3rd SUMMIT

Siem Reap, Cambodia | 2-5 April 2018

ONE MEKONG | ONE SPIRIT

SEDIMENT OF THE MEKONG BASIN

Finding from the Mekong River Commission Study

INTRODUCTION

Why should we think about Sediment?

- *The Significance of Sediment:*
  - **Land degradation**
  - **Water Resource Development:** *siltation of reservoirs, canals, navigation channels, harbours etc*
  - **Impacts on aquatic ecology:** *Turbidity, channel and lake sedimentation*
  - **Sediment-associated nutrients and contaminants**

- *Sediment is essential for fish habitats and reproduction*

- *The Mekong River serves as the heart and circulatory system for all the nutrients*
- *The pure water is the lifeblood that carries the fine sediment that conveys the nutrients*

Drivers of Change

- **Increasing Sediment Loads**
  - Land clearance
  - Land use change
  - Infrastructure development
- **Decreasing Sediment Loads**
  - Dam construction
  - Soil conservation and sediment control programmes

OBJECTIVES

1. *Sediment contribution from tributaries to the Mekong River*
2. *Sediment trapped by hydropower cascade on the Mekong Basin*
3. *Trends in sediment reduction from scenario comparison analysis*

Definition of Scenarios

Infrastructures of six related sectors in 2007

M1
Early Development 2007

+

Infrastructures of six related sectors in 2007, currently under construction and planned for 2020

M2
Development 2020

+

Infrastructures of six related sectors in 2007, currently under construction and planned for 2020 and 2040

