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For sustainable development



Council Study

Progress Update: Formulation of Development Scenarios - Irrigation



5th RTWG Meeting
Siem Reap, Cambodia
13-14 August 2015

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Technical Working Session on 25 June 2015



Discussed and agreed on:

- (1) Overall context and guidance for formulation of sub-scenario development
- (2) Approach, methodology and proposed for sub-scenarios development
- (3) Data requirements and handling data gaps
- (4) Detailed schedule

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Scenario Formulation and Development



- Access data on existing & planned irrigation schemes
- Map planned and existing irrigation projects throughout the basin with basic info on each project (i.e., extent, basic use & season, intake point)
- Describe selected irrigation development projects. Indicate general parameters including extent of development, crops, impact on land conversion, infrastructure including parameters of headworks & weirs

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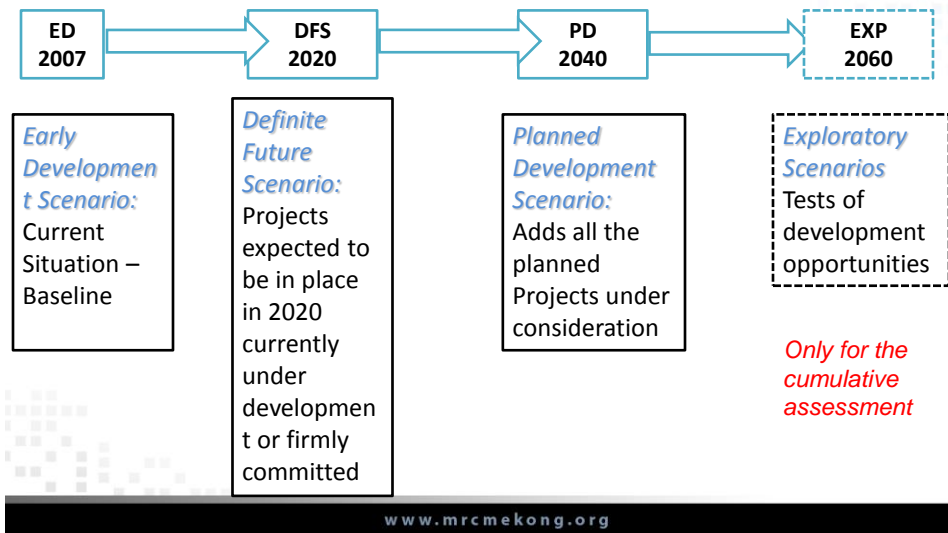
Scenario Formulation and Development (continued)



- Estimate water intake & return flows for each project & development time-step estimates
- Identify baseline, trends and potential of groundwater use for irrigation and its impact on downstream hydrology
- Estimate fertilizer & pesticide use & develop time-step estimates (weekly or daily) of pesticide & nutrient loading/run-off

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Scenarios Timeline



Purpose of the Scenarios



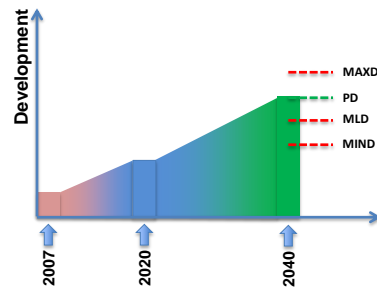
- **Early Development Scenario (2007) :**
 - The main purpose of this scenario is to assess the distribution of the benefits, costs, impacts and risks of water resources development in the Mekong Basin as of 2007
- **Definite Future Scenario (2020):**
 - The main purpose of this scenario is to assess the distribution of the benefits, costs, impacts and risks of water resources development in the Mekong Basin as predicted in 2020.
- **Planned Development Scenario (2040):**
 - The main purpose of this scenario is to assess the distribution of the benefits, costs, impacts and risks of water resources development in the Mekong Basin as of 2040.
 - On a timescale, the scenario covers the water resources development that would be in place by 2040 assuming these plans are fully implemented.

Sub-Scenarios Formulation



▶ **3 sub scenarios needs to be formulated for the 2040 horizon:**

- A minimum expected development (MIND),
- A 'Most Likely' expected development (MLD) and,
- A maximum expected development (MAXD).



