will be updated, focussed and translated into national languages to provide a vehicle for strengthening the understanding of IFRM concepts and principles by key personnel in relevant line agencies and the MRCS. It is proposed that a regional IFRM strategy be prepared first so that relevant personnel from Line Agencies gain an understanding of the process before FMMP 2011-2015 assists MCs to prepare national IFRM strategies.

Awareness-raising amongst the leadership within the relevant Line Agencies is a crucial element to achieve this outcome. The use of pilot projects to prepare and implement of district-level IFRM and Land-use Strategies in the four Member Countries will assist the understanding of IFRM concepts. Annex 2 describes how the IFRM process can be applied to develop an IFRM Plan for a flood-prone area.

Output 1.1: IFRM-Strengthened Regional and National Strategies

Output 1.1 consists of a regional IFRM strategy, including IFRM principles and Best Practice Guidelines (BPGs), as partly already elaborated under FMMP 2004-2010. In effect, the regional IFRM Strategy will comprise an updating of the MRC Strategy on Flood Management and Mitigation, published in 2001. The regional IFRM Strategy will first, revisit the 2001 Strategy to confirm MRC mandate and roles in FMM, the principles and objectives of MRC involvement, and the fields of MRC intervention. The Strategy will then set out how the MRC and the four Member Countries can use IFRM concepts and principles to better manage regional, national, local and trans-boundary flood risks, including an assessment of constraints and opportunities to the implementation of IFRM.

An important component of these deliberations will be an assessment of future flood risk. It is noted that BDP has recently published its IWRM-based Basin Development Strategy (MRC, 2011). Liaison with BDP will be required to identify likely future development scenarios that affect future flood risk.

Output 1.1 will also see IFRM principles and practices incorporated in the BDP and will assist MCs define national IFRM Strategies and incorporate IFRM principles and guidelines in national planning instruments. Country-specific roadmaps will be prepared to guide this work.

Table 3.2 Outputs and Activities Under FMMP 2011-2015

OUTCOME NO. 1:	IFRM principles are incorporated in the regional basin plan and strategy and in national (long-term) strategies and planning processes.
<p>Output 1.1 <i>IWRM basin development planning processes and related regional and national strategies are strengthened by incorporation of IFRM principles.</i></p>	<p>1.1.1 Develop Regional IFRM Strategy. 1.1.2 Incorporate BPG on IFRM in basin development planning. 1.1.3 Assist MCs to formulate country-specific national IFRM strategies. 1.1.4 Assist MCs incorporate BPGs on IFRM in related regional and national strategies and plans, including disaster management strategies and plans.</p>
<p>Output 1.2 <i>IWRM principles incorporated in IFRM Strategies and IFRM Management Plans for flood-prone areas.</i></p>	<p>1.2.1 Develop District-level (or comparable level) IFRM Plan and Land-use Management Plan for Flood Focal Areas (one pilot project in each MC). 1.2.2 Deliver Capacity Building and training to facilitate implementation of the Plans.</p>
<p>Output 1.3 <i>National planning processes reflect IFRM principles.</i></p>	<p>1.3.1 Identify national needs, review, modify, develop, disseminate and secure uptake of BPGs a) for Flood Hazard Assessment, b) for Flood Damage Assessment, c) for Flood Risk Assessment, d) for Selection and Use of Structural and Non-Structural measures to Manage Flood Risks, e) for Socio-economic & Environmental Evaluation of Flood Risk Management Measures, f) for the Flood Proofing of Buildings and Infrastructure in Urban and Rural Areas, g) for the Use, Design, Construction, Maintenance & Operations of Structural Flood Mitigation Works & Floodplain Infrastructure, h) for the Control and Repair of Riverbank Erosion, i) for the Integrated Planning and Design of Economically Sound and Environmentally Friendly Roads in the Mekong Floodplains of Cambodia and Vietnam. 1.3.2 Raise IFRM awareness amongst Leadership of Line Agencies.</p>
OUTCOME NO. 2:	Flood forecasting, impact assessment, modelling, monitoring and knowledge management (and drought monitoring and forecasting) is occurring on a routine, year-round, basin-wide basis.
<p>Output No. 2.1 <i>Monitoring, collection, dissemination and sharing of data and information between RFMMC and MCs are improved and occurring on a year-round routine basis.</i></p>	<p>2.1.1 Critically review and improve: a) Real-Time Hydro-meteorological Data for Flood Forecasting Purposes, b) Near Real-Time Hydro-meteorological Data for Flood Forecasting Purposes, c) Hind-Cast Hydro-meteorological Data for Flood Behavior Analyses, d) Satellite-based Hydro-met. Data for Mainstream Forecasts & Flash Flood Alerts, e) Sharing of Historical Hydro-meteorological Data. 2.1.2 Critically review and improve Data Sets a) of Flood Behaviour, b) of Flood Damage, c) of Flood Vulnerability, d) of Existing Structural Flood Mitigation Measures, e) of Socio-Economic Survey Data, f) of Topography and River Cross-Sections. 2.1.3 Critically review and improve topographical and hydrographical data and information for updating ISIS Hydraulic Model schematizations (improved DTM in cooperation with other MRC programmes (especially IKMP); related to Activities 2.1.2d and 2.3.1c).</p>
<p>Output No. 2.2 <i>Flood simulation models being used by RFMMC and MCs.</i></p>	<p>2.2.1 Critically review, identify operational support required and improve a) URBS Hydrological Model of Catchment Upstream of Kratie, used for Flood Forecasting, b) ISIS Hydraulic Model of Cambodian/Cuu Long Floodplains, used for Flood Forecasting, c) ISIS Hydraulic Model of Cambodian/Cuu Long Floodplains, used for TB FR Assessment. 2.2.2 Develop appropriate URBS models for Flood Forecasts for Mekong Tributaries. <i>(New)</i></p>
<p>Output No. 2.3 <i>Highly responsive river, flood and drought forecasts and warnings, and flash flood guidance and alerts, available to MCs and other stakeholders.</i></p>	<p>2.3.1 Critically review, identify operational support required and improve: a) Operational Short-Term Forecasts for the Mekong Mainstream, b) Operational Flash Flood Alerts, c) Medium-Term (5-10 Days) Mainstream Flood Forecasts, d) Long-Term (10-30 Days) Mainstream Flood Forecasts, e) Dissemination of Flood Forecasts and Flood Warning Information. 2.3.2 Review need for system/formulate action plan to develop and implement system to forecast the Tracks and Heavy Rainfalls of Tropical Cyclones. <i>(New)</i> 2.3.3 Liaise with MRC's DMP to assess the feasibility and to develop and implement action plan to incorporate information on Real-time and Forecast Rainfall, Stream-flow and Soil Moisture Deficits for LMB. <i>(New)</i> 2.3.4 Liaise with MRC's DMP, assess feasibility of, develop and implement Real-time Drought Assessment and Forecasting system. <i>(New)</i></p>
<p>Output No. 2.4 <i>Impact of climate change on short and long-term flood and drought behaviour and risk and climate change adaptation systemized in RFMMC and MCs</i></p>	<p>2.4.1 Develop a methodology for assessing the likely impacts of future CC on the hydro-meteorological regime of the LMB. <i>(New)</i>. 2.4.2 Use of flood simulation models (URBS and ISIS) to assess the impacts of the changed hydro-meteorological regime of the LMB, especially for Cambodian/Cuu Long floodplains. <i>(New)</i> 2.4.3 Develop and implement an action plan to assess the likely impacts of possible future CC on flood behaviour and flood risks (refer to DMP for drought elements). <i>(New)</i> 2.4.4 Pilot projects to demonstrate important CC adaptation initiatives designed and implemented in MCs. <i>(New)</i></p>

Table 3.3 Outputs and Activities Under FMMP 2011-2015 (Cont.)

OUTCOME NO. 3: Member Countries and Dialogue Partners address trans-boundary flood issues, differences and disputes in an efficient, effective and coordinated way.	
Output 3.1 <i>MCs capable of using administrative and technical tools to address TB flood issues, differences and disputes.</i>	<p>3.1.1 Critically review, assess and improve Administrative, Technical, Socio-Economic Tools and BPGs for Addressing Regional and National TB Issues, including TB Emergency Management for strengthening dialogue and coordination between MCs and DPs.</p> <p>3.1.2 Identify needs, modify, develop and disseminate Administrative, Technical Tools, and BPGs for Addressing Regional and National TB Issues, including TB Emergency Management allowing MCs to use these.</p> <p>3.1.3 Identify needs, review, modify, develop and disseminate Administrative and Technical Tools for Addressing Trans-Boundary Flood Issues in order to embed these into curriculum Regional and National Knowledge Institutes.</p>
Output 3.2 <i>Pilot Studies on TB flood issues, differences and disputes implemented.</i>	<p>3.2.1 Identify new Joint TB Demonstration Project to Assess Flood Risk, enhance existing Joint TB Demonstration Project in Cambodia/Viet Nam Border Area.</p> <p>3.2.2 Identify additional Pilot Studies to enhance capacities and skills through Demonstration of the Facilitation of Resolution of TB Flood Issues among MCs and Dialogue Partners.</p> <p>3.2.3 Identify Pilot Projects to facilitate TB Cooperation for Inter-Province Flood Emergency Management.</p>
OUTCOME NO. 4: The ability of relevant line agencies and NMCs to use IFRM knowledge and principles to better manage flood risk is strengthened.	
Output 4.1 <i>The IFRM awareness, capacities and skills of MCs enhanced.</i>	<p>4.1.1 Identify needs, define and agree, develop and implement an Action Plan for Training & Capacity Building courses on Introduction to IFRM Concepts and Planning in the LMB. <i>(New)</i>.</p> <p>4.1.2. Deliver IFRM training and capacity building courses to key personnel in MRC and MRC MCs on existing and new BPGs (where possible to be combined with 1.3.1 and 1.3.2).</p> <p>4.1.3 Identify needs, define and agree, develop and deliver Training & Capacity Building Courses on: a) the Use of the Unified River Basin Simulator (URBS) Model, b) the Use of the ISIS Model, c) the MRC Mainstream FF System (FEWS-Mekong), d) the MRC Flash Flood Guidance System (MRC-FFGS).</p> <p>4.1.4 Develop and deliver Training & Capacity Building Courses on BPGs: a) for Flood Risk Assessment in the LMB, b) for IFRM Planning and impact Evaluation in the LMB, c) for Structural Measures and Flood Proofing in the LMB.</p>
Output 4.2 <i>MCs capable of applying and exchanging IFRM knowledge.</i>	<p>4.2.1 Identify needs, define and agree, develop and deliver Training & Capacity Building Courses: a) for Improved Data and Information Exchange <i>(New)</i>, b) for Tributary Forecasting <i>(New)</i>, c) for Tropical Cyclone Tracks and Rainfall Forecasts <i>(New)</i>, d) for Adaptation to Climate Change Impacts on Flooding <i>(New)</i>, e) for Rainfall, Stream-flow and Soil Moisture Deficit Reporting <i>(New)</i>, f) for GIS and Satellite Images <i>(New)</i>.</p>
Output 4.3 <i>Knowledge on addressing TB flood issues, differences and disputes embedded in MCs.</i>	<p>4.3.1 Identify needs, define and agree, develop, deliver and secure uptake of Training in the Identification and Assessment of Trans-Boundary Flood Issues, Differences and Disputes.</p>
OUTCOME NO. 5: The transition of RFMMC to a financially sustainable and professionally capable institution is initiated.	
Output 5.1 <i>Roadmap for the RFMMC.</i>	<p>5.1.1 Identify needs, define and agree, and develop a Roadmap for the short, medium and long-term development of the RFMMC after 2011.</p> <p>5.1.2 Identify options for cooperation with / integration in other MRC programmes.</p>
Output 5.2 <i>Key functions secured by riparian staff.</i>	<p>5.2.1. Assess, identify and specify commitments of MCs to sustain delivery of products and services by the RFMMC.</p> <p>5.2.2 Prepare human resources strategy, as well as transition strategy.</p>
Output 5.3 <i>RFMMC regionally recognized.</i>	<p>5.3.1 Identify options for extending regional cooperation and partnerships.</p> <p>5.3.2 Prepare and conduct Annual Forums.</p>

Output 1.2: IFRM Plans Demonstrated

Output 1.2 involves the preparation of a district level (or comparable level) IFRM Plan and a Land-use Management plan for a flood focal area in each of the MCs. These are pilot projects with the purpose of demonstrating the application of IFRM principles and BPGs in the preparation of these two plans, and so raise Line Agency awareness of the 'IFRM process'. Annex 2 describes the various steps in the development of IFRM and Land-use Plans.

Output 1.3: IFRM-Strengthened National Planning Processes

Output 1.3 includes revision of the BPGs developed under FMMP 2004-2010, incorporating a more country-specific focus, developing additional guidelines as required, and translating key elements into local languages. Output 1.3 will also increase IFRM awareness by formulating policy briefs for Line Agencies and other stakeholders on the relevance of IFRM, including an outline how to incorporate IFRM into national policies, strategies and plans. A high level RFMMC/FMMP workshop on IFRM for Line Agency leadership will be conducted. Output 1.3 will also include an assessment of flood management constraints and opportunities in existing strategies and plans.

3.3.2 Outcome No. 2: Collection and Use of Flood-Related Data

The provision of accurate and relevant flood forecasts to the region and Member Countries is considered to be a 'key' business of the Mekong River Commission. It is mandated as such according to the Mekong Agreement of 1995 and MRC's Flood Management and Mitigation Strategy (FMMS) 2001. Outcome No. 2 includes a critical review of existing forecasting systems in use at RFMMC systems and MC expectations of these systems and forecasts, followed by relevant improvements including an Action Plan.

Historical hydro-meteorological data from the four Member Countries is also important for basic water resource analyses and for assessing climate change over the historical record. Under Outcome No. 2, it is proposed to comprehensively review the collection, analysis and sharing of hydro-meteorological data between RFMMC and the four Member Countries.

Flood simulation models are essential tools of IFRM. They are used for flood forecasting and for evaluating and mapping flood risk and flood hazard. They are also used to assess the impact of new structural flood mitigation measures, other infrastructure (such as road and rail embankments and dams), and land-use changes on flood behaviour and flood risk.

The monitoring, collection, management, dissemination and sharing of basic hydro-meteorological data and information is essential to the provision of flood forecasts and warning information by the RFMMC – and by the four Member Countries – and to the assessment of the impacts and effectiveness of water resource developments across the LMB. Hydro-meteorological data streams used for flood forecasting and warning purposes are considered to be 'key' products of RFMMC, and the operation, maintenance and improvement of these monitoring networks are considered to be 'key' activities of RFMMC.

