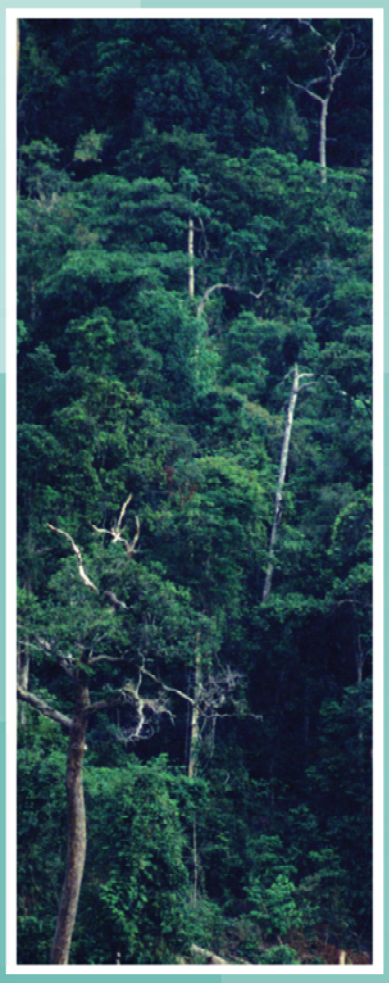

# The MRC Basin Development Plan

## Sub-area Analysis and Transboundary Planning

**BDP Library Volume 2**

**December 2004**
**Revised January 2006**

**Mekong River Commission**

# BDP

## The MRC Basin Development Plan

## Sub-area analysis and transboundary planning

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December 2004, revised January 2006

Mekong River Commission

# Foreword

The BDP Library was compiled towards the end of Phase 1 of the BDP Programme. It provides an overview of the BDP formulation, together with information about the planning process and its knowledge base, tools and routines.

The library incorporates the essence of more than a hundred technical reports, working papers and other documents. It consists of 15 volumes:

1 The BDP planning process

2 Sub-area analysis and transboundary planning

3 Sub-area studies (including 13 sub – volumes)

4 Scenarios for strategic planning

5 Stakeholder participation

6 Data system and knowledge base

7 MRCS Decision Support Framework (DSF) and BDP applications

8 Economic valuation of water resources (RAM applications)

9 Social and environmental issues and assessments (SIA, SEA)

10 IWRM strategy for the Lower Mekong Basin

11 Monographs. March 2005

12 Project implementation and quality plan

13 National sector reviews

14 Regional sector overviews

15 Training

The work was carried out jointly by MRC and the NMCs with comprehensive support and active participation by all MRC programmes and more than 200 national line agencies. Financial and technical support was kindly granted by Australia, Denmark, Japan, Sweden and Switzerland.

The library has been produced for the purpose of the BDP and is intended for use within the BDP Programme. The work was done from 2002 to 2005, and some information may already have been superseded by new developments and new knowledge. The library does not reflect the opinions of MRC nor the NMCs.

It is hoped that the work will contribute to the sustainable development of water resources and water-related resources in support of the MRC vision of *'an economically prosperous, socially just and environmentally sound Mekong River Basin'.*

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# Acknowledgement

The BDP sub-area analyses were carried out by the NMCs and a large number of national line agencies and other institutional and individual stakeholders, including provincial department staff and the academic community. In the case of Thailand, the new River Basin Committees served as a platform for the work. The data, information, contributions, guidance and support received in connection with the work have been indispensable and are gratefully appreciated.

# Acronyms and abbreviations

| | | |
|---|---|---|
| BDP | : | Basin Development Plan (of MRC) |
| CNMC | : | Cambodia National Mekong Committee |
| DSF | : | Decision-Support Framework (of MRC) |
| EIA | : | environmental impact assessment |
| GWP | : | Global Water Partnership |
| HRD | : | human resources development |
| IWRM | : | integrated water resources management |
| LMB | : | Lower Mekong Basin (the Mekong Basin parts of Cambodia, Lao PDR, Thailand and Viet Nam) |
| LNMC | : | Laos National Mekong Committee |
| MDBC | : | Murray-Darling Basin Commission |
| MRC | : | Mekong River Commission |
| MRCS | : | Mekong River Commission Secretariat |
| NA, n/a | : | not applicable |
| NMC | : | National Mekong Committee |
| RAM | : | Resource Allocation Model (of BDP) |
| TNMC | : | Thailand National Mekong Committee |
| VNMC | : | Viet Nam National Mekong Committee |
| WSM | : | watershed management |
| WUP | : | Water Utilization Programme (of MRC) |

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# Executive summary

## *General*

The Basin Development Plan (BDP) aims to provide a general planning tool and process as a framework for regional cooperation in developing the water resources of the Lower Mekong Basin (LMB). Planning in the LMB has traditionally been carried out on a sectoral basis at country or provincial level with little regard for impacts in neighbouring areas. The core of the BDP is to promote coordination of planning across sectors and countries, and to ensure that effects of development outside the immediate area are taken into account.

The concept of sub-areas of the LMB was proposed to facilitate this planning process. Sub-areas will be used to assist in identifying and zoning areas for integrated management and development of water and water-related resources. The advantages of using a smaller planning unit than the whole LMB or single countries include:

- Better coordination across sectors;
- closer coordination with existing developments;
- improved stakeholder involvement;
- decentralisation, with enhanced potential for 'bottom up' planning; and
- opportunity to define regions with common planning issues which transcend national borders.

Sub-areas for the BDP are units for integrating and reporting on water resources planning at regional scales. They do not replace the current planning units, and have no legal significance. The proposed sub-areas may not be useful for all planning purposes, and it might be appropriate to consider other types of units, or the LMB as a whole, for some applications.

## *Approach*

The sub-area analyses were conducted and reported between late 2002 and early 2005 by working groups established for the purpose [1] under guidance by the NMCs and with technical support by MRCS.

In parallel, a targeted supportive capacity-building programme was carried out, partly under the MDBC training programme, and partly at the initiative and management of the NMCs under the BDP programme.

Following the basic analyses, a series of so-called transboundary meetings were held (in late 2004) between sub-areas in different countries that shared a sub-catchment of the basin and sub-areas that face each other across the Mekong mainstream.

The outcomes of the sub-area analyses have been carried forward to the basinwide scenario analyses, strategy formulation, and project portfolio.

[1] In the case of Thailand in close liaison with the new River Basin Committees

### *Results*

The sub-area analyses have been published in a series of sub-area study reports. They have produced

- baseline descriptions of the situation in each sub-area with regard to water resources and water-related resources for relevant water-consuming or water-dependent sectors;
- an overview of water-related concerns and development opportunities in each sub-area;
- linkages between different sector planning processes and development priorities at sub-area level;
- linkages between the basinwide, the national, and the de-central planning processes;
- development scenarios at sub-area level; and
- identification of water-related development initiatives for further screening and consideration under the BDP.

The sub-area reports have been circulated via the BDP Archive CD and are being compiled into an upcoming GIS-based BDP Planning Atlas (in preparation, early 2006).

### *Transboundary meetings*

A series of 5 transboundary meetings were held in late 2004 between adjacent sub-areas in neighbouring countries.

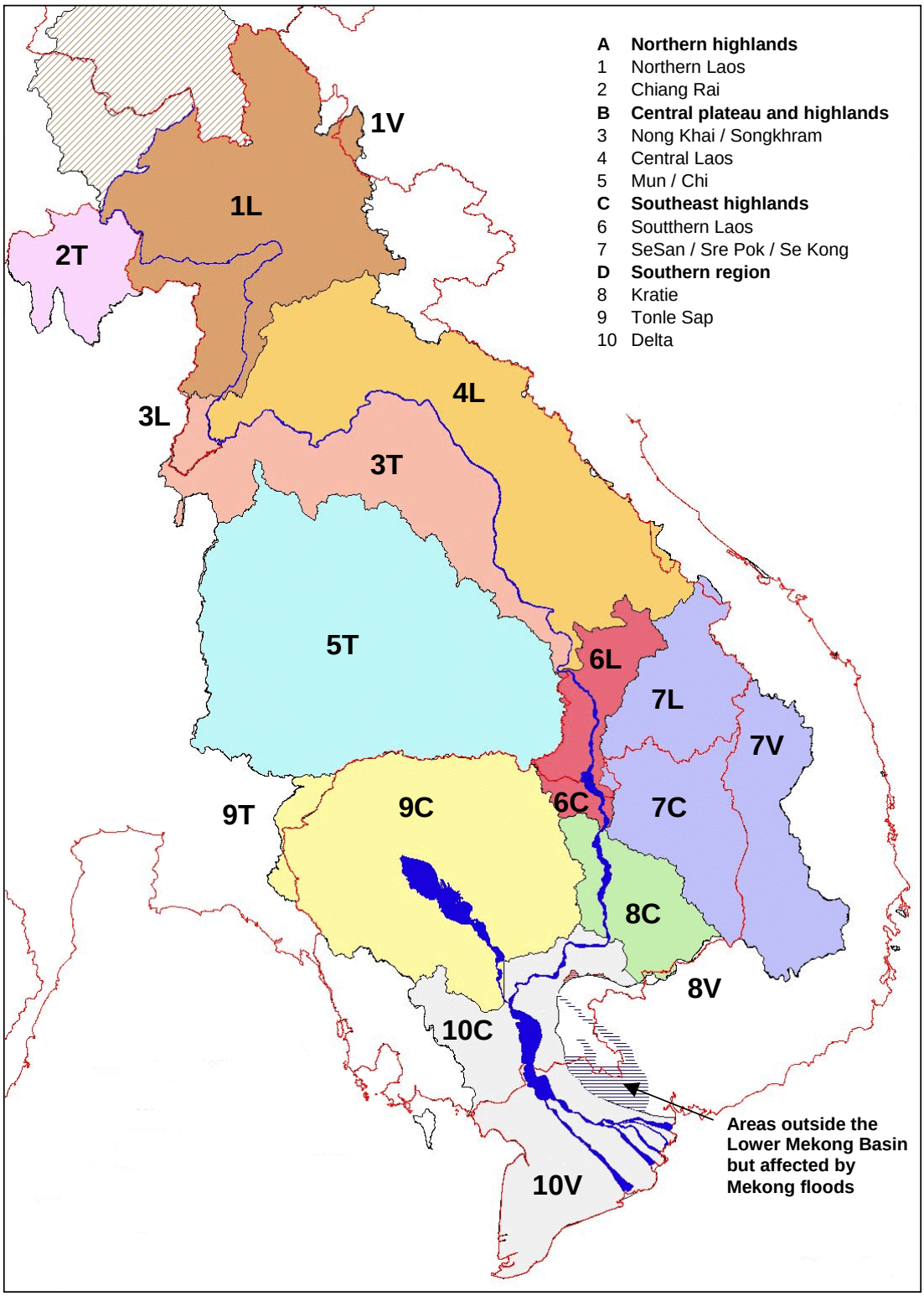
The meetings identified shared concerns and shared development opportunities. As one outcome, they raised 69 suggestions on water-related development initiatives. These were distributed as follows (in random order):

| | |
|---|---|
| Agriculture | 9 project ideas |
| Fisheries | 8 project ideas |
| Floods and drought management and mitigation | 7 project ideas |
| Morphological management and river bank protection | 6 project ideas |
| Watershed management | 6 project ideas |
| Public water supply | 6 project ideas |
| Navigation and river transport | 6 project ideas |
| Institutional development, capacity building, IWRM | 6 project ideas |
| Hydropower | 5 project ideas |
| Environmental management | 5 project ideas |
| Tourism | 5 project ideas |

The ideas comprised structural intervention (preparatory studies and implementation) as well as policy and decision-support studies and institutional development efforts.

Following a review of strategic significance, political support, benefits, and relations (including possible overlaps with other activities), the ideas will be carried forward to a live portfolio of priority development initiatives.

# Map of BDP sub-areas



# 1 Introduction

The MRC Basin Development Plan (BDP) was instituted by the April 1995 Mekong Agreement. Following a series of preparatory studies, the BDP project document was approved by the MRC Council in October 2000. The BDP formulation (Phase 1) started in October 2001 and is scheduled for completion in July 2006.

The vision of the Basin Development Plan (BDP) is to contribute to acceleration of inter-dependent sub-regional growth by establishing a process and framework conducive to investment and sustainable development. To contribute to this vision, the BDP process being undertaken by the Mekong River Commission (MRC) should establish a planning framework for development programmes, capable of balancing efficient use of resources with protection of the environment and the promotion of social justice and equity.

There are two main outputs sought from the first phase of the BDP programme. First, the establishment of a more participatory form of basin planning than has previously existed in the Lower Mekong Basin for use in subsequent planning rounds. Second, an agreed short-list of high priority development projects with basin-wide or trans-boundary significance which have benefits that transcend national borders.

This paper describes the basic sub-area analyses that provided a cornerstone in the Phase 1 planning process.

## 1.1 Origin of document

The document is based on reports and working papers prepared between March 2002 and December 2004:

MRC-BDP (Mar 02): BDP20: Working groups for basin development plan. Draft guideline

MRC-BDP (Sep 02): BDP sub-area analysis. Draft guideline

MRC-BDP (Nov 03): Sub-area reports (draft format, indicative)

MRC-BDP (Mar 04): Identification of sub-areas of the LMB for the Basin Development Plan

MRC-BDP (May 04): Sub-area transboundary meeting, draft guideline

MRC-BDP (Dec 04): Report on sub-area transboundary meetings

## 1.2 Basis and context

### 1.2.1 Link/relationship of subject to IWRM

The relationship to IWRM is illustrated by Agenda 21, which recommends that *'Integrated water resources management, including the integration of land- and water-related aspects, should be carried out at the level of the catchment basin or sub-basin'.* [1]

The sub-area analyses provided, at this planning level, a cross-sector overview and an inter-sector coordination that are among the particular advantages of IWRM.

### 1.2.2 Link/relationship of subject to BDP Inception Report

The Inception Report retains the stage-wise approach to BDP formulation that had been identified during the programme formulation:

Stage 1 - analysis of the LMB and of sub-areas

Stage 2 - analysis of development scenarios

Stage 3 - strategy formulation

Stage 4 - compilation of long-list of programmes and projects

Stage 5 - compilation of short-list of programmes and projects

The sub-area analyses are an important part of Stage 1, from where the results are carried forward to the subsequent stages.

### 1.2.3 Link/relationship of subject to other BDP reports / activities

The sub-area analyses are linked to many other BDP activities. In addition to national planning documents, they are partly based on the national and regional sector overviews prepared under the BDP [2], as well as the MRC State of Basin Report.

The work was supported by a comprehensive, targeted capacity-building, partly under the MDBC training programme, and partly at the initiative and management of the NMCs under the BDP programme. [3]

Also, the work has been linked to the public participation in the planning process. [4]

Results of the sub-area analyses have been carried forward to the subsequent basinwide analyses, as published in a large number of documents, and are being compiled into an upcoming GIS-based BDP Planning Atlas (in preparation, early 2006).

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1 Agenda 21, Article 18.9

2 As synthesized in BDP Library volumes 13 and 14

3 Cf. BDP Library volume 15

4 Cf. BDP Library volume 5

### 1.2.4 Link/relationship of subject to BDP's Logical Framework Matrix

In the Logical Framework Matrix (from the BDP Inception Report), the sub-area analyses cover the following outputs and activities fully or partly:

Output 2.1: Sub-area studies

Activity 2.1.1: Sub-area identification

Activity 2.1.4: National working groups

Activity 2.1.5: Sub-area analysis

Activity 2.1.6: Sub-area development options

Activity 2.1.7: Data assessment

Activity 2.1.8: Public participation

Output 2.3: Sub-area strategies

Activity 2.3.1: Formulation of strategies

Activity 2.3.2: Stakeholder analysis

Output 2.5: Project long-list

Activity 2.5.1: Identification

## 1.3 Significance

### 1.3.1 Significance of subject for strategic planning

In the Lower Mekong Basin, important levels for strategic planning include:

1 The basin level (i.e. the Lower Mekong Basin), within the mandate of MRC, and involving the NMCs;

2 The national level, within the mandate of the national governments and involving their various government agencies; and

3 The sub-area (or sub-basin) level, under the mandate of River Basin Committees/River Basin organizations (where they exist), and otherwise typically involving the provincial administrations and the provincial departments of the national line agencies.

In this context, the sub-area working groups have established important linkages between the planning levels, as well as between the different water-consuming or otherwise water-dependent sectors.

It is believed that the inter-sector liaison formed by the NMCs within the sub-area working groups have been innovative and have fully proven their high value to IWRM in general and to holistic strategic water resources planning in particular.

### 1.3.2 Significance of subject for Mekong Basin

Between them, the studies have provided information about baseline conditions, development trends as they appear at present, development needs and options, and an assessment of potential future developments.

The sub-area analyses have provided indispensable contributions to the basinwide strategy formulation and identification of useful and practical development interventions.

### 1.3.3 Significance of subject for MRCS / BDP 1

The studies have formed a platform for basinwide scenario analysis of inter-sector dependencies (describing synergies and constraints), which is useful to all MRC programmes. Also, the studies have provided the basis for the preparation of a holistic, integrated IWRM Strategy[1] and for identification of viable development projects under BDP Phase 1.

# 2 Summary of approach

## 2.1 BDP sub-areas

For the purpose of the BDP process, the Lower Mekong Basin has been divided into 10 sub-areas. Most of these have been sub-divided into national sub-areas, of which there are 19.

*Table 2.1: BDP sub-areas*

| Major sub-area | | | National sub-area | |
|---|---|---|---|---|
| | *area (km2)* | *% of LMB* | | *area (km2)* |
| 1 Northern Laos | 80100 | 13% | 1L | 78700 |
| | | | 1V | 1376 |
| 2 Chiang Rai* | 17300 | 3% | 2T | 17300 |
| 3 Nongkhai / Song Khram | 50600 | 8% | 3L | 3400 |
| | | | 3T | 47200 |
| 4 Central Laos | 87100 | 14% | 4L | 86300 |
| | | | 4V | 800 |
| 5 Mun / Chi | 119100 | 19% | 5T | 119100 |
| 6 Southern Laos | 19100 | 3% | 6C | 3200 |
| | | | 6L | 15700 |
| 7 Se San – Sre Pok – Se Kong | 78300 | 12% | 7C | 26000 |
| | | | 7L | 22700 |
| | | | 7V | 29700 |
| 8 Kratie | 22700 | 3% | 8C | 22300 |
| | | | 8V | 400 |
| 9 Tonle Sap | 86000 | 14% | 8C | 81800 |
| | | | 8T | 4200 |
| 10 Delta | 58300 | 10% | 9C | 23400 |
| | | | 9V | 34900 |
| Total* | 618700 | 100% | | |
| Areas outside LMB affected by Mekong floods | 12500 | - | Cambodia | 6000 |
| | | | Viet Nam | 6600 |

* Does not include area in Myanmar

[1] In preparation (mid 2005)

*The formal ('scientific') difference between a sub-basin and a sub-area is that a sub-basin is fully delineated by watersheds, so that all water from a sub-basin is discharged via a specific tributary. Using different words, a sub-basin is a catchment of a tributary. A sub-area of the BDP is largely delineated by watersheds, but in such a way that the sub-areas, between them, cover the entire Lower Mekong Basin. In addition to the hydrological boundaries, the planning must observe the national borders, both because of the important links to the sovereign national planning and administration processes, and for important practical reasons, including data compilation and public participation in the planning process.*

*In many cases within practical planning, however, such a formal distinction is not justified.*

Sub-areas for the BDP are units for integrating and reporting on water resources planning at regional scales. They do not replace the current planning units, and have no legal significance. The proposed sub-areas may not be useful for all planning purposes, and it might be appropriate to consider other types of units, or the LMB as a whole, for some applications.

## 2.2 Sub-area working groups

The analyses were carried out by sub-area working groups established for the purpose under the BDP. In the case of Thailand, these working groups were identical with, or sub-sets of the new River Basin Committees.

As relevant from case to case, the working groups would include representation from

- the NMCs
- national line agencies (involved in water or water-related management and national planning in general)
- river basin committees/river basin organizations (if they exist);
- inter-provincial or regional cooperation bodies (if they exist and are involved in water and water-related resource management issues);
- provincial administrations and provincial line agency departments;
- civil society (for example water user groups);
- the private sector;
- the academic community (for example local universities, scientific institutes, or service institutes)

## 2.3 The sub-area analysis

Sub-area studies involve:

- Preliminary review of available information at regional, national and sub-area levels to provide overviews of keys issues; review of development plans/programmes (either already prepared or under preparation) and preparation of GIS and related information from MRC data sets;
- Identification of key issues and sectors

- Information collection: identify information gaps, collate or collect required information (particularly from national and provincial agencies)
- Analysis: identify sub-area development objectives, formulate scenarios and strategies and identify potential projects/programmes.
- Public consultation to include local knowledge and opinions

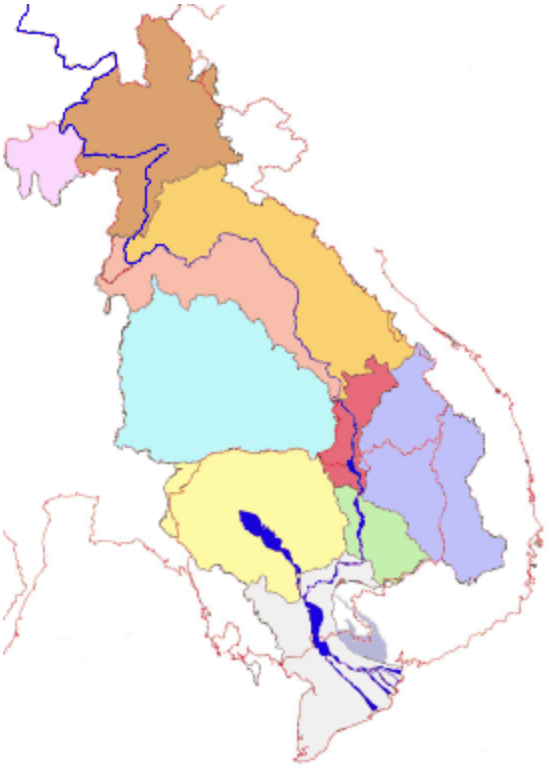
The analyses would build on

- Data and information produced by MRCS and the NMCs within and outside the BDP;
- Data and information from national planning and sector studies;
- Data and information produced for the purpose by the sub-area working group itself.

The outcome of the analysis would typically comprise

- A baseline description: (i) Population, livelihoods, resources, environment; (ii) particular features (assets, 'hot spots', particular priorities and concerns); (iii) sector summaries, sector-related trends, and inter-sector linkages; (iv) transboundary issues; and (v) perceived knowledge gaps
- An agenda for development: (i) Needs and opportunities related to social development, economic development, and natural resources and the environment; (ii) cross-cutting issues; and (iii) overview of ongoing and planned development initiatives
- A scenario analysis: Initially, a set of narrative, conceptual, itemized descriptions of a few future situations, expectedly including an illustration of 'preferred' development(s)
- Comments on stakeholders and dialogue: (i) Institutional framework; (ii) other (non-institutional) stakeholders; and (iii) notes on stakeholder dialogue (with suggestions on how to collaborate)
- An outline of a sub-area development strategy: (i) National development policies (extracts from national development policies and plans), listed as short statements under (a) social aspects; (b) economic aspects; and (c) natural resources and the environment; and (ii) sub-area priorities and principles for implementation, listed as short statements under (a) social aspects; (b) economic aspects; and (c) natural resources and the environment
- A set of project ideas

Following the basic analyses, a series of so-called transboundary meetings were held (in late 2004) between sub-areas in different countries that shared a sub-catchment of the basin and sub-areas that face each other across the Mekong mainstream.



