

The MRC Regional Stakeholder Forum

14th – 15th December 2017

Vientiane, Lao PDR



MRC Council Study - Collaborative Modelling -Tool for Cross Sector/Cross Country Scenario Planning – An Introduction



Outline of Presentation

1. Background
2. Model description
3. Progress to date
4. Next steps



1. Background

The Council Study – a wealth of information

- Thematic Sectors:**

Agriculture, Irrigation and Land Use

Hydropower

Navigation

Domestic and Industrial Water Use

Flood protection



- Discipline Sectors:**

BioRa

Social

Economic

Category	Upper bound	Average	Lower bound	W1 (2007)	W2 (2020)	W3 (2040)	MCCC (2040)	A1 (2007)	A2 (2020)	C2 (Net)	C3 (Dry)	H (no RR)	I2 (RR)	F1 (no FP)	F2 (FP)	F3 (FP)	H1a (noPP)	H1b (million)	H2 (PPP)
GDP in billion US\$ (deflated to 2017 dollar)	\$513	\$456	\$465	\$477	\$515	\$467	\$463	\$462	\$463	\$462	\$463	\$463	\$463	\$463	\$462	\$463	\$463	\$476	\$474
Cambodia	\$483	\$418	\$385	\$385	\$48.0	\$40.8	\$40.8	\$40.7	\$40.8	\$40.8	\$40.8	\$40.8	\$40.8	\$38.4	\$38.4	\$38.6	\$40.2	\$38.6	\$38.5
Upper bound	\$513	\$456	\$465	\$477	\$515	\$467	\$463	\$462	\$463	\$462	\$463	\$463	\$463	\$463	\$462	\$463	\$463	\$476	\$474
Average	\$483	\$418	\$385	\$385	\$48.0	\$40.8	\$40.8	\$40.7	\$40.8	\$40.8	\$40.8	\$40.8	\$40.8	\$38.4	\$38.4	\$38.6	\$40.2	\$38.6	\$38.5
Lower bound	\$462	\$38.0	\$32.6	\$29.3	\$45.4	\$34.8	\$35.0	\$35.3	\$35.1	\$34.6	\$32.0	\$31.7	\$32.3	\$31.8	\$31.5	\$31.5	\$31.8	\$31.5	\$31.5
Lao PDR	\$420	\$404	\$400	\$387	\$371	\$40.0	\$38.7	\$38.9	\$40.0	\$38.9	\$38.9	\$38.9	\$38.9	\$38.9	\$38.9	\$38.9	\$40.4	\$41.6	\$38.9
Upper bound	\$420	\$404	\$400	\$387	\$371	\$40.0	\$38.7	\$38.9	\$40.0	\$38.9	\$38.9	\$38.9	\$38.9	\$38.9	\$38.9	\$38.9	\$40.4	\$41.6	\$38.9
Average	\$382	\$35.1	\$30.3	\$30.3	\$36.3	\$30.2	\$30.7	\$30.7	\$30.3	\$30.1	\$30.5	\$30.5	\$30.5	\$30.5	\$30.5	\$30.5	\$32.5	\$30.9	\$30.4