Any significant change to the climate of the Mekong Basin will have an affect on flood behaviour and flood risk across the basin. The likely nature, direction and significance of future climate change in the LMB over the next 50-100 years will be assessed, as will the impact of these changes on flood behaviour and flood risk, and finally the likely success and effectiveness of various measures that enable communities to adapt to these changed risks will be evaluated. RFMMC, through its flood simulation models, is in a unique position to assess the impact of climate-changed floods on flood risk. RFMMC will work closely with the MRC Climate Change Adaptation Initiative (CCAI) on this matter.

Droughts can occur anywhere at any time across the LMB, reducing agricultural production and inflicting significant hardship on affected communities. The economic (and probably social) costs of drought are even greater than floods. During the recent rounds of national consultations, droughts and drought management were topics of considerable interest to Line Agencies in the four Member Countries. The MRC recognizes the importance of drought and drought management and is currently striving towards implementation of a Drought Management Programme (DMP). Outcome No. 2 also includes an assessment of the feasibility of FMMP 2011-2015 providing drought indicators and possibly drought forecasts to the DMP.

Output 2.1: Improved Management of Flood-Related Data

Output 2.1 involves a review of the adequacy and accuracy of hydro-meteorological data and other flood-related data collected and managed by RFMMC and used for forecasting purposes. Accurate and relevant data is essential for reliable mainstream flood forecasts and warnings and flash flood alert information.

Output 2.2: Flood Simulation Models Being Used

Output 2.2 is related to flood simulation models and will focus on the review of future flood modelling needs, criteria for the use of flood simulation models, including the training and the appointment of competent staff.

A number of new/updated flood simulation models are proposed under FMMP 2011-2015. It is proposed to:

- i. Review and upgrade where necessary the existing models used for mainstream flood forecasting purposes;
- ii. Assess the worth of developing a suite of URBS models to provide forecasts for Mekong tributaries;
- iii. Review and upgrade where necessary the ISIS trans-boundary model of the Cambodian Lowlands/Cuu Long Delta; and
- iv. Modify existing models or develop new URBS and ISIS models to assess the impact of climate change on flood risk across the LMB.

Under FMMP 2004-2010, the ISIS hydraulic model was used to provide flood probability information to national land management agencies, which facilitated the preparation of land-use management plans by these agencies. During FMMP 2011-2015, consideration should be given to up-scaling this approach to provide flood probability information over larger areas. This will need to be done in collaboration with IKMP. An important element of this task is improving the DTM/DEM of the floodplain of Cambodia, accompanied by combined 1-D and 2-D flood modelling.

Output 2.3: Improved Flood Forecasting

Output 2.3 relates to improvements in the flood forecasting activities undertaken by RFMMC, including the dissemination and uptake of this information by Member Countries. Under Output 2.3, it is proposed to review the adequacy of the existing monitoring networks used for mainstream flood forecasts and flash flood alerts, and assess future data needs for improved forecasts and for tributary forecasts. It is also proposed that there should be the interchange of flood forecasting staff between RFMMC and national flood forecasting centers to facilitate on-the-job learning and capacity building.

It is anticipated that additional monitoring stations will have to be installed, perhaps one station (telemetry) on the Mekong mainstream upstream of Luang Prabang in Lao PDR to improve mainstream forecasts at this location, and a number of additional stations (most near real-time) in Mekong tributaries to both provide tributary forecasts and improved mainstream forecasts. Further, it is proposed to investigate the feasibility and usefulness of providing forecast information concerning the track and heavy rainfalls of tropical cyclone affecting the LMB. It is noted that the medium-term rainfall forecasts are of great interest to Member Countries. FMMP 2011-2015 will investigate options for seasonal forecasting, the accuracy of such forecasts, and the usefulness of presenting seasonal rainfall outlooks on the MRC website.

Under Output 2.3, it is also proposed to investigate the feasibility of publishing forecast tracks and forecast heavy rainfalls associated with landfalling typhoons. FMMP 2011-2015 would not undertake any typhoon forecasting itself, but would publish forecast tracks and rainfalls generated by other agencies in the region.

Although outside its mandate, the RFMMC is in a unique position to provide drought-related data and statistics to MRC's Drought Management Programme (DMP) and Member Countries. Under Output 2.3, it is also proposed to investigate the feasibility and usefulness of RFMMC generating (i) maps of real-time rainfall, stream flow and soil moisture deficits, ie 'drought indicators' (or supervising its generation by IKMP), and (ii) the forecasting of this information. Drought deficit maps at weekly intervals (say) could allow appropriate agencies and authorities to track the waxing and waning of droughts. Rainfall and stream flow deficits can be easily obtained from the hydro-meteorological data streams collected by RFMMC/IKMP. It is possible that additional existing national monitoring stations may have to be included

in the reporting networks. Soil moisture deficits (updated hourly) can be obtained directly from the Mekong Flash Flood Guidance System (M-FFGS), which tracks soil moisture across 6,400 sub-basins in the LMB. It is anticipated that this 'drought management' information will be displayed on MRC's website. (A number of agencies in the USA provide drought forecast information, largely on the basis of satellite data. It should be possible to have the relevant agencies provide this information for the LMB, thereby enabling drought forecasts for the basin.) Under FMMP 2011-2015, all these possibilities will be assessed and appropriate drought indicators developed in conjunction with MRC's Drought Management Programme and Member Countries. It is noted that a number of agencies in the USA provide drought forecast information, largely on the basis of satellite data. It should be possible to have the relevant agencies provide this information for the LMB, thereby enabling drought forecasts for the basin.

Output 2.4: Climate Change Impacts on Flooding Assessed

Under Output 2.4 of FMMP 2011-2015, it is proposed that a number of agreed climate-changed flood scenarios (CCFSs) be developed to reflect the effects of future climate change on flood producing rainfalls and flood characteristics (such as flood volume, flood duration, peak flood discharge, flood hydrograph, time of onset and finish of flooding, etc). This information can be obtained from climate modelling exercises (paying special attention to the identification and evaluation of uncertainties in such exercises), in conjunction with the judicious analysis and interpretation of the historical rainfall and flood records. When the CCFSs have been developed, they will be 'run' through appropriate flood simulation models (existing models, modified models or new models, as appropriate – see Output 2.2) to assess changes to flood behaviour and flood risk.

It is also proposed to assess flood vulnerability across the LMB to establish the nature and significance of existing community vulnerability and likely climate-changed future vulnerabilities. This information will be used to assess the likely effectiveness of various regional, national and local adaptation measures.

Outcome No. 3: Improved Management of Trans-boundary Flood Issues

The management of trans-boundary flood risks is a 'core' function of RFMMC, as expressed in the 1995 Mekong Agreement, the FMM Strategy 2001 and FMMP 2004-2010. The major flood risk in the LMB is to the population of the Cambodian Lowlands and the Cuu Long Delta. Much of this risk is trans-boundary in nature – land-use changes and infrastructure construction in Viet Nam can influence flooding behaviour in Cambodia and vice versa. Both countries recognize and acknowledge the importance of potential trans-boundary effects.

Under FMMP 2004-2010, a number of technical, socio-economic and administrative tools were developed to identify and assess trans-boundary flood risk impacts, including an ISIS hydraulic model to predict flood behaviour and flood risk throughout the common area of interest. Both Cambodia and Viet Nam have expressed strong interest to see this work continued and expanded, including the incorporation of climate change impacts. Work done under FMMP 2004-2010 this work needs to be capitalized on in FMMP 2011-2015. In passing, it is noted that the tools and methodologies developed to identify and assess trans-boundary flood risks could be taken up by other MRC programmes to assist with their trans-boundary endeavours.

3.3.3 Outcome No. 3: Efficient dialogue and coordination among Member Countries and Dialogue Partners in addressing Transboundary flood issues

This is a key outcome and strongly relates to the key functions of RFMMC. Tools developed (partly already) under FMMP 2004-2010 through analysis as well as through pilot projects including flood simulation models and recommendations for trans-boundary emergency management and water and land use legislation, are major outputs to achieve this outcome. Enhanced skills and knowledge in the application of the 1995 Mekong Agreement for dealing with Trans-Boundary flood issues for relevant user groups is a major element to contribute to the resolution of trans-boundary issues. Trans-boundary pilot projects, along with capacity building at various levels, are important to achieve this outcome. Appropriate interaction between the FMMP 2011-2015 and other MRC programmes is required.

Output 3.1: Improve MCs Capacity to Address Trans-boundary Issues, Differences and Disputes

Output 3.1 will assess the adequacy and improve if necessary the trans-boundary flood risk management tools developed under FMMP 2004-2010.

Output 3.2: Pilot Studies to Demonstrate the Use of Trans-boundary Tools and Techniques

Output 3.2 relates to additional pilot studies to further demonstrate the application of trans-boundary flood risk management tools, to foster a better understanding by Member Countries of the physical nature of trans-boundary flood impacts and emergencies, and the effect of land-use changes of trans-boundary flood behaviour and flood risk.

3.3.4 Outcome No. 4: Strengthening IFRM Knowledge and Capacity in Member Countries

IFRM should be the keystone of MRC's endeavours in flood risk management in the LMB. Fundamental to IFRM is the aim of eliminating an ad-hoc approach to flood risk management, whereby the adverse activities of one agency (or country) may offset and overwhelm the beneficial activities of another agency (or country) to reduce flood risk.

IFRM is regarded as a 'key' concept and the 'key' overarching management tool of RFMMC, and one that needs to be explained and promoted to other MRC programmes and Member Countries, and be adopted by them.

Under FMMP 2004-2010, a considerable and varied volume of 'flood risk knowledge' has been compiled. This knowledge cannot be effectively used by others unless it is quality screened, reliably archived and updated, is readily attainable, and is wanted and useful.

This Outcome in fact looks at the whole FMMP 2011-2015 Programme from a capacity building perspective, including assessment of the required capacity and capabilities within the Member Countries, as well as the gaps in basic knowledge. Different products require various types of CB and training at various levels. It is crucial that IFRM-related training and Training-of-Trainers is delivered to the key personnel and to key Line Agencies to strengthen IFRM.

Under Outcome No. 4, it is proposed to delegate to Member Countries much of the training and capacity building associated with the management of national and local flood risks. This will be done through a train-the-trainers program to embed core training skills in the Member Countries. It is proposed that RFMMC initially oversee and manage these national training courses, at least until an adequate national skills base has been developed.

Outputs 4.1 to 4.3: IFRM Awareness Raising and Capacity Building

Outputs 4.1 to 4.3 consist of an integrated capacity building programme that builds on and expands the IFRM BPGs and capacity building and knowledge transfer courses developed under FMMP 2004-2010. The delivery chain for capacity building and training courses will be identified and agreed on, as will responsibilities between RFMMC, MRC and Member Countries' Line Agencies for the delivery of these courses. An effective M&E system will be developed and implemented to monitor training outcomes.

Lessons learned under FMMP 2004-2010 in capacity building for flood preparedness and emergency management strengthening should be mainstreamed as 'best practices' into national agencies.

Important aspects concern the responsibilities of RFMMC and IKMP for various 'knowledge parcels', and the transfer of training material and other 'knowledge' to appropriate national institutes (e.g universities, other tertiary institutes) for use in teaching and for the future delivery of training Courses by these institutes.

3.3.5 Outcome No. 5: Change Management at RFMMC

This outcome is not an operational outcome, but more a 'change management' outcome, and is of a different nature to the first four outcomes. A financially and technically sustainable RFMMC that meets key operational functions can only be achieved through the development of a transition (change management) process that clearly defines the key functions of RFMMC and the required financial and human resources to meet these functions, which will ultimately have to be funded by Member Countries.

Inherent in this transition process is the potential transfer of some functions from RFMMC to Member Countries. The transfer of capacity building and training programmes dealing with national and local flood risks is mentioned in Section 3.3.4. Another area of possible function transfer involves flood forecasting

duties carried out by RFMMC and flood forecasting undertaken by national flood centres. The integration and rationalization of these efforts needs to be considered.

A further larger question to be addressed under the transition process of Outcome No. 5 is the option of combining certain tasks and responsibilities of the flood and drought management programmes into an integrated ‘flood and drought management programme’. The benefits of such an integrated concept is that it would allow combined flood and drought data and information to be included in the annual hydrology report of the Lower Mekong Basin, and in the context of Climate Change.

Output 5.1: Roadmap for RFMMC

Output 5.1 refers to the roadmap for the RFMMC to facilitate and direct the transition process, including the identification of a number of milestones. Over the next five-years, MRC itself as well as the RFMMC will need to plan for the achievement of financial autonomy by the deadline of 2030. In this transition, there will be a growing demand for national agencies to increasingly integrate regional dimensions of the Mekong affairs into their routine national activities. This can be considered as a medium-term national investment that will bring about benefits to the respective agencies in terms of strengthened institutional, management and technical capacities.

Output 5.2: Riparian Staff Performing key Functions at RFMC

Output 5.2 refers to key functions to be secured by riparian staff including a clear human resources as well as a training strategy.

Output 5.3: RFMMC Regionally Recognized

Output 5.3 relates to options for extending regional cooperation and partnerships, including annual flood forums, leading to the regional recognition of RFMMC as a world-class flood forecasting organization.

3.4 KEY FEATURES OF THE FMMP 2011-2015 PROGRAMME

3.4.1 Programme Design

FMMP 2004-2010 was designed reactively in response to the Year 2000 and Year 2002 Floods. The programme was output based, cost some USD 27 M, and produced some 92 separate ‘outputs’ (products) (see Annex No. 4). Under FMMP 2004-2010, there was no M&E of programme outcomes; in fact, no data were collected to indicate which products provide the most cost-effective reduction in flood risk. Integration of programme activities was only gradually developed; much effort had to be put into integration as different Donors separately funded individual programme components and some sub-components. The overall concept of IFRM became ‘fragmented’ through the delivery of FMM ‘products’.

FMMP 2011-2015 has been designed differently. First, it is an outcome-based programme with outcomes subject to M&E analysis to ensure that outcomes are being achieved, or that the programme is progressively modified to achieve the expected outcomes. Second, the programme has been designed proactively: Member Countries have been consulted in some depth as to what they want and need regarding FMM in their countries (see Section 1.3). It is noted that there is still a tendency by Donors to provide funds on a ‘reactive’ basis¹², and this may affect the way in which FMMP 2011-2015 develops. Unlike its predecessor, FMMP 2011-2015 has been built around a central IFRM framework (see Annex No. 2). The implementation of IFRM in the LMB is not an easy task: many people, both within the MRC and the Member Countries are unfamiliar with IFRM concepts; deep and continuous capacity building and training will be required (and has been incorporated in FMMP 2011-2015).

FMMP 2011-2015 builds on the ‘sub-outputs’ (products) of FMMP 2004-2010. A number of these products are incomplete; many have not been effectively disseminated or taken up by end users, so diminishing their potential benefits. FMMP 2011-2015 addresses these issues through review, capacity building and training processes.

¹² There is considerable interest by Donors on ‘climate change’ elements in FMMP 2011-2015.

Another key element in the design of FMMP 2011-2015 has been the rigorous use of a Design and Monitoring Framework to define Outcomes (5), Outputs (15) and Activities (36), as described in Annex No. 1.