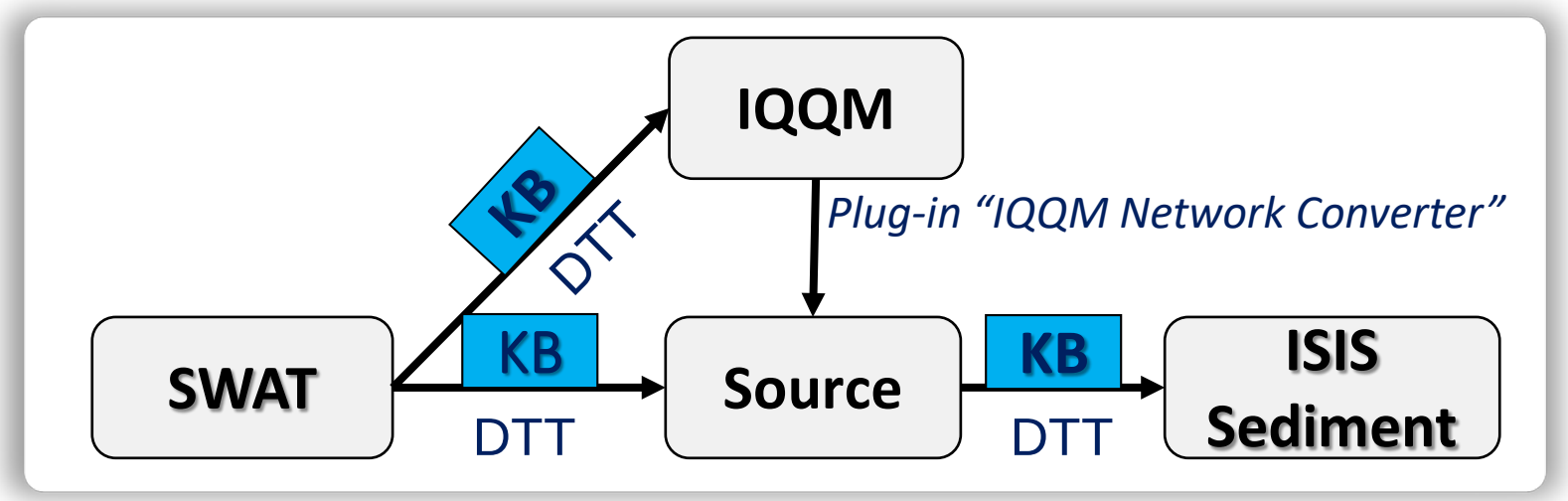
M3
Development 2040

MODELLING APPROACH

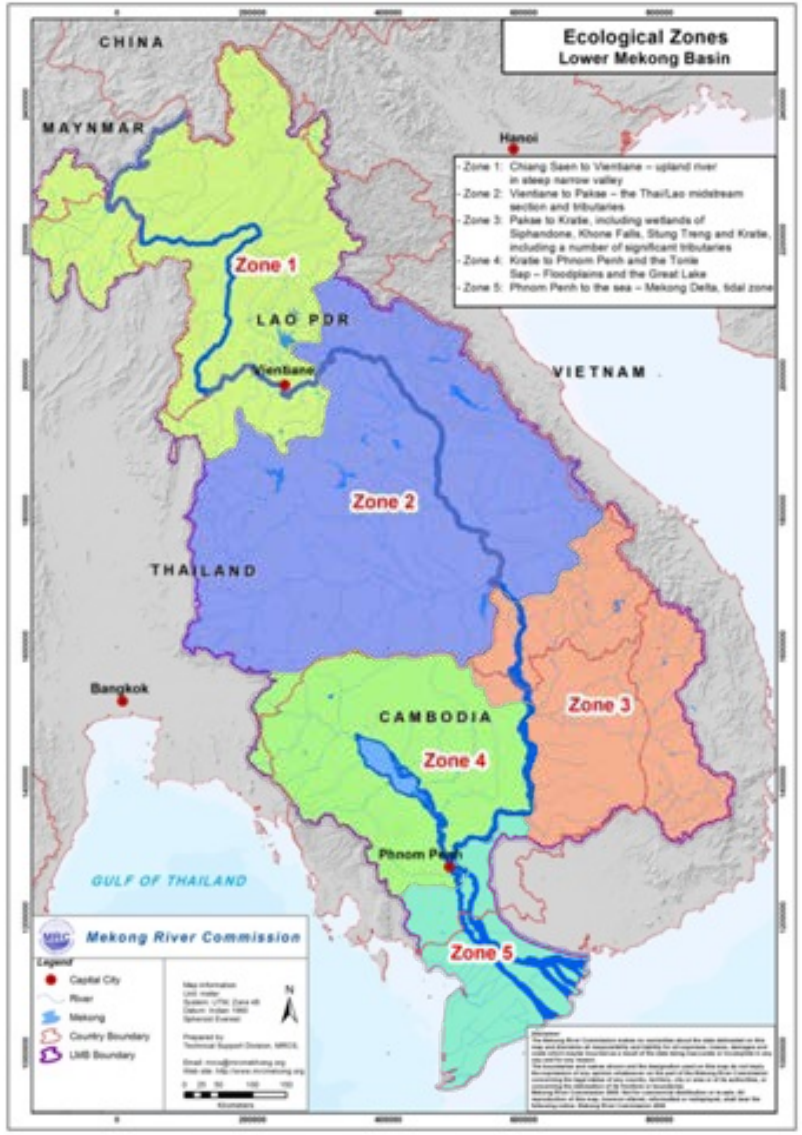
The following selected developments are modelled:

- *Dams in the Upper and Lower Part*
- *Flood Protection Structure and Food plain Infrastructure*
- *Irrigation development*
- *Agriculture and Forest cover reduction and increase*
- *Navigation*
- *Domestic and Industrial Water use*