Lower bound	\$363	\$29.9	\$25.1	\$21.0	\$33.5	\$21.6	\$21.6	\$21.6	\$21.6	\$21.4	\$21.0	\$21.0	\$21.0	\$21.0	\$21.0	\$21.0	\$21.0	\$21.0	\$21.0
Thailand	\$80.0	\$101.6	\$98.4	\$98.2	\$97.0	\$98.4	\$98.1	\$98.4	\$98.4	\$98.4	\$98.3	\$98.2	\$98.4	\$98.3	\$98.2	\$98.4	\$98.3	\$102.6	\$97.6
Upper bound	\$80.0	\$101.6	\$98.4	\$98.2	\$97.0	\$98.4	\$98.1	\$98.4	\$98.4	\$98.4	\$98.3	\$98.2	\$98.4	\$98.3	\$98.2	\$98.4	\$98.3	\$102.6	\$97.6
Average	\$79.8	\$73.7	\$68.8	\$70.5	\$70.3	\$69.0	\$71.2	\$71.0	\$69.0	\$69.0	\$69.0	\$70.4	\$70.5	\$70.5	\$70.5	\$70.5	\$70.2	\$72.1	\$70.3
Lower bound	\$81.5	\$45.9	\$38.5	\$42.7	\$38.6	\$38.6	\$44.3	\$43.6	\$38.5	\$38.7	\$42.7	\$42.7	\$42.7	\$42.7	\$42.7	\$42.7	\$42.5	\$41.5	\$42.8
Vietnam	\$92.3	\$93.6	\$92.9	\$92.9	\$93.3	\$92.8	\$92.4	\$93.5	\$92.5	\$92.5	\$92.5	\$92.6	\$92.6	\$92.6	\$92.6	\$92.6	\$94.3	\$93.6	\$93.0
Upper bound	\$92.3	\$93.6	\$92.9	\$92.9	\$93.3	\$92.8	\$92.4	\$93.5	\$92.5	\$92.5	\$92.5	\$92.6	\$92.6	\$92.6	\$92.6	\$92.6	\$94.3	\$93.6	\$93.0
Average	\$82.3	\$82.7	\$82.5	\$81.3	\$84.4	\$84.1	\$83.8	\$83.8	\$83.8	\$82.7	\$82.9	\$82.9	\$82.9	\$82.9	\$82.9	\$82.9	\$83.9	\$84.0	\$82.1
Lower bound	\$72.2	\$71.7	\$72.0	\$69.7	\$75.6	\$75.4	\$75.3	\$75.1	\$75.3	\$75.1	\$75.2	\$72.8	\$72.0	\$73.1	\$73.5	\$73.5	\$74.4	\$73.3	\$73.3
LMB	\$282.6	\$281.2	\$277.9	\$278.5	\$281.8	\$277.9	\$278.5	\$278.9	\$277.4	\$278.5	\$277.6	\$277.6	\$277.6	\$277.6	\$278.3	\$277.6	\$280.2	\$285.5	\$278.1
Upper bound	\$282.6	\$281.2	\$277.9	\$278.5	\$281.8	\$277.9	\$278.5	\$278.9	\$277.4	\$278.5	\$277.6	\$277.6	\$277.6	\$277.6	\$278.3	\$277.6	\$280.2	\$285.5	\$278.1
Average	\$248.5	\$233.3	\$221.2	\$220.6	\$247.8	\$224.1	\$226.2	\$228.3	\$223.9	\$223.3	\$223.1	\$223.3	\$223.3	\$223.3	\$223.4	\$223.4	\$228.8	\$228.8	\$223.3
Lower bound	\$216.3	\$195.3	\$184.6	\$182.7	\$213.1	\$170.2	\$176.0	\$175.8	\$170.2	\$170.0	\$168.6	\$168.4	\$168.1	\$168.1	\$168.1	\$168.1	\$169.4	\$167.7	\$166.5



