



Mekong River Commission

Basin Development Plan Programme, Phase 2

Working Towards an IWRM-Based Basin Development Strategy for the Lower Mekong Basin

March 2011

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Preface

This report is based on a working document prepared by the Basin Development Plan Programme to facilitate preparation of the MRC's IWRM-based Basin Development Strategy. The previous version of this report was dated 18th October 2010. Following that version, it was agreed between the national and regional teams involved in developing the Strategy that a more concise document was required and accordingly a new and much shorter draft of the Strategy was prepared, drawing heavily upon the longer October version.

The shorter draft was then taken forward and, following further extensive and collaborative effort, an agreed version of the IWRM-based Basin Development Strategy was placed before the MRC Council at its Seventeenth Meeting on 26th January 2011 and approved by them. As recorded in the approved version, the preparation and adoption of the Strategy represents an important milestone in the history of cooperation under the framework of the Mekong River Commission.

At the same time it was recognised by members of the preparatory team that the longer October 2010 version contained much valuable information that may be of use when implementing the approved Strategy (which is acknowledged in the Strategy which refers to the longer document for further description of the approach to developing the Strategy). Accordingly, this longer version has been updated and is re-presented here, as far as possible, aligned to the now approved shorter version.

It should be noted that the IWRM-based Basin Development Strategy approved by the MRC Council on 26th January 2011 is the ruling version of the Strategy and takes precedence over any statements made in this document.

This updated version of “Working towards an IWRM-based Basin Development Strategy” follows a similar format to the earlier version, except that a new Chapter has been added to explain more fully the nature of the participatory process adopted in preparing the Strategy. In addition, the “road map” (given in expanded form in Annex 1 of this report) has been substantially edited to bring it into line with the agreed road map in the approved Strategy and the specific points made within the text of the Strategy to activities contained within road map. Where relevant, references to the countries having agreed elements of the Strategy have been removed to avoid any conflict with the finally approved version.

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Glossary

ADB	Asian Development Bank	MRC	Mekong River Commission
ASEAN	Association of Southeast Asian Nations	MRCS	Mekong River Commission Secretariat
BDP2	Basin Development Programme Phase 2	MW	Mega Watt
DOS	Development Opportunity Space	NGO	Non-Government Organization
DSF	Decision Support Framework	NMCs	National Mekong Committees
EIA	Environment Impact Assessment	NMCSs	National Mekong Committee Secretariats
GMS	Greater Mekong Sub-region	NPV	Net Present Value
IFI	International Financial Institution	PDIES	Procedures for Data and Information Exchange and Sharing
IUCN	International Union for Conservation of Nature	PMFM	Procedures for Maintenance of Flow on the Mainstream
IWRM	Integrated Water Resources Management	PNPCA	Procedures for Notification and Prior Consultation
JC	Joint Committee	PWQ	Procedures for Water Quality
Km	Kilometer	PWUM	Procedures for Water Use Monitoring
Km2	Square kilometer	RBC	River Basin Committee
Km3	Cubic kilometer	RBO	River Basin Organization
LMB	Lower Mekong Basin	RTWG	Regional Technical Working Group
m3/s	Cubic meters per second	SEA	Strategic Environmental Assessment
MDGs	Millennium Development Goals	WB	World Bank
Mm3	Million cubic meters	WREA	Water Resources and Environmental Administration (Lao PDR)
MNRE	Ministry of Natural Resources and Environment (Thailand)	WRM	Water Resources Management
MONRE	Ministry of Natural Resources and Environment (Viet Nam)		
MOWRAM	Ministry of Water Resources and Meteorology (Cambodia)		

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1 Introduction

1.1 Shared vision, goals and directions for IWRM

A fundamental aim of the 1995 Mekong Agreement is cooperation among the four Lower Mekong Countries (Cambodia, Lao PDR, Thailand and Viet Nam) to achieve '***the full potential of sustainable benefits to all riparian countries and the prevention of wasteful use of Mekong River Basin waters***'. This aim is affirmed with a shared vision for '***an economically prosperous, socially just and environmentally sound Mekong Basin***'.

The Agreement is based on the internationally recognized principles of 'integrated water resources management' (IWRM) and in regard to guiding water development in the basin, it emphasizes the need for '***the formulation of a basin development plan that would be used to identify, categorize and prioritize the projects and programs to seek assistance for and to implement at the basin level***'.

To strengthen this underpinning IWRM approach, in 2005 the MRC Council adopted the '***Strategic Directions for IWRM in Lower Mekong Basin***' (LMB) that identifies eight priority areas for IWRM that are seen as most relevant to the goals of sustainable, optimal and equitable development in the Mekong basin.

This means that basin planning must seek to obtain a balance between water resources development and water resources protection, in a way that all riparian countries agree is fair and equitable and acceptable – fair from social and cultural points of view as well as economic and environmental aspects. This highlights the range of difficult debates and decisions that need to be made when considering what might be 'acceptable' development at a basin-scale for all four sovereign countries.

And these difficult discussions must occur within the Mekong basin cooperation model which is built on 'cooperation, coordination and mutual respect'. It is the four countries, as 'owners' of the Mekong Agreement that must make these collective decisions towards balanced and acceptable water related development. Thus, developing a common understanding of the IWRM transboundary issues, and of the importance of the environmental and social values and assets of the basin, and how these can be used and managed in the future development is the essential supporting foundation for moving towards basin-wide sustainability. This becomes much more important when water resources development is accelerating in several economic sectors, as is now the case.

IWRM Strategic Directions (2005)

Eight priority IWRM key result areas:

- Economic development and poverty alleviation
- Environmental protection
- Social development and equity
- Dealing with climate variability
- Information based planning and management
- Regional cooperation
- Governance
- Integration through basin planning

At the 1st MRC Summit in April 2010, Prime Ministers of LMB countries acknowledge that accelerating the development of water and related resources will make a significant contribution to the socio-economic development of the region, but may also have negative impacts on the basin environment that need to be fully addressed. The Summit Declaration reaffirms the countries' continued commitment to cooperate and promote the sustainable development, utilization, conservation and management of the water and related resources for "Meeting the Needs, Keeping the Balance: Towards Sustainable Development of the Mekong River Basin".

It highlights the need for further cooperation to tackle critical emerging challenges in the Mekong basin that include, amongst others: managing the risks of floods and droughts, better integrating sustainability considerations into the development of the basin's significant hydropower potential, minimizing any deterioration of water quality, loss of wetlands and deforestation, which present risks to biodiversity and people's livelihoods, better managing the basin's unique natural fisheries and preparing for climate change adaptation.

1.2 Purpose and scope of the Strategy

Whilst the 2005 'IWRM Strategic Directions' document provided useful 'high level' guidance on the broad IWRM needs at the basin scale, it was limited in how it considered possible links to the national planning processes. Since 2005, national planning in the water resources sector has been accelerating. There has been increasing demand from both riparian countries and project developers for the provision of an integrated basin perspective against which ambitious national plans and proposed projects can be assessed to ensure an acceptable balance between economic, environmental and social outcomes, and mutual benefits to the countries. ***This is an IWRM perspective that goes beyond the scope of the 2005 IWRM Strategic Directions.***

It also goes beyond the responsibility of any individual country or project developer. Yet without such a perspective, private project developers could be discouraged as they would not be able to place their proposals within an overall framework that gives them some certainty as to the water resources management processes and practices against which proposals will be judged, and within which they will operate.

All of this has confirmed the importance to the four LMB countries of a strengthened commitment by the four LMB countries to a basin-wide IWRM approach to steer, guide and support the accelerated development now planned. It has led to the preparation of this more comprehensive IWRM-based Basin Development Strategy for the Lower Mekong Basin.

This IWRM-based Basin Development Strategy provides this strengthened commitment and responds directly to the foundation provisions of the 1995 Mekong Agreement by emphasizing the countries' intention to share, use, manage and protect the basin's resources in an equitable and acceptable way.

The Strategy thus contributes to a wider adaptive planning process that links regional and national planning for sustainable development and management of the LMB. It considers

projected development scenarios over a fifty-year period to create a twenty-year view of basin development and management. It provides an integrated basin perspective against which current and future national water resources development plans can be assessed to ensure an acceptable balance between economic, environmental and social outcomes in the LMB, and mutual benefits to the LMB countries, as required by the 1995 Mekong Agreement. The Strategy therefore:

- Defines the scope of opportunities for water resources development (hydropower, irrigation, water supply, flood and drought management), their associated risks and the actions needed to optimize opportunities and minimize risks;
- Defines other water-related opportunities (fisheries, navigation, environment and ecosystems, watershed management); and
- Provides a coordinated, participatory and transparent process that promotes sustainable development.

Term of the Strategy: The formulation of the IWRM-based Basin Development Strategy considers development scenarios over a fifty-year period. However, it concentrates on a twenty-year view of basin development and management, which is considered to be a period for which rational and informed decisions can be made. However, the IWRM-based Basin Development Strategy will not remain static. A full review of the Strategy will be conducted every five years, as account needs to be taken of new knowledge of how the basin's water resources behave under evolving circumstances and changing social, economic and environmental conditions.

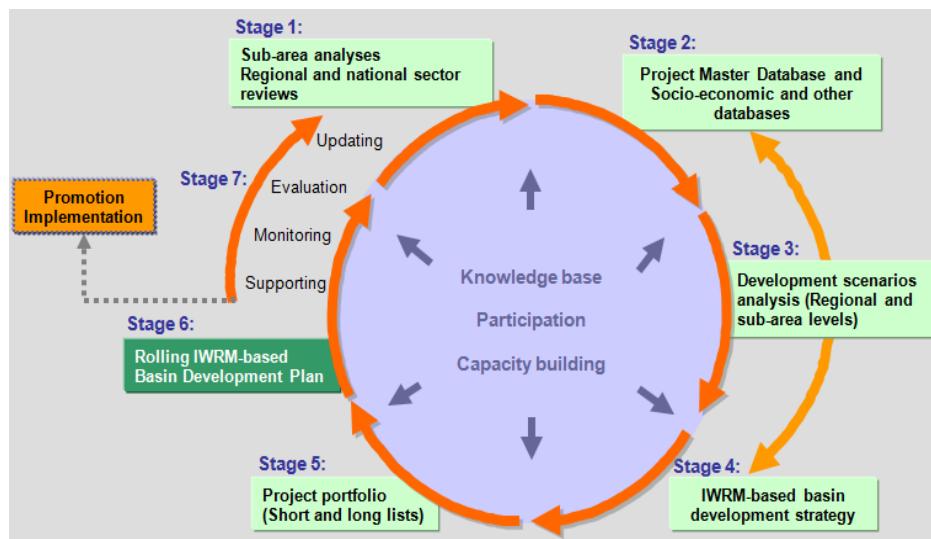
1.3 Approach to developing the Strategy

It was agreed during the earlier stages of the MRC basin planning activities that 'formulation of a basin plan', as required under the 1995 Mekong Agreement, would best be achieved by utilizing a rolling basin development planning process that followed seven stages as shown in Figure 1 overleaf. The key feature of the process is the necessary inter-play between national and sub-national plans with the opportunities at basin-level that are made possible through effective transboundary cooperation. The IWRM-based Basin Development Strategy is shown at Stage 4.

In a large and complex basin as the Mekong basin, with six sovereign countries, it would not be appropriate to 'force' a rigid and constraining basin development plan, based on basin optimization techniques. Also, this would not be consistent with the Mekong Agreement which is based on 'cooperation and coordination', not 'regulation and direction'.

Nor would it be sensible or feasible to prepare an 'IWRM Strategy for the Lower Mekong Basin', which would require the 'integration' of all water related national policies, strategies and procedures of the sovereign riparian countries into one overarching document and approach. This would clearly impact on the sovereign rights of the countries.

Figure 1 The BDP planning cycle



However, it is feasible to prepare an IWRM-based Basin Development Strategy for the Lower Mekong Basin, drawing upon the understandings gained from assessment of various 'packages', or scenarios, of nationally-proposed water related developments, opportunities and activities, and which focuses on how the cumulative impacts of these 'scenarios' could be accepted in a way that meets national environmental and socio-economic objectives and goals, and strengthens regional and national institutional and management arrangements.

In this way, major water resources development opportunities have been identified and cumulatively assessed against a wide range of socio-economic and environmental criteria. The assessment results can then assist national and regional discussions in deciding what might be an acceptable 'balancing point' between future development levels and related environmental and social impacts. This agreed level of water resources development opportunities, together with a range of other water related opportunities that are more 'passive' in water related impacts (such as involving fisheries, navigation, watershed management, flood warning systems, navigation aids etc,) then represents the 'opportunities' for water related development as agreed by the countries. When this is supported by a range of institutional strengthening, capacity building, improved technological and analytical systems, and an improved basin-wide water policy/strategy framework, it becomes the IWRM-based Basin Development Strategy for the Lower Mekong Basin.

The scenario assessment approach

The 'scenarios' represent different levels of water resources development in the Mekong basin. Each country has reviewed its short, medium and long terms water related plans and produced packages of water resources development opportunities that best reflected national priorities. Each scenario was formulated to represent different combinations of sectoral development, with a focus on hydropower and irrigation as these are the two sectors that the countries identified as having most dominance for future water developments, as well as having the most potential for significant transboundary impacts.

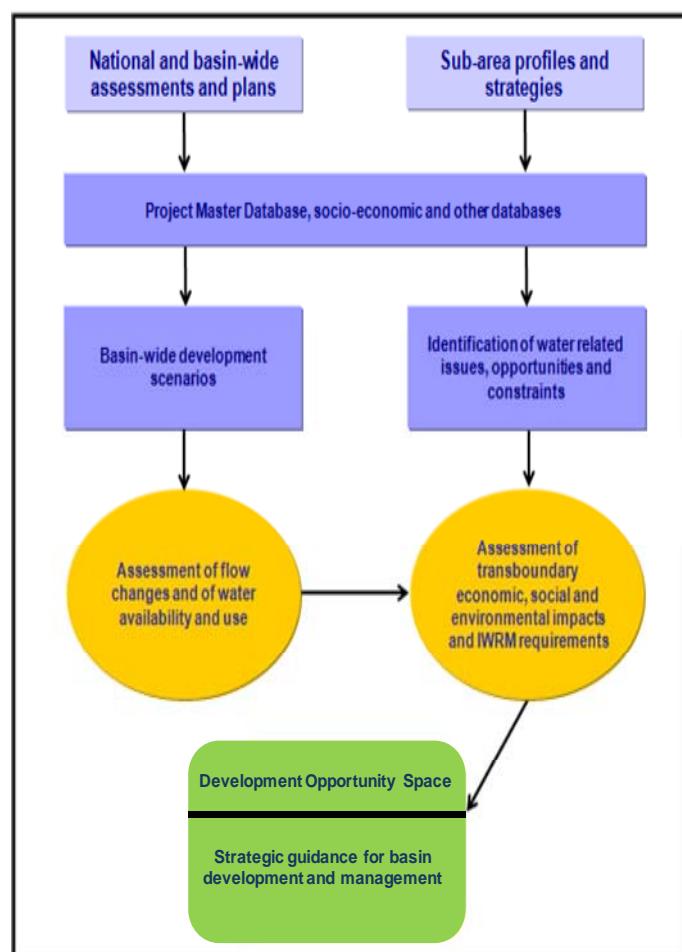
The countries agreed to assess these scenarios against a range of economic, social and environmental criteria that allows the assessment of the likely cumulative impacts of the scenarios, or packages of development opportunities. This is the first time that cumulative impacts of ‘packages of development opportunities’, at the ‘scenario level’, has been undertaken.

Whilst this process in no way provides any form of endorsement for a particular project (*this can only occur after normal project development and assessment under national and MRC processes occurs*) it does provide a more strategic picture of what levels of hydropower and irrigation development may be acceptable, and those that may not, and thus provides promoters and investors of particular projects a clearer direction of whether the project is likely to be acceptable at the transboundary level.

Figure 2 Towards strategic guidance for basin development

The approach is shown in Figure 2. The whole process is a ‘step by step’ process that depends first on the collection, analysis and assessment of water and related issues at the national and sub-area levels, and also on the information within the water related sectors. This has also identified a range of strategic issues, opportunities and constraints that will both guide and constrain how scenarios are assessed and impacts are evaluated.

As well, the sub-area analyses have identified a range of socio-economic, institutional strengthening and capacity building needs for both agencies and communities that are important in achieving strengthened water management in the basin.



The cumulative transboundary assessment of economic, social and environmental impacts of the basin-wide scenarios is the foundation of the Strategy. These are ‘cumulative assessments of possible scenarios’ and are not environmental or socio-economic assessments at the project level

From Scenario Assessment to “Development Opportunity Space”

National discussions of the results of the assessments among many stakeholder groups have considered the possible trade-offs between countries and between sectors, areas, and population groups, and ultimately led to national positions as to the preferred and acceptable scenarios (or elements within a particular scenario) as well as the supporting strategic guidance (or enabling conditions) that is essential to support, steer and direct how development could proceed. A scenario that is agreed as ‘acceptable’ represents a particular level of ‘development opportunity’ and provides the confidence that any project from within this scenario is likely to pass the more stringent national and MRC evaluation tests. This has been called the '**Development Opportunity Space**' (DOS).

Through the results of the scenario assessment process, boundaries are placed around the DOS which represent the acceptable levels of cumulative impact. The DOS limits where, when and how water can be used by the major water controlling and consuming sectors (irrigation and hydropower). At the same time, the DOS provides development opportunities for the more ‘passive’ water uses, including navigation, capture fisheries and wetlands.

Underpinning the DOS is a range of ‘enabling conditions’, including strategic guidance and MRC procedures which, collectively, will either support, steer, constrain, and guide how development opportunities in the DOS can be developed and implemented in an acceptable way. Many of these enabling conditions are still under investigation, and desirably should now be well underway so that assessments of development opportunities could proceed in parallel with the necessary supporting framework. This will be a priority area for the implementation of this Strategy.

The DOS is part of an overall ‘basin development framework’ and is explained in more detail in Sections 6.1 and 6.2. The framework aims at bringing basin-wide development opportunities and challenges into the national planning, and vice versa, supported by management processes such as the improved implementation of the MRC procedures, the strengthening of monitoring systems, and institutional development. The entire basin development framework needs to be reflected in national policies and plans, and implemented through collaboration at the basin, national and sub-basin levels (Chapter 7).

It is important to emphasize that *the DOS does not specify particular ‘projects’ that can proceed now – it is more about defining ‘future development opportunities’* that are agreed to fall within acceptable impact bounds. However, it *can be used by countries as a ‘cooperation space’ or ‘negotiation space’* to explore win-win situations, including benefit and impact sharing agreements that go beyond the specific project level and even the water-related sectors.

When the water resources development opportunities become particular national or multi-national projects, they will need to be developed through the normal feasibility and assessment processes, governed by national legislation, and be evaluated through the agreed MRC notification and prior consultation procedures.

Participatory Approach

This Strategy has been developed in a consultation process of two years with many stakeholders, including national sector agencies, provinces, river basin committees, community representatives, NGOs, academia, development partners and others. All of them have provided inputs to the initial outline and the consecutive six draft versions of the Strategy and supporting documents in over 100 meetings, workshops, conferences and forums that were organized at the local, national and basin levels. To assure transparency at all stages, all relevant documents have been posted on the MRC web-site.

Technically, the assessment of the scenarios and the preparation of the Strategy were overseen by a Regional Technical Working Group of 40-60 experts from the LMB countries and the MRC. A Panel of Experts with international and regional members provided an independent expert review of the Strategy and supporting documents to ensure that their technical quality is ‘fit-for-purpose’. Senior national advisors have been working to ensure the relevance and responsiveness of the Strategy to the prevailing conditions in the region. MRC governance bodies have reviewed and endorsed strategically important inputs and results.

Bringing together these IWRM issues, analyses, assessments, opportunities and risks, and stakeholder views is the main role of an ‘IWRM-based Basin Development strategy’ – it will provide the ‘glue’ for the basin planning process and the “strategic guidance” for how each country, and private developers, can develop within the scope of the basin plan.

1.4

Links to National Planning and the MRC Strategic Plan

The IWRM-based Basin Development Strategy, as the overarching water-related development policy for the LMB, will guide and influence not only the national planning but also the planning of other stakeholders in the water sector, including the MRC. They all have the responsibility to ensure that their programs fit within the overall sustainability of the basin, as well as meeting national priorities.

Each country has its own system and procedures for water-related planning (Section 7.1). But there is no basin-wide overview that allows each country to take account of synergies that could occur from multi-country planning, or from shaping national sector plans and projects to achieve broader basin wide benefits. This IWRM-based Basin Development Strategy will, for the first time, provide this basin-wide strategic overview. The Strategy also provides the practical linkages that need to be established to adapt the strategic guidance and processes in the Strategy into various transboundary and national planning, decision-making and governance processes.

The Strategy has directly responded to Goal 1 in the MRC Strategic Plan (2006 – 2010) and will now be the major activity in promoting the sustainable planning work in the next strategic plan. This new Strategic Plan (2011-2015) will provide the overall vision, direction and priorities for all MRC activities, including basin wide water planning. Through this plan, the various MRC

sector programmes will identify where particular priorities are, and how they should be responded to over the life of the plan. In a complementary way, this Basin Development Strategy identifies particular areas within programmes that need better information or policy/strategic advice to support the sound implementation of the Strategy.

2 A participatory approach to Strategy development

This Chapter describes the extensive consultations held with key stakeholders during 2008 to 2011 by BDP during preparation of the IWRM-based Basin Development Strategy.

2.1 Process overview

The focus of both phases of the MRC's Basin Development Plan programme (BDP1 and BDP2) has been on planning through a participatory approach in which, primarily, each of the four member States has been fully engaged and steering the planning process through collective decision taking at every stage since inception of the BDP (see Table 1).

Table 1 Summary list of main consultations held during BDP2

Event	No of meetings	Participants	Objective
MRC Joint Committee meetings	8 at the regional level	100	<i>Review and approval of scenario formulation and assessment</i>
National advisors	12 at the regional level	5	<i>Advisory, facilitation and mediation services</i>
Regional BDP stakeholder forums	Annually at the regional level	150-300	<i>Discussion of national positions at the regional level</i>
Regional Technical Working Group	9 at the regional level	40-60	<i>Technical validation of assessments</i>
National consultations	3 in each country	20-40	<i>Development of national policy and negotiation positions</i>
Sub-area working groups	2 in priority sub-areas	20-30	<i>Data and information improvement</i>
Transboundary meetings	1 in the 3Ss basin	100	<i>Discussion of scenarios and improvement of transboundary cooperation</i>
Various meetings with MRC Programmes, interest groups (M-POWER, private developers, etc.)	6	20-100	<i>Discussion of assessment approaches, methodologies, tools, data, results etc.</i>

Within this, the role of the MRC's BDP team has been to provide expert guidance and facilitation of the process. During BDP2, much of the burden has fallen on the BDP's Regional Technical Working Group (RTWG), made up of experts drawn from key Government agencies and relevant institutions in each country, supported by the BDP components from the National Mekong Committee Secretariats (NMCS).

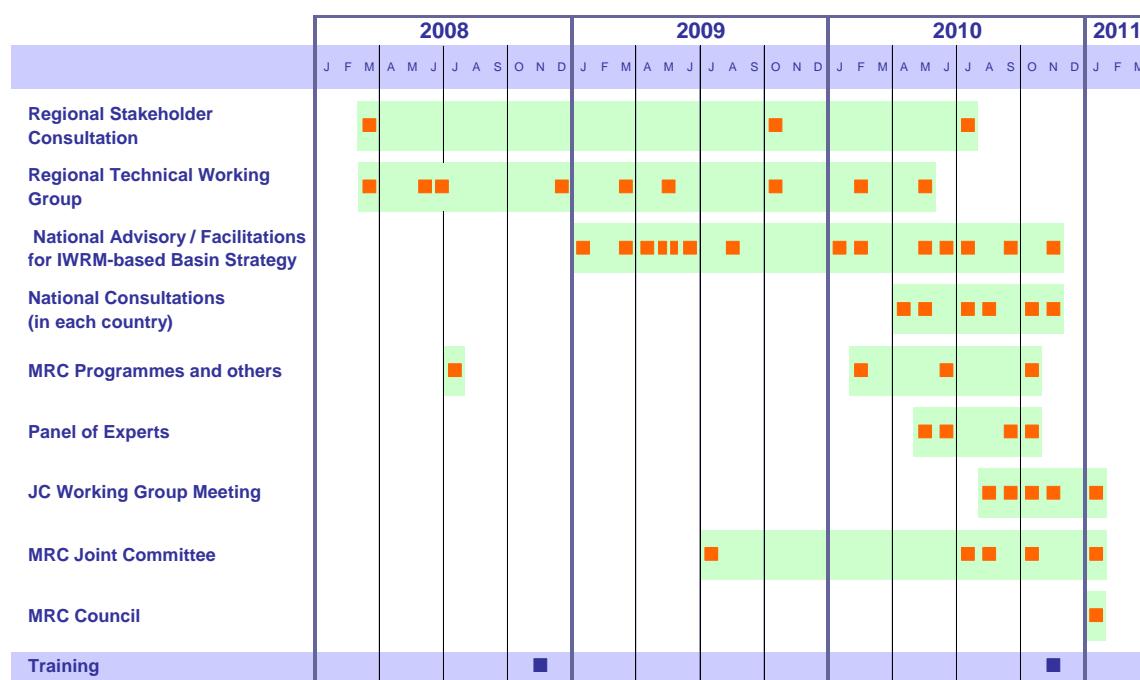
The NMCS have also arranged extensive consultations within their respective countries, which together with the RTWG have provided much valued guidance to the planning process and related technical assessments.

Steps have also been taken to ensure that the wider development community have also been involved in the process. To this end, and to assure transparency at all stages, all relevant documents have been posted on the MRC web-site. In addition regular meetings have been held with the BDP's stakeholder forum (comprising representatives from each country, from the donor and NGO communities and other MRC Programmes) to keep stakeholders informed of the process and to elicit feedback and suggestions on key issues.

A Panel of Experts was assembled to review and quality-assure the processes and products of the BDP2 effort. Their views provided valuable insights to a Joint Committee Working Group whose role it was to negotiate the final draft of the IWRM-based Basin Development Strategy for adoption by the MRC Joint Committee and subsequent consideration and approval by the MRC Council.

A summary of the consultation programme held during the second phase of BDP during 2008-2011 is provided in Figure 3 below, illustrating the commitment made by BDP to ensure relevance and quality of the formulation and assessment processes for the basin-wide development scenarios and the IWRM-based Basin Development Strategy. A full listing of the consultations undertaken is provided in Annex 3 of this report.

Figure 3 Summary of consultation programme



2.2 Stakeholder engagement

The following describes the main groups of stakeholders in the preparation of the IWRM-based Basin Development Strategy and how each was engaged during the BDP2 in enriching the process.

2.2.1 *Regional stakeholder forum*

The regional stakeholder forum was established to promote understanding of the BDP process and outcomes amongst the wider stakeholder groups within the LMB and to capture, and as far as possible, integrate their views. The forum comprised between 200 and 250 stakeholders drawn from government agencies, dialogue partners, university researchers, river basin committees (RBC), provinces, international, regional and local non-government organisations (NGO), civil society organisations (CSO), development partners, professional associations, private developers, international financial institutions and the media.

Three forums were held during the course of BDP2. The first, held at an early stage, introduced the MRC Basin Development Plan Programme Phase 2 and proactively sought their engagement in the BDP process and in the work of the MRC in general. Discussions were held on development opportunities in LMB to achieve socio-economic benefits for all countries while preserving the Basin's rich riverine system.

The second forum at broadly the mid-point of the process focussed on discussion of the critical water resources development issues in the MRB and how the water and related resources could be developed and managed. Ideas and suggestions for improvement were sought on the proposed approaches and methodologies for the assessment of Basin-wide development scenarios and the preparation of the IWRM-based Basin Strategy.

In the third and final forum, the preliminary results of the basin-wide scenario assessment were presented and discussed and comments sought on the emerging findings. A draft of the IWRM-based Basin Development Strategy was also presented and views were exchanged on this too, with note taken of the various concerns that the stakeholders held over the future directions for the development of the LMB's water and related natural resources. A separate session looked at the future of RBOs in the Mekong region and their role in supporting implementation of the Basin Development Strategy.

