Ministry of Water Resources and Meteorology

Water Accounting Plus Framework: A Cambodia Case Study to Improve Water Resources Management

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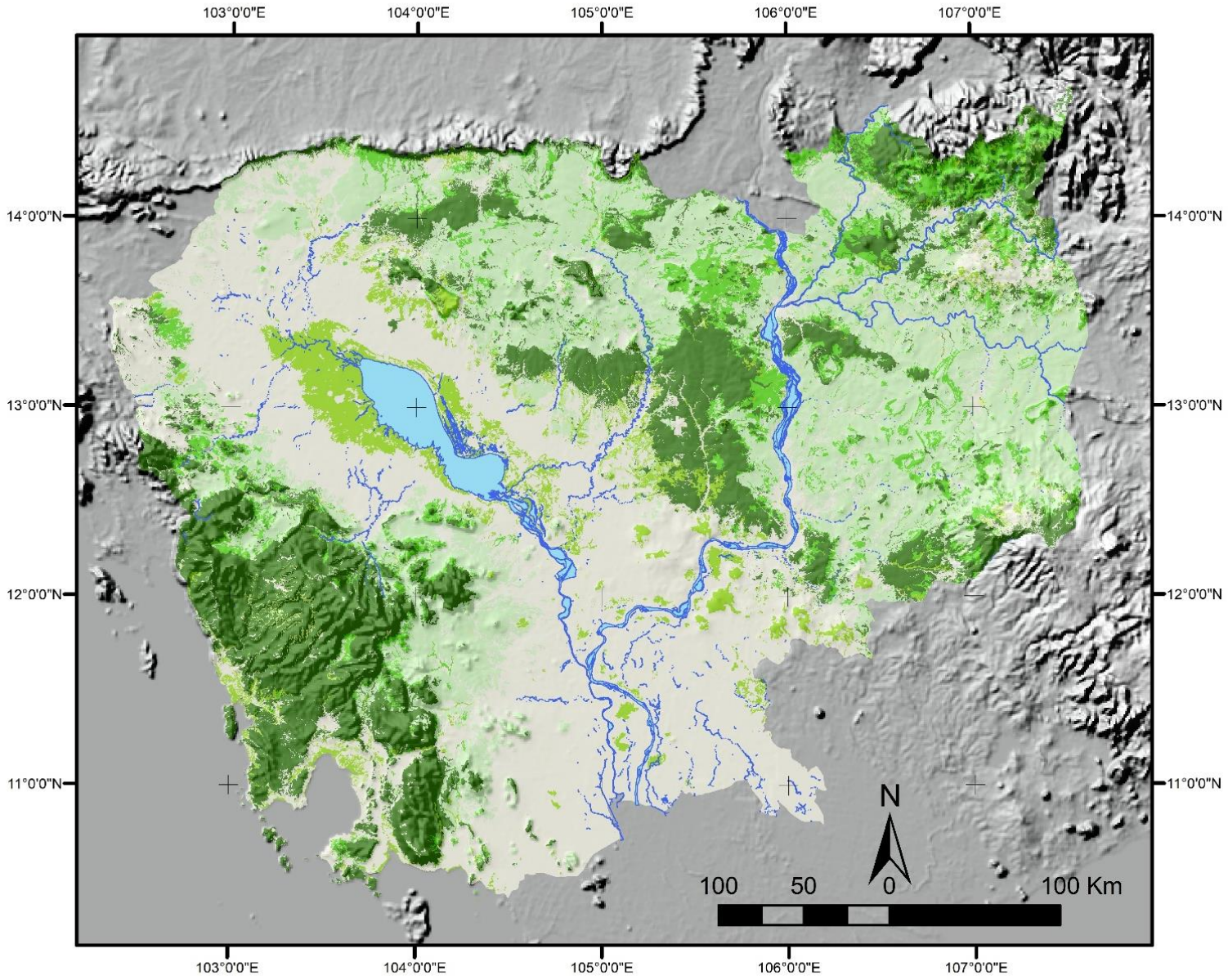
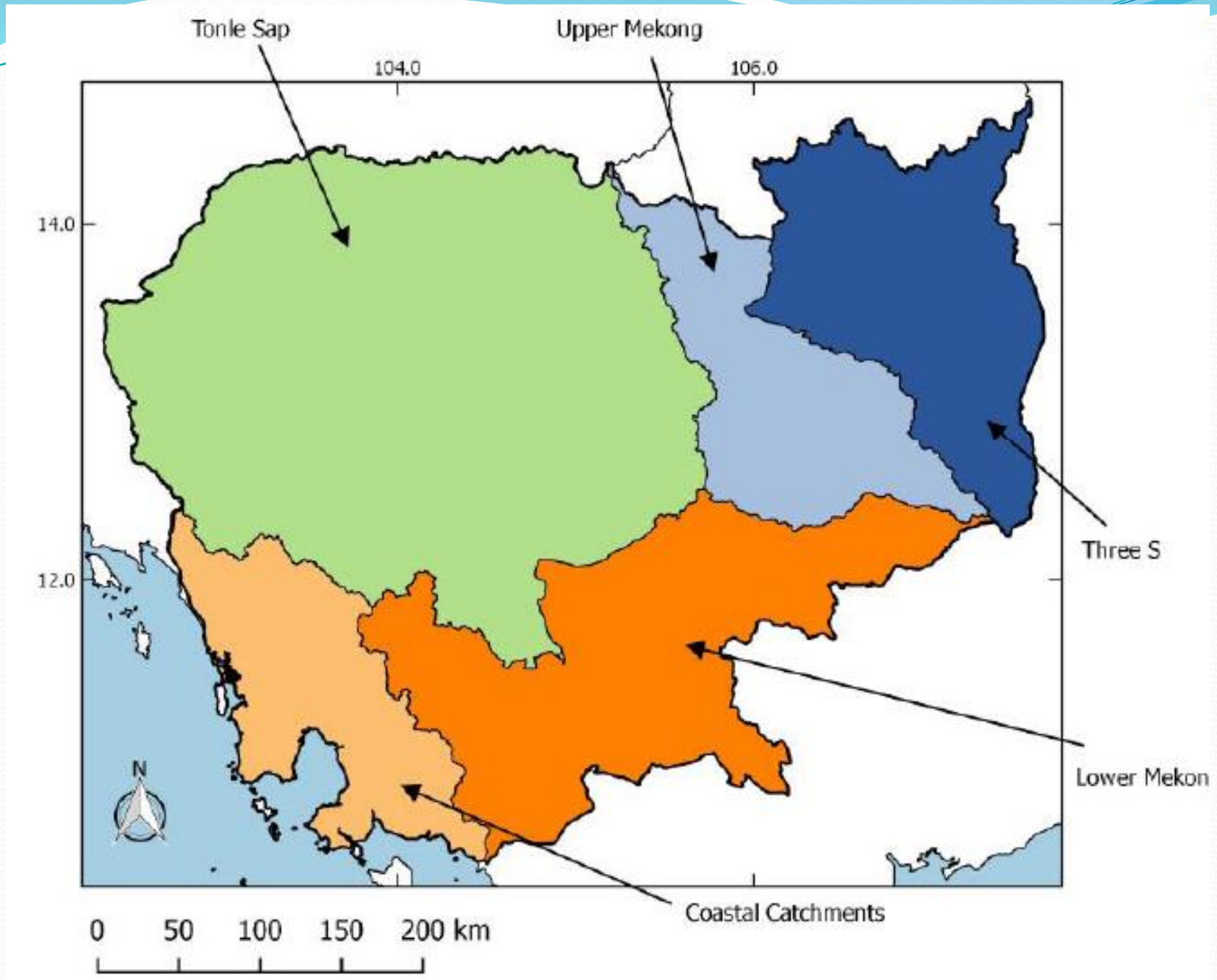
Outline