3.4.2 Classification of FMM Activities, Functions and Products

Extensive national consultations were held with Member Countries to determine the relevance and importance of ‘existing’ FMM products developed under FMMP 2004-2010 and to identify ‘new’ FMM products wanted or needed by the Member Countries. A classification scheme was developed to assist in this process. Based on the nature of FMM Programme activities, functions and products, three categories were defined: ‘key’, ‘supplementary’ and ‘additional’ (see Annex No. 4 for details). In summary:

- ‘*Key*’ activities, functions and products are of prime importance in addressing the mandated responsibilities of FMMP under the Mekong Agreement (1995) and the FMM Strategy (2001);
- ‘*Supplementary*’ activities, functions and products are also mandated under the above instruments, but are of lesser importance; and
- ‘*Additional*’ activities, functions and products are not specifically described in MRC’s strict mandate to manage flood risk, but are needed by Member Countries.

3.4.3 FMM Products Proposed for Inclusion in FMMP 2011-2015

Table 3.3 shows the various FMM products identified for inclusion in FMMP 2011-2015. In all some 45 products were identified, comprising 37 existing products (FMMP 2004-2010) and 8 new products (see Annex Nos. 4 and 5 for details). For the sake of convenience, the products have been classified into 10 product groups. Note that two of these product groups are ‘new’: Climate Change Impacts on Flood Risk, and Drought Management Support. Annex No. 8 provides a brief description of the work required to develop/modify the products proposed for inclusion in FMMP 2011-2015.

3.4.4 Capacity Building and Training Courses Proposed for Inclusion in FMMP 2011-2015

Capacity building and training are ‘key’ functions of MRC and RFMMC. One knowledge transfer programme and 24 capacity building and training courses¹³ were developed under FMMP 2004-2010 (see Annex No. 6). With the exception of four ‘key’ courses, the other 19 courses are regarded as ‘supplementary’ or ‘additional’. It is considered unlikely that the RFMMC will be able to support all these courses under FMMP 2011-2015.

Annex No. 6 describes the proposed capacity building and training role of RFMMC. In particular, it is proposed that courses relating to the management of national and local flood risks be divested to Line Agencies, whilst being overseen by RFMMC. It is also proposed that RFMMC appoint a full-time staff member to oversee and organize capacity building and training courses.

As part of the national consultation process, the four Member Countries were asked to identify the 10 most needed capacity building and training courses of relevance to their countries (see Annex No. 6 for details).

Table 3.4 lists the 16 capacity building and knowledge transfer courses¹⁴ proposed for inclusion in FMMP 2011-2015, which comprise 10 existing courses and six new courses. Five of the six new courses relate to the new products proposed for inclusion in FMMP 2011-2015. Annex No. 8 describes the work required to develop/modify the various capacity building and training courses included in FMMP 2011-2015.

¹³ Details of many of these courses are unclear to the FMMP 2011-2015 Formulation Mission and it is strongly recommended that the content and need for current capacity building and training courses be reviewed at commencement of FMMP 2011-2015. It is anticipated that many FMMP 2004-2010 capacity building and training courses will require further development and refinement, including country-specific focus and the translation of key elements into national languages.

¹⁴ Notwithstanding the above selection of capacity building and training courses, it is recommended that the training needs of all stakeholders be reviewed when FMMP 2011-2015 commences and the capacity building and training courses be adjusted accordingly.

Table 3.3 FMMP Products (Sub-Outputs) Proposed for Inclusion in FMMP 2011-2015

Product Group	Product Description	Product Standing ^a	
		Existing	New
1. The Monitoring, & Sharing of Hydro-Meteorological Data.	1. Improved Real-Time Hydro-meteorological Data for Flood Forecasting Purposes.	K1	
	2. Improved Near Real-Time Hydro-meteorological Data for Flood Forecasting Purposes.	K1	
	3. Improved Hind-Cast Hydro-meteorological Data for Flood Behaviour Analyses	K3	
	4. Improved Satellite-based Hydro-met. Data for Mainstream Forecasts & Flash Flood Alerts	K1	
	5. Improved Sharing of Historical Hydro-meteorological Data.	K1	
2. Flood Forecasts and Warning Information.	6. Improved Operational Short-Term Forecasts for the Mekong Mainstream.	K1	
	7. Improved Operational Flash Flood Alerts.	K1	
	8. Improved Medium-Term (5-10 Days) Mainstream Flood Forecasts.	K1	
	9. Improved Long-Term (10-30 Days) Mainstream Flood Forecasts.	K2	
	10. Improved Dissemination of Flood Forecasts and Flood Warning Information.	K1	
	11. Flood Forecasts for Mekong Tributaries. (<i>New</i>)		K1
3. Flood Simulation Models.	12. Forecasting the Tracks and Rainfalls of Tropical Cyclones. (<i>New</i>)		K1
	13. URBS Hydrological Model of Catchment Upstream of Kratie, used for Flood Forecasting.	K1	
	14. ISIS Hydraulic Model of Cambodian/Cuu Long Floodplains, used for Flood Forecasting.	K1	
	15. ISIS Hydraulic Model of Cambodian/Cuu Long Floodplains, used for TB FR Assessment.	K1	
	16. URBS Hydrologic Model used to assess CC Impacts on Flood Behaviour and Risk. (<i>New</i>)		K1
4. Knowledge Base of Flood-Related Data and Information.	17. ISIS Hydraulic Model of Cambodian/Cuu Long Floodplains used to assess CC Impacts on Flood Behaviour and Risk. (<i>New</i>)		K1
	18. Enhanced Data Sets of Topography and River Cross-Sections.	K3	
	19. Enhanced Data Set of Flood Behaviour.	K3	
	20. Enhanced Data Set of Flood Damage.	K1	
	21. Enhanced Data Set of Flood Vulnerability.	K1	
	22. Enhanced Data Set of Existing Structural Flood Mitigation Measures.	S3	
5. Trans-Boundary Flood Risk Management Tools.	23. Socio-Economic Survey Data	K1	
	24. Technical Tools for Addressing Trans-Boundary Flood Issues.	K1	
	25. Socio-Economic Tools for Addressing Trans-Boundary Flood Issues.	K1	
6. Demonstration and Pilot Projects.	26. Administrative Tools for Addressing Trans-Boundary Flood Issues.	K1	
	27. Joint TB Demonstration Project to Assess Flood Risk in Cambodia/Viet Nam Border Area.	S3	
	28. Pilot Project to Demonstrate the Facilitation of Resolution of TB Flood Issues.	S3	
	29. Pilot Project to facilitate TB Cooperation for Inter-Province Flood Emergency Management.	S3	
	30. IFRM Strategy and Masterplan for Cambodian Floodplain. (<i>New – Cambodia</i>)		A1
7. Best Practice Guidelines and User Manuals.	31. IFRM and Land-use Management Plans for Tonle Sap Tributaries. (<i>New – Cambodia</i>)		A1
	32. BPGs for Flood Hazard Assessment.	S1	
	33. BPGs for Flood Damage Assessment.	S1	
	34. BPGs for Flood Risk Assessment.	S1	
	35. BPGs for Selection and Use of Structural and Non-Structural measures to Manage Flood Risks.	S1	
	36. BPGs for Socio-economic & Environmental Evaluation of Flood Risk Management Measures.	S1	
	37. BPGs for Stakeholder Consult. & Public Participation in IFRM Planning and Project Prep.	S1	
	38. BPGs for the Flood Proofing of Buildings and Infrastructure in Urban and Rural Areas.	S1	
	39. BPGs for the Use, Design, Const, Maintenance & Operation of Structural Flood Mitigation Works & Floodplain Infrastructure.	S1	
	40. BPGs for the Control and Repair of Riverbank Erosion.	S1	
	41. BPGs for IFRM for the Basin Development Plan.	S1	
	42. BPGs for the Integrated Planning and Design of Economically Sound and Environmentally Friendly Roads in the Mekong Floodplains of Cambodia and Viet Nam.	S1	
	43. BPGs to Address Regional and National Trans-Boundary Issues	S1	
9. Climate Change Impacts on Flood Risk (<i>New</i>)	44. Impact of Climate Change on Flood Behaviour and Risk. (<i>New</i>)		K1
10. Drought Management Support (<i>New</i>)	45. Real-time and Forecast Rainfall, Stream-flow and Soil Moisture Deficits for LMB. (<i>New</i>)		K1

^a 'K' is for Key; 'S' is for Supplementary; 'A' is for Additional. Numbers indicate Priority from 1 (most important) to 5 (least important).

Table 3.4 Capacity Building and Training Courses (Sub-Outputs) Proposed for Inclusion in FMMP 2011-2015

CAPACITY BUILDING OR TRAINING PROGRAMME		PRODUCT STANDING ^a	
		EXISTING	NEW
1.	Annual Flood Forums	S1	
2.	Training Course on the Use of the Unified River Basin Simulator (URBS) Model.	K1	
3.	Training Course on the Use of the ISIS Model.	K1	
4.	Training Course on the Use of the MRC Mainstream FF System (FEWS-Mekong).	K1	
5.	Training Course on the Use of the MRC Flash Flood Guidance System (MRC-FFGS).	K1	
6.	Capacity Building Course on Introduction to IFRM Concepts and Planning in the LMB.	S1	
7.	Capacity Building Course on BPGs for Flood Risk Assessment in the LMB.	S1	
8.	Capacity Building Course BPGs for IFRM Planning and impact Evaluation in the LMB	S1	
9.	Capacity Building Course on BPGs for Structural Measures and Flood Proofing in the LMB.	S1	
10.	Training in the Identification and Assessment of Trans-Boundary Flood Issues.	S1	
11.	Capacity Building for Improved Data and Information Exchange (<i>New</i>).		K1
12.	Capacity Building for Tributary Forecasting (<i>New</i>).		K1
13.	Capacity Building for Tropical Cyclone Tracks and Rainfall Forecasts (<i>New</i>).		K1
14.	Capacity Building for Adaptation to Climate Change Impacts on Flooding (<i>New</i>).		K1
15.	Capacity Building for Rainfall, Stream-flow and Soil Moisture Deficit Reporting (<i>New</i>).		A1
16.	Capacity Building for GIS and Satellite Images. (<i>New</i>)		A1

^a 'K' is for Key; 'S' is for Supplementary; 'A' is for Additional. Numbers indicate Priority from 1 (most important) to 5 (least important).

3.5 KEY RFMMC FUNCTIONS AND DUTIES

Key functions and duties to be undertaken by RFMMC are mandated by the Mekong Agreement (1995) and the FMM Strategy (2001) and represent the essential 'key' business of RFMMC. It is anticipated that ultimately the Member Countries will fund key duties. The key functions identified below encompass a *minimum set of activities* that justify the operation of a dedicated Regional Flood Management and Mitigation Centre.

3.5.1 Operational Data Collection and Processing Duties

Identify and update data requirements; secure data transfer from the MRC Member Countries through dedicated protocols/agreements; carry out real-time and near real-time data collection; undertake real-time, near real-time and historic data analysis; undertake hydrologic URBS and hydraulic ISIS modelling for flood forecasting purposes, including model adjustment/calibration; presentation and dissemination of data and information; continuously check, verify and update flood/dry season pages on the MRC website.

3.5.2 Operational Flood Forecasting, Flash Flood Guidance and Dry Season Monitoring Duties

- *During the flood season:* daily (1/24 hrs) operational forecasting for the Mekong mainstream (MRC-FFS); preparation and dissemination of warning information to relevant national centres; maintain proper communication with the national centres; preparation and dissemination of weekly reports. Prepare, present and update weather reports.
- *During flood events:* twice or thrice daily (1/12 hrs or 1/8 hrs) operational flood forecasting for the Mekong mainstream (MRC-FFS); preparation and dissemination of related warning/flooding information, in close communication with the relevant national centres; maintain close communication with the relevant national centres; preparation and dissemination of flood event reports. Prepare, present and update weather reports.
- *During existing depressions, tropical storms and typhoons approaching or over the LMB:* operational 24/7 of the flash flood guidance system (M-FFGS); preparation and dissemination of flash flood alerts to the relevant national centres; maintain close communication with the national

centres; preparation and dissemination of flood event reports. Prepare, present and update weather reports.

- *During the dry season:* daily (1/24hrs) operational river monitoring for the Mekong mainstream; the preparation of information and dissemination of information to the relevant national centres; preparation and dissemination of weekly dry season reports; preparation dissemination of dry season situation reports¹⁵. Prepare, present and update weather reports.

3.5.3 Capacity Building and Training Duties

- *During the dry season:* deliver capacity building and training for the national centres regarding the MRC flood forecasting system and the flash flood guidance system; activities include possible adoption of hydrologic and hydraulic models and their application in the specific MRC Member Countries by the national centres; help in selecting participants for training; periodically revise and update the capacity building and training materials; prepare present evaluation reports, based on questionnaires.
- *During the dry season:* deliver capacity building and training at regional (Phase 2) and national levels (Phase 3) regarding “Enhancing Cooperation in Addressing Trans-boundary Flood Issues” through dedicated institutes in Member Countries; identify target groups and help select participants; periodically revise and update the curriculae and teaching modules; prepare and present evaluation reports, based on questionnaires.

3.5.4 Special Reporting Duties

- To draft the annual MRC hydrology report in close cooperation with IKMP and the DMP, based on the various flood and dry season data and findings.
- To draft the annual accuracy assessment of the Mekong flood forecasting system for the Mekong mainstream, including findings/lessons learnt and recommendations for further improvement, and include the findings in the annual Flood Season Performance Evaluation Report.
- To draft the annual assessment of the effectiveness of the MRC flash flood guidance system for the MRC Member Countries, including findings/lessons learnt, requirements and recommendations for improvements, and include the finding in the annual Flood Season Performance Evaluation Report.

3.5.5 Management Duties

- To manage the staff of the RFMMC. To prepare daily/weekly/monthly and annual plans, reports on the RFMMC’s duties, as requested by MRCS.
- To interact with Director TSD on daily basis and to coordinate with other MRC programmes as needed.
- To interact with national centres of the MRC Member Countries and Dialogue Partners (if and when required) on upcoming or existing flood events, dry season situations, weather conditions, data collection, data transfer, data and information dissemination, and composition and dissemination of warning and alerts information.

3.6 ADDRESSING SUSTAINABILITY

FMMP 2011-2015 focuses on the generation of accurate flood forecasting and flood warning information, reliable modelling, the inclusion of IFRM considerations in policy and planning processes, the resolution of trans-boundary flood issues, tools development and capacity building to ensure the implementation of IFRM in planning processes. The sustainability of outputs - and therefore the outcomes - depends on a number of factors, which have been summarized in risks and risk management matrix shown in Table 3.5.

¹⁵ These could include the regular assessment and forecasting of drought indicators, such as rainfall, stream-flow and soil moisture deficits.