2.2.2 *National consultations and sub-area forums*

National consultations were organised by the NMCS in each country in three rounds during 2010. These focussed on both the approach to and findings arising from the basin-wide scenario assessments as well as the emerging IWRM-based Basin Development Strategy through its successive drafts.

Participants included NMCS representatives, National Working Group members, representatives from relevant line agencies and Sub-area Working Group members. These

consultations provided a valuable opportunity for the NMCS to share with key stakeholders within their respective countries the main elements of the planning process. Through this, steps have been made to raise awareness of the relevance of the regional planning to national and sub-national planning. Similarly, avenues have been created for sub-national participants to feed back views, through the NMCS, to enrich the basin-wide assessments and planning.

In addition to the national consultations above, a three-day meeting was held to discuss the perspectives and vision for development and management of the 3-S basin (Srepok, Sesan and Se Kong basins). Given its transboundary position within the LMB, the 3-S basin is of particular importance and appreciation of the development issues within this basin provides considerable insight into the wider issues to be addressed in the LMB as a whole.

2.2.3 ***Regional technical working group***

The formation of the Regional Technical Working Group (RTWG) drew on the positive experiences gained during the earlier phase of the BDP programme from close technical interaction between national and regional levels. The RTWG was established soon after the start-up of BDP2 and comprised members of the national BDP teams (as in phase 1) complemented and supported by technical experts drawn from the line agencies and research institutions. Other members included representatives from the MRC Programmes as well as members of the regional BDP team.

The RTWG met on nine occasions at different stages of the process. The technical issues addressed in these meetings included definition of the planning process and its component parts, identification and selection of scenarios to be assessed, development and agreement of the assessment framework, review of the hydrological and triple-bottom-line assessments, consideration of the initial findings from these assessments and review and improvement of the scenario assessment report.

The RTWG also addressed issues relating to the concepts behind and design of the Project Master Database and Project Portfolio and facilitated the collation of national data on projects needed for the assessments.

In parallel to the above, RTWG reviewed and discussed successive drafts of the IWRM-based Basin Development Strategy and provided guidance on its improvement, taking into account the feedback from national consultations on the findings from the scenario assessment.

As with all other consultations, interactions with RTWG were carefully documented, including actions/comments taken with regard to issues raised in each meeting.

Much of the success in reaching an agreed IWRM-based Basin Development Strategy can be attributed to the commitment and collaborative effort of RTWG members through a lengthy and at times arduous process.

2.2.4 *National advisory / facilitations for IWRM-based Basin Development Strategy*

The RDBP team recognised at an early stage that preparation of the first IWRM-based Basin Development Strategy involving four countries sharing a river basin with two others is a formidable task. To this end, the RDBP established a team of senior and highly experienced national advisors, one from each country, to help facilitate the preparation of the Strategy.

Their role was explicitly advisory. It involved helping each country better understand the often complex planning issues so that each country could respond to these mindful of both the national and regional consequences of the opinions expressed. The advisors individually interacted with their RTWG groups as well as with JC members, and collectively were able to discuss potential solutions or “ways forward” with RBDP.

The National Advisors met together 14 times over the period January 2009 to November 2010. Whilst their main focus was on guiding successive drafts of the Strategy, they also considered a wide range of other issues, including taking account of the scenario assessment findings and of the parallel Strategic Environmental Assessment of eleven mainstream dams.

2.2.5 *The MRC Programmes*

The MRC Programmes and other components of the MRCS contributed much to the assessment of scenarios and development of the Strategy. Particularly important inputs to the BDP were:

- **Information and Knowledge Management Programme (IKMP):** Running of the DSF hydrological models and post-processing results in support of the hydrological assessments underpinning the scenario assessments, and provision of information on studies of sediment transport undertaken by an expert group for IKMP;
- **Environment Programme (EP):** Preparation of climate change base data to be used in the scenario assessment and provision of much data supporting environmental impact assessment;
- **Fisheries Programme (FP):** Assessment of the impact of the scenarios on capture fisheries and information on potential growth of aquaculture within the LMB;
- **Flood Management and Mitigation Programme (FMMP):** Formulation and assessment of the flood management scenarios;
- **Navigation Programme (NP):** Elaborating and inputting the navigation component to the Strategy;
- **Initiative on Sustainable Hydropower (ISH):** Support in developing the hydropower database and coordination and information sharing between the scenario assessment and the SEA of the mainstream dams; and

□ **Mekong Integrated Water Resources Management Project:** Shared perspectives on IWRM capacity building within LMB

In addition to being represented on the RTWG and to numerous ad hoc meetings with RBDP, formal consultations were held by the RBDP with the MRC Programmes on various occasions. These consultations were associated with the approach and methodologies to be used in the scenario assessment, the emerging findings from these and with the emerging IWRM-based Basin Development Strategy. These consultations were augmented by a number of topic-related meetings in smaller groups including, for instance, debates on sediment transport issues and sharing findings with the SEA team.

2.2.6 ***Consultations with the private sector and others***

At an early stage of BDP2 a joint workshop was held with M-POWER (Mekong Program on Water, Environment and Resilience), a network of collaborators undertaking action-based research, facilitated dialogues and knowledge networking to improve water governance in the Mekong Region in ways that support sustainable livelihoods and healthy communities and ecosystems.

The aim of the workshop was to build a common approach to basin-wide development scenario formulation and assessment and to the purpose, scope and outline of the IWRM strategy for basin development and management. Topics included also hydrological modelling, cumulative impact assessment (CIA), and Strategic Environmental Assessment with a focus on the challenges for the MRCS. Selected experts from M-Power with relevant experience spent two days with the RDBP team sharing their experience and ideas.

Opportunity was also taken by the RDBP team to participate in meetings and field trips with private developers promoting mainstream dams to better understand their plans and proposals.

2.2.7 ***Panel of experts***

The panel of experts (PoE) were recruited to provide independent assessment of the relevance and quality of the BDP2 outputs as a means of providing a measure of quality assurance for all stakeholders and particularly for the four countries.

The PoE met three times during the later stages of BDP2 when the principal draft outputs were at a stage worthy of review. The PoE comprised both international and regional experts. Their findings were made available to stakeholders.

2.2.8 ***Joint Committee Working Group***

The Joint Committee (JC) Working Group was constituted by JC to review and guide the final stages of preparation of the IWRM-based Basin Development Strategy into a form that was mutually acceptable and which JC could recommend to the MRC Council to approve.

The JC Working Group was constituted in August 2010 and met five times to consider successive drafts of the Strategy. Their deliberations were informed by feedback from national policy makers and line agencies.

2.2.9

MRC Joint Committee

The role of the MRC Joint Committee was to review the progress of the BDP2, to agree key principles and work plans and to provide formal direction to the MRCS and RBDP team on the preparation of the Rolling Basin Development Plan, of which the Assessment of Basin-wide Scenarios and the IWRM-based Basin Development Strategy form the two key elements.

The MRC Joint Committee met five times between July 2009 and January 2011 to provide this direction.

2.2.10

The MRC Council

The role of the MRC Council was to consider and provide approval of the IWRM-based Basin Development Strategy on behalf of the four member States of the Mekong River Commission. The MRC Council met on 26 January 2011 and approved the Strategy as presented to them by the Joint Committee.

2.3

Training for selected stakeholder groups

In addition to the valuable insights for the RBDP team gained from the workshop with M-Power, training was provided early on on the general approach and underlying philosophy of IWRM planning for the RDBP and National BDP teams, Regional Technical Working Group members and National Working Group members.

In advance of finalisation of the IWRM-based Basin Development Strategy, a four-day training was provided on negotiation skills for 30 participants from key national line agencies and National Mekong Committee Secretariat and MRC Secretariat staff. The aim of the training workshop was to achieve better understanding of the nature of multiple parties' negotiation in the context of increased interest in Mekong region's management and utilization of water and related resources. Key elements were the principles of win-win negotiation, the flow of negotiation, and the development of active-engagement strategies for multiple parties' negotiation.

2.4

Use of website

In order to broaden access to the extensive written material to as wide a group as possible, key BDP documents were placed on the MRC website and updated as appropriate. The current content of the website includes:

At: <http://www.mrcmekong.org/programmes/bdp/findings-ofMekong-Basin-wide-dev-scenario-ass.htm>

- ❑ IWRM-Based Basin Development Strategy for the Lower Mekong Basin, (Final)
- ❑ Assessment of basin wide assessment scenarios main report, November 2010
- ❑ Scoping and planning of basin-wide scenario assessment, March 2009
- ❑ Assessment methodologies, October 2009
- ❑ Hydrological assessment, February 2010
- ❑ Impacts to river morphology, June 2010
- ❑ Impacts on water quality, June 2010
- ❑ Power benefits, June 2010
- ❑ Agriculture impacts, June 2010
- ❑ Impacts of changes in salinity intrusion, June 2010
- ❑ Impacts on wetlands and biodiversity, June 2010
- ❑ Impacts on the Tonle Sap ecosystem, June 2010
- ❑ Impacts on Fisheries, June 2010
- ❑ Social Assessment, July 2010
- ❑ Economic benefits and costs, June 2010
- ❑ Findings of Panel of Expert on BDP2 outputs

Other Technical Supporting Notes are available at:

<http://www.mrcmekong.org/programmes/bdp/bdp-publication.htm>

During the preparatory work for the Strategy, a discussion forum was established on the MRC website to allow anyone to input their views. However, on the whole, notwithstanding the valuable comments received, relatively few availed themselves of this facility.

3 Status of the Mekong River Basin

This Chapter provides a summary of the present situation in the Mekong Basin from a water and related resources perspective – the bench mark. It is mostly based on the 2010 State of the Basin Report of the MRC.

3.1 Water and related resources

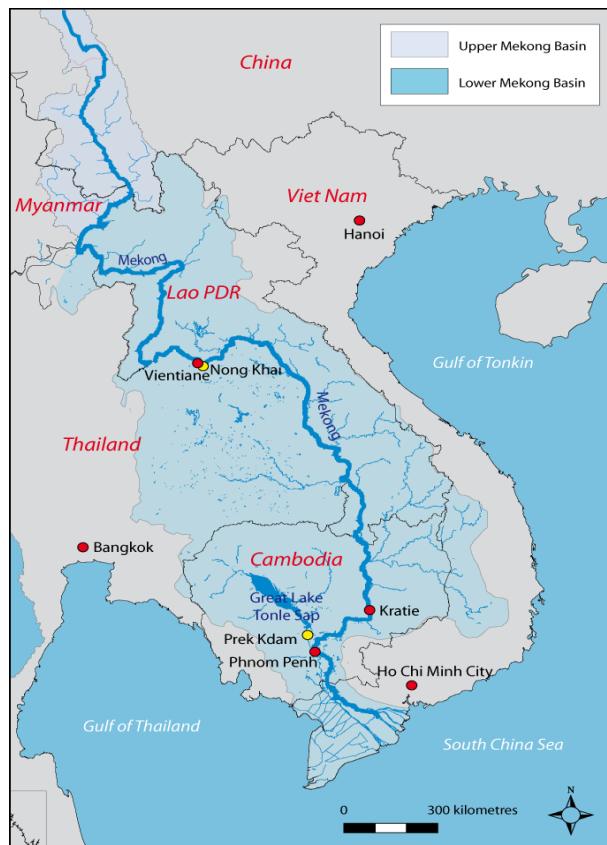
The Mekong flows for almost 4,700 km from its source in Tibet through China, Myanmar, Lao PDR, Thailand and Cambodia before entering the South China Sea via a complex delta system in Viet Nam. The area of 795,000 km² that drains into the Mekong is called the Mekong Basin. The mean annual discharge of the Mekong is approximately 475 km³. Per capita water resources amounts to 8,500 m³/person/year, which is on average ‘plentiful’ compared with most other international river basins.

The basin can be divided into two broad physiographic parts: the Upper Mekong Basin in China and Myanmar and the Lower Mekong Basin that drains most of Cambodia and Lao PDR and substantial parts of Thailand and Viet Nam (Figure 4).

Figure 4 The Mekong River Basin

One of the important features of the Mekong is the very large difference in wet and dry season flow, caused by the Southwest Monsoon, which generates wet and dry seasons of more or less equal length (Figure 4). The seasonal cycle of changing water levels at Phnom Penh results in the very large ‘flow reversal’ of water into and out of the Great Lake via the Tonle Sap river.

Also the historically observed natural year-to-year variability is large in terms of river discharges, flooded areas, and the beginning and end of the wet and dry seasons. For example, the historical observed data for 1924-2007 shows that annual flood peak at Kratie varied

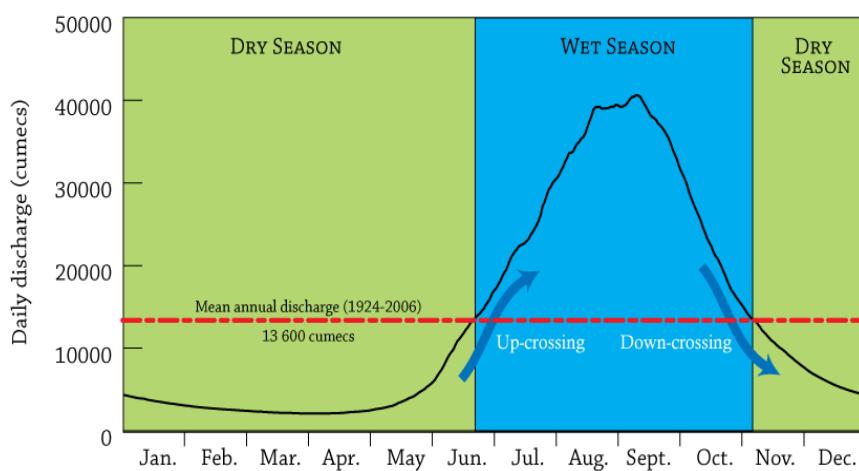


between 32,000 and 78,000 m³/s, while the flood volume varied between 200 and 470 million m³. The timing of the beginning and end of the flood season shows a range of about 4 weeks.

Figure 5 Monthly distribution of flow in the Mekong mainstream at Kratie

Another important feature is the Mekong Basin's rich riverine ecology, fuelled

by the annual 'flood pulse' in and out the Great lake and the associated flooding and drying of major parts of the floodplain. The Mekong is the second most bio-diverse in the world after the Amazon, and supports the world's largest fresh water capture fishery of about 2.3 million tones per year.



3.2 Socio-economic setting

The total population living in the LMB was estimated at 60 million in 2007. About 90% of the population of Cambodia (13 million) and Lao PDR (5.2 million) are living within the basin. Comparatively, the Thai portion in the basin holds 39% of the national population (23 million), while in Viet Nam only 20% of the country's population lives in the basin (17 million in the Mekong Delta and 3 million in the Central Highlands). Population growth in the basin is at a rate of 1-2% in Thailand and Viet Nam and higher in Cambodia and Lao PDR (2-3%).

Although urbanization is a trend in all four LMB countries, about 85% of the basin's population is living in rural areas. Most live near rivers, lakes and wetlands with 25 million living within a 15km corridor at either side of the Mekong mainstream. It is estimated that 63% of the economically active population of 10 years and above have a water resource related occupation as their main occupation and 38% as their secondary occupation. Many of them live in poor conditions and depend on fish and other products from rivers, forests and wetlands for their food security, income, livelihood opportunities and their way of life. This makes the rich ecology of the LMB unique in terms of its contribution to livelihoods, particularly of the poor. This close relationship also means that poor people are particularly vulnerable if the river and associated resources become degraded.

Agriculture accounts for more than 30% of GDP in Cambodia and Lao PDR, but only to 11% and 22% in Thailand and Viet Nam, respectively. The contribution of mining and hydropower to the GDP and export are growing fast in the basin, and tourism becomes an increasingly important source of both national revenue and people' income.

Cambodia and Lao PDR are making progress towards achieving several of the MDGs, but face challenges in critical areas such as food security, poverty reduction and malnutrition. More than 30 percent of the people in Cambodia and Lao PDR living in the basin have incomes below the national poverty line, but in many rural areas the proportion is much higher. Almost half of all households in Lao PDR have no safe water supply and half of all villages are unreachable by all-weather roads during the wet season. Life expectancy is increasing but is still well below the average of 69 years for developing countries in East Asia and the Pacific.

In Viet Nam and Thailand the rate of development is further advanced. Thailand has achieved the objectives of MDGs well in advance of the 2015 target. The proportion of people living below the poverty line was reduced from 27% in 1990 to 12% in 2004. Electricity and water supply and sanitation services are now almost everywhere available. Viet Nam is on track to achieve most of the MDGs. It made good progress in overcoming poverty with a decline in the number of people below the national poverty line from 75% in 1990 to 16% in 2006. Nevertheless, disparities exist between population groups and regions, with the poverty rate in the Central Highland remaining at 29%.

3.3 Present development of water resources

Average annual withdrawals for agricultural, industrial and other consumptive uses in the LMB are estimated at about 60,000 million m³, or 12% of the Mekong's average annual discharge. The most downstream end of the Mekong Basin, the Viet Nam delta, is the largest water user in the basin. Diversions from the Mekong mainstream upstream of the delta are so far negligible. Existing storage of water resources behind dams corresponds to less than 5% of the average annual flow, and does not significantly redistribute water between seasons.

Present groundwater use in the Mekong Basin is modest except in Northeast Thailand and Viet Nam where fresh water is scarce during the dry season. The potential for sustainable use is uncertain in many places and will be a key area for future research and assessment.

Agriculture is the most dominant water-related sector, particularly in Thailand and Viet Nam. In the dry season, the irrigated area is less than 10% of the agricultural area (1.2 million hectares). Expansion of the present levels of irrigation is limited by the availability of dry season flows. The water flows that reach the Viet Nam delta in the dry season are fully used for economic, environmental and social purposes, including combating seawater intrusion.

The hydropower potential of the Mekong Basin is estimated at over 60,000 MW and about 10% of this potential has been developed to date. Navigation is an important sector but is largely undeveloped in the sense that it is occurring naturally and, so far, not as an integrated transport

sector. To reduce damage by major floods, the emphasis so far has been on the reduction of vulnerability to floods by flood proofing and non-structural measures. Water resources have been developed on a small scale for the improvement of wetlands and aquaculture.

While millions of poor people use the natural resources of the Mekong Basin for their food security, income and livelihoods, the Mekong's water and related resources are largely undeveloped.

3.4 Current impact of development

The areas with the highest levels of water resources development in the Mekong Basin - Northeast Thailand and particularly the Viet Nam delta - have witnessed strong economic growth during the last two decades. The Viet Nam delta is now one of the world's most productive agricultural areas. Some biodiversity has been lost, but thanks to thriving fisheries in rainfed rice fields and associated habitats and in reservoirs, as well as continually increasing aquaculture production, the annual fish yields in Thailand and Viet Nam are the highest in the basin.

Current water resources developments have had various localized adverse impacts in the Mekong's sub-basins. On some of the tributaries, inadequately designed hydropower projects have created wide and sudden variations in the daily downstream flows, often to the distress of people living downstream. Uncontrolled deforestation, mainly for agriculture, in many of the tributary basins has led to increased erosion and flood risks. Significant water quality problems have developed in the Viet Nam delta. Throughout the LMB, there are localised impacts from some industries, such as mining.

While the developments so far on the tributaries have had localized impacts, the impacts on the flow regime and water quality of the Mekong mainstream have been until recently insignificant. The net impacts of past individual development in the sub-basins on the flows upstream of the Viet Nam-Cambodia border are small compared to the unregulated flows from elsewhere in the basin. Evidence suggests that the increased runoff that would have been expected to have occurred as a result significant regional deforestation since the 1960's has been offset by the retention and re-regulation introduced through the parallel expansion of bunded rice fields and, generally small scale storage reservoirs.

Overall, the status of the water and related resources in the Mekong Basin is still good, but there are challenges ahead, as described in Chapter 4.

3.5 Water resources management – policies, strategies and institutions

At the Mekong Basin scale

Water resources management in the LMB is a mix of a ‘cooperative and coordinating model’ at the basin-scale (facilitated through the MRC) and four national models, where individual sovereignty, customs and administrative systems dominate. MRC, through the 1995 Mekong Agreement, acts as a focal point for the cooperation, and assists the member countries in achieving their basin-scale aims through provision of shared information, technical guidance and mediation.

Since 1995, the MRC has made slow but sure progress, with member country agreement to a procedural framework for cooperation and the development of a regionally recognized knowledge base. It also established a participatory process for basin planning and commenced an effective dialogue with China. Most of MRC’s activities are now implemented through sector or thematic programmes. In 2009 a start has been made with the definition of core functions, which would be fully financed by the member countries after a transition period.

Work has begun in MRC programmes on developing a suite of natural resource and social indicators and basin-wide policy/strategy statements that could define ‘acceptable environmental baselines’ that will help to better define the relationship between various levels of ecological ‘health’ and various levels of development use of the resource base.

‘Acceptable environmental baselines’ or ‘objectives’ have not been available for this initial IWRM-based Basin Development Strategy. Thus the assessments of the impacts of various packages of development opportunities on the social and environmental baseline, and what could be considered by the four countries as ‘acceptable’ impacts, has had to use ‘best available information’ and discussion and negotiation. Once this work on ‘objective statements’ is completed and negotiated among countries, they will provide better benchmarks for defining the DOS or what mitigating measures might be necessary, to ensure the ‘benchmark objective’ level is not breached or exceeded.

Whilst these 42 criteria are very comprehensive in coverage of possible impact areas and provide a good and acceptable basis for multi-national discussions and negotiations, there has not been available a suite, or package, of natural resource and social indicators and basin-wide policy/strategy statements that define ‘acceptable environmental/social baselines’ or ‘objectives’ against which cumulative impacts could be judged. This would have provided decision makers with a further level of assessment information as they decided which scenario, or level of future development could be acceptable. The MRC programmes have plans to work on these objective statements and these will provide better benchmarks for the review period of this Strategy against which to judge the acceptability of cumulative impacts of projects.

At the national level

Each country is implementing IWRM in a way that suits its particular circumstances. There have been large changes in all countries, particularly relating to developing clear statements of

national water-related policy and strategy. An improving institutional and regulatory framework increasingly supports these policies, and removes uncertainty as to which agency has the role of the ‘water resources manager’, and gives it strong legal backing through modern water resources legislation. In Thailand, River Basin Committees are becoming the main bodies for participatory water management at the river basin and local level.

All countries are further developing the overall water policy, legal and institutional framework, and have plans for implementing and strengthening the new approaches and systems. The most important recent initiatives have been:

- All countries now have specified agencies with the responsibility for IWRM – a specified ‘national water resources management agency’ (MOWRAM in Cambodia, WREA in Lao PDR, MNRE in Thailand, and MONRE in Viet Nam);
- All countries have at least a ‘framework’ national ‘water policy and strategy’ based on IWRM principles and covering the priority economic, environmental and social issues and policies relating to water. All are modernizing water resources legislation;
- All countries are strengthening participative approaches to river basin and sub-basin planning and management – Thailand has a well structured framework for RBO’s covering all major sub-basins in the country, while Vietnam and Lao PDR are now commencing an RBO approach;
- New decentralization policies that will enable water related decisions to be taken at the provincial levels, where the problems exist; and
- All countries are supporting capacity building programmes for IWRM and introducing new technical, modelling and analytical tools and approaches to support water planning and management.
- Environmental protection objectives are prominent in the National Socio-economic Development Strategies of all countries.

Changes are also occurring in the processes for regulating and supplying water services for both urban and rural water demands. The water supply corporations for major cities are being required to operate to high levels of water service and environmental efficiency. In the irrigation sector, water users associations are being formed, which places greater accountabilities on the farmers. There are also new approaches to private-public sector partnerships, and to private sector-community farmer partnerships.

Approaches to **stakeholder participation and consultation** are being strengthened in all four countries. Such processes are a central part of modern IWRM practices. Each country has its own systems, approaches and cultures relating to community or mass participation and these must be respected as processes are extended to provide for basin-wide IWRM-based water resources development and management.

4 Development trends and plans

This Chapter summarizes water-related development trends, needs and plans, as specified by the LMB countries. It ends with the identification of the principle transboundary challenges and opportunities, based on sub-area and sector analysis and discussions at a number of stakeholder forums.

4.1 Global developments and climate change

Global developments once would have had only a small impact on developing countries. In the last decade this has changed dramatically and now the effect of market changes and global economic downturns and peaks are registered in all countries. The main global developments that affect the Mekong basin are:

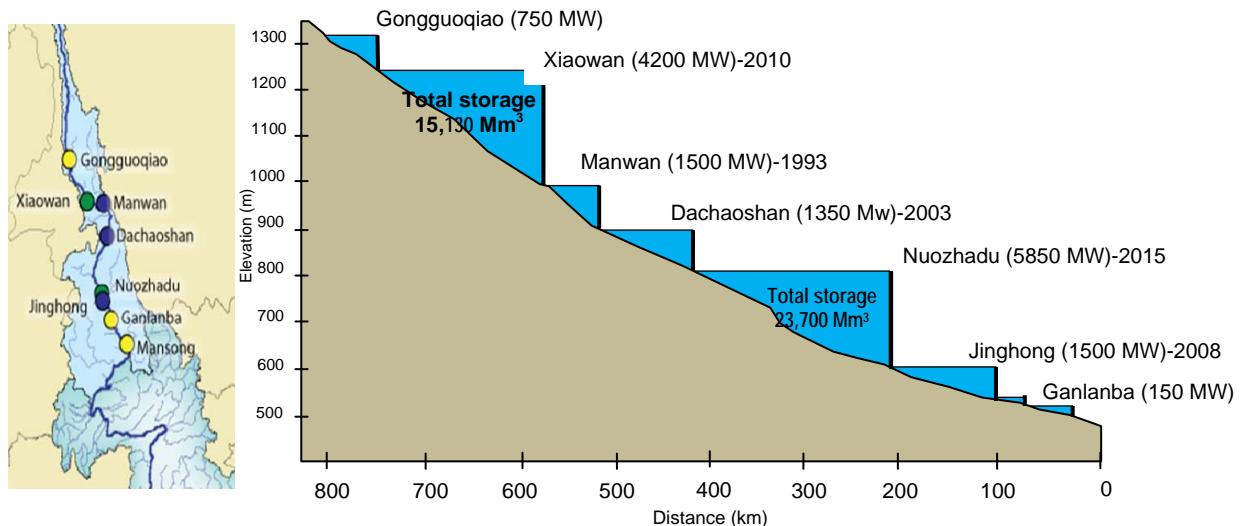
- Fluctuating oil and natural gas prices are making hydropower development financially more attractive to private investors. This has led to accelerating hydropower development in the Mekong Basin;
- Global food shortages and rising prices can make irrigation more profitable in the LMB, while irrigation development may attract investments from foreign entities that seek more diversified food types. This opens up new market opportunities and new public-private business relationships for irrigation development; and
- Global climate change may change future water demand and water availability. Initial assessments suggest that in the Mekong Basin, the wet season may become wetter but the dry season will be largely unaffected. However, there are major uncertainties which merit further strategic studies (Section 5.1, 5.6 and 6.5).

All of these global emerging trends provide additional incentives for the development of significant water infrastructure in the Mekong Basin, including storage projects. The challenge is to develop these projects within an IWRM context, and with an emphasis on developing multi-purpose projects within a river basin perspective.

4.2 Developments in the Upper Mekong Basin

In the Upper Mekong Basin, China is completing its hydropower cascade on the Lancang (Figure 6). The Manwan, Dachaoshan and Jinghong Dams are currently operational. The Xiaowan Dam, completed in 2009, is being filled and tested. The Nuozhadu Dam will be completed in 2014.

Figure 6 Profile of the hydropower cascade on the Lancang in China



In particular the Xiaowan and the Nuozhadu hydropower projects, with 9,800 and 12,400 million m³ of active storage, will cause a very significant seasonal redistribution of flow from the wet season to the dry season and reduce sediment transport in the Mekong mainstream. The significantly increased dry season water availability makes run-of-the-river hydropower schemes in the LMB financially more attractive.