- Introduction: River networks in Cambodia and Issues
- ADB/IHE Delft support: Water Accounting Plus (WA+) Framework
- Examples of WA+ results: performance of remote sensing data and models
- Conclusions and Next steps

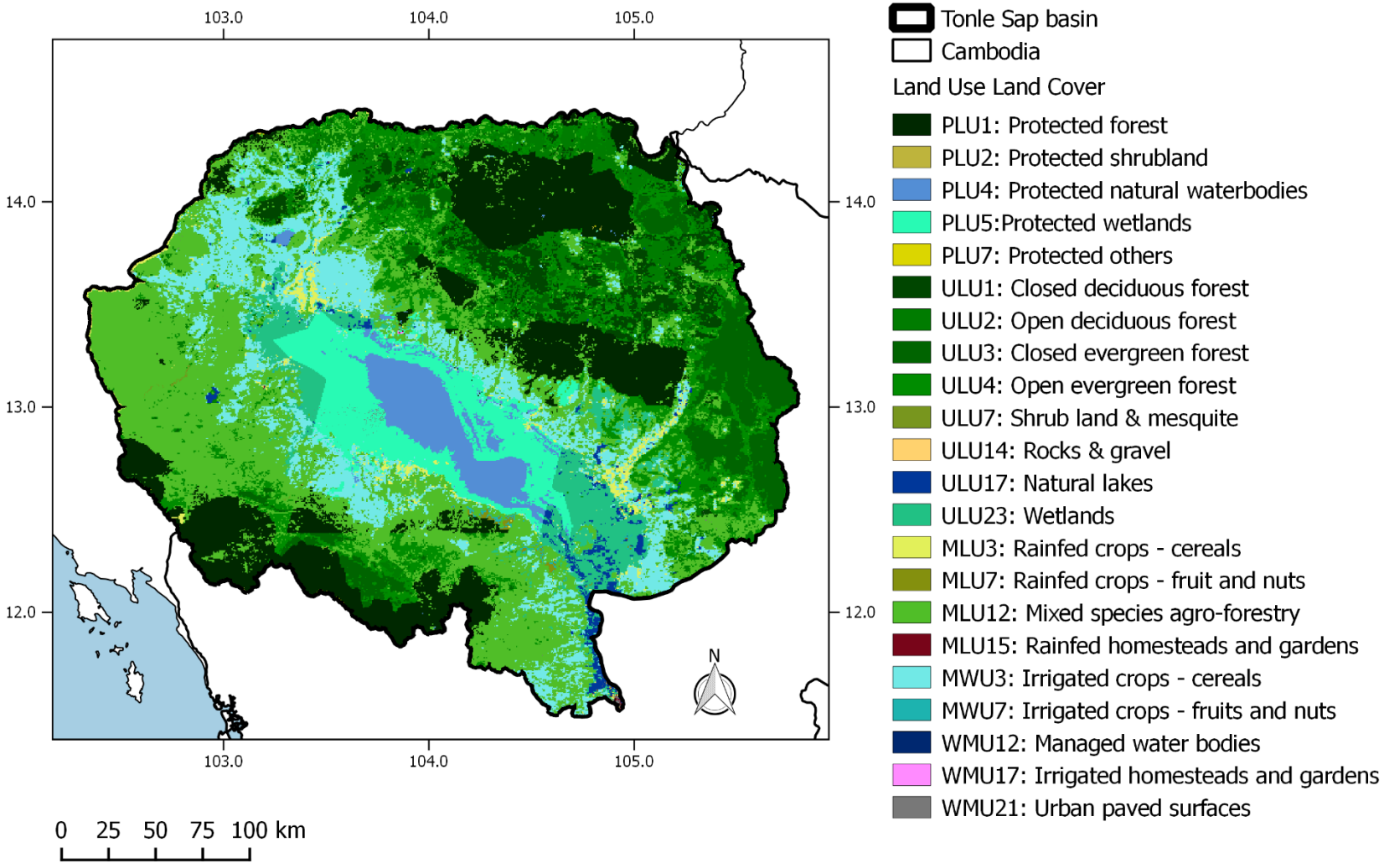

103°0'0"E
104°0'0"E
105°0'0"E
106°0'0"E
107°0'0"E
14°0'0"N
13°0'0"N
12°0'0"N
11°0'0"N
N
100
50
0
100 Km


Tonle Sap
Upper Mekong
104.0
106.0
14.0
12.0
Three S
Lower Mekon
Coastal Catchments
N
0
50
100
150
200 km

Key Issues

- Water for agriculture is a key issue in Cambodia as crop production contributes to 54% of the sector GDP. Increase of rice exports are vital for Cambodia economy.
- Cambodia is highly dependent on water coming from upstream countries.
- The decrease in forest cover cause negative impact to the water retention
- Dry season: water scarcity, food security
- Wet season: flood, flash flood

