4th RTWG for Council Study
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The Council Study

Scoping of the formulation and assessment of development scenarios

Prepared by

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in consultation with Thematic Teams and Discipline Teams

Part 1
Introduction to the scenarios

Recap on objectives of Council Study

1. **Further understand** the environment, social and economic consequences (positive and negative) of water resources development
2. **Enhance the BDP process** to support the Member Countries (MCs) in the sustainable development of the basin
3. Promote **capacity building**

Agreed thematic areas of the scenarios

- Irrigation: water use, return flows, water quality, proposed diversions
- Agriculture and land use: watershed management, deforestation, livestock and aquaculture, fisheries
- Domestic and industrial water use: urban development, waste water disposal, water quality, sediment extraction
- Flood protection structures and floodplain infrastructure: roads, levees and embankments
- Hydropower development
- Navigation

Agreed geographical scope of the scenarios

- In these 6 thematic areas, the entire Mekong basin will be considered: the scenarios are 'basin-wide'
- Related to the assessment of the impacts, emphasis will be on:
  - *A corridor on both side of the mainstream from Chinese border to Kratie (Cambodia)*
  - *The Cambodia Floodplains including the Tonle Sap River and Great Lake*
  - *The Mekong Delta in Cambodia and Viet Nam*
  - *The coastal areas directly influenced by the Mekong estuary*

Temporal scope of the scenarios - considerations

1. **Avoidance of duplication:**
   - *The IBFM process (2004-2007)*
   - *the SEA of 2009-2010 assessed the planned LMB mainstream dams*
   - *The MRC/BDP scenario assessment of 2009-2011 assessed the impact of ongoing and planned development*
   - *Delta Study is assessing the impacts of the mainstream dams*

Temporal scope of the scenarios – considerations (2)

2. Reasonable and equitable use:

In line with the 1995 Mekong Agreement, decisions on new water resources development can be made with better confidence with:

- *Information on the: distribution of the benefits, costs, impacts and risks across the basin countries*
- *And whether the distribution is reasonable, equitable and fair*

This necessarily requires the assessment of past, ongoing and planned water resources development

Temporal scope of the scenarios – considerations (3)

3. Sustainable development:

- *… whether overall water resources development in the Mekong Basin is moving towards basin-wide "optimal" and sustainable development (as directed in the 1995 Mekong Agreement),*
- *And addressing long-term needs, including climate change adaptation and environmental protection.*

This requires the exploration of development opportunities to improve currently planned development

Lessons learnt from 2009-2011 assessment (1)

- **A strong interplay in the Mekong Basin between flood, energy, agriculture, environment and climate change (and thus between the six agreed thematic sectors):**
  - *A sector or thematic based approach will not provide a comprehensive picture by which to understand synergies and trade-offs between sectors*
- Assessment of future looking water resources development scenarios needs to take **exogenous development** (developments outside the water sector) into account
- Climate change could significantly increase or decrease impacts of the longer-term development scenarios (> 2030)

Lessons learnt from 2009-2011 assessment (2)

- The number of scenarios should be restricted to a minimum:
  - *There is little point in defining a large number of scenarios, each slightly different from the others*
  - *Too many scenarios lead to "scenario fatigue"*
- A reasonably possible scenario is a "plausible" scenario, or at least "not implausible"
  - *But scenarios that are low in probability but high in consequences could be of interest to the Mekong Basin*

Using all these considerations and lessons, the following basin-wide scenarios are identified

1. Early Development Scenario (2007) – past development

2. Definite Future Scenario (2020) – under construction and firmly committed development plans of the MCs

3. Planned Development Scenario (2040) – medium term development plans of the MCs

4. Exploratory Scenarios (up to 2060) – opportunities to improve the medium term development plans and address longer-term needs and challenges

5. Alternative Plan Scenarios (2040) – a "winning" combination of keeping high benefit/low risk development (from #3) and adding joint development/management opportunities (from #4)

Added value of Council Study (1)

- The assessment of early water resources development, which is important for the provision of a complete picture
- The broadening of impact drivers to embrace all forms of water resource and related development
- The updating of the existing Definite Future Scenario and Planned Development Scenario
- The assessment of Exploratory Scenarios that explore where opportunities lie in the future to sustainably address longer term needs and provide a comprehensive response to climate change and other challenges

Added value of Council Study (2)

- The use of a strengthened MRC Indicator Framework (compared with the 2009-2011 assessments) for the 'triple bottom line' assessment of the scenarios, including the more explicit assessment of regional cost and benefit sharing
- The assessment of 2 or 3 Alternative Plan Scenarios (2040) that would set the countries on the pathway of optimal and sustainable development
- The use of exogenous development situations, which is essential for a meaningful assessment of the planned devlopment, exploratory and alternative plan scenarios

Part 2
Scenario formulation

<u>For each scenario</u>:

What is the scope and how to formulate?