At the regional stakeholder forum on BDP2, Chinese representatives indicated that China has no plans at present to use any of the water resources in the Upper Mekong Basin for consumptive purposes. If it chose to do so, this would be for irrigation development downstream of the cascade (but there is very limited suitable land) or possibly by diversion into an adjoining basin such as the Yangste. This would be a very large undertaking and may not yield an acceptable amount of water, and would also take water away from its primary purpose of power generation at the Lancang cascade.

4.3

Socio-economic needs in the LMB

Projected population growth suggests that by 2030 the basin's population will reach 78.3 million (Table 1). These conditions along with increased longevity mean that overall population growth will remain significant.

Economic growth is expected to continue at fairly high rates in the LMB countries, supported by diversification of the economies, improved regional economic integration, and continued investments in infrastructure and human resource development. Lao PDR and Cambodia have the ambition to graduate from Least Developed Country (LDC) status, while Vietnam wants to become a middle income country in the foreseeable future (2030).

Table 2 Projected population growth of the Lower Mekong Basin

Portion within Mekong Basin	Current Basin Population in 2007 (million)	Annual Growth Rate (%)	Basin Population Projected in 2030 (million)
Cambodia	13.0	1.9	20.5
Lao PDR	5.2	2.1	8.4
Thailand	23.1	0.8	24.7
Viet Nam	18.7	1.2	24.6
Total	60.0	Average 1.5	78.3

Source: MRC State of the Basin report, April 2010 and MRC BDP Assessment of Basin-wide Development Scenarios, June 2010

The increasing population, growing economies and increasing living standards accelerate food and electricity demand. As the countries are battling the persistent wide-spread poverty in their rural areas, they also have to contend with the regular devastating effects of severe droughts and floods which every year claim lives, property and cause substantial economic losses.

In order to address these challenges, there will inevitably be a high demand for developing the economic potential of the river for irrigation, energy, transport and flood protection.

Governments realize that developing water resources can stimulate economic growth and reduce poverty, as demonstrated in the Vietnam Delta and Thailand where millions of people have been lifted out of poverty and capture fisheries remains among the highest in the basin (Sections 3.2 to 3.4).

All four LMB countries have targeted ‘poverty reduction strategies’ within the national socio-economic and sector plans, and these all include the development of water resources for irrigation, flood management, hydropower, domestic water supply, and other uses to produce benefits for the many millions who live in poverty, especially in rural areas (Section 4.4).

4.4

Developments in the Lower Mekong Basin

The above global trends and hydropower developments in the Upper Mekong Basin offer both opportunities and threats in the LMB. At the same time, there are socio-economic needs within the LMB, and priority issues within each of the four countries, that influence how and when land and water resources could be developed.

The countries’ socio-economic and sector policies and plans demonstrate that governments will continue developing some of the economic potential of the water resources in the Mekong Basin to boost economic growth, reduce poverty, improve livelihoods, and work towards meeting the UN Millennium Development Goals. All four countries plan to:

- Considerably increase irrigated agricultural production, for food security, safe food production, the growth of high-value crops, and to create high employment;
- Significantly increase hydropower production to meet increasing demand for affordable electricity and/or generate foreign exchange with minimal adverse effects, thereby promoting economic growth;
- Improve navigation to increase international trade opportunities and river-based tourism, and to develop effective and safe waterborne transport;
- Considerably decrease the damages of floods to prevent or minimize people's suffering and economic losses, while preserving the environmental benefits of floods;
- Improve water supply and wastewater management to make available sufficient water of adequate quality to people and industries;
- Further develop aquaculture and maintain capture fisheries for food security;
- Alleviate poverty by creating job opportunities through the continued development of some of the basin's water resources for beneficial use; and
- Maintain vital ecology and cultural heritages and minimize adverse effects on natural resources from economic development.

The national policies and plans show that the LMB countries are all following ‘common and consistent’ approaches in the development and management of national water resources, in their efforts to reduce poverty and boost economic growth. It highlights the importance and value of an IWRM-based Basin Development Strategy that can capture these similarities and guide a common set of shared goals and values at the basin-scale.

In particular, the two development areas that have the greatest potential to impact on the basin's resources are the countries' hydropower and irrigation development plans. The countries have identified in the various development scenarios that these are the primary and priority areas for development over the next 20 years. Of course, there will be major developments in areas such as navigation and flood management over the next 10 to 20 years, but these do not have the same potential to impact on the basin's resources as do irrigation and hydropower.

- The hydropower sector is accelerating because of the large demand for electricity in Thailand and Viet Nam and the export earnings that would accrue to the host countries Lao PDR and Cambodia after the concession period of 20-25 years. These earnings can be used to finance other development aspirations in the social, education, health and other sectors; and
- Irrigated agriculture is relatively small at the moment outside the Viet Nam delta, but this is likely to change given the sector's key role in poverty alleviation, food security and commercial agricultural development.

Currently, 26 large (>10 MW) hydropower projects are under construction on tributaries and many more are planned in the LMB, including 11 projects on the mainstream (see Figure 6). Many of the hydropower projects on tributaries include significant reservoirs which will further increase dry season flows, making more water available for irrigation development. Table 3 below shows that the dams in China and the dams under construction in the LMB will create 36,639 million m³ of additional active storage in The Mekong Basin. An additional 30 dams are being planned to be constructed during the next 20 years, mostly in Lao PDR. These dams would add another 20,721 million m³ of storage to the Mekong system.

Table 3 Hydropower dam storage capacity in the Mekong Basin (million m³)

Situation	Cumulative Active Storage (million m ³)	Incremental Active Storage (million m ³)	Comments
Baseline 2000	9,906	0	
China Dam Cascade	32,842	22,936	
Near Future (2015)	46,545	13,703	<i>Mainly because of committed or under construction Lao tributary dams</i>
Foreseeable Future (2030)	67,266	20,721	<i>Mainly because of planned Lao tributary dams</i>

Source: MRC BDP Hydropower Sector Review, March 2009

Most of the LMB countries have ambitious plans for irrigation development. For example, Lao PDR plans to increase dry season irrigation from less than 100,000 hectares at present to more than 300,000 hectares in twenty years from now (Table 4). Large irrigation expansions are being studied in Cambodia, in particular in the undeveloped Cambodian delta, linked to major investments in flood control, and elsewhere, linked to hydropower development. Water transfers from the Mekong mainstream have long been considered by Thailand to complement national approaches to alleviate droughts.

Table 4 Planned increases in irrigated agriculture

Country	Increases in Irrigation in the Dry Season (hectares)		
	Current Situation (2008)	20- Year Plan Scenario (Foreseeable Future 2030)	Increase in %
Lao PDR	97,224	329,952	239
Thailand	148,237	427,741	189
Cambodia	260,815	378,917	45
Viet Nam	739,594	739,594	0
LMB total	1,245,870	1,876,204	50

Source: MRC BDP Irrigation Sector Review, March 2009

Figure 7 Existing and proposed mainstream dams



Development plans of this size and scope bring with them both ‘synergies’, or complementary effects between water resources developments, and ‘trade-offs’, where benefits for one area or activity create dis-benefits for another. For example there can be synergies between hydropower, irrigation and upland watershed management - with some benefits occurring for all. Trade-offs at the transboundary level will largely be about hydropower benefits from mainstream dams, on the one hand, and the dis-benefits caused by the blockage of fish migration routes and other potential impacts caused by this infrastructure.

Trade-offs in particular require much analytical work and negotiation between countries, or between sectors, to find the ‘middle ground’ or ‘balancing point’ which all key players and stakeholders are prepared to agree. All of this requires strong IWRM understanding and capabilities across the basin, and across institutions, and time for consultation and to develop preferred negotiating positions. It will also require close consideration of a range of complementary measures that may be needed to offset or mitigate the impacts of these new large development proposals.

4.5 New investments and development assistance

As the four LMB countries reform, improve government investment policies, and clarify the rules for resource utilization, there will be increasing opportunities for the private sector (and foreign ‘state-owned companies’) in the development of water and related resources, such as hydropower, navigation, large-scale irrigation, and industry (mining, forestry, and tourism). In many of these areas, investment from the private sector now outweighs public sector investments.

In comparison with conventional public sector driven developments, the emerging private sector developments in the LMB are more opportunity-driven with relatively short planning cycles and assessment processes that meet minimum requirements. As well, private project developers are not obliged to develop projects through processes open to public scrutiny, and are less sensitive to arguments and advocacy promoted by civil society and NGOs. Moreover, private project developers do not have to comply with safeguard policies of the multilateral banks (WB, ADB), which previously dominated the hydropower and irrigation sectors.

When private sector projects begin to dominate, the government requires strong government regulatory systems and enforcement capacity, and the readiness to interpret the national policies to include emerging good practice. This means a more strategic set of skills and capacities for the central regulating and resource management agencies, and stronger supporting laws and regulations.

4.6 Main transboundary challenges and opportunities

In the basin planning process, the water-related issues have been collated from the national and sub-area data collection and analyses process. In addition, assessments by MRC programmes

have added sector and thematic issues. Strategic assessments of this large amount of information have identified over fifty main IWRM issues that must be addressed when future water-related development is being considered.

Many of these issues do not have transboundary implications, while others are more related to opportunities for transboundary cooperation, which are described in Chapter 7. The transboundary issues that have been initially assessed as being of the highest priority for a basin-wide scenario-based economic, environmental and social assessment are described below.

Water availability for use

Dry season flows maintain a wide range of economic, social and environmental values in the LMB. Until recently it was assumed that the countries' irrigation plans had to be 'sourced' from within the natural dry season flows. Comprehensive studies were started to investigate the trade-offs between increased levels of water utilization and the resulting environmental and social decline, and what would be the acceptable limits of such a decline. The ongoing construction of storage reservoirs for hydropower in the Upper Mekong Basin will redistribute water from the wet season to the dry season. The increased availability of water resources in the dry season will provide more than enough water to satisfy the 20 year future consumptive needs in the dry season and still leave more water in the river than now exists in the dry season. But there will be a reduction in wet season flows due to the upper dams re-regulation which will change to a degree the patterns of flow variability.

Geomorphologic changes

Sediment trapping by the ongoing and planned construction of large dams may cause a number of consequences, including increases in river bed and bank erosion, changes in the delta shaping processes, and reductions in fertilization of floodplains and coastal waters with nutrients. The timing and extent of possible impacts are likely to be strongly influenced by autonomous developments (flood protection, river training, and sand mining) and by sea level rise.

Fisheries production and livelihoods

High annual fish yields are already under pressure from over-fishing, habitat fragmentation, reduction of flood plains, and blockage of fish migration by dams, weirs and other infrastructure. A significant proportion of the system's river-floodplain fisheries are at risk from ongoing and planned developments. Reductions in fisheries yield would have profound socio-economic implications for millions poor rural people. On the other hand, there is considerable potential to increase fisheries yield by implementing measures to improve the management of capture fisheries and develop aquaculture (reservoir fisheries and rice-field fisheries), as demonstrated in the Vietnam delta and Northeast Thailand. In these parts of the Mekong Basin, water resources development and fishery yields are among the highest in the basin.

Incomplete and inadequate fish management policies and strategies can, in themselves, have severe impacts on fish health and productivity. More work is needed to improve these management approaches and allow a clearer distinction between impacts that could be caused

by poor management practices and those that can be attributed to present and future water related developments.

Navigation

The potential impact of proposed mainstream dams on the integrated development and implementation of ports, river works, locks and regional waterways may affect trade and tourism, as well as local river transport. The navigation sector offers great opportunities in transboundary cooperation in terms of regional harmonization of navigation processes and schemes (border regulation, navigation aids, navigation rules, pollution control, certification, monitoring, and statistics) and morphological management, including bank protection and dredging. Also, the integration of navigation with regional initiatives to improve road and rail transportation would be important. All of this needs to be considered in the context that the dams now under construction in the upper basin will increase dry season flows and thus open up new opportunities for navigation and trade.

Floodplain management

If mid to long term plans of the LMB countries are implemented, significant parts of the current floodplains would be protected from flooding and developed for irrigated agriculture and other land uses. Such development may cause significant transboundary impacts, such as loss of biodiversity, reduction of fisheries yield, and increased flood heights and velocities due to the diversionary effect of flood banks and roads. These impacts result essentially from the loss of storage capacity during the different stages of the floods. Options to store or divert flood waters in the Mekong delta are limited. New concepts are needed in the longer term, with increased levels of flood plain development in Viet Nam and Cambodia, and possibly higher flood risks due to climate change.

Wetland management

The LMB wetlands, support diverse ecosystems and the large fisheries yield and the associated rich biodiversity and livelihoods of many communities. The ongoing and planned hydropower developments and irrigation expansion are a considerable risk to the productivity of ecosystems. Changes in the hydrological regime will change the wetlands and their functions. In particular, changes in the Mekong flood pulse are expected to have transboundary impacts, particularly for the floodplains in Cambodia, including the Tonle Sap Lake and the Mekong Delta. Large dams in particular may also reduce sediment transport and associated nutrients, and disconnect wetlands from the river system.

Flagship species

Amongst the wide diversity of aquatic life in the LMB, there are a number of species that have a high profile and are critically endangered due to people and development impacts. These are called 'flagship species'. They include the Mekong River Dolphin, the Siamese Crocodile, the Easter Sarus Crane, and the Giant Catfish. The ongoing and planned hydropower developments will further impact these flagship species through one or more of the following changes:

isolation of populations, sedimentation or disconnection of deep pools, flow regime modifications, changes in wetlands, and changes land use.

Climate change

Whilst climate change impacts will not create major near term uncertainties, in the longer term, beyond the proposed 20-year planning horizon, the threats posed are much more significant. MRC is working with the countries to better define climate change risks and this will need to be considered during the first 5 year review of this Strategy.

These priority transboundary issues, together with the priority ‘strategic guidance’ issues in Section 6.5, and the ‘WRM sector guidelines’ in Section 6.6, provide a clear picture for the various MRC sector programs, and the relevant national line agencies, of the IWRM related policy and strategy priorities for the basin, which will need to be addressed in future work programs. How and when these priority issues will be addressed, by whom, and how they will be adopted by the countries in national planning processes, will be a key part of the early stages of the implementation plan for this Strategy.

5 Transboundary environmental, economic and social assessment

This Chapter summarizes the scenario assessment approach and the key findings of the assessment. It draws on the MRC publication “Assessment of Basin-wide Development Scenarios” and its supporting Technical Notes (June 2010). The Chapter ends with the views of the LMB countries on the opportunities and risks associated with each scenario.

5.1 The scenario assessment approach

All aspects of the scenario assessment process represent the product of extensive dialogue and consensus building between the LMB countries. This collective effort has led for the first time to the countries coming together to put forward their individual development aspirations and examine these within an agreed framework of shared aims and concerns.

The purpose of assessing development scenarios is to provide an appreciation of how different levels of water resources development within the basin impact upon economic, environmental and social objectives of the LMB countries. The results will enable the examination the trade-offs between different types of development, taking into account the developments in the Upper Mekong Basin. Basin-wide dialogue on the results would inform the identification of the DOS (see Section 1.3).

The ‘*scenarios*’ represent different levels of water resources development in the Mekong Basin and are based on the short, medium and long-term plans of the LMB countries. Each scenario is formulated to represent different combinations of sectoral development, recognizing the synergies and trade-offs between water-related sectors, such irrigation and hydropower synergies and hydropower and fisheries trade-offs.

The scenarios were selected by the countries and fall into four main categories:

- **Baseline Situation** – establishing the reference situation as regards hydrological, economic, environmental and social conditions against which all future developments can be compared. This has been agreed as the hydrological situation of 1985-2000 and the socio-economic situation of the year 2008-2009;
- **Definite Future Situation** (DFS) – assessing the cumulative impact of developments that are fully expected to occur by 2015 (i.e. have been built since Year 2000, are under construction or already committed), including the new dams in the Upper Mekong Basin and other significant reservoir developments in the LMB;
- **Foreseeable Future Situation** (FFS) – assessing the impact of plans that the LMB countries have put forward for development in the next 20 years (up to 2030), including 11 mainstream dams and variants on these, other tributary dams, irrigation expansion, and

rising water supply demands. The scenarios have been structured to investigate the transboundary impacts of these proposed developments without and with different combinations of mainstream dams (“20-year plan scenarios”). The impact various flood management interventions within the Cambodian – Viet Nam floodplain is investigated by the “Mekong Delta Flood Management Scenario”; and

- **Long-term Future Situation (FFS)** – looking at two levels of development that might occur in the very long term (next 50 years), as formulated by the countries and how these may impact on near term decisions.

The scope of the development scenarios is the triple bottom line, i.e. embracing economic, social and environmental cumulative impacts, at a level of detail that enables decisions to be reached based on the key transboundary impacts of different developments at basin-scale. The scope of assessments is expressly not to endorse specific project-level interventions, which may come later, through detailed studies of their own to confirm their individual viability and acceptability.

Hydrological changes caused by each scenario are assessed with MRC’s suite of simulation models. Based on the hydrological changes and physical impacts caused by each scenario, a multi-disciplinary expert group conducted an integrated assessment of 42 criteria to evaluate the degree to which each scenario responds to 13 economic, environmental, social and equitable development objectives (Table 4). The scenarios for the foreseeable future and the long-term are assessed with and without the potential impacts of climate change.

Whilst these 42 criteria are very comprehensive in coverage of possible impact areas and provide a good and acceptable basis for multi-national discussions and negotiations, there has not been available a suite, or package, of natural resource and social indicators and basin-wide policy/strategy statements that define ‘acceptable environmental/social baselines’ or ‘objectives’ against which cumulative impacts could be judged. This would have provided decision makers with a further level of assessment information as they decided which scenario, or level of future development could be acceptable. The MRC programmes have plans to work on these objective statements and these will provide better benchmarks for the review period of this Strategy against which to define the DOS and judge the acceptability of cumulative impacts of development opportunities.

5.2 Tools, data and assumptions

The **principal tool** used for predicting impacts of water resource developments on flow regime (and hence on environmental social conditions) is the suite of models contained within the MRC’s Decision Support Framework (DSF). These models were tested, peer reviewed and subsequently adopted by MRC in 2004 as the tool to be used for assessing transboundary flow assessment. The level of accuracy remains appropriate for basin scale planning given that the nature of the assessments are about predicting relative rather than absolute results.

Table 5 Assessment criteria

Specific development objective	Issue	Assessment criteria	Unit
1. Economic development			
1.1 Increase irrigated agricultural production	Irrigable area, production tonnage and value	Incremental area Crop production Net economic value	'000 ha '000 ton NPV US\$M
1.2 Increase hydropower production	Hydropower capacity, power generated and value	Installed capacity Power generated Net economic value from generation Net economic value from purchased	MW GWh/yr NPV US\$M NPV US\$M
1.3 Improve navigation	River transport	Navigable days by class Net economic value	'000 boat-days NPV US\$M
1.4 Decrease damages by floods	Extent and duration of annual flooding by class	Average area flooded annually to max 1.0m depth Average area flooded annually > 1.0m depth Net economic value of flood damage	'000 ha '000 ha NPV US\$M
1.5 Maintain productivity of fishery sector	Capture fisheries and aquaculture production	Annual average capture fish availability Annual average aquaculture production Net economic value of capture fish	'000 ton '000 ton NPV US\$M
2. Environmental protection			
2.1 Maintain water quality and acceptable flow conditions	Water quality	Total pollutant discharge Water quality conditions	tonnes / yr Severity
	Flow characteristics	Average flow in March Average wet season peak daily flow Average flow volume entering Tonle Sap	MCM m3/s MCM
	Protection of forests around Tonle Sap	Forest, marshes and grasslands flooded at Tonle Sap Net economic value	'000 ha NPV US\$M
2.2 Maintain wetland productivity and ecosystem services	Productivity of wetland ecosystems	Area of wetlands (forest, marshes, wetland) Net economic value	'000 ha NPV US\$M
2.3 Manage salinity intrusion in the Mekong delta	Impact of salinity intrusion on land use	Area within delta within threshold level of salinity Net economic value	'000 ha NPV US\$M
2.4 Minimize channel effects on bank erosion and deep pools	River bank erosion	Area at risk to erosion Net economic value	Severity NPV US\$M
	Flow and sediment transport changes	Functioning deep pools Induced geomorphological changes	No. Severity
2.5 Conservation of biodiversity	Impacts of flow management changes on endangered species	Status of river channel habitats Flagship species Unaffected environmental hot spots Biodiversity condition Incremental net economic value of habitat areas	Severity no. No. Severity NPV US\$M
3. Social development			
3.1 Maintain livelihoods of vulnerable resource-users	Health, food and income security	No. of people affected Severity of impact on health, food and income security	'000 Severity
3.4 Increased employment generation in water related sectors	Incremental sustainable employment from water resource interventions	Incremental number of people engaged in: Agriculture Fisheries Water-related service industries Tourism	'000 '000 '000 '000
4 Equitable development			
4.1 Ensure that all four LMB countries benefit from the development of water and related resources	Aggregate benefits by country	Total net economic value No. of people affected vulnerable to changes No. of jobs generated Overall environment impact	NPV US\$M '000 '000 Severity

Source: MRC BDP Assessment of Basin-wide Development Scenarios, November 2009

The **sources of data** used have been generally either the MRC Master Catalogue data or data supplied by each country. Scenario set up data have been extensively reviewed and verified by each country. In all of the above cases, the data appear adequate to support basin-scale assessments. Nevertheless the wide-reaching assessments undertaken have identified a number of knowledge gaps where data availability is either limited or unavailable. The main gaps are:

- **Social data:** Detailed data sets are needed to understand more fully demographic patterns and social conditions in high impact areas in particular in order to assess the dependency of communities on water and related resources and their resilience to changes in these resources;
- **Fisheries data and response to changing conditions:** More information on fisheries and how the sector performs and will respond to future changes are needed;
- **Water quality, nutrients and sediments:** The MRC monitoring programmes for water quality, nutrients and sediments should be reviewed in the light of the assessments in this report and, where required, intensified and related to natural and human-induced changes in the basin, such as sediment trapping by dams, flood protection, river training and sand mining;
- **Flood-related impacts upstream of Kratie:** More detailed modelling in this area would be beneficial to understanding the impacts of flow changes on the different reaches upstream of Kratie, and how mainstream dams will impact on these; and
- **Climate change data:** More information on the trends and ranges of climate change and extreme events that need to be incorporated into basin planning and water-related sector plans.

It is recognized that the scenario assessment approach has its limitations and is based on **several assumptions** that should be borne in mind when considering the outputs from the assessments, such as:

- The developments embodied within the scenarios are limited to primarily those plans put forward by the countries to exploit opportunities for hydropower development and irrigation of mainly rice-based farming systems. These interventions are those most likely to impact on basin's hydrology and eco-system. Nevertheless, through the assessment process, key issues have been identified related to other forms of development such as management of capture fisheries, environmental protection, poverty alleviation etc, which may be expected to form a key part of integrated water resources management within the Basin;
- The values of impacts are based on the assessment of the changes brought about to the 2008-09 economic, social and environmental landscapes. Thus, for instance the social characteristics of vulnerable people within affected communities in 2030 will be assumed to be those of 2008-09. Clearly these landscapes will change as a result of circumstances outside the water resources sector.

- Autonomous and/or exogenous conditions are not included generally with the one exception of aquaculture (for which the growth potential has been estimated). Examples of circumstances that might change include: the productivity of wild fisheries as a consequence of fisheries management practices; the numbers of vulnerable people dependent upon the river's eco-system as a consequence of continuing economic development, urbanization and poverty alleviation measures; and evolving patterns of land use and land coverage as a consequence of population growth and socio-economic development.

The type and extent of the above limitations are not unusual in scenario or "future looking" basin planning studies and do not necessarily prevent decisions being taken on what is an acceptable scenario for defining how development, and resource protection, can proceed. At issue is whether the limitations are significant with respect to, firstly, the evaluation of the particular impact and, secondly, to the overall strategic decisions that may be influenced by the particular assessment. If this is true in both instances, then it is appropriate to recommend further data collection or more detailed studies.

5.3 Definite future situation

The Definite Future Situation (DFS) is inevitable and is already happening. It primarily evolves from water resources developments which are already under construction and/or committed, involving major new storages in Upper Mekong Basin and 15 new tributary dams in the LMB. These developments will increase the total storage in the basin to about 10% of the mean annual runoff. This will have a substantial impact on the mainstream river flows, which previously has seen no observed net change since records begun in 1915.

Flow changes

The new storage reservoirs are primarily for hydropower generation and will store water in the wet season reducing flood peaks and will release increased flows during the dry season. This redistribution of water will result, for example, at Kratie in an increase in dry season flows of 19% on average, and in March with 40%, raising water levels in the lowest flow month (April) by typically 0.8m. In contrast, wet season discharges will reduce by about 4% on average, with peak daily flows reduced on average by 7%.

The trends observed at Kratie in general are reflected throughout the length of the main stream with the difference between the baseline being most marked at the northerly end (eg upstream Vientiane), where the influence of the mainstream dams in the Upper Mekong Basin is greatest. These effects attenuate further downstream.

The regulation of the mainstream flows will **reduce the extent of annual average flooding** in the LMB by some 249,000ha (5%) - Lao PDR by 64,000 ha (16%), Thailand by 64,000 ha (16%), Cambodia with 106,000 ha (5%), Viet Nam by 11,000 ha (1%). Flow reversal volume

into Tonle Sap will reduce by some 8% with an average 3-day delay in this occurring. Areas in Viet Nam affected by salinity intrusion will be reduced by some 272,000ha (15%).

Benefits and opportunities

The DFS will create an ***economic benefit to the LMB countries of US\$ 11.7 billion NPV***, mainly from new hydropower but also from reductions of flood damages and salinity intrusion and increases of reservoir fisheries and navigation. The investments are highest in Lao PDR and Viet Nam and these countries will benefit most: Lao PDR with US\$ 6.6 billion and Viet Nam with US\$ 3.3 billion. Thailand and Cambodia benefit with US\$ 1.1 billion and US\$ 0.7 billion, respectively.

The DFS will create some ***370,000 employment opportunities***, primarily in the hydropower and fisheries (reservoir and aquaculture) sectors.

The increase in dry season flows will be sufficient in volume to support all new consumptive uses, including the ambitious irrigation expansion in the foreseeable future (next 20 years). Therefore, further expansion beyond the DFS of tributary storage within the foreseeable timescale needs to be judged against its economic benefits from energy and flood control on the one hand, and against any downsides from wetlands and bio-diversity, sediment trapping, fisheries reduction and social consequences.

Negative impacts and risks

Sediment trapping by storage reservoirs will initiate an irreversible process of river bed incision and bank erosion. Whilst locally significant in some locations in the short term, this process will become more noticeable in the longer term. A key issue is the potential for cumulative impacts of sediment trapping within the basin on wetland productivity and especially on the delta-shaping processes, which are potentially exacerbated by sea level rise. Even if these impacts are in the longer term – 20 to 50 years or longer - development choices now may have major consequences for the delta in the future. Floodplain sedimentation will decrease within a decade with consequences for wetland and agricultural productivity. Also the discharge of fine sediments and associated nutrients to coastal waters will decrease considerably.

The combination of reduced flooding and depleted natural nutrients within the system will reduce wetlands and their productivity. ***Valuable wetland areas (forests, marches and grasslands) will reduce in the LMB by about 35,000ha (2.4%)***. The largest reduction is predicted in Thailand (9,300ha or 15%) and Cambodia (21,000ha or 2%), including a reduction of 9,500ha or (1%) of valuable wetlands around the Tonle Sap lake.

The combination of these changes and blockage of fish migration, caused mostly by current tributary dam development in the LMB, will deplete capture fisheries. ***Capture fisheries will be reduced by an estimated 15% in Lao PDR, 3% in Thailand, 7% in Cambodia, and by 9% in Viet Nam.*** Reductions in sediment outflow from the basin will also negatively impact upon marine fisheries.

Two environmental hotspots will be highly impacted by the ongoing developments in the DFS: one environmental hotspot on the mainstream in Northern Thailand and one hotspot on the Lower Sesan in Cambodia.