Land Use and Land Cover for the Tonle Sap

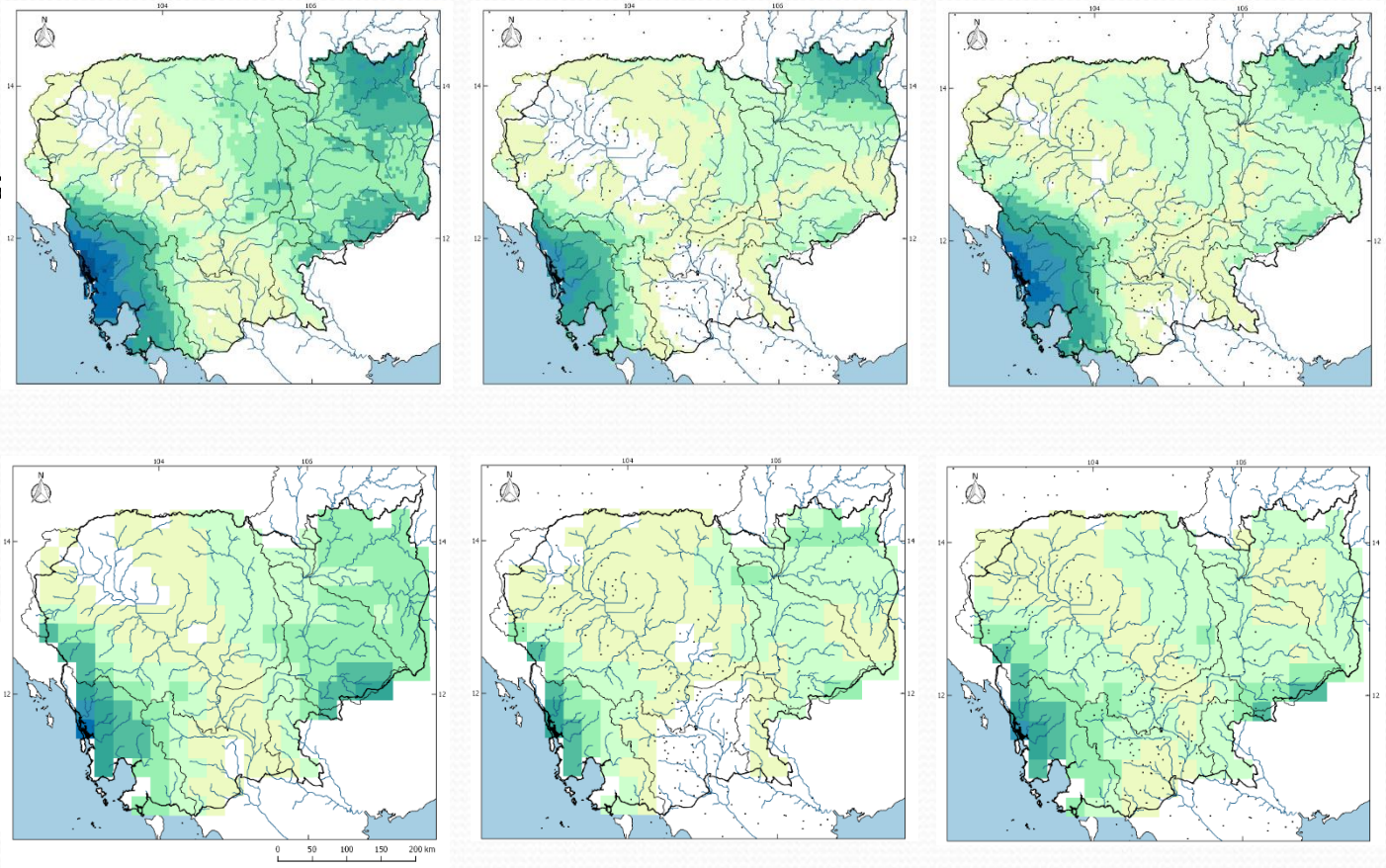


Rainfall Remote Sensing

WET YEAR: 2007 DRY YEAR: 2004 AVG YEAR: 2008

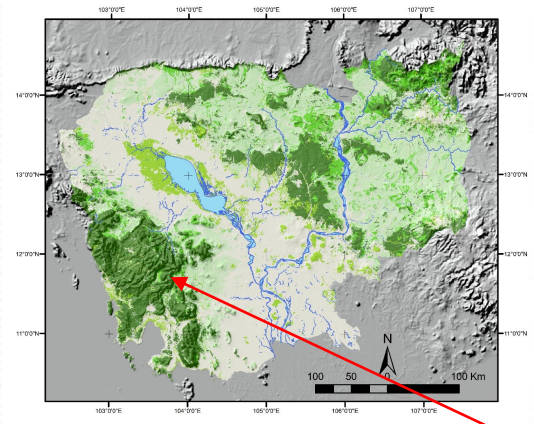
CHIRPS