MODELLING APPROACH



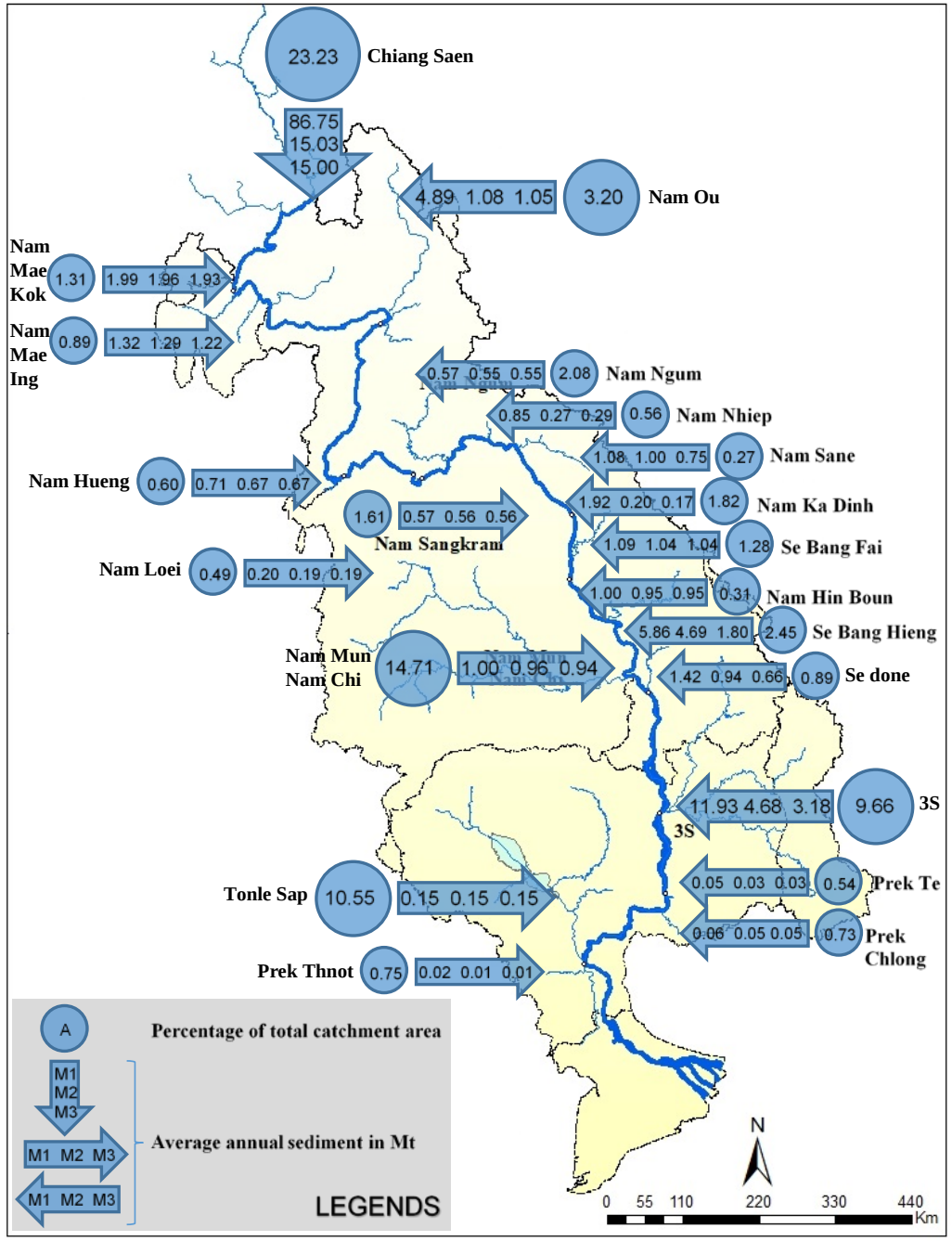
1. Route sediment and nutrient loads generated by **SWAT** through Mekong tributaries to the mainstream
2. Replicate the **IQQM** flows, hydropower and water use
3. Simulate **Source** by using Brune Reservoir Sediment Trapping Model (Brune, 1953) which primarily in the tributaries and storage dams
4. Route sediment along the Mainstream by **ISIS**