The DFS will put the ***livelihoods of about 900,000 vulnerable people at risk*** who are dependent on river's resources: 300,000 in Lao PDR, 50,000 in Thailand, 100,000 in Cambodia, and 450,000 in Viet Nam.

In summary – The DFS is inevitable and happening. Notwithstanding the favorable economic benefits, the assessment has highlighted the significant irreversible environmental and social impacts that will occur over time. ***Actions are needed now to address the downsides associated with environmental, fisheries and social impacts***, and to set a framework for managing future development opportunities as well. On a positive note, the DFS provides sufficient dry season flow augmentation to meet all new consumptive demands of the foreseeable future.

5.4

Foreseeable future situation without LMB mainstream dams

The incremental impacts of Foreseeable Future Situation (FFS) without mainstream dams in the LMB are principally associated with a 630,000ha (50%) expansion of irrigated agriculture in the dry season (over current levels as included in the DFS) and 30 additional tributary hydropower dams, raising total active storage in the basin from 10% in the DFS to 15% of mean annual runoff.

Flow changes

Compared to the new flow regime established under the DFS, there will be a relatively small further change in the flow regime. The flow changes are small because the additional storage reservoirs more than offset the substantial increase in irrigation and other consumptive water demands. The dry season flows in March will be typically 33% higher than the baseline at Tan Chau and 91% greater at Vientiane, representing a 9% increase over the DFS. Peak daily discharges will remain largely unchanged.

Compared to the baseline, the changes in flow regime will reduce the average flooded area by 300,000ha, reduce saline intrusion in affected areas by 305,000ha, and reduce the flow reversal volume entering Tonle Sap by 12%. Most of these reductions are caused by the ongoing developments in the DFS.

Climate change could further increase the already high year-to-year variability of wet and dry season flows as well as the frequency and intensity of floods and droughts, reversing the reduction of flooding (and wetlands) caused by current developments in the DFS. Particularly in the Viet Nam Delta, the flooded area could increase significantly, due to sea level rise.

Benefits and opportunities

The assessments show that ***from a water availability point of view, there would be enough water re-regulated from the wet to the dry season by storage dams in the Upper Mekong Basin (included in the DFS) to satisfy all the consumptive needs of the proposed new developments in the FFS, and still provide more dry season water into the Viet Nam Delta than exist in the baseline.***

The development of substantial new storages on the LMB tributaries in the FFS will add opportunities for further increases of consumptive water uses in the dry season in the longer term. Moreover, as much of the irrigation development and related water abstractions will likely not occur until the latter part of this 20 year period, there would be quite significant increases in flows to the lower river for the next decade.

So, for the first time, the four LMB countries can have the confidence that water is available to proceed with the preparation of planned water consumptive developments without touching the current dry season flows in the mainstream (which still resemble the natural flow regime).

Therefore, the present dry season flow, as represented by the baseline (the 1985-2000 flow regime in the DSF), can be protected through the implementation of the Procedures of Maintenance of Flow on the Mainstream (PMFM) and continue to meet important social and environmental needs.

The irrigation expansion has been assessed to have potentially significant benefit in terms of rice-field fisheries. The assessment of future water quality shows that increased waste water discharges and runoff of agricultural chemicals will cause local water quality problems in some tributary basins and in the Viet Nam Delta. It will be beneficial on both counts if best practices in both areas are developed and followed.

Compared to the DFS, the economic upsides are for hydropower US\$ 6.1 billion NPV, for irrigation US\$ 1.7 billion NPV, and US\$ 0.5 billion NPV for navigation, reservoir fisheries, flood mitigation, and saline area reduction. The downsides related to capture fisheries, wetlands, hotspots/biodiversity and recession rice, which mostly stem from the 30 new tributary dams, are US\$ 0.4 billion NPV. At face value, the tributary hydropower component has significant economic benefits, even after accounting for the environmental disbenefits. However, the economic benefits are spread unevenly across the four countries. All four countries benefit but Lao PDR would gain most as the largest hydropower operator.

Additionally 650,000 job opportunities in all four LMB countries would be created compared to the DFS, primarily in the hydropower, irrigation, and fisheries (reservoir and aquaculture) sectors. About 400,000 jobs would be created in the irrigation sector, of which 120,000 in Thailand.

Negative impacts and risks

The incremental environmental impacts are relatively small compared to the DFS and are principally associated with the 30 additional tributary dams reducing the flood season flows, in addition to their direct construction and barrier impacts. They also increase the amount of sediment trapping, heightening the uncertainties associated with wetland productivity, the stability of delta shaping processes, and changes in the discharge of nutrients to coastal waters (see Section 5.3). In contrast, the **numbers of livelihoods placed at risk will rise to 59% above the DFS** reaching 1,400,000 people within the LMB. The main increases above the DFS will be felt in Lao PDR (135% up) and Cambodia (108% up), due principally to impacts from reservoir construction in these countries.

The combination of the reductions in wetlands, blockage of fish migration by the tributary dams in the LMB and the reduced sediment flows will deplete capture fisheries, which will be reduced by an estimated 10% in the LMB (15% in Lao PDR, 4% in Thailand, 15% in Cambodia, and by 9% in Viet Nam) compared to the baseline. **Compared to the DFS, capture fisheries would further decline, most significantly in Cambodia (8%) but less in the other countries: Lao PDR (0%), Thailand (1%), and Viet Nam (4%).**

The number of **highly impacted environmental hotspots would increase from two in the DFS to five**. All three additional highly impacted hotspots are situated along Mekong mainstream: two in Northern Lao PDR and one between Vientiane and the Mun river confluence.

The planned flood risk reduction measures in the Mekong Delta would have marginal positive and negative transboundary impacts. The planned measures result in lower risk in both countries with the exception of Long Xuyen Quadrangle (LXQ) in Viet Nam, which apart from the main Mekong and Bassac rivers is more or less the only flood passage way to the sea. Projects are already underway to mitigate the increased risks by the widening of existing canals in the LXQ rather than constructing new large canals elsewhere.

There appears to be little risk that the augmented flows from both the dams in the Upper Mekong Basin and the LMB tributary dams will not meet the abstraction demands of all new consumptive water demands in the foreseeable future. Nevertheless, there will always be some risk that water releases from reservoirs do not meet expectations. To minimize risks, ongoing dialogues and processes regarding data exchange should lead to seasonal and three-year operation plans being exchanged and discussed among the basin countries, and also a process for ‘advance warning’ of any major operational changes or new water planning initiatives.

In summary – Notwithstanding the favourable economic benefits to all four countries, the assessment shows that the **incremental negative impacts compared to the DFS are principally associated with the additional 30 tributary dams in Lao PDR and Cambodia**, reducing the flood season flows and trapping sediments, and blocking fish migration. Although the localized negative impacts can be considerable, the transboundary impacts are relatively small compared to those caused by ongoing developments in the DFS.

5.5 The impact of LMB mainstream dams

The inclusion of up to eleven new mainstream run-of-the river dams within the FFS creates the potential for both high economic benefits as well as very severe environmental and social impacts. Whilst the economic benefits are easy to recognize, it is important to distinguish the environmental and social disbenefits that may be attributed to the mainstream dams from those which arise from dam development in the Upper Mekong Basin and on the tributaries in the LMB.

Benefits and opportunities

The 11 mainstream dams together generate an extra US\$ 15.2 billion NPV, which is 2.5 times larger than the combined benefits of the 30 additional tributary dams in the DFS. The benefits are unevenly distributed. Lao PDR invests and benefits most. Thailand and Viet Nam benefit from hydro-electricity sharing. The economic benefits to Cambodia are relatively low compared to its investments, due to the adverse impact on capture fisheries and wetlands, as well as the negative NPV of the proposed Stung Treng mainstream dam.

The 11 mainstream dams would ***create about 400,000 new employment opportunities*** during the construction and operation phases.

Negative impacts and risks

The direct environmental impacts of the mainstream dams are very large (as elaborated in the SEA of hydropower on the Mekong mainstream, see box). Although, being run-of-river, the mainstream dams have only small impact on basin-scale mainstream flows, locally they will modify water levels very significantly with considerable harm caused to eco-systems within the affected reaches. In addition, the mainstream dams create a barrier to fish migration, the severity of which is broadly proportional to the extent of the river system disconnected from the Tonle Sap lake.

The eleven mainstream dams together will change sixty percent of the ecologically valuable river channel between Kratie and Houei Xai to a

The Strategic Environmental Assessment of Hydropower on the Mekong mainstream (SEA)

The SEA, commissioned by the MRC, seeks to identify the potential opportunities and risks, as well as contribution of these proposed projects to regional development, by assessing alternative mainstream Mekong hydropower development strategies. In particular, the SEA focuses on regional distribution of costs and benefits with respect to economic development, social equity and environmental protection. As such, the SEA supports the wider Basin Development Planning (BDP) process by complementing the MRC BDP assessment of basin-wide development scenarios with more in-depth analysis of power related and cross-sector development opportunities and risks of the proposed mainstream projects in the lower Basin.

The main recommendation of the SEA team is to defer decisions on mainstream dams for a period of ten years with reviews every three years to ensure that essential deferment-period activities are being conducted effectively. As the highest priority, the deferment period would include a comprehensive undertaking of feasibility studies for partial in-channel, diversion and other innovative systems for tapping the power of the mainstream in ways which do not require dams across the full breadth of the river channel. The deferment period would also include a comprehensive assessment and fast tracking of tributary projects that are considered feasible and ecologically sustainable according to current international good practice, including retrofitting of existing projects and innovative schemes.

series of connected impoundments. Important habitats like deep pools, rapids and sandbars would be largely lost, resulting in severe loss of biodiversity. Nine environmental hotspots would be highly impacted, mostly in Cambodia (Tonle Sap, 3Ss-Basin and the Mekong mainstream). **Two of the four flagship species would be put at severe risk of extinction along with many others.**

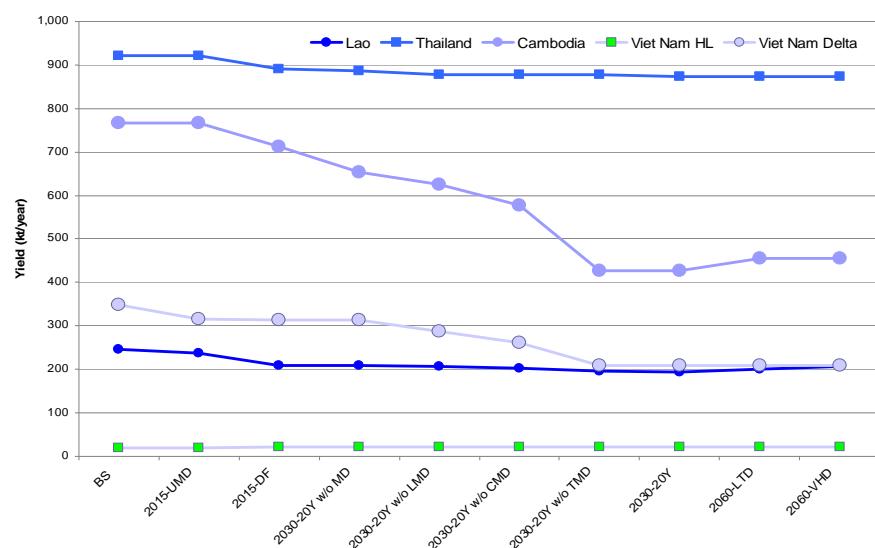
The mainstream dams also will have impacts on sediment transport. Again, being run-of-river, in the context of basin-scale impacts, the volumes of sediment trapped should reach equilibrium within a few years of construction. However, local impacts can be expected to be significant. The manner in which the dams are operated will have significant bearing on their geomorphological impacts.

The eleven mainstream dams will also create a near-total barrier to fish migration along most of the mainstream. Compared to the baseline, overall capture fisheries production in the FFS would be depleted by 25% within the basin. These declines would be most severe in Cambodia (44% decline) and Viet Nam (37% decline). The basin-wide reduction of capture fisheries caused by the LMB mainstream dams varies from 10% for the proposed mainstream dams in Cambodia to 2% for the proposed mainstream dams upstream of Vientiane.

As a result of the eleven mainstream dams, livelihoods put at risk would rise by nearly three times compared to the FFS without LMB mainstream dams (and nearly five times that under the DFS), bringing the total to 4,300,000 of which 900,000 would be in Lao PDR, 500,000 in Thailand, 1,200,000 in Cambodia and 1,700,000 in Viet Nam.

The clear evidence from the assessments (including the SEA) is that the lower of the proposed eleven mainstream dams have the largest impact on LMB's capture fisheries and environmental values. This is illustrated by Figure 8, which shows the large increase in fisheries losses in the last four scenarios that include the Cambodian dams. The losses are particularly severe in Cambodia and Viet Nam. The absence of the two Thai mainstream dams (Sangthong-Pakchom and Ban Kum) from the cascade makes very little difference to the capture fisheries impact due to the presence of Don Sahong, Stung Treng and Sambor further downstream creating a barrier effect.

Figure 8 Overall assessment of changes to capture fisheries in each country



The six mainstream dams in Lao PDR upstream of Vientiane would have incremental environmental impacts arising from the increased pondage and backwater and barrier effects in this part of the mainstream. Two environmental hotspots in Lao PDR will be severely impacted and crucially the Giant Catfish could become extinct along with other species locally. However, the scenario assessments and the SEA show that, given their location at the farther end of the basin's main migratory routes, these dams will have a relatively small transboundary effect on capture fisheries, reducing basin-wide productivity by a further 2-3% typically.

Both the benefits as well as the negative impacts are spread unevenly across the four countries. With such a variance in the distribution of benefits, it becomes important to consider the overall "equity" between countries of basin wide developments, to look closely at how negative impacts are also distributed. Which country suffers more than others, what type of impacts occur, which sectors and which groups of the basin communities are effected, how do these impacts relate to the longer term socio-economic plans of the countries and for regions/provinces within countries – these are all questions that must be considered and discussed in the wider context of basin wide benefit and impact sharing, and country to country trade-offs debates.

In summary - The cumulative environmental and social impacts of the proposed eleven mainstream dams are severe, throughout the Mekong Basin, but not all of this is of a transboundary nature. In particular, the lower of the proposed mainstream dams will cause substantial transboundary impacts. Both benefits and negative impacts of the proposed mainstream dams are spread unevenly across the four countries, which highlights the need for transboundary cooperation to reach mutually acceptable decisions.

5.6

The long-term future situation

The assessment of the Long-term Future Situation (LFS) has provided valuable insights into the impacts that expanded water resources development may have in the future. There is sufficient storage potential in the LMB's tributaries to meet continued increases in consumptive water uses, even at very high development without touching the present dry season flow. However, the assessment also highlighted the massive impacts these developments would have on the eco-systems and social fabric of the basin, and point to the need to proceed prudently and at a pace that allows knowledge to stay ahead of actions.

The assessments made of ***climate change point clearly towards increasing runoff and more variable conditions within the basin.*** The increased average flood season flows could be offset by the increased tributary storage envisioned in the FFS and LFS. However, the already high year-to-year variability of wet and dry season flows would further increase together with the frequency and intensity of floods and droughts. Understanding how climate change will impact on eco-systems and agricultural practices will be important, as also will be identifying practical measures to combat droughts and more extreme flooding.

In the longer term, pressures will increase in the Vietnam and the Cambodian portions of the Delta to develop part of the currently deep flooded areas for agriculture and the protection of communities and infrastructure. ***The assessments show that severe negative transboundary impacts will occur if significant areas of the presently deep flooded areas will get year-round flood protection.*** The impacts result essentially from the loss of storage capacity during the different stages of the floods. Climate change may further increase these transboundary impacts.

In summary - Major challenges are expected to arise in managing increased flooding and saline water intrusion, as well as further land development within the Cambodian and Viet Nam Delta, including the Tonle Sap floodplains. These challenges need to be addressed in a more holistic and comprehensive manner than has been the case so far to determine a long-term plan for rationalizing these competing demands on land in a sustainable manner, and which would guide near term development choices

6 Basin development framework

The scenario assessments for the ‘foreseeable future situation’ show that there will be large economic benefits from all of these planned ‘20 year’ developments, but that these are not spread uniformly amongst the four LMB member countries. As well, there will be environmental and social impacts associated with these developments, particularly regarding fisheries and livelihood issues related to the mainstream dams and these impacts also are not spread evenly amongst the four member countries.

This imbalance in the spread of both benefits and impacts highlights the need for trans-boundary cooperation to reach mutually acceptable decisions on the sustainable development of the LMB and it reconfirms the relevance and importance of the provisions of the 1995 Mekong Agreement and MRC’s shared vision, goals and values for the sustainable development of the Mekong Basin.

The imbalance also highlights the need for the countries to develop, and accept the need for, strong linkages between project identification, preparation, endorsement and implementation on the one hand, and the priority strategic guidance and procedures on the other, that guide or steer project development and implementation in a way that avoids or mitigates adverse impacts.

Unless in future project preparation and implementation development proceeds in parallel with the necessary impact avoidance and mitigating measures, it is unlikely that outcomes will be achieve the aspirations of the 1995 Mekong Agreement regarding the ‘development of the full potential of sustainable benefits to all riparian States’.

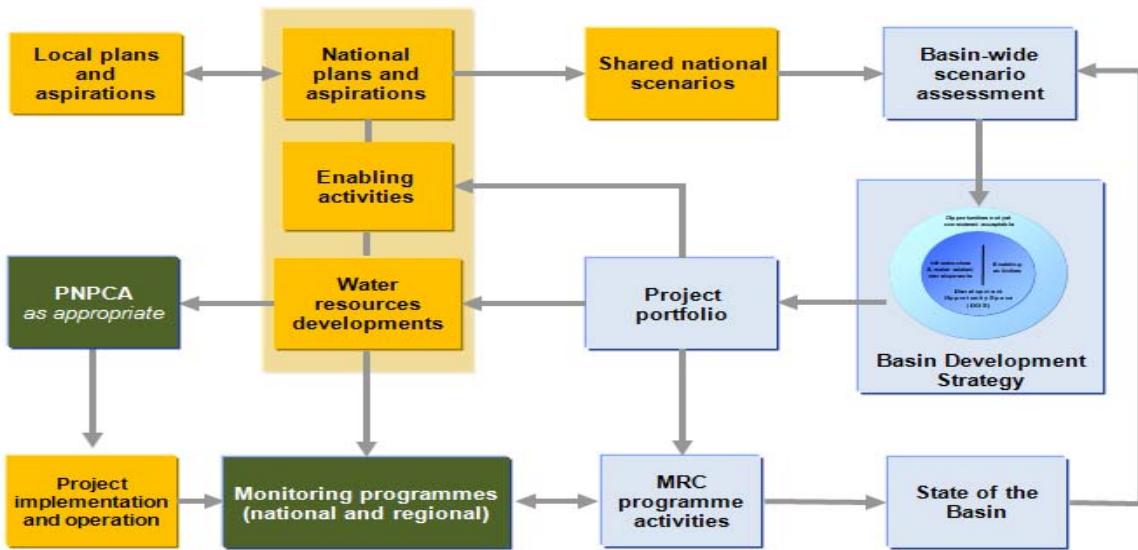
The strategy for basin development described in Chapters 6 and 7 provides a strengthened commitment to the implementation of the 1995 Mekong Agreement.

6.1 Outline of the basin development framework

The basin development framework is illustrated in Figure 9 overleaf. It describes the full cycle of basin planning and shows the role of the Basin Development Strategy in assessing and supporting national water related development plans and proposals for categorization into a project portfolio, from where they can be further developed by national agencies, and ultimately evaluated under the MRC’s PNPCA procedures. That is, packages of development opportunities that are assessed as having acceptable cumulative impacts under the Strategy still must pass through the PNPCA procedures before they can be considered ‘endorsed’.

The success of this Strategy depends on how each country will be able to adapt the guidance, processes, opportunities and constraints into various transboundary and national planning decision-making and governance processes. At the transboundary level, this relates to how each country is able to work through the MRC cooperation process and interact with each other, to develop acceptable projects but particularly to endorse, incorporate into national processes and

Figure 9 Basin development framework



then manage to, the a wide range of strategic guidance and procedures that must underpin and guide developments towards sustainable outcomes.

The MRC does not have the mandate to enforce adoption of these strategic guidance and procedures and nor should it, in the cooperative and coordinating model that is the basis of the Mekong agreement.

However this does place strong obligations on the four countries to agree to a ‘code of conduct’, and a monitoring and reporting process, that would ensure this package of supporting strategic guidance and procedures will be adhered to.

The monitoring of the health of the Basin, supported by MRC procedures, will help to ensure water resources developments will not stretch beyond the boundaries of the agreed level of acceptable development, as defined by the development opportunity space. Periodic analyses of the trends in various water-related monitoring parameters and the integration of the outcomes in five-yearly updates of the State-of-the Basin Report, will lead to the identification of problems or new issues that will feed into the five-yearly updates of this Strategy, based on updated scenario assessments.

Nothing in these concepts deny countries their sovereign right in the normal way to take up other projects or programmes that fall outside the strategic actions as defined by the IWRM-based Basin Development Strategy. The purpose of the strategic actions is only to guide development along optimal and acceptable lines through cooperation and not through undermining sovereign rights.

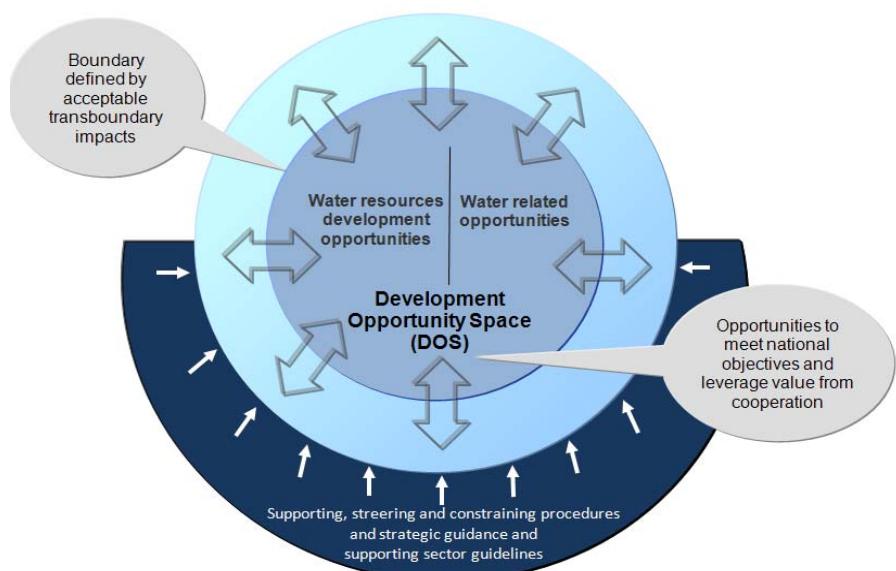
6.2

The Development Opportunity Space

The ‘development opportunities’ that are bounded by what the countries agree is an acceptable level of cumulative impacts, are said to be within the ‘development opportunity space’ (DOS).

Figure 10 Development Opportunity Space

Figure 10 illustrates the concept of the DOS. It comprises two components or parts: (i) an agreed overall package of **water resources development opportunities** that comes out of the scenario assessments; and (ii) an agreed package of **water-related opportunities**. Together these represent the ‘opportunities’ for possible acceptable development of the basin beyond the Year 2000 baseline.



(i) Water resources development opportunities

The water resources development opportunities relate to water infrastructure that consume or control the available water resources, being civil, mechanical or electric engineering-based projects, such as river diversions for water supply and/or irrigation schemes, river regulation structures, dams and reservoirs. The overall package of water resources development opportunities in the DOS represent, at any time, the total amount of potential development that the countries agree can ‘consume or regulate’ water above the Year 2000 baseline with acceptable levels of impact.

These opportunities are derived from the assessment of national plans and proposals, grouped within scenarios, based 42 economic, social and environmental criteria (Section 1.3 and 5.1). The scenario(s), or part of scenario(s) that are perceived to be acceptable by the LMB countries in terms of transboundary impacts will enter into the DOS. Water resources development opportunities within the DOS can then be further studied by national agencies to the feasibility and planning stages with confidence that the basin-wide impacts are likely to be acceptable.

However for these water resources development opportunities to go further, they require project preparation in accordance with agreed strategic guidance and evaluation by MRC under the

PNPCA procedures. This would include agreement to implement the necessary avoidance and mitigating measures during the project implementation and operation phases.

(ii) *Water-related opportunities*

Water related opportunities include socio-economic activities involving fisheries, navigation, watershed management and other water-related projects and activities, as well as non-structural investments that contribute directly to improved management of water and related resources, such as flood warning systems, navigation aids, and systems for the monitoring of water flows, water quality and sediments, as well as the improvement of the legal and regulatory systems, institutional development and human capacity building.

Most importantly, these two parts of the DOS - water resources development opportunities and water related opportunities - are closely connected. It is not possible, or most unlikely, for agreed water resources development opportunities within the DOS to proceed to the final feasibility, endorsement of acceptable transboundary impacts, and to achieve 'sustainable implementation and management', unless strengthened institutional and water management systems, and human resource capacities are achieved at national and regional levels. For this reason, both aspects are included within the DOS - not one or the other – together they reflect the opportunities for future sustainable development.

Figure 10 also shows the importance of a full suite or package of '***supporting, steering and constraining procedures, strategic guidance and supporting water resources management sector guidelines***'. These can be seen as the enabling conditions that must go hand in hand with how a project is prepared, approved, implemented and operated – they both support and constrain a project. These conditions would cover all areas of environmental policy and management, and improvements to basin wide resource management practices, such as benefit and impact sharing processes, MRC procedures, strategic guidance for high priority issues, research programmes, data collection and studies, assessment tools, laws and regulation, legal and regularly development, institutional development and capacity building.

6.3 LMB Country perspectives on development opportunities

(i) *Water resources development opportunities*

For the first time since the signing of the 1995 Mekong Agreement, the member countries felt they have the information needed to discuss and negotiate basin-wide levels of water resources development. The four countries have entered into an extensive consultation process, firstly at the technical level and then at the policy level. The following is an outline of the results of these consultations.

The LMB countries acknowledge the Definite Future Situation is inevitable and happening, as a result of past decisions. Given the significant opportunities and negative impacts, they believe that actions are needed now to address the downsides associated with environmental, fisheries

and social impacts, and to set a framework for managing future development opportunities as well. **Accordingly, the Strategy document gives the highest priority to the detailed determination of the impacts, mitigation and benefit-sharing measures related to the Definite Future Situation.**

The LMB countries acknowledge the considerable future potential for development of the basin's water resources for expansion of irrigated agriculture and other consumptive uses, as a result of the re-regulation of water resources from the wet to the dry season by ongoing hydropower developments in China and the LMB. They consider that the baseline dry season flow, as represented by the 1985-2000 flow regime in the DSF, can be protected in accordance with Article 6 of the 1995 Mekong Agreement. Agreement with China will be sought on favourable and predictable operating rules of their reservoirs that are mutually compatible. The sustainable development of irrigated agriculture will be supported by strategic guidance and sector guidelines regarding fish friendly irrigation designs and practices and the control of agro-chemicals.

The LMB countries acknowledge that there is substantial potential for further hydropower development in the tributary basins in Lao PDR and Cambodia beyond the ongoing developments included in the Definite Future Situation. The countries consider that the negative transboundary impacts need to be avoided or mitigated. The sustainable development of tributary hydropower opportunities will be supported by strategic guidance and sector guidelines, which would assist planners in the spatial planning of projects and project developers in the multi-purpose design and implementation. The range of mitigation measures, benefit-sharing arrangements and trade-off deals would be fully part of project design and implementation.

The LMB countries see that the cumulative negative impacts from the implementation of the 11 proposed mainstream dams in the LMB are severe and the uncertainties surrounding these impacts are wide. Recognizing the high potential financial and economic returns, it is obvious that the high costs, irrevocable nature and high risks of mainstream dam development demand a high degree of knowledge to inform rational decisions. The countries indicate that there is much evidence to demonstrate that the current state of knowledge is insufficiently robust to make rational decisions on all 11 LMB mainstream dams; they also suggest a list of strategic studies to provide more definite information about impact size and distribution, mitigation and management, and possible benefit and impact sharing mechanisms. This list is included later in Table 7 on page 61.