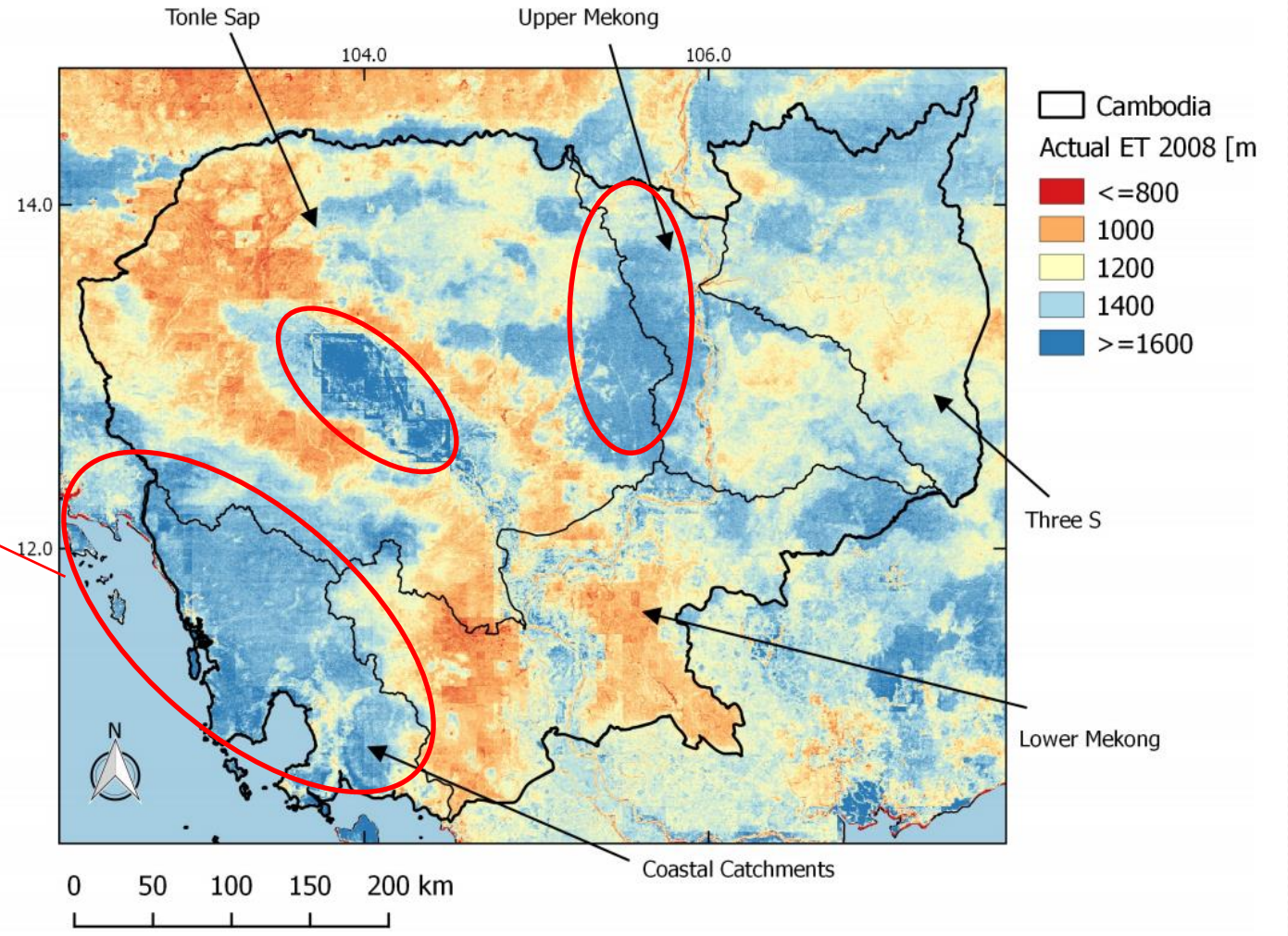
TRMM



CONSUMPTIVE USE

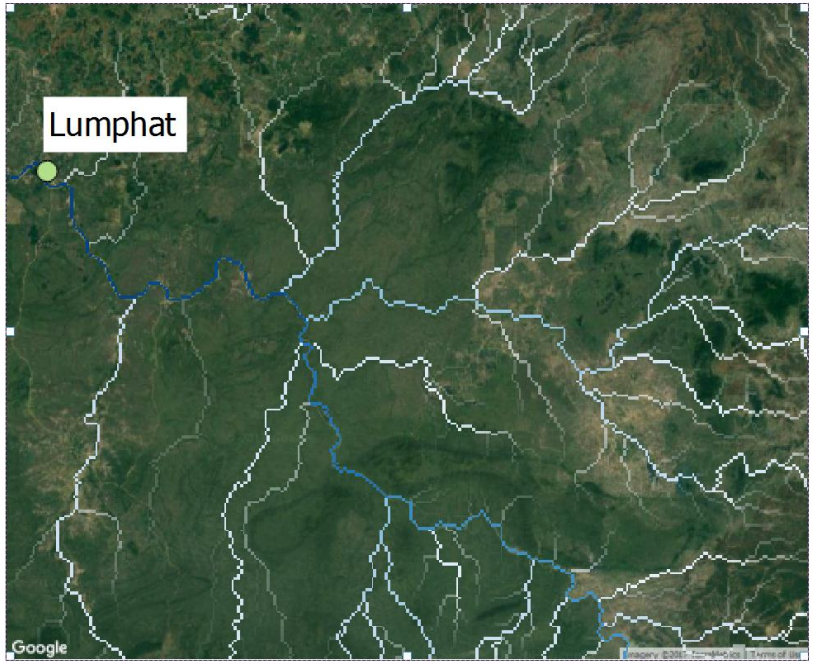
Water withdrawn for a process that does not return back into the basin. It comprises of evapotranspiration (ET), water pollution and water incorporated into products.