Table 3.5 Sustainability Matrix¹⁶

Sustainability Factor	How Sustainability will be Enhanced
The extent to which Member Countries maintain the necessary level of political commitment.	FMMP 2011-2015 will update national political entities with policy briefs informing policy makers regarding the relevance of IFRM within the national planning process.
The level of ownership the national Line Agencies develop of FMMP 2011-2015 outputs.	The preparation of FMMP 2011-2015 is a participatory process in which the Line Agencies are clearly expressing their problems, their needs, their priorities as well as the major challenges ahead. This participatory process will be a continuous process through the whole five year period 2011-2015 to ensure commitment and the highest possible level of ownership.
The extent to which outputs are considered relevant and of good quality by the end-users.	During the preparation of FMMP 2011-2015 the relevance and quality of the products have been assessed in detail by the various stakeholders. Together with outputs focused capacity building will be provided to ensure that stakeholders involved have the necessary capacity to use the products effectively.
The extent to which Line Agencies play their role in the dissemination of products	The sense of ownership amongst the Line Agencies regarding products to be disseminated is essential and will be taken care of during the FMMP 2011-2015 preparatory phases of the formulation process.
The level of capacity which Line Agencies develop as well as the level of capacity the Line Agencies can create amongst provincial and district agencies.	To clearly identify the relevant staff to be trained, to provide down-to-earth training including follow-up. Training of Trainers (ToT) focused on the specific requirements of the provincial and district level staff.
The extent to which target beneficiaries use the products.	To clearly identify target beneficiaries, their needs and requirements. To monitor progress made in the use of products and lessons learnt to be used for further product adaptation if and when required.
The extent to which RFMMC will be resourced to the level required to ensure its role and functions as agreed upon.	Ensure that operational costs for RFMMC, the Basic organizational option as well as expanded (full) option are clearly defined and agreement is reached amongst the Member Countries regarding the funding of these costs. Agreement on the secondment of experienced national staff to RFMMC.

3.7 RISKS AND RISK MANAGEMENT

A number of assumptions have been formulated for each of the FMMP 2011-2015 Outcomes. Assumptions can become ‘risks’ if the assumptions prove to be invalid. The results framework for FMMP 2011-2015 (Annex No. 1) defines risks for each of the five outcomes of FMMP 2011-2015. The level of risk associated with the FMMP 2011-2015 outcomes needs to be assessed in terms of likelihood and potential impact. The risks facing the successful implementation and the achievement of FMMP 2011-2015 benefits as well as the level of risks have been so assessed, as shown in Table 3.6, which also shows proposed measures to manage these risks.

¹⁶ See also M-IWRM draft Inception report, June 2010

Table 3.6 Risk Assessment and Management Matrix

Risk	Risk Management	Risk Level
<p>Macro-Economic Context & Political Commitment:</p> <p>The incorporation of IWRM and IFRM in national systems not implemented due to a lack of political commitment.</p> <p>Flooding has not been a major problem since 2001 flooding consequently less of commitment and interest at all levels.</p>	<p>The Declaration of the 1st MRC Summit in Hue Hin stresses the need for Flood Management and Mitigation services and capabilities for the MRC.</p> <p>Ref.: “<i>Intensifying efforts to effectively manage the risks from flood, drought and sea level rise including establishment of forecasting and warning systems across the whole basin</i>”.</p>	H3
<p>MRC Support:</p> <p>The relationships between various components not properly translated in operational terms with special reference to roles and responsibilities regarding development, use and maintenance flood related data and products.</p> <p>Approaches and tools as developed by various MRC Courses are considered to be too sophisticated to be included in national institutions.</p>	<p>MRC Strategic plan and MRC programmes are properly integrated and transparency regarding roles and responsibilities of various programmes towards each other.</p> <p>Stakeholder commitment through a comprehensive participatory process during preparation, implementation and monitoring of the 2011-2015 MRC Programme.</p> <p>MRC with special reference to FMMP 2011-2015 focuses on the relevance of core products as well as the agreement on clear roadmaps to ensure the implementation from “production” to the end-users.</p>	M2
<p>RFMMC and Riparianization:</p> <p>Agreement on the nature and timing of the riparianization of the programme not explicitly reached.</p> <p>Too quick riparianization will possibly create Donor reluctance on funding packages.</p>	<p>Ensure the commitment from Member Countries started during the participatory preparation process of the FMMP 2011-2015 Programme.</p> <p>Retain the possibility to incorporate foreign TA related to specific packages and tasks.</p>	L2
<p>Donor Support:</p> <p>Due to the financial crisis the availability of bilateral Donor funds for individual programme components will be reduced.</p>	<p>The clear definition of FMMP core products as well as a comprehensive roadmap to ensure that the funding of core functions will be made by the Member Countries at the medium term will create “goodwill” amongst the Donor community.</p> <p>There is a growing recognition that the multi-lateral agencies can play a more prominent role in ensuring co-funding of relevant FMMP 2011-2015 core products.</p>	M2
<p>Line Agencies:</p> <p>The transition process including a larger role for the Line Agencies is not fully endorsed or implemented by the LAs.</p> <p>A lack of trust in the quality and usefulness of FMMP products.</p> <p>The relevant capacity building within Line Agencies not fully implemented.</p>	<p>The Line Agencies played a major, pro-active role during the FMMP 2011-2015 preparation process regarding the assessment of the quality, relevance and prioritization of FMMP products.</p> <p>The Line Agencies clearly indicate their priorities regarding focused, down-to-earth capacity building.</p> <p>Responsibilities of Line Agencies clearly define and agreed upon in MOUs and roadmaps</p>	M3
<p>Provincial and District Agencies:</p> <p>The Line Agencies will not fully honor their commitment for capacity building amongst provincial and district agencies.</p>	<p>MOUs with Line Agencies regarding their responsibilities including the responsibilities for capacity building are elaborated and agreed upon.</p>	M2
<p>Upper Riparian Engagement:</p> <p>Required data regarding aspects of FF and FW are not systematically made available by countries concerned.</p>	<p>Increased dialogue between countries with special reference to exchange visits, training with China.</p>	L2
<p>Programme Implementation:</p> <p>The 2011-2015 FMMP 2011-2015 plan not formally agreed upon with special reference to staffing and financial issues possibly leading to a lack of resources and/or trained staff.</p>	<p>The 2011-2015 FMMP 2011-2015 plan will be drafted with maximum participation of the Member Countries in all phases of the formulation process.</p> <p>MRC will ensure commitment from Member Countries by putting FMMP 2011-2015 approval explicitly on the agenda of the Joint Committee.</p>	M3

Likelihood: L(low), M (medium), H (high). Potential impact: 1 (low), 2 (medium), 3 (high)

4. MANAGEMENT AND IMPLEMENTATION

4.1 EXISTING FRAMEWORK, NEW REQUIREMENTS AND THE TRANSITION PROCESS

The coming five years of 2011-2015 is a critical transition period to investigate and decide how the MRC as well as the RFMMC will be able to reach the objective of financial autonomy by the deadline of 2030. In this transition, there will be a growing demand for national agencies to increasingly integrate regional dimensions of the Mekong affairs into their routine activities. This can be considered as a medium-term national investment that will bring about benefits to the respective agencies in terms of strengthened institutional, management and technical capacities. By integrating and mainstreaming regional dimensions into national activities, there is less chance for major differences to arise with neighbor countries, and regional integration¹⁷ is strengthened.

The transition towards greater national ownership and implementation has already started in some of the core functions¹⁸. This is an ongoing process, based on training and capacity building at the level of national agencies responsible for flood forecasting and warning. In this process, the interest from MRC Member Countries in RFMMC products is growing. However, the need of national agencies is to specifically address national issues. FMMP is working with national agencies to identify the manner in which RFMMC can be helpful in supporting the national requirements, whether this is related to data exchange, flood simulation modeling or other activities. In the coming years under FMMP 2011-2015, it is expected that the provision of dedicated services to meet national requirements will increasingly be requested by the Member Countries.

A long-term model for MRC could be one where it has a ‘facilitation, coordination and advisory’ role in the management of the Mekong River Basin and provides technical assistance only in basin-wide impact/trend analysis, basin-wide modeling and assessment, basin-wide planning and river system monitoring. These are essential functions of MRC that need to occur on a regular basis; it is expected that these functions will be fully financed by the Member Countries by 2030. The suggested approach to this long-term vision is a phased one, where a transition period is needed to prepare the MRC and its Member Countries for the new implementation modality, and where a roadmap for the change is calibrated with a clear timeline and milestones.

A detailed roadmap to facilitate the transition process will be prepared during the implementation of FMMP 2011-2015. However, major indicators of such a roadmap for the transition period are shown in Figure 4.1.



Figure 4.1 Roadmap for the Transition Period 2011-2015: Major Indicators

During the transition period 2011-2015, Line Agencies should accept increased responsibilities for advancing the implementation arrangements. The following major indicators of progress over the period 2011-2015 have been defined (and are shown in Figure 4.1):

1. An estimation of the human, technical and financial capacities required by the Line Agencies to perform activities that at present depend on external technical and financial support, including development of a comprehensive Capacity Building Plan with:

¹⁷ Background paper on Implementation of the core river basin management (RBM) functions of the MRC at regional and national levels.

¹⁸ Water monitoring activities used to be fully funded by external Donors through the WUP but have been handed over for full implementation and full financing by the Member Countries since the end of the programme in 2008.

- A targeted needs assessment in lead agencies related to the future implementation of key functions.
 - The identification of national capacity gaps in various areas.
 - Addressing the different levels of national capacities in certain areas.
2. Memorandums of Understanding (MOU)¹⁹ need to be formulated and signed, clearly indicating the responsibilities of the Line Agencies in the dissemination, monitoring and evaluation of FMMP 2011-2015 products.
 3. Budgets should explicitly be made available to implement responsibilities, as agreed in the MOUs.
 4. Regional expert groups should be established to work jointly on priority areas. National experts should be appointed to work together to implement the regional dimension of Mekong cooperation.
 5. The institutional mechanisms related to RFMMC/FMMP activities should be changed, with special reference to the roles of the Member Countries and the relevant Line Agencies.
 6. The Monitoring and Evaluation of RFMMC/FMMP activities, outputs, outcome and impacts will be a joint responsibility of RFMMC/FMMP and Member Countries, with a clear delineation of responsibilities between RFMMC/FMMP and Line Agencies.
 7. At the end of the transition period, the responsibilities of Line Agencies need to be clearly defined, agreed upon and are being implemented.

It should be emphasized that the various MRC programmes are at different stages of advancing implementation arrangements under which national agencies take increased responsibilities. For FMMP 2011-2015, various programme components are at different stages of advancing implementation arrangements. Moreover, the capacity and capabilities differs substantially between the Member Countries. This requires a careful transition process, with a focus on dedicated capacity building in the two least-advanced Member Countries.

4.2 IMPLEMENTATION STRATEGY

The implementation strategy consists of the following elements:

4.2.1 Products and Roadmaps

- Definition of the needs and priorities for old and new products as expressed by the MCs.
- Clear understanding that products will not automatically be disseminated.
- The “chain of products” from producer to end-user in review report needs to be further elaborated and used.
- Adopt the principle of elaborating a roadmap with special reference to the “real core” products answering the question “how to come from production to use by end users”. The roadmap includes (i) steps to be taken; (ii) milestones to be achieved and measured and; (iii) responsibilities.

4.2.2 Responsibilities

- Responsibilities for RFMMC/FMMP and the Line Agencies in the dissemination, monitoring and evaluation of products and results will be properly defined. Herewith the responsibilities of RFMMC and Line Agencies will be sharply delimited and the role of RFMMC/FMMP in the dissemination process is clearly defined.
- The Line Agencies should in advance declare that they will implement/integrate/disseminate the products they require. This will be formalized in MOUs between MRC/FMMP/RFMMC and Line Agencies indicating who is responsible for what.

¹⁹ Some Member Countries may use a different type of agreement.

4.2.3 Communication

- With the participation of many stakeholders, their diverse interests and capacities the emphasis will be on the establishment of different mechanisms for communication, dialogue, negotiations and consensus building for all relevant IFRM related issues. The participatory formulation process including specific problems, needs and priorities expressed by all stakeholders during two rounds of national consultations should be assessed in this light.
- The process of policy making requires consultations and awareness raising amongst policy makers as well as amongst the broader group of stakeholders. In line with the MRC Stakeholder Engagement Policy and the Communication Strategy and Disclosure Policy, FMMP 2011-2015 will ensure that the FMMP 2011-2015 approach, products and results are understandable, well targeted and disseminated to all concerned levels.

4.2.4 Knowledge

- Integration of IFRM related knowledge into the Member Countries planning system.

4.2.5 Role of Pilot and Demonstration Projects

- Pilot and Demonstration Projects played a large and valuable role in FMMP 2004-2010: they were used to address specific IFRM issues and flood management measures in the four Member Countries and provided important on-the-job training and capacity building in Line Agencies that was highly valued by the countries. However, some countries see pilot and demonstration projects as a means of implementing national and local flood risk management measures and wish this process to be continued under FMMP 2011-2015. The Formulation Mission sees the primary role of Pilot and Demonstration Projects as an effective means of delivering capacity building and training – and they should continue in this role under FMMP 2011-2015. Pilot and Demonstration Projects *should not be used* as an on-going means of delivering IFRM measures. The use of pilot projects, especially trans-boundary pilot projects, will encourage collaboration between Member Countries and will ensure registration, dissemination and promote the up-scaling of results.

4.3 INSTITUTIONAL ARRANGEMENTS FOR FMMP 2011-2015

The institutional framework of RFMMC/FMMP resides under the overall framework of the Mekong River Commission (MRC), which enjoys the status of an international-governmental institution, including entering into agreements and obligations with the Donors and international community. The Commission consists of three permanent bodies; the MRC Council, the MRC Joint Committee and the MRC Secretariat. The Secretariat is co-hosting through the Office of the Secretariat in Vientiane (OSV) and the Office of the Secretariat in Phnom Penh (OSP).

The RFMMC, which officially started its operations in Phnom Penh in April 2005, forms part of the OSP and as such functions under the purview of the Director of the Technical Support Division (TSD) in OSP, which is under the purview of the CEO in OSV.

The FMMP Steering Committee (SC) supports the CEO. The SC is part of the Project Executive at CEO level, reflecting the fact that the contract for RFMMC/FMMP 2011-2015 implementation is between MRCS and Donors. The SC members comprise the CEO, Director TSD, representatives of the NMCs (of Deputy Secretary General/Deputy Director General level) and the Donor representatives from the funding Donor Agencies. The RFMMC coordinator will function as the Secretary of the SC. The basic mandate of the SC is to ensure programme implementation and delivery in terms of contract specifications.

The main bodies of MRC including its MRC Council, the MRC Joint Committee and the MRC Secretariat are indicated in Figure 4.2.