The hydrological and development baseline to use

The water resources development to assess

What are the data needed and who has them?

Scenarios, baseline and situations to assess

Scenarios	# of scenarios	# of climate change scenarios	Hydrologic baseline (natural flow regime)	Period of assessment (level of water resources development)	Exogenous development situation (due to developments outside water sector)
Early Development	1	-	1985 – 2007	All up to 2007	2007
Definite Future	1	-	1985 – 2007	All up to 2020	2020
Planned Development	1	2-3	1985 – 2007	All up to 2040	2040
Exploratory	Up to 5	2-3	1985 – 2007	All up to 2060	Up to 2060
Alternative Plan	2 to 3	2-3	1985 – 2007	All up to 2040	2040

The formulation of these scenarios

- **Fairly straightforward** : data of the water resources development situation at 2007, 2020, 2040 is available in MRC databases and/or national planning documents
- Nevertheless, a considerable amount of work may still be needed to formulate the scenarios, depending on the status of some of the sector development databases in the six thematic areas.
- The issue of data exchange between the MCs and the MRCS needs to be discussed
- The 2009-2011 BDP scenario assessment team included experts related to (or trusted by) the line agencies/institutes which collect and maintains the data
  - *Such a set up is in line with international practice and proposed for the future 'MRC expert groups'*

The hydrological baseline

- **Also straightforward**: the required hydrological baseline is available.
- the extended 1985-2000 baseline to 2007 can be used to assess the hydrological changes under each of the proposed scenarios
- The 1985-2007 baseline still represents natural flow conditions in the Mekong mainstream. The assessment results for each scenario will provide the changes relative to the natural flow regime
- It is not advised to extend this baseline further:
  - *Before 1985, less meteorological data are available for calibrating and validating the baseline*
  - *After 2007, hydropower development in the upper Mekong Basin started to modify the natural flow regime*

The development baseline

- **Also straightforward**: the development baseline represents the situation whereby there is no significant water resources development in the Mekong Basin
- The Early Development Scenario (2007) includes the water resources development in the six thematic areas that was in place by 2007 (and thus is well known)
- The Definite Future Scenario includes all water resources development in the six thematic areas that is expected to be in place by 2020
- And so on

The exogenous development situation

- This represents the environmental, social and economic development situation brought about by developments outside the water sector
- For example, for the **Planned Development Scenario** (which assesses the impacts of the water resources development in the six thematic areas that is planned to be in place by 2040), the exogenous development situation is:

  The *environmental, social and economic situation in the year 2040 that is predicted to be brought about by developments outside the water sector*

- The preparation of the exogenous development situation will be further discussed in relation to the assessment of the scenarios

Part 3
Assessment of the scenarios

For each scenario:

What is the purpose of the assessment?

What is the assessment methodology?

What assessment indicators will be used?

How will the developments outside water sector (exogenous development) be taken into account?

How will the assessment results be used?

Purpose of the assessment

- **For each scenario, the regional distribution of the benefits, costs, impacts and risks of the water resources development within the scenario will be assessed**
- Thus the assessment will provide this regional distribution at different points in time: 2007, 2020, 2040 and 2060.
- This information permits basin-wide discussions to identify acceptable pathways that could increase regional benefits, mitigate regional costs, and provide water-related security in an equitable manner through cooperation.
- The results will be used to formulate a few Alternative Plan Scenarios that will represent possible adapted national water resources development plans that set the countries on the path of optimal and sustainable development

