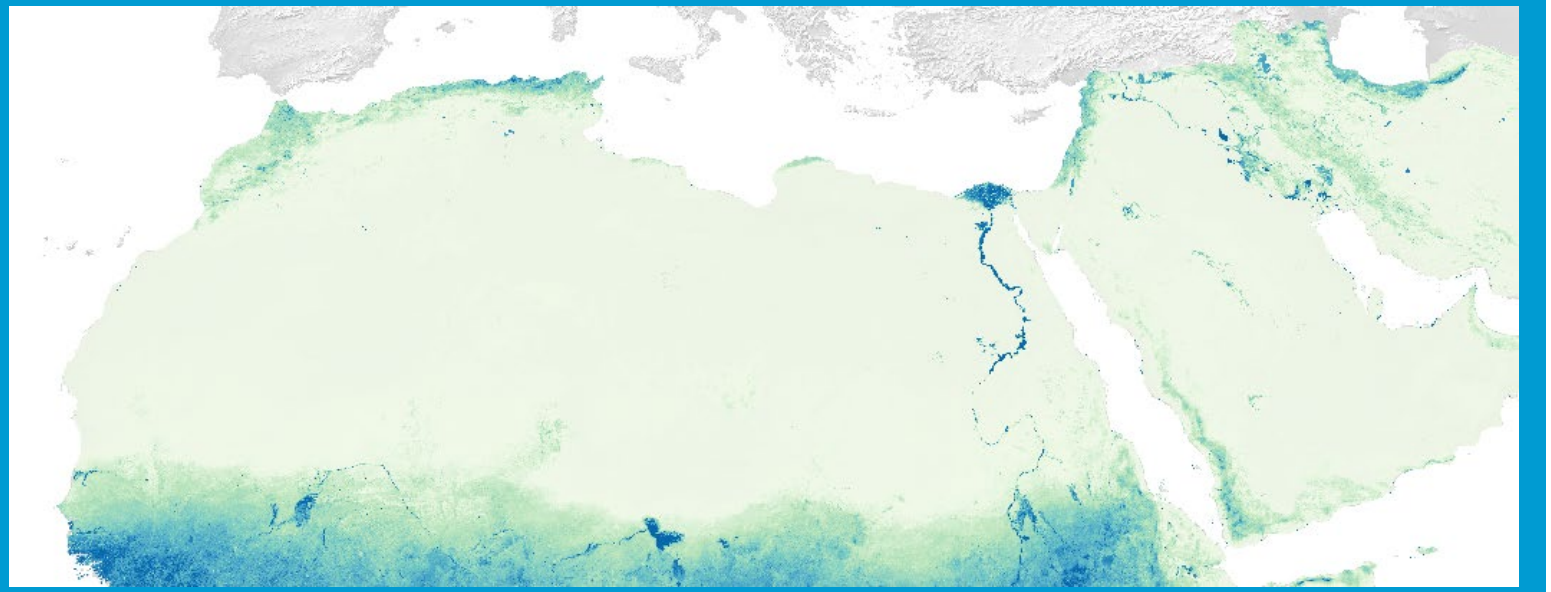
"Water Accounting for improved water allocation"