However, the LMB countries also recognize the evidence from the scenario assessments and the SEA that the lower of the proposed 11 mainstream dams would cause most of the transboundary negative impacts. The six mainstream dams in Lao PDR upstream of Vientiane may cause relatively small transboundary impacts related to fisheries and associated environmental and social values. **Therefore, the countries consider that the analysis essential to gain the knowledge needed to make rational decisions on the LMB mainstream dams, must prioritize the 6 dams above Vientiane.** Good politics requires that the necessary time be given to do this

well, as mistakes could have major and irrevocable impacts, with large social, environmental and reputational risks.

The LMB countries acknowledge that the ongoing and planned flood protection measures in the Mekong Delta can be implemented as they will cause marginal transboundary impacts only.

They also wish to specifically develop and implement a 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. The aim would be to frame a floodplain management strategy for the Delta that guides developments in a manner that leads to prudent investment in the near term that would better enable long term solutions to be achieved.

(ii) Water-related opportunities

The assessment of all the information on project lists from BDP 1, from the countries' strategies and plans, and from ongoing sub-area analyses in the initial part of the MRC/BDP2 phase has identified many water related issues and key priorities. This list needs to be expanded and updated and will be a key part of the national and sub-area consultations during the early phase of the strategy implementation. This will include a detailed review of the existing regional and national institutional development and capacity building programmes to identify areas where strengthening is needed to ensure effective implementation of this Strategy.

As well, there are water related opportunities emerging from the MRC sector programme work relating to sector strategies and priorities that should move into the development opportunity space. This particularly relates to fisheries, navigation and environment as well as non-structural investments that contribute directly to improved management of water and related resources, such as flood warning systems, navigation aids, and systems for the monitoring of water flows, water quality and sediments. Most of these activities will not impact on water quantity or flow variability issues but could have social and environmental impacts so will need to pass through the 'screening tests' of the DOS before inclusion in that space. These activities may presently be within sector programmes or will emerge from further sector work over the next few years but by inclusion in the water related opportunities component of the DOS means that all key water activities across the basin are included within the one strategic framework.

For example, the Navigation Programme has previously prepared a sector strategy document "Incorporation of Navigation into the Integrated Water Resources Management and Development Strategy" which goes well beyond the present navigation work programme. This represents water related opportunities for the future and should be considered as a key entry into the DOS regarding navigation. Related to this is the need for a regional Master Plan for Navigation, which is yet to commence.

For the early stages of the implementation phase of the Strategy, each sector programme will be asked to identify likely projects and activities that can be added to this 'acceptable' list, particularly those that relate closely to how future updates of the strategy might be managed. The LMB countries acknowledge the need to develop and negotiate visions and clear basin

objectives or guidelines for developing basin-wide strategies and plans for the development and management of all water-related sectors, including fisheries, environment and navigation. This will support the updating of this Strategy document and identify and prioritize coordinated, collaborative and joint Mekong river management and mitigation projects and actions.

Also the on-going work to maintain the appropriateness and integrity of the MRC knowledge based systems and procedures needs to consider the needs of this Strategy and its implementation over the next five years – this will be a key ‘water related opportunity’ as the strength of the Strategy, and the strength of the move toward sustainable development, will depend largely on the quality of the data and information available for evaluation of projects and for monitoring on the success, or otherwise of the strategy. And the whole approach to stakeholder and basin-wide community consultation and participation needs to be strengthened to ensure the basin community and the particular stakeholders, towns and farmers in the sub-basins are included effectively in the implementation of the Strategy.

The countries consider that a list of water related opportunities, together with implementation and outcome details, arising from sub-area and MRC sector programme discussions be a priority area for the initial implementation phase of the Strategy, with the aim of JC endorsing a priority list and action plan by end 2011.

(iii) *Supporting guidance, procedures and sector guidelines*

The LMB countries wish to develop a programme of enabling activities that will support, steer and guide the above water resources development opportunities and water-related opportunities towards sustainable development and enhance the mutual benefits of the riparian countries and the sustainable management of the river’s natural resources. These activities should include the development of priority strategic guidance (Section 6.5), water resources management sector guidelines (Section 6.6) and the improved implementation of MRC procedures (Section 7.3) and the associated capacity building.

6.4

Use of the Development Opportunity Space

Moving towards sustainable development

The defined DOS provides a picture or summary of the overall packages of possible water resources development opportunities and water-related opportunities that are contained or fall within acceptable levels of transboundary social and environmental impacts. The **DOS can be used by countries as a ‘cooperation space’ or ‘negotiation space’** to explore the best ‘deals’ for developing the DOS, including benefit and impact sharing agreements that go beyond the specific project level. Projects and issues outside the water sector can be ‘brought to the table’ to get to the best ‘deals’.

Such transboundary collaboration within the DOS may lead to win-win situations for all: the countries’ economic benefits would increase, negative local and transboundary impacts might

decrease, and the opportunities for the more ‘passive’ water uses (navigation, fisheries and wetlands etc.) would further increase. But the limits of where, when and how water can be used by the ‘active’ water using sectors (irrigation and hydropower) will remain unchanged until the next review of this Strategy.

As emphasized before in this Strategy, being in the DOS or in a ‘deal’ agreement does not mean that any particular development opportunity can proceed now. ***To use the defined DOS for moving further towards sustainable development covers seven stages, each involving data refinement and new stakeholders***, as summarized in Table 6.

Table 6 Moving towards sustainable development of water resources within the DOS

Stages	Process	Main Supporting Tools
1 IWRM-based assessment of needs, combined national water resources development plans, water-related sector plans, and other possible developments	Sharing and/or notification of nationally-identified projects for incorporation in Project Master Database; National and regional discussions to define the basin-wide scenarios and environmental, social and economic assessment objectives and criteria; Expert and participatory assessment process and verification of results;	Project Master Database Basin-wide development scenarios assessment Other basin-wide assessment tools
2 DOS: identification of a package of both water resources development and water-related opportunities	National and regional discussions and negotiations on acceptable levels of basin development; Possible consideration of options for benefit and impact sharing that will enhance the DOS	Basin-wide development scenarios assessment; Agreed environmental and social objective statements and baseline indicators; MRC Procedures; Strategic Priorities; Studies.
3 Identification of water resources development and water-related projects, using the DOS	Project identification, including options analysis within and outside the water sector; Periodic updates of Project Master Database	Broader (regional and national) sustainability considerations; Strategic Priorities; Option analysis; Project Master Database.
4 Preparation of water resources development and water-related projects	Project preparation, including (where applicable) feasibility studies, EIAs, etc. Periodic updates of Project Master Database	Broader (regional and national) sustainability considerations; Strategic Priorities; WRM and sector guidelines; Project Master Database.
5 Transboundary assessment of identified projects	Implementation of MRC Procedures	MRC Procedures; Strategic Priorities; WRM and sector guidelines; Project Portfolio.
6 National approval	In accordance with national legislative framework	National laws and regulations;
7 Implementation and operation of projects	In accordance with regional and national standards, values and safeguards	National laws and regulations; WRM and sector guidelines

Project identification within the DOS is a very important stage in sustainable development of water and related resources. Poor project identification can lead to failures that are costly in time and money. IWRM guidelines for project identification will be developed and implemented under this Strategy. The main vehicles for MRC to work with the governments on project identification are the sector work of the various MRC programmes and the sub-area assessments undertaken by MRC/BDP.

Some water resources development opportunities in the DOS will never become identified as water resources development projects because sector agencies, NGOs, developers and others may identify alternative developments, such as energy efficiency and thermal generating options that can replace hydropower development opportunities. Also, opportunities to withdraw substantial water resources from the Mekong for irrigation may not be taken further for economic, financial, environmental, political or other reasons.

Transboundary approval. When the water resources development opportunities or water related opportunities become identified national or multi-national projects, they are evaluated (and negotiated for mainstream projects) in accordance with agreed MRC procedures (such as the PNPCA) and the strategic guidance provided within this strategy. This process provides the transboundary approval for the proposed project and it includes a close assessment of project specific avoidance, mitigation and enhancement options. The projects that are endorsed by MRC procedures are ready for national implementation and management.

MRC does not have a mandate to direct countries to follow particular strategic guidelines and directions. Thus it is important for the implementation and management stage that countries agree to follow the range of supporting strategic guidance and sector guidelines that are developed within this strategy. ***This can be done by countries agreeing to a ‘code of practice’ that commits to making ‘best possible efforts’ to manage water resources activities within the framework detailed in this Strategy, and for this to be monitored in regular reports the Joint Committee and the Ministerial Council.***

Enhancing the DOS

The size of the DOS at any time, will be shaped by what development opportunities are taken up for project identification and subsequent transboundary approval. Whilst many projects will consume resources, others will expand the development opportunities through regulating river flows from wet to dry season (e.g. storage reservoirs), improving efficiency of resource use (e.g. promotion of best practice), removing knowledge gaps (e.g. R&D), etc.

The overall objective should be to continue maximizing its size (and by implication the mutual benefits derived by each country) through wise and efficient use of the basin’s resources and active cooperation between basin countries. This will be encouraged by specific enabling activities that: 1) guide and enhance the implementation of the water resources development actions above to promote best value from and acceptability of those actions and/or 2) lead to

definition and acceptability of further opportunities becoming agreed water resources development opportunities in the DOS.

It is noted that the size of the DOS can also reduce, based on the assessment of the basin's status and health (as described in the periodically updated State-of-Basin Report) and basin-wide scenario analysis that links unacceptable environmental decline to specific development opportunities in the DOS.

The Project Master Database

The effective use of the DOS requires the maintenance of a register that records all existing, ongoing, and planned water resources development and water-related projects and activities.

There are many thousands of water resource development and water-related projects existing within the LMB and equally many more planned by individual Governments, the private sector and others, such as identified in MRC programmes. The relevant details of these projects need to be captured for planning and management at the basin and sub-basin levels, and maintained for future generations of planners.

Therefore, all relevant details of all existing, planned and potential projects in the nine defined water-related sectors will be contained in the ***Project Master Database*** as part of the MRC Information System. A compatible national version will be maintained by the line agency responsible for water resources management. Common sense suggests that very small projects should not be listed individually, but it is nevertheless vital that cumulative impacts can be assessed within different parts of the Basin. In practice however, the issue is more often a question of being able to access the data and that the question of minimum threshold size does not arise.

BDP sectors

- Water supplies
- Irrigated agriculture
- Hydropower
- Flood management & mitigation
- Fisheries
- Navigation & river works
- Tourism and recreation
- Environment & ecosystems
- Watershed management

The Project Master Database can be designed to serve various other needs, in particular:

- At the national level there is a clear desire to have a national database which will serve the purpose of coordinating information on existing and planned water-related developments between line agencies, river basin committees (RBCs), and others. Such a database is usually maintained by the national resource management agency, which is responsible for the management of the water resources and has a steering and coordinating role in IWRM: thus, MONRE (Vietnam), MNRE (Thailand), WREA (Lao PDR), and MOWRAM (Cambodia), which all house a NMC of the MRC;
- There is a fundamental need within the MRC to maintain a record of existing, planned and potential future water uses within the basin, as enshrined in the Procedures for Data and Information Exchange and Sharing (PDIES), the Procedures for Water Use Monitoring

(PWUM), and the Procedures for Notification, Prior Consultation and Agreement (PNPCA); and

- The basin-wide planning process under the MRC/BDP requires the storage of information of water-related programmes, projects, initiatives and issues that come from sub-area analysis and sector reviews to support the development and management of the Project Portfolio of the IWRM-based Basin Development Plan. In addition, the project related information is needed for the periodic updating of the IWRM-based Basin Development Strategy, linked to the MRC procedures above and the periodic updates of the State-of-Basin Report.

The Project Master Database is the foundation for the identification, categorization and prioritization of projects in the project portfolio of IWRM-based Basin Development Plan.

The Project Portfolio

Article 2 of the 1995 Mekong Agreement defines that the Basin Development Plan '*would be used to identify, categorize and prioritize the projects and programmes*'.

Implementation of the Strategy requires a wide range of national and transboundary projects. These will be incorporated within a Project Portfolio, with the objective of attracting and facilitating project financing. These projects include both development opportunities themselves, including infrastructure development, and the supporting studies and other activities identified within the Strategic Priorities. The Portfolio will thus comprise:

- **Infrastructure projects** (investments in infrastructure that use or control water and that are subject to national processes and MRC Procedures);
- **Non-structural projects** (investments in improved management of water and related resources, such as flood management, navigation, fisheries, and environmental health); and
- **Enabling projects**, such as studies and measures for promoting development and management best practices and good governance.

Infrastructure projects will primarily be national projects with transboundary implications and non-structural and enabling projects will primarily be transboundary or basin-wide in nature. Non-structural and enabling projects will be defined in 2011 during the planning of national and regional actions for Strategy implementation.

The design of the Project Portfolio was initially set out in 2009 and may now need refining. The basic principles then envisaged are in summary:

- The **Project Master Database** should be a repository for all existing, planned and potential water-related projects in the LMB to support the monitoring of water use within the basin, to facilitate assessment of future basin-wide development opportunities and to act as a foundation of the Project Portfolio;

- The **Project Portfolio** will be made up of a sub-set of those projects held in the Project Master Database of those projects which have passed through the PNPCA for the purposes of both keeping track of notified projects and promoting those which require funding.

The project portfolio will therefore serve its purpose of describing the opportunities by which the riparian countries can capture the mutual benefits that can be created by cooperation under the 1995 Mekong Agreement. In addition, for the MRC it provides a platform for early engagement in significant infrastructural development, and assists the line agencies and development partners in the ‘clearing’ of such projects in an overall basin context, which would help attract financial investments. The project portfolio will set out an agenda for MRC programmes to respond to and against which to prioritize their activities in the future.

6.5 Key strategic guidance

The transboundary economic, environment and social assessments (Chapter 5) and the countries’ negotiations on what can be agreed as ‘acceptable levels of development’ have identified the priority areas which must have strategic guidance developed. This strategic guidance is an essential part of this Strategy and as it provides directions, support and constraints for development opportunities to proceed ‘acceptably’.

It is well understood that the most desirable situation is for the completion of all priority ‘strategic guidance and enabling conditions’ to go in parallel with, or even in advance of, the scenario assessment work and the endorsement of what packages of development could be part of the DOS. In that way as countries begin to convert the ‘opportunities’ within the DOS to more specific projects, and commence feasibility studies and impact assessment, the essential supporting and constraining strategic guidance and direction would be available to influence and shape these assessments.

It has not been possible within this phase 2 of the BDP process to complete, or in some cases commence, this ‘guidance’ work so the emphasis must now be on identifying the priority areas for immediate study and review and to progressively complete this strategic guidance work within the three years of this next planning phase. In some cases, such as researching and developing environmental and social objective statements and moving toward a system of acceptable benchmarks and indicators, it may take even longer.

So the priority needs for strategic guidance will be included as part of the implementation plan of this Strategy (Chapter 8). A more detailed action plan, with specific ‘activity TOR’, will be developed during the inception phase of BDP 3 in conjunction with stakeholder consultations to determine the widest cross-section of views.

The LMB countries have already indicated the priority strategic guidance that should be completed by 2011. They include the following:

1) *Develop benefit and impact sharing options for Mekong basin conditions:*

The scenario assessments show that both benefits and negative impacts in the Definite Future Situation (DFS) and the Foreseeable Future Situation (FFS) are spread unevenly across the four countries, sectors and groups of the basin communities. In such a situation, it becomes important to relate the impacts to the longer term socio-economic plans of the countries and for regions/provinces within countries and consider options for benefit and impact sharing at the basin, national and local levels.

In this connection, review international approaches and options for benefit and impact sharing. Develop options that could be suitable for the Mekong basin and that take account of future developments as well as those implemented since the planning baseline year of 2000. Conduct case studies that demonstrate how the preferred options could apply to the basin and the areas and populations impacted by the DFS and the FFS. Make recommendations based on the outcomes of the case studies to the Joint Committee and then to the Council regarding the preferred option for Mekong basin conditions and how this would be implemented.

2) *Address the negative impacts of the Definite Future Situation (on wetlands, people):*

This is seen as the highest priority actions by LMB countries. This work will identify the range, scope, the sub-basins, the populations impacted, and the intensity of the various inevitable impacts arising from the ongoing developments. Develop and implement a range of studies for each of the impact areas that will investigate the widest range of options for mitigating impacts and how these could be implemented. And include in this work, the approaches that are developed for benefit and impact sharing (strategic guidance 1 above).

3) *Strengthen cooperation with China for coordinated operations of the hydropower dams to secure the mutual benefits of the increased dry season flow:*

Future water related development in LMB is very closely related to the increased dry season flow coming from the China dams cascade. Develop a programme, through high level international engagement, to interact with China that can develop an agreement to recognise the rights of China and the LMB countries to develop and use the Mekong resources, that provides for annual and multi-year information exchange about infrastructure operation and flow releases and patterns, that provides for early advice on future water planning issues, and that seeks to minimize risks from upstream developments.

4) *Agree to protect the baseline dry season flow on the Mekong mainstream:*

Protect the present dry season flow, which can be considered to be in, or very close to, its natural state, so that this flow can continue meeting a range of important social and environmental needs. This can be by protecting the baseline 1985-2000 flow regime in the DSF through the implementation of the Procedures of Maintenance of Flow on the

Mainstream (PMFM) and agreeing that new consumptive water uses in the dry season (such the planned increases in irrigation (Section 4.4) need to be sourced from the additional dry season flows that will be provided by the re-regulation of water from the wet to the dry season by ongoing hydropower development.

5) *Moving towards sustainable development of hydropower on tributaries:*

Assess tributary basins or sub-basins with high ecological value (hotspots) and ‘wild’ or ‘pristine’ rivers, guidance for ‘sustainably managed’ developments in these basins, as well as guidance on concepts/approaches to prioritise hydropower in presently ‘development basins’, causing less harm to environment and people;

Ensure that hydropower projects are assessed and designed from a multi-purpose perspective to increase overall economic benefits in the tributary basin and decrease adverse effects on other water usages, both upstream and downstream of the projects;

Avoid and mitigate negative impacts from hydropower development and operations, such as: the construction of re-regulation reservoirs downstream of peaking hydropower projects, the use of multi-level water intakes or aeration facilities to manage water quality and temperature of water released from large reservoirs, and design and operating standards for minimizing the trapping of sediments;

Develop management plans for environmental hotspot areas impacted by changed river flow regimes.

6) *Addressing the more localized issues caused by developments in the Foreseeable Future with possible mainstream dams upstream of Vientiane:*

This includes the strengthened implementation of the Procedures for Notification, Prior Consultation and Agreement (PNPCA) with the application of the design guidance for mainstream dams and the development and application of specific guidance related to existing and new wetlands, river flow variations and related erosion impacts, and tangible improvement of social conditions, to complement the project-specific studies such as feasibility studies, EIAs and SIAs.

7) *Develop a basin-wide strategy for fisheries management and improve a range of fisheries information and policy advice essential for future development:*

Development of a comprehensive, basin-wide fish management strategy that builds on national programmes and recent MRC basin-wide activities, takes account of ‘international best practice’, is structured to provide a range of fish management’ policy/strategy that is needed to influence and guide basin planning over the next 10 years. This work would include best possible information of fish migration routes, robustness to adjust to changes in patterns particularly by barriers across rivers, fish health and related social issues that could impact on basin level planning, fish passage technology particularly related to mainstream dams, the behaviour of fish migration,

productivity and health under various forms of development stress (with particular reference to the ‘flagship’ species mentioned earlier in this Strategy).

Determine if, and how, reduction of capture fisheries production could be offset, to varying degrees, by increases in aquaculture (including rice field, pond and reservoir fisheries) and how this could benefit the basin poor (this would be in addition to the planned increases in aquaculture socio-economic developments that the countries are planning to implement as part of the normal 5 year socio-economic planning cycles).

- 8) *Set up monitoring systems and studies to provide the range of sediment related information and policy advice essential for future development:*

Consider different levels of levels of water-related development and autonomous and exogenous conditions and predict changes in sediment transport and on how these possible changes might impact on river and bed erosion, on water quality, on floodplain sedimentation and the productivity of fisheries, agricultural land and wetlands, on the delta shaping processes and on sediment movements to marine water, and the possible impacts of all these changes as well as promising avoidance, mitigation and enhancement measures.

- 9) *Address social and livelihood aspects and impacts on populations in and around the Tonle Sap and in the 3S system:*

Investigate impacts and identify solutions and options arising from developments and management options in the Definite Future Situation and the planned development in the Foreseeable Future, including the lower mainstream, and coordinate this work with the benefit and impact sharing project in study 1) above, as well as with the proposed basin-wide and multi-sector study of the long term flood management options for the Mekong Delta.

- 10) *Develop policy/strategy statements for water-related sectors to improve future basin planning:*

Development of environmental and social ‘objective statements’ or ‘benchmark criteria’ to guide future updates of the Strategy and provide more detailed information against which to assess acceptability of impacts of development options.

In addition, to the above issues that require priority strategic guidance, the LMB countries have identified a range of studies of strategic importance to further inform future planning processes. Some of these studies will also be covered by recommendations from the SEA project.

The Strategy thus outlines the urgent studies to provide the information required for decision making on planned water resources development. Table 7 includes other studies of strategic importance to fill the current knowledge gap to an acceptable level and support implementation of the Strategic Priorities.

Table 7 List of other prioritized studies

No.	Study
1	Identification of priority habitat areas and environmental hotspots and development of management plans for those that would be highly or moderately impacted by potential changes in flow conditions and the proposed LMB mainstream dams
2	Mitigation of the impacts of converting much of the mainstream to a series of slow moving waters between proposed LMB mainstream dams
3	Assessment of mainstream and tributary hydropower potential and alternative power options, including innovative hydropower schemes that do not affect connectivity in the lower basin
4	Detailed modelling of flood-related impacts upstream of Kratie to understand the impacts of flow changes on different river reaches, and how mainstream dams will affect these
5	Basin-wide and multi-sector study of 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
6	Climate change adaptation studies of sub-basins, to define climate change trends, including extreme events, to incorporate in water-related sector plans, including hydropower
7	Monitoring and assessment programme to analyze the implications of climate change on: the basin's long-term hydrology; on agriculture and food security; and on ecological conditions and bio-diversity
8	Updating of groundwater inventories throughout the Basin to set priorities for development and management

It is emphasized that all of the above ‘strategic guidance issues and studies’ will be taken to stakeholder consultations in the beginning of the implementation phase of this Strategy to ensure that all priorities have been identified and all approaches considered.

6.6

Water resources sector ‘best practice’ guidelines

The Strategy reasserts the relevance and importance of MRC Procedures and associated guidelines, and reinforces their implementation and effectiveness as enabling conditions for sustainable basin development as set out overleaf in Table 8.

Whilst the high priority strategic issues in the preceding Section 6.4 must receive immediate attention to guide new development and resource management, the Strategy should also either identify or provide guidelines, or ‘helping hands’, across the whole spectrum of water resources management where these guidelines, or ‘best practice’ processes and experiences’ relate to, or influence transboundary impacts.

The background information obtained from sub-area analysis, sector reviews and MRC programmes provides a preliminary list of more than 50 water management or sector issues that could influence how future water related development proceeds. In the supporting documentation to this Strategy the full range of water related issues has been analyzed under the sub-headings of environment, socio-economic and people, institutional and capacity, and water use and impact.

Table 8 MRC Procedures and associated guidelines

Procedures/Technical Guidelines	Status
Procedures for Data and Information Exchange and Sharing (PDIES)	Approved by MRC Council on 1 November 2001
Technical Guidelines for the implementation of the procedures for data and information exchange and sharing (PDIES)	Adopted by MRC Joint Committee on July 2002
Procedures for Notification, Prior Consultation and Agreement (PNPCA)	Approved by Council on 13 November 2003
Technical Guidelines for the implementation of the procedures for notification, prior consultation and agreement (PNPCA)	Adopted by Joint Committee on 31 August 2005
Procedures for Water Use Monitoring (PWUM)	Approved by Council on 13 November 2003
Technical Guidelines for the implementation of procedures for water use monitoring (PWUM)	Adopted by Joint Committee on 5 April 2006
Procedures for the Maintenance of Flows on the Mainstream (PMFM)	Approved by Council on 22 June 2006
Technical Guidelines for the implementation of the procedures for maintenance of flows on the mainstream (PMFM)	In preparation
Procedures for Water Quality (PWQ)	Approved by MRC Council on 25 January 2011
Technical Guidelines for the implementation of the procedures for water quality (PWQ)	In preparation

Table 9 overleaf identifies an initial listing of a possible 35 water resources management and sector guidelines. The guidelines will subsequently be included within a "***Manual of Best Management Practices at the Basin-Scale***". The manual will be progressively developed as part of this Strategy through the activities of the MRC programmes in conjunction with working groups from the national line agencies and other organizations in all LMB countries.

Table 9 Proposed WRM Sector Guidelines (of transboundary significance)

No.	Guideline	Status
Multi-sector guidelines		
1	Guidelines for sound project identification	
2	Guidelines for trade-off negotiations and benefit sharing	
3	Guidelines for independent validation of any representations made by the project developers regarding the project hydrology	
4	Guidelines for optimizing the benefits of projects and minimizing harmful effects that might result from natural occurrences and man-made activities	
5	Guidelines for multi-purpose development and operation of water resources development projects	
6	Guidelines for planning, design, construction, and operation of mitigating measures related to water resources projects, considering local and downstream implications for environmental management, protection and rehabilitation	
7	Guidelines for consultation with, and participation by, the broader basin community in the planning of water and related resources at the basin, national, sub-basin and project levels	
Guidelines for the facilitation of networks		
1	Guidelines for the facilitation of a Mekong network of national resource management agencies	
2	Guidelines for the facilitation of a Mekong network of RBCs/RBOs with linkages to wider networks	
Fisheries Sector		
1	Guidelines for assessing fish migration and yield impacts due to mainstream infrastructure, and possible mitigating measures	In preparation
2	Guidelines for fish-friendly irrigation development and operation	
Environment Sector		
1	Transboundary Environment Impact Assessment	In preparation
2	Guidelines for assessing and managing non-point source runoff from irrigation/agricultural development that could impact on the mainstream	
3	Environmental considerations for sustainable hydropower development	In preparation
4	Guidelines for river bank erosion risk management	
5	Guidelines for valuation of wetlands	
6	Guidelines for protecting and managing valuable wetlands under increasing pressures from development	
Navigation Sector		
1	Guidelines for river regulating works for navigation safety	
2	Guidelines for planning, design, construction and operation of navigation locks in relation to the development of hydropower projects on the mainstream	In preparation
Agriculture Sector		
1	Guidelines for drought management and conservation of water	
2	Identification, financing and development of irrigation projects	
Hydropower Sector		
1	Preliminary design guidance for proposed mainstream dams	Available
2	Hydropower sustainability assessment tool and guidelines	In preparation
3	Guidelines on institutional, regulatory and other requirements to be met by investors for the study, construction and operation of projects on the mainstream	
4	Guidelines for minimizing sediment trapping by dams	In preparation
5	Avoidance, mitigation and enhancement of impacts of tributary dams	
Flood Management Sector		
1	Best practice guideline for flood risk assessment.	Available
2	Best practice guidelines for integrated flood risk management planning and impact evaluation	Available
3	Best practice guidelines for the development and design of structural and flood proofing measures	Available
4	Best practice guidelines for integrated flood risk management for basin-wide planning	Available
Watershed Management		
1	Guidelines for watershed management	

7 Basin management processes

This Chapter summarizes the main basin management processes that will support the implementation of the basin development framework, in particular to bring basin-wide development opportunities and constraints into the national planning and vice versa. The Chapter focuses on the main principles and steps of the management processes

7.1 Harmonization of basin and national planning

The final success of this Strategy will depend on how each country can adapt the Strategy's principles, practices, outcomes and guidelines in a way that is appropriate to its particular government and administrative processes. Each country has a different administrative, policy and legal system and each will implement the contents of this Strategy in a way most appropriate to its customs and practices.