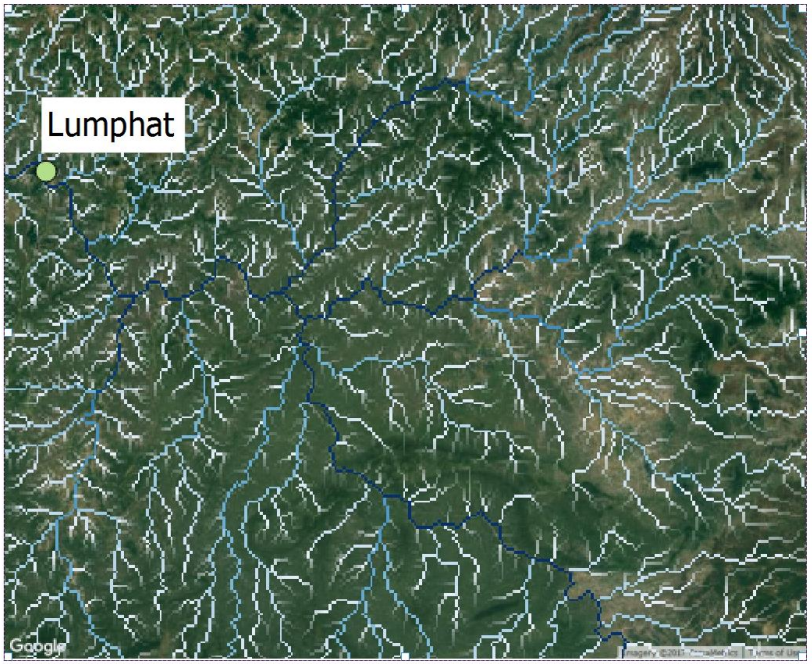


During the wet season, the accumulated flow is higher (from 100 to 3000 m3/s at Lumphat) and more pixels contribute to the flow in the major streams