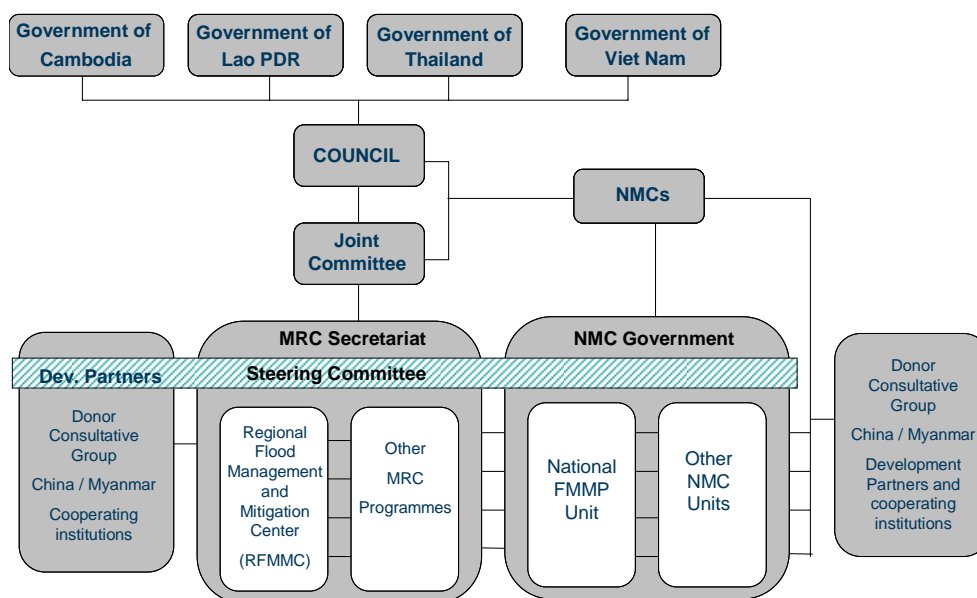


Figure 4.2 Main Bodies of the MRC

All FMMP 2011-2015/RFMMC activities will be under the responsibility of the Director TSD because the main bulk of the work undertaken by FMMP/RFMMC is related to data collection and analysis, information dissemination, modeling, mapping, etc, and consequently is directly related to the work of the TSD.

RFMMC will host all the components of FMMP. The overall direct management of the FMMP 2011-2015/RFMMC implementation is under the RFMMC coordinator.

The NMCs are the national focal points for the FMMP implementation. A National FMMP Coordinator has been selected for each of the NMCs. This National FMMP Coordinator will head the National FMMP Unit until such a Unit is no longer required.

4.4 MANAGEMENT OF FMMP 2011-2015

4.4.1 Role of Steering Committee

A Steering Committee (SC) will be set up to facilitate the CEO in ensuring the programme implementation in line with the agreed goals and outcomes. The objectives, responsibilities and functions of the SC will be elaborated in a later phase. However, the following should be taken into consideration:

- (i) The roles, responsibilities and relevance of the FMMP 2011-2015 Steering Committee (SC) depend to a certain extent on the size and complexity of FMMP 2011-2015. Therefore, the roles and responsibilities of the SC cannot easily be standardized.
- (ii) The key objectives of the SC will be threefold:
 - a. To supervise FMMP 2011-2015, monitor its implementation and facilitate the coordination between various RFMMC functions, as well as between RFMMC and National Agencies;
 - b. To address and resolve major issues or submit to the Joint Committee's for consideration, and;
 - c. To ensure the achievement of the FMMP 2011-2015 goals.
- (iii) The functions of the SC are focused on the following fields:

- a. To monitor the performance of FMMP 2011-2015;
 - b. To approve the overall Programme Implementation Plan (PIP);
 - c. To consider any proposed modifications to the Programme Implementation Plan in terms of programme structure, organization, scope, content, timing, budgets for which the consent of the CEO and/or Donors would be required;
 - d. To assist the CEO in making FMMP/RFMMC major management decisions that are within his mandate;
 - e. To provide strategic guidance to the overall programme and recommend actions to increase its effectiveness and impact if and when required and;
 - f. To act as the arbiter with regard to all high level strategic and policy issues and assess whether issues require MRC Joint Committee advice and/or involvement.
- (iv) The SC membership will comprise the CEO, Director TSD, representatives of the NMCs (Deputy Secretary General or Deputy Director General level) and Development Partners if and when required within the context of major additional functions to be implemented by RFMMC.

4.4.2 National Mekong Committees

The National Mekong Committees (NMCs) are the coordinating bodies for the FMMP 2011-2015 implementation with the following major functions:

- To take the lead in coordinating the FMMP 2011-2015 activities at national level and provide the link between the MRC Secretariat with the national ministries, line agencies and local authorities.
- To ensure a close partnership between the NMCs and the Secretariat as well as with the RFMMC with a view to increase each country's capability to deliver effectively the outputs and results of the FMMP 2011-2015.
- To monitor the process of mobilization of national inputs and progress of implementation.
- To provide the necessary guidance and support to the MRCS, RFMMC and the Line Agencies in achieving the objectives.
- To assist their national governments in managing all relevant activities with the MRCS and RFMMC and submit to their governments for consideration all policies on IFRM cooperation with the aim to achieve the FMMP 2011-2015 goals.

The role of NMC, Line Agencies at National, Provincial and District level should be clearly specified in their contribution to the achievement of the FMMP 2011-2015 goals.

4.4.3 Line Agencies²⁰

The NMCs and their Secretariats are important. However, their role must be practical and output oriented. For all technical issues the Line Agencies including all dedicated partners dealing with flood management and mitigation like National Centers for Flood Forecasting, Disaster Management Agencies as well as Line Agencies are the key actors. The direct links between this group of implementing agencies and RFMMC will be established and intensified to ensure an effective implementation.

The role of the Line Agencies during FMMP 2011-2015 will be specified, intensified and formalized as follows:

- Roadmaps will be described for the core products indicating the chain between production and the final end-users of the products including milestones and the role of Line Agencies (roadmaps).
- MOUs will be signed between RFMMC, NMCs and the Line Agencies to clearly define the responsibilities of all parties.
- Role in capacity building of key persons at provincial and district level.

²⁰ The national agencies responsible for the implementation of various FMMP 2011-2015 activities and products have been specified per country in Annex 7.

- Gradual incorporation of FMMP 2011-2015/RFMMC functions within the budget of the Line Agency.
- RFMMC will work directly with Line Agencies for the implementation of activities.

The permanent RFMMC will provide technical support to Member Countries, and in particular to dedicated partners dealing with flood management and flood mitigation, such as appropriate Line Agencies, National Centres for Flood Forecasting, Disaster Management Agencies and others. The RFMMC will coordinate implementation of its national activities at the level of Line Agencies and National Centres through the National Mekong Committees, as indicated in Figure 4.3. The relationship with the Line Agencies and National Centres is particularly relevant regarding flood forecasting capabilities. Figure 4.3 shows the present relationship²¹ between RFMMC and Line Agencies/National Center for Flood Forecasting (for technical services only, which are governed by MoUs²²), in which FMMP provides support to the National Centres, which in turn provide guidance for a permanent RFMMC.

LINKAGE RFMMC – NATIONAL CENTER FOR FLOOD FORECASTING

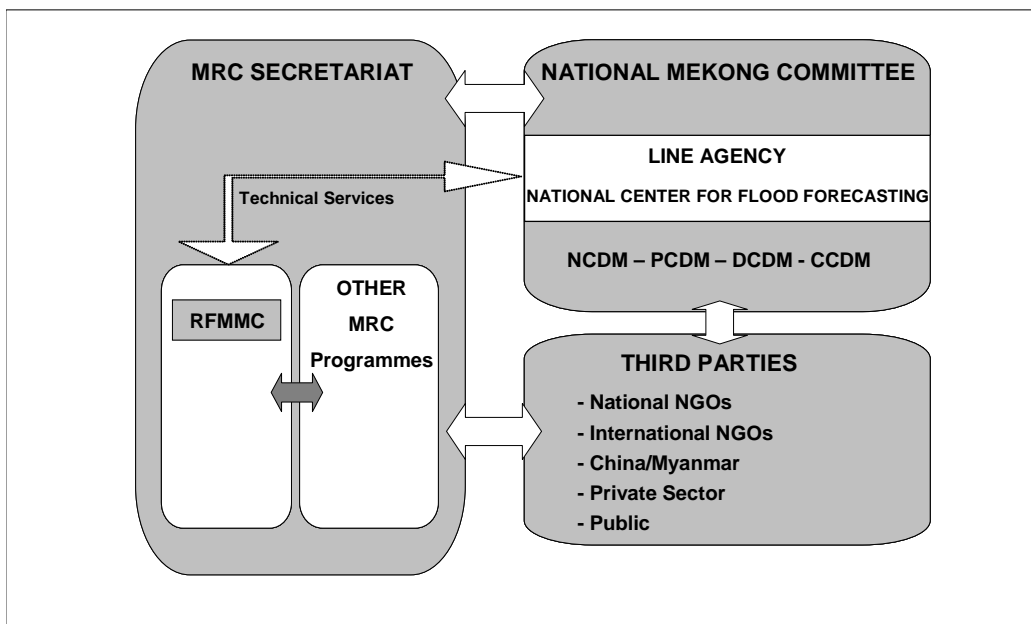


Figure 4.3 Linkages between the RFMMC and National Centres for Flood Forecasting

The Technical Services Support Mechanism between MRC/RFMMC and the national level of Line Agencies and National Centres for FF through the NMCs is depicted in Figure 4.4. Depending on the type of products developed by FMMP 2011-2015/RFMMC, a closer direct link between FMMP/RFMMC and the national agencies concerned will be considered.

²¹ The example of Figure 4.3 relates to the National Flood Forecasting Centre of Lao PDR. See Figure 4. Each Member Country has its own institutional framework.

²² In case MoU is not acceptable by one of the Member Countries, another type of arrangement will be applied.

Implementation Mechanism

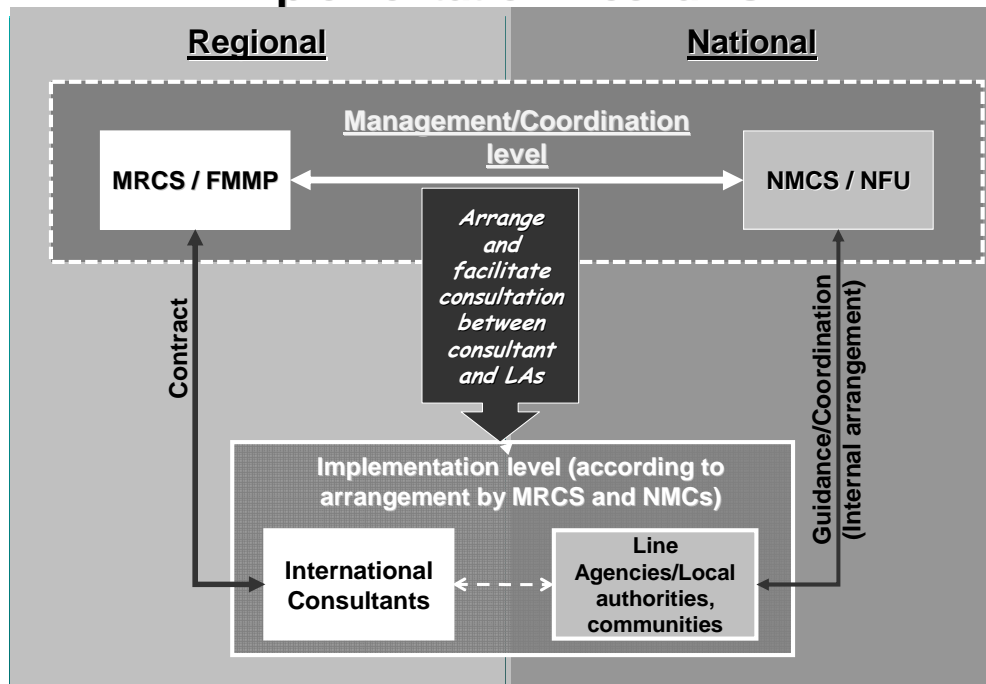


Figure 4.4 Implementation Mechanism

4.4.4 National FMMP Coordinator

During FMMP 2004-2010 a National FMMP Unit (NFU) has been established at the NMC Secretariat, headed by the National FMM Coordinator with an additional FMM Expert and support staff and fully funded by Donors. In view of the MRC priorities in the field of consolidation, core functions and regional responsibilities as well as the design of the FMMP 2011-2015 Programme, the need for a separate NFU is less evident during the 2011 Bridging Period as the focus in 2011 will be on the preparation and formulation of proposals to be funded from external sources. A NFU could possibly be revived in case major FMMP 2011-2015 components will attract additional funding which could imply an enhanced role for a NFU.

However, a National FMMP Coordinator will remain necessary. Such a coordinator should have the following major responsibilities:

- (i) National coordination of FMMP activities
- (ii) Liaise with national partners and Line Agencies.
- (iii) Act as a manager for FMMP coordination and a focal point for all FMMP related information that go beyond the individual FMMP activities at national level.
- (iv) Make available quarterly reports on the overall progress of FMMP 2011-2015 in the country concerned according to a preset format.
- (v) Guarantee proper exchange of data and the dissemination of relevant FMMP information between MRCS, RFMMC and the country concerned.
- (vi) Carry out programme level monitoring and review and propose revisions to RFMMC if and when required.

The National FMM Coordinator in close coordination with the NMC and supported by RFMMC will draft a specific project document specifying the roles and responsibilities of country level for the achievement of the FMMP 2011-2015 goals.

4.4.5 Provincial, District and Community Levels

This Programme Document clearly identifies stakeholders and target beneficiaries and their roles. The role of provincial, district and community level agencies will depend on the activity involved and will be further specified in the Program Implementation Plan (PIP).

4.5 CURRENT STRUCTURE AND OPERATION OF RFMMC

The current structure and operations of RFMMC, ie current arrangements, are briefly described because they provide the foundation for the structure and operations of the organization proposed under FMMP 2011-2015.

4.5.1 Current Functions

The current responsibilities of RFMMC are focused on the following functions:

- Operational data collection and processing;
- Operational flood forecasting, flash flood guidance and dry season monitoring;
- Capacity building and training;
- Special reporting; and
- Management of the Center and its Programmes.

Under current staffing and funding arrangements there is little if any opportunity for Center staff to undertake development and services activities for the MCs.

4.5.2 Current Organizational Structure

Under current arrangements, RFMMC has a relatively simple organizational structure, comprising three functional units:

1. A Data Collection & Processing Unit;
2. A Flood Forecasting & Warning Unit; and
3. A Capacity Building Unit.

To simplify things further, these three separate units could be merged into one single unit, the *Technical Unit*. Currently, Technical Advisors are hired on a 'case-by-case' basis and/or through framework contracts.

4.5.3 Current Staffing

Under current arrangements, full-time staffing at RFMMC is as follows.