# 3 The sub-areas

## 3.1 Introduction

The Basin Development Plan (BDP) aims to provide a general planning tool and process as a framework for regional cooperation in developing the water resources of the Lower Mekong Basin (LMB). Planning in the LMB has traditionally been carried out on a sectoral basis at country or provincial level with little regard for impacts in neighbouring areas. The core of the BDP is to promote coordination of planning across sectors and countries, and to ensure that effects of development outside the immediate area are taken into account.

The concept of sub-areas of the LMB was proposed to facilitate this planning process. Sub-areas will be used to assist in identifying and zoning areas for integrated management and development of water and water-related resources. The advantages of using a smaller planning unit than the whole LMB or single countries include:

- Better coordination across sectors;
- closer coordination with existing developments;
- improved stakeholder involvement;
- decentralisation, with enhanced potential for 'bottom up' planning; and
- opportunity to define regions with common planning issues which transcend national borders.

Sub-areas for the BDP are units for integrating and reporting on water resources planning at regional scales. They do not replace the current planning units, and have no legal significance. The proposed sub-areas may not be useful for all planning purposes, and it might be appropriate to consider other types of units, or the LMB as a whole, for some applications.

The proposed sub-areas for the BDP have been delineated with the help of the National Mekong Committees, in an iterative consultation process. They provide a framework for initial sub-area studies, but if necessary, may be modified as experience is gained in sub-area analysis. Sub-areas studies will be carried out following the "BDP Guidelines for Sub-area Studies"[1] and will provide for each sub-area an analysis of baseline conditions, development potential and critical issues relating to water resources.

Some comments from Cambodian and Viet Nam suggested that areas outside the LMB, but affected by Mekong flooding, should be considered by the BDP for issues relating to flood management and mitigation.

## 3.2 Criteria for defining sub-areas

Sub-areas should provide a logical unit on which to formulate and assess regional cross-sectoral development plans for water resources, and to analyze and predict their environmental and socio-economic impacts, including transboundary effects. Sub-areas should be small enough to represent a coherent unit for planning and monitoring, but practicality demands that the number of sub-areas be limited. BDP Bridging Documents suggested that there should be 'about 10' sub-areas (MRC-BDP Nov 2000).

[1] Summarized in Chapter 4 of the present document

Thus sub-areas should:

a. be suitable for integrated management and development of water and related resources – that is, reflect natural hydrological units (catchments)

b. reflect major geographic characteristics affecting land and water resources (topography, climate, land use, land capability)

c. reflect the administrative areas on which planning is based (including country and provincial boundaries)

d. take account of transboundary effects of water resource management

e. represent "communities of common interest" for planning and development (for example, reflect the planning regions within countries)

f. take account of areas with a high incidence of poverty, to allow planning and development for poverty reduction

g. promote links to existing major plans / development activities.

These criteria are not fully compatible. The main discrepancy is between administrative planning units and hydrological catchments, which cut across national and provincial boundaries. In addition, because catchments encompass both upstream (headwater) and downstream (outflow) areas, they are often geographically diverse. Internationally, the trend is towards integrated management of water resources in a catchment (or watershed) context, with explicit links between upstream uses and downstream effects. Administrative boundaries and geographic regions do not always reflect these links.

Since the BDP is primarily concerned with water resources planning, and with issues with regional and transboundary effects, the highest priority is given to hydrological units (sub-catchments). Geographic characteristics affecting water resources (topography, climate) are considered to be the second priority. Administrative boundaries (national and provincial) are given third priority.

## 3.3 Approach for defining sub-areas

### 3.3.1 Data sources

Based on the criteria listed above, primary data sources considered in defining the sub-areas were:

- Major catchments areas of the LMB as defined by WUP-Halcrow for the WUP Basin Models (see Map 3.1 and MRC-WUP-A, September 2002);
- catchments of the LMB as defined by the MRC Watershed Classification Program (see MRC Core Datasets, MRC-TSD May 2000);
- modified subcatchment areas of the LMB (MRC, Fisheries Program, 2000);
- national boundaries;
- regions of Lao PDR (North, Center, South) as defined by the State Planning Committee (2001);
- regions of Cambodia used for the Cambodia Socio-Economic Survey (1999);
- major geographical regions of the Mekong River Basin as described by Öjendal (2000), and (slightly differently) by Pöyry (MRC-BDP 1999);

- MRC core GIS datasets (MRC-TSD May 2001), including digital elevation model, forest cover, watershed classification;
- division of the LMB into the upper catchment (above Kratie) and the delta/floodplain (below Kratie) for hydrological modelling under the WUP (MRC-WUP-A, Jan 2002);
- position of key hydrological network stations for WUP (MRC, March 2001); and
- extent of inundation during flooding (MRC GIS core Datasets, 2001).

### 3.3.2 Method

Data on the criteria outlined above were collated, the distribution of various types of units compared, and a strategy devised for delineating the sub-areas, as follows.

Since the highest priority is given to hydrological units, sub-catchments were used as the basic building blocks for sub-areas, and were grouped according to geographic characteristics, national boundaries and administrative units.

The sub-catchments used were those defined by WUP-A in developing hydrological models for the basin (MRC-WUP-A Sept 2002). Sub-catchments lying along the Mekong mainstream were divided into left and right bank units along the center line of the river; otherwise, sub-catchments were always retained as discrete units. Division of the sub-catchments along the Mekong mainstream is in line with the definition of sub-catchments but the Watershed Classification Project, previously used as the MRC standard (MRC-TSD May 2000).

For the purpose of the BDP, the Upper Mekong Basin is treated as a single separate sub-area, which is outside the region covered by the BDP but has an impact on it.

To accommodate all the criteria considered to be important, an hierarchical approach was used, dividing the LMB into:

Regions

Major sub-areas

National sub-areas.

**Major sub-areas** were defined by grouping the 104 sub-catchments of the LMB on the basis of geography and national planning regions.

These were then grouped into larger **regions.** These regions are broadly similar to the geographic regions described by Öjendal (2000) and MRC (1997), reflecting similarities in topography and climate, but their boundaries are determined by the sub-catchments. Their purpose is to emphasize the relationships between neighbouring sub-areas, and the relationships between the sub-areas and the mainstream.

The major sub-areas can also be sub-divided using national boundaries, to distinguish **national sub-areas.** These have only been differentiated where the area is more than 100 km2.

### 3.3.3 Areas outside the Mekong Basin affected by Mekong flooding

The Lower Mekong Basin as currently defined outlines the extent of the LMB in the dry season – that is, areas which drain into the Mekong. However, during floods, the terrain in the delta is sufficiently flat that floodwaters may extend across nominal catchment boundaries. In particular, the Mekong floods often extend into the catchments of the Vaico Rivers, affecting areas in Svey Rieng province in Cambodia, and Long An, Tien Giang and Tay Ninh in Viet Nam.

The extent of this area is shown in Map 3.2. It covers an area of 5500 km2 in Svay Rieng province in Cambodia, and Long An and Tay Ninh in Viet Nam. It has been determined by consultation with water resources experts in each country, and by examining the maps of areas inundated in the 1999 and 2000 flood seasons. The area is all within the delta (downstream of Kratie).

In order to cover this area appropriately in a modeling context, the WUP-A models cover the sub-basins within which this area lies. Hydrological sub-basins contributing to the area outside the LMB but affected by Mekong flooding are shown in Map 3.2. Although not strictly a sub-area, for convenience when working with the model outputs, these are designated as BDP sub-area 11.

### 3.3.4 Note on the LMB boundary

It should be noted that the LMB boundary as defined for the WUP models (using SWAT) differs slightly from the standard LMB boundary used by MRC (as depicted in the TSD dataset b_lmbbnd50). The two main areas of difference are in the north of the basin (where a much larger area in Myanmar and China is included in the Lower Basin); and in the south-east, which includes areas in Svay Rieng, Long An and Tay Ninh outside the nominal dry season LMB, but affected by Mekong flooding. The boundary differs slightly in other areas as well – notably that an area of northern Luangnamtha which drains north into China is omitted from the LMB as defined for the models; and there are discrepancies along the boundaries, particularly in the Central Highlands.

BDP sub-areas are defined on the basis of hydrological units, and are designed to facilitate analysis of hydrological outcomes from the WUP models. For convenience in working with the models, the BDP sub-areas have been defined using the LMB boundary from the WUP models. The discrepancies are not generally large, and are *not significant* at the level of regional analysis.

## 3.4 Sub-areas of the LMB for BDP

The Lower Mekong Basin has been divided using an hierarchical approach into

4 regions

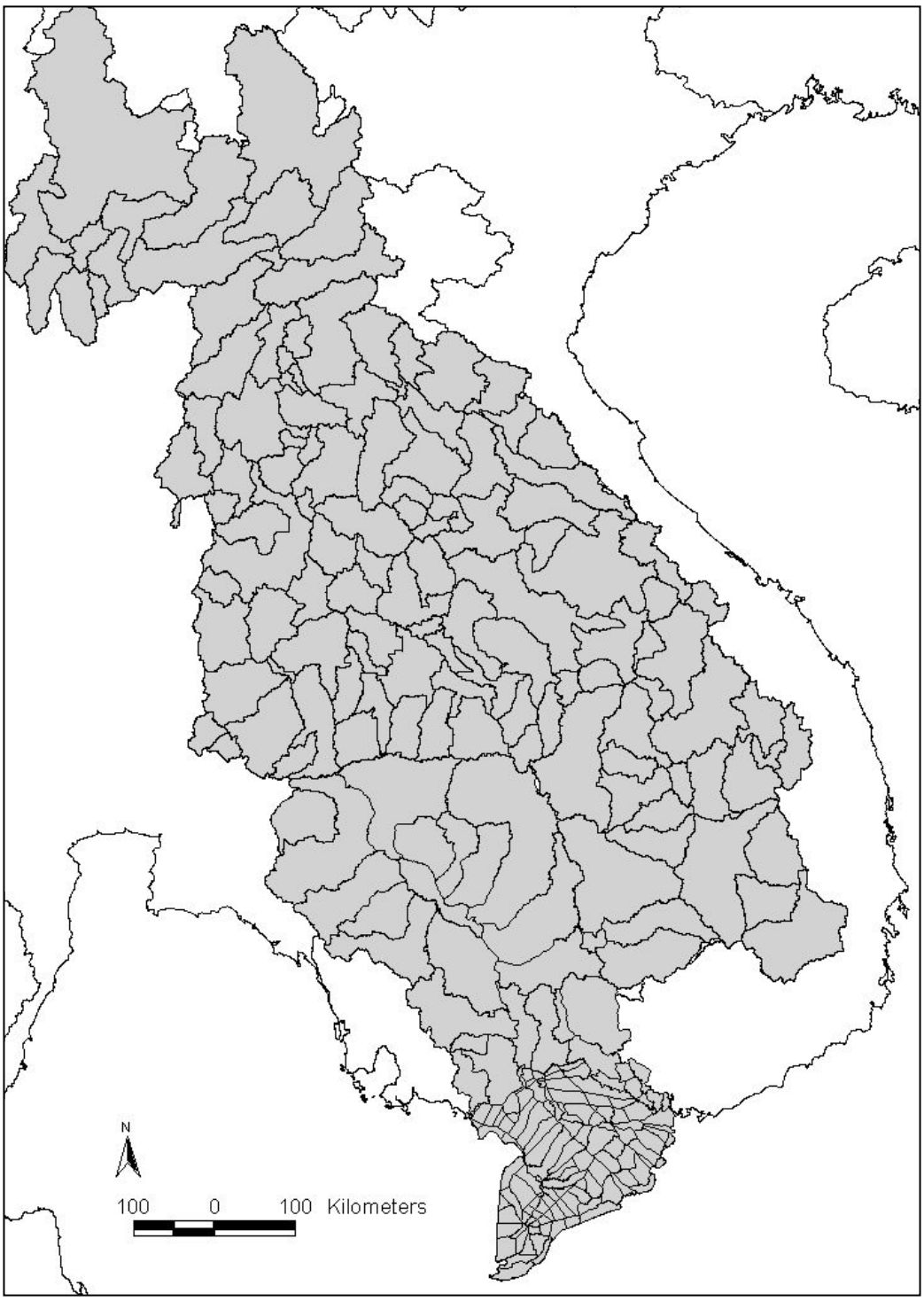
10 major sub-areas

17 national sub-areas.

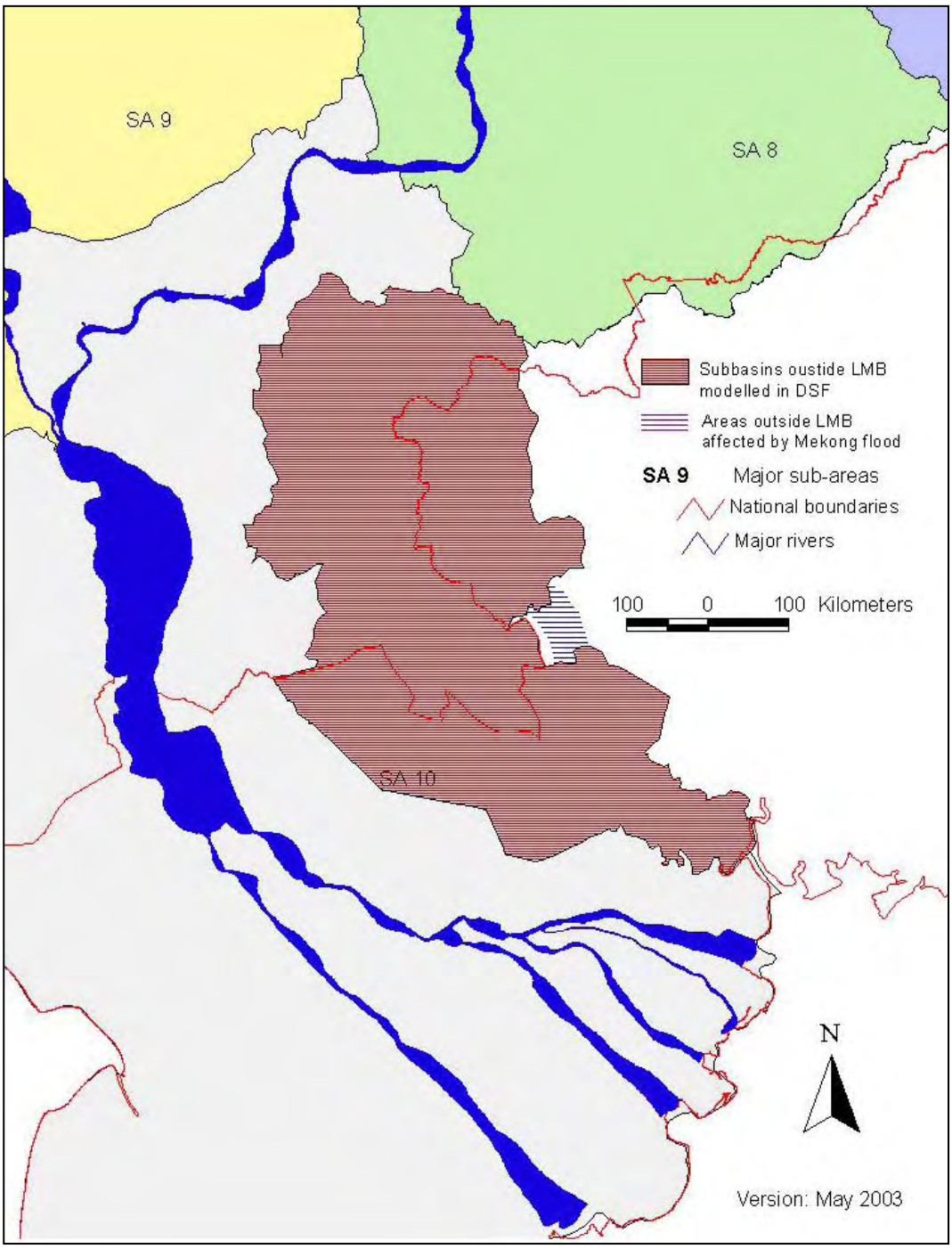
The major sub-areas form the basic unit for BDP analysis. Map 3.3 shows the major sub-areas and Map 3.4 shows the regions. A brief description of sub-areas and regions is given below.

Table 3.1 lists the area of each sub-area, and the proportion of national sub-areas within each major sub-area.

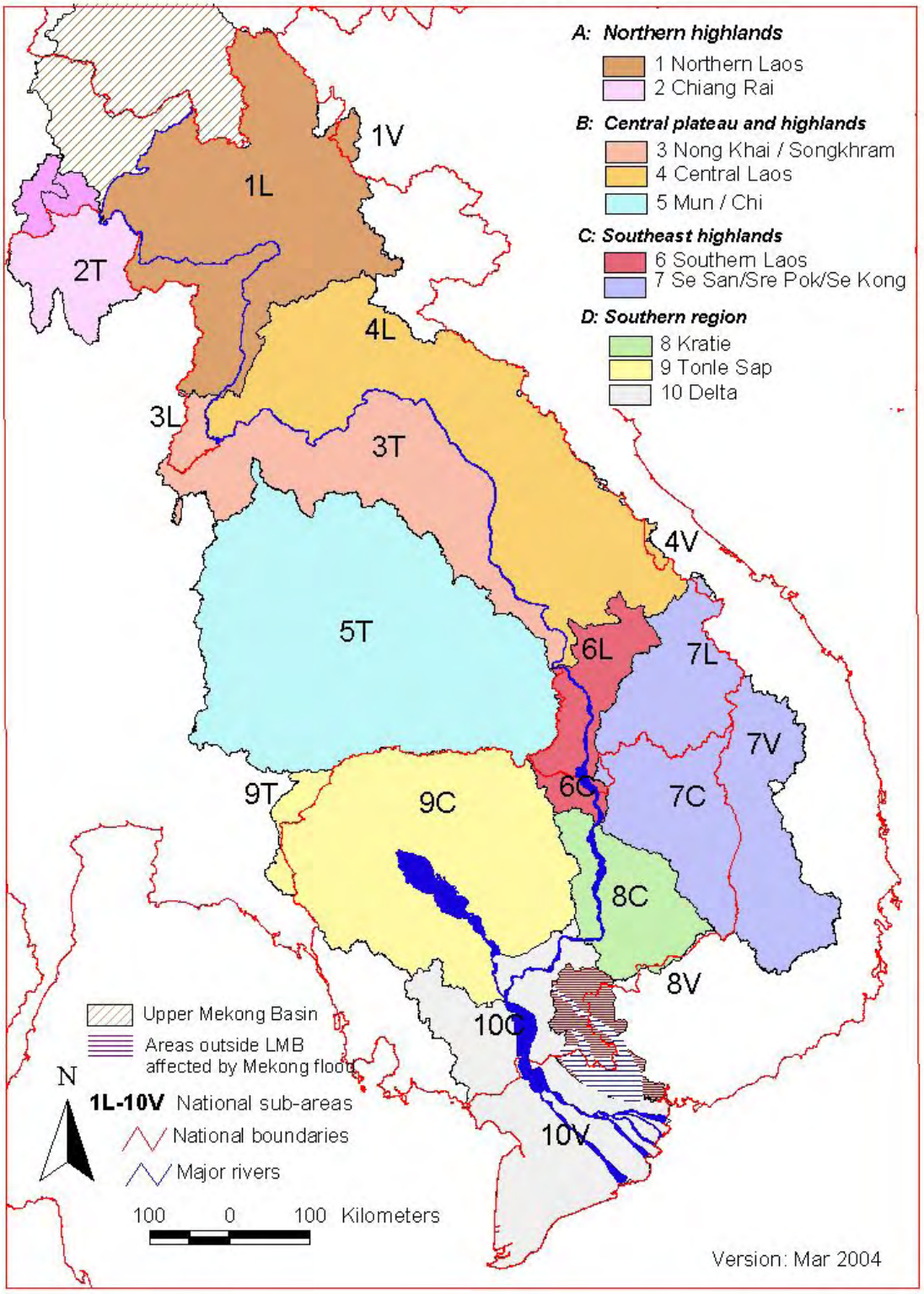
*Map 3.1: Subcatchments of the Lower Mekong Basin*



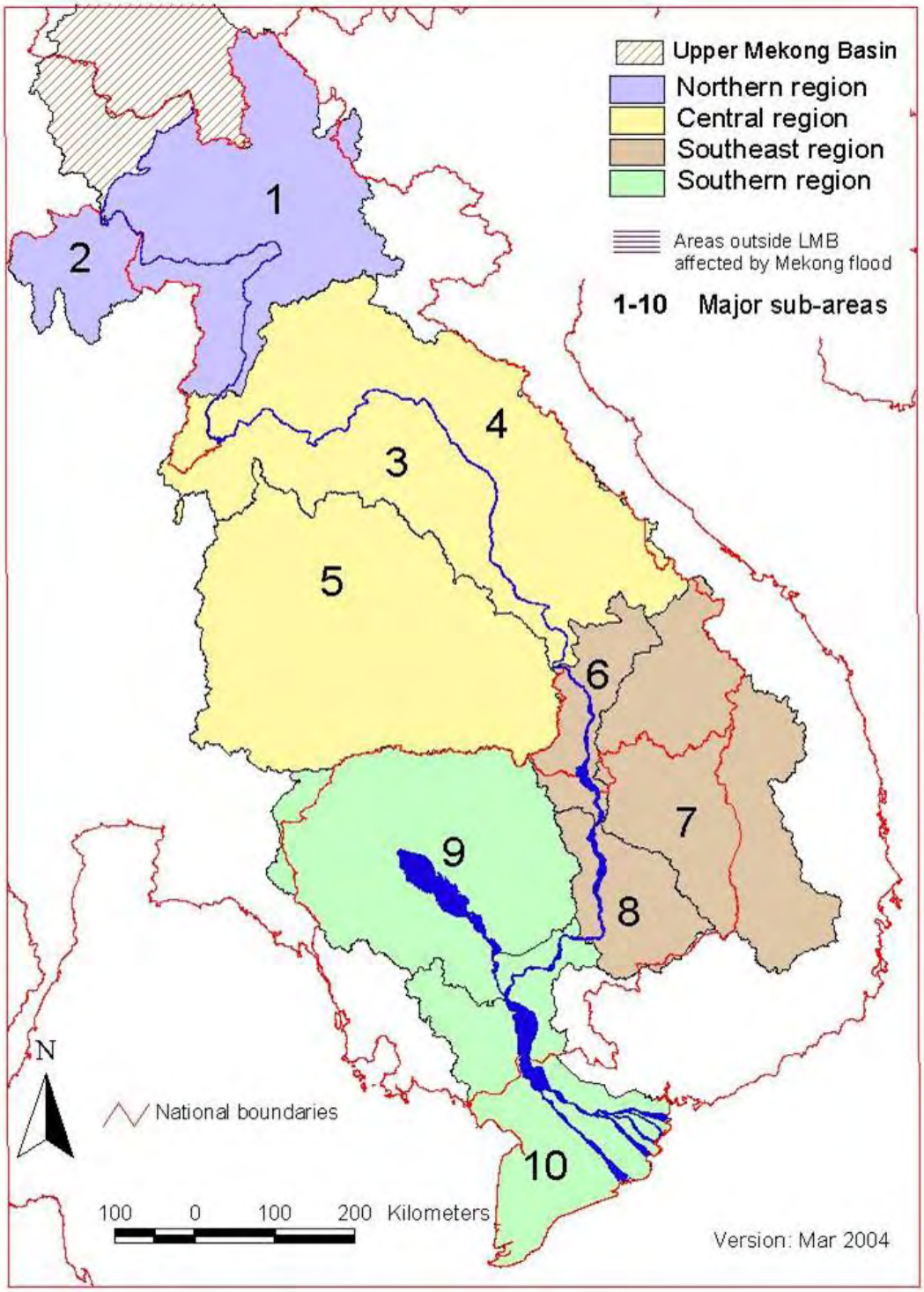
*Map 3.2: Areas outside the LMB affected by Mekong flooding*



*Map 3.3: BDP subareas of the LMB*



*Map 3.4: BDP regions of the LMB*



## *A. Northern region*

The mountainous regions of the northern Lower Mekong Basin, comprising the highlands of Northern Laos and Northern Thailand, are strongly dissected by the Mekong and its tributaries. The Mekong forms the border with China (Yunnan province) and Myanmar in the north, then runs between Laos and Thailand.

