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The Council Study

Study on the sustainable management and development of the Mekong River, including impacts of mainstream hydropower projects

Work Plan: Formulation of Development Scenarios for the Agriculture and Land Use Change Thematic Area

This work plan describes the roadmap and the approach for formulating the development scenarios for the Agriculture and Land Use Change thematic area. It includes the following:

- Approved Cumulative Scenarios (2007 Early Development, 2020 DFS, 2040 Planned Development) and Proposed Thematic Sub-scenarios
- Detailed schedule of data collection and analysis including coordination with Member Countries through consultation with appropriate experts of line agencies, national consultations, and regional technical working group
- Detailed data needs including current status, source agencies, and known issues for each proposed development scenario
- Proposed methodology and assumptions to fill data gaps in particular where data are known to be not available
- Personnel roles and responsibilities

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1 Introduction

This work plan describes the roadmap and the approach for the formulation of the development scenarios that are going to be assessed under the Council Study. The results of these development scenario assessments will be used as the primary basis to address the overall objective of the Council Study which is to further enhance the ability of the Mekong River Commission (MRC) to advise Member Countries (MCs) on the positive and negative impacts of water resources development on people, economies and the environment of the Mekong River Basin. This enhanced ability is expected as a result of meeting the following specific objectives of the Council Study:

> Objective 1: Further develop/establish a reliable scientific evidence base on the environment, social and economic consequences (positive and negative) of development in the Mekong River Basin.
>
> Objective 2: Results of the study are integrated into the MRC knowledge base to enhance the Basin Development Planning (BDP) process providing support to the MCs in the sustainable management and development of the Mekong River Basin.
>
> Objective 3: Promote capacity and ensure technology transfer to MCs in the process of designing and conducting of the study.

As such, the formulation of development scenarios is most critical since it defines the extent to which these three objectives can be met. The formulated development scenarios will set the boundary for what new knowledge will be generated, what knowledge gaps will be closed, and what uncertainties in the assessments will be minimized (i.e., Objective 1). The assessment methodology and the associated tools (both existing and new) along with the expanded MRC knowledge base will determine the extent of how the current BDP process can be enhanced (i.e., Objective 2). The participatory process adopted in formulating the development scenarios will govern how effective the learning-by-doing approach is with respect to building internal capacity and successfully transferring technology (i.e., Objective 3).

As per the Council Study Concept Note, Terms of Reference (ToR) and Inception Report, the assessments will include the following types:

- An assessment of the cumulative positive and negative impacts of water resource developments in all six selected thematic areas on the triple-bottom-line including clear indications of hotspots when/if relevant, and the thresholds of rapid transition—tipping points—in complex systems such as the Tonle Sap Lake in Cambodia and the Mekong Delta in Cambodia and Viet Nam (i.e., referred hereinafter as the assessment of **cumulative development scenarios**).
- Assessments for each thematic area summarising the transboundary impacts of developments in the selected thematic areas including cross-cutting impacts on the triple-bottom-line: the environmental, social and economic parameters of interest in the Mekong River Basin (i.e., referred hereinafter as the assessment of **thematic development sub-scenarios**)

In the end, the Council Study will produce a set of clear, strategic, pragmatic and actionable recommendations directly addressing potential uncertainties, risks and the information needs for

development planning in the mainstream of the Lower Mekong Basin (LMB) including recommendations for impact avoidance and mitigation measures.

Within Council Study, Agriculture and Land use change thematic Study focuses on agriculture development and land use change. The main objective of the Study is to further enhance the understanding of the negative and positive impacts of water resources development in the agriculture and land use sector on water resources, people, economies, and the environment of the Lower Mekong River Basin. This study will fill knowledge gaps and reduce the uncertainty in estimating these impacts, providing the Member Countries with higher confidence information towards informed decision-making.

2 Development Scenarios

The development scenarios will be formulated by defining levels of developments in six thematic areas for each scenario. The six thematic areas are:

- Irrigation; including water use, return flows, water quality, proposed diversions, etc.
- Agriculture and Land use; including watershed management and deforestation
- Domestic and Industrial use; including mining, sediment extraction, waste water disposal, urban development, water quality etc.
- Flood protection structures and floodplain infrastructure, including roads on major floodplains
- Hydropower, including potential of alternative energy options.
- Navigation, specifically on infrastructure to aid navigation

The development scenarios will be of two types namely cumulative development scenarios and thematic sub-scenarios.