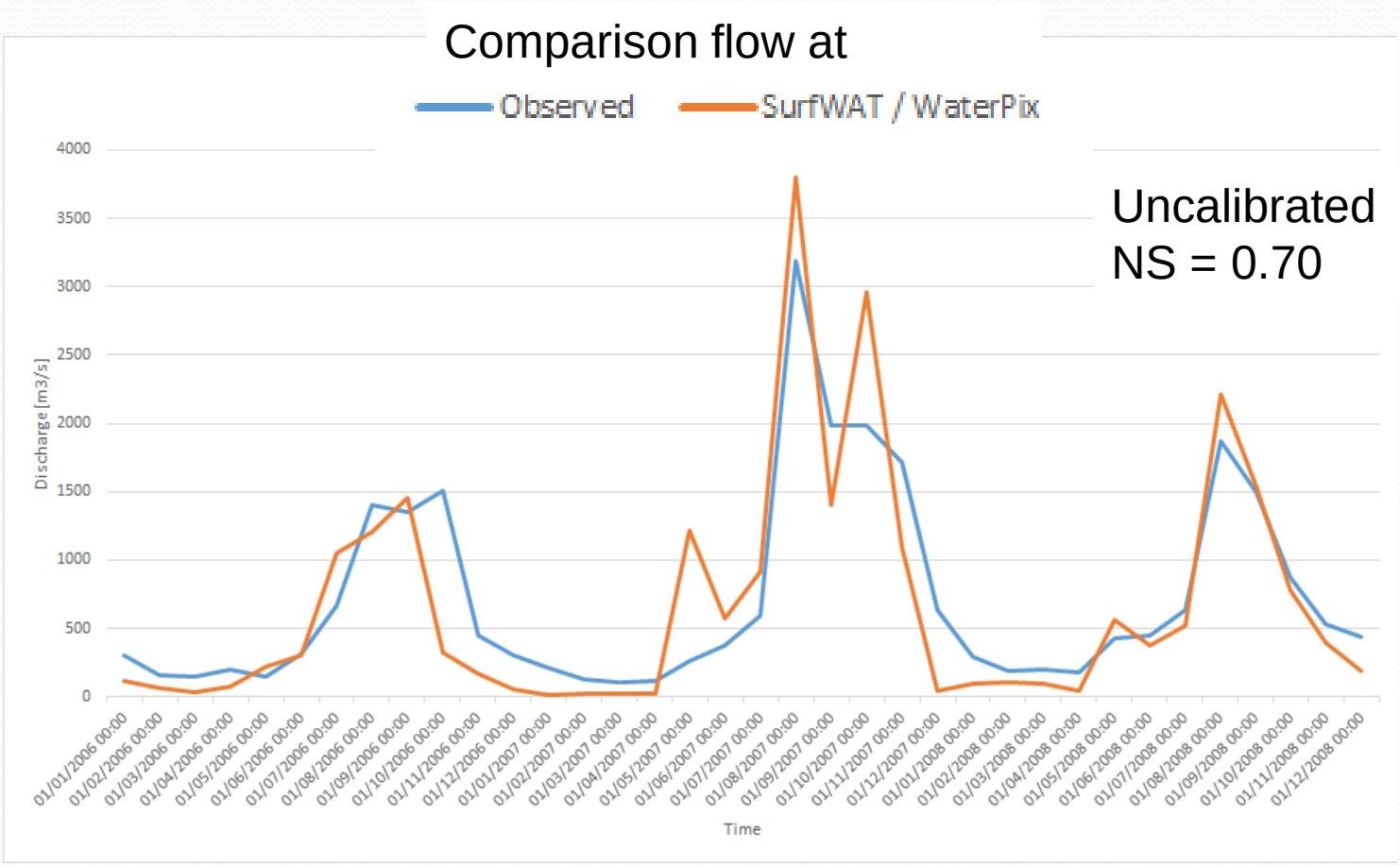
January 2006



August



MOWRAM Discharge Sations
Monthly River Discharge [m3/s]
0
0.5
1
2
5
10
20
50
80
90
100
110
120



Relatively precise results of modelled data

Result

Basins significantly depend on upstream flow

Basin	Qsurf in / Net Inflow [%]
Tonle Sap	22.0
Three S	42.9
Coastal Catchments	0.0
Mekong Delta	89.8
Upper Mekong	92.0