Virtual Technical Workshop

Improved Water Allocation for Agriculture in the Arab Region

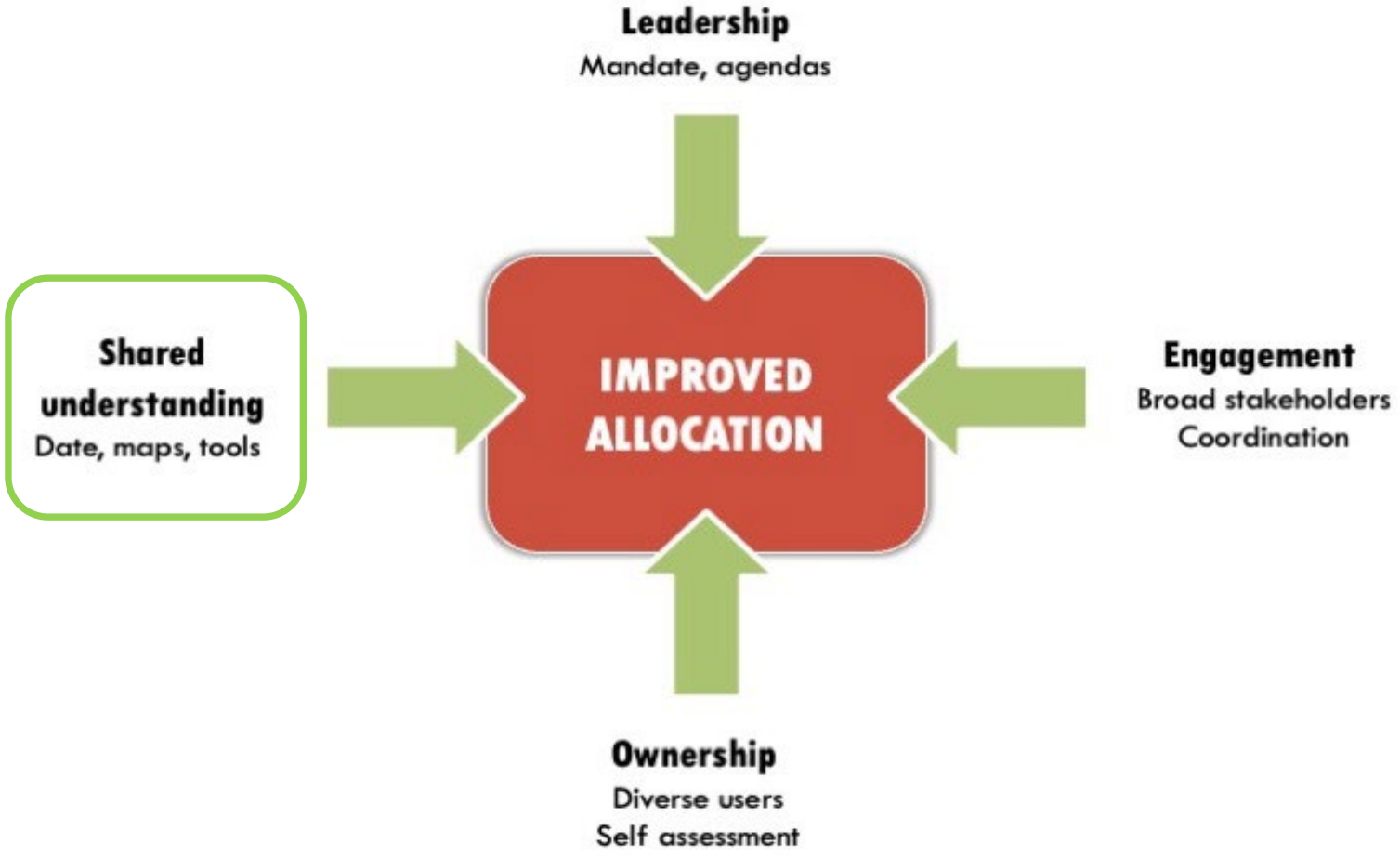
3-4 October 2022



Dr. Salvadore Elga

https://wapor.apps.fao.org/

Water Accounting can support the creation of a shared understanding



What is water accounting?

Water accounting is a tool to support decision making

Name comes from financial accounting

Identification and tracking of sources of revenue and expenses

> *"Water Accounting makes sense of how much water is available and how to use it"*
>
> *"Water Accounting is the systematic **quantitative assessment** of the **status** and **trends** in water supply, demand, distribution and accessibility"*

Definitions from: FAO, Water Accounting for Water Governance and Sustainable Development

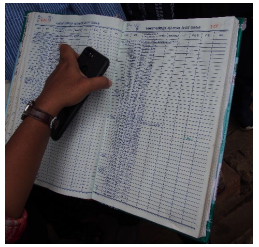
Reporting system to translate data to useful information

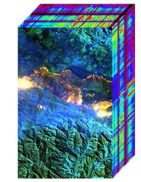
Water Accounting uses a three-step approach