The RFMMC Management functions comprise:

One *RFMMC Coordinator*, a riparian professional staff (RPS) member, who is responsible for operations and development, including communications, and fundraising for the development functions, and one *administrative staff cum secretary*, a national support staff (NSS) member, who is responsible for providing administrative/secretarial support to the RFMMC coordinator.

In addition, one Chief Technical Advisor (optional) is currently employed, who is responsible for assisting the coordinator with all technical issues arising under FMMP 2011-2015, as well as providing support for fundraising.

The RFMMC Operational functions are covered by the Technical Group, consisting of seven persons, comprising four RPS and three national technical staff (NTS):

One *Operations Manager* (RPS), who will head the Unit (currently vacant). The Operations Manager is assisted by two *Flood Forecasting Experts* (RPS), one *Assistant Hydrologist (Flood Forecasting)* (NTS), one *Assistant Meteorologist (Flood Forecasting)* (NTS), one *Capacity Building Expert* (RPS) (currently vacant), and one *IT Expert* (NTS).

4.5.4 Finance and Administrative Support

Under FMMP 2004-2010, the Financial and Administrative Unit of RFMMC consisted of 11 support staff (all NSS). From the 1st July 2010, these functions were transferred to the Office of the Secretariat Phnom Penh (OSP), as per the MRC Council co-hosting decision (Hua Hin, Dec. 2009). This transfer leads to direct savings by RFMMC. Another positive budgetary effect for RFMMC is that building-related costs are also covered by OSP from 1st July 2010, onwards. The transfer of these costs reduces the financial requirements of FMMP 2011-2015.

Thus, the total number of permanent staff to currently running RFMMC is *only nine*, (management and technical), as listed above. Technical Advisers for special assignments are considered as ‘optional’ and are expected to be part-time.

4.5.5 RFMMC Costs Under Current Arrangements

Table 4.1 shows the annual cost of running RFMMC under current arrangements. The current cost is some USD 750,000 per year (see Annex 10 for details).

Table 4.1 Estimate of Annual RFMMC Costs, Current Arrangements

Items	Amount (USD)
1. Personnel Services ²³	330,000
2. Data Collection and Transfer	32,000
3. Operational Costs ²⁴	277,000
Sub-Total	639,000
4. Contingency @ 5%	32,000
5. MRC Secretariat Support 11%	74,000
Grand Total	745,000

The following aspects of the RFMMC costs under ‘current arrangements’ should be noted:

- The personnel costs are for nine riparian staff only.
- There is no allowance for a CTA or specialist TA inputs from international consultants in regard of the Center’s operations. There is no allowance for a capacity building expert (national) to manage the Center’s capacity building and training activities.
- There is no allowance for any development & services activities. At best, the current arrangements might be able to maintain the technical status quo; the cost of technical improvements to operations systems are not included in the cost estimate.

Thus, under ‘current arrangements’, RFMMC will wither technically. Center staff will continue to deliver flood forecasts, as at present, and be available to conduct capacity building programmes in the dry season. However, the management and standard of these programs is expected to decline in the absence of a capacity building staff member.

4.6 PROPOSED STRUCTURE AND OPERATION OF RFMMC UNDER FMMP 2011-2015

4.6.1 Proposed Organizational Structure

The proposed organizational structure of RFMMC under the FMMP 2011-2015 is shown in Figure 4.5. The Center will continue undertake key operations functions (such as flood forecasting), as well as identified development and service functions. All these functions are described in Annex No. 9. The

²³ Including coordinator, operations manager, two flood forecasting experts, capacity building expert, assistant hydrologist and meteorologist, IT expert and support staff but excluding technical advisors.

²⁴ Including training costs, meetings, reporting and operational costs, equipment and maintenance, but excluding Annual Mekong Flood Forum and Annual Flood report.

proposed structure will progressively be developed, according to the set priorities and the available funding.

Organizationally, RFMMC consists of two technical units, an *Operations Unit (OU)* and *Development & Services Unit (DSU)*. The Operations Unit is essentially the Center’s current ‘Technical Unit’ that undertakes data processing, forecasting and warning. In RFMMC 2011-2015, a hydrodynamic modeller has been added to the OU. The DSU will consist of a number of cells, each associated with a different suite of development activities and headed by a Project manager.

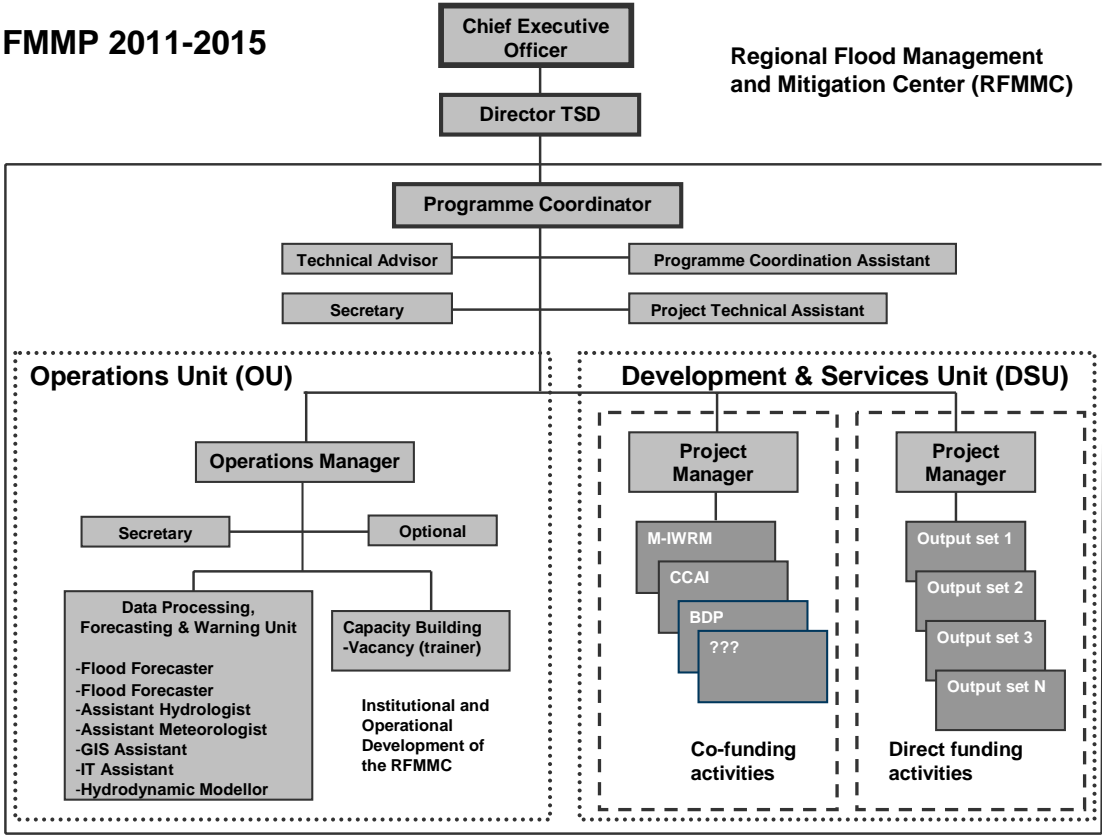


Figure 4.5 FMMP 2011-2015 Organizational Structure

4.6.2 Management and Technical Staff

The RFMMC *management team* for FMMP 2011-2015 has been expanded from the two full-time staffs to four full-time staffs as described below. The greater depth of management reflects the broader responsibilities and larger scope of development & services to be provided under FMMP 2011-2015.

The RFMMC management arrangement for FMMP 2011-2015 accommodates the following functions:

- the Overall RFMMC Management functions,
- the RFMMC Operations functions, and
- the RFMMC Development functions.

The Overall RFMMC Management functions are delegated to:

- One *Programme Coordinator*, a riparian professional staff (RPS), who is responsible for operations and development, including communications, and fundraising for the development function, who is assisted by:
- One *Programme Coordination Assistant* (NTS) to provide assistance to the Programme Coordinator;
- One *Project Technical Assistant* (NTS) to provide coordination between the various projects of the DSU (effectively head of the Development Unit) and liaison with senior FMMP Management; and
- One *Secretary*.

Given the number and scope of technical studies proposed under FMMP 2011-2015, a Chief Technical Adviser is considered to be *essential* rather than optional, as under current arrangements. It is stressed that the Technical Advisor's role is *specifically 'technical'*, ie to provide technical advice and ensure the technical integration of the various development studies. The management of all administration is the responsibility of the Programme Coordinator.

The RFMMC Operational functions are delegated to:

- One *Operations Manager* (RPS), who will head the Operations Unit. This person should be a senior flood-forecasting expert with professional qualifications. The Operations Manager, who is assisted by:
- One *Secretary*, and as an option one or more *Technical Advisors*. These *Technical Advisors* may be contracted on short or medium term basis for specific assignments.

The *Operations Manager* leads two Units: the *Data Processing, Forecasting & Warning Unit*, and the *Capacity Building Unit*.

The *Data Processing, Forecasting & Warning Unit* is comprised of:

- Two *Flood Forecasting Experts* (RPS) with professional qualifications and a Master of Science Degree in Hydrology.
- One *Assistant Hydrologist* (Flood Forecasting) (NTS) with hydrologic modelling capabilities and professional qualifications;
- One *Assistant Meteorologist* (Flood Forecasting) (NTS) with meteorologic experience and professional qualifications;
- One *GIS Assistant* (NPS) with GIS application capabilities and professional qualifications;
- One *IT Expert* (NPS) with skills in the Mekong Flood Forecasting System and the MRC Flash Flood Guidance System used at the RFMMC;
- One *Hydrodynamic Modeller* (RPS) with hydrodynamic modelling experience and professional qualifications.

The *Capacity Building Unit* is comprised of:

- One *Capacity Building Expert* (RPS) with skills in R&D and with professional qualifications.

The RFMMC Development functions are anticipated as follows:

- Two *Project Manager* (RPS) with project management skills and professional qualifications in the field of hydrology/meteorology and/or hydraulics.

One *Project Manager* will assume the duties related to the co-funding activities and cooperation with other MRC Programmes, like for instance M-IWRM, CCAI, BDP, ISH etc. These duties will be aimed at achieving a number of FMMP and other MRC Programmes related outputs, which contribute to the MRC goals.

One *Project Manager* will assume the duties related to direct funded activities related to specific outputs. These duties will be aimed at achieving a number of FMMP outputs, which contribute to the MRC goals.

With regard to *technical staff*, the staffing of the OU is essentially the same as under current arrangements for the Technical Unit (see above), with the exception of two additional staff members (one Assistant Meteorologist and one hydrodynamic modeller). Regarding the DSU, RFMMC will select additional staff members, such as project managers, to implement the outputs and activities associated with the selected development and service functions. Project managers will operate under the responsibility of the Programme Coordinator of the RFMMC.

The implementation of FMMP 2011-2015 will require not only technical-oriented skills (hydrology and hydraulics), but will also require a mix of non-technical disciplines, such as land-use planning, social impact assessment, economic impact assessment, etc. This will be particularly so when applying IFRM concepts and shaping BPGs to meet the specific needs of the Member Countries and local communities.

4.6.3 Estimated Cost of Operations Activities

Table 4.2 shows the estimated annual cost of operations activities at RFMMC under FMMP 2011-2015 (see Annex No. 10 for details). The annual cost is some USD 1.23 M or some USD 6.15 M over the course of FMMP 2011-2015. Note that the ‘Personal Services’ costs of Table 4.2 include an allowance of USD 200,000 pa for a full-time CTA and part-time TA inputs by international specialists in relation to the ‘operations’ of the Center. These latter inputs are considered essential to support and improve the quality of key operations tasks, such as monitoring, forecasting and data management, and to elevate RFMMC into a regionally recognized center of forecasting excellence.

Table 4.2 Estimate of Annual RFMMC Operations Costs, FMMP 2011-2015

Items	Amount (USD)
1. Personnel Services	724,000
2. Data Collection and Transfer	32,000
3. Operational Costs	302,000
Sub-Total	1,058,000
4. Contingency @ 5%	52,900
5. MRC Secretariat Support 11%	122,200
Grand Total	1,233,100

4.6.4 Estimated Cost of Development & Service Activities

Annex No. 10 shows details of the estimated inputs from international and national consultants to deliver the development & services activities proposed under FMMP 2011-2015. *Table 4.3* shows a summary of these inputs by Outcome and Output. In total, some 104.5 international person-months and 216.0 national person-months are required to fully realize the FMMP 2011-2015 programme outlined in this document. The cost of the proposed development & services activities (*See Table 4.4*) is estimated to be some USD 7.93 M over the course of FMMP 2011-2015, bringing the total cost²⁵ of the Programme to some USD 14.0 M (say USD 13.0 M to 15.0 M).

²⁵ In case a reservation for support by Technical Advisors is incorporated covering at least the period 2011-2013 then the total cost of the Programme will increase to some USD 12.5 M (say 11 M to 14 M).

Table 4.3 Additional Technical Inputs (Non-Staff) Required to Realize FMMP 2011-2015

Outcome	Activity Group	Output	Person-Months	
			Int.	Nat.
1. IFRM principles are incorporated in the regional basin plan and strategy and in national (long-term) strategies and planning processes.	Implementation of IFRM Principles in the LMB.	1.1 IWRM basin development planning processes and related regional and national strategies are strengthened by incorporation of IFRM principles.	10.0	22.0
		1.2 IWRM principles incorporated in IFRM Strategies and IFRM Management Plans for flood-prone areas.	8.0	12.0
		1.3 National planning processes reflect IFRM principles.	6.5	13.0
Sub-Total			24.5	47.0
2. Flood forecasting, impact assessment, modelling, monitoring and knowledge management (and drought monitoring and forecasting) is occurring on a routine, year-round, basin-wide basis.	The Collection, Management and Use of Basin-wide Flood-Related Data and Information.	2.1 Monitoring, collection, dissemination and sharing of data and information between RFMMC and MCs are improved and occurring on a year-round routine basis.	12.0	29.0
		2.2 Flood simulation models being used by RFMMC and MCs.	5.0	12.0
		2.3 Highly responsive river, flood and drought forecasts and warnings, and flash flood guidance and alerts, available to MCs and other stakeholders.	7.0	14.0
		2.4 Impact of climate change on short and long-term flood and drought behaviour and risk and climate change adaptation systemized in RFMMC and MCs.	10.0	18.0
Sub-Total			30.0	67.0
3. Member Countries and Dialogue Partners address trans-boundary flood issues, differences and disputes in an efficient, effective and coordinated way.	The Management of Trans-boundary Flood Risk.	3.1 The IFRM awareness, capacities and skills of MCs enhanced.	10.5	16.0
		3.2 Pilot Studies on TB flood issues, differences and disputes implemented.	4.0	8.0
Sub-Total			14.5	24.0
4. The ability of relevant line agencies and NMCs to use IFRM knowledge and principles to better manage flood risk is strengthened.	Increasing IFRM Awareness and Capacity.	4.1 The IFRM awareness, capacities and skills of MCs enhanced.	14.0	32.0
		4.2 MCs capable of applying and exchanging IFRM knowledge.	9.0	19.0
		4.3 Knowledge on addressing TB flood issues, differences and disputes embedded in MCs.	2.0	4.0
Sub-Total			25.0	55.0
5. The transition of RFMMC to a financially sustainable and professionally capable institution is initiated.	Administrative Changes to RFMMC.	5.1 Roadmap for the RFMMC.	2.0	4.0
		5.2 Key functions secured by riparian staff.	1.5	4.0
		5.3 RFMMC regionally recognized.	3.0	7.0
Sub-Total			6.5	15.0
Total			104.5	216.0

Table 4.4 Estimated Costs of Development Activities, FMMP 2011-2015

Items	Amount (USD Million)
1. Professional Services	6.126
2. Programme Costs	0.675
Sub-Total	6.801
3. Contingency @ 5%	0.340
4. MRC Secretariat Support 11%	0.785
Grand Total	7.927

Table 4.5 shows the breakdown of development & services costs by Outcome. Note that these figures *do not include* Center operations costs. The cost of delivering Outcome No. 2 is the greatest (USD 2.65 M); the costs of delivering Outcome Nos 2 and 4 are about the same (USD 1.8-1.9 M). The cost of delivering Outcome No. 3 is USD 1 M; Outcome No. 5 will cost about USD 0.5 M.