### *1 Northern Laos*

*1L Laos and 1V Viet Nam*

This is an ecologically diverse region, but the population is small relative to other sub-areas. It includes a small area of Viet Nam in Lai Chau province. Also includes an area of 695 km2 around Muang Sing in Luangnamtha in Northern Lao PDR which is omitted from the SWAT basins for the LMB in the WUP models, as it drains northwards into China. However, this area has been included in BDP SA1, since it drains into the Nanla Ho, which eventually drains back into the Mekong north of the border between Lao PDR and China.

### *2 Chiang Rai*

*2T Thailand*

Highlands of northern Thailand, including extensive agricultural land around Chiang Rai. Note that the Nam Mae Kok and Nam Mae Kham catchments extend into Myanmar, as shown in Map 3.3.

## *B. Central region*

The Central Region comprises the Korat and Sakon Plateaus of Thailand, the Eastern Highlands of Laos, and the floodplains of the central reaches of the Mekong between them, including the Vientiane and Savanakhet plains. The Mekong forms the border between Laos and Thailand.

### *3 Nongkhai / Song Khram*

*3T Thailand and 3L Laos*

Areas of the Korat Plateau which drain northwards into the Mekong. Includes a small area of Laos in Xayabury province, south of the Mekong.

### *4 Central Laos*

*4L Laos and 4V Viet Nam*

Incorporates the major rice growing areas of Vientiane and Savannakhet, and the Eastern Highlands including small areas of Viet Nam along the border in Quang Tri province.

### *5 Mun/Chi*

*5T Thailand*

The major agricultural areas of the Korat plateau drained by the Mun and Chi river systems, which enter the Mekong mainstream at Khong Chiam. This is a very large and heavily populated region, but is relatively homogeneous in terms of water resources. In addition, all impact on the Mekong mainstream of development in this region will be felt south of Khong Chiam. It may be desirable to sub-divide this sub-area into smaller units for sub-area analysis.

### *C. Southeast region*

This region comprises areas draining from the highlands of Central Viet Nam and Southern Laos, including the Bolovens Plateau.

### *6 Southern Laos*

*6L Laos and 6C Cambodia*

Area surrounding the Mekong mainstream in Southern Laos down to the Khone Falls. Includes large parts of the Bolovens Plateau.

### *7 Se San / Sre Pok / Se Kong*

*7C Cambodia, 7L Laos, and 7V Viet Nam*

Areas draining from the highlands of southern Laos and Viet Nam through Cambodia, entering the Mekong near Stung Treng.

### *D. Southern region*

The southern region is comprised dominantly of the lowlands and the delta, but includes some upland areas in southern Cambodia (Mondulkiri).

### *8 Kratie*

*8C Cambodia and 8V Viet Nam*

Areas in Cambodia draining into the Mekong mainstream south of the Khone Falls, down to just south of Kratie. Includes a small area in Bin Phuoc in Viet Nam. Mainly lowland, but incorporates some mountainous areas in Mondulkiri.

### *9 Tonle Sap*

*9C Cambodia and 9T Thailand*

Areas draining into the Tonle Sap lake. Includes small areas in western Thailand.

### *10 Delta*

*10C Delta (Cambodia) and 10V Delta (Viet Nam)*

### *Areas outside the LMB affected by Mekong floods (11C and 11V)*

Comprises the delta and floodplain south of where Prek Chhlong catchment flows into the Mekong (south of Kratie). This includes the southern half of the Siem Bok catchment, which has been arbitrarily divided at this point. Under the WUP, the delta and floodplain south of Kratie are being modelled as a separate unit. Also includes sub-catchment Prek Thnot on the basis that it drains into the Bassac – Mekong system, not Tonle Sap.

Areas outside the LMB, but affected by Mekong floods are included with sub-area 10 for consideration by BDP for issues relating to flood monitoring and mitigation, as shown in Maps 3.2 and 3.3.

### *Discussion*

There is no single "right" way to define sub-areas. The scheme suggested above has been defined specifically for the purposes of the BDP, and so reflects the BDP's concerns of

regional scale, transboundary issues, and integrated water resources management. Other types of regionalisations will be more appropriate for other purposes.

For example, biogeographic regions, defined by elevation and climate, are often used in land resources planning. For the BDP it was considered that hydrological continuity was more important than homogeneity of land type or use, since transboundary issues are of paramount importance. Biogeographic characteristics such as elevation, climate, topography and land use are, however, very important criteria for describing and analysing the sub-areas.

The subareas as defined cover large areas (see Table 1), and include a range of ethnic groups, cultures and living standards. This is inevitable if a region as large and diverse as the LMB is to be divided into only a small number of sub-areas. Planning frameworks developed under BDP must take account of this diversity. For some purposes, a further sub-division of the sub-areas will be necessary. In other cases, other types of units (such as provinces) may be a more logical unit. However, it is convenient to define larger units suitable for description and assessment of development initiatives that have an impact at the regional scale.

In the sub-areas as defined, the mainstream of the Mekong river often forms the border between the sub-areas. It is essential that there be close collaboration in both monitoring and management of the mainstream where it forms a national or sub-area boundary. The use of broader geographic regions emphasises the connections between sub-areas, and their relationship to the Mekong.

*Table 3.1: Area of major sub-areas with their component national sub-areas*

| Major sub-area | | | National sub-area | | |
|---|---|---|---|---|---|
| | *area (km2)* | *% of LMB* | | *area (km2)* | *% of major sub-area* |
| 1 Northern Laos | 80100 | 13% | 1L | 78700 | 98% |
| | | | 1V | 1376 | 2% |
| 2 Chiang Rai* | 17300 | 3% | 2T | 17300 | 100% |
| 3 Nongkhai / Song Khram | 50600 | 8% | 3L | 3400 | 7% |
| | | | 3T | 47200 | 93% |
| 4 Central Laos | 87100 | 14% | 4L | 86300 | 99% |
| | | | 4V | 800 | 1% |
| 5 Mun / Chi | 119100 | 19% | 5T | 119100 | 100% |
| 6 Southern Laos | 19100 | 3% | 6C | 3200 | 17% |
| | | | 6L | 15700 | 83% |
| 7 Se San – Sre Pok – Se Kong | 78300 | 12% | 7C | 26000 | 33% |
| | | | 7L | 22700 | 29% |
| | | | 7V | 29700 | 38% |
| 8 Kratie | 22700 | 3% | 8C | 22300 | 98% |
| | | | 8V | 400 | 2% |
| 9 Tonle Sap | 86000 | 14% | 8C | 81800 | 95% |
| | | | 8T | 4200 | 5% |
| 10 Delta | 58300 | 10% | 9C | 23400 | 40% |
| | | | 9V | 34900 | 50% |
| Total* | 618700 | 100% | | | |
| Modelled areas outside LMB affected by Mekong floods | 12500 | - | Cambodia | 6000 | |
| | | | Viet Nam | 6600 | |

* Does not include area in Myanmar

*Table 3.2: Provinces in each sub-area*

| National sub-area | Province code | Province name | % of province in SA |
|---|---|---|---|
| 12 | 202 | Phongsaly | 92% |
| 12 | 203 | Luangnamtha | 100% |
| 12 | 204 | Oudomxay | 100% |
| 12 | 205 | Bokeo | 99% |
| 12 | 206 | Luangprabang | 99% |
| 12 | 207 | Huaphanh | 9% |
| 12 | 208 | Xayaboury | 78% |
| 12 | 209 | Xiengkhuang | 13% |
| 12 | 210 | Vientiane | 14% |
| 14 | 4301 | Lai Chau | 8% |
| 23 | 312 | Chiang Rai | 79% |
| 23 | 312 | Chiang Rai | 14% |
| 23 | 312 | Chiang Rai | 5% |
| 23 | 313 | Chiang Mai | 9% |
| 23 | 372 | Phayao | 59% |
| 32 | 208 | Xayaboury | 21% |
| 33 | 320 | Nakhon Phanom | 100% |
| 33 | 352 | Loei | 78% |
| 33 | 354 | Sakon Nakhon | 100% |
| 33 | 366 | Nong Khai | 100% |
| 33 | 368 | Udon Thani | 72% |
| 33 | 371 | Ubon Ratchathani | 15% |
| 33 | 373 | Mukdahan | 98% |
| 33 | 375 | Nong Bua Lamphu | 28% |
| 33 | 376 | Amnat Charoen | 25% |
| 42 | 201 | Vientiane Municipality | 99% |
| 42 | 209 | Xiengkhuang | 44% |
| 42 | 210 | Vientiane | 85% |
| 42 | 211 | Bolikhamxay | 99% |
| 42 | 212 | Khammuane | 99% |
| 42 | 213 | Savannakhet | 100% |
| 42 | 214 | Saravane | 43% |
| 42 | 218 | Xaysomboun SR | 100% |
| 44 | 4409 | Quang Tri | 15% |
| 53 | 303 | Kalasin | 100% |
| 53 | 305 | Khon Kaen | 100% |
| 53 | 310 | Chaiyaphum | 98% |
| 53 | 317 | Yasothon | 98% |
| 53 | 321 | Nakhon Ratchasima | 96% |
| 53 | 327 | Burirum | 100% |
| 53 | 339 | Phetchabun | 7% |
| 53 | 342 | Maha Sarakham | 100% |
| 53 | 345 | Roi Et | 100% |
| 53 | 352 | Loei | 16% |

| National sub-area | Province code | Province name | % of province in SA |
|---|---|---|---|
| 53 | 353 | Si Saket | 99% |
| 53 | 365 | Surin | 100% |
| 53 | 368 | Udon Thani | 28% |
| 53 | 371 | Ubon Ratchathani | 84% |
| 53 | 375 | Nong Bua Lamphu | 72% |
| 53 | 376 | Amnat Charoen | 75% |
| 61 | 113 | Preah Vihear | 12% |
| 61 | 119 | Stung Treng | 13% |
| 62 | 214 | Saravane | 50% |
| 62 | 216 | Champasak | 66% |
| 71 | 111 | Mondul Kiri | 49% |
| 71 | 116 | Ratana Kiri | 100% |
| 71 | 119 | Stung Treng | 62% |
| 72 | 214 | Saravane | 7% |
| 72 | 215 | Sekong | 96% |
| 72 | 216 | Champasak | 32% |
| 72 | 217 | Attapeu | 100% |
| 74 | 4411 | Thua Thien Hue | 7% |
| 74 | 4601 | Kon Tum | 84% |
| 74 | 4603 | Gia Lai | 39% |
| 74 | 4605 | Dak Lak | 72% |
| 74 | 4703 | Lam Dong | 14% |
| 81 | 103 | Kampong Cham | 10% |
| 81 | 110 | Kratie | 96% |
| 81 | 111 | Mondul Kiri | 50% |
| 81 | 119 | Stung Treng | 24% |
| 84 | 4707 | Binh Phuoc | 5% |
| 91 | 101 | Banteay Meanchey | 100% |
| 91 | 102 | Battambang | 100% |
| 91 | 103 | Kampong Cham | 15% |
| 91 | 104 | Kampong Chhnang | 97% |
| 91 | 105 | Kampong Speu | 14% |
| 91 | 106 | Kampong Thom | 100% |
| 91 | 108 | Kandal | 12% |
| 91 | 112 | Phnom Penh | 28% |
| 91 | 113 | Preah Vihear | 87% |
| 91 | 115 | Pursat | 84% |
| 91 | 117 | Siem Reap | 100% |
| 91 | 122 | Otdar Meanchey | 100% |
| 91 | 124 | Krong Pailin | 100% |
| 91 | 199 | Great Lake | 100% |
| 93 | 306 | Chanthaburi | 20% |
| 93 | 374 | Sa Kaeo | 41% |
| 101 | 103 | Kampong Cham | 53% |
| 101 | 105 | Kampong Speu | 83% |
| 101 | 107 | Kampot | 41% |

| National sub-area | Province code | Province name | % of province in SA |
|---|---|---|---|
| 101 | 108 | Kandal | 88% |
| 101 | 112 | Phnom Penh | 72% |
| 101 | 114 | Prey Veng | 70% |
| 101 | 121 | Takeo | 100% |
| 104 | 4801 | Long An | 10% |
| 104 | 4803 | Dong Thap | 99% |
| 104 | 4805 | An Giang | 100% |
| 104 | 4807 | Tien Giang | 100% |
| 104 | 4807 | Tien Giang | 90% |
| 104 | 4809 | Vinh Long | 100% |
| 104 | 4811 | Ben Tre | 100% |
| 104 | 4813 | Kien Giang | 100% |
| 104 | 4815 | Can Tho | 100% |
| 104 | 4817 | Tra Vinh | 100% |
| 104 | 4819 | Soc Trang | 99% |
| 104 | 4821 | Bac Lieu | 100% |
| 104 | 4823 | Ca Mau | 100% |
| 111 | 103 | Kampong Cham | 18% |
| 111 | 114 | Prey Veng | 30% |
| 111 | 120 | Svay Rieng | 100% |
| 114 | 4801 | Long An | 90% |
| 114 | 4807 | Tien Giang | 10% |

# 4 Approach to sub-area analysis

## 4.1 Sub-area working groups

### 4.1.1 Background

The Basin Development Plan (BDP) Project Document specifies that *"BDP Working Groups are established on a temporary or semi-permanent basis, according to the needs of the Project. They may from case to case serve the joint needs of BDP, WUP, EP and other MRC and national projects, programmes and core functions. They are expected to make their expertise, experience and outlook available to the BDP Project.".*

During the course of consultation meetings conducted with National Mekong Committee (NMC) officials in the four riparian countries during the BDP Phase 1 Inception Phase, it was evident that the issue of forming working groups for the BDP requires careful consideration to ensure efficient and effective function according to defined needs.

The following sections describe the establishment and functioning of the sub-area working groups.

### 4.1.2 Overall institutional structure

#### *MRC Secretariat*

A revised working group structure was introduced at the Secretariat during March 2002. This structure was established to ensure effective collaboration across sectors, programmes and organisational units and to allow the formation of ad-hoc working groups as required. It comprises a Core Programmes Management Group to ensure coordination between the MRC Secretariat's organisational structure and the National Mekong Committee Secretariats. The Programmes Coordination Group manages the working group system and will be responsible for preparing combined workplans of the 3 core programmes and following up on decisions of the Core Programmes Management Group.

There were three *Permanent Working Groups.* These were:

- Working group on Basin Modelling and Knowledge Base
- Working group on Environmental and Transboundary Issues
- Working group on Basin Development Planning and Socio-Economic Issues

*Temporary Working Groups* could be established to deal with specific issues such as public participation or flood management or mitigation.

#### *National Level – existing working groups for cross cutting issues*

At the national level, working groups were established within the WUP covering modelling, transboundary issues, and water rules.

#### *National BDP structure*

The institutional structure for the BDP in each country comprises the following:

- A *Steering Committee* or a *BDP Sub-committee.* Draft Terms of Reference were prepared in January 2002 and circulated to the four NMCs for consideration. The purpose of the Steering Committee/Sub-committee is to oversee and monitor the overall national implementation of the BDP, the activities of the National BDP Unit and consistency between the BDP and national policies and planning procedures.

- A *National BDP Unit* established in the Secretariat of each NMC and including *"a full and active participation of the national planning agencies".* The overall function of the BDP Units is to coordinate their country's involvement in the BDP project.

### *Proposed working groups*

Two levels of working groups were proposed for implementation of the BDP in each country:

- National level *BDP Planning Coordination Working Group;*
- Sub-area level *Working Groups* – the number depending on how many of sub-areas (or parts of sub-areas) there are in each country

### 4.1.3 National BDP Planning Coordination Working Group

*Composition:* 12 – 20 members (Head of BDP Unit, BDP Coordinator, National Specialist, WUP and EP Coordinators, representatives of planning units of key agencies, agency responsible for provincial/local administration and 1 –2 provincial representatives

*Chairman:* Senior representative of main national planning agency

*Secretary:* Head of BDP Unit

*Duties:*

- Identify macro-level issues of national concern with potential transboundary implications relevant to preparation of a Basin Development Plan;
- Mobilise information from development and sector plans relevant to national and sub-area planning in the Lower Mekong Basin parts of the country for inclusion as part of an information management system operated at NMC Secretariat;
- Propose a framework for sub-area planning including identification of agencies, organisations and their representatives and an locally appropriate mechanism;
- Overview and coordinate sub-area analysis, scenario building, strategy and project/programme formulation;
- Ensure adequate incorporation of Public Participation into the process and provide recommendation on necessary capacity building;
- Review sub-area information to identify long list projects/programmes. Elaborate assessment criteria to select priority projects/programmes for submission to the BDP Steering Committee/Sub-committee;
- Organise national workshops to consider proposal prepared by sub-area working groups;
- Review projects/programmes proposed by other riparian countries in terms of transboundary implications, and
- Incorporate consideration of other regional activities such as ADB/GMS, Initiative of ASEAN Integration, special development zones etc into BDP planning process.

### 4.1.4 Sub-area working groups

*Composition:* 15 – 20 members, depending on size of sub-area. It is important that representation on the working groups ensures a good balance between those with administrative responsibility, technicians, water and resource users, academics and investors.

*Members* of sub-area working groups could be draw from:

- River basin organisations, if they already exist;
- existing inter-provincial or regional cooperation bodies. Need to be assessed as to suitability for BDP purposes (i.e. are they involved in water and related resource management issues);
- in the absence of the above, the most "important" province within the sub-area based on area, population, economic development and dependence of Mekong related resources could take a leading role.

Members should represent: regional/provincial administration; regional sector line agencies; civil society (user groups); concerned private sector (as ad hoc members), research and development institutions (including local universities/colleges)

*Chairman:* Senior representative of River Basin Organisation, Inter-provincial cooperation body or most "important" province within the sub-area.

*Secretary:* Designated by National Sub-Committee.

*Duties:*

The Sub-area Working Groups will function in close coordination with the National BDP Unit/Working Group. They serve to implement the BDP at the sub-area level by considering existing plans and local concerns to identify development opportunities and constraints concerned with water and related resources. Through a process of scenario building and strategy development, the working group will identify potential projects/programmes with possible transboundary implications to be forwarded for consideration at the national level.

Duties comprise

- Maintain coordination/information flow with the BDP Unit/Working Group;
- ensure on-going consultation with sub-area stakeholders;
- review available information and prepare an overview of the current situation in the sub-area related to social, economic and resource utilisation issues;
- review water and related resource development plans for the sub-area;
- identify opportunities and constraints to development in the sub-area with particular reference to upstream/downstream factors;
- based on medium and long term assumptions about the future use of water and related resources, create a series of development scenarios for the sub-area;
- identify strategies capable of building on opportunities and leading to sustainable development in terms of social equity, environmental balance and economic progress;
- identify potential projects/programmes for consideration at national level; and

- maintain liaison with sub-area working groups in neighbouring countries on transboundary issues.

## 4.2 Sub-area analysis

### 4.2.1 Introduction

Below is given a summary of the scope of work, stakeholders, information considerations, tools available to assist in the analysis, and expected outcomes. More detailed discussions of many aspects are given in related BDP working papers.

### 4.2.2 What is sub-area analysis?

The approach to BDP formulation and the main five stages in the overall planning process are described in the BDP Inception Report. Stage 1 (analysis of the Lower Mekong Basin and sub-areas) will determine key options and constraints for development, by analysing local concerns and requirements as well as regional trends and trans-boundary cause-effect relationships. The studies will result in a description of overall conditions, development potential and critical issues relating to water resources in each sub-area of the Lower Mekong Basin.

Sub-areas of the LMB have been delineated to provide a more focused analysis of local concerns and requirements. Sub-areas (clusters of sub-basins identified for the BDP) are regional scale units for integrating and reporting on water resources planning in a catchment context (MRC-BDP 2002a). A catchment-based approach highlights the links between upstream use and downstream flows, and improves the analysis of the impacts and dependencies in development of water and related resources, particularly trans-boundary issues.

The proposed sub-areas for the BDP have been delineated with the help of the National Mekong Committees, in a consultation process. The current version (shown in Appendix 1) has been noted by the Joint Committee in May 2002 as a working framework for initial sub-area studies. However, if necessary, they may be modified as experience is gained.

Sub-area analysis will provide the basis for formulating scenarios and strategies for water use in the sub-areas and the region. Thus, the outcomes for each sub-area analysis will be:

- summary of present conditions and context for development
- summary of water availability, ecological demands and present water uses
- identification of opportunities, concerns and risks
- formulation of development objectives.

The studies will be based on a participatory process, in line with the proposed draft MRC Public Participation Strategy Paper (MRC 2002). In addition to BDP Units based at the National Mekong Committee Secretariats, national and provincial agencies and a range of stakeholders, including representatives of resource users in the sub-area will be involved.

The results of the analysis of each sub-area will be reported in a working paper of perhaps 50-100 pages. An indicative table of contents for the working paper is presented in Appendix 1.

### 4.2.3 Process of sub-area study and analysis

Sub-area studies involve:

- Preliminary review of available information at regional, national and sub-area levels to provide overviews of keys issues; review of development plans/programmes (either already prepared or under preparation) and preparation of GIS and related information from MRC data sets;
- Identification of key issues and sectors
- Information collection: identify information gaps, collate or collect required information (particularly from national and provincial agencies)
- Analysis: identify sub-area development objectives, formulate scenarios and strategies and identify potential projects/programmes.
- Public consultation to include local knowledge and opinions

It is proposed that the process of sub-area study and analysis should be orientated around two forums as indicated in Figure 3.1. The process can then be broken down into a number of steps as follows:

- Review: mainly through activities coordinated at MRC Secretariat
- Forum 1: a multi-stakeholder forum within the sub-area to consider sub-area information, identify key issues and information gaps, and prepare a work plan for further study and analysis;
- Implementation of work plan, mainly collection of further information as defined at Forum 1
- Forum 2: a second multi-stakeholder forum to agree on sub-area development objectives, scenarios and strategies and to identify potential projects/programmes.