2. Collaborative Modelling Conceptualization

Confirmation for Booking II | Collaborative Model guide | CLEAN-RSF-on-CS-PDG-SH | MRC Modeling Worksh... | New tab

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IWRM is an iterative process that becomes more complex as stressors increase and interests differ

GWP definition:
 "The process which promotes the coordinated development and management of water, land, and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems"

Progress of IWRM

Impacts (Social, Environmental, etc.)

IWRM Process



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1. Collaborative process

Rules of engagement
 Circles of Influence
 Stakeholder analysis

- Who can affect decision?
- Who is affected by decision?
- Who represents values?

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Shared Vision Planning

integrates tried-and-true

1. Planning principles
2. Decision support model
3. Structured collaboration

into a practical forum for making resource management decisions;

SVP means involving stakeholders in the technical analysis - in the data and technical relationships

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Structuring the Participatory Process

Circle D: Decision Makers

A: Planning

C: Broad Stakeholders

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2. Planning supports a decision making process

Shared vision planning uses collaborative modelling for complex decision making

Problem Statement

Collaborative Modelling

Performance Tradeoffs & Objectives

Decision space & key

Recommendation / Decision

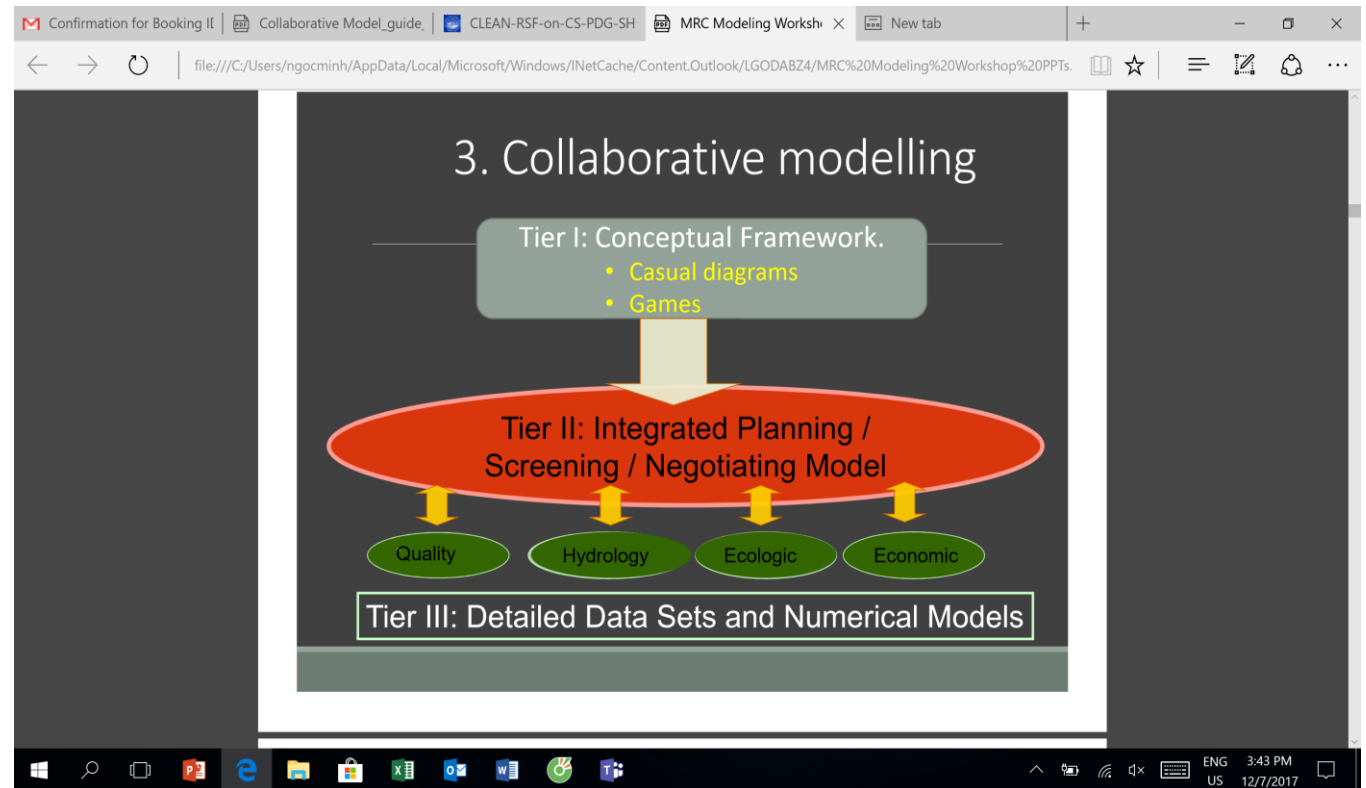
Evaluate Tradeoffs

Shared Vision Planning

Conceptualize & Formulate

Collaborative Modelling – Put it Simply

A process of involving different stakeholders in using a decision support model to debate and agree on resource management decisions



Model Interface

The screenshot shows an Excel spreadsheet titled "collaborative_model_H1 - Excel" with the user "Nguyen Thi Ngoc Minh". The ribbon is set to "Home". The spreadsheet content is organized into three main sections:

- 1. Define Preferences:** A grid of 12 buttons arranged in 3 rows and 4 columns. The rows represent "Economic Development", "Social Development", and "Environmental Protection". The columns represent "Laos PDR", "Thailand", "Cambodia", and "Vietnam".
- 2. Cross-examine Preferences:** Two buttons: "Preferred MRC Basin-Wide Scenarios by country by Objective" and "Scenario Equity".
- 3. Results:** Two large ovals labeled "Multi-Objective Trade-offs" and "Two-handed Trade-offs". A yellow button labeled "ALL DATA" is positioned to the right. Below the ovals, the formula $Score = (scenario\ score - worst)/(best - worst)$ is displayed.

The bottom of the spreadsheet shows a row of tabs: "dash", "prefs", "Trade-offs", "Trade-offs (2)", "Radars", "equity", "example_Thrsh", "L_econ", "T_econ", "C_econ", "V_econ", "L_soc", "T_soc", "C_soc", "V_soc", "L_env", "T_env", "C...". The status bar at the bottom indicates "Ready Calculate" and "Sign in with your work or school account to use add-ins assigned to you." with a zoom level of 100%.