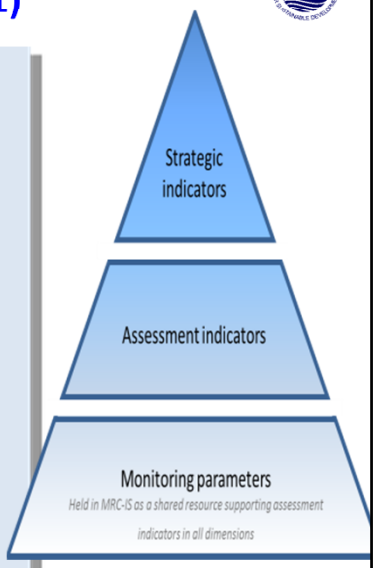
Triple bottom line assessment

- The quantification of the distribution of the benefits, costs, impacts and risks of each of the scenarios requires a “triple bottom line assessment” that uses a wide range of relevant environmental, social and economic assessment indicators
- For this purpose, the MCs and MRC Programmes have been developing the MRC Indicator Framework
- This framework and the related methodology build on the experiences and results of comparable assessments under the IBFM process (2004-2007) and the 2009-2011 MRC/BDP scenario assessment

MRC Indicator Framework (1)

Five dimensions of the new MRC Indicator framework

Economic dimension	*Performance of water and related sectors and contribution to riparian economies*
Social dimension	*Conditions of livelihoods and employment*
Environment dimension	*Status of water flows, quality, sediments and environmental assets*
Climate change dimension	*Climate change trends, vulnerability and adaption*
Cooperation dimension	*Benefits derived from the Mekong river basin and from cooperation in its development and management*



MRC Indicator Framework (2)

- The The MRC IF includes 71 assessment indicators (see Appendix 1 of the handout)
- Together these indicators provide the information required to quantify the distribution of the benefits, costs, impacts and risks of each scenario at the appropriate level of detail
- All indicators can be 'quantified' but about half of them requires 'expert opinion' as opposed to scientific quantification based on the values of evidence-based monitoring indicators
- It will be important to clearly describe the method and tools that will be used to quantify each of the assessment indicators so that stakeholders can scrutinize the underlying assumption (and reproduce the assessment results)

Hydrological assessment

- The quantification of many of the assessment indicators requires the assessment of the hydrological changes caused by each scenario
- The predicted changes include changes in water flows, floods, flow reversal in the Tonle Sap river, salinity intrusion, sediment transport, and water quality
- The hydrological changes will assessed with MRC's suite of simulation models
- These models are fit for purpose for use in the Council Study

DRIFT

- DRIFT has been developed as a tool for assessing ecosystem response to hydrological changes
- In 2004, an earlier version of DRIFT has been applied by the MRC (during IBFM) to assess the environmental flow requirements in the Mekong mainstream
- DRIFT comprises a process and a DSS with "response curves" that depict the relationship between a biophysical indicator and driving variables
- DRIFT could be used in the Council Study to develop science-based response curves to quantify those environmental indicators in the MRC IF that are currently dependent on 'expert opinion'

The exogenous development situation

- The exogenous development situation needs to be quantified for the same indicators that will be used for the assessment of the scenarios
- For the longer term scenarios, any guestimate of the exogenous situation by 2040 and 2060 is better than assessing these scenarios against the current environmental, social and economic conditions (which would lead to wrong and misleading results)
- Since stakeholders may have different views about the future of the Mekong region, a range of exogenous situations could be developed based on different assumptions such as for:
  - *Economic growth and poverty reduction*
  - *Urbanization and industrialization*
  - *Education and the nature of future employment*
  - *Share of agriculture and fisheries in the national economies*

Data and information requirements

A four-country agreement on the scenarios, the baseline, the exogenous development situations and the assessment indicators, provides the opportunity to focus efforts to address knowledge gaps and collect data to the needs of the scenario formulation and assessment:

- *The discipline teams can align their work plans around building assessment processes related to the agreed assessment indicators*
- *Thematic Teams can start formulating the thematic components of development scenarios*

Use of the results (1)

- Basin-wide discussions to identify acceptable pathways that could increase regional benefits, mitigate regional costs, and provide water-related security in an equitable manner through cooperation, based on:
  - *The regional distribution of the benefits, costs, impacts and risks of the water resources development within each scenario*
  - *This consensus building process that requires IWRM capabilities across the basin and institutions, and time for consultation*
- It will be important to provide training to some stakeholders to maximize their engagement in the process

Use of the results (2)

The results of the assessment and basin-wide discussions will feed into the MRC Knowledge Base and will be used for basin development and management planning, in particular:

- The *preparation of the five-year editions of the Basin Development Strategy*
- *The formulation of basin-wide sector and cross-cutting strategies (hydropower, fisheries, flood, navigation, environment, climate change, etc.).*

The RTWG may wish to take note of the scoping of the scenario formulation and assessment under the Council Study, and provide guidance

Thank you