#### *Preliminary review*

Regional and national overviews set the context for sub-area study and analysis by defining the macro-issues at basin and country level that should be further investigated in each sub-area. Regional overviews should set the scope of the analysis for each sub-area, by identifying:

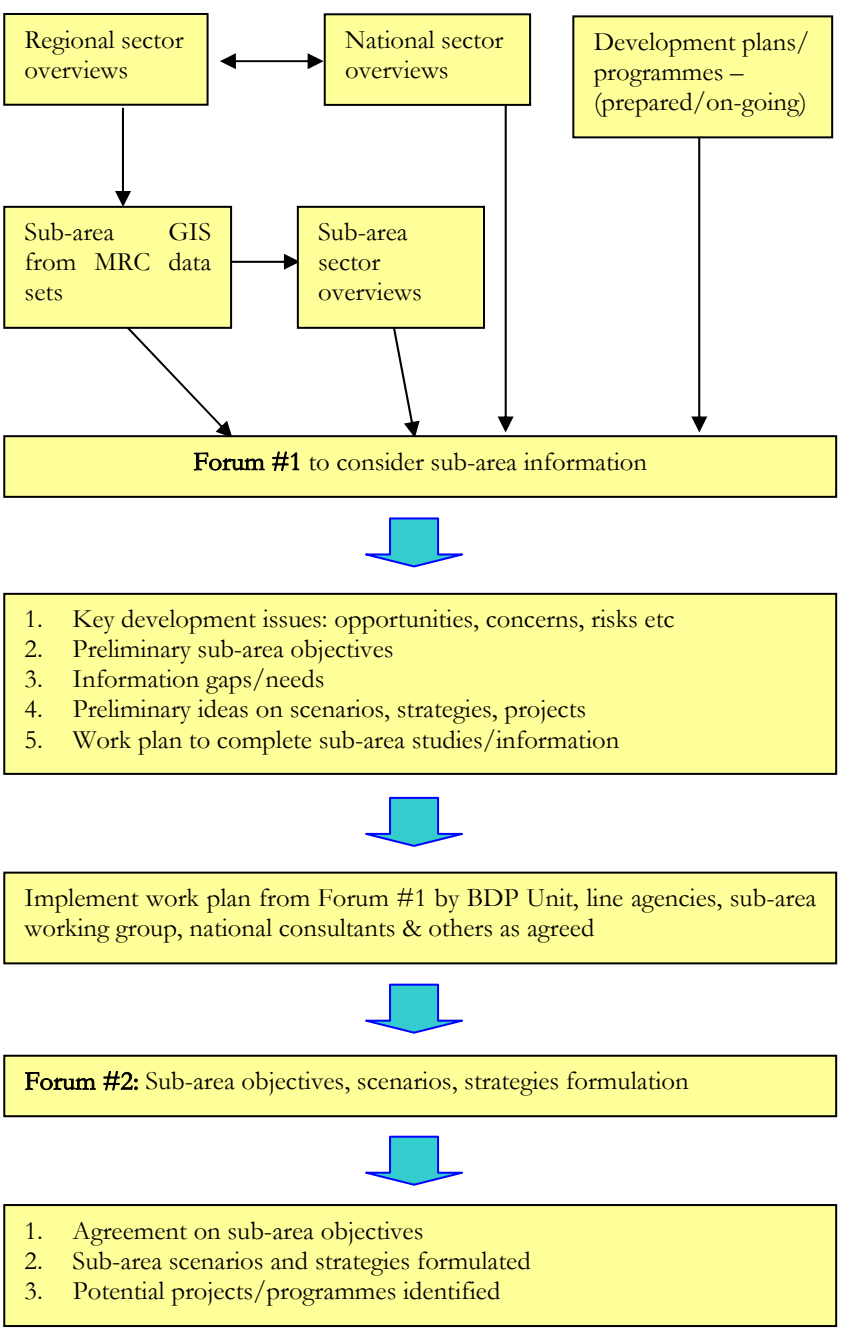
- key sectors and issues to be considered
- major stakeholder groups to be consulted
- likely trans-boundary and regional issues.

Regional overviews will involve consultation with MRC programmes and sector strategies, and with other related regional programmes. They will also incorporate sector information from national plans: policies, current plans, ongoing projects and programmes, and projects and programmes likely to be implemented during the next 5-10 years. Resource material for overviews of each sub-area includes for example:

- national and provincial plans
- regional sector overviews (prepared by the MRCS BDP Team)

- The MRC State of Basin Report
- ... and much more

*Figure 4.1: Overall approach to sub-area analysis*




**Who:**
BDP Unit
Concerned line agencies
Sub-area working group
National consultants
Research institutes
Universities
International organisations
etc

---

**Forum participants:**
BDP Unit staff
National line agency reps
Provincial staff
Local users reps
Development plans reps
Mass organisation reps
Local CSOs reps
etc

---

**Forum participants:**
- same as Forum #1

### *Information collection and analysis*

The aim of sub-area studies is to identify opportunities for and constraints to sustainable development of water resources within the sub-area. This requires a baseline description of water resource use in each sub-area (including current water demands), and identification of the pressures and trends that will affect future development of water resources. Information is required on

- current water dependent sectors and water demands (including ecological demands)
- development opportunities, in terms of:
  - available resources for sector development
  - trends in land and water use
  - dependencies between sectors
  - constraints to development
- potential social, environmental and economic impacts (positive and negative) of development, including affected populations or areas
- trans-boundary /cross regional issues and impacts, in terms of:
  - trans-boundary effects of water resource development
  - dependencies between sub-areas/countries
  - balancing social, economic and environmental issues
  - basin-wide benefits

Information collection within a sub-area should concentrate on relevant sectors and likely developments identified from the regional overview, and their transboundary impacts. The type of information and level of detail will vary between sub-areas. Information required for sub-area analysis is discussed in more detail in BDP Working Paper on Information Needs Assessment (MRC-BDP 2002d).

As sub-area analysis will rely heavily on secondary data (derived and summarised from other sources), an important role of the first forum will be to assess whether the data adequately reflects the real situation, identify information gaps and agree on a work plan to collect missing and needed information.

Information on each sub-area will be integrated as a subset of the MRC Information System, and be available to all BDP partners. The aim is to provide a combined dataset of relevant information on each sub-area, which will be held by both MRCS and the NMCs. The information will include

- digital maps, imagery and related data in GIS (ArcView)
- spreadsheets
- hardcopy and digital reports
- hardcopy maps and images.

A suitable scale for spatial data is 1:100,000 to 1:250,000. Other data will be collated at district or provincial level. For those sub-areas that cover only some parts of the province, the analysis will cover communes or districts within the boundary.

*Public consultation and participation*

Public consultation and participation is a critical aspect of the planning process. It is proposed that two forums be conducted to involve key stakeholders. During the first forum, sub-area information that will have been collected will be considered and information gaps identified, whilst by the conclusion of the second forum agreement on sub-area objectives will have been reached, sub-area scenarios and strategies formulated and potential projects/ programmes discussed. The forums should involve representatives of national line agencies, provincial and local administration, and representatives of local users, mass organisations, civic society organisations (CSO), universities, local business and investors and those with knowledge of specific development plans. The valuable information and perspectives that local people will be able to contribute includes:

- resource needs and access
- relations between the use of water/natural resources/social economy and the ecology of the region
- development priorities in the sub-areas

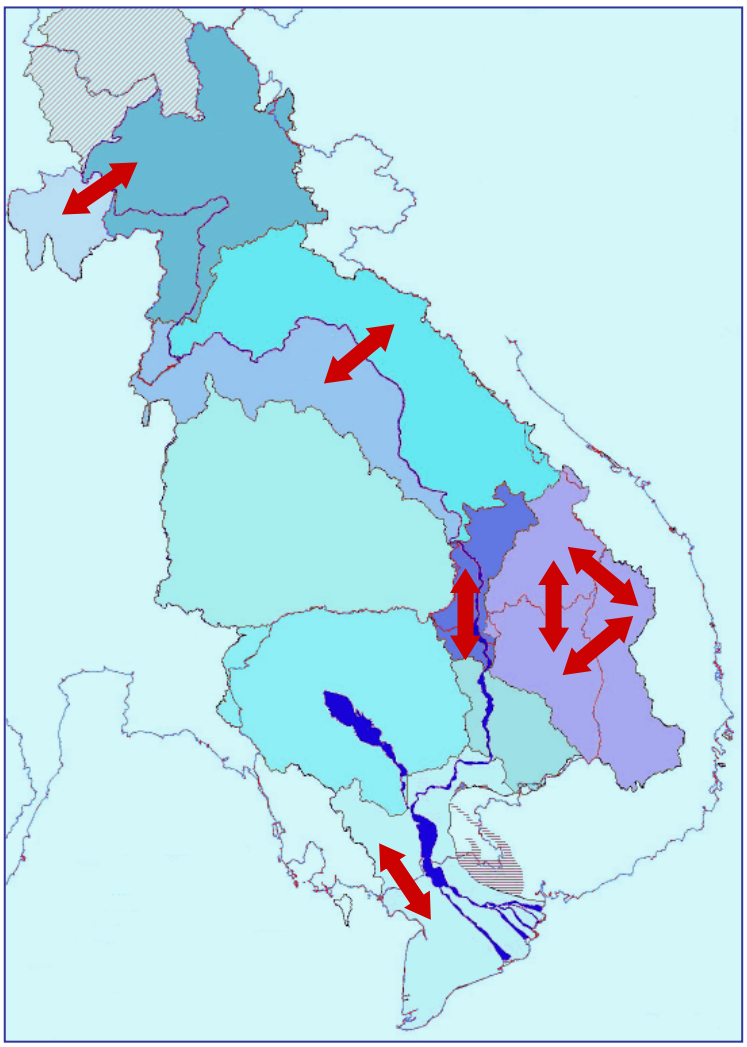
The national BDP Unit/working group will have prime responsibility for coordinating activities. A body that represents the main stakeholders in the sub-area should support the BDP Unit/working group. Establishing a Sub-area Working Group (SAWG) has been proposed and was included in Annex D of the BDP Inception Report in terms of possible composition and terms of reference (see Appendix 3.). Provincial planning authorities will need to be involved through orientation, provision of data and participation in the sub-area forums. However, it is expected that national consultants will be needed to supplement the work of the BDP Unit/working group, SAWG and provincial authorities.

### 4.2.4 Tools for sub-areas analysis

A number of tools are available to assist with sub-area analysis:

- GIS to simplify overlay of data and analysis of spatial relationships
- Landsat imagery to assist with visualisation of resources, environments and land use, and connections between sub-areas
- Key socio-economic, water resources, environmental and macro economic indicators (as defined under BDP Activity 1.3.4)
- Analysis of water resources (availability, and changes in flow regime under different scenarios) will be produced by WUP, using hydrological models (MRC-WUP-A Jan 2002)
- Impact analysis tools that help to identify and describe environmental and social impacts are being developed in the WUP Decision Support Framework (MRC-WUP-A Feb 2002)
- Guidelines for strategic environmental assessment (SEA) for BDP have been developed by the Environment Program, and are being reviewed by each country (MRC-EP Feb 2002)
- Economic models, such as simple resource allocation models, which should be available within the timeframe of the first BDP.

More information on these tools is given in MRC-BPD (006), MRC-EP (2002), and MRC-WUP-A (Jan 2002, Feb 2002).



# 5 Transboundary meetings

## 5.1 Rationale

Today's increasing demand of water resources for development has caused a lot of tension, particularly among the countries which share the same rivers that flow across political borders. Efforts have been made by many international river basin and positive moves towards multilateral and regional cooperation have appeared. However, concrete outcomes particularly water sharing arrangements, strong legislative arrangements, demand management, and agreement on whole basin management for the economic, environmental, and social needs of all riparian nations have not generally occurred.

MRC's Water Utilization Programme (WUP) defines transboundary impacts as a measurable impact originating from a place in another country. It is important to note that not all transboundary impacts are necessary negative.

The BDP makes a distinction between a *transboundary impact* (based on a cause-effect relationship) and a *transboundary issue* (which can for example be a shared development opportunity). Here, an issue can relate to a problem, but does not need to do so.

Many MRC works have been carried out for identifying transboundary impacts. These include the Transboundary Analysis (MRC 2002b) and Working Paper No. 4 (MRC, 2002c) on transboundary issues by WUP, Environmental Conflicts in the Mekong River Basin Prevention and Resolution by RMIT University (Buxton et al., 2003), and other works on transboundary environmental governance. These works have arrived to useful outcomes such as identified major issues, approach of transboundary analysis[8], learning about approach to conflicts prevention elsewhere, and Policy Making Mediation in the Mekong River Basin.

## 5.2 Dealing with transboundary issues

For BDP, transboundary issues is referred due to the broader issues raised at the sub-area level for regional water and related resources planning (Annexes). Thus, in this context, transboundary issues refer to development planning issues including development options and transboundary impacts which benefit and affect more than one country and basin-wide. Development planning issues involve issues related to water and water related resources such as availability and use, agenda for development, candidate and long-list projects that are critical to basin-wide and other issues such as cooperation issues for natural resources utilisation, trading issues, etc.

The framework to deal with transboundary issues in BDP will concentrate on cooperation for basin-wide benefits in terms of economic, environmental and social needs by departing from integration of sub-areas key development issues, scenario elements and projects to identifying framework for cooperation and including 'joint development opportunities'.

The transboundary issues will be analysed and addressed at the basin-wide level, but involving the provincial people and other key stakeholders of the sub-areas to provide their views (this is important). This will be complementary to the works done by WUP and EP.

– At the sub-area level, the involvement of the provincial people and key stakeholders in the analysis for key development issues and scenario elements/projects, and including transboundary impacts, has been done in each sub-area study and analysis.

8 WUP approaches transboundary impacts through causal change analysis to identify the root causes which then would be addressed.

At the same time, the sub-area analysis proceeds through the three-parallel process of BDP (planning, stakeholder participation, and capacity building), in which the analysis for transboundary issues is mainstreaming in its steps.

- At the regional level, the analysis for transboundary issues will integrate important issues, which are put forward by the sub-areas, but only those of basin-wide significance9. The analysis will look for common and differences of all sub-areas' key issues and scenario elements/projects and programmes, and the extent of conflicts through comparison, combination and ranking method. Then framework for dealing with transboundary issues and opportunities for planning cooperation will be explored through the supporting development initiative. As also part of the outcome is the identification of 'joint development opportunities' - where there is a particular value of collaboration across the border. For example in the Khone Fall area; or within flood management; or within navigation; or within fisheries – there must be many examples.

As can be observed, there is good stakeholder participation and analysis of transboundary issues, and also opportunity for exploring ways of development cooperation along the BDP process. BDP will be as one way of conflict mediation in the Mekong River Basin, because the basin-wide transboundary issues will be dealt from the onset of development plan.

## 5.3 The sub-area transboundary meeting

Several BDP sub-areas within different riparian countries share the catchment, thus have inter-dependence issues with each other, are defined as transboundary sub-areas. They include:

- 6LC: Southern Laos/Northern Cambodia
- 7LCV: Se San/Sre Pok/Se Kong
- 10CV: Delta

Other sub-areas which do not share the catchment, but share the mean stream river thus have inter-dependence issues, should be also considered as transboundary sub-areas. They include:

- 1L & 2T: Northern Laos and Northern Thailand
- 4L & 3T: Central Laos and Songkram River/Upper Northeast Thailand

These transboundary sub-areas need to identify transboundary issues including integrated planning issues and cooperation agenda for themselves and for basin-wide, therefore transboundary meeting is also required at this level. The framework for dealing with transboundary issues at the basin wide level can be adopted. The sub-area transboundary meeting is one of the BDP stakeholder forum which involves mainly representatives of the transboundary sub-areas. The meeting will be conducted after the sub-area stakeholder forum #2, when all sub-area key issues and scenario elements/projects and programmes are completely identified, and before the regional meeting takes place.

9 Transboundary impacts from the Upper Mekong Basin will also considered

### 5.3.1 Objectives

The sub-area transboundary meeting will proceed with the following objectives:

- Have a common understanding of the transboundary issues between sub-areas
- Integrate transboundary issues (including inter-dependence issues) in each sub-area into transboundary sub-area
- Identify framework for dealing with transboundary issues in BDP

### 5.3.2 Scope

- Transboundary issues identified in each sub-area
- Review ongoing transboundary development plans initiatives
- Identify projects that can support transboundary development

### 5.3.3 Participants

A maximum of four-five participants from each country will be invited to this meeting. They should have sufficient knowledge to deal with key issues of transboundary basin development planning. Environment, hydrology and water planner experts should be invited. Participants from ADB/GMS, ASEAN, etc. could be considered. It is proposed that one riparian participant should be allowed to participate as an observer, when the transboundary meeting takes place in other transboundary sub-area.

A neutral facilitator is needed, she/he needs to have good knowledge of transboundary issues and experience in handling delicate cases. She/he needs to have clear understanding of the concept and framework, and meeting instruction; and must be well prepared for facilitation work. The BDP Team should provide a good orientation to the facilitator.

### 5.3.4 Preparations

The transboundary meeting will be time consuming, all need to be prepared carefully for minimizing sensitive issues and achieving the expected outcome. It is important to make the following preparations:

- A joint preparation prior to the sub-area transboundary meeting should be conducted to set clear agenda and expected outcome, and to consider tips for a peaceful meeting. Key representatives of the sub-areas will work together with the assistance of the BDP Team and the external facilitator.
- Discussion papers prepared and circulated prior the sub-area meeting to allow participants enough time for consultation and preparation for the meeting. The discussion papers will cover focal points of transboundary issues, which are prepared in advance by the BDP Team at the MRC Secretariat; and DSF/SEA/RAOM testing will also be prepared before hand. It is possible that the modeler to operate these tools and expert will be invited to assist the planners in this meeting.
- Sub-area/national consultation and preparation prior to the transboundary meeting by each riparian country should be conducted in order to get well prepared for the meeting.

### 5.3.5 Duration

The duration will be 2 days maximum. It is recommended to have only two meetings maximum due to limited time and to avoid tense discussion.

### 5.3.6 Procedure

In fact, the framework for dealing with transboundary issues in BDP is, by nature, oriented to cooperation for basin-wide benefit. To ensure a fruitful meeting, a peaceful and relaxing environment will be created. The meeting process will be very simple with clear instruction and expected outcome, and the arrangement will be organized during the joint preparatory meeting.

The transboundary meeting will proceed through three main steps below:

#### *Step1. Common understanding of transboundary issues (Day 1, morning)*

The participants present sub-area key issues and development scenario/projects and programmes, including some transboundary issues identified in their respective sub-area for discussion and common understanding. The presentation will focus on the following:

- Brief key sub-area development issues: assets, needs/priorities, opportunities, concerns, objectives and some sub-area transboundary issues
- Sub-area development scenario elements, strategies and projects/programmes

The two focal points above will be compiled and attached to a discussion paper prepared for circulating to the participants before the meeting. Points for discussion will be also provided before hand. In this way, it will help to speed up the process and help achieving the outcome expected.

#### *Step 2. Integrating sub-area transboundary issues (Day 1, afternoon)*

The integration of sub-area transboundary issues will be done by making cross analysis of the sub-area key issues and scenario elements/projects and programmes. Cross analysis consists of:

- comparison of the sub-area key issues and scenario elements and revision of projects and programmes for commonalities and differences;
- assessing the extent of conflicting issues;
- analysis for transboundary issues will also be done with the assistance of DSF, SEA, RAM and other tools, particularly for sub-area scenario and projects and programmes.

The analysis should come up with the following outcome of transboundary issues:

- Basin-wide and national benefits
- Conflicts/differences
- Possible ideas about cause-effect10 of transboundary impacts
- Ranks of transboundary issues: i) likely happen, ii) basin-wide importance

[10] Cause-effect analysis will be done in cooperation with WUP and EP since it is focus of the two programmes.

It is expected that discussion paper and preparation prior to the transboundary meeting will help a lot in speeding up the process and controlling the tension.

*Step 3. Identifying framework for dealing with transboundary issues(whole Day 2)*

The framework will be built up by using a supporting development initiative as tool to explore possibilities for cooperation. The process will consist of identifying a transboundary development project (between sub-areas that are met), and look at transboundary issues and framework for cooperation. The framework for cooperation will contain goals for cooperation, actions and measures for addressing transboundary issues in basin-wide planning, and joint development opportunities.

The MRC 1995 Agreement and the BDP development strategies/program and sector strategies, and the national development policies will be used as basis and guiding principles; approach identified by WUP-EP and the DSF, SEA, and RAM tools can be used.

This part will also prepared in advance and included in the discussion paper.

### 5.3.7 Expected outcome

It is expected that at the end of this meeting:

- Sub-area transboundary issues will be identified and agreed upon
- Framework for cooperation including actions and measures for addressing transboundary issues in basin-wide planning will be identified
- A recommendation on joint development opportunities will be made

## 5.4 Proceedings

### 5.4.1 Overview

The MRC's role is to promote *"Cooperation in sustainable development, utilisation, and conservation of the water and related resources of the Lower Mekong Basin."* One component of the Basin Development Plan (BDP) approach is that analysis of transboundary issues be integrated in the planning process. Transboundary issues, in the BDP context, are development opportunities, issues of interest to more than one country; or issues affecting and involving more than one country for water and water-related resources planning. The framework to deal with transboundary issues in the BDP will concentrate on cooperation for basin-wide benefits in terms of economic, environmental and social needs.

The analysis of transboundary issues as part of the River Basin approach has commenced in the single BDP sub-areas and introduced among the BDP sub-areas that have inter-dependent issues. These sub-areas are defined as transboundary sub-areas and sub-areas that share the mainstream river (Figure 5.1). Five sub-area transboundary meetings were conducted as agreed among the four riparian countries. The four riparian countries agreed to alternate the locations of the meeting, and all committed to finish all meetings during November (Table 5.1).

*Figure 5.1: Transboundary meetings held*

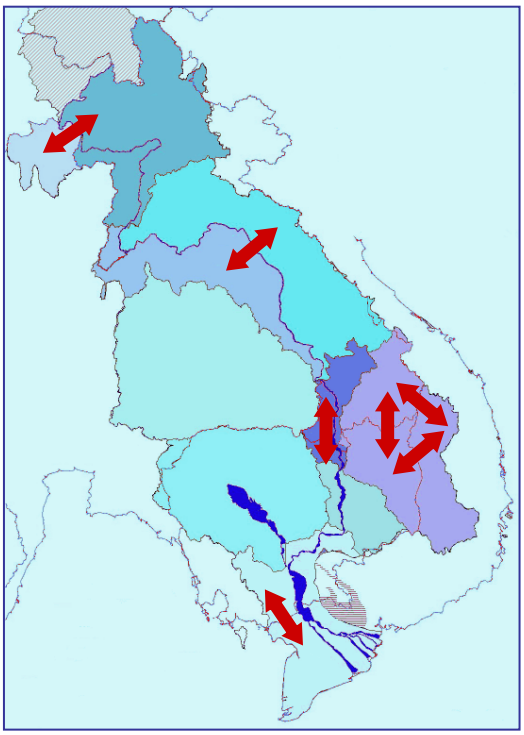


*Table 5.1: Dates and locations of transboundary meeting*

| Transboundary sub-area | Meeting dates | Location |
|---|---|---|
| Sub-areas Northern Laos and Northern Thailand (1L & 2T) | 2-3 November 2004 | Chieng Rai Province, Thailand |
| Sub-areas Central Laos and Songkram River/Upper Northeast Thailand (4L, 3L & 3T) | 15-16 November 2004 | Savannakhet Province, Lao PDR |
| Sub-area Southern Laos/Northern Cambodia (6C and 6L) | 18-19 November 2004 | Champasak Province, Lao PDR |
| Sub-area Delta (10C and 10V) | 22 November 2004 | Svay Rieng Province, Cambodia |
| Sub-area Se San/Sre Pok/Se Kong (7C, 7L and 7V) | 29-30 November 2004 | Nha Trang, Viet Nam |

### 5.4.2 Objectives and outcomes

The objectives of the meeting were:

- To identify key transboundary issues, opportunities, and common goals
- To identify joint projects related to trans-boundary issues and goals
- To agree upon steps for future cooperation

The meeting intended to achieve the following outcome:

- Sub-area transboundary issues identified
- Recommendation on development initiatives
- Means for cooperation

### 5.4.3 Participation and procedure

Overall, the participants included the Secretary/Director General of NMCs, members of the National Working Group, team leaders/members of the sub-areas, BDP coordinators of NMCs, and some MRC BDP Team. Mr Hans Guttman from Environment Programme facilitated 1L2T, 10CV and 7CLV; Mr Staab Manfred from BDP facilitated 6CL; and Mr Suchart, consultant, facilitated 3L4L3T. The Chairperson of the meeting was the Secretary/Director General of the NMC which hosted the meeting. The number of participants ranged from 20-32.