2.1 Cumulative Scenarios

The cumulative scenarios are based on historic (2007) and planned (2020 and 2040) basin-wide developments in the six thematic areas. These cumulative scenarios will allow the assessment of cumulative positive and negative environmental and socio-economic impacts associated with planned developments by the MCs. The assessment will show the predicted changes in the environmental and socio-economic conditions in the LMB in space and time and potentially reveal clear indications of geographic hotspots and rapid transitions in time as a result of combined developments in the six thematic areas. Along with the results of the assessment of selected thematic sub-scenarios under which impacts of specific-thematic developments can be better understood, realistic, reasonable, and thus actionable development options and management measures can be identified to enhance positive impacts and minimize negative impacts of the planned developments. Strategic measures for long-term negative impact avoidance and risk mitigation can also be identified for development planning considerations by the MCs.

During the 4th RTWG Meeting, the following cumulative development scenarios were approved for the Council Study.

Early Development Scenario/Situation (2007): This scenario covers the period from the beginning of large-scale water resources development until the year 2007 when the flow regime of the Mekong mainstream was considered to be still in its natural state. This scenario includes the water infrastructure and the land use/cover changes in the six thematic areas by 2007.

Definite Future Scenario (2020): This scenario includes all existing (before and after 2007), undergoing construction, and firmly committed development infrastructure in the six thematic areas which are expected to be in place by 2020.

Planned Development Scenario (2040): This scenario includes all water resources development that is planned in the six thematic areas in the Mekong Basin and are expected to be in place by 2040 assuming these plans are fully implemented.

2.2 Thematic Sub-Scenarios

The Thematic Sub-Scenarios represent plausible thematic-specific deviations from the 2040 Planned Development Scenario. These thematic-specific deviations reflect level of uncertainties in the full implementation of the planned development level for the thematic area of interest as per the 2040 Planned Scenarios. These deviations can be due to several factors such as changes in national development policies and priorities, technology, demography, socio-economic conditions, global context, etc. The deviations are formulated around the 2040 Planned Scenario to keep these thematic sub-scenarios plausible. It should be noted that while a different level of development is used for the thematic area of interest, the levels of development for the other thematic areas are held equal to the planned 2040 levels.

The assessment of these thematic sub-scenarios will provide the following understanding:

- Sensitivity of impacts to deviations from planned development levels
- Better understanding of impacts of specific development stressors (i.e., closing knowledge gaps)
- In-depth analysis of the plans and plausible deviations in the plans (i.e., understand uncertainty in the plans and identify measure to minimize deviations)
- Increase understanding and capability to explore options and measures to enhance positive impacts and mitigate/reduce negative impacts

As per the Inception Report, a maximum of three thematic sub-scenarios per thematic area will be assessed. However, the Thematic Team may identify more than three potential thematic sub-scenarios. These thematic sub-scenarios will be presented to the MCs to get their input and final concurrence on what thematic sub-scenarios to assess.

2.3 Proposed Thematic Sub-Scenarios for the Thematic Area Agriculture and Land Use Change

Scenarios in Agriculture and Land Use Change

Planned Development Scenario 2040 (2040 PDS) in Agriculture and Land Use Change thematic theme, covers the water resources development in term of Agriculture and Land Use Change that would be in place by 2040.

Based on scope of the thematic area of Agriculture and Land Use Change and other thematic areas also, three sub- sectors will be considered within the thematic area, as bellow:

- Rain-fed Agriculture
- Surface Mining
- Forest

It is important to note that Irrigation Thematic area will cover developments of irrigated agriculture and Domestic and Industrial use thematic area will include urban area development.

According to the scoping report of the scenarios formulation, 2040 PDS includes all water resources development that is planned. However, existing planning achievement are vary amongst MCs and from a sector to other. In some cases, these plans have been developed to be detail and got commitment from concern authorities to implement. But in other cases, some plans are still general, can be existed in a format of a vision or development directions for the future. Therefore, 2040 PDS covers all specific plans and all visions/ development directions to 2040 or before 2040, example vision of aquaculture development to 2030.

Sub-scenarios

The Thematic Sub-Scenarios represent plausible thematic-specific deviations from the 2040 PDS. These thematic-specific deviations reflect level of uncertainties in the full implementation of the planned development level for the thematic area of interest as per the 2040 PDS.

Driving forces to make sub-scenarios from implementation view includes changes of several factors such as national development policies and priority, technology improvement, demography, socio-economic condition, global context etc. *(Figure 1)*. As a result, the factors may create 3 possibilities in term of implementation achievement of 2040 PDS: low level, medium level and high level of the implementation achievement.

It is important to note that specific plans could have higher priority of implementation than those for vision and development directions.