Table 4.5 Breakdown of Development and Services Costs (USD M) by Outcome

Item	Outcome No. 1	Outcome No. 2	Outcome No. 3	Outcome No. 4	Outcome No. 5
	Development Strategies and Plans Reflect IFRM Considerations.	The Collection and Use of Flood-Related Data.-	Improved Management of Trans-boundary Issues.	IFRM Knowledge and Capacity Strengthened	Change Management at RFMMC
1. Professional Services	1.547	2.055	0.772	1.509	0.402
2. Programme Costs	0.158	0.220	0.094	0.161	0.042
Sub-Total	1.547	2.275	0.866	1.671	0.444
3. Contingency @ 5%	0.077	0.113	0.043	0.083	0.022
4. MRC Secretariat Support 11%	0.179	0.263	0.100	0.193	0.051
Grand Total	1.802	2.651	1.009	1.947	0.517

4.7 FUNDING SHORTFALL

FMMP 2011-2015 is currently unfunded, apart from Bridging Period finance of some USD 1.43 M from RNE Hanoi (see Section 4.10.1) to cover the period 1 November 2010 to 31 December 2011. Some of this bridging finance is to be used to prepare funding applications; initial discussions have already been held with several potential Donors. Thus, unlike other MRC Programmes, FMMP 2011-2015 does not have a known budget at the time of programme formulation. Further, funding is expected to become progressively available over the programme period 2011-2015. Thus, consideration needs to be given to the scheduling and priority of activities during periods of funding shortfall.

Annex No. 9 lists the 70 activities (and sub-activities) supporting FMMP 2011-2015. These activities have been classified on the basis of Priority (1 and 2) and have been approximately scheduled depending on when they should (could) commence. (Some activities logically precede others, eg BPGs have to be finalized before they can be used for capacity building purposes.) For scheduling purpose, the five-year programme period has been divided into three trimesters as follows:

- Trimester I: Years 1 and 2
- Trimester II: from Year 1.5 to Year 3.5
- Trimester III: Years 3, 4 and 5.

4.7.1 Activity Scheduling

Activities scheduled 'I' are regarded as the most urgent; Schedule III activities are regarded as the least urgent. See Annex 9 in Volume 2. In scheduling the start date of activities, the following general considerations were taken into account:

- The dependence of an activity on the completion of other activities.
- Priority 1 activities aimed at improving existing flood forecasts, together with associated capacity building and training activities, have been classified as Schedule I.
- New flood forecasting activities have been classified Schedule II, along with associated capacity building and training activities.
- The finalization of BPGs and the delivery of capacity building and training courses are fundamental to many other activities and are regarded as Schedule I and II activities. The development and delivery of BPGs for IFRM is regarded as being most important.

- The implementation of IFRM principles into national policies and strategies has been scheduled III. (This activity has to be preceded by the finalization of BPGs and the delivery of awareness raising and capacity building courses.)

The results of this scheduling exercise are shown in Table 4.6, which indicates the general starting trimester(s) of activities supporting the various outcomes. The scheduling of activities under FMMP 2011-2015 will need to be flexible to adapt to changing levels of programme funding. This matter will be more fully addressed in the PIP.

Table 4.6 General Trimester Start Dates of FMMP 2011-2015

FMMP 2011-2015 Outcome	Trimester I (1-2 Years)	Trimester II (1.5-3.5 Years)	Trimester III (3-5 Years)
1. Development Strategies and Plans Reflect IFRM Considerations.			
2. The Collection and Use of Flood-Related Data.			
3. Management of Trans-boundary Issues			
4. IFRM Knowledge and Capacity Strengthened			
5. Change Management at RFMMC.			

4.7.2 Activity Priorities

The activities in Annex 9 have been classified into two priority levels, 1 and 2, Priority 1 activities being judged to be the more important. This does not mean that Priority 2 activities are not important, but that they are less important to the overall outcome than Priority 1 activities. Limited resources should first be used to address Priority 1 activities.

4.7.3 Cost Scheduling

Operations Costs

The operations costs for FMMP 2011-2015 are estimated to be USD 1.23²⁶ M pa (see Table 4.2). These costs remain constant for cost scheduling purposes over the five-year programme period. By way of comparison, the operations costs of RFMMC under current arrangements are some USD 0.74 M pa (see Table 4.1).

Development & Services Costs

Table 4.7 shows the breakdown of development & services costs over the three scheduling trimesters. It is seen that 40-45 percent of the costs are incurred in each of the first two trimesters.

Table 4.7 Development & Services Costs (USD M) by Programme Trimester

FMMP 2011-2015 Outcome	Trimester I (Yrs 1 & 2)	Trimester II (From Yr 1.5 to Yr 3.5)	Trimester III (Yrs 3, 4, 5)	Total (USD M)
1. Development Strategies and Plans Reflect IFRM Considerations.	0.405	0.650	0.748	1.803
2. The Collection and Use of Flood-Related Data.	1.274	1.153	0.224	2.651
3. Management of Trans-boundary Issues	0.709	0.300	-	1.009
4. IFRM Knowledge and Capacity Strengthened	0.862	1.085	-	1.947
5. Change Management at RFMMC.	0.332	0.130	0.055	0.517
Total	3.582	3.317	1.028	7.927

²⁶ Including USD 200,000 pa for a permanent CTA and for specialist TA inputs by international consultants to support Center operations.

Total Costs

Table 4.8 shows an approximate breakdown of trimester costs into 6-month periods. It is emphasized that these results are indicative only.

Table 4.8 Indicative Breakdown of Costs Across Programme Period 2011-2015

Item	Jan-Jun 2011	Jul-Dec 2011	Jan-Jun 2012	Jul-Dec 2012	Jan-Jun 2013	Jul-Dec 2013	Jan-Jun 2014	Jul-Dec 2014	Jan-Jun 2015	Jul-Dec 2015	Total
Outcome 1	-	-	-	0.258	0.258	0.258	0.258	0.258	0.258	0.258	1.803
Outcome 2	0.379	0.379	0.379	0.379	0.379	0.379	0.379	-	-	-	2.651
Outcome 3	0.144	0.144	0.144	0.144	0.144	0.144	0.144	-	-	-	1.009
Outcome 4	0.278	0.278	0.278	0.278	0.278	0.278	0.278	-	-	-	1.947
Outcome 5	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.516
Sub-Total	0.853	0.853	0.853	1.110	1.110	1.110	1.110	0.309	0.309	0.309	7.927
RFMMC	0.617	0.617	0.617	0.617	0.617	0.617	0.617	0.617	0.617	0.617	6.165
Total	1.469	1.469	1.469	1.727	1.727	1.727	1.727	0.926	0.926	0.926	14.092

4.8 BUDGET CONSIDERATIONS

FMMP 2011-2015 is currently unfunded, apart from bridging finance of some USD 1.43 M from RNE Hanoi (see Section 4.10.1) to cover the period 1 November 2010 to 31 December 2011. Some of this bridging finance is to be used to prepare funding applications; initial discussions have already been held with several potential Donors. Thus, unlike other MRC Programmes, FMMP 2011-2015 does not have a known budget at the time of designing this programme document.

4.8.1 Initial Phase FMMP 2010-2011

The one-year Bridging Period budget of some USD 1.43 M provided by RNE Hanoi is made up of existing and some new funds (see Section 4.10 for details). The bridging budget will allow improvements to be made to outputs and products of FMMP 2004-2010, the identification of potential funding options, and the preparation of project proposals for funding. These activities under RNE funding are considered to be the *initial phase of FMMP 2011-2015*.

The present state of affairs (2010-2011) regarding operational costs at RFMMC is as follows:

- Two permanent staff positions are funded by the Member Countries.
- All other operational costs are funded from the RNE contribution until 31 December 2011.

4.8.2 Final Phase FMMP 2012-2015

The future options for the period 2012-2015 to cover operational costs are as follows²⁷:

- Some of the core functions will gradually be taken over by individual Member Countries and will gradually be covered from the national budgets of the Line Agencies concerned;
- To increase the number of permanent staff positions funded from OEB from 2 in 2010 to 10 in 2015;
- Contributions from other MRC programmes to which RFMMC/FMMP provides services.
- Contributions from the regular MRCS budget; and
- Overhead costs for the implementation of activities funded by GTZ, WB and ADB.

²⁷ Cost reduction through the permanent co-hosting location decision. The costs for the operation and maintenance of the RFMMC building as well as the functions of the general support staffs are born by MRCS since 1st July 2010. The RFMMC Finance and Administration Unit (FAU) is incorporated in the Finance and Administration Section (FAS) of the Office of the Secretariat in Phnom Penh (OSP).

4.9 CONTRACT DURATION

Riparian professional staffs are contracted full-time. A 6-month 'try-out' period is applied. Assignment of professional staff is based on a 3-year contract period. Contracts may be extended a maximum of four times, allowing a maximum period of employment of 12 years. Whilst this is adequate to allow technical staff to develop, special attention needs to be paid to *succession planning* so that 'technical gaps' do not develop when key staff members leave.

4.10 FUTURE FINANCIAL COMMITMENTS

Several activities have been set in motion to favourably position FMMP for funding under FMMP 2011-2015. Most important is the completion of the formulation of FMMP 2011-2015 to enable development partners to get insight into the FMMP 2011-2015 Programme as formulated in close collaboration with the Member Countries.

4.10.1 Bridging Period

The Royal Netherlands Embassy in Hanoi (RNE Hanoi) has earlier expressed interest in funding a Bridging Period project. In November 2010, the MRCS and the RNE Hanoi signed an agreement allowing the use of remaining RNE FMMP 2004-2010 funds, supplemented by new funds from RNE, to cover the Bridging Period project, which will run from 1 November 2010 to 31 December 2011.

The Bridging Period funding covers staff costs for 16 specified staff positions plus estimated operational costs for the period till the end of December 2011. The total budget required for the Bridging Period has been estimated at USD 1,424,576²⁸. The FMMP 2004-2010 budget remaining as of 1 November 2010 was USD 1,010,854 (including the Component 3 Capacity Building Programme Phase 2). Excluding Component 3, only USD 927,281 is available for the Bridging Period. Therefore, a 'top-up' budget of some USD 413,722²⁹ is required to meet bridging period costs, and has been committed by RNE Hanoi.

The Bridging Period will provide sufficient time for ongoing FMMP activities to continue, while it will also provide a reasonable amount of time, not only to inform development partners about the possibilities to support regional FMM activities through MRCS/FMMP, but to also provide these partners with sufficient time to formulate and process the necessary Donor appraisal and to prepare commitments and complete the funding agreements with MRC. Nevertheless, RFMMC needs to act urgently on these activities.

4.10.2 Re: Basin Development Programme

The Basin Development Programme (BDP) has requested FMMP to support the development scenarios for the Mekong Delta (Cambodia and Viet Nam) taking into account the potential impact of sea level rising. This will require a framework commitment from Cambodia and Viet Nam to cooperate on these trans-boundary development scenarios, modelling inputs exclusive and inclusive of climate change, as well as sea level rising. Crucial for the development scenarios will be the trans-boundary flood risk considerations for which a wide variety and application of the hydrodynamic modelling tools for the Mekong delta will be required. Incidental support should be offered by FMMP using the regular FMMP of Bridging Period funding, however for the delivery of more structural support and specific outputs FMMP's involvement must be well specified in outputs, activities, planning and against costs involved. Structural FMMP involvement must be well specified in outputs, activities, planning and costs involved. It is too early to be more specific at this moment.

4.10.3 Re: Mekong Integrated Water Management Project³⁰

The FMMP is cooperating with the Mekong-Integrated Water Management Project (M-IWRM) on a support facility under funding of the AUSAID and World Bank-APL2. The World Bank and AUSAID

²⁸ This amount does include a limited reservation for International Experts.

²⁹ For details see Bridging Period proposal FMMP, version 7.3, 18.10.2010

³⁰ See also note Chris Joy on FMMP 2011-2015 M-IWRM collaboration 30.07.2010

provide support in the field of disaster risk reduction to Cambodia, Lao PDR and Vietnam. Under APL-2 more support is envisaged. Proposals are being developed by the M-IWRM Project in close cooperation with FMMP and other MRC programmes. Incidental support should be offered by FMMP using the regular FMMP of Bridging Phase funding, however for the delivery of more structural support and specific outputs FMMP's involvement must be well specified in outputs, activities, planning and against costs involved. This would require an internal arrangement within MRCS to transfer funds to another programme for outputs and services to be delivered. It is too early to be more specific at this moment.

4.10.4 Re: Climate Change Adaptation Initiative

The Climate Change Adaptation Initiative (CCAI) under the Environment Programme (EP) is developing its implementation plan and arrangements, based on expecting funding from FINAID. The CCAI has approached the FMMP to cooperate in the field of flood management, as flood management is considered a useful instrument in identifying eventual climate change impacts. In July the CCAI and FMMP have identified options for cooperation in carrying out a baseline study in pilot districts in the MRC Member Countries with respect to flood and drought vulnerability assessment, through incorporation of possible climate change effects. It is expected that CCAI and FMMP will jointly develop a work plan, which may also serve the ADB-ICHARM support to FMMP on flood vulnerability assessment in the Lower Mekong Basin (FVA-LMB). It is too early to be more specific at this moment.

4.10.5 Climate Change and Flood Forecasting/Management

The *German Ministry of Environment (BMU)* through the *Gezellschaft für Technische Zusammenarbeit (GTZ)*³¹ has indicated its willingness to fund exploration on adaptation and incorporation of climate change into flood forecasting and flood management. A GTZ prepared proposal has been accepted. A more detailed project proposal, which has recently been produced, specifies more in detail the outputs, activities, timeframe and cost involved. The order of magnitude of the support to FMMP would be USD 3.6 million. The funding arrangement between MRC and GIZ is expected to be signed somewhere during the first quarter of 2011.