Prior to the transboundary meeting, there was an orientation to have clear understanding of the concept, framework and objectives/intended outcome, and meeting procedure (Guidelines). The country was requested to get well prepared with the sub-area overview, potential transboundary issues, and project ideas for the meeting. The organisation, number of participants, and agenda of the meeting were prepared by countries. The host country was in charge of logistics, and the BDP Team from the Secretariat assisted in all preparations and budget allocation.

In general, the meetings proceeded with the country presentation of the sub sub-area overview, key transboundary issues and proposed joint projects; followed by identification of common and prioritised issues and joint projects; and the group work on joint projects in simplified PIN development. Further actions were also made at the end of the meeting. Appendix 2 presents agenda of the meetings in detail.

### 5.4.5 Outcome

Overall, the meetings were very successful. All countries actively participated and they were very committed to the achievement of the meetings' objectives and outcomes in a friendly environment. The outcomes of the meeting can be presented under sub-headings below.

#### *Key transboundary issues and measures to address them*

The potential transboundary issues were both development opportunities and impacts, and combinations of the two. It was not possible to discuss about cause-effects chain in detail during the meeting, but measures to address them were implicit in the joint projects . It is hoped that as these projects will be implemented there will be more studies and analysis on transboundary issues and measures identified along the process. The important action now is to look at possibility for implementation of joint projects. Budget is the most important question.

#### *Joint project proposals*

At the end of the meetings, a total of 69 joint projects in simplified PIN development were prepared. Table 5.2 summarises types and number of joint projects from each transboundary meeting. Among them, the main joint projects include eight agriculture and irrigation, four watershed management, nine fisheries and aquaculture, five river bank protection, five tourism, six floods and droughts management, six navigation, four hydropower, seven water supply, and four human resources development.

It should be noted that these joint projects are first of all transboundary projects among the sub-areas, and at the same time some are basin-wide projects, because they are the concerns

of all. For examples, agriculture and irrigation, riverbank protection, fisheries and aquaculture, watershed management, floods and droughts, water supply and sanitation, tourism, hydropower, and human resources development. Common strategies for project implementation can be formulated.

All transboundary projects can be considered as long-listed, however, it is important to review them against the selection criteria. Then they will be prioritized and run for short-listed projects.

*Table 5.2: Joint projects*

| Meeting | Joint projects identified |
|---|---|
| SA 1L & 2T<br>(total: 15 joint projects) | - Agro-forestry: 1<br>- River bank protection: 2<br>- Watershed management: 1<br>- Fisheries: 3<br>- Floods: 1<br>- River/hydrology: 1<br>- Tourism: 1<br>- Water supply/ waste management: 3<br>- Navigation: 1<br>- HRD: 1 |
| SA 3L, 4L & 3T<br>(total: 13 joint projects) | - Irrigated agriculture: 1<br>- River bank protection: 1<br>- Watershed management: 1<br>- Fisheries: 1<br>- Floods: 1<br>- Wetland conservation: 1<br>- Hydropower: 1<br>- Trans-boundary water reallocation: 1<br>- Tourism: 1<br>- Water supply/ waste management: 2<br>- Navigation: 1<br>- HRD: 1 |
| SA 6 CL<br>(total: 10 joint projects) | - Irrigated agric.: 1<br>- River bank protection: 1<br>- Watershed management: 1<br>- Fisheries: 1<br>- Floods & drought: 1<br>- River ecology: 1<br>- Hydropower: 1<br>- Tourism: 1<br>- Water supply: 1<br>- Navigation: 1 |

| Meeting | Joint projects identified |
|---|---|
| SA 10CV<br>(total: 17 joint projects) | - Agriculture & soils: 2<br>- River bank protection: 1<br>- Fisheries/aquaculture: 2<br>- Floods &drought: 3<br>- Water quality: 1<br>- Water diversion: 1<br>- Navigation: 3<br>- Tourism: 1<br>- Integrated water planning: 1<br>- HRD: 1<br>- Optimization use of water: 1 |
| SA 7CLV<br>(total: 14 joint projects) | - Agriculture, irrigation: 3<br>- Watershed management: 1<br>- Aquatic ecosystems development: 2<br>- Study on flow management: 1<br>- Hydropower: 1<br>- Alternative energy study: 1<br>- Water supply and sanitation: 1<br>- Tourism: 1<br>- HRD: 1<br>- Integrated water planning: 1<br>- Flood forecasting & warning system: 1 |

## *Next steps*

The participants agreed that the development of joint projects in full PIN format will be done together by countries that will jointly implement the projects. The Bilateral Meetings between countries will be continued for this purpose.

*Table 5.3: Transboundary issues and joint projects*

| TB sub-areas | Transboundary issues | Joint projects |
|---|---|---|
| SA1L 2T | River bank erosion<br>Soil erosion & sedimentation<br>Decline of fisheries<br>Deterioration of water quality<br>Cultural and livelihood of the community along the Mekong River | River bank protection: 2<br>River/hydrology: 1<br>WSM: 1<br>Fisheries: 3<br>Water supply/ waste management: 3<br>Tourism: 1<br>Agro-forestry: 1<br>Floods: 1<br>Navigation: 1<br>HRD: 1 |
| SA 3L 4L 3T | Flooding<br>River bank erosion<br>Deterioration of water quality | Floods: 1<br>River bank protection: 1<br>Water supply/ waste |

| TB sub-areas | Transboundary issues | Joint projects |
|---|---|---|
| | Decline of fisheries<br>Conservation and rehabilitation of biodiversity in tropical forest of watershed area<br>Soil erosion & sedimentation<br>Wetland conservation<br>Sustainable agriculture<br>Promotion of ecotourism and livelihood of the community along the Mekong River<br>HRD | management: 2<br>Fisheries: 1<br>WSM: 1<br>Wetland conservation: 1<br>Irrigated agric.: 1<br>TB water reallocation: 1<br>Tourism: 1<br>Navigation: 1<br>HRD: 1<br>Hydropower: 1 |
| SA 6C 6L | Flood and drought incidence<br>River bank erosion<br>Soil erosion and sedimentation<br>Illegal exploration of forest resources along border lines<br>Natural resources management and protection<br>Wetland conservation and management<br>Impacts of hydropower dams from upstream<br>Deterioration of water quality<br>Tourism development<br>Improvement of navigation and transport facilities<br>Cross-border trading<br>Decline of fisheries<br>Dolphin and deep pools protection and conservation | Flood & drought: 1<br>River bank protection: 1<br>WSM: 1<br>Hydropower: 1<br>Water supply: 1<br>Tourism: 1<br>Navigation: 1<br>Fisheries: 1<br>River ecology: 1<br>Irrigated agriculture: 1 |
| SA 10C 10V | Floods (wetlands mitigating functions, flood protection)<br>Water shortage/drought (saline water intrusion)<br>Water quality (increased pollution from agricultural intensification and industrial development<br>Bank erosion (sedimentation)<br>Soil quality (management of soil nutrient & acid sulphate)<br>Agricultural development (intensification and diversification, agro-industries development)<br>Fisheries resources (environmental management of habitats, spawning areas and migration routes)<br>Tourism<br>Navigation<br>Natural resources development<br>Sea water level rise<br>Mangrove protection<br>Border area river works<br>Cross border small scale trade | Flood &drought: 3<br>Water quality: 1<br>River bank protection: 1<br>Agriculture & soils: 2<br>Fisheries/aquaculture: 2<br>Tourism: 1<br>Navigation: 3<br>Water diversion: 1<br>Integrated planning for socio-economic development: 1<br>HRD: 1 |
| SA 7C 7L 7V | Flooding (Natural e.g climate change, deforestation..)<br>Droughts and floods<br>Poor flood forecasting systems in providing data and information<br>Agriculture development: irrigation, crop intensification, agro-industry, animal production<br>Sharing and exchange of good farming practices and techniques<br>Decline in fisheries (illegal fishing, manmade activities…)<br>Fisheries resources threatened (habitats, migration routes and spawning ground)<br>Flagship species habitat and migratory pathways conservation<br>Protection of upper watershed forests | Flood: 1<br>Agriculture: 3<br>Irrigation efficiency: 1<br>Aquatic prod: 2<br>IWSM: 1<br>Water supply and sanitation<br>Tourism: 1<br>Hydropower: 2<br>Study on flow management: 1<br>HRD: 1 |

| TB sub-areas | Transboundary issues | Joint projects |
|---|---|---|
| | Uncontrolled deforestation may effect to watershed management. | |
| | Soil erosion and Sedimentation (slash&burn cultivation, decreasing vegetation cover…) | |
| | Environment and natural resources threatened | |
| | Degradation of natural resources including water resources (Illegal exploration of forest resources along border lines) environment) | |
| | High pressure of population on natural resources may result in conversion of forest land into cultivation. | |
| | Cooperation in the natural resources use and management (quantity and quality) | |
| | Water resources threatened (quantity and quality) | |
| | River bank erosion | |
| | Cooperation in tourist development | |
| | Hydropower development | |
| | Transboundary impacts from hydropower development in the upper stream Mekong and LMB (hydrological change, impacts on people, biodiversities, fisheries assets, | |
| | In-appropriate operation regulations of hydraulic work may affect the flow regime downstream | |
| | Reservoir and dams constructed to better regulate flow downward, for water supplementation during dry season and flood peak reduction in rainy season. | |
| | Good tendency in developing trade corridor crossing border for goods and electric power | |
| | Difficulties in communication | |
| | Enhance close relationship between communes along border lines in exchanging cultures and experiences in farm work and lifestyles | |
| | HRD: Knowledge and experiences sharing | |

# 6 Issues and priorities

Please note that the following sections relate to the sub-area analyses as such, and not to the outcomes of the analyses (which are addressed in other reports).

### *Sub-area delineation*

The sub-areas were initially intended as a generator of data, information and ideas to be fed into the BDP process. In return, the BDP would provide a basinwide planning context, together with hydrological data and GIS-based data and information to be available for the de-central planning.

Also, the sub-areas were important in connection with the stakeholder dialogue and the institutional interfacing that is important in IWRM.

Beyond BDP Phase 1, the sub-areas will assume a new and equally important role in connection with implementation of development initiatives identified and promoted under the BDP.

These priorities were reflected in the delineation of the sub-areas.

### *Sub-area analysis*

The sub-area analyses started in 2002 and were guided by the MRC mandate according to the 2000-2005 MRC Strategic Plan. They addressed development that was (i) water-related; and (ii) transboundary.

In some respects, this scoping was not entirely fruitful, and in consequence, it was not fully observed during the work. For example, at the initial identification of a development initiative, it may not at all be clear whether or not an idea has a transboundary character. There may be cumulative effects of minor interventions that are unheeded at the de-central level; and there may be a scope for basinwide synergies (for example within knowledge-sharing) if an otherwise local initiative is raised in different places at the same time.

A visible feature of the sub-area studies was that they took a much longer time to complete than originally expected. This was for a variety of reasons, which included their innovative and explorative character, the need of capacity-building, and the need of basinwide networking and liaison. In this connection, a reference can be made to the time required to establish and operationalize the new RBCs/RBOs which normally do not address national nor basinwide development.

The results of the analyses are likely to become outdated within a rather short time, due to the rapid and often step-wise changes of development needs and opportunities. Therefore, they should be maintained, preferably in a collaboration between the BDP, the NMCs, and the de-central planning bodies at the province or RBC/RBO level.

### *Transboundary meetings*

The transboundary meetings had been planned from the onset of BDP Phase 1, but got a particular significance once the results emerged from the sub-area analyses.

In some cases, these analyses had given less attention to transboundary aspects, due to a lack of information and dialogue. In other cases, such aspects were addressed, but in an asymmetrical way.

Also, many project ideas identified within each single sub-area were conceived in a way that targeted the local benefits and implications, as much as the cross-border ones.

In consequence, it became evident that the value of the sub-area analyses could be highly increased by a transboundary dialogue directly between adjacent sub-areas.

These meetings took place at a late stage of Phase 1, which was appropriate, as far as they could build on completed (or nearly completed) sub-are studies.

# 7 Solutions

### *Sub-area delineation*

The sub-area delineation emerged as an outcome of a process that involved (i) development of delineation criteria; (ii) dialogue with MRCS modellers (from WUP); (iii) dialogue with national planners; and (iv) a gradual clarification of the sub-areas.

The eventual outcome was entirely practical for the purpose of the BDP, and could be useful for other basinwide planning purposes as well.

In the meantime, river basin committees / river basin organizations have been established or are being planned in many places within the LMB. These permanent bodies have functions that comprehensively overlap with the semi-temporary functions of the BDP sub-area working groups. It is interesting to see that the independent delineation of the sub-basins under each RBC/RBO has, in many cases, given an administration area that either resembles a BDP sub-area or is largely compatible with it.

### *Sub-area analysis*

The technical distinction between local transboundary and basinwide development can in some cases impede the stakeholder dialogue, because the stakeholders are not aware of the difference or have little interest in it.

Also, of course, a water-related development project can be extremely useful even if it falls outside the main purpose of the BDP because it is an entirely local enterprise.

Therefore, the suggestion was made that the sub-area studies should consider openly any sort of water resources or water-related development that was regarded as useful and practical at the sub-area level, without too much concern regarding their transbounday or basinwide implications.

Regarding the time required for the analyses, it is believed that the continued work at sub-area level will proceed at a much higher speed that during Phase 1. This is for two reasons: One is the capacity that has been built, and another is the much clearer perception of context and purpose that has been provided by the basinwide scenario analyses and strategy formulation that took place at a late stage of Phase 1.

### *Transboundary meetings*

Although strictly result-oriented, the meetings were held with an open agenda in terms of development initiatives.

Different comparative advantages have their origin in for example water availability, infrastructure, and applied technology. In many cases, such divergences represent particular opportunities for added value of transboundary collaboration. Whenever something can be done better, faster or cheaper on one side of a border than on the other, there is a scope for collaboration - be it by trade, joint production systems, distribution and marketing, or knowledge-sharing and capacity-building.

From this point of view, also the barriers can be regarded as potential opportunities for development collaboration. While pursuing opportunities as much as barriers, this is a circumstance to keep in the top of the mind in basin development planning.

In consequence, during the meetings, the aim of transboundary development was not restricted to transboundary cause-effect relationships, but was expanded to any sort of transboundary synergy or interaction:

- *Natural relations:* Physical or ecological cause-effect relations, for example an upstream regulation affecting a downstream water availability, an upstream withdrawal affecting the salinity intrusion in the Delta; or a downstream regulation preventing fish from migrating to an upstream habitat. For this type of issue, an effort was made to convert an observed or imminent problem into a development opportunity (aiming to by-pass or mitigate the problem);

- *structural relations:* Economic or infrastructural links between development goals with a joint or related decision basis - for example the channel depth of a regional waterway; the performance and benefits of a flood protection scheme; or joint tourism development; and

- *immaterial relations:* These occur between development goals that can add value to each other without being formally linked, for example in connection with policy and strategy formulation, awareness-building, research, or knowledge-sharing.

This means that in some cases, the transboundary implications were not determined until after the entire series of meetings.

In case that some otherwise useful ideas should fall outside the scope of the BDP, these may be promoted and implemented at the national or the de-central level.

# 8 Findings and recommendations/ lessons learnt

### *Sub-area delineation*

- The sub-area delineation took place as an iterative and highly participatory process. The outcome proved itself practical and useful. It was a right decision to observe the national borders as well as the hydrological ones.

### *Sub-area analysis*

- During BDP Phase 1, important inputs from MRCS (such as water availability, maps and GIS analyses) were not available in time. In fact, some of these inputs were never produced. This was due to delays in the other programmes (just like other delays occurred within the BDP). There is a scope for extended inter-programme coordination , for example linked to milestone submissions

- The critical links between BDP and WUP were realised from the onset and were discussed in depth during the inception phase. These links remained decisive and affected the progress and the final outcome of the analyses (and possibly the final outcome of the WUP analyses as well).

- The scenario analyses turned out to be particularly difficult, because this method was new to the participants (who were otherwise well familiar with resource planning), and also because its justification was initially not entirely clear to the participants.

The sub-area and the basinwide scenario analyses had different orientations and were not fully linked. This is among the important lessons learned from BDP Phase 1.

- There is a scope for expansion and consolidation of the participation in the planning process, including the general public participation. Considering the scope of the BDP, some patience is required in this connection.

- The sub-area analyses as made are regarded as highly successful. They have been indispensable for the BDP process and highly useful for several other applications within and outside MRC.

- The sub-area studies will get gradually outdated and should be regularly revised. Their maintenance should be regarded as an ongoing routine rather than a once-off exercise. This work may be accommodated under BDP Phase 1 and may be linked to both the BDP process and the state of the basin reporting. Also, the links to de-central planning should be maintained, in the interest of all parties involved.

- The sub-area working groups have set a good example in connection with streamlining and interfacing the institutional water resources management framework at the transboundary, as well as the national and the (sub-) river basin committee/organization level. This is partly related to their demonstrated ability to facilitate a positive interaction between regional and national water resources management and across sectors.

### *Transboundary meetings*

From the five transboundary meetings, it was observed that:

- The meetings proceeded well and achieved a substantial progress in a short time (in contrast to the basic sub-area analyses that took a much longer time than anticipated).

- The participants could raise their issues and interests in a friendly way. This means that everyone was clear about the purpose of the dialogue were determined to achieve the intended outcome.

- It was possible to engage the participants in the discussion, and to make commitment for achieving the objectives and expected outputs of the meeting. This means that cooperation across national borders was possible and useful at the sub-area level.

- Good preparations were supporting the proceedings of the meetings, together with clear objectives and a clear intended outcome.

- Orientation, good preparation and commitment from all riparian countries contributed to the success of the transboundary meeting.

- Regarding the transboundary project ideas, the strategic significance of the various potential development initiatives can be further highlighted, partly with reference to the new MRC IWRM Strategy for the LMB, and partly in relation to the national socio-economic and sector development plans and policies. Also, there is a scope for an early screening of interfaces and overlaps with related parallel development initiatives.

# 9 Relevance

## 9.1 Relevance for NMCs and/or line agencies

The sub-area studies have provided a useful perspective to the national sector development planning, both by illustrating options and constraints, and by addressing important linkages between sectors and between planning levels.

In relation to the new or upcoming river basin committees and river basin organizations, the NMCs and line agencies have provided valuable planning inputs, as well as examples of successful dialogue between the many different participants in the planning process.

Also, the sub-area studies have produced a wealth of project ideas, many of which are suited for implementation at de-central level, for example by national or provincial agencies, or by the river basin committees/ river basin organizations.

## 9.2 Relevance for MRCS and/or BDP Phase 2

Towards the completion of BDP Phase 1, the concept of the sub-areas and the approach to sub-area analysis are regarded as highly successful. It is tentatively expected that the work should proceed into BDP Phase 2.

The sub-area analyses and recommendations provide valuable information to other MRC programmes and a good starting point for BDP Phase 2.

# 10 Concluding general outlook

In the time to come, it is hoped that the sub-area analyses and the sub-area working groups can continue their good work, possibly in an expanded interaction with new or upcoming river basin committees/ river basin organizations, who might in the course of time gradually absorb the functions, the expertise, the experience and the results of the sub-area working groups.

The de-central transbounday dialogues initiated by the transboundary meetings were appreciated by all involved parties and should be gradually institutionalized with support from MRC and the BDP.

In the course of time, China and Myanmar can be involved in the de-central transboundary dialogue, perhaps initially as observers, in order to gradually expand this (apparently attractive) part of the planning process to the entire basin.

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# Appendix 1: Reporting format

Below is given an indicative draft format for sub-area reports, as envisaged before completion of the sub-area studies.

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Data summary (sample enclosed) *(prepared by MRCS)*

Maps
- Borders, rivers, towns, forests ? *(prepared by MRCS)*
- Land use ? *(prepared by MRCS)*
- Land classes? Soil types? *(prepared by MRCS)*

1 Introduction

... including a summary of the sub-area study process and its participants, with listing of workshops and forums

2 Baseline description

- 2.1 Population, livelihoods, resources, environment (Geographical summary) including a few photos?
- 2.2 Particular features (assets, and 'hot spots'?? - or particular priorities and concerns) - with a few photos?
- 2.3 Sector summaries (of each relevant BDP sector only) ... including trends ... and inter-sector linkages - with a few tables & graphs?
- 2.4 Transboundary issues
- 2.5 Perceived knowledge gaps

3 The agenda for development

- 3.1 Social development issues, needs and opportunities
- 3.2 Economic development issues, needs and opportunities
- 3.3 Natural resources and environmental development issues, needs and opportunities
- 3.4 Cross-cutting issues
- 3.5 Ongoing and planned development initiatives

4 Scenario analysis

... initially, a set of narrative, conceptual, itemized descriptions of a few future situations, expectedly including an illustration of 'preferred' development(s)

5 Stakeholders and dialogue

- 5.1 Institutional framework
- 5.2 Other stakeholders
- 5.3 Notes on stakeholder dialogue (with suggestions on how to collaborate)

6 Outline of a sub-area development strategy

6.1 National development policies (extracts from national development policies and plans)

6.2 Sub-area priorities and principles for implementation listed as short statements under (i) social aspects; (ii) economic aspects; and (iii) natural resources and the Environment

Reference list

Appendix: Project ideas

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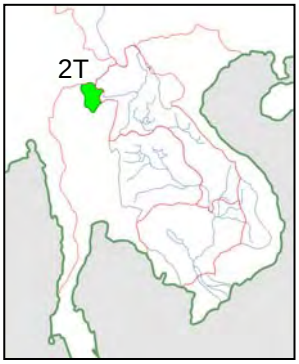


Data summary sheet (sample)

# Sub-area 2T: Chiang Rai

**x,xxx km2, xxx,xxx people**

**The river system:**
The major river in this sub-area is Nam Kok (326 km, 10,656 km2), which flows from Myanmar (180 km, 3,363 km2) through Thailand (146 km, 7,293 km2) to join the Mekong south of The Golden Triangle. Tributaries to Nam Kok include Lao River (191 km, 2,709 km); Fang River (117 km, 1,920 km2); and Suai River (50 km, 437 km2)

**Rainfall:**
Rainfall varies between 8 mm/month in January and 285 mm/month in August, with above-average rainfall in May-October

**Streamflow:**
The streamflow varies between 3.3 l/s/km2 in April and 41.4 l/s/km2 in September, with above-average flow in July-December

**Existing regulation:**
Present regulation comprises the Chiang Rai Weir, and 3 mini-hydropower plants: Mae Kum Luang (6,4 MW, run-of-river); Mae Chai (875 kW, run-of-river); and Mae Mao (4,6 MW, reservoir).

**Development issues and opportunities:**
Examples of potential interventions are the Kok-Ing-Nan diversion scheme (1,800 Mm3/year), and the 3,033 Mm3 Mae Kok Reservoir just upstream of the Myanmar border. 8 minor multipurpose reservoir sites have been identified, with a total storage volume of some 343 Mm3.