The policy, strategy, institutional and regulatory advancements in all four LMB countries provide an excellent platform to maximize cooperation at the basin level through MRC activities. Each of the countries now have specified agencies with the responsibility for the management of water resources in their country, backed by improving water legislation and a water resources policy and implementation strategy (Section 3.5).

Table 10 Indicative management arrangements for IWRM

Management Level and Strategy	Purpose of Strategy or Plan	Coordination or Management Body	Partner, Supporting or Implementing Bodies.
Basin Scale: IWRM-based Basin Development Strategy	Guides the water related development and management in the LMB.	MRC	NMCs, national water resources management agencies
National: National water policy and strategy (linked to basin scale strategy)	Plans the actions to achieve national objectives, follows an IWRM approach. Takes account of the basin scale strategy.	MOWRAM WREA MNRE MONRE	NMCs, national planning and sector agencies, private and non-government stakeholders
Sub-basin: Sub-basin IWRM Strategy	Plans the actions for local level socio-economic development and resource protection, in accordance with the national IWRM strategy.	River Basin Organizations Province level coordinating mechanism	NMCs, national sector agencies (province level)
Watershed: Watershed Plan of Action	Provides information into sub-basin level plans	Watershed Committees	Districts and commune agencies, local communities.

These national water resources management agencies would now become the primary authority for water resources management. The aim is to further strengthen their coordination, steering, monitoring role for IWRM, while the long established water-related sector agencies (agriculture, energy etc.) do most of the on-the-ground planning, but in a way that maintains the most acceptable balance between water resource development and water resources protection.

Moreover, the NMCs are housed in these agencies, which will increasingly facilitate the linkage to basin-wide perspectives (Table 10 above).

Thus, the national water resources management agencies are, or soon will be, in an excellent position to bring basin perspectives, including the use and enhancement of the DOS, into the national planning, in particular through:

- Merging of basin-wide issues and strategies into national water policies and strategies;
- Reviewing and influencing the periodically updated national socio-economic plans and sector plans;
- Supporting the development of sub-basin IWRM strategies and plans; and
- Reviewing preparatory studies (feasibility studies, EIAs, etc.) of significant water resources development projects, such as hydropower and irrigation projects, and clearing these projects in an overall river basin context.
- Incorporation of regional procedures and strategic guidance in national planning and regulatory processes.

In addition, through the NMCs, the national water resources management agencies will be able to bring existing or emerging national perspectives into future updates of this IWRM-based Basin Development Strategy. This creates a ‘loop of ownership’ between MRC and the four countries and ensures that regular updates of the strategy will be fully informed and based on current and emerging trends and issues. ***This whole process can be strengthened by the proposed networks between water resources management agencies and between sub-basin organizations, facilitated by the MRC*** (Section 7.5).

The national water resources management agency will develop its own implementation principles for the harmonization of the outcomes of basin and national planning processes, which will both meet the needs of national plans and processes and also closely parallel the timing and approaches of the other riparian countries. The MRCS will support this process by identifying and advising issues in the national planning and regulatory processes that can be improved.

This will be an important early activity in the implementation of the Strategy and requires an analysis of national socio-economic planning systems, the processes used by each country to incorporate the water related aspects and environmental considerations into these plans, and an assessment as to how the broader basin-wide planning directions and outcomes sought from this Strategy can be merged into these systems. This will require some flexibility and possibly some changes in how planning issues are handled. As well, each country now has ‘national water policy and strategy’ statements and these should be analysed to how best to incorporate the directions of this Strategy, consistent with how national systems and administrations apply. MRCS can facilitate this process but essentially it will be the national agencies coordinated by the NMCs that will do this work.

The implementation of the nationally developed principles for the harmonization of basin and national principles will be annually reported to the MRC governance bodies, together with related progress reporting, such as the reporting on the implementation of the MRC procedures. The MRCS will undertake, on behalf of the countries, five-yearly reviews of the impact of the Strategy and will advise the MRC governance bodies on any emerging issues and the need for change.

All countries are now developing approaches to sub-basin level water resources planning and management. To achieve the full benefits of an integrated basin wide approach, these more local level approaches should incorporate linkages upwards first to the national level policies and then, where appropriate, to the basin-wide strategy. This IWRM-based Basin Development Strategy is a key part of this process - for example:

- ***The IWRM-based Basin Development Strategy***, which provides the basin development framework within which the LMB countries can plan and work, and optimize the multiple use and mutual benefits of all riparians, as envisioned in the 1995 Mekong Agreement;
- ***National IWRM policies and strategies*** - each riparian country is developing, or has developed its approaches to IWRM at the national level. However, how these approaches link into a basin wide framework vary across the countries. This basin-wide strategy will assist by providing a large variety of technical and institutional activities and support to complement the activities now underway to improve water and related resources management.
- ***The sub-basin IWRM frameworks*** – most of the actual implementation of projects and IWRM issues will be at the sub-basin level within the four countries. This basin-wide strategy provides guidance that will assist in developing appropriate sub-basin planning frameworks that will in turn, help the long established sector agencies (agriculture, navigation, hydropower, etc.) to do the on-the-ground planning and project development, but in a way that is sensitive to the environmental and other sub-basin needs.

A priority for the MRC for the next few years is the consultation with, and participation by the broader basin community to improve processes for transparent basin wide dialogue, and where required, to strengthen the development of national approaches to consultation that relate well to the basin perspective. However, all MRC processes must be governed by the views and processes of its “owners” – the four LMB countries – and each country has its own systems, approaches and cultures relating to community or mass participation. All of these views need to be blended into a coherent and well structured stakeholder participation policy and set of processes.

7.2 Enabling methods and tools

National water planners and managers can plan and work within the agreed DOS to sustainably develop and manage water resources. However, in order to monitor, allocate and protect water resources effectively at the national level, the basic water resources management tasks need to be further strengthened in each of the countries, including resource evaluations, demands assessments, impact assessments, water use permitting, compliance assurance, data and information management, and water resources planning.

This offers an opportunity to harmonize the methods, standards, tools and quality assurance systems that the countries utilize to perform these basic water resources management tasks. If there are large differences in these issues between the basin countries, then it becomes very difficult to exchange reliable data and information between the countries and generate joint discussion and agreements. In particular, the various MRC programmes are in a good position to support the strengthening and harmonization of the basic water resources management tasks, based on accepted international practices and tailored to the Mekong Basin.

Of particular importance will be the further development of a suite of modern management tools, particularly hydrologic and socio-economic modelling packages – at the sub-basin and basin levels - that countries can use to assess new policies and development proposals. A sound and modern modelling package is the “engine room” of basin management; without these tools and the skills to use the models and interpret results, it becomes very difficult to assess new developments in a balanced way.

7.3 Implementation of MRC Procedures

A key set of procedures and implementing guidelines are the *water utilization procedures (or MRC procedures) and associated guidelines* that have been progressively developed over the last decade (see Table 8 on page 62). The countries use these guidelines to share data and information (but at the same time protect national sovereignty issues), to monitor water use, and to keep each other advised of new projects and proposals that could be of transboundary significance. The implementation of the guidelines is essential for a shared basin wide perspective for water resources development and management.

The implementation of the Procedures for Notification, Prior Consultation and Agreement (PNPCA) is an essential stage in the utilization and enhancement of the DOS (Table 8). The appropriate implementation of the other procedures is essential for the five-yearly review and revision of the Strategy.

The four country agreement to a DOS in which country proposals can now be considered, will create confidence that water can be allocated and used without unforeseen impacts. ***This should lead to proposals being notified under the terms of the PNPCA much earlier in the process.*** This will then need evaluations to be timely and comprehensive, and will require the effective

use of notification procedures and a commitment by MRCS to process these notifications in a timely and transparent way.

Early notification will offer the opportunity for the MRC to demonstrate its wide range of experience and skills that are available among MRC's professional staff to support project development throughout the project preparation cycle. Strategic guidance, best practice sector guidelines and other knowledge will be used to adding value to the various TOR and feasibility studies, EIA etc. in close consultation with the governments and relevant parties. The process will include a close assessment of project specific avoidance, mitigation and enhancement options. This will assist the countries to develop and implement water resources development and water related projects sustainably.

An agreed DOS will provide confidence that water can be allocated and used without unforeseen impacts. This should enable the countries to notify a water resources development project well before the completion of the project preparatory studies.

7.4

State-of-Basin Monitoring

This Strategy will establish a joint basin-national monitoring programme to measure both the implementation of the Strategy and the outcomes from implementation. The proposed

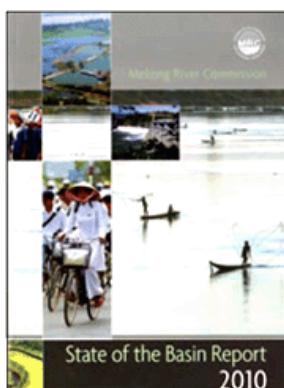
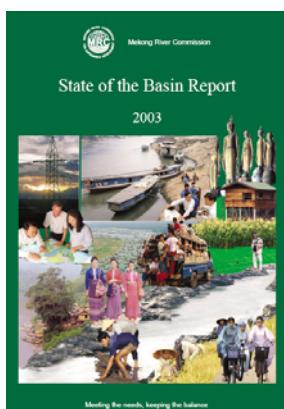
monitoring programme builds on ongoing monitoring and reporting activities at the basin and national levels (Chapter 8), which will be further harmonized and integrated across the basin (Section 7.2).

MRC has a role of monitoring water and related resources and publicly reporting through 'State-of-the-Basin' reports and other mechanisms, and this should include progress on how this IWRM based Basin Development Strategy is being implemented.

MRC's transboundary monitoring programs includes water quantity, water quality, aquatic ecosystem health, socio-economic impacts and

vulnerability to aquatic ecosystem change, and wetland distribution, function and values. The resulting monitoring information and the information obtained through the implementation of the MRC procedures (Section 7.3) can be used to continually check on the condition of the basin's transboundary water resources.

The reporting process includes periodic updates of the State-of-Basin Report, which provides an overall assessment of the basin's status and trends, including evidence whether or not there is a need to update the basin-wide development scenarios and the IWRM-based Basin Development Strategy.



7.5

Institutional development and human capacity building

The policy, strategy, institutional and regulatory advances in the water related sectors described in Section 3.5 are quite new. Successful implementation of the Strategy will depend to a large degree on building human resource capacities, improving the range and extent of data and information that is collected and processed, and developing new water resource technological and analytical systems and tools, such as hydrologic and socio-economic modelling capabilities. This needs to occur at all levels of government to ensure effective implementation of IWRM at national and basin scales, and proper compliance by all water sector agencies.

As with any new systems and processes, it will take time and a targeted institutional and capacity building program to maximize the benefits of these new approaches to IWRM. It is likely that as capacities increase and institutions change, there will be a need for further policy, legislative and organizational change to better capitalize on the overall improvements in IWRM. This will likely be a gradual process and will benefit from continual discussion and review by the various ‘four country networks’ of water resources management agencies facilitated by MRCS. Where these needs for further change can influence transboundary IWRM issues, then these matters would be reported annually to the MRC JC.

At the same time, the increasing pressures on the basin’s resources (Chapter 4) require that as much as possible there is increasing synergies, or greater common features, between the policies and practices of the four governments, as well as greater integration/coordination between the policies and processes from the national line agencies. This requires strong IWRM understanding and capabilities across the basin, and across institutions, and time for consultation and exchange of experiences.

The chance of success for effective coordination will be greatly improved if the national water resources management agencies regularly interact between themselves and with MRCS (*a network of resource management agencies*). Similarly, sub-basin IWRM, which has only commenced during the last 5 years, will become more effective if there is interaction between these emerging organizations (a network of sub-basin organizations or coordinating committees). Facilitating these networks is an important part of the MRC’s ‘cooperation and coordination’ role.

7.6

Risk management

Creating this IWRM-based Basin Development Strategy has not been done using some rigid formula or set of processes. It has had to adapt to the level of information and the strategic water policy framework that exists now, and to develop a methodology and approach that best combines the present situation with new concepts, analyses and assessments.

All stages of this process have associated ‘risks’ as seldom, if ever, are water resources planning guided by data, information, policies, systems and analytical tools of a quality and extent that

basin planners would like – there are always deficiencies in these parameters and these must be managed through a carefully considered ‘risk management approach’.

Risk management will be a main part of the strategy implementation plan that will be developed with stakeholder input soon after the Strategy is approved by MRC Council. This will include particular strategies or action regarding:

- Data and information monitoring, collection and analysis (such as the State of Basin report, activity trend analysis etc.) and regular reporting to MRC JC and to stakeholder groups;
- The need for MRC to develop or enhance benchmarks or clear objective statements for all environmental and social parameters relevant to basin planning; this information has not been available to this present phase of planning and is needed to provide clear objectives against which existing or new developments can be judged and revised if necessary, during the review periods of the strategy over the next 5 years,
- Annual reviews of planning technologies and analytical system requirements to ensure analytical ‘risks’ are minimized;
- Annual (at least) meetings of riparian country ‘network groups’ to review progress of the Strategy, assess data monitoring information, and assess emerging risks;
- Annual stakeholder workshops at which all aspects of the Strategy will be debated; and
- Annual hydrologic and socio-economic reviews to assess any variations from planned assumptions and outcomes, particularly regarding the flow regimes from the Upper Mekong Basin.

All of this will be collated into an annual report to the MRC JC in which major risks will be identified, and actions suggested for overcoming unintended outcomes.

7.7 Managing differences

The 1995 Mekong Agreement (Article 34 and 35) has already provisions to cover dispute resolution but there may be particular issues relating to basin development, such as accelerating hydropower development that may lead to disputes and possibly conflicts between sectors or countries. Whilst it would be appropriate for any unresolved disputes to follow the specific procedures in the agreement, it should be seen as a ‘process of last resort’.

A mechanism will be developed that will provide for country discussions (either four country or less as required), and for negotiations at various technical levels, and ultimately for discussions at the higher policy levels. Lessons learned from relevant case studies in the Mekong region and elsewhere where successful basin organizations operate, will be used to prepare the guidelines.

8

Implementation of the IWRM-Based Basin Development Strategy

8.1

Road map – the way forward

The Strategy provides vision for basin development for 20 years with review and adjustment every five years. The priority needs of the Strategy are covered by a ‘roadmap’ which is provided in Annex 1 and summarized in Table 11 overleaf.

This details the main actions needed to implement the Strategy, particularly the new or strengthened processes for moving projects from the DOS to the project portfolio, for developing the key strategic guidance to underpin how developments could proceed, and other enabling conditions such as benefit and impact sharing policies and measures that will need to apply. As well, responsibilities and a timeframe are specified which will then lead to a monitoring and reporting process as described below in Section 8.2.

Following the Joint Committee’s endorsement of the roadmap, each of these main action areas will have an ‘activity TOR’ prepared during the first 3 months of implementation (early 2011) through a national consultation process and stakeholder involvement. In this way, a clear and widely endorsed programme covering all main action areas will be ready for the start of the BDP3 planning phase, which is expected to commence early to mid 2011. The roadmap also identifies the process to prepare and/or finalize the basin-wide water resources sector guidelines and prioritizes further research to address the key transboundary issues.

This roadmap is just what it says – a guide as to how to proceed with the main priority activities into and through the implementation phase, and a guide to how these activities should be timed for completion to fit in with the expected needs of the basin water planning, development and implementation cycle. By focusing on priority issues, it clearly does not cover all planning-related issues for the next five years; these are more properly contained in the inception report for BDP 3 which will be completed early in 2011. But these priorities now identified will merge into the next planning phase as ‘high priority areas’ and be regularly reported to the Joint Committee in this way.

How activities within the roadmap are undertaken and completed will, to some extent, depend on how these basin-wide planning issues, strategic guidance and strengthened management processes can be ‘merged’ or ‘scheduled’ with the national annual and 5 year resource management policy, strategy and action plans of the four countries. This will only become clear once the national consultations and stakeholder interaction occurs early in 2011.

A key part of the implementation process depends on how the countries decide to establish **‘networks’ or ‘working groups’ to jointly work on ways to make the Strategy implementation most effective**. As explained in this Strategy document there will be wide benefits if the water

Table 11 Road map outline

Priority action	Targets	Outcome
Basin Action Plan to implement the Strategy		
Regional action plan	Prepared and endorsed by MRC JC in 2011	Clear objective, outcomes and activities at regional level, to be implemented mainly through the MRC Strategic Plan but also in partnership with regional organizations and programmes; Regional monitoring and evaluation system, led by MRCS
National indicative plans	Prepared and endorsed by NMC/relevant national authorities in 2011	Clear national objective, principles and activities for integrating and implementing Strategic Priorities in national systems and focal areas; National monitoring and evaluation systems, coordinated by resource management agencies/NMCSs
Strategic Priorities for Basin Development		
Address opportunities and consequences of on-going developments	Measures agreed by the end of 2011; Actions taken by 2013	Regional cooperation provides added value to development opportunities and mitigation actions by member countries
Expand and intensify irrigated agriculture	Guidelines prepared by 2013 and applied by 2015	Increased food security and opportunities for economic growth and poverty reduction in LMB countries and the region
Improve sustainability of hydropower development	Prepared by 2013 and applied continuously	Enabling conditions and guidelines “internalized” in national planning and regulatory systems and applied by project developers, regulators and national agencies
Acquire knowledge to address uncertainty and risk	Most urgent information available by 2013 and continuously used	Monitoring systems (for sediment, fisheries and social issues) operational and data available for necessary analyses and decision making
Seek benefit and cost sharing options	Options prepared by 2014 and applied continuously	More sustainable options for water resources development that leverage cooperation among countries
Adapt to climate change	Adaptation strategy developed by 2013	Adaptation strategy mainstreamed in basin and national planning Improved flood and drought management
Integrate basin considerations into national systems	Continuously	National water resources development and plans and projects proceed within the identified DOS in compliance with the Strategic Priorities and guidelines
Strategic Priorities for Basin Management		
Establish basin visions and management strategies of water related sectors	Visions prepared by 2012; Management strategies prepared by 2014	Agreed basin strategies for the development and management of water related sectors (fisheries, navigation, flood management, tourism, environment and ecosystem management, watershed management)
Strengthen national water resources management processes	Continuously	Basic data regarding the status and use of water resources available and accessible for everyone
Strengthen basin management processes	Continuously	National and basin (regional) procedures, methods, tools and processes strengthened and harmonized, leading to increased basin-wide cooperation for sustainable development and management of the Basin
Develop Basin environmental and social baseline indicators	Prepared by 2013	Agreed set of basin biophysical and social indicators to be used to assess future developments
Build capacity for basin level IWRM	Continuously	Improved coordination and data and information exchange between national line agencies; National capacity to identify, discuss and negotiate mutual beneficial Basin development and management opportunities the Mekong Basin level
Establish basin visions and management strategies of water related sectors	Visions prepared by 2012; Management strategies prepared by 2014	Agreed basin strategies for the development and management of water related sectors (fisheries, navigation, flood management, tourism, environment and ecosystem management, watershed management)
Prioritised studies and guidelines		
Prioritised studies	Completed by 2015	Important knowledge gaps for planning and decision-making on future development are “filled” with required information
Guidelines	5 guidelines by 2015	Helping hands for planning, using and managing water resources

Priority action	Targets	Outcome
All guidelines by 2020		
Table 10 Road map outline (continued)		
Monitoring and evaluation		
Monitoring	Developed by 2011 Operational 2012	Planners and decision-makers have at all times the information about the status and impacts of their plans
Evaluation	In 2015	Information whether and how the Basin Development Strategy needs to be adjusted
Updating	In 2015	Basin Development Strategy updated based on new information regarding needs, opportunities and constraints

resource management agencies in each country meet periodically to discuss the Strategy implementation and emerging water related issues. The heads of these agencies, facilitated by MRCS, could be the group that reports regularly to the Joint Committee. In this way, the countries will be able to bring existing and emerging national perspectives into future updates of the Strategy. This creates a ‘loop of ownership’ between MRC and the four countries and ensures that regular updates of the strategy will be fully informed and based on current and emerging trends and issues.

8.2 Monitoring and periodic updating of the Strategy

Monitoring, evaluation and reporting

The planning process in which BDP is engaged follows a cycle which is reflected in the rolling plan process which integrates basin-scale planning with national and sub-national planning (see Figure 1, The BDP planning cycle on page 4). A cornerstone of this process is that each cycle includes monitoring of how implementing the plans have impacted on the basin and whether the desired outcomes have been achieved. Monitoring thus represents a key instrument in the planning cycle.

A comprehensive monitoring programme will be developed during the first 3 months of the implementation phase and will be linked to the inception phase of the BDP 3 activity as strategy implementation is a basic priority of the new planning phase. Monitoring and reporting will be directed to provide planners and decision-takers with the information necessary to judge whether the plans and processes in the strategy are being implemented effectively and whether outcomes are being achieved. Thus a monitoring programme will embrace both activities and outcomes:

- **Activities** monitoring refers to whether the strategy components, including the planning work related to project portfolio and actual project development, assessment, endorsement and implementation plan components have been implemented. This includes water resources developments and enabling activities, as well as the action plan associated with

this Strategy. The national and basin-level Project Master Databases form a part of this aspect of monitoring. Progress reports of MRC programmes will form another; and

- **Outcomes** must relate ultimately to whether the stated goals are being achieved. The regular reports to the Joint Committee plus the periodic State-of-Basin report are two sources of information that informs how well this Strategy is implemented and guides whether it requires adjustment.

The quick reproduction of future editions of the State-of-Basin reports requires a hierarchy of monitoring indicators linked ultimately to that which can be directly measured. Ideally, such a monitoring framework will be designed with the current and future information needs in mind, including the needs of IWRM at the basin and sub-basin levels. This would require an integrated monitoring system that serves multiple purposes, including the five-yearly updating of the State-of-Basin Report, the development scenarios, this Strategy, and the MRC Strategic Plan. This is a complex and major project and will relate to all programs right across the MRCs and national agency framework. It will be reflected within the MRC Strategic Plan (2011 – 2015) and the scope and content of the monitoring framework will come from how the Strategic Plan is implemented.

The assessment framework which has been developed during the current planning process provides a good starting point for designing a monitoring system to provide the necessary assurance to all stakeholders in the Basin Development Plan, but clearly will need to be elaborated.

In view of the high importance for MRC of successful implementation of the Strategy, ***the overall process of Strategy implementation and monitoring will be overseen and coordinated by a four-country working group or sub-committee that reports directly to the Joint Committee.***

Periodic review and updating

It is anticipated that the scenarios and the IWRM-based Basin Development Strategy will need to be reviewed in detail every five years, as new data and information becomes available that may necessitate a review of the basin dynamics, basin needs and potential, and the national development needs. In this way, each successive Basin Development Strategy can be updated in an informed way, adjusting as necessary the Strategy design to ensure that projects, cumulatively, stay within the agreed development space and are on track towards achieving the Strategy's long term policy objectives.

The next formal update would be considered during year 2014 and this is an appropriate timeframe for issues, such as climate change, advances on poverty reduction, strengthening of multi-stakeholder basin management processes etc., to be evaluated. At that time, the acceptable developments within the LMB 20-Year Plan Scenario will only have just commenced and any adjustments to the 'development space' can then be made, well in advance of any unforeseen circumstances.

8.3

Roles and responsibilities

This Strategy is ‘implemented’ by the four countries with support and monitoring by MRCS, but it will require the input and direct involvement of many players and stakeholders throughout the basin, as well as international financial institutions and donor agencies. It will need ‘partnerships’ to be developed, networks to be created and a genuine desire for transparent and ‘real’ consultation and participation. Private developers and investors will benefit by following the guidelines and practices in the Strategy; civil society and NGO’s will be able to work closer with the MRC and national agencies as the Strategy encourages all players to be positive and participative.

Establishing networks between the resource management agencies in the four countries, and the various sub-basin organizations within the countries, will be very effective ways of achieving practical capacity building not only for this Strategy but for IWRM generally.

National Governments

The primary role in water resource management will always rest with national governments, which have responsibility for all aspects of policy, strategy, planning and legislative and institutional reform. Some of the national responsibility may be devolved to provincial or local levels, in line with policies on decentralization.

National water resources management agencies

The main national agencies involved will be the water resources management agencies – MOWRAM (Cambodia), WREA (Lao PDR), MNRE (Thailand), and MONRE (Vietnam). These agencies will have the responsibility to merge the basin wide issues and strategies into the national policy and strategy framework that guides socio-economic and sector planning. Developing strong regional networks between these agencies will help strengthen these basin wide and national connections. The ***National Mekong Committee Secretariats***, in whatever form each country decides to provide this mechanism, will continue to be the link between MRCS and the countries, and maintain liaison with the various national bodies and agencies that are involved in water-related development.

River basin organizations

River basin organizations are being organized within key catchments in the LMB. These bodies have the important role of translating national policy and strategy into sustainable development and management at the sub-basin level, with a large amount of stakeholder and community involvement, in a form that suits each country.

The Mekong River Commission has clear responsibility for regional coordination within the water sector in the LMB. This includes all aspects of negotiation between the countries relating to water resources, including the formulation of procedures and guidelines for the countries’ use of the shared resource. It has a mandate to monitor water use to ensure compliance with agreed procedures, and provides shared technical information for monitoring and as the basis for

planning and research. It has the principal role of monitoring how the Strategy is implemented and whether new information such as from the periodic ‘State of the Basin’ reports, and other water use information, is indicating that adjustments need to be made.

Civil society and NGOs

Basin-wide stakeholders (civil society and NGOs) must continue to have close involvement in how this Strategy is finally structured and endorsed, and how it is implemented and monitored. MRC has emerging processes that seek to provide a meaningful and transparent consultation and participation role for these basin wide groups.

Development partners and financial institutions

A substantial proportion of water resource development at the national to local level will still be financed through international financial institutions (IFIs) and donor organizations. Country investment and assistance strategies should take account of regional as well as national concerns and priorities, and be formulated in the context of this overall regional Strategy.

Private developers

Private investors are increasingly becoming ‘players’ in the development of the Mekong basin. The most visible presence is in the development of both mainstream and tributary hydropower schemes but also within the agriculture sector with private-public sector partnerships. Private investors will need to comply with reasonable safeguard policies that the resource management agencies should develop to comply with the strategic guidance detailed in the Strategy.

Regional development programs

Regional development programs, whether coordinated multilaterally (such as the development triangle initiatives) or by international organizations (such as those under ADB-GMS and ASEAN) have the responsibility to ensure that their programs fit within the overall sustainability of the basin, as well as meeting national priorities.