Result

Basins utilize less than 60% of the available water resource

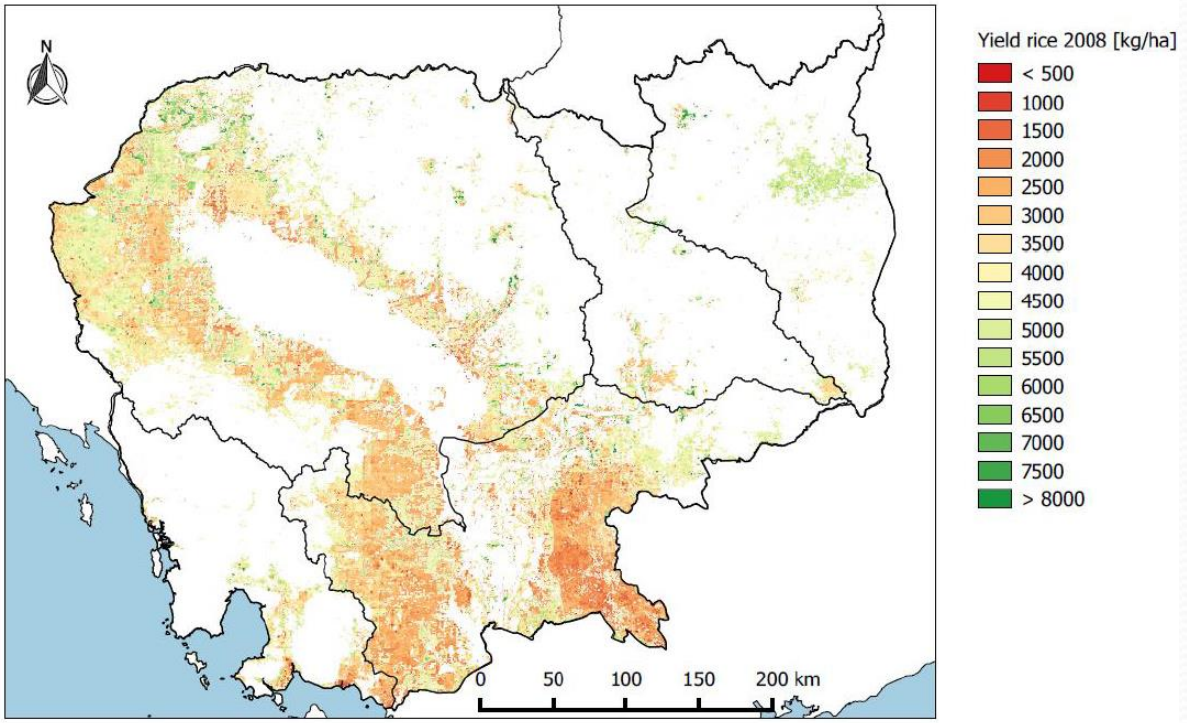
Basin	Available [km3/yr]	Utilizable [km3/yr]	Utilizable/Available [%]
Tonle Sap	79.4	40.5	51.0
Three S	82.9	37.2	44.9
Coastal Catchments	30.3	9.6	31.7
Mekong Delta	526.6	274.9	52.2
Upper Mekong	472.0	279.9	59.3

Result

Agricultural Services

- Values of land productivity (kg/ha) and water productivity (kg/m³)are generally low

- The 3S basin and Banteay meanchey province seems to contain the best performing food production area.



Result

Related to Capacity Building

- Understanding concepts of WA+
- Hydrology, GIS and Remote Sensing
- Global hydrological modelling
- Obtain/process Remote sensing data
- Calculate/ Interpret P-ET
- Use remote sensing for WA+
- From WA+ sheets to diagnosis

Conclusion

- The power/accuracy of the data from satellite
- Improve the knowledge of technical staff on remote sensing product
- Understand the advantage of using remote sensing to complement the scarce ground measurements
- Help government and other key decision-maker on the use of this system for taking smart decisions.

Next Steps

- Incorporate WA+ framework in the National Water Resources Information System in the National Water Resources Data Center
- Continue capacity building for MOWRAM (and MAFF + MOE) in WA+
- Government technical staff to operate WA+ framework by 2025
- Government senior staff to use WA+ for planning, management, and monitoring of water resources
- Consider climate change in the WA+ framework for planning purpose?

Thank you very much for your attention