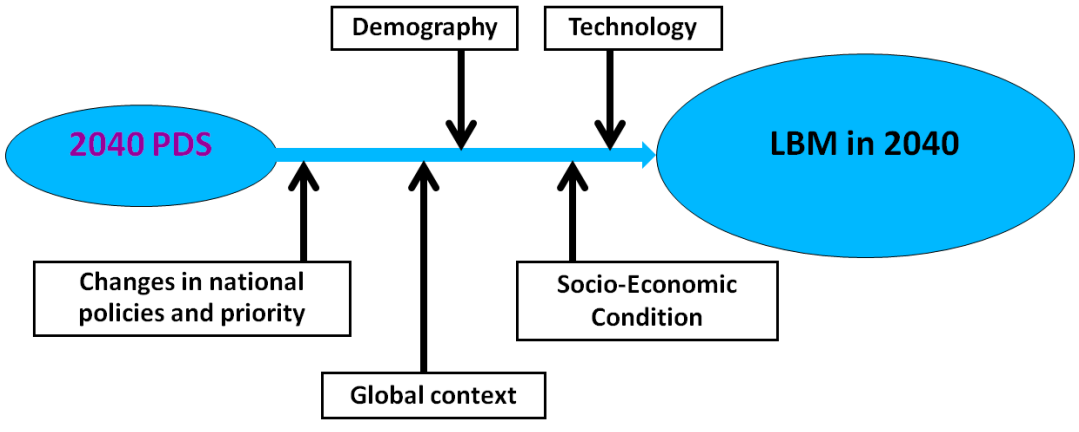

Figure 1: Driving forces to implementation process of 2040 PDS

Scope of Sub-Scenarios:

Sub-scenarios 1: Low level of PDS implementation achievement: only all ''specific'' plans are implemented. They include (i) plan is under-implementation, (ii) plan has got commitment to implement, (iii) plan has specific proposal and (iv) plan is considered as a high priority to implement.

Sub-scenarios 2: Medium level of PDS implementation achievement: all specific plans + other plans (all vision/ development directions) are implemented

Sub-scenarios 3: High level of PDS implementation achievement: all specific plans + other plans (all visions/ development directions) + continued trend to develop are implemented.

(Figure 2)

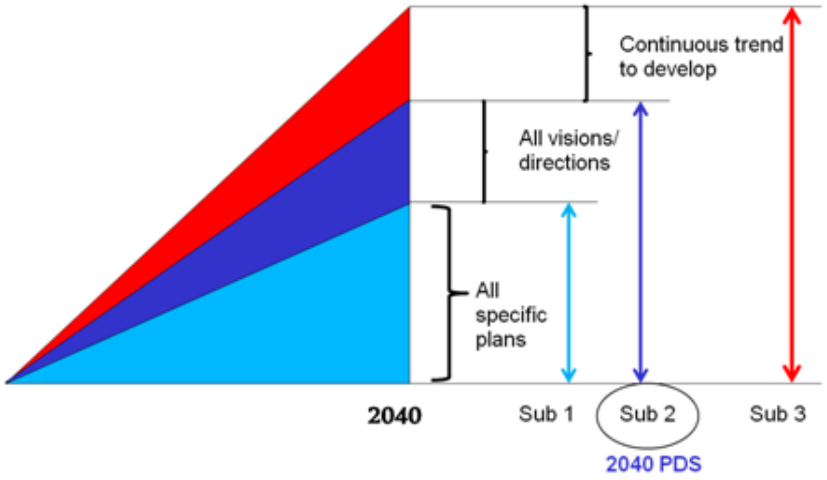

Figure 2: Three sub-scenarios of 2040 PDS in Agriculture and Land Use Change

Methods to formulate sub-scenarios

Following methods will be used to formulate sub-scenarios:

- Apply concept of PDS and sub-scenarios
- Participatory approach with an approval from MCs for formulated scenarios
- Data collection: secondary available data

- Using mathematical model, data assumption, and spatial distribution approaches with highest land suitability and simplification for addressing data gaps.

3 Data Requirements

(Note: Only include data requirements for your own thematic area.

Note: include maps and additional tables if necessary to illustrate further the data requirements

Questions for the Team:

1) *Review data requirements and identify additional data requirements*
2) *Provide current status (with MRCS, available at MCs) with respect to the three cumulative scenarios*
3) *List line agencies to be contacted/contact person*
4) *List any data issues (data not available) and assumptions)*

Table 1: List of required dataset

Scenario element	Data required (different for each scenario)	Current Status (2007, 2020, and 2040 scenarios)	MC Line Agencies to Contact	Known Data Gaps/Assumptions to Make
Early development 2007	- Area and spatial distribution, characteristics on rainfed agriculture, forest and surface mining in 2007	Land cover/ use map 2010		
Definite development 2020	- Area and spatial distribution, characteristics on rainfed agriculture, forest and surface mining in 2020			
Current situation	- Demography - Socio-economic condition and national development policies - Data on area, production, technology, water use and land suitability in each sector: ✓ Rain-fed agriculture ✓ Surface mining ✓ Forest			