Annexes

Annex 1 – Road map for Strategy implementation

Priority Action	Targets	Expected Outcomes
Basin Action Plan to implement the Strategy		
1. Regional action plan <i>RAP will include a description of the activities, methodologies, implementation and management responsibilities, milestones, deliverables, and costs and coordination requirements. The preparation will be led by the MRC and implemented through the MRC Strategic Plan 2011-2015. The MRC/BDP 2011-2015 provides overall guidance, coordination and support to the implementation of the Strategy</i>	Prepared and endorsed by MRC JC in 2011	Clear objective, outcomes and activities at regional level, to be implemented mainly through the MRC Strategic Plan but also in partnership with regional organizations and programmes; Regional monitoring and evaluation system, led by MRCS
2. National indicative plans		
<i>The national indicative plans (NIP) will seek to incorporate the Strategy's basin perspectives into national planning, decision-making and governance processes, integrating to the extent possible with five-year socio-economic and sector planning and annual work planning of relevant national agencies. Each NIP will include a description of the activities, methodologies, implementation and management responsibilities, milestones, deliverables, and costs and coordination requirements. The NIP would supplement the prevailing national planning processes by providing incremental actions necessary to implement the Strategy within each country, reflecting different focus areas and priorities. The preparation of the NIP will be led by the NMC in consultation with the line agencies concerned.</i>	Prepared and endorsed by NMC/relevant national authorities in 2011	Clear national objective, principles and activities for integrating and implementing Strategic Priorities in national systems and focal areas; National monitoring and evaluation systems, coordinated by resource management agencies/NMCSs
Strategic Priorities for Basin Development		
1. Address opportunities and consequences of on-going developments (i) Strengthen cooperation with China for coordinated operations of Lancang hydropower dams to secure benefits of increased dry season flow, address the issue of sediment transport and provide early warning. <i>Annual and multi-year information on the releases and China's longer-term Lancang development plans and dam operating rules are essential inputs to LMB planning. Building on the experience of the existing Memorandum of Understanding between China and the MRC, agreement is to be sought on a more integrated hydrological monitoring system.</i>	Measures agreed by the end of 2011; Actions taken by 2013	Regional cooperation provides added value to development opportunities and mitigation actions by member countries
	<i>Country endorsement of approach and methodology to commence dialogue – June 2011</i> <i>Dialogue proceeds under high level four country leadership</i> <i>Agreement/protocol between four LMB countries and China – December 2013</i>	<i>Affirmation of mutual commitment to sustainable Basin development, promote benefit sharing and facilitating information exchange, while recognising sovereign rights</i>

Priority Action	Targets	Expected Outcomes
(ii) Enhance coordination among the LMB countries on the operation of tributary dams. <i>Improved implementation of MRC Procedures supported by actions taken up under item 3 of Strategic Priorities for Basin Management and item 2 of Prioritised Studies and guidelines</i>		<i>Coordinated operation of tributary dams to ensure reliable annual dry season flows will be facilitated</i>
(iii) Reach agreement to protect the baseline dry season flows on the Mekong mainstream. <i>The baseline flow regime of 1986-2000, as represented in the MRC Decision Support Framework, is considered to be close to its natural state. The PMFM provides both mechanisms to ensure that baseline flows are maintained at 12 key points along the mainstream and the foundation to agree on further use of water. Together with maintaining water quality standards through PWQ, this will assist in maintaining the natural functions of the river</i>	<i>Technical Guidelines for the implementation of the procedures for maintenance of flows on the mainstream (PMFM) agreed by end of 2011</i> <i>Technical Guidelines for the implementation of the procedures for water quality (PWQ) agreed by end of 2011</i>	<i>Protection of the baseline flow regime to meet essential social and environmental needs</i>
(iv) Manage the risks of committed projects. <i>National agencies, RBOs, communities and project developers need to work together on the design and operation of tributary dams, to minimize sediment and nutrient trapping and blocking of fish migration, and on reaching agreement on management measures for valuable wetlands (from ecosystem and livelihood perspectives). Opportunities will be explored to address the social implications of ongoing water resources development through national poverty reduction and other development activities.</i>	<i>Scoping study and TOR approval – June 2011</i> <i>Interim report identifying range, scope and distribution of impacts and identifying studies to determine mitigating options – December 2011</i> <i>Mid term report, resulting from work-shopping options and refine processes, goals and targets – June 2012</i> <i>Final report – December 2012</i>	<i>Comprehensive understanding gained of impacts, distribution, and mitigating options relating to developments under the Definite Future Scenario</i>
2. Expand and intensify irrigated agriculture <i>In many areas there is scope for increasing agricultural yields and generating higher farm incomes through improved varieties and farming practices. Agricultural yields vary by 200-400% across the basin, indicating considerable potential for agricultural intensification</i>	Guidelines prepared by 2013 and applied by 2015	Increased food security and opportunities for economic growth and poverty reduction in LMB countries and the region
(i) Drought mitigation strategies are needed for rainfed areas		<i>Reduced impacts of drought upon rainfed farmers</i>
(ii) Study of groundwater potential		<i>Identification of areas where groundwater presents a solution to drought mitigation</i>
(iii) Guidelines for fish-friendly development of irrigation schemes		<i>Increased farmer incomes and protein sufficiency within irrigated areas</i>
(iv) Guidelines for promoting integrated pest management (IPM)		<i>Reduced risks of bio-diversity depletion and of pollutant run-off from agricultural areas</i>
(v) Guidelines for improved irrigation management		<i>Sound project identification will be essential to attract investments</i>

Priority Action	Targets	Expected Outcomes
3. Improve sustainability of hydropower development	Prepared by 2013 and applied continuously	Enabling conditions and guidelines “internalized” in national planning and regulatory systems and applied by project developers, regulators and national agencies
<p>(i) Move towards sustainable development of hydropower on tributaries</p> <ul style="list-style-type: none"> <input type="checkbox"/> <i>Identifying sub-basins with high ecological value to be protected and those where hydropower can be developed with limited social and environmental impacts;</i> <input type="checkbox"/> <i>Evaluating hydropower projects from a multi-purpose perspective to increase overall economic benefits and decrease adverse effects on other water uses;</i> <input type="checkbox"/> <i>Mitigating negative impacts of hydropower, such as through: re-regulation reservoirs downstream of peaking projects; multi-level water intakes or aeration facilities to manage water quality/temperature; fish passage; and minimizing sediment entrapment;</i> <input type="checkbox"/> <i>Developing management plans for environmental hotspots impacted by changed flow regimes; and</i> <input type="checkbox"/> <i>Evaluating benefit-sharing options, such as watershed development and management benefiting hydropower generation and funded from hydropower revenues.</i> 	<i>Scoping studies and TOR approval – December 2011</i> <i>Preliminary findings presented – June 2012</i> <i>Final reports and/or technical guidelines agreed – December 2013</i>	<i>Enhanced selection and design of tributary hydropower developments leading to sustainable solutions bringing increased benefits to stakeholders</i>
<p>(ii) Address the uncertainty and risk of possible mainstream dams.</p> <ul style="list-style-type: none"> <input type="checkbox"/> <i>Acquisition of essential knowledge to minimize uncertainty;</i> <input type="checkbox"/> <i>Identification of risk mitigation options</i> <input type="checkbox"/> <i>Strengthening the PNPCA process;</i> <input type="checkbox"/> <i>Design Guidance for Mainstream Dams;</i> <input type="checkbox"/> <i>Specific guidance for existing and new wetlands, river flow variations and related erosion impacts, and improvement of social conditions.</i> 	<i>Scoping studies and TOR approval – December 2011</i> <i>Preliminary findings presented – June 2012</i> <i>Final reports and/or technical guidelines agreed – December 2013</i>	<i>Enhancement of project-specific studies such as feasibility studies, EIA and SIA leading to more informed decision taking on mainstream hydropower developments.</i>
<p>(iii) Assess power options, including alternatives to mainstream hydropower.</p> <ul style="list-style-type: none"> <input type="checkbox"/> <i>Promote evaluation of the benefits and impacts of mainstream hydropower dams, within the broader context of power options assessments and national and regional power strategies.</i> 	<i>Scoping studies and TOR approval – December 2011</i> <i>Preliminary findings presented – June 2012</i> <i>Final reports and/or technical guideline agreed – December 2013</i>	<i>Benefits and impacts of mainstream hydropower recognised within the context national and regional power strategies</i>
4. Acquire knowledge to address uncertainty and risk	Most urgent information available by 2013 and continuously used	Monitoring systems (for sediment, fisheries and social issues) operational and data available for necessary analyses and decision making

Priority Action	Targets	Expected Outcomes
<p><i>The uncertainties and risks associated with basin development opportunities, including uncertainties of climate change, require early implementation of a range of studies of strategic importance to fill knowledge gaps and to develop risk mitigation measures, necessary for the opportunities to move to the next stage of study or transboundary appraisal. Immediate analysis will be undertaken of:</i></p>		
<p>(i) Sediment and nutrient trapping and their consequent risks</p> <p><i>Predict changes in sediment transport arising from both ongoing and planned water resources developments. Analyze the impacts of these changes on: river incision; bank erosion; water quality; floodplain sedimentation; productivity of fisheries, agricultural land and wetlands; Delta-shaping processes; and sediment movement to marine water. Identify avoidance, mitigation and enhancement measures.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> <i>Facilitate expert workshop to explore a full range of different opinions and likely consequences of development,</i> <input type="checkbox"/> <i>Develop a program of studies, implement and develop a package of wide ranging future strategies and mitigating actions that will address the adverse impacts that are agreed upon.</i> 	<p><i>Scoping study and TOR - June 2011</i> <i>Expert discussions and workshops, finalizing specific studies and research, finalizing implementation plan – December 2011</i> <i>Mid term report – December 2012</i> <i>Final report 2013</i></p>	<p><i>Enhanced understanding of sediment transport within the basin, the impacts that developments may have on this and guidance on how best to manage sediment flows on a sustainable and viable basis</i> <i>Agreed strategy being implemented for addressing sedimentation and erosion aspects relating to present and future developments.</i></p>
<p>(ii) Reduction of capture fisheries and its social implications</p> <p><i>Identify: fish migration routes; the impact of existing natural and man-made barriers and evidence of adaptation; fish productivity and health under development stresses and associated social implications; fish passage technology options; and the potential role of fisheries production (paddy, ponds, aquaculture, reservoirs) in offsetting loss of capture fisheries (including flagship species) due to water developments.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> <i>Facilitate expert workshop to explore a full range of different opinions and likely consequences of development,</i> <input type="checkbox"/> <i>Develop a program of studies, implement and develop a package of wide ranging future strategies and mitigating actions that will address the adverse impacts that are agreed upon.</i> 	<p><i>Scoping study and TOR - June 2011</i> <i>Expert discussions and workshops, finalizing specific studies and research, finalizing implementation plan – December 2011</i> <i>Mid term report – December 2012</i> <i>Final report 2013</i></p>	<p><i>Enhanced understanding of capture fisheries within the basin, the impacts that developments may have on this and the social economy, and guidance on how best to mitigate negative impacts</i> <i>Agreed strategy being implemented for addressing capture fisheries losses and related impacts on livelihoods relating to present and future developments.</i></p>
<p>(iii) Biodiversity changes</p> <p><i>Identify the biodiversity consequences of development, and suitable indicators and their baseline for monitoring biodiversity loss. One key approach is to consider flagship species, but a broader view is needed to protect species that are an integrated part of wetland functions and services, requiring the mapping of ecosystem units and habitats and the roles of water, sediment and nutrient flows</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> <i>Facilitate expert workshop to explore a full range of different opinions and likely consequences of development,</i> <input type="checkbox"/> <i>Develop a program of studies, implement and develop a package of wide ranging future strategies and mitigating actions that will address the adverse impacts that are agreed upon.</i> 	<p><i>Scoping study and TOR - June 2011</i> <i>Expert discussions and workshops, finalizing specific studies and research, finalizing implementation plan – December 2011</i> <i>Mid term report – December 2012</i> <i>Final report 2013</i></p>	<p><i>Enhanced understanding of bio-diversity within the basin, the impacts that developments may have on this, and guidance on how best to monitor bio-diversity conditions over time</i> <i>Agreed strategy being implemented for addressing threats to biodiversity loss relating to present and future developments.</i></p>
<p>(iv) Social and livelihood aspects and impacts on populations in and around the Tonle Sap, and in the 3S system from future development scenarios.</p>	<p><i>Scoping study and TOR approval – June 2011</i> <i>Interim report identifying range, scope and</i></p>	<p><i>Enhanced understanding of the specific social and livelihood impacts in the mainstream corridor, Tonle Sap, and 3S system</i></p>

Priority Action	Targets	Expected Outcomes
<p><i>Large numbers of communities around the Tonle Sap and in the 3S system are assessed as being significantly impacted by the present and future developments.</i></p> <p><i>Investigate extent of impacts that arise from present and future developments, at sub-area and below levels, work with local administrations and identify solutions and options,</i></p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> <i>Link mitigating measures with national socio-economic programs and with outputs and outcomes from related studies</i> 	<p><i>distribution of impacts and identifying studies to determine mitigating options – June 2011</i></p> <p><i>Mid term report, resulting from work-shopping options and refine processes, goals and targets – December 2012</i></p> <p><i>Final report – June 2013</i></p>	<p><i>that may arise and how to mitigate these</i></p> <p><i>Agreed programs and strategies being implemented that address all aspects of impact mitigation, and benefit and impact sharing, related to affected communities around the Tonle Sap and 3S system.</i></p>
5. Seek benefit and cost sharing options	Options prepared by 2014 and applied continuously	More sustainable options for water resources development that leverage cooperation among countries
<ul style="list-style-type: none"> <input checked="" type="checkbox"/> <i>Options for benefit and risk sharing mechanisms will be identified following a review of international practice</i> <input checked="" type="checkbox"/> <i>The potential for sharing benefits and risks from identified development opportunities to compensate and/or address risks to the environment, other water related sectors and people's livelihoods will be examined</i> <input checked="" type="checkbox"/> <i>MRCS will support and facilitate negotiated solutions for sharing benefits and risks</i> 	<p><i>Project Scoping and TOR approval –July 2012,</i></p> <p><i>Interim report – June 2013,</i></p> <p><i>Final report and endorsement – December 2014</i></p>	<p><i>Options identified and solutions negotiated for sharing benefits and risks that are sensitive to the region, in compliance with MRC Procedures, and respectful of the development strategies and aspirations for regional cooperation of the parties.</i></p>
6. Adapt to climate change	Adaptation strategy developed by 2013	<p>Adaptation strategy mainstreamed in basin and national planning</p> <p>Improved flood and drought management</p>
(i) Assess impacts of climate change on water and related resources of LMB in medium to long term	<p><i>Project Scoping and TOR approval –December 2011,</i></p> <p><i>Interim report on CC impacts studied under other assessments within the Strategy – December 2013,</i></p> <p><i>Final report on CC impacts studied under other assessments within the Strategy completed and endorsed – December 2014</i></p>	<p><i>Improved understanding of the impacts expected from climate change, climate change considerations factored into strategic assessments and appropriate monitoring systems established</i></p>
(ii) Prepare and negotiate a Climate Change Adaptation Strategy for the LMB	<p><i>Project Scoping and TOR approval – December 2012</i></p> <p><i>CCA strategy developed and endorsed – December 2013</i></p>	<p><i>A basin-wide coherent approach to climate change adaptation developed and integrated with basin and national planning</i></p>

Priority Action	Targets	Expected Outcomes
(iii) Pilot schemes for climate change adaptation <input checked="" type="checkbox"/> <i>Pilot of selected adaptation measures to seek successes worthy of scaling up.</i>	<i>Project Scoping and TOR approval – December 2011</i> <i>Pilot schemes selected - June 2012</i> <i>Interim report on pilot schemes - December 2013</i> <i>Final report on pilot schemes - December 2015</i>	<i>Best practice in introducing climate change adaptation measures established in key areas</i>
7. Integrate basin considerations into national systems	Continuously	National water resources development and plans and projects proceed within the identified DOS in compliance with the Strategic Priorities and guidelines
(i) Align national water resources development planning and project identification with identified development opportunities <input checked="" type="checkbox"/> <i>MRCS to facilitate interactions with national agencies and NMC's to identify processes and improvements to harmonise basin-wide and national processes.</i>	 <i>Scoping study and TOR approved – October 2011</i> <i>Discussions, workshops, national consultations with planning and other relevant line agencies – June 2012</i> <i>Agreed processes for each country being implemented December 2012</i>	<i>The move towards sustainable development is enhanced through aligned regional and national planning</i>
(ii) Address identified risks early in project identification and preparation <input checked="" type="checkbox"/> <i>NMCs to identify risks in consultation with line agencies and private developers, MRCS to provide support as needed</i> <input checked="" type="checkbox"/> <i>NMCs to provide early advice on addressing transboundary risks, MRCS to provide support as needed.</i>		<i>Improved project designs which are more responsive to national regulations and to the requirements of transboundary assessment through the PNPCA, as applicable</i>
(iii) Maintain a register of existing, ongoing and planned water resources development and water-related projects at NMCSSs and MRCS <input checked="" type="checkbox"/> <i>Develop the Project Master Database and processes for recording newly identified projects and for regularly updating of the status of projects therein</i> <input checked="" type="checkbox"/> <i>Develop the Project Portfolio and harmonise with Project Master Database and PNPCA and PWUM and establish processes for regular updates and reporting</i>	 <i>Project Scoping and TOR approval – June 2011</i> <i>Project Master Database developed and installed in each country – December 2011</i> <i>Project Portfolio developed and installed at MRCS – December 2011</i> <i>Quarterly updates and annual reports produced from 2012 onwards</i>	<i>Project Master Database and Project Portfolio established along with updating and reporting procedures leading to better coordinated basin management.</i>

Strategic Priorities for Basin Management

Priority Action	Targets	Expected Outcomes
1. Establish basin visions and management strategies of water related sectors	Visions prepared by 2012; Management strategies prepared by 2014	Agreed basin strategies for the development and management of water related sectors (fisheries, hydropower, navigation, flood management, tourism, environment and ecosystem management, watershed management)
(i) Fisheries management <ul style="list-style-type: none"><input type="checkbox"/> <i>Studies to improve fisheries knowledge (Strategic Priority 1 above)</i><input type="checkbox"/> <i>Development of a comprehensive, basin-wide fisheries management strategy that builds on national strategies and plans, recent MRC basin-wide studies, and international best practice</i>		<i>Guidance on fisheries management as an input to basin development and management planning</i>
(ii) Navigation <p><i>The MRC Navigation Programme will prepare:</i></p> <ul style="list-style-type: none"><input type="checkbox"/> <i>A master plan for regional waterborne transport and development of rural water transport,</i><input type="checkbox"/> <i>A master plan for navigation in Cambodia; and</i><input type="checkbox"/> <i>A navigation improvement plan, which will further define the development opportunities for navigation.</i>	<i>Scoping studies and TOR approval – October 2011</i> <i>Preliminary findings presented – June 2012</i> <i>Final reports and strategic guidelines – December 2013</i>	<i>Strategies agreed to promote the opportunities for and manage the attendant risks of increased navigation, such as accidents and environmental damage</i>
(iii) Flood and drought risk management <ul style="list-style-type: none"><input type="checkbox"/> <i>Detailed analysis of flow and flood changes along the mainstream from northern Thailand to the Delta as an input to integrated spatial planning</i>		<i>Predictions of changes in the frequency and intensity of flood and drought events as a result of both development and climate change</i>
(iv) Wetland management <ul style="list-style-type: none"><input type="checkbox"/> <i>Priority attention will be given to those wetlands with ecologically important areas and where people are depending on their services, like the Tonle Sap.</i><input type="checkbox"/> <i>Actions will include monitoring biodiversity loss, promoting integrated wetland management, and supporting implementation of the Ramsar Convention.</i>		<i>Monitoring system for bio-diversity in place and basin-wide wetland management strategies agreed</i>
2. Strengthen national IWRM processes	Continuously	Basic data regarding the status and use of water resources available and accessible for everyone
<i>The Strategy depends on the effective implementation in all countries of the basic processes:</i>		
(i) Capacity building in surface water and groundwater monitoring		
(ii) Capacity building in water use permitting of: <ul style="list-style-type: none"><input type="checkbox"/> <i>Withdrawals and pollution discharges, and</i><input type="checkbox"/> <i>Compliance assurance of permit conditions and regulations</i>	<i>Scoping study and TOR approved – December 2011</i> <i>Data improvement needs determined, program developed – December 2012</i> <i>Data and system improvements completed as per program – December 2014</i>	<i>This will provide a strong foundation for managing and developing water resources in the Basin.</i> <i>Improving and sustaining these essential tasks will require additional financing.</i>
3. Strengthen basin management processes	Continuously	National and basin (regional) procedures, methods, tools and processes strengthened and harmonized, leading to increased

Priority Action	Targets	Expected Outcomes
(i) Strengthening implementation of MRC Procedures <i>Remaining guidelines will be prepared in line with item 2 of Prioritised studies and guidelines below</i>	<i>Guidelines prepared according to priorities set below</i>	basin-wide cooperation for sustainable development and management of the Basin
(ii) Development and promotion of harmonized methods and tools <i>Strengthen and harmonize methods, standards, tools and quality assurance systems relating to water resources management</i>	<i>MRC toolbox launched in 2011 and continuously improved and updated MRC-IS strengthened and updated continuously Studies and guidelines produced as below</i>	<i>Reassertion of MRC Procedures and associated guidelines, and reinforcement of their implementation and effectiveness as enabling conditions for sustainable basin development.</i>
(iii) Strengthen State of Basin monitoring and reporting <ul style="list-style-type: none"> <input checked="" type="checkbox"/> <i>Broaden and strengthen national and basin scale monitoring systems including impacts of climate change impacts</i> <input checked="" type="checkbox"/> <i>Prepare “State of the Basin” report every five years</i> 	<i>Monitoring programmes enhanced in line with targets above State of Basin Report prepared and endorsed – December 2014</i>	<i>Improved understanding of development issues within the Basin and the impacts of implementation the IWRM-based Basin Development Strategy on selected key development indicators</i>
(iv) Project cycle monitoring to support basin planning <i>Develop and implement a system of comprehensive monitoring of project development in the basin, using MRC Procedures and other tools.</i> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> <i>Finalise guidelines for MRC Procedures (item 2 under Prioritised studies and guidelines)</i> <input checked="" type="checkbox"/> <i>Develop and implement Project Master Database (item 7 under Strategic Priorities for Basin Development above)</i> <input checked="" type="checkbox"/> <i>Develop and implement Project Portfolio (item 7 under Strategic Priorities for Basin Development above)</i> 	<i>Project Scoping and TOR approval – June 2011 Project Master Database developed and installed in each country – December 2011 Project Portfolio developed and installed at MRCS – December 2011 Quarterly updates and annual reports produced from 2012 onwards</i>	<i>Promotion of early registration of nationally-identified projects with transboundary implications in the Project Master Database and tracking of their status and main characteristics Enhancement of basin-wide cumulative assessments; monitor the use of the DOS; initiation of dialogues on controversial projects; Population and update of the Project Portfolio for promotion and implementation</i>
(v) Develop a network of national WRM agencies and RBOs <ul style="list-style-type: none"> <input checked="" type="checkbox"/> <i>Establishment of a network for Strategy implementation comprising the national WRM agency in each country (being, the primary national authority for water resources) together with the four NMCs and emerging RBOs.</i> <input checked="" type="checkbox"/> <i>Facilitated interactions by MRCS</i> 	<i>Scoping study and TOR endorsed – October 2011 Network of WRM agencies created and operating under MRCS facilitation – June 2012 Reports on network activities to JC – October 2012</i>	<i>Strengthened IWRM planning, coordination and monitoring and basin wide synergies developed.</i>
(vi) Strengthen and support regional and national stakeholder participation <ul style="list-style-type: none"> <input checked="" type="checkbox"/> <i>Build upon processes developed in Strategy preparation, respecting community and wider popular participation approaches in each country.</i> <input checked="" type="checkbox"/> <i>Assure increased stakeholder access to information through implementation of the</i> 	<i>Scoping study and TOR approved – Dec 2011 Mid term report and key stakeholder forum –</i>	<i>An agreed stakeholder participation program in operation and effectively meeting the needs of stakeholders and countries.</i>

Priority Action	Targets	Expected Outcomes
<i>MRC Communication Strategy and Information Disclosure Policy.</i>	<i>December 2012</i> <i>Agreed stakeholder participation processes operating effectively – December 2013</i>	
(vii) Development of guidelines or mechanisms to facilitate early resolution of disputes <input checked="" type="checkbox"/> <i>Consideration will be given to the development of guidelines or mechanisms that will help the parties to discuss and negotiate at various technical levels, and as needed, at higher policy levels.</i>	<i>Scoping study and TOR endorsed – Oct 2011</i> <i>Network of WRM agencies created and operating under MRCS facilitation – June 2012</i> <i>Reports on network activities to JC – Oct 2012</i>	<i>Processes in place for reducing the likelihood of needing to resort to Articles 34 and 35 of the 1995 Mekong Agreement to resolve disputes within MRC.</i>
4. Develop Basin environmental and social baseline indicators <i>The Strategy places importance on the facilitated development of agreed basin-wide objectives or “baseline indicators” that will cover economic, environmental and social factors, reflecting and respecting national sovereignty, policies and processes.</i> <input checked="" type="checkbox"/> <i>Review international examples of how this approach is developed and used in other river basins;</i> <input checked="" type="checkbox"/> <i>Develop options for countries to consider relating to the Technical Guidelines for implementation of MRC Procedures, such as the PMFM and PWQ and also to achieve the Millennium Development Goal 7 on environmental resources sustainability, aimed at reducing biodiversity loss.</i> <input checked="" type="checkbox"/> <i>Demonstrate, by case studies, how these could impact on basin planning</i> <input checked="" type="checkbox"/> <i>Develop a preferred approach and user guidelines that will assist with future basin planning activities.</i>	<i>Prepared by 2013</i> <i>Project scoping and TOR approval – June 2011</i> <i>International reviews, national consultations, outline of strategy – December 2011</i> <i>Specific studies as required by strategy outline – December 2012</i> <i>Progressive completion of objective statements/benchmarks - December 2012 to December 2014</i> <i>All work completed, objectives and benchmark indicators available for planning use – June 2014</i>	<i>Agreed set of basin biophysical and social indicators to be used to assess future developments</i> <i>Enhanced guidance provided to Strategy implementation and updating and assessment of the impacts of development options.</i>
5. Build capacity for basin level IWRM <i>Implementation of a targeted capacity building programme, linked to the MRC’s overall initiatives and complementary to national capacity building activities, including:</i> <input checked="" type="checkbox"/> <i>Development of robust institutional arrangements;</i> <input checked="" type="checkbox"/> <i>Competent male and female riparian professionals in all water-related fields;</i> <input checked="" type="checkbox"/> <i>Sound basin and national planning and decision making processes; and</i> <input checked="" type="checkbox"/> <i>Effective communications and participation to ensure inputs from all basin stakeholder groups.</i>	<i>Continuously</i> <i>Scoping study and TOR approval – December 2011</i> <i>Targeted capacity building program developed, ready for use – June 2012</i> <i>Program progressively implemented – 2012 to 2015.</i>	<i>Improved coordination and data and information exchange between national line agencies; National capacity to identify, discuss and negotiate mutual beneficial Basin development and management opportunities the Mekong Basin level</i> <i>National water related agencies effectively undertaking IWRM and the oversight and implementation of the Strategy</i> <i>An MRCS that is expert in water resources management and implements its role effectively as coordinator and technical facilitator for preparation of strategies and action plans.</i>

Priority Action	Targets	Expected Outcomes
Prioritised studies and guidelines		
1. Prioritised studies <i>(Studies (i) to (vi) below as in item 4 of Strategic Priorities for Basin Development above)</i>	Completed by 2015	Important knowledge gaps for planning and decision-making on future development are “filled” with required information
Urgent priority studies are listed under item (4) of Strategic Priorities for Basin Development above and include:		
<p>(i) <i>Sediment and nutrient trapping and their consequent risks</i></p> <p>(ii) <i>Reduction of capture fisheries and its social implications</i></p> <p>(iii) <i>Biodiversity changes</i></p> <p>(iv) <i>Social and livelihood aspects and impacts on populations in and around the Tonle Sap, and in the 3S system from future development scenarios.</i></p>		
<p>(v) Other required studies</p> <ul style="list-style-type: none"> <input type="checkbox"/> <i>Identification of priority habitat areas and environmental hotspots and development of management plans for those that would be highly or moderately impacted by potential changes in flow conditions and the proposed LMB mainstream dams</i> <input type="checkbox"/> <i>Mitigation of the impacts of converting much of the mainstream to a series of slow moving waters between proposed LMB mainstream dams</i> <input type="checkbox"/> <i>Assessment of mainstream and tributary hydropower potential and alternative power options, including innovative hydropower schemes that do not affect connectivity in the lower basin</i> <input type="checkbox"/> <i>Detailed modelling of flood-related impacts upstream of Kratie to understand the impacts of flow changes on different river reaches, and how mainstream dams will affect these</i> <input type="checkbox"/> <i>Basin-wide and multi-sector study of 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</i> <input type="checkbox"/> <i>Climate change adaptation studies of sub-basins, to define climate change trends, including extreme events, to incorporate in water-related sector plans, including hydropower</i> <input type="checkbox"/> <i>Monitoring and assessment programme to analyze the implications of climate change on: the basin’s long-term hydrology; on agriculture and food security; and on ecological conditions and bio-diversity</i> <input type="checkbox"/> <i>Updating of groundwater inventories throughout the Basin to set priorities for development and management</i> 		
2. Guidelines	5 guidelines by 2015	Helping hands for planning, using and managing water resources

Priority Action	Targets	Expected Outcomes
	All guidelines by 2020	
<p>(i) Technical guidelines to implement MRC Procedures:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> <i>Technical Guidelines for the implementation of the procedures for maintenance of flows on the mainstream (PMFM)</i> <input checked="" type="checkbox"/> <i>Technical Guidelines for the implementation of the procedures for water quality (PWQ)</i> <p>(ii) Other guidelines in preparation:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> <i>Transboundary EIA framework</i> <input checked="" type="checkbox"/> <i>Preliminary Design Guidance for Mainstream Hydropower</i> <input checked="" type="checkbox"/> <i>Guidelines for Integrated Flood Risk Management</i> <p>(iii) Other guidelines to be determined as per priority:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> <i>Refer to Table 9, Proposed WRM Sector Guidelines (of transboundary significance)</i> 	<p><i>This list will be prioritized by the concerned national line agencies and MRC sector programmes so as to meet immediate needs in the broader water and related resources development context in the basin</i></p>	<p><i>Essential basin-wide water resources management guidelines and guidelines needed for addressing basin-wide issues in sector development and management.</i></p>

Monitoring and evaluation		
1. Monitoring	Developed by 2011 Operational 2012	Planners and decision-makers have at all times the information about the status and impacts of their plans
<p>Develop an NMC based process for reporting on strategy implementation to JC. <i>The Strategy will require a detailed monitoring and reporting process to be developed, that reports to the JC, and that must be driven by national agencies under NMC coordination.</i></p> <p>BDP and NMCs, together with relevant MRC Programmes, develop a reporting process for implementation of the Strategy that is based on activity progress, outputs and outcomes;</p>	<p><i>Scoping study and TOR approved – June 2011</i> <i>Reporting system developed and operating to meet particular needs of Strategy ‘internal reporting’ (ie., between countries, MRCS and JC) – December 2011</i></p>	<p><i>An agreed monitoring and reporting program that provides regular, detailed and accountable reports on the strategy progress to the JC.</i></p>

Priority Action	Targets	Expected Outcomes
2. Evaluation	In 2015	Information whether and how the Basin Development Strategy needs to be adjusted
State of the Basin Monitoring <i>Develop a monitoring programme to assess the impacts of strategy implementation on key indicators of economic, social and environmental conditions within the basin, including linking with the MPCC climate change monitoring (as set out in items 3 under Strategic Priorities for Basin Management and 6 under Strategic Priorities for Basin Development)</i>	<i>Monitoring programmes enhanced in line with targets above</i> <i>State of Basin Report prepared and endorsed – December 2014</i>	<i>Improved understanding of development issues within the Basin and the impacts of implementation the IWRM-based Basin Development Strategy on selected key development indicators</i>
3. Updating		
<p>Preparation of an updated IWRM-based Basin Development Strategy taking into account:</p> <ul style="list-style-type: none"> <input type="checkbox"/> <i>Outcome and considered findings from the State of the Basin Report</i> <input type="checkbox"/> <i>Updated and agreed social and environmental objectives</i> <input type="checkbox"/> <i>Updated national and sectoral development strategies and plans</i> <input type="checkbox"/> <i>Increased knowledge gained from priority and other studies</i> <input type="checkbox"/> <i>Technological advances in analytical and assessment techniques, and</i> <input type="checkbox"/> <i>Following enhanced and agreed stakeholder participatory processes</i> 		
<i>Scoping study and TOR approval – December 2013</i> <i>Interim report following drawing on draft of the State of the Basin report – June 2014</i> <i>First draft Strategy update – March 2015</i> <i>Strategy update endorsed – December 2015</i>		
<i>Basin Development Strategy updated based on new information regarding needs, opportunities and constraints</i>		

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Annex 2 – Supporting documents

The supporting documents comprise available reports and documents, as described below. They provide additional information that will lead to the findings, views and recommendations expressed in the IWRM-based Basin Development Strategy.