MODELLING RESULTS

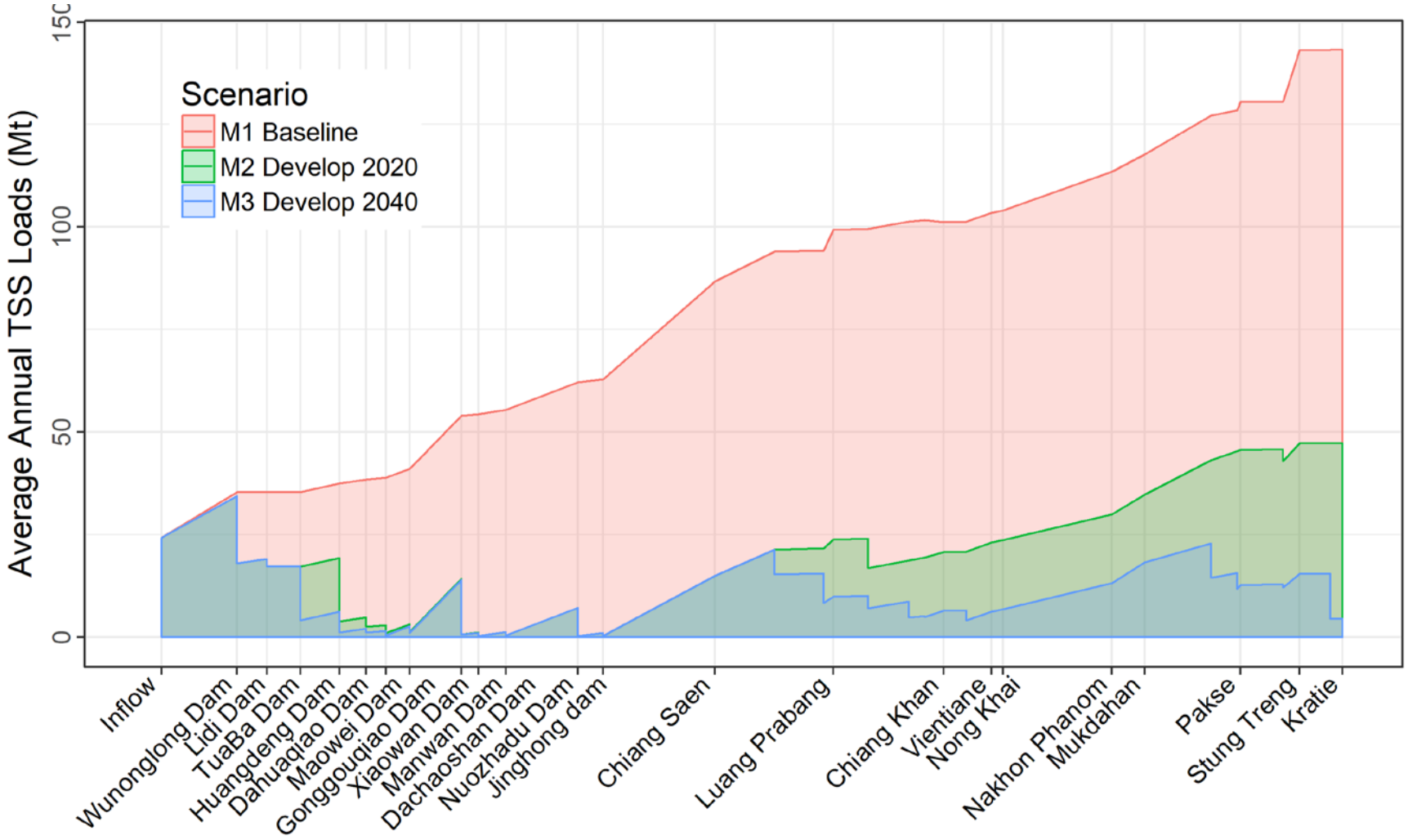
Sediment Contribution from Tributaries to the Mekong River

Tributaries name	Area (%)	Average Annual Sediment (Mt)		
		M1	M2	M3
NamOu	3.20	4.89	1.08	1.05
MeaKok	1.31	1.99	1.96	1.93
MeaIng	0.89	1.32	1.29	1.22
NamNghiep	0.56	0.85	0.27	0.29
NamSane	0.27	1.08	1.00	0.75
NamKaDinh	1.82	1.92	0.20	0.17
SeBangFai	1.28	1.09	1.04	1.04
NamHinboune	0.31	1.00	0.95	0.95
Xebanghiang	2.45	5.86	4.69	1.80
SeDone	0.89	1.42	0.94	0.66
3S	9.66	11.93	4.68	3.18
NamNgum	2.08	0.57	0.55	0.55
NamHueng	0.60	0.71	0.67	0.67
NamLoei	0.49	0.20	0.19	0.19
NamSongkhram	1.61	0.57	0.56	0.56
Nam Mun-Nam Chi	14.71	1.00	0.96	0.94
Pre Chlong	0.73	0.06	0.05	0.05
Prek Te	0.54	0.05	0.03	0.03
Tonle Sap	10.55	0.15	0.15	0.15
Prek Thnot	0.75	0.02	0.01	0.01