Model Demonstration – Country selection example

Lao PDR Social Development



Discipline	Indicator	Units	#	Lao PDR		Rank	Preference	Weight
				worst	best			
SOCfood	rainfed	production tonnes	2	347,756.1	463,378.9	1	100	0.056
SOCfood	irrigated	production tonnes	3	569,446.0	1,673,953.9	1	100	0.056
SOCfood	White fish	production tonnes	6	4,664.5	98,769.5	1	100	0.056
SOCfood	Grey fish	production tonnes	7	19,222.2	25,901.0	1	100	0.056
SOCfood	Black fish	production tonnes	8	25.4	51.5	1	100	0.056
SOCfood	Exotic	production tonnes	9	7,016.9	14,610.7	1	100	0.056
SOCfood	Marine	production tonnes	10	1,396.8	1,768.0	1	100	0.056
SOCfood	aquaculture	production tonnes	11	15,541.8	15,541.8	1	100	0.056
SOCfood	OAA	production tonnes	12	10,359.9	13,562.8	1	100	0.056
SOCfood	cattle	production tonnes	14	14,140.4	14,140.4	1	100	0.056
SOCfood	goats	production tonnes	15	242.9	242.9	1	100	0.056
SOCfood	pigs	production tonnes	16	18,076.5	18,076.5	1	100	0.056
SOCfood	poultry	production tonnes	17	7,737.2	7,737.2	1	100	0.056
SOCfood	Daily calorie	Kcal/day/capital	18	2,239.6	2,248.6	1	100	0.056
SOCfood	Daily protein	g/day	19	55.4	64.0	1	100	0.056
SOCfood	Daily fat	g/day	20	32.8	35.3	1	100	0.056
SOCincome	National Primary Income	Annual total (\$ billion)	24	0.5	1.0	1	100	0.056
SOCincome	National Manufacturing and Service Income	Annual total (\$ billion)	25	1.2	1.8	1	100	0.056

Model Demonstration – Cross Examination

2. Cross-examine Preferences

Preferred MRC Basin-Wide Scenarios by country by Objective

Scenario Equity



<- Click on the smiley face anywhere to return to this menu

dash | prefs | Trade-offs | Radars | **equity** | L_econ | T_econ | C_econ | V_econ | L_soc

Equity Among Member Countries						Choose Sub-Scenario	CODE
						2040 Planned + CC (CC)	CC
Lao PDR							
Discipline	Indicator	Units	#	worst	best	COUNTRY VALUES	
ENVkey	Aquatic biodiversity	% change from baseline M1	215	-61.3	0.0	-51.5	
SOCfood	Daily calorie	Kcal/day/capital	18	2,239.6	2,248.6	2,244.9	
ECON	Sector Sum (NAV, HYD, FISH, AG)	NPV (\$ billion)	226	52.3	105.8	91.6	
Thailand							
ENVkey	Aquatic biodiversity	% change from baseline M1	215	-55.3	0.0	-39.1	
SOCfood	Daily calorie	Kcal/day/capital	18	2,812.3	2,817.0	2,814.0	
ECON	Sector Sum (NAV, HYD, FISH, AG)	NPV (\$ billion)	226	171.3	256.8	251.9	
Cambodia							
ENVkey	Aquatic biodiversity	% change from baseline M1	215	-48.5	0.0	-40.6	
SOCfood	Daily calorie	Kcal/day/capital	18	2,299.2	2,303.4	2,302.7	
ECON	Sector Sum (NAV, HYD, FISH, AG)	NPV (\$ billion)	226	93.7	183.0	172.8	
VietNam							
ENVkey	Aquatic biodiversity	% change from baseline M1	215	-35.0	3.0	-19.0	
SOCfood	Daily calorie	Kcal/day/capital	18	2,605.7	2,614.5	2,614.5	
ECON	Sector Sum (NAV, HYD, FISH, AG)	NPV (\$ billion)	226	130.0	233.1	230.1	