Plans *(including specific plans and other kind of plans such as visions and development directions)*	- Land use plan (map and report): area and spatial distribution of each sector development - Sector development plans on rainfed agriculture, forestry, and surface mining: area, spatial allocation, production, technology, water use, investment… *Example:* + Land use plan to 2020 in Mekong Delta + Agriculture development plan to 2020 - Vision/ development directions on land use: changes in land allocation - Vision/ development directions on sector development on agriculture, forestry, and surface mining: changes in area, production, technology, water use efficiency etc.			

4 Handling of Data Gaps: Methodology and Assumptions

In order to formulate scenarios, necessary data will be collected in both MRCS and line agencies in MCs. National consultants working in this thematic area will be responsible for collecting available data during period 2007, 2020 and 2040 from national line agencies. In the cases, the data is not available; some following methods will be use to addressing data gaps.

4. 1 Mathematic model

Mathematic model will be use to get value of a parameter/ an indicator as an output of the model from other data inputs. For example, population in 2040 can be calculated from current population and population growth rate.

4. 2 Data assumption

In case of data is not available, a data assumption that is to keep the trend of change with previous period, will be used.

4.3 Spatial distribution with highest land suitability

In the case, spatial distribution information (map) on a development project is not available; the project will be allocated in land with highest suitability.

4.4 Boundary simplification

When land boundary of the development is not indicated in detail and no other reference available, a circle will be drawn with central point is representative point and area is equal with area of land of the development project.

5 Detailed Schedule

The Table 2 below shows the proposed detailed schedule for formulating the development scenarios for the Agriculture and Land Use Change Thematic Team.

Table 2: Detailed Schedule of Agriculture and Land Use Change Thematic Team

Activity	Lead	Due Date	Note
Develop work plan	Regional AIP Team. Consult with CS Coordinator	12/06/2015	
Technical working session on scenarios development for Agriculture and Land use Change thematic theme	Regional AIP Team	09/07/2015	
Develop guideline/ template to national consultants for data collection	Regional AIP Team, consultation with national consultants	27/06-18/07/2015	
Conduct data collection	National consultants	18 - 28/07/2015	
Conduct data analysis, identify data gap and develop sub-scenarios for each MC	National consultants and AIP technical support	28/07-15/08/2015	
Progress report to 5th RTWG	Regional AIP Team	Early August 2015	
National consultation meeting for seeking comments on sub-scenarios	NMCs	Aug - Sept 2015	
Conduct final data collection	National consultants	01 - 20/09/2015	
Improve sub-scenarios and submit scenarios development documents	National consultants	01 - 23/09/2015	
Approval of scenarios	Regional AIP Team and NMCs	23 - 30/09/2015	
Submit scenarios development documents to CS Coordinator	Regional AIP Team	30/09 - 01/10/2015	
Submit 5th RTWG Briefing Materials	CS Coordinator	02/10/2015	Include Scenarios/Sub-scenarios Data/Map Specification Document

6 Personnel Roles and Responsibilities

(This section should identify the names of the personnel involved and their roles. In particular, it should include the technical lead and national consultants and Programme Management Lead)

Name	Position	Role	Responsibility
Regional AIP Team			
Prasong Jantakad	Programme Coordinator	Programme Management Lead	
Nguyen Dinh Cong	Programme Officer		
Koji Kitamura	International Technical Advisor		
xxxxxxxx	International Consultant		
Cambodian Team			
Suos Bunthan	National AIP Coordinator		
Ek Menrith	National consultant	National consultant for Agriculture and Land use specification	
Huy Keavuth	National consultant	National Consultant for Mining development and its environment impacts	
Lao Team			
Khamsone Philavong	National AIP Coordinator		
Soytavanh Mienmany	National consultant	National consultant for Agriculture and Land use specification	
Khammay Vongsathain	National consultant	National Consultant for Mining development and its environment impacts	
Thai Team			
Panut Manoonvoravong	National AIP Coordinator		
Prasit Wangpakapattanawong	National consultant	National consultant for Agriculture and Land use specification	
Amarin Boontun	National consultant	National Consultant for Mining development and its environment impacts	
Vietnamese Team			
Pham Tuong	National AIP Coordinator		
Nguyen Kim Loi	National consultant	National consultant for Agriculture and Land use specification	
Nguyen Thi Loan	National consultant	National Consultant for Mining development and its environment impacts	