## Provinces & towns

Chiang Rai (x percent of population, y percent of area)
Chiang Mai (x percent of population, y percent of area)
Major town(s): Chiang Rai

## Population

| | 2000 | growth | 2020 |
|---|---|---|---|
| Chiang Rai | | pct/year | |
| In rural areas | | pct/year | |
| Total | | pct/year | |

## Rainfall and runoff

| | J | F | M | A | M | J | J | A | S | O | N | D | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rainfall (average for sub-area) *mm* | | | | | | | | | | | | | |
| Runoff (average for sub-area) *l/s/km2* | | | | | | | | | | | | | |

## Land classification

| | | 2000 | 2000 |
|---|---|---|---|
| Class 1: | Very steep | *km2* | *pct* |
| Class 2: | Steep | *km2* | *pct* |
| Class 3: | Moderately steep | *km2* | *pct* |
| Class 4: | Gentle slopes | *km2* | *pct* |
| Class 5: | Flat | *km2* | *pct* |

## Cultivation areas

| | 2000 | 2000 | 2020 | 202o |
|---|---|---|---|---|
| Area suited for highland cultivation | *km2* | *pct* | | |
| Suited for irrigated paddy cultivation only | *km2* | *pct* | | |
| Suited for irrigated lowland cultivation other than paddy | *km2* | *pct* | | |
| Total suited for irrigated lowland cultivation | *km2* | *pct* | | |
| Actual irrigation area | *km2* | *pct* | *km2* | *pct* |

## Land elevation

| | |
|---|---|
| 0 - 100 m | *percent of area* |
| 100 - 200 m | *percent of area* |
| 200 - 400 m | *percent of area* |
| 400 - 800 m | *percent of area* |
| Above 800 m | *percent of area* |

## Water availability

| | | Annual average | Annual 'reliable' (4 of 5 years) | April 'reliable' (4 of 5 years) |
|---|---|---|---|---|
| Rainfall | *a* | *mm/year* | *mm/year* | *mm/mth* |
| Evaporation | *b* | *mm/year* | *mm/year* | *mm/mth* |
| Net rainfall | *a - b* | *mm/year* | *mm/year* | *mm/mth* |
| Surface runoff | *c* | *mm/year* | *mm/year* | *mm/mth* |
| Surface runoff | *c* | *l/s/km2* | *l/s/km2* | *l/s/km2* |
| Surface runoff | *c* | *m3/s* | *m3/s* | *m3/s* |
| Groundwater recharge | *a - b - c* | *m3/s* | *m3/s* | *m3/s* |
| Flow from upstream | *d* | *m3/s* | *m3/s* | *m3/s* |
| Surface water resource | *c + d* | *m3/s* | *m3/s* | *m3/s* |
| Ecological demand | *e* | *m3/s* | *l/s/km2* | *l/s/km2* |
| Ecological demand | *e* | *m3/s* | *m3/s* | *m3/s* |
| Available to supplies | *c + d - e* | *m3/s* | *m3/s* | *m3/s* |
| Present withdrawals | *f* | *m3/s* | *m3/s* | *m3/s* |
| Corresponding return flows | *g* | *m3/s* | *m3/s* | *m3/s* |
| Flow to downstream | *c + d - f + g* | *m3/s* | *m3/s* | *m3/s* |

## Water demand & withdrawal

| **Wet season, 6-months average** | 2000 | 2020 |
|---|---|---|
| Demand at xxx percent crop intensity | *m3/s* | *m3/s* |
| Withdrawal at xxx percent crop intensity | *m3/s* | *m3/s* |
| Return flow | *percent* | *percent* |
| **Dry season, 6-months average** | | |
| Demand at xxx percent crop intensity | *m3/s* | *m3/s* |
| Withdrawal at xxx percent crop intensity | *m3/s* | *m3/s* |
| Return flow | *percent* | *percent* |
| **Domestic demand** | *m3/s* | *m3/s* |
| Return flow | *percent* | *percent* |
| **Industrial demand** | *m3/s* | *m3/s* |
| Return flow | *percent* | *percent* |

## Water quality

**Monitoring stations (if any)**

**Issues and concerns:**
No problems reported in connection with BOD and nutrients. Few data available about persistent contaminants. No data about groundwater quality. Inadequate solid waste disposal capacity

No major industries. Some hospitals and clinics. Since 2000, sewage from Chiang Rai Town is treated in stabilization ponds

## Notes

1): Data from ....
2): Data from ....
3): Data from ....

# Appendix 2: Joint project ideas

Note: This appendix is a list of joint project ideas raised in connection with the transboundary dialogue. These are an important outcome of the dialogue. They are listed below *'as made',* before screening of overlaps with other development initiatives, and screening of the scope for merging several ideas into one. At a later stage of preparation, some ideas were skipped because their objectives were covered by other projects (within or outside MRC), while other ideas were merged into larger projects or programmes with a broader geographic coverage and/or a broader scope.

### *Northern Sub-areas Lao and Thailand (1L-2T)*

| | |
|---|---|
| Title: | Bank Protection Study (Code J-001) |
| Development objectives: | To identify critical areas of Bank erosion and its associated causes<br>To identify means for Bank protection<br>To promote local knowledge on traditional bank protection measures |
| Background and justification: | The Mekong River flows through several deposit areas where channel is unstable and this causes bank erosion. Other causes may result from manmade activities such as unregulated release of water from the dams in China, construction of Navigation facilities and any other construction that change the flow directions. As Mekong River in this section forms borders not only between Lao PDR and Thailand but also with China and Myanmar, bank erosions may lead to a change of borderline. In addition, most of the people live near the river banks, erosion will become a serious threat to their property and the nearby agricultural lands. |
| Expected outputs: | The project will produce the following outputs:<br>(i) Identification of the most critical areas of bank erosion and its causes<br>(ii) Identification of means to cope with bank erosion<br>(iii) Future trends on bank erosions<br>(iv) Implementation of Pilot project that has suitable/selected measures for the areas<br>(v) Identification local available materials that are environmental friendly<br>(vi) Data and information exchange between sub-areas (impacts identified and notified before implementation) |
| Title: | Implementation of Bank Protection (J-002) |
| Development objective: | Study on river morphological changes and critical areas<br>Protection of public and private properties<br>Improve people's knowledge on low cost river bank protection |
| Background and justification: | Mekong River in SA 2T&1L forms long border between Lao PDR and Thailand. It flows through its own alluvial deposits, where its channel is unstable and tends to meander. Bank erosions, sand and silk deposits are normal frequencies of rapidly changing river morphology. In densely populated areas along both sides of Mekong River in Sub-area 2T&1L, bank erosions have become a serious threat to land, buildings, housing, private and public properties. Naturally, the river banks in this river section are sensitive to erosion. In some cases, bank erosions have resulted from manmade activities such as ports facilities, bank protection etc. |

| | |
|---|---|
| Expected outputs: | The project would produce the following outputs:<br>(i) Protection of land and agriculture land from the erosion (Cultural sites protected, Economic benefits improved...)<br>(ii) Technical know-how on low cost protection scheme transferred<br>(iii) River morphology changes reduced (sedimentation from the erosion …) |
| Title: | Morphological study in Mekong River and Heung River including river course change (J-003) |
| Development objectives: | To identify morphological changes of the Mekong River<br>To identify Sediment transport |
| Background and justification: | Mekong River characteristics include high flow velocity, big differences between wet and dry seasons water flow. Mekong also carries huge volumes of sediments, some of which are relocated within the basin, while some are lost to the sea. In the course of time, the basin as it appears today has been shaped by the erosion and sedimentation processes. Particular morphological features of the system include the flow channels with their platform and connectivity, navigation channels and deep pools; the active flood plains with their habitats and spawning grounds; and the lakes and reservoirs. Bank erosion has occurred at all times, but can escalate due to physical intervention, such as waterways, flood embankments, port facilities, reclamation, and reservoirs. At the same time, the consequences grow increasingly severe due to the large investments in infrastructure, production plants, and housing, not to speak of the general pressure on the unique river-related habitats and ecosystems. Also, at places, the river serves as a national border. Improved knowledge on cause-effect relationships and management options will facilitate control of undesired natural morphological developments as well as negative side effects of otherwise desirable interventions. |
| Expected outputs: | The project would produce the following outputs:<br>(i) Morphological changes in the study areas identified<br>(ii) Sediment transport studied<br>(iii) identification of cause-effect and management options;<br>(iv) dissemination and promotion of results |
| Title: | HRD Capacity Building to Lao and Thai River Basin Organisations/Committees (J-004) |
| Development objectives: | To strengthen and exchange of experience between RBO/Cs<br>To Improve knowledge on IRBM |
| Background and justification: | There is early stage of the application of IRBM approach. Thailand has more advances in terms of the establishment RBOs countrywide while Lao PDR is in the beginning stage of the establishment so-called River Basin Committee starting from Nam Ngum Basin. The existing capacity of local people on Integrated Resources Management, in some cases, is still limited. Thus, there is a need to introduce IRBM approach for people involved in RBM especially strengthen their knowledge to ensure an effective management of Basin resources. |
| Expected outputs: | The project would produce the following outputs:<br>(i) Capacity of RBO/Cs strengthened<br>(ii) Knowledge of local people on IRBM improved<br>(iii) Network of RBO/Cs established |

| | |
|---|---|
| Title: | Joint development of tourism (Ecotourism, cultural and historical sites) as well as environmental impacts carrying capacity of tourist areas and studies on historical culture and livelihood (J-006) |
| Development objective: | Identify tourism areas/sites including routes<br>Promote eco-tourism including cultural & historical<br>Generate incomes for local people<br>Conserve traditional cultures |
| Background and justification: | Sub-areas 1l&2T posses potential in terms of the valuable natural resources as well as living styles & culture. These sub-areas have many similarities on traditions and cultures. This creates conditions for promotion of joint eco-tourism and cultural tourism that will bring benefits to local people and improve national income. This project will support national policy on poverty alleviation and job creation for local people. Regionally, there are different initiatives on tourism development.<br>Since the economic development in two countries has rapidly increased recently, some local style of living and tradition have been lost hence, for the sake of tourism development, practical activities should be applied to rehabilitate traditional cultures and living styles. |
| Expected outputs: | Tourism areas/sites including routes identified<br>Eco-tourism including cultural & historical promoted and implemented<br>Incomes for local people improved<br>Conservation of traditional cultures |
| Title: | River Fishery management including fish breeding, spawning ground management, fish restocking to the nature and deep pools management (J-007) |
| Development objective: | To sustain valuable aquatic resources of the Mekong River Basin<br>To transfer knowledge on sustainable fisheries management |
| Background and justification: | Capture fishery in the Mekong and main tributaries is an open access type of fishery. It is recognized that fishery over the years is declining. In addition, the fish stock is also decreasing from time to time These problems may result from illegal and over fishing as well as using inappropriate fishing gears. There is also inadequate rules and regulation on fishing. Fishermen have little understanding on sustainable management of fisheries resources. Since, fishery is considered as a common property, to maintain the fish population and optimize the exploitation of fisheries resources, there is a need to protect and conserve these common resources for the benefits of people. In the past, various attempts on fish conservation were made especially the establishment of conservation zones and deep pool management and also restocking etc. |
| Expected outputs: | Fish population and fish stock studied and managed<br>Public awareness on benefits from fishery management raised<br>Enforcement of rules and regulations on fishery management<br>Fish restocking to the natures<br>Deep pools management<br>Setting up village committee and knowledge transfer |

| | |
|---|---|
| Title: | Research on Mekong Giant Catfish life cycle and a study of Local Fish Feed Sources (J-008) |
| Development objective: | To conserve rare Fish Specie of the Mekong River<br>To create awareness of the local people on sustainable fisheries management |
| Background and justification: | Mekong River is rich in terms of fishery resources. There are over 1000 Fish Species in the Mekong and its tributaries. Mekong Giant Catfish (Pla Buk) is one of the significant fish specie which rarely found in other river basin. Since the Mekong environment has changed recently, it was observed that number of Pla Buk like many other Mekong fish species has been declining at alarming rate. The reasons for this declining have to be explored to avoid having this significant specie become extinct in the future. This may include also study/research on life cycle and feed sources for this specie. |
| Expected outputs: | Giant Catfish population including lifecycle and its feed sources, spawning grounds studied<br>Establishment hatchery stations<br>Public awareness on sustainable fishery management raised<br>Enforcement of rules and regulations on fishery management<br>Deep pools management |
| Title: | Integrated Watershed Management Programme (code J-009) |
| Development objectives: | Sustainable Development and Management of water and related resources for the benefits of people in the selected basins<br>Protection and conservation of water sources<br>Maintain water contribution to the Mekong River |
| Background and justification: | There are more than 10 sub-catchments in the sub-area 1L. At present, illegal exploitation of forest and slash and burn cultivation are still exist. This creates potential problems in general to catchment conditions in particular to the water sources (water availability). There is a need for protection and conservation of critical habitats and protect natural resources in order to maintain the unique and rich biodiversity of wildlife and other plant species that provide valuable resources for sustaining rural livelihood of the people who live in the catchments. To protect and to make best use of these resources, a community-based natural resource management and Integrated Watershed Management are needed. |
| Expected outputs: | The project would produce the following outputs:<br>(i) Improvement of watershed management in the selected basins<br>(ii) Conservation forest (reforestation)<br>(iii) Water contribution maintained<br>(iv) Community-based natural resources management |

| | |
|---|---|
| Title: | Agro-forestry and horticultural development including crops substitution/permanent cultivation (J-010) |
| Development objectives: | Sustainable management of natural resources especially upland agriculture<br>Generate income to reduce poverty<br>Exchange of experience and transfer of knowledge |
| Background and justification: | Upland Development and Poverty Alleviation are very important in developing social economic and conserving natural resources. Majority of the people of Sub-area 1L are poor and they live below the poverty line. They have been practicing subsistence upland agriculture, mainly upland rice and crops, for centuries. This creates problems in relation to natural resources management especially the decreasing existing forest cover of the areas. In contrast in Sub-area 2T, there was better management of natural resources especially upland agriculture practices. Sub-area 2T people have long experience in the development of agro-forestry and horticulture as means to generate incomes. This project will help to generate incomes and create opportunity of exchanging experience in upland agriculture development (income generation/ poverty alleviation/permanent cultivation) between people who live in these two sub-areas. |
| Expected outputs: | Improved farming system<br>- Experience in Agro-forestry and horticulture development<br>Community forest established<br>Non- Timber Forest Production for income generation<br>Permanent cultivation |
| Title: | Study on flash floods (J-011) |
| Development objectives: | Identify mitigation measures to reduce damages from flash floods<br>Improve flood forecasting and warning system |
| Background and justification: | Flood management and Mitigation has become a priority issue at the national and regional levels. Every year floods results in loss of life and property, damage to agriculture and rural infrastructure and disrupts the social and economic activities of people who live in the areas of 2T&1L. In the mountainous sub-areas 2T&1L, flood forecasting and warning system is insufficient to cope with the flash floods. The flood forecasting procedures including data transmission takes long time. In the remote areas, data collection and processing is inaccurate. |
| Expected outputs: | The project would produce the following outputs:<br>(i) Measures for flood damages reduction identified<br>(ii) Hydro-meteorological data collection network/stations improved and expanded<br>(iii) Warning system improved<br>(iv) Awareness of people on floods increased |
| Title: | Improvement of Navigation facilities along the Mekong River (L-001) |
| Development objective: | Regional & National economic growth<br>Improve navigation system and facilities |
| Background and justification: | From Chinese border to Houeisay-Chieng Khong, the number of vessels transporting goods has significantly increased recently. The existing navigation system and facilities e.g ports, navigation aids, channels etc in the areas are considered poor and insufficient to cope with the increasing water traffic. This has to be improved to facilitate not only tourism development but also for the passengers and river transportation in general. |

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| Expected outputs: | 1. Economic growth and better income generation<br>2. Navigation channels identified and improved<br>3. Improved navigation facilities |
| Title: | Improvement and expansion of Towns and Rural Water Supply (L-002) |
| Development objective: | To improve health and sanitation - clean water for local population |
| Background and justification: | 90% of population without access to clean water<br>Diseases caused by lack of clean water |
| Expected outputs: | Studies on Surface and Groundwater<br>Digging of wells<br>Spring water treatment<br>Expansion of urban water supply<br>Water treatment facilities<br>Sanitation facilities |
| Title: | Study on Water Use for Industrial Development(L-003) |
| Development objectives: | Study and identify potential Industrial Development areas |
| Background and justification: | SA 2T&1L is considered as one of the fast growing areas for agricultural and also industrial development. These areas will in the future become the transport linkage to facilitate international trade especially the movement of goods and agricultural products. In parallel, industrial sector will be expanding especially those related to agricultural products processing industries. Water uses for these activities will unavoidably be increased. |
| Expected outputs: | The project would produce the following outputs:<br>(i) Industrial Development areas identified<br>(ii) Water Uses for industries studied<br>(iii) Measures to prevent wasteful use of water |
| Title: | Management and treatment of waste water and solid wastes from town, industrial and mining sites(L-004&L005) |
| Development objectives: | Identify potential point source pollution areas<br>Manage waste water and solid wastes from point sources pollution areas |
| Background and justification: | The SA 2T&1L will in the future become the transport linkage to facilitate the international trades among the upper Mekong countries. Waste water and solid wastes as a result of the rapid expansion of urbanization and industrial development in the areas will be increased. In addition, wastes generated from mining exploration are also expected to be increased. These will create pollution and eventually to the environment and to the Mekong River. |
| Expected outputs: | The project would produce the following outputs:<br>(i) Information on wastes water and solid wastes generated<br>(ii) Treatment facilities<br>(iii) Measures to control wastes generation<br>(iv) Cooperation on management of wastes |

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| Title: | Rural aquaculture extension including development of hatchery station and nursery network (L-006) |
| Development objective: | - To reduce poverty and generate incomes for rural population<br>- To promote aquaculture development in the upland area |
| Background and justification: | Geographically SA 1L is a mountainous and most people live under the poverty line. It is widely acknowledged that the capture fishery is declining over the years. Upland agriculture and aquaculture development in the areas will assist rural people to generate incomes and provide foods supply. In the past, the supply of fingerings for these activities is inadequate. Thus, the development of hatchery stations and nursery networks to support will be needed. |
| Expected outputs: | The project would produce the following outputs:<br>Rural aquaculture promoted<br>Hatchery stations and nursery networks established<br>Better incomes and food supplies |

## *Central Lao and Upper Northeast Thailand (4L-3T)*

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| Title: | Joint Feasibility Study of Transboundary Water Reallocation/sharing between Sub-areas 3T&4L |
| Development objectives: | Sustainable water allocation and sharing for Agricultural development<br>Enhance cooperation on water allocation and sharing<br>Regional & National economic growth |
| Background and justification: | There are two different features of SA 3T&4L in terms of hydrological conditions. It is generally accepted that high proportion of the Mekong Water flow comes from SA 4L as major Mekong tributaries such as Nam Ngum, Se Bang Hieng, Se Bang Fai etc are lied within the area. The existing water uses is relatively low compared to water availability due to the limitation of irrigated areas and other uses. On the other hand, SA 3L&5T has relatively less water and is considered as dry area. There is also a greater demand for water for agricultural development in these areas. |
| Expected outputs: | The project would produce the following outputs:<br>(i) Physical and socio-economic conditions of the areas<br>(ii) Benefit-cost analysis for the proposed projects<br>(iii) Possible alternatives for water allocation/sharing<br>(iv) Cooperative arrangements |
| Title: | Improvement of Irrigated Agriculture and Water Use Efficiency of Irrigation System |
| Development objective: | Sustainable water utilisation for Agricultural development<br>Regional & National economic growth |
| Background and justification: | SA 3T&4L are considered as one of the fast growing areas for Agricultural development in the LMB. Irrigation areas plus intensification of Agriculture and diversification of crops are expected to be increased in the future. Irrigation schemes ranking from small to large ones are exist in the area and many other planned schemes are expected in the next 5-20 years. Efficiency of some of the existing schemes need to be improved especially during the dry season when water become scare. Better management of these schemes will lead to better water use for agricultural development in the area. |

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| Expected outputs: | The project would produce the following outputs:<br>(i) Improved existing irrigation schemes<br>(ii) Increased agricultural production<br>(iii) More efficient water use |
| Title: | Management and treatment of waste water and solid waste from urban, industrial and mining sites |
| Development objectives: | Prevent unregulated waste discharge<br>Improvement of water quality from point source pollution<br>Improvement of the health of river and people |
| Background and justification: | Major urban centers are located along the Mekong River and some of its main tributaries. Population growth in these areas is high compared to other areas, partly, because of the influx of people from rural areas to major cities. Every year, the amount of wastes generated from the areas is significant. In addition, problems may arise from mining exploration which is expected to be increased over the years. There are also insufficient measures for urban planning including lack of rules and regulations for wastes control and discharge. |
| Expected outputs: | The project would produce the following outputs:<br>(i) Controlled solid and waste water discharge<br>(ii) Improved water quality and river health<br>(iii) Rules and regulations exist<br>(iv) Awareness of the people on water quality raised |
| Title: | Improvement of Town and Rural Water Supply |
| Development objectives: | Improve health and sanitation of urban and rural population<br>Increase water supply network sufficient for urban and rural areas<br>Improve knowledge on water supply |
| Background and justification: | There is an inadequate access to the water supply especially clean water not only for the urban but also rural population. These problems associated with the insufficient water supply network and treatment facilities. The lack of access to clean water and sanitation may lead to water-borne diseases such as diarrhoea .Government policy is to provide better access of all people to the clean drinking water and have better access to sanitation in the next 5-10 years |
| Expected outputs: | The project would produce the following outputs:<br>(i) Improved health and sanitation urban and rural population (ii) Increased water supply network sufficient for urban and rural areas<br>(iii) Clean drinking water for urban and rural population supplied<br>(iv) Better knowledge on sanitation |
| Title: | Technical and Investment Cooperation in Hydropower Development in 3T&4L |
| Development objectives: | - Sufficient power supply for both areas 3T&4L<br>- Economic growth and poverty alleviation |
| Background and justification: | The areas 3T&4L are considered as rapid economic growth areas. Consequently, the demand for electricity is expected to be increased rapidly in the next few years. Overall, Central Lao PDR possesses huge potential for Hydropower Development as major Mekong tributaries such as Nam Ngum, Nam Nhiep, Nam Theun, Nam Se Bang Hieng etc are located in this area. The proposed Hydropower Development schemes are the priority for Lao Government to supply electricity to Thailand under the existing Power Trade Agreement between the two countries. |

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| Expected outputs: | Secured Technical and Investment (funding) for the proposed hydropower projects<br>Power availability to meet demand of the areas<br>Economic growth and poverty alleviation |
| Title: | Improvement and promotion of Navigation system and facilities along the Mekong River to facilitate tourism development |
| Development objective: | Regional & National economic growth<br>Enhance cooperation on tourism development<br>Improve navigation system and facilities |
| Background and justification: | There are huge tourism potentials in the sub-areas SA 3T&4L. These include cultural & historical sites that are mainly located along the Mekong River. In addition to the tourism sites, natural conditions in the areas are still intact and the people's way of life provides conditions for ecotourism development. However, the existing navigation system and facilities e.g ports, navigation aids etc in the areas are considered poor and insufficient. This has to be improved to facilitate not only tourism development but also for the passengers and river transportation in general. |
| Expected outputs: | 1. Economic growth and better income generation<br>2. Tourism routes identified<br>3. Improved navigation facilities |
| Title: | Joint Study on River Bank Protection in Sub-areas 3T&4L |
| Development objectives: | Study on river morphological changes and critical areas<br>Protection of public and private properties<br>Improve people's knowledge on low cost river bank protection |
| Background and justification: | Mekong River in SA 3T&4L forms long border between Lao PDR and Thailand. It flows through its own alluvial deposits, where its channel is unstable and tends to meander. Bank erosions, sand and silk deposits are normal frequencies of rapidly changing river morphology. In densely populated areas like Sub-area 3T&4L, bank erosions have become a serious threat to land, buildings, housing, private and public properties and the protection dike placed along river bank, which has to protect the areas during the Mekong floods, is virtually no longer existing. Naturally, the river banks in this river section are sensitive to erosion. In some cases, bank erosions have resulted from manmade activities. |
| Expected outputs: | The project would produce the following outputs:<br>(i) River morphological changes studied and critical areas identified<br>(ii) Protection of public and private properties<br>(iii) Knowledge on low cost bank protection for local people improved |
| Title: | Improvement of flood forecasting and warning system |
| Development objectives: | Reduce damages from floods including flash floods<br>Improve flood forecasting and warning system |
| Background and justification: | Flood management and Mitigation has become a priority issue at the national and regional levels. Every year floods results in loss of life and property, damage to agriculture and rural infrastructure and disrupts the social and economic activities of people who live in the areas of 3T&4L which topographically are flood plains. For sub-areas 3T&4L, flood forecasting and warning system is insufficient to cope especially with the flash floods. In addition, the gauging/hydrological stations along the Mekong River and its main tributaries also are inadequate. The flood forecasting procedures including data transmission takes long time. In the remote areas, data collection and processing is inaccurate. |