Model Demonstration - Cross Examination

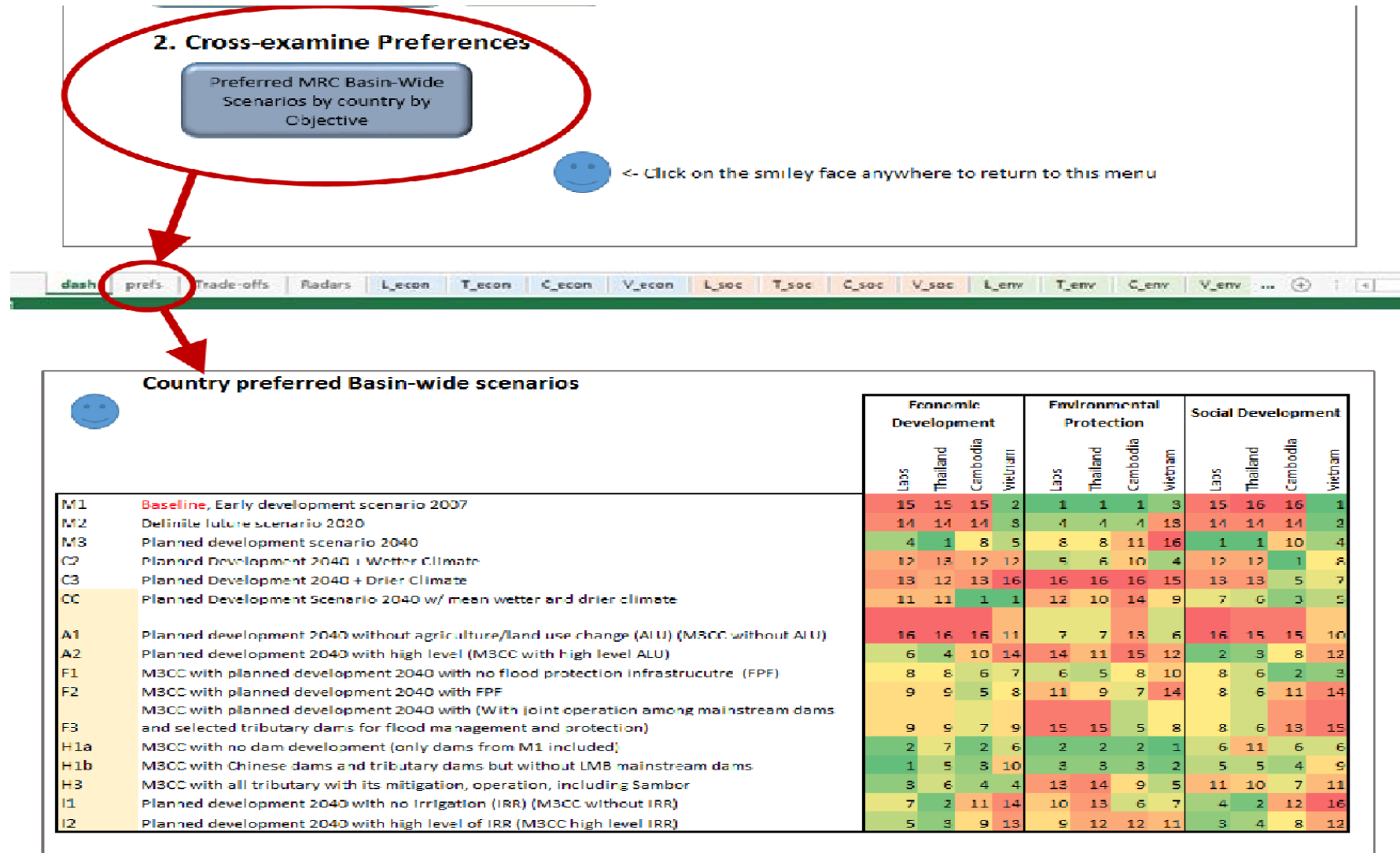


Figure 6. Visualization of sub-scenario country preferences for each objective (economic, social, and environmental) on the 'prefs' tab.

3. Progress to date

- Workshop with MRCS and MCs, 13-14 Nov
- Revised model and guidance/USACE
- Data verification/MRCS – ongoing



13 – 14 November 17 workshop preliminary feedback

Vietnam	Laos	Cambodia	Thailand
<p>In Economic Development prioritized agriculture and fisheries, valued model as a good tool</p>	<p>Prioritized hydropower, food and income security</p>	<p>Prioritized environment, e.g water flow, sediment, fish biomass, in economy prioritized agriculture and fisheries</p>	<p>Prioritized hydropower, agriculture and fisheries, and primary income</p>
<p>Some inconsistencies in the units and indicator description</p>	<p>Some indicators in food production have the same values in all scenarios - should be removed?, model structure still not clear</p>	<p>Some scenarios ranking did not change even when indicators were assigned different preference values</p>	<p>Need to revise some indicators' description</p>

4. Next steps

- Complete data verification - 20 December 2017
- Internal workshop for MRCS technical staff – early January 2018
- Guidance and revised model sent out to MCs – mid January 2018
- Regional event for MC higher level participants – April 2018
- Subject to MC agreement, a workshop for stakeholders to work with the model – May 2018



Thank you