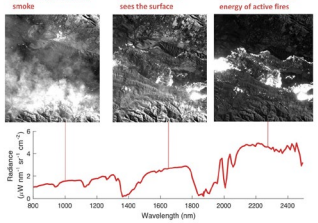
Data collection
gaps identification

Data analysis
from data to information

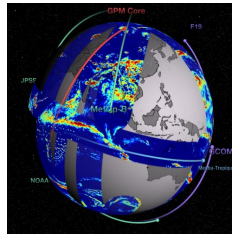
Communication
making information available to stakholders

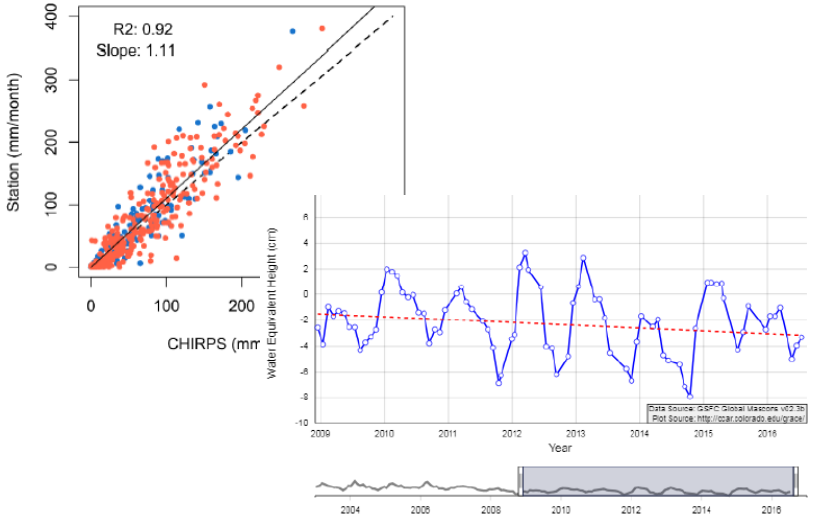




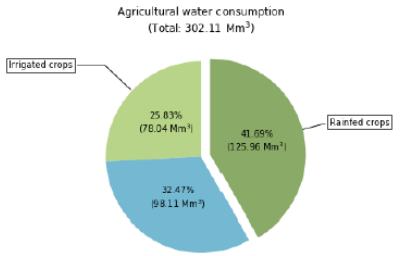


False color image from AVIRIS data cube acquired on Dec 5 2017. The front face shows: (red) active fires at 2250 nm; (green) surface at 1650 nm; and (blue) smoke at 1000 nm.





Crop													
Cereals	Non-cereals				Fruit & vegetables			Oil-seeds	Feed crops	Beverage crops	Other crops	Agricultural water consumption	302.11
15.28	3.64	17.54	-	-	5.85	55.49	-	28.16	-	-	-	ET rainfed	125.96
	Root / tuber crops	Leguminous crops	Sugar crops	Merged	Vegetables & melons	Fruits & nuts	Merged						
16.29	8.18	13.74	-	-	9.82	28.55	-	1.46	-	-	-	ET from rainfall irrigated	78.04
23.22	11.14	19.94	-	-	14.68	28.27	-	0.87	-	-	-	Incremental ET irrigated	98.11
39.51	19.32	33.67	-	-	24.50	56.82	-	2.33	-	-	-	Total ET irrigated	176.15