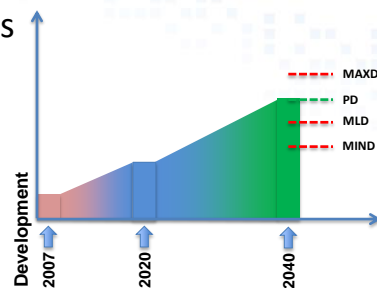
The 3 sub scenarios should provide variations that bound the Planned Development Scenario

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Sub-Scenarios Formulation



- ▶ **The minimum expected development (MIND)**, corresponds to a scenario where only a very limited development of the irrigation sector will occur respect to the Planned Development Scenario



- ▶ **The 'Most Likely' expected development (MLD)**, corresponds to what most possibly will occur in 2040
- ▶ **The maximum expected development (MAXD)**, corresponds to the maximum extension of the irrigation development in the LMB for each country

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Concept of the Irrigation Process



- ▶ The Irrigation process combines different inputs associated timely and spatially over a land area to provide an output
- ▶ The Inputs are (but not limited to):
 - ▶ Water resources
 - ▶ Agricultural Inputs (Seeds, Fertilizer, Pesticides, etc)
 - ▶ Energy
 - ▶ Capital Investments (Infrastructures, Land, etc)
 - ▶ Machinery and Manpower
- ▶ The Outputs are (but not limited to):
 - ▶ Water (Infiltration, return flow, etc)
 - ▶ Crop Production with its value
 - ▶ Employment (direct and indirect)
- ▶ But also other positive and impacts (Ecologic and Physical Services, Pollution, etc)

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Irrigation Development: Sub Scenarios Which drivers should be considered?



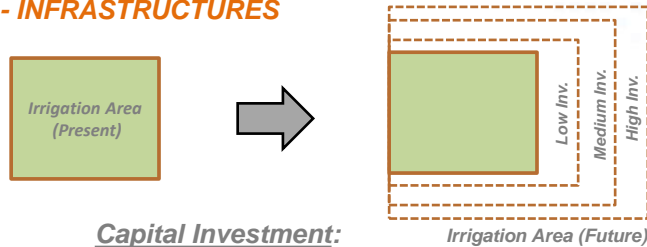
- ▶ The Irrigation process involves a multiplicity of factors that influence the potential development the sector may have
- ▶ To evidence different sub scenarios, we look at some specific drivers that will allow to difference the development
- ▶ The delineation of the sub scenarios is guided by the following drivers that will influence the development:
 - ▶ The **Investment** Plan and Policy on **Irrigation Infrastructure**
 - ▶ The **Improvement** on **Water Use Efficiency**

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Irrigation Development: Sub Scenarios Which drivers should be considered?



1- INFRASTRUCTURES



Capital Investment:

- Storage & Control Structure
- Conveyance Structure
- Land & Rural Infrastructure

- The level of Investment in the Infrastructure development or rehabilitation will differentiate the path of the irrigated areas increment
- Investment can focus on canals, reservoirs, headworks, etc
- With a low, medium or High level of investment, the Area Increment will variate

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Irrigation Development: Sub Scenarios Which drivers should be considered?



2- WATER USE Efficiency



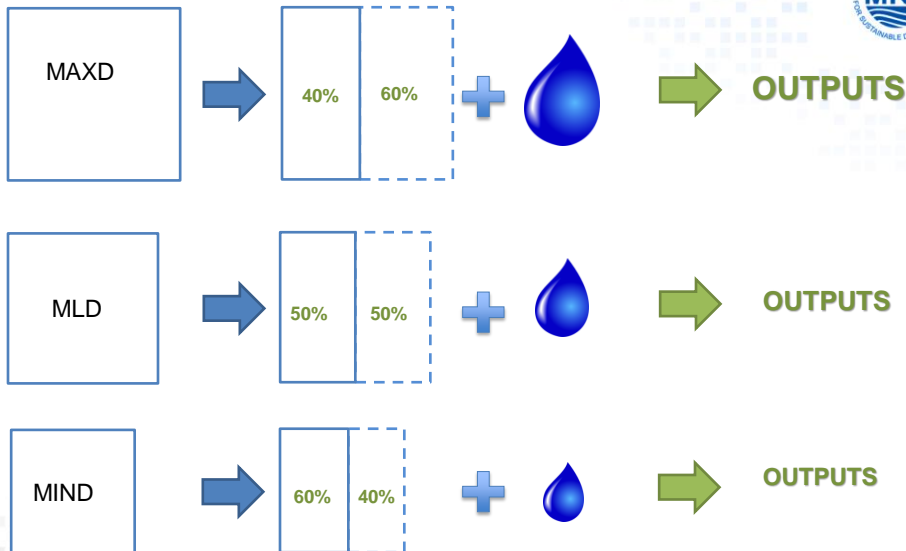
Investment:

- Water management (Control)
- Conveyance Infrastructure
- On Farm Irrigation technology