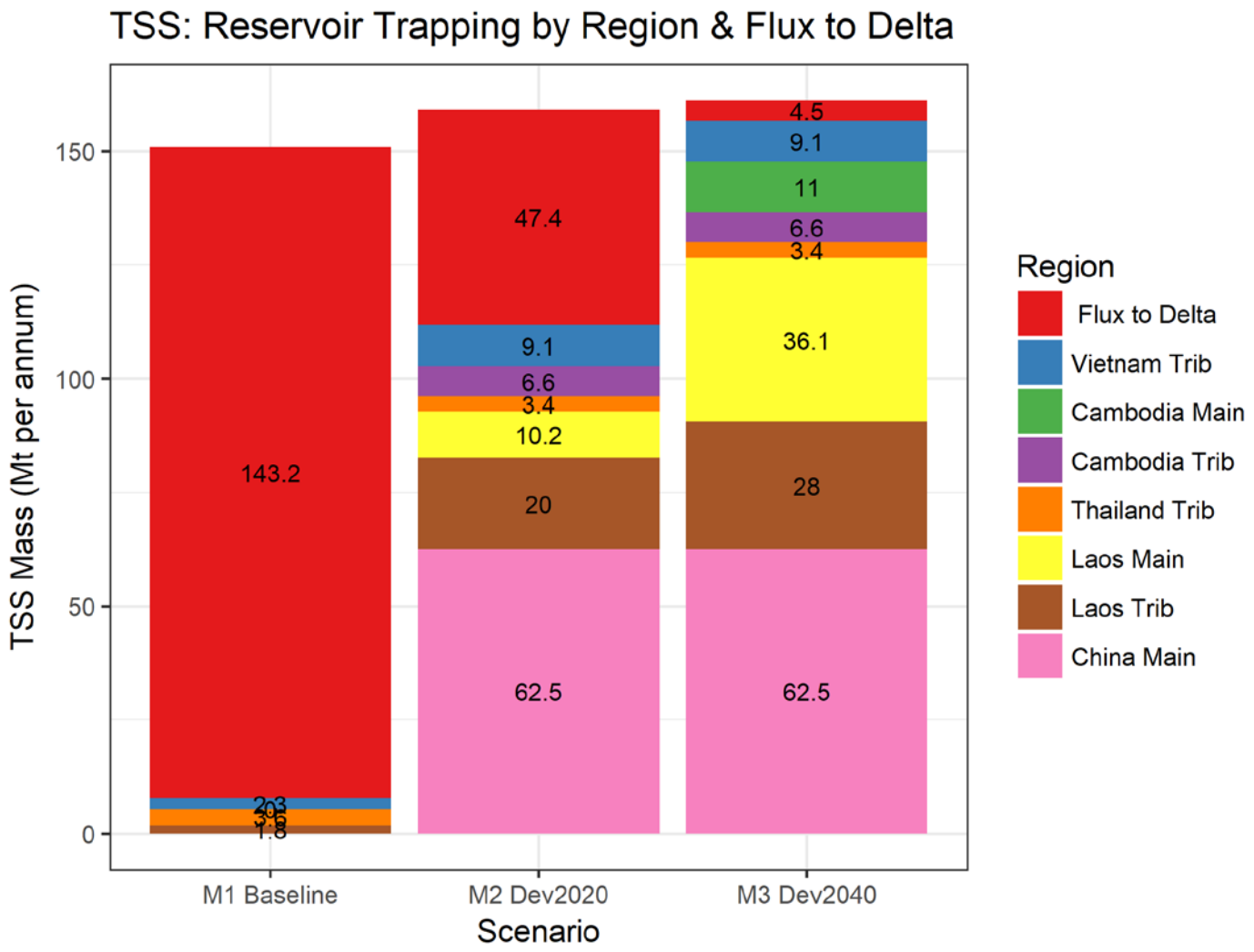
MODELLING RESULTS

Trends in Sediment Reduction



MODELLING RESULTS

Sediment Trapped by Hydropower cascades on the Mekong Basin



CONCLUSION AND RECOMMONDATION

- **The changes in seasonal flow patterns** in the Mekong Basin(MB) is significant**.** However, The differences in total flow volumes are subtle
- **Large Reduction of sediment transport downstream** caused by hydropower projects in the MB is about 67% and 97% in the 2020 and 2040 scenarios respectively
- It is likely to have **substantially impacts** on the river channel and delta landforms, floodplain fertility as well as other productivities .
- **Mitigation strategies** of all planned dams should be implemented to improve sediment loads reaching the Mekong Delta

To have effective outcomes, mitigation measures should be implemented in a coordinated way for all dams in the cascade

Thank you