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| Expected outputs: | The project would produce the following outputs:<br>(i) Flood damages reduced<br>(ii) Hydro-meteorological data collection network/stations improved and expanded<br>(iii) Warning system improved<br>(iv) Awareness of people on floods increased |
| Title: | Integrated Watershed Management Programme |
| Development objectives: | Sustainable Development and Management of water and related resources for the benefits of people in the selected basins<br>Protection and conservation of water sources<br>Maintain water contribution to the Mekong River |
| Background and justification: | There are more than 20 sub-catchments in the sub-area 4L. The water contribution from this area is significant to the Mekong mainstream flow. At present, illegal exploitation of forest and slash and burn cultivation are still exist. This creates potential problems in general to catchment conditions in particular to the water sources (water availability). There is a need for protection and conservation of critical habitats and protect natural resources in order to maintain the unique and rich biodiversity of wildlife and other plant species that provide valuable resources for sustaining rural livelihood of the people who live in the catchments. To protect and to make best use of these resources, a community-based natural resource management and Integrated Watershed Management are needed.<br>The sub-project related to Integrated Watershed Management should be applied as :<br>The study and conservation of herbs knowledge along the Mekong River<br>The conservation of plants natural food for community stability<br>Forest plantation and buffer zone<br>The study of Biodiversity in pilot area<br>Promotion of environmental friendly agriculture |
| Expected outputs: | The project would produce the following outputs:<br>(i) Improvement of watershed management in the selected basins<br>(ii) Conservation forest (reforestation)<br>(iii) Water contribution maintained<br>(iv) Community-based natural resources management<br>(v) Knowledge base of local biodiversity |
| Title: | Wetland Conservation and Rehabilitation affect to water ecology and fishery |
| Development objective: | Rehabilitate aquatic life in wetland area<br>Apply wetland as water treatment plant |
| Background and justification: | The local people in 3T-4L is living with wetland as their supermarket which serve their preliminary requirement standard. In wet season when flood occur in wetland bring natural valuable fertiliser to land and fisheries breeding also flushing pollute substance to the river. Natural wetland has capacity to treat waste water especially close to urban area and the pilot area should be selected. |
| Expected outputs: | Best practice compare before and after rehabilitate/conserve wetland;<br>Waste water treated by wetland has appropriate quality |

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| Title: | Pilot project of river (Mekong tributaries) fisheries management |
| Development objective: | To sustain valuable aquatic life of the Mekong River Basin and transfer knowledge to sub-area level |
| Background and justification: | Fishery is important to food security in the LMB and to subsistence and national economies. Existing fishing practices exceed potential, the use of prohibited fishing gears in many area deteriorated aquatic life. The fishery is under pressure in connection with the general infrastructure and land use development in the Region. The project comprises with following activities:<br>Promotion the establishment of fish conservation area with communities participation in doing the management in two sides of the Mekong River;<br>Encourage administrations and communities in producing local fingerings for the release into natural water bodies;<br>Revive fish culture in pilot area. |
| Expected outputs: | The project would produce the following outputs:<br>Conservation area<br>Restocking of local aquatic species<br>Regulations of fishing gears |
| Title: | In-dept Study of tourism, culture and social cooperation |
| Development objective: | Rehabilitation of culture<br>Promote eco-tourism including cultural & historical<br>Rehabilitation of local knowledge (cotton produce etc.)<br>Linkage culture to tourism |
| Background and justification: | 3T-4L sub-areas are the valuable natural resources as well as living styles & culture. This should be promoted for eco-tourism and cultural tourism that will find a balance to maintain the habitats while enabling the local people to gain benefits. Since the economic development in two countries has rapidly increased recently, some local style of living and tradition have been lost hence practical activities should be applied, rehabilitated techniques consequently occupation promote and link to tourism.<br>Also, there are some local people groups in 3T-4L which should be studied history and culture, selected groups similar culture will be pilot.<br>Cultural and social changing<br>Traditional technique loss<br>Non-integrated development |
| Expected outputs: | The project would provide the following outputs:<br>1. Implementation plan for joint development of tourism<br>2. Promotion results of the study to physical activities |
| Title: | Capacity Building in Integrated River Basin Planning and Management |
| Development objective: | |

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| Background and justification: | Human is the most important resources for the sustainable development. The suitable courses should be applied to the target groups. Such as community area should be applied simple and non-technical method with local language, local officers should be applied basic technical. This project should apply previous TNA or success courses which will be save time to start from zero.<br>Technical assistance for Water Use Group/Association<br>Technical Assistance for Water Supply Planning and Management<br>Capacity building for the RBO/RBC including scholarship on short and long-term training<br>Capacity Building of Local Communities in IRBP |
| Expected outputs: | The project would provide the following outputs:<br>1. Good understanding for natural resources management in grass root level<br>2. Strength network support to BDP |

## *Southern Lao and Steung Treng (6L & 6C)*

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| Title: | Fisheries conservation, development, and management (Dolphin protection): dolphin conservation and fisheries |
| Development objective: | Increase fish population<br>Ensure food security and reduce poverty in the sub-area<br>Ensure sustainable development and utilization of fish resources<br>Fisheries habitats, migration routes, and spawning ground<br>Through enhanced cooperation |
| Background and justification: | The fisheries are extremely important to food security, and to subsistence and to national economies in general. The population growth in the sub-area will demand more fish for food. The fisheries are under pressure in connection with general infrastructure and land use development in the Region. The two main determinants of the gross fishery yield are (i) the state of the habitats; (ii) spawning ground, and (iii) the state of the migration routes. |
| Expected outputs: | The project would yield the following outputs:<br>(i) physical, legal, economic and social conservation measures to protect and preserve these species and areas will be recommended including community-based participatory natural resource management, awareness raising and promotion of good practices<br>(ii) the potential links to eco-tourism and how to maximize the benefits from this to assist in funding local people to cooperate in the protection of the fisheries resource will be examined and enhanced<br>(iii) the fisheries resources increased for food security |
| Title: | Integrated watershed management: Sedone, Lpeuov, LMB, Agro-forestry development |
| Development objective: | Enhance the sustainable management and utilization, protection and conservation of natural resources such as water, land, forest, biodiversities and grassland located in the sub-area for the sake of rural socio-economic development and tourist sector promotion |
| Background and justification: | There is need for protection and conservation of critical habitats and protect natural resources in order to maintain the unique and rich biodiversity of wildlife and other plant species that provide valuable resources for sustaining rural livelihood and for the promotion of eco-tourism. To protect and to make best use of these resources, a community-based natural resource management. |

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| Expected outputs: | The project would provide the following outputs:<br>(i) natural forests, wildlife and other biodiversity will be protected and conserved through community organization and capacity building in natural resource development and management for public servants and local community<br>(ii) an effective community-based natural resource management structure established and functioning<br>(iii) regional cooperation enhanced |
| Title: | River bank protection – from studies to protection (basin wide) |
| Development objective: | The project is aiming to put into an end the problem imposed by the morphological changes of the Mekong river, and to protect the continuity of river bank erosion that have caused the loses of village land and altered the ecological condition of the river. |
| Background and justification: | Apparently escalating problem is imposed by the morphological alteration, which led to the problem of the Mekong river bank erosion and other associated physical, social and economic loses of the people living along the Mekong river bank. Timely intervention is required to avoid major consequences in the future. |
| Expected outputs: | The project would provide the following outputs:<br>(i) morphological processes and their determinants studied; and potential mitigation measures, aiming at recommendations on practical stabilization schemes recommended to based upon economic, social and environmental assessment of preferred scheme(s)<br>(ii) detailed design, preparation of tender documents and construction of eroded river bank |
| Title: | Hydropower |
| Development objective: | The project is aiming to provide population living in the sub-area with reliable electricity, which is a key factor in the rehabilitation and development of rural economy toward the improvement of living standards and an important infrastructure requirement for agricultural and small-scale industrial development in the areas with minimal negative impacts on the environment and local people, thereby promoting economic growth for the country. |
| Background and justification: | The sub-area where the water is available for the entire year the small and medium scale hydropower development is very sanctify. The small and medium scales hydropower potentials in the area have not been thoroughly studied, evaluated and developed. Small and medium scales hydropower stations require less capital for investment but provide great benefits to the rural population. They will be ideal for small rural communities. If a small scale hydropower capability exists in the vicinity of a village, it should be exploited for providing supply |
| Expected outputs: | The project would provide the following outputs:<br>the project may have a total installed capacity of …? MW. With this capacity, approximately 80 percent of population in the sub-area will access to the energy supply, which would help to promote small-scale industry, handicrafts, tourist sectors, and agricultural production. |
| Title: | Flood and drought management and mitigation: studies and development |
| Development objective: | To minimize risks and damage from flood and drought incidence<br>To take advantage from floods for addressing drought problems, irrigation, fisheries, and maintain the ecology<br>To reduce death of population and animals |

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| Background and justification: | Mekong floods cause serious damage to the national economy and life of people<br>Floods water can be restored and used<br>Floods is good for fisheries and ecology<br>Inadequate early warning system from both national and MRC programme<br>Particularly, 25,000 ha in Champasak and Saravan and Steung Treng sub-area are suffered from flood incidence almost every year. |
| Expected outputs: | Loss of economy and people life reduced<br>Information system improved<br>Structural and non-structural flood control measures developed |
| Title: | Conservation of River Ecology to maintain water quality, biodiversity, incl. Mekong River Dolphin |
| Development objective: | Conservation of biodiversity and water quality in Champasack and Stung Treng provinces |
| Background and justification: | Existing bio-diversity rich area<br>Deterioration of river ecology<br>Food security endangered |
| Expected outputs: | Inventory Mapping<br>Identification of priority areas<br>Monitoring systems established<br>Facilities to control waste / Water treatment facilities<br>Food security<br>Improved awareness amongst populations<br>Regulations drafted |
| Title: | Improvement of navigation facilities and transport linkage |
| Development objective: | Support to trade, investment, agricultural production and tourism |
| Background and justification: | Poor transportation facilities, existing infrastructure needs to be upgraded and/or replaced |
| Expected outputs: | Studies<br>Ports (including loading and storing facilities)<br>Navigation channels (including aids)<br>Landscaping<br>Other infrastructure<br>Facilitation of intermodal transport linkage<br>Economic benefits from trade and tourism |
| Title: | Improvement of Domestic Water Supply and Sanitation |
| Development objective: | To improve health and sanitation - clean water for local population |
| Background and justification: | 90% of population without access to clean water<br>Diseases caused by lack of clean water |
| Expected outputs: | Studies on Surface and Groundwater<br>Digging of wells<br>Spring water treatment<br>Expansion of urban water supply<br>Water treatment facilities<br>Sanitation facilities |

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| Title: | Joint Development of Tourism, sustainable development |
| Development objective: | Income generation and economic growth |
| Background and justification: | Increased number of visitors reveals huge potential for economic development in the region. Region rich on historical, cultural and environmental sites. |
| Expected outputs: | Studies and surveys on potential sites<br>Develop tourism routes along specific destinations<br>Collaboration between agencies<br>Tourism Facilities |
| Title: | Irrigation system rehabilitation and development |
| Development objective: | Food security, poverty alleviation |
| Background and justification: | Existing systems in poor condition<br>Potential to triple agricultural production in the region |
| Expected outputs: | Studies and surveys on existing and new sites<br>Rehabilitation works on ..... ha<br>New irrigation systems with 75.000 ha<br>Production increase by ...%<br>Diversification of agricultural production<br>Efficient use of water |

## *The Delta (10C-V)*

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| Title | Integrated Planning for Socio-economic Development of the Mekong Delta (Viet Nam and Cambodia) |
| Development objective | Improve the living standard of the local people, who live in the Caico-Longkhot area.<br>Reinforce the unity, friendly relationship of two countries (VN & Cambodia) through sharing the Water source of Caico-Longkhot. |
| Background and justification | Project area is a land band located along the Boundary of VN and CBD, belongs to the Dong Thap, Long An provinces of VN and Prey Veng of CBD. Total area is about 35,000 ha, of which in the VN part is about 25,000ha and CBD part is about 10,000 ha. Total cultivated area is about 18,000ha (15,000ha of VN and 3,000ha of CBD).<br>Due to the shortage of water source in the dry season, deep flood inundation in the rainy season and affected by acidity at the beginning and the end of rainy season, that till now most of cultivated area of the project only one crop can be grown, large area (4,000ha in VN) is still a waste land.<br>In order to increase the Agricultural production of the project area, in 1997 the Feasibility study of main canal (Cai co-Longkhot) was carried out by SIWRP and approved by VM Government, but due to many reasons, the implementation of project has not been completed. In other side, the project did not include the whole system and water demand for CBD part. However, nowadays, the canal still used for both of VN and CBD. An area of 6,000ha of VN and 1,600 ha of CBD were irrigated and could cultivate double crops, but the competition for water resources has increased |

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| Expected outputs | Cai co - Long khot canal, irrigation scheme, embankment system will be upgrade and constructed<br>Living standard of people in the boundary and remote area will be increased<br>Improved relationship and peacefulness between two countries |
| Title: | Improvement and Promotion of Navigation between Viet Nam and Cambodia |
| Development objectives: | To improve cross-border navigation between Viet Nam and Cambodia<br>toward enhancing economic growth and social and cultural ties |
| Background and justification: | There have been a number of physical, technical as well as legal constraints that hinder the operation of inland waterway transport between the two countries, such as shallow river bed in some part of the channels, customs inspections and procedures, border and transit formalities and other managerial aspects.<br>To ease these hindrances and to tap and expand the opportunity and potentials of navigation, it is, thus, important to have a comprehensive study through a Technical Assistance project in order to improve and promote river transportation between the two countries. |
| Expected outputs: | The project would provide the following outputs:<br>(i) satisfactory agreements on the border crossing and customs inspections and procedures;<br>(ii) improvements of navigation aid systems along the river;<br>(iii) a plan for channel rehabilitation, maintenance and management agreed by the two countries. |
| Title | Pre-feasibility of transportation route from Hong Ngu to Neak Loeung (Viet Nam and Cambodia) |
| Development objective | To promote cross-border trade and economic activities as well as to enhance social and cultural exchanges between two countries. |
| Background and justification | It is 75 km from Hong Ngu to Neak Loeung., but most transportation and trading have been done through water ways. As a results, the cost for longer distance transportation is always higher. Thus, it is necessary to create the route from Hong Ngu to Neak Loeung by road, reduce cost for transportation, and promote trading between two countries<br>Moreover, with best design of construction could allow better flood control in flooding areas in the Plain of Reeds area along the Mekong river |
| Expected outputs | Pre-feasibility of transportation route from Hong Ngu to Neak Loeung. |
| Title | Improvement of inland waterway environmental control system between Viet Nam and Cambodia |
| Development objective | To have better monitoring and controlling environmental impacts caused by navigations between Viet Nam and Cambodia |
| Background and justification | Inland waterway transport is recently increasing rapidly at the rate of 9-10% per year (including passenger and cargo transport). An increase of navigation properly and certainly influences to environment.<br>There are no any studies relating to the assessment of environment impacts caused by navigation and inland waterway transport.<br>It is necessary to carry out some activities for controlling and mitigating pollution in inland waterway transport |
| Expected outputs: | Completed assessment of pollution status caused by inland waterway transportation and cross border navigation on main channels between Viet Nam and Cambodia; and<br>Draft environmental protection procedures within inland waterway transport and navigation by two down stream countries, Viet Nam and Cambodia. |

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| Title: | Soil Fertility and Nutrient Management in the Delta Area |
| Development objectives: | To increase agriculture production and productivity improvement through soil fertility and nutrition management |
| Background and justification: | There exists a potential to increase agricultural production and its productivity for food self-sufficiency and export markets, these could be pursued and achieved by improving the fertility of t soil through an application of a combination of modern and traditional soil nutrient management in an integrated fashion. |
| Expected outputs: | The project would provide the following outputs:<br><br>(i) Joint study on soil fertility improvement conducted;<br>(ii) Well-managed soil fertility and nutrition management system;<br>(iii) Sound soil fertility management application; and<br>(iv) Exchanged experiences in soil fertility management between counties. |
| Title: | Promotion of Agriculture and Livestock Production and Exports |
| Development objective: | To support rural economic growth through increase of agriculture and livestock production and their productivity improvement by providing some fundamental support services and to ensure quality standard for exports |
| Background and justification: | There exists a potential to create added-value of agriculture and livestock production and these should be pursued and achieved by:<br>(i) increasing the quality of the production as much as its volume;<br>(ii) gradual development of livestock, crops, cultivation practices and farming systems;<br>(iii) securing some fundamental needs such as extension services, marketing support, and education; and<br>(iv) continuously improving the quality of products to meet required standard for both domestic and international.. |
| Expected outputs: | The project would provide the following outputs:<br><br>(i) Sustainable integrated agriculture practices;<br>(ii) Training of farmer on farming and harvesting techniques; and<br>(iii) Organization of crop and livestock producing cooperatives to ensure quality standard for export markets. |
| Title: | Promotion of Smallholder Aquaculture Development |
| Development objective: | To ensure short- and long-term protein intake for rural house holds towards improvement of food security and safety for poor small households. |
| Background and justification: | Fish supplies from nature are not enough to meet the demands of the people due to population increase, esp. who is living far from water bodies. To supplement these needs there is a need to promote small-scale aquaculture development in rural areas.<br><br>Pond culture and rice-fish culture play important roles in providing food security and increasing their income to provide standard of living. However, besides rice farming, farmers are able to have secondary occupation in small-scale aquaculture so that farmers can get both rice and fish. |

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| Expected outputs: | The project will produce the following outputs:<br><br>(i) supplemented protein sources to rural people;<br>(ii) reduced pressure on natural capture fisheries; and<br>(iii) improved food security amongst the poor and reduced poverty incidence in the rural area. |
| Title: | Natural Capture Fisheries Development and Management |
| Development objective: | To enhance economic social and cultural significant of fishery resources through protection and conservation of it's habitat and to ensure sustainable development and utilization of resources, which must be based on good knowledge about opportunities and threat. |
| Background and justification: | The fisheries are extremely important to food security, and to subsistence and to national economies in general. The fisheries are under pressure in connection with the general infrastructure and land use development in the Region.<br>The two main determinants of the gross fishery yield are (i) the state of the habitats; and (ii) the state of the migration routes. |
| Expected outputs: | This project would result the following outcomes<br><br>(i) critical habitats and pathways for fish will be examined and delineated;<br>(ii) physical and legal conservation measures to protect and preserve natural fisheries will be recommended including community based-participatory natural resources management and awareness raising and promotion of good practices. |
| Title: | Development of the Long Terms Flood and Drought Control Plans for the Mekong Delta |
| Development objective: | - To improve living conditions of the rural community and agricultural production of the Mekong Delta |
| Background and justification: | Mekong Delta is affected by flood and draught that damage to lives and property of people during the shortage of water source in the dry season, deep flood inundation in the rainy season.<br>The areas are affected by acidity at the beginning and the end of rainy season.<br>To increase the Agricultural production of the Mekong Delta within Cambodia and Viet Nam, some Feasibility studies were conducted both Governments agencies, but due to many reasons, the effective studies were limited and not fully completed and did not include the whole system and water demand for Cambodia part.<br>The two countries seek to develop the water management system for irrigation and flood control in the Mekong Delta in order to support the development of socio-economic growth of the local people which about 23 Million living in the Mekong Delta. |
| Expected outputs: | Detailed action plan will have been formulated for two countries<br>Non-physical structure will have been designed for two countries |

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| Title: | Development and improvement flood control system for Plain of Reeds in Viet Nam and Cambodia. |
| Development objective: | To efficiently control over-flood flow into Plain of Reeds by providing appropriate protection solutions. |
| Background and justification: | Complicated distribution of flow into Plain of reeds causes difficulties in finding out appropriate solution for flood control. As a results, no any study and research have been done for specific purposes of flood control, especially for some serious problems concerning the flood flow over border, effecting the flood drainage capability for downstream of Plain of Reeds areas in Cambodia and Viet Nam.<br>In recent years, with the continuous occurrence of the flood with higher flow and deeper flooding, causing more serious damages for human life and properties of two countries. |
| Expected outputs: | - established and improved flood control measures<br>and new flood control construction<br>- Effective and efficient control flood flow over border into plain of reeds. |
| Title: | Feasibility study of the flood control system in area between Mekong and Bassac rivers (Viet Nam and Cambodia). |
| Development objective: | Justify solution and action plan for flood control system in the area between Mekong and Bassac rivers, aiming at stabilization of living condition of the people in the area, contribution to social economic development and poverty alleviation of remote. |
| Background and justification: | One of the most important reason resisting socio economic development if region between Mekong and Bassac rivers is annual flood with flooding depth from 1 – 4.5 m and lasting for 4 – 5 months. But flood also bring many advantages to down stream such as clean the fields after harvesting, fertile soils and feed to fishery raising.<br>It is necessary to conduct pre-feasibility of the flood control system the area between two rivers, Mekong and Bassac rivers, aiming at enhancing advantages and minimizing disadvantages for development. |
| Expected outputs: | Pre-feasibility study for flood control system in the area between Mekong river and Bassac river. |
| Title: | Capacity building for community on integrated water resources management and planning for Delta area. |
| Development objective: | - To develop and strengthen knowledge for people in community (decision makers, technical and local people)<br>- To develop networks among provinces between Cambodia and Viet Nam. |
| Background and justification: | Mekong Delta trends to be pressured by rapid population growth and its natural resources will be challenged with increased high demand and affected by development activities.<br>It is important to protect and manage natural resources through improving the knowledge of people in terms of environment, socio-economic, gender and capacity building esp. integrated water resources management. |
| Expected outputs: | The training centres will have been established<br>Educational system will have been improved and developed on new concepts for sustainable development in the Mekong basin and IWRM concepts applied. |

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| Title: | Promotion and management of sustainable tourism (Cultural, Agricultural and Eco-tourism) in the Mekong Delta |
| Development objective: | - To identify and promote delta tourist destinations<br>- To manage the tourist development to ensure sustainability and equity benefits for local people |
| Background and justification: | The Mekong river basin is dominant natural resources including waters, forests, wetlands, heritages, living culture that are crucial and significant sources for tourism promotion for socio-economic development of the countries. This sector is not yet initiated for the MRC, but it still considered as important activities for riparian country to use their resources in sustainable development of the Mekong river Basin. The project would be incorporated with ADB project, but extended to more-wide water-related tourism. It plays an important role giving good opportunity in generation of income of people. |
| Expected outputs: | Tourism atlas<br>Improved tourism facility<br>Tourism network |
| Title: | Feasibility Studies for water diversion of Mekong tributaries through Svay Rieng province connecting to Vam Co river in Viet Nam |
| Development objective: | To ensure short-term and long-term food security and safety for the poor and increased agricultural production ensured quality and standard and diversified products for the market.<br>To reduce the economic and social difficulties and loses due to the flooding and drought problems, which is great impediment among rural poor farm-households and imminent to the poverty incidence.<br>To supply water in dry season and control flood during wet season. |
| Background and justification: | The project is in early stages of conception. It is foreseen that there is great potential for the possible diversion of the Mekong water from Chhlong District in Kampong Cham province down through Romeas Hek district in Svay Rieng and eventually into Viet Nam. With this project it would bring one of the poorest and driest areas in Cambodia potentially into better-off and multiple seasons of irrigated agriculture.<br>It would also significantly reduce the annual flooding problem in the lowland and floodplain areas in three provinces, namely, Kampong Cham, Prey Veng and Svay Rieng where the economic and social loses is great burdens and imminent for the realization of poverty alleviation. The project would also potentially reducing flooding problem in the Mekong Delta of Viet Nam where the incidence occurs al most every year. |
| Expected outputs: | This project would result the following outcomes examine<br>(i) initial screening of hydraulic, technical, environmental and institutional aspects will be undertaken;<br>(ii) the potential economic cost and environmental impacts of the project<br>will be studied and examined ;<br>(iii) formulation of potential scheme(s);<br>(iv) assessment of hydraulic feasibility, economic feasibility, institutional aspects, as well as social and environmental consequences positive and negative); and<br>(v) identification of a preferred scheme, with recommendations on whether and how to proceed towards implementation and construction. |