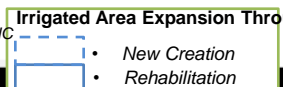
- The level of Investment in the Water use Efficiency will differentiate the path of the irrigated areas increment
- The direct effects of the investment can be measured on the Supply / Demand pattern and on the return flow
- Investment can focus on the Water Management infrastructures, on water Policies, on farm Irrigation, on community development etc

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Sub-Scenario Development - Example

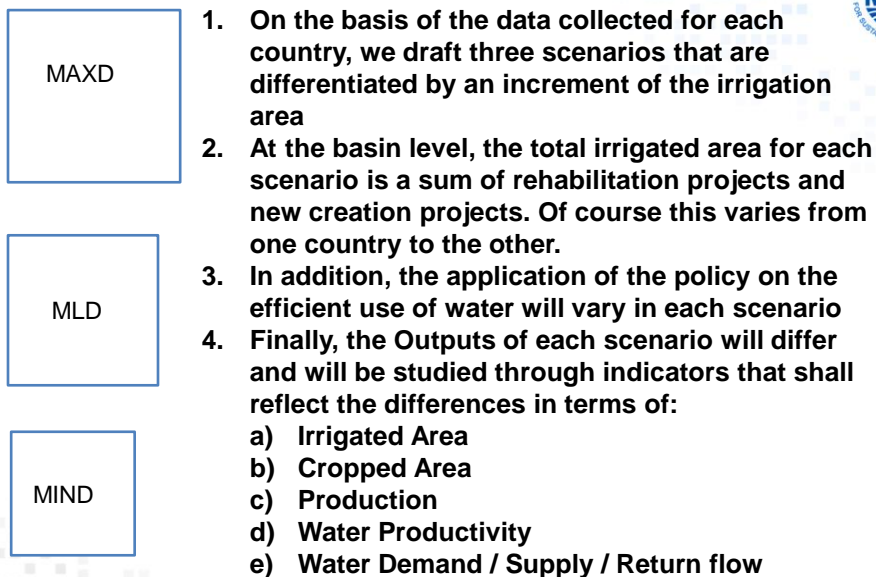


The shares are only indicative and will be adjusted by country based on the indications of the NC



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Sub-Scenario Development - Example



The shares are only indicative and will be adjusted by country based on the indications of the NC

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The minimum expected development (MIND)



- Combination of a low level of investment with a limited improvement of water use efficiency.
- Priority will be given for the investment policies on the scheme rehabilitation rather than on the creation of new ones.
- Spatial differences occurring in the priority of the investment shall be indicated by the MCs.

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The 'Most Likely' expected development (MLD)



- Combination of a medium level of investment with a medium improvement of water use efficiency.
- The share of the investment between the creation and the rehabilitation, together with the spatial distribution would be balanced.

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The Maximum expected development (MAXD).



- This scenario would combine a high level of investment with a high improvement of water use efficiency.

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DEVELOPMENT

- Areas equipped for irrigation (ha)
- Wet, dry and 3rd season irrigated areas (ha)
- Non-rice crop area (ha)

WATER

- Cropping calendars
- Evapotranspiration data (mm) by project and timestep
- Gross irrigation water Requirement (Rice and Non rice) (m³/ha) by project and timestep
- Return Flow and location (m³/ha) by project and timestep

INFRASTRUCTURE

- Irrigation Method and On-farm efficiency (%)
- Conveyance, On Farm and Overall Efficiency (%)
- Cost for Conveyance Infrastructure (USD/Ha)
- Cost for On Farm Infrastructure (USD/Ha)
- O&M Cost per Year (USD/Ha/Year)
- Energy Cost per Year (USD/kWh/Year)

CROP

- Crop Production (t)
- Production Value (USD)
- Crop Production Cost (USD/ ha)
- Crop Intensity (%) by project
- Mechanization level (units to be determined)

ENVIRONMENT

- Erosion load (t/Ha) by project and timestep
- Return flow water quality (units to be determined)