Chapter	Document title	Location	Remarks
Supporting information to the chapters with ‘background’ information			
1	1995 Mekong Agreement and Procedures and Rules	http://www.mrcmekong.org/download/agreement_procedure.pdf	
1	Strategic Directions for IWRM in the Lower Mekong Basin (2005)	http://www.mrcmekong.org/download/programmes/bdp/BDP-0512-IWRMstrategy.pdf	
2	Stakeholders Analysis for the MRC Basin Development Plan Programme Phase 2 (BDP2), Final Report (Final, March 2010)	http://www.mrcmekong.org/download/programmes/bdp/BDP-SHA-Final-Mar-2010.pdf	
2	Stakeholder Participation and Communication Plan for Basin Development Planning in the Lower Mekong Basin	http://www.mrcmekong.org/download/Papers/SPCP-Final-July-2009-Final.pdf	
3	Overview of the hydrology of the Mekong Basin (2005)	http://www.mrcmekong.org/download/free_download/Hydrology_report_05.pdf	Report is being updated
3 and 4	State of the Basin Report (2010)	http://www.mrcmekong.org/download/free_download/state_basin_executive_sum.pdf	
4	Hydropower sector review for the joint basin planning process (March 2009)	http://www.mrcmekong.org/download/programmes/bdp/BDP2-Regional-Hydropower-Sector-Review-5-Mar-09.pdf	
4	Regional Irrigation Sector Review for Joint Basin Planning Process (March 2009)	M:\BDP2Share\Thanapon\Irrigation database	Will be published on website soon
4 and 5	National sector reviews (2005)	http://www.mrcmekong.org/download/programmes/bdp/13-Natl_sector_reviews.pdf	
4 and 5	Sub-area reports (2005)	http://www.mrcmekong.org/programmes/bdp/BDP-core-library.htm	
5	Compilation of supporting analysis annexes (2009): development sector reviews, sub-area overviews, water use and impact considerations, and water related opportunities and constraints		Will be published soon
Supporting information to the chapters on the assessment of water related opportunities and constraints			
	Main Report: Assessment of Basin-wide Development Scenarios (November 2010)	http://www.mrcmekong.org/programmes/bdp/findings-ofMekong-Basin-wide-dev-scenario-ass.htm	
	Technical Note 1: Scoping and planning of the assessment of basin-wide development scenarios (March 2009)	http://www.mrcmekong.org/programmes/bdp/findings-ofMekong-Basin-wide-dev-scenario-ass.htm	
	Technical Note 2: Assessment Methodologies (October 2009)	http://www.mrcmekong.org/programmes/bdp/findings-ofMekong-Basin-wide-dev-scenario-ass.htm	

Chapter	Document title	Location	Remarks
	Technical Note 3: Assessment of Flow Changes (February 2010)	http://www.mrcmekong.org/programmes/bdp/fin dings-ofMekong-Basin-wide-dev-scenario- ass.htm	
	Technical Note 4: Impacts on River Morphology (June 2010)	<a href="http://www.mrcmekong.org/programmes/bdp/fin
dings-ofMekong-Basin-wide-dev-scenario-
ass.htm">http://www.mrcmekong.org/programmes/bdp/fin dings-ofMekong-Basin-wide-dev-scenario- ass.htm	
	Technical Note 5: Impacts on Water Quality (June 2010)	<a href="http://www.mrcmekong.org/programmes/bdp/fin
dings-ofMekong-Basin-wide-dev-scenario-
ass.htm">http://www.mrcmekong.org/programmes/bdp/fin dings-ofMekong-Basin-wide-dev-scenario- ass.htm	
	Technical Note 6: Power Benefits (June 2010)	<a href="http://www.mrcmekong.org/programmes/bdp/fin
dings-ofMekong-Basin-wide-dev-scenario-
ass.htm">http://www.mrcmekong.org/programmes/bdp/fin dings-ofMekong-Basin-wide-dev-scenario- ass.htm	
	Technical Note 7: Agriculture Impacts (June 2010)	<a href="http://www.mrcmekong.org/programmes/bdp/fin
dings-ofMekong-Basin-wide-dev-scenario-
ass.htm">http://www.mrcmekong.org/programmes/bdp/fin dings-ofMekong-Basin-wide-dev-scenario- ass.htm	
	Technical Note 9: Impacts on Wetlands and Biodiversity (June 2010)	<a href="http://www.mrcmekong.org/programmes/bdp/fin
dings-ofMekong-Basin-wide-dev-scenario-
ass.htm">http://www.mrcmekong.org/programmes/bdp/fin dings-ofMekong-Basin-wide-dev-scenario- ass.htm	
	Technical Note 10: Impacts on the Tonle Sap Ecosystem (June 2010)	<a href="http://www.mrcmekong.org/programmes/bdp/fin
dings-ofMekong-Basin-wide-dev-scenario-
ass.htm">http://www.mrcmekong.org/programmes/bdp/fin dings-ofMekong-Basin-wide-dev-scenario- ass.htm	
	Technical Note 11: Impacts on Fisheries (June 2010)	<a href="http://www.mrcmekong.org/programmes/bdp/fin
dings-ofMekong-Basin-wide-dev-scenario-
ass.htm">http://www.mrcmekong.org/programmes/bdp/fin dings-ofMekong-Basin-wide-dev-scenario- ass.htm	
	Technical Note 12: Social Impacts (July 2010)	<a href="http://www.mrcmekong.org/programmes/bdp/fin
dings-ofMekong-Basin-wide-dev-scenario-
ass.htm">http://www.mrcmekong.org/programmes/bdp/fin dings-ofMekong-Basin-wide-dev-scenario- ass.htm	
	Technical Note 13: Economic Benefits and Costs (June 2010)	<a href="http://www.mrcmekong.org/programmes/bdp/fin
dings-ofMekong-Basin-wide-dev-scenario-
ass.htm">http://www.mrcmekong.org/programmes/bdp/fin dings-ofMekong-Basin-wide-dev-scenario- ass.htm	
	MRC SEA for Hydropower on Mekong Mainstream- Final Report (October 2010)	<a href="http://www.mrcmekong.org/ish/SEA/SEA_F
R_summary_13oct.pdf">http://www.mrcmekong.org/ish/SEA/SEA_F R_summary_13oct.pdf	

Annex 3 – Consultation records

Date	Subject/objectives	Key stakeholders engaged
Regional Stakeholder Consultation		
1 12-13 March 2008	<p>To introduce the MRC Basin Development Plan Programme Phase 2 to Stakeholder groups and seek their inputs to complement the draft BDP2 Inception report, as well as to enhance their engagement in the BDP process and in the work of the MRC in general.</p> <p>To initiate discussions and share views on development opportunities in LMB, aiming at mobilizing countries and stakeholders in preparing the IWRM-based Basin Development Plan, as called for in the 1995 Agreement, which will equitably utilise some of the common Mekong water and related resources to achieve equal socio-economic benefits for all countries while preserving the Basin's rich riverine system.</p> <p>To build partnerships between the MRC/BDP2 and stakeholder groups for a fruitful BDP process and sustainable development of the Basin.</p>	More than 200 participants from government agencies, dialogue partners, University researchers, RBCs, provinces, NGOs, CSOs, Development partners, professional associations, private developers, International Financial Institutions and the media
2 15-17 October 2009	<p>Sharing knowledge and understanding of the critical water resources development issues in the MRB and how the water and related resources can be developed and managed</p> <p>Inputs from a large variety of stakeholders to the approach and methodology proposed for the assessment of Basin-wide development scenarios and the preparation of the IWRM-based Basin Strategy</p>	More than 250 participants from government agencies, dialogue partners, University researchers, RBCs, provinces, NGOs, CSOs, Development partners, professional associations, private developers, International Financial Institutions and the media
3 29-30 July 2010	<p>To present and discuss the results of the basin-wide scenario assessment for the finalization of the assessment, and the use of the results to determine what would be the acceptable level of water resources development in the LMB.</p> <p>To present and discuss the draft Strategy for development and management of the Mekong water and related resources (IWRM-based Basin Development Strategy), and provide inputs for planning and decision making by the LMB Countries.</p> <p>To facilitate a critical dialogue on the future of RBOs in the Mekong region to support the implementation of the Basin Development Strategy.</p> <p>To continue strengthening of partnerships between MRC and stakeholders</p>	More than 250 participants from government agencies, dialogue partners, University researchers, RBCs, provinces, NGOs, CSOs, Development partners, professional associations, private developers, International Financial Institutions and the media

Date	Subject/objectives	Key stakeholders engaged
Regional Technical Working Group		
1 6-7 March 2008	<p>To build a common understanding on the objectives and working arrangements of the Regional TWG: TOR, Workplan, expected roles of members and other arrangements (convener, meeting schedule, etc)</p> <p>To discuss and provide inputs on:</p> <p>Proposed approach to formulation and assessment of basin-wide development scenarios</p> <p>Draft BDP Assessment Framework</p> <p>Initial concept and outline of the IWRM-based basin strategy</p> <p>To discuss and agree on the roadmap to achieve final BDP outputs i.e. the basin-wide development scenarios and IWRM-based basin strategy for approval by JC and Council</p>	RTWG Members, MRC Programme Representatives, RBDP Team
2 6 June 2008	<p>Discuss overall process to formulate and assess scenarios</p> <p>Discuss proposed criteria to screen significant project to formulate scenarios</p> <p>Discuss further refined criteria and indicators to assess scenarios</p>	
3 23-24 June 2008	<p>To review the final draft of the following Discussion papers and illustration of the proposed approaches</p> <p>Proposed approach to formulation and assessment of basin-wide development scenarios</p> <p>Draft BDP Assessment Framework</p> <p>Draft concept and outline of the IWRM-based basin strategy</p> <p>To consider endorsement of the draft Discussion papers for submission to the Joint Committee</p>	RTWG Members, MRC Programme Representatives, RBDP Team
4 8-9 December 2008	<p>To present the initial hydrological impacts of fast tracked basin-wide water resources development scenarios</p> <p>To discuss and agree on the scope and plan for the formulation and hydrological assessment of normal track basin-wide water resources development scenarios</p> <p>To discuss the proposed scope for environmental, social and economic impacts, building upon results and lessons learned from the fast track and agree on priority activities</p> <p>To discuss and agree on the process for the preparation of the IWRM-based Basin Strategy</p>	RTWG Members, MRC Programme Representatives, RBDP Team
5 18-19 March 2009	<p>To review the preliminary results of hydrological assessment of priority scenarios and discuss next steps to finalize the hydrological assessment</p> <p>To discuss the updated Scoping of formulation and assessment of basin-wide development scenarios and Terms of References for assessment of economic, environment and social impact assessment</p> <p>To discuss the revised outline of the IWRM-based Basin Strategy and next steps in the preparation of the Strategy.</p>	RTWG Members, MRC Programme Representatives, RBDP Team

	Date	Subject/objectives	Key stakeholders engaged
6	25-29 May 2009	<p>To update on progresses of the hydrological assessment and the economic, environment and social impact assessment of basin-wide development scenarios</p> <p>To discuss the 1st draft Strategy (version 2) that incorporates comments from national consultations and MRCS internal discussion</p> <p>To seek inputs and build a common understanding of the concept of the Project Portfolio and its guideline</p> <p>To discuss sample Project Portfolio and Master Project Database</p>	RTWG Members, MRC Programme Representatives, RBDP Team
7	13-14 October 2009	<p>To update on the progress and discuss the draft results of the hydrological assessment of basin-wide development scenarios and the next steps</p> <p>To discuss the detailed approaches to the economic, environment and social impact assessment of the scenarios and the next steps</p> <p>To update on the progress including the guidance from the Joint Committee for the IWRM-based Basin Development Strategy and to discuss the Consultation draft number 1 of the Strategy and next step</p>	RTWG Members, MRC Programme Representatives, RBDP Team
8	1-2 February 2010	<p>To review the draft results of the hydrological and socio-economic and environment impact assessment of basin-wide development scenarios</p> <p>To discuss with the expert team on methodologies, draft results and areas for improvement</p> <p>To agree on the next steps in terms of national and regional discussion and consensus building</p>	RTWG Members, MRC Programme Representatives, RBDP Team
9	7-8 June 2010	<p>To discuss outcomes of national consultations on of the updated results of the basin-wide development scenario assessment</p> <p>To discuss the draft final results and how they have incorporated the comments</p> <p>To discuss “preferred scenarios” and possible “Development space” for water and related resources development in LMB in the next 20 years as emerging from national discussions</p> <p>To discuss possible associated Strategic Guidance for the IWRM-based Basin Development Strategy</p>	RTWG Members, MRC Programme Representatives, RBDP Team

National Consultations in Cambodia, Lao PDR, Viet Nam and Thailand

1-3	3 times per country from April-November 2010	<p>Discussion of approach and methodology and the initial, interim and final results of the Basin-wide Development Scenarios assessments</p> <p>Parallel discussion of draft outline of the Strategy and the consecutive drafts of the IWRM-based Basin Development Strategy</p>	NMCSs' representatives, National Working Group Members, other Line Agencies representatives, Subarea Working Group Members
4	31 May-2 June, 2010	Sub-area Transboundary Meeting: Discussion of visions for the 3S River Basins	Analysis and discussion of current situation and trends within the 3 river basins and 3S River Basins in broader LMB context

Date	Subject/objectives	Key stakeholders engaged
National Advisory/Facilitations for IWRM-based Basin Strategy		
1 5-8 January 2009	<p>To brief the Riparian Advisors/Facilitators on BDP 2 and progress especially in terms of basin-wide scenario analysis and preparation of the IWRM-based Basin Strategy</p> <p>To discuss and plan for the assignment including clarification on TOR, objectives, expected outputs, process in each country and coordination amongst the Group, NMCs and MRCS</p> <p>To discuss the outline and timeframe for the Country Brief and preparation of process for consultation/dialogue in support of the preparation of the IWRM-based Basin Strategy</p>	National Advisors, RBDP Team
2 2-4 March 2009	<p>To discuss the Country perspectives for the Strategy</p> <p>To work on the improved outline of the IWRM-based Basin Strategy, based on comments from the National Advisors/facilitators</p> <p>To discuss and agree on the plan to prepare the 1st draft Strategy</p> <p>To discuss and establish working mechanisms and plan for the IWRM-based Basin Strategy among International consultant and National advisors/facilitators</p>	National Advisors, RBDP Team
3 1-2 April 2009	<p>To discuss the 1st draft IWRM-based Basin Strategy</p> <p>To discuss a national consultation/dialogue process for a national policy and strategy and consultation/dialogue at basin level</p>	National Advisors, RBDP Team
4 12-13 May 2009	<p>To discuss the comments and suggestions from National consultations on the 1st Draft IWRM-based Basin Strategy (version 2) including proposed responses</p> <p>To discuss the preparation for the 6th RTWG and way forward</p>	National Advisors, RBDP Team
5 26 May 2009	<p>To discuss and agree on the content of the next version of the Strategy document, considering the recent comments and suggestions from the national meeting in Thailand and the RTWG</p>	National Advisors, RBDP Team
6 16-17 June 2009	<p>Comments and revision of the 1st draft Strategy, working paper version 3</p> <p>Linkage between BDP and SEA</p> <p>Re-arrange the informal JC discussion and preparation for reporting on the Strategy to the 30th meeting of the JC</p>	National Advisors, RBDP Team
7 19 August 2009	<p>To take stock of the guidance from the JC on the Strategy process and discuss ways forward</p> <p>To discuss the required process at national and regional level to allow fully informed discussions on the results of assessment and the draft definition of Development Space and the Strategic Directions</p> <p>To plan for the inputs by the Advisory Group until the Council Meeting in November 2009</p>	National Advisors, RBDP Team

	Date	Subject/objectives	Key stakeholders engaged
8	3 January 2010	To discuss how to prepare the complete draft of the IWRM-based Basin Development Strategy and its Supporting Analysis Volume To discuss the required process at national and regional level to allow fully informed discussions on the results of assessment and the finalization of the Strategy for JC endorsement by August and Council approval by November 2010	National Advisors, RBDP Team
9	3 February 2010	To review the draft Basin-wide Development Scenarios results To revisit the MRC Council Comments and Recommendations on the incomplete draft of IWRM-based Strategy To discuss the required process at national and regional level to allow fully informed discussions on the results of assessment and the finalization of the IWRM-based Strategy before March 2010 and plan for the inputs by the Advisory Group	National Advisors, RBDP Team
10	7 May 2010	To discuss the complete results of basin-wide development scenario assessment To brainstorm on the content of Chapter 7 of the IWRM-based Basin Development Strategy To prepare for national consultations on the results of scenario assessment and national perspectives on the missing chapters of the IWRM-based Basin Development Strategy, 9th RTWG and Informal JC Meeting	National Advisors, RBDP Team
11	09 June 2010	To discuss the options for “development space” as emerging from national and RTWG discussions To discuss possible Strategic Guidance To discuss the next steps in reaching regional consensus of the “Development Space” and Strategic Guidance and the finalization of the IWRM-based Basin Development Strategy for JC and Council approval	National Advisors, RBDP Team
12	08 July 2010	To discuss draft Chapter 6 and 7 of the Strategy, taking stock of initial feedbacks of 3rd consultation in Thailand To prepare for the 3rd National consultations To discuss and agree on the preparation of the complete draft Strategy	National Advisors, RBDP Team
13	23 September 2010	To discuss the feedbacks from national/Joint Committee Working Group on the 1 st Complete draft IWRM-based Basin Development Strategy To discuss in details the necessary improvements of the draft Strategy	National Advisors, RBDP Team
14	11 November 2010	To take stock of comments from national consultations/national line agencies on the 2nd draft of the Strategy To discuss the ways to incorporate the comments and prepare the 3rd draft of the Strategy To discuss the draft Working Document “Toward an IWRM-based Basin Development Strategy” for its finalization	National Advisors, RBDP Team

MRC Programmes and others

1-3	From February-October 2010	MRC Programmes Discussion of approach and methodology and the initial, interim and final results of the Basin-wide Development Scenarios assessments	CEO, MRC Programme representatives, RBDP Team
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Date		Subject/objectives	Key stakeholders engaged
4	25-26 July 2008	<p>Consultation with M-Power</p> <p>To discuss and provide inputs for the improvement of three BDP discussion papers prepared by MRCS BDP Team, namely</p> <ul style="list-style-type: none"> <input type="checkbox"/> Draft approach and process to formulate and assess basin wide development scenarios; <input type="checkbox"/> Draft Assessment Framework for the development of the IWRM based basin development plan; <input type="checkbox"/> Draft IWRM based basin strategy for the Lower Mekong Basin. <p>To build a common approach to basin-wide development scenario formulation and assessment and the purpose, scope and outline of the IWRM strategy for basin development and management</p> <p>To sharpen understanding of scenarios, hydrological modelling, cumulative impact assessment (CIA), and Strategic Environmental Assessment with a focus on the challenges for the MRCS.</p>	Selected experts from M - Power with credible experience in scenario work and IWRM issues in MRB/LMB and the RBDP team
Panel of Experts			
1	5-14 May 2010	<p>Contribute to the relevance and quality of the aforementioned main BDP2 outputs (which come in the form of reports, models, databases, process, etc), while understanding the purpose, schedule, resources, and the wider context of the BDP2.</p> <p>Provide clear and practical recommendations, based on demonstrable experience and solid rationale, aiming to ensure that the BDP process and its outputs are of the highest quality and reliability.</p>	Regional POE members
2	11- 17 June 2010	<p>Contribute to the relevance and quality of the aforementioned main BDP2 outputs (which come in the form of reports, models, databases, process, etc), while understanding the purpose, schedule, resources, and the wider context of the BDP2.</p> <p>Provide clear and practical recommendations, based on demonstrable experience and solid rationale, aiming to ensure that the BDP process and its outputs are of the highest quality and reliability.</p>	Regional and international POE members
3	28 September- 8 October 2010	<p>Contribute to the relevance and quality of the aforementioned main BDP2 outputs (which come in the form of reports, models, databases, process, etc), while understanding the purpose, schedule, resources, and the wider context of the BDP2.</p> <p>Provide clear and practical recommendations, based on demonstrable experience and solid rationale, aiming to ensure that the BDP process and its outputs are of the highest quality and reliability.</p>	Regional and international POE members
JC Working Group Meeting on the IWRM-based Basin Development Strategy			
1	30 August 2010	<p>To discuss and agree on objective and working principles of the JC Working Group</p> <p>To take stock of the progress to date with the scenario assessment results and the preparation of the IWRM-based Basin Development Strategy</p> <p>To discuss country's perspectives and expectations and the ways forward to reach agreement and to finalize the Strategy</p> <p>To agree on the next steps including working schedule of the Working Group</p>	JCWG members, RBDP Team

	Date	Subject/objectives	Key stakeholders engaged
2	23 September 2010	To review and discuss the 1st Complete Draft IWRM-based Basin Development Strategy To share feedbacks from concerned national line agencies and policy makers from countries as appropriate To reconfirm the working schedule of the JC WG to meet the agreed target for the finalization and approval of the Strategy	JCWG members, RBDP Team
3	06 October 2010	To discuss 2nd Complete Draft IWRM-based Basin Development Strategy and share feedbacks from POE To reconfirm the working schedule of the JCWG to meet the agreed target for the finalization and approval of the Strategy	JCWG members, RBDP Team
4	23 November 2010	To provide comments on the 3rd draft of the Strategy, including comments from the JC Members To agree on the finalization of the Strategy	JCWG members, RBDP Team
5	06 January 2010	To provide final comments on the 4th draft of the IWRM-based Basin Development Strategy To agree on the final draft of the Strategy for further submission to MRC JC and Council approval	JCWG members, RBDP Team
MRC Joint Committee			
1	25 July 2009	Informal JC meeting To present to the JC the Working paper version 3 To seek JC guidance on the objectives, scope and the approach to prepare the Strategy including its Strategic Directions	JC Members, NMCs Representatives, National Advisors and RBDP Team
2	29-30 July 2010	30th JC Meeting Endorsement of key principles, approach and process to prepare IWRM-based Basin Development Strategy	JC Members, NMCs and National Line Agencies representatives and RBDP Team
3	25-26 August 2010	32nd JC Meeting Report on progress of the assessment of basinwide development scenarios and the preparation of the IWRM-based Basin Development Strategy, the initial findings of the scenario assessments	JC Members, NMCs and National Line Agencies representatives and RBDP Team
4	27 October 2010	Special Session of the JC Discussion of the second draft of the IWRM-based Basin Development Strategy Recommendations for further improvements based on comments made	JC Members, NMCs and National Line Agencies representatives and RBDP Team
5	24 January 2011	33rd JC Meeting Discussion of the final draft of the IWRM-based Basin Development Strategy Endorsement of the final draft of the Strategy for further submission to MRC Council approval	JC Members, NMCs and National Line Agencies representatives and RBDP Team
MRC Council			
1	26 January 2011	17th Council Meeting and Joint Meeting with the DCG Approval of the IWRM-based Basin Development Strategy Recommendations for its implementation	JC and Council Members, NMCs and National Line Agencies representatives and Development Partners' Representatives

Date		Subject/objectives	Key stakeholders engaged
Training			
1	18-22 November 2008	IWRM Training Building IWRM planning capacity amongst NMCs and line agencies to support the production of the IWRM-based Basin Development Plan and a sustainable BDP process	RBDP Team, National BDP Team, Regional Technical Working Group Members and National Working Group Members
2	November 16-19, 2010	Negotiation Skills Training/Workshop Increased understanding of the nature of multiple parties' negotiation in the context of increased interest in Mekong region's management and utilization of water and related resources. Improved knowledge on (a) the principles of win-win negotiation, (b) flow of negotiation, and (c) the development of active-engagement strategies for multiple parties negotiation Increased skills in (a) planning for a negotiation strategy that includes clear negotiating objectives, detail analysis of the situation of management and utilization of water and related resources of different negotiation partners, (b) developing best possible 'deals' or 'best alternatives to a negotiated agreement' (BATNA) prior to and during any possible related negotiation, (c) identifying most relevant negotiation tactics/strategies for multiple parties settings negotiation, (d) preparing for possible trade-offs, ect. Better understanding of possible sources of conflicts in a negotiation process such as (a) mismatches in mindsets,(b) difference in interests, (c) difference in culture and (d) difference in power positions, The ability to develop general principles or formula for an effective IWRM negotiation that consist of common terms, referents, and fairness criteria. Identified next steps to ensure the increasing general knowledge and skills on negotiation among participants.	30 participants from key national line agencies, National Mekong Committee Secretariat (NMCSs) and MRC Secretariat (MRCS)