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| Title: | Water quality Assessment in the areas along the border lines between Cambodia and Viet Nam. |
| Development objective: | - Assess changes in water environment effected by human activities<br>- Establish the database on environment regarding the water quality in the areas along the border lines between Viet Nam and Cambodia, which will serve future scientific research, planning and construction for irrigation. |
| Background and justification: | Mekong delta is most down stream in the Mekong river systems. With this feature, the Mekong delta are potentially affected by un-controlled development activities which may happen in upper parts.<br>During the dry season, the flow into Mekong Delta reduces remarkably, that may cause problems in terms of water quality and pollution through water environment.<br>To allow keeping alarm whenever bad condition occurs, it is necessary to monitor the water environment and water quality in the areas along the border lines between Viet Nam and Cambodia, especially in futures, more development activities will be foreseen, and more wastes from human life and agriculture and industry production may cause problems to down stream countries. |
| Expected outputs: | established monitoring system according to international standard. |
| Title: | Bank erosion protection for river system in the area along the border lines between Viet Nam and Cambodia. |
| Development objective: | Formulate integrated action plan for bank erosion protection of the river systems in bordering areas between Viet Nam and Cambodia |
| Background and justification: | Bank erosion in the river system in the bordering areas between Viet Nam and Cambodia are seriously, especially during flood season with high velocity of flood flow.<br>Causing loss in human life and properties and damages to infrastructures for production.<br>Increase sedimentation to downstream |
| Expected outputs: | Integrated action plan for bank erosion protection of the river systems in bordering areas between Viet Nam and Cambodia. |

## *Sekong, Sesan, Srepok (7C-L-V)*

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| Title: | Highland agriculture stabilization and poverty reduction |
| Development objectives: | Ensure basic food security and safety in highland areas and increase agricultural production with ensured quality and standard, diversity and value-added products for markets.<br>Ensure sustainable water and land resources use and sound environment management.<br>Improve water use efficiency through application of advanced irrigation technology in different ecological upland areas |
| Background and justification: | |
| Expected outputs: | increased food production in the remote areas with consequent improvements in food security and economy for the vulnerable highland people.<br>reduced pressure on fragile upland areas with consequent conservation of biodiversity and reduced soil erosion, sedimentation and an improved flow condition. |

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| | maintenance of the unique and vulnerable highland communities and a sustainable model for their development during a time of great change.<br>improved land use in the upper watersheds including protected areas.<br>Improved water use efficiency<br>methods to address the poverty of the highland people that is directly linked to environmental degradation and poor catchments response to rainfall with downstream impacts.<br>improved knowledge of upper catchments conditions and stabilization methods.<br>Capacity of staff on water utilization and modern irrigation technology strengthened<br>Advanced irrigation technology transferred |
| Title: | Integrated agro-forestry development project |
| Development objective: | Ensure basic food security and safety in upland areas in order to enable poor farmers to integrate into the market economy and promote sustainable and sound natural resource uses and environmental management<br>Sustainable management of natural resources especially upland agriculture<br>Forest protection and development<br>Generate income to reduce poverty<br>Exchange of experience and transfer of knowledge |
| Background and justification: | The highland peoples are among the poorest in the Mekong River basin, and their traditional way of life is under great stress. This includes particularly their swidden agricultural systems, also known as "slash and burn", which is of particular concern to resource managers now that the population density cannot sustain the system as in the past.<br>Technical options are needed to be developed to demonstrate viable approaches for agro-forestry in these upland areas. This will allow permanent culture to be established on the vulnerable slopes of the hills and thereby reduce soil erosion and increase water conservation while at the same time providing the necessary economic benefits to the farmers who maintain the land. This will also increase the amount of land able to be set aside for conservation to maintain the biodiversity of the area.<br>The project would include research on potential systems that have developed in other regional projects so as to select the options for piloting that have the highest likelihood for success. These options would then be implemented in close cooperation with selected communities to learn lessons and demonstrate successful approaches that could be multiplied beyond the pilot site on a wider scale.<br>The project would contribute to upper watershed management and conservation as well as the stabilization of the lifestyles and cultures of the indigenous peoples in the uplands. It would positively impact on the water quality and quantity downstream and provide lessons and approaches that could be applied in similar situations in neighbouring countries. Therefore it qualifies as having a trans-boundary and regional significance. |
| Expected outputs: | A compendium of regional development options and projects that have been applied in the uplands with highland people for reference and to use as a resource base for field visits extension and study.<br>A series of pilot projects working with local communities to develop agro-forestry systems that are successful economically and technically and can be disseminated more widely to other similar situations and communities.<br>Project locations with sustainable permaculture in the uplands where slopes are most vulnerable so that soil erosion and flooding are reduced<br>Improved farming system<br>Experience in Agro-forestry and horticulture development |

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| | Community forest established<br>Non- Timber Forest Production for income generation<br>Permanent cultivation |
| Title: | Integrated watershed management: Sustainable development, management and conservation of water and water related resources |
| Development objective: | Promote sustainable integrated watershed management practices in order to ensure the long-term sustainability of natural resource utilization and environmental sustenance as well as to preserve some of the global most significant biodiversity in the sub-area.<br>Sustainable Development and Management of water and related resources for the benefits of people in the selected basins.<br>Protection and conservation of water sources to maintain water contribution to the Mekong River flow regime. |
| Background and justification: | Background:<br>The Sub-area#7 has unique forests, wetland and flood plains and water systems. They represent natural assets with a high economic, social, cultural, and environmental value, directly providing a few millions of people in Cambodia, Lao PDR and Viet Nam with food security, employment, and income. These vital assets are, however, under high pressure and in critical conditions with reduced forest cover, threatened wildlife and fisheries habitats, land ownership conflicts, increased use of water for irrigation and change of water flow, quality, and quantity, impacts of the upstream hydropower projects on downstream people livelihoods due to the lack of consultation and information sharing.<br>Justification:<br>To manage the above problems, the three countries – Cambodia, Lao PDR and Viet Nam have jointly proposed this IWSM to pave the way for the process of overall basin-wide development planning and activities, incorporating the social and natural resource factors into the development process of the region, taking into account the national economic growth, the livelihoods of the local villagers, sustainable resource management and biodiversity conservation. |
| Expected outputs: | address the critical natural resource issues in this important sub-area while developing understanding and tools that could be widely applied throughout the sub-area for watershed management.<br>provide a nexus for natural resources management in the context of the rapid growth:<br>mapping the area to high detail including analysis of change over time to provide context and a base for examining natural resource and cultural management issues.<br>research on soils and forest cover, upland agriculture and potential use and a forum for managing conflicts between concessionaires and local people.<br>seek to develop a universal zoning plan for the watershed that would provide the much-needed framework for managing development and maintaining the natural resources that underpin the area's growth.<br>forest Conservation (reforestation)<br>Water contribution maintained<br>Community-based natural resources management |

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| Title: | Conservation and sustainable development of aquatic eco-systems |
| Development objective: | This project is aiming at enhancing economic, social and cultural significance of the Mekong natural fish resources through the protection and conservation of deep pools and brood stocks and their migratory routs and their habitats and ensures sustainable development and utilization of the resources.<br>To sustain valuable aquatic resources of the Mekong River Basin<br>To transfer knowledge on sustainable fisheries management<br>To enhance perception of people in exploitation and protection of aquatic system in the Srepok basin, then improve the living condition and livelihood for those whose living depends on natural resources; and<br>To contribute to bio-diversification of the Lower Mekong Basin, especially in Viet Nam and Cambodia |
| Background and justification: | Background:<br>Tributary rivers and streams of the Mekong River provide many habitats and breeding grounds for rich aquatic resources, which evidently support millions of people settling along them in terms of protein intake, food security, employment, and income. Of particular importance are the sub-areas #7 of Cambodia, Lao PDR, and Viet Nam, which comprise deep pools, complex water systems and flows, and inundated forests. These areas cover many provinces and Se San, Sre Pok, and Se Kong rivers, which support hundreds of fish species and aquatic animals as breeding and growing grounds.<br>Uncontrolled development activities such as the construction of dams, timber logging, industrialization, and unsustainable fishing practices are gradually threatening these natural resources and placing them in a critical condition.<br>Justification:<br>To ensure benefits for future generations, the three countries have conceptualized a project to develop and conserve these vital aquatic eco-systems in a sustainable way. It is expected to undertake socio-economic and biological researches, and do mappings on migratory pathways, habitats, deep pools and breeding grounds of the aquatic species, followed by policy analysis and management interventions. Possible strategies would include promoting community-based natural resource management, revising policy and regulations with stronger enforcements, and raising environmental awareness among community people in using and protecting their dependent resources. |
| Expected outputs: | Assessment of factors determining access to aquatic resources by different communities and social groups and how these can be better managed [Milestone: year 3];<br>Assessment of the ecological functions of key aquatic ecosystems, resources valuations and the cost of degradation [Milestone: year 3 and 4];<br>Projections of the impacts of development policies and hydrological change on the functions of different aquatic ecosystems [Milestone: year 5]; and<br>Mappings on critical aquatic habitats shall be produced, recommending for protection and conservation [Milestone: year 4 and 5]. |

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| Title: | Rural aquaculture extension including development of hatchery station and nursery network |
| Development objective: | To reduce poverty and generate incomes for rural population<br>To promote aquaculture development in the upland area |
| Background and justification: | Geographically SA 7 is a mountainous region and most people live under the poverty line. It is widely acknowledged that the capture fishery is declining over the years. Upland agriculture and aquaculture development in the areas will assist rural people to generate incomes and provide foods supply. In the past, the supply of fingerings for these activities is inadequate. Thus, the development of hatchery stations and nursery networks to support will be needed. |
| Expected outputs: | Rural aquaculture promoted<br>Hatchery stations and nursery networks established<br>Better incomes and food supplies |
| Title: | Promotion and Sustainable Development of Eco-tourism |
| Development objective: | To alleviate poverty through tourism development, economic growth and employment support-unities, increasing foreign exchange earnings and promoting the conservation of the natural and specifically to promote eco-tourism in the LMB through tourism-related infrastructures developments and improvements, increased community and private sector participation and regional cooperation. |
| Immediate objectives: | Competence in Human resource development (hospitalities and tour guide training course [for sort and long-term], and awareness) and Tourist sites improvement (natural site) to support implementation of the project. |
| Background and justification: | Background:<br>The whole sub-area #7 possesses a potential for diverse an Eco-tourism development and attractive natural landscapes on a wide area with more than 20 national parks and natural preserved areas characterized by an animal and plant system that is among the most abundant ones in the Indochina and over 40 nationalities and ethnic minority groups living in remote and isolated villages.<br>Justification:<br>These are favourable factors for tourism development of the LMB Cooperation as a unified tourism destination will increase the international attractiveness of the region over and above the sum of the individual tourism attractions of each country and be contributing to the increase in revenues of the local budget, and to hunger eradication and poverty alleviation. |
| Expected Outputs: | Tourism-related infrastructures improvement;<br>Pro-poor community-based tourism development;<br>Regional cooperation, for sustainable development of eco-tourism;<br>Established tourist information centers in each province;<br>Promoted awareness programmes on environmental issues-related tourism for local communities; Water Resources Development;<br>Promoted awareness programmes on conservation of natural resources, and<br>Promoted awareness Programme on safeguarding and conservation the natural unique heritage of freshwater dolphin in Stoeung Treng\Pakse Provinces. |

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| Title: | Capacity building and institutional strengthening |
| Development objective: | Awareness strengthening in sustainable water resources use and management<br>Improve local participation in water resources planning and implementation<br>Improve governance and ownership<br>Increase sustainability and rational use of natural resource |
| Background and justification: | There is early stage of the application of IRBM approach<br>The existing capacity of government staff on integrated river basin management, in some cases, is still limited. Thus, there is a need to introduce IRBM approach for people involved in RBM especially strengthen their knowledge to ensure an effective management of Basin resources |
| Expected outputs: | Structure of water and natural resources established<br>Legal framework developed<br>Knowledge and information exchange network developed<br>Good local participation<br>Capacity in natural resources development and management improved |
| Title: | Improvement of water use efficiency in agriculture development in Sekong, Sesan and Srepok basins |
| Development objective: | To improve water use efficiency in Sekong, Sesan and Srepok basins by enhancement of people's know-how and upgrading of irrigation systems |
| Background and justification: | Se Kong Se San and Srepok river basin belongs to Cambodia, Lao PDR and Viet Nam (sub-area #7)<br>Lack of knowledge and skills in exploitation and management of natural resources and poor irrigation systems lead to low water use efficiency<br>It is necessarily to enhance awareness of people in water use and develop irrigation schemes in the Srepok river basin for better uses and management of water resources. |
| Expected outputs: | increased people awareness and know-how in water use<br>some selected Irrigation schemes improved and upgraded<br>Irrigation schemes upgraded and developed<br>Approach for crop diversification towards high economic efficiency and environmental protection completed<br>Framework for comprehensive cooperation for sustainable development of Sekong, Sesan and Srepok river basin between Viet Nam, Cambodia and Lao PDR |
| Title: | Water Supply and Sanitation Project (7CLV) |
| Development objectives: | To improve the living condition in rural areas by supplying safe water for better sanitation and heath care services |
| Background and justification: | Poor public health in Sub-area 7 is a structural issue that undermines development efforts in all other sectors. When local people become ill, much of their savings are lost and they may enter into a cycle of debt that they have difficulty in recovering from. This results in a multitude of effects, including degradation of natural resources as they try to recover any income they can without consideration of long-term impacts. Not having safe source of water and poor hygiene is the major cause of disease in these areas, and addressing the issue would support the foundation from which development can occur.<br>Water supply in these remote and sloped areas is not as simple as elsewhere – groundwater resources are often limited, and alternative methods need to be considered. Even if a viable source of water is found, improper use through poor sanitation practices for water use, cooking and human waste disposal can negate the benefits. |

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| | The project would focus on developing a holistic and appropriate approach to rural water supply and sanitation problems. It would include demonstrating alternatives such as rainwater collection and ceramic filtration of source water in addition to development of good quality groundwater sources where possible. It would have a strong water use education component to train farmers and children on good hygienic practice and proper food preparation and storage. It would promote private sector initiatives to maintain facilities and develop a market for products to provide preventive health benefits.<br>The project would have regional importance as it would address an underlying cause of much of the poverty in the region that leads to environmental degradation. |
| Expected outputs: | (i) a number of water points and new appropriate technologies introduced to provide safe water for rural populations along with trained technical staff to extend the technology.<br>(ii) a campaign of public health messages and trainings to address the myths and poor practices commonly followed at village level that lead to illness.<br>(iii) a reduction in infant and maternal mortality, an increase in household economic situation and a consequent improvement in land use. |
| Title: | Appraisal study of hydropower development in Sekong, Sesan and Srepok basins (Sub-Area 7) |
| Development objectives: | To develop hydropower to meet increasing demand for affordable electric energy in the region. |
| Background and justification: | Sub-Area 7 (Sesan, Srepok and Sesan river basins) is currently dependent on fossil-fuel generation for much of its electricity generation. Electricity is a basic need that provides light for children to study, power for computers to operate and small- and medium enterprises to operate and allows irrigation of nearby farmland. The government authorities are concerned that they maintain control over their own power generation rather than depend on others, while there are opportunities to gain revenue to sell electricity to neighbouring countries.<br>For these reasons and other there is a perceived need for establishment of large-scale hydropower in Sub-area 7. At the same time it is understood that the process to prepare feasibility studies and get to the point where investors are found is a very long one – however, if the first steps are not taken, the destination will never be reached. Studies of the potential have been done at a basic level in the 1960's and 1980's but need to be updated to the present with a more current and realistic environmental, economic and social perspective. This will provide the additional benefit of increasing the database of hydrological and meteorological information on the Sub-area that will positively impact future irrigation and other infrastructure development.<br>This project would include a compilation and review of the previous studies, data and proposals from the past. It would include preliminary discussions and forums with the local people near the sites, and a prioritization to identify the hydropower possibility most likely to succeed. It would prepare detailed terms of reference for a feasibility study including establishment of stations for long-term data collection and environmental and social impact assessment. It would include tendering and implementation of the feasibility study by a qualified and experienced international consortium, with the results used to determine the project potential and direction.<br>The project would have trans-boundary impact as the large scale would affect downstream flows and be affected by upstream operations. |
| Expected outputs: | 1. Feasibility study of some selected hydro power projects<br>2. Action plan for implementation |

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| Title: | Study on flow management in downstream reaches of Sesan river |
| Development objectives: | Better understanding of flows in Sesan to improve the utilization and management of water and water related resources |
| Background and justification: | The construction of the Yali Falls Dam in Viet Nam on the Se San River has caused numerous impacts downstream, yet the feasibility studies and designs did not extend more than a few kilometres away from the head-works. Additional dams on the river are under construction, and these too will affect flows. But these projects also offer a chance to optimize the operation of the cascading series of dams on the Se San River in such a way as to mitigate and reduce the impacts on downstream users and learn from the experience so that the lessons can be applied to other dams (e.g. on Mekong/Lancang in China).<br>The project includes participatory appraisal of the impacts of the operation of the dam on the downstream users that includes the operators of the upstream Yali Falls Dam. The water requirements and problems identified would then form the basis for an improved dam operation plan that would be tested for optimization with feedback from the downstream users. A flood warning system would be set up to ensure that in the event of a major and unexpected release of water from upstream, the downstream people would have sufficient warning so that damages are minimized. The project would extend the electricity network from the upstream dams into the Sub-area so that benefits from the upstream development could be gained downstream and the downstream people would become customers and stakeholders of the dam operators.<br>This project is a trans-boundary project that would provide a working example and lessons learned that could be applied to planning, design and operation of all hydropower dams in the Mekong River basin. |
| Expected outputs: | (i) The project would undertake an flow study of the Sesan to better understand the flow dynamics in the river and its role in maintaining the health of the river.<br>(ii) based on (i) produce an optimized management plan that better incorporates the concerns and needs of the downstream users while still providing the benefits for which the dam was designed;<br>(iv) lessons learned from the project would feed into the ongoing discussions at the Mekong River Commission with China and other upstream users who are considering or implementing the construction of hydropower dams |
| Title: | Alternative electric energy generation and distribution in Sub-Area 7. |
| Development objectives: | The project is aiming to provide population living in the sub-area with reliable electricity supply, which is a key factor in the rehabilitation and development of rural economy toward the improvement of living standard and an important infrastructure requirement for tourism, agricultural and small-scale industrial development in the areas with minimal negative impacts on the environment and local people. |
| Background and justification: | Large-scale hydropower projects require a long preparation period and funding for these projects has become increasingly difficult to find given the worldwide sensitivity to large dams. This happens at a time when electricity has become indispensable as a basic resource to improve the quality of life and education and provide the foundation for the economy and growth of the private sector. In order to bridge this gap, alternative sources of energy must be investigated both separately and as a component of larger downstream investments.<br>Small-scale hydropower stations require less capital for investment but provide great benefits to the rural populace. They will be ideal for small rural communities. If a small-scale hydropower capability exists in the vicinity of a village, it should be exploited for providing supply.<br>However areas where the water is available for the entire year the small-scale hydropower development is very sanctify. The micro hydropower potentials in the area have not been thoroughly studies, evaluated and developed. |

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| | Sub-area 7 has the topography necessary to harness smaller water resources to produce electricity. Small-scale and Micro Hydropower has become increasingly popular among donors as it can provide the needed electricity without the potential negative environmental and social impacts commonly associated with large dams.<br>Extension of the electricity network or "grid" would allow the Sub-area to tap into the large investments already made in parts of the Sub-area to generate electricity, and thereby provide access to the resource without the complications of dam construction and operation. The construction of the grid would furthermore contribute to the likelihood of a successful implementation of a large-scale hydropower dam project in the future as the distribution costs would be already taken care of if the grid existed. In addition, it would make the people in the Sub-area the clients of the upstream hydropower producers, thereby giving them a benefit and stake in their use, and therefore more consideration from the operators.<br>For these reasons, the alternative energy project would be supportable to provide the needed energy for the rural and urban areas while harnessing the existing resources within the region without major negative impacts. It would include study of the locations where the topography and hydrology are suitable for micro-hydropower generation and analysis of the costs and benefits for same. It would include the economic analysis of the grid extension and consideration of the best locations for future development of a national grid in the region.<br>The project would be of trans-boundary significance since it would take advantage of and link the grid to the hydropower projects between neighbouring countries. |
| Expected outputs: | (1) a feasibility study of selected projects in the Sub-area,<br>(2) A project implemented<br>(3) Feasibility study for extension of the grid into sub area #7<br>Note the project will address installed capacity up to and 5 MW units. |
| Project Title | Integrated planning for Water resources development of the Sekong, Sesan and Srepok river basin |
| Development objective | To provide solid framework to comprehensive cooperation for sustainable development of the Sekong, Sesan and Srepok river basin in Viet Nam, Cambodia and Lao PDR. |
| Background and justification | Sekong, Sesan and Srepok river basins with total area of 78,344 km2 (Cambodia 33%, Lao 28% and Viet Nam 38%) belong to three countries: Cambodia, Lao and Viet Nam (sub-area #7)<br>Improper exploitation and managements of Water resources and related resources for development may lead to degradation of natural resources. Lacking integrated and comprehensive planning for socio economic development may un-expected cause cross border impacts<br>It is necessarily and urgently to formulate integrated planning and development strategy for socio economic development in these river basins, basing on proper exploitation and management of natural resources |
| Expected outputs: | Integrated planning for development of Sekong, Sesan and Srepok river basin<br>Framework to comprehensive cooperation for sustainable development of Sekong, Sesan and Srepok river basin between Viet Nam, Cambodia and Lao PDR<br>Priority activities to promote cooperation for development |
| Project Title | Improvement of efficiency in flood forecasting and warning systems in the Sekong, Sesan and Srepok Basin (Viet Nam, Cambodia and Lao PDR) |
| Development objective | To minimize threats and damages caused by floods in the Sekong, Sesan and Srepok basins by improvement of flood forecasting and warning systems. |

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| Background and justification | Sekong, Sesan and Srepok river basins with total area of 78,344 km2 (Cambodia 33%, Lao 28% and Viet Nam 38%) belong to three countries: Cambodia, Lao and Viet Nam (sub-area #7) |
| | Threats of the floods, especially flash flooding, are seen as main harm factors affecting to the production and living condition in the Sekong, Sesan and Srepok basin |
| | It is necessarily to develop and improve the systems for flood forecasting and warning in these areas |
| Expected outputs: | Installed and operated the systems for flood forecasting and warning in the basins |
| | Framework for cooperation in flood forecasting and warning as well as data and information sharing between Viet Nam, Cambodia and Laos within the Sekong, Sesan and Srepok basins. |
| | Feasible action plan for further improvement and operation of the flood forecasting and warning systems |