4.10.6 Asian Flood Network/Flash Flood Guidance System

USAID has been providing support under FMMP 2004-2010 to the RFMMC for a number of early warning related activities, like the Villages Early Warning systems and Asian Flood Network. The recently activated Mekong Flash Flood Guidance System (M-FFGS) is expected to be a strong asset for the MRC Member Countries to address flash floods. USAID has expressed its interest in supporting over the coming years the improvements and refinement of the M-FFGS. USAID/OFDA will secure operational support to the RFMMC through the Hydrologic Research Centre (HRC) in San Diego, USA, as well as through dedicated funding to FMMP 2011-2015 through UCA.

4.10.7 Flood and Drought Management Programmes

The Government of Japan has indicated that it is interested in providing support MRC's flood, as well as MRC's drought programme. In initial discussions it was mentioned that USD 1 million would be allocated for FMMP and USD 1.5 million for the DMP. FMMP has submitted a proposal to the Government of Japan for funding through its Japan-ASEAN Integration Fund (JAIF) for USD 1,320,900 for improvement of the mainstream forecasting and flash flood alert services, and strengthening of the operational cooperation between the National Centres in the MRC Member Countries and the RFMMC. IKMP has also submitted under the same JAIF a proposal of USD 2.5 million external funding of the DMP.

4.10.8 Flood Vulnerability Assessment³²

ADB support to the MRC's Flood Vulnerability Assessment for the Lower Mekong Basin (FVA-LMB) will be implemented by ICHARM. ADB has signed a partnership contract with ICHARM to provide support to MRC, but also to countries like Bangladesh, India and Indonesia. A separate contract is signed by ADB with Deltares (The Netherlands) to support implementation of the FVA-LMB through ICHARM. The initiative is started-up under FMMP 2004-2010 and completion is expected by mid 2011, under FMMP

³¹ GTZ is from 2011 onwards replaced by GIZ, which means in full "Deutsche Gesellschaft für Internationale Zusammenarbeit"

³² These options may provide mainly services and/ or limited co-funding.

2011-2015. The ADB through ICHARM is presently providing technical services³³ to MRCS and the MRC Member Countries. There is no direct funding of MRCS.

4.10.9 Trans-boundary Flood Risk Management and UNESCO-IHE³¹

UNESCO-IHE Institute for Water Education³⁴ is interested in co-funding a trans-boundary flood risk management programme under the DGIS-UNESCO-IHE Programmatic Cooperation (DUPC) for the following reasons:

- To conduct pilot studies and to draw lessons for up-scaling;
- The specific interest and expertise of UNESCO-IHE (link theory-practice, link between different levels such as line agencies – academics – MRC, the notion of action-research, the possibility for dissemination, interest in income aspects of previous capacity building and research activities and development of tools, the geographical focus on the Mekong with a host of other activities in which UNESCO-IHE and others are involved and the generation of material which may be used in comparative studies with other (deltaic) river basins);
- The possibility to use local “researchers” guided by UNESCO-IHE; and
- The possible link with the current capacity building programme.

The choice of a pilot basin and the commitment of all parties concerned is crucial to make such a programme activity successful. The implementation of activities under FMMP 2011-2015 should be based upon a well-defined project document. The preparation of such a document could take place at short notice and can possibly be co-funded between UNESCO-IHE and FMMP under the bridging phase.

The need for sharing, jointly updating, developing and implementing IWRM curriculum with specific attention to floods, climate and trans-boundary cooperation in the wider Mekong region is being considered as a potential future UNESCO-IHE activity in close collaboration with institutes and universities in the Mekong countries with special reference to institutes and universities in Cambodia, Lao and Myanmar.

4.11 FMMP 2011-2015 DONOR COMMITMENTS AND FUNDING OPPORTUNITIES

Table 4.9 provides an overview of the FMMP 2011-2015 Donor commitments and additional funding opportunities for the period 2011-2015.

Funding for FMMP 2004-2010 was based upon the principle that different Donors individually funded their ‘own project components’. The exception was funds from RNE Hanoi, which could be used in a more flexible manner to enable FMMP 2004-2010 to function more efficiently. Funding sources, approach, mechanisms and modalities will be different for RFMMC/FMMP 2011-2015, as discussed below.

³³ A methodology to develop FVI-es, based on the application of remote sensing and the findings in three pilot areas in Cambodia.

³⁴ UNESCO-IHE activities in the Mekong include contribution to the MRC Integrated Training Strategy and Programme, short courses on flood management (under ICBP), distance learning as well as training and CB activities under FMMP 2004-2010 component : structural measures and flood proofing”, training and CB activities under component 3 “trans-boundary flood issues”.

Table 4.9 Overview of Funding Opportunities and Commitments for FMMP 2011-2015/RFMMC for the Period 2011-2015

Donor	Description of Activities	Funds	Modality	Duration
Netherlands Government	To finance a Bridging Period from 31.10.2010 to 31.12.2011 to secure capacities required in FMMP/RFMMC to develop dedicated Donor proposals for funding and to kick-start any Donor funded new activity after 2010.	USD 927,281 M ³⁵	Budget support to FMMP/RFMMC	30.10.2010-31.12.2011
Germany-GTZ	Climate Change and Flood Management in LMB as part and parcel of the International Climate Initiative. From the documents it does not become fully clear that project will be implemented through FMMP/RFMMC.	USD 3.6 M	Earmarked for project as well as for funding FMMP/RFMMC core functions	01.04.2011-31.07.2014
Japan ASEAN Integration Fund	To finance the provision of products and services by the FMMP/RFMMC. JAIF is processing the project proposal.	USD 1,320,900	Grant for MRC project, FMMP/RFMMC	01.01.2012-31.12.2015
World Bank	M-IWRM Pre-Appraisal Mission Adaptable Programmatic Loan (APL 1): Under Subcomponent 1-2 (Support for Disaster and Environment Impact Risk Assessment in LMB) activity 1-2-2 FMMP 2011-2015 will be involved. The goal of the FMMP sub-component is to prepare for development of an open risk model in LMB intended to raise awareness and increase preparedness for disaster risk and facilitate a common understanding of what risk is posed by floods, drought and storms and how to incorporate this risk into the decision making, while the main activities to develop the model would be carried out under the forthcoming APL 2, an activity under APL 1 is included to jump start this activity.	USD 350,000 ³⁶	Grant to MRC	1 year
World Bank	Role FMMP/RFMMC in M-IWRM/APL 2 to be specified			
Asian Development Bank	Flood and Drought Project; this project has created opportunities for the Member Countries to use ADB funds for the strengthening of FMM within the bilateral framework of the individual countries and ADB. Funds could be used for FMM feasibility studies, for flood protection works, for strengthening the line agencies and for supporting FMMP 2011-2015/RFMMC. This option is attractive for Laos and Cambodia as they can draw on grant funds. Concrete details are still expected.		Grand Fund facility for Laos and Cambodia	
Asian Development Bank	GMS RETA from the Japan Poverty Reduction Fund. A total amount of USD 1mnl for floods and 2 million for drought.			
World Bank Asian Development Bank	Individual LMB countries decide to use part of their loans (relevant for IFRM) from Development Banks to support core functions and/or additional functions of FMMP 2011-2015/RFMMC. Concrete details are still expected.			
Basin Development Programme MRC	To support the development scenarios for the Mekong Delta. Crucial for the development scenarios will be the trans-boundary flood risk considerations for which a wide variety and application of the hydrodynamic modeling tools for the Mekong delta will be required.			
Environmental Programme	Climate Change Adaptation Initiative (CCAI); FMMP cooperation in the field of flood management as flood management is considered a useful instrument in identifying eventual climate change impacts. Work plan to be developed.			
DGIS- UNESCO-IHE Programme	UNESCO-IHE Institute for Water Education is interested in co-funding a trans-boundary flood risk management programme under the DGIS-UNESCO-IHE Programmatic Cooperation (DUPC)			

³⁵ Additional USD 413,722 plus remaining USD 513,559 for 14 months.

³⁶ In Pre-Appraisal AM only USD 350,000 is mentioned.

4.12 FUNDING OPTIONS

The Asian Development Bank through the “Flood and Drought Project” has created opportunities for the MRC Member Countries to use ADB grant or loan funds for the strengthening of FMM. Even though the Flood and Drought project is conceptually taking a regional approach, funding arrangements will have to be considered within the bi-lateral framework of the individual countries and the ADB. The funds could be used not only for FMM feasibility studies, for flood protection works, or for strengthening the line agencies, but also for supporting the RFMMC/FMMP 2011-2015. This could be considered as an attractive option for Lao PDR and Cambodia, as these countries can draw on grant funds for the latter purposes. Other countries like Viet Nam and Thailand will have to use the loan modality.

Some countries may have other options through grant or loan facilities, based on bi-lateral agreements. Only Viet Nam during the 1st round of FMMP 2011-2015 consultation meetings informed the mission about possibilities of considering such a facility for supporting regionally oriented initiatives.

4.13 MONITORING, PERFORMANCE MANAGEMENT AND REPORTING

4.13.1 Levels of Monitoring and Evaluation

The MRC uses two levels of monitoring and evaluation:

1. Progress made towards the Basin Vision through the State of the Basin Report to be produced every five years; and
2. Regular assessment of the implementation of the Strategic Plan to achieve the MRC goals and outcomes as set in the Strategic Plan. FMMP 2011-2015 monitoring and evaluation will focus on the second level; a regular assessment of the implementation of the FMMP 2011-2015 Five Year Plan to achieve the FMMP 2011-2015 goals and outcomes as defined in log frames and result frameworks in Annexes 1 to 4.

To assess FMMP 2011-2015 performance, independent evaluation as well as internally driven assessment approaches in the performance management system will be employed by RFMMC.

4.13.2 Performance Management

The initial performance management framework for RFMMC/FMMP 2011-2015 has been developed including goals, outcomes, outputs, activities, indicators, means of verification and risks. The final performance management framework will be developed and will be fully aligned with the new MRC-wide Performance Management System (PMS) which is currently still under development within the framework of the elaboration of the MRC SP 2011-2015. Such a performance management framework will also address M&E capacity of the Line Agencies participating in FMMP/MRC including capacity building activities.

FMMP 2011-2015 will support Line Agencies in defining and implementing roadmaps for core products and in regularly reviewing progress made. FMMP 2011-2015 will also facilitate the exchange of M&E data between Line Agencies involved in the four Member Countries.

4.13.3 Specific Performance Indicators for Flood Forecasting and Flood Guidance

The annual Flood Season Performance Evaluation Report (FSPER) is an important document for assessing the performance of the flood forecasting/guidance systems and the RFMMC. Specific Performance indicators as well as Benchmarks as elaborated in Annex No. 5 of the Concept Note 9, December 2009, related to flood forecasting and flash flood guidance should be incorporated in the Flood Season Performance Evaluation Report. These performance indicators are described in Annex No. 3.

4.13.4 Member Country Performance

An essential component of FMMP 2011-2015 is that the responsibilities of RFMMC and the Line Agencies are clearly spelled out regarding the dissemination and use of FMMP products. The product chain from producer to end-user will be clearly elaborated for the FMMP products. This means that RFMMC cannot

be held responsible for all outputs and outcomes as Line Agencies have a major responsibility in a number of fields. Therefore a system should be in place to measure and monitor progress made by Member Countries/Line Agencies in their contribution to the achievement of the FMMP 2011-2015 goals and outcomes. Progress monitoring will mainly lie with the NMCs and the participating national implementing agencies.

4.13.5 General Reporting

FMMP/RFMMC management will produce the following main reports during the period 2011-2015:

- *RFMMC Annual Performance Report.* RFMMC will report periodically to MRC as part and parcel of the MRC Performance Management System. The RFMMC Annual Performance Report will describe results achieved against a set of indicators for outcome and outputs as defined in result framework Tables 3 and 4 on outcomes and outputs in Annex No. 1. Special attention will be paid to reasons for delays/problems as well as actions to be taken to solve the problems/constraints identified.
- *Bi-annual Progress Reports.* These reports will consolidate progress notes regarding outputs to update all relevant parties. The main aim of these bi-annual progress reports is to ensure an effective collaboration and coordination between MRC/FMMP, the National Mekong Committees and the national implementing agencies through joint M&E.
- *An External Mid-term Programme Review.* Such a review is meant to assess progress made, achievements and to propose further actions/adjustments if deemed necessary with special reference to capacity development.

4.13.6 Quality Assurance

To secure the quality of the FMMP 2011-2015 working processes and deliverables, the FMMP 2011-2015 will develop a Programme Quality Plan (PQP). This plan defines the responsibilities and procedures to be adopted to ensure that the data and information produced as part of the programme are reliable, fit for purpose and consistent with documented objectives and deliverables. It summarizes the system of internal management that governs the decisions and instructions concerning project quality assurance. The PQP will refer for financial, contractual and administrative matters to provisions of the MRC manuals. The quality plan also will detail arrangements for the control and storage of FMMP documents, records and data. The PQP will be prepared under the supervision of the RFMMC Coordinator for approval by the TSD and agreed by the Steering Committee. The PQP will include:

- (i) The technical standards and visual quality of reports;
- (ii) Communication procedures and exchange of technical and contractual information;
- (iii) Validation of data;
- (iv) Traceability of project data and results;
- (v) Security of confidential information;
- (vi) Approval of results and outputs to be placed in the public domain; and
- (vii) Archiving of project information.

4.14 NEXT STEPS

After this programme document has been approved by the JC, the immediate next steps in the implementation of FMMP 2011-2015 are as follow:

1. The FMMP will share the MRC-approved FMMP 2011-2015 Programme Document with all MRC programmes.
2. The MRC Secretariat will share the programme document with Development Partners for the purpose of raising additional financial support for implementation of FMMP 2011-2015. If considered useful by the MRC Secretariat, FMMP management may facilitate presentation of the document to Development Partners.

3. RFMMC will develop a Programme Implementation Plan (PIP) to guide the implementation of FMMP 2011-2015.
4. The PIP will describe, amongst other things, the institutional framework and management structure of the implementation arrangements, monitoring and evaluation activities, reporting and coordination and interfaces, as well as the overall plan of operations. The PIP is a working document, which will be updated whenever additional funding is made available for the implementation of FMMP 2011-2015, allowing the number of outputs to be increased and the plan of operations to be broadened.
5. The FMMP will work closely with other MRC programmes to achieve outputs under the MRC Strategic Plan 2011-2015. FMMP, together with other MRC programmes, will identify the preferred arrangements for collaborative work, including the time schedule and responsibility for various tasks, as well as the financial implications for each of the programmes. Cooperation between FMMP with other MRC programmes can be governed by a standard MRC arrangement.

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