Data Requirement



**FOR EACH PROJECT
FOR EACH TIME HORIZON**

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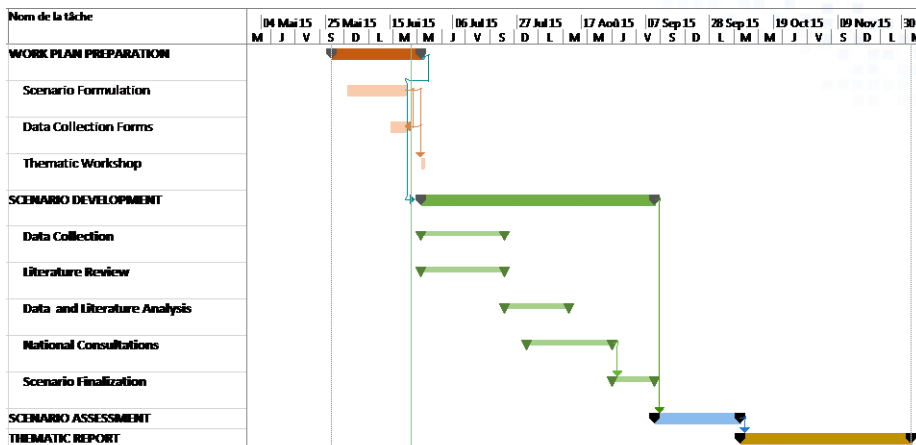
DATA COLLECTION

- ▶ Existing data at the MRC
 - AIP 2004 database (Old)
 - BDP2 database (Old)
 - Relevant literature and documents
- ▶ Irrigation Database (AIP Activity #1.4.1) – Ongoing
 - Laos, Thailand and Vietnam: submitted draft of irrigation database
 - Cambodia did not implement (Cambodian national consultants are working under CS)
 - Database has been checked in their consistency with their reports and need to be finalized
- ▶ Data Collection Forms to be compiled
 - Feedback from the NC
- ▶ External data
 - Internet
 - Scientific Literature
 - Other sources: AFD – ADB – WB – FAO – JICA - CGIAR



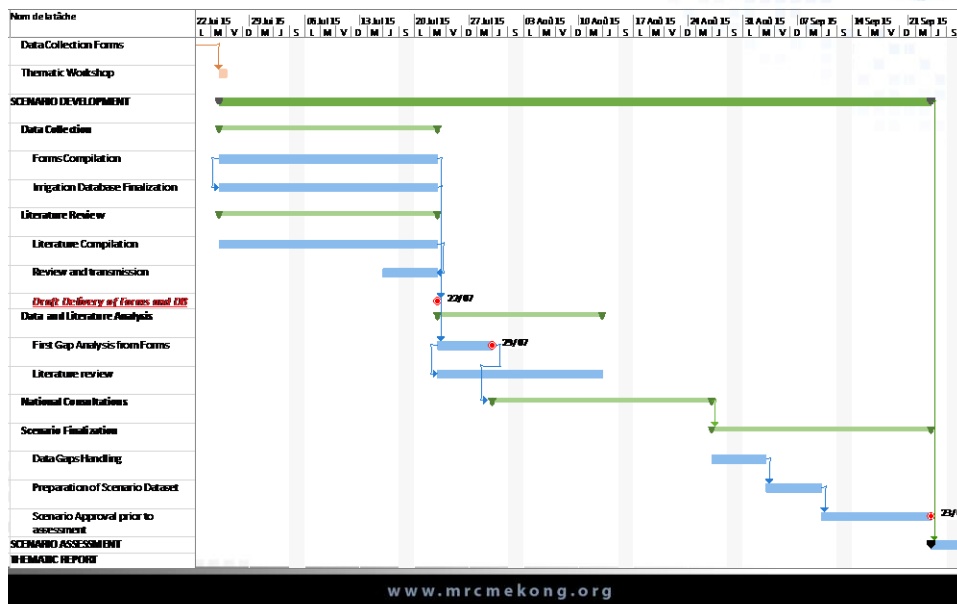
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WORK PLAN - General



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WORK PLAN - Details



Work Plan for Scenario Development:



TASK	Start	End
SCENARIO DEVELOPMENT	25/06/15	23/09/15
Data Collection	25/06/15	22/07/15
Forms Compilation	25/06/15	22/07/15
Irrigation Database Finalization	25/06/15	22/07/15
Literature Review	25/06/15	22/07/15
Literature Compilation	25/06/15	22/07/15
Review and transmission	16/07/15	22/07/15
<i>Draft Delivery of Forms and DB</i>	22/07/15	22/07/15
Data and Literature Analysis	23/07/15	12/08/15
First Gap Analysis from Forms	23/07/15	29/07/15
Literature review	23/07/15	12/08/15
National Consultations	30/07/15	26/08/15
Scenario Finalization	27/08/15	23/09/15
Data Gaps Handling	27/08/15	02/09/15
Preparation of Scenario Dataset	03/09/15	09/09/15
Scenario Approval prior to assessment	10/09/15	23/09/15

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Thank you



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