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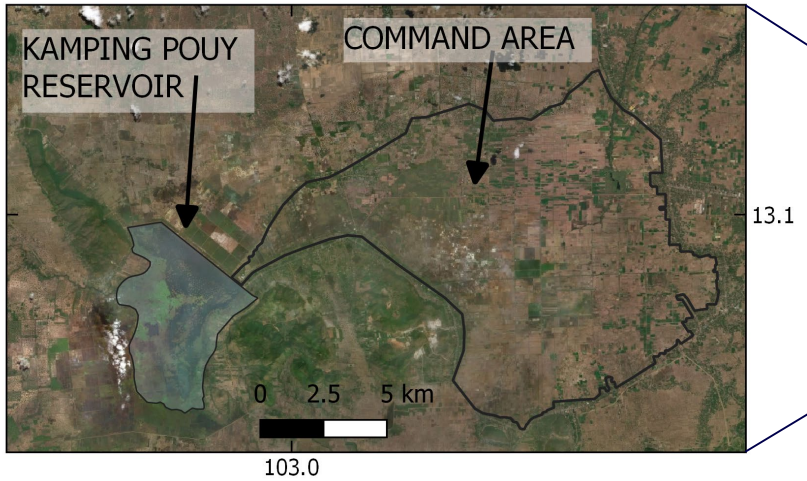
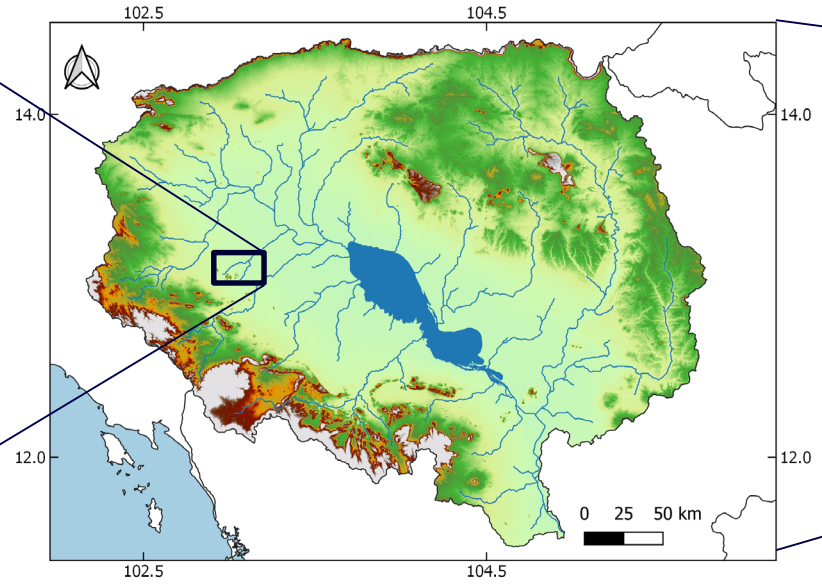
Water Accounting analyses water resources and their use in a specific geographical domain

Irrigation Scheme Level



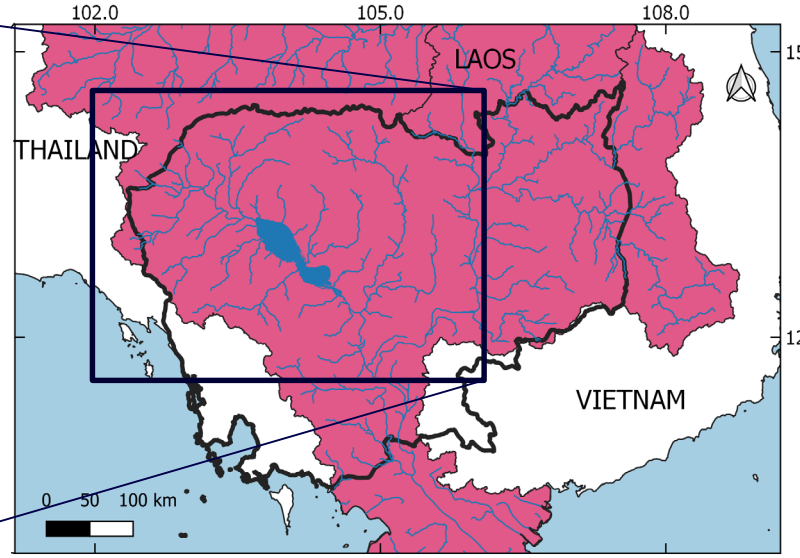
Bing VirtualEarth and data from the Irrigated Agriculture Improvement Project (Cambodia)

Basin Scale



Tonle Sap basin elevation, HydroSHED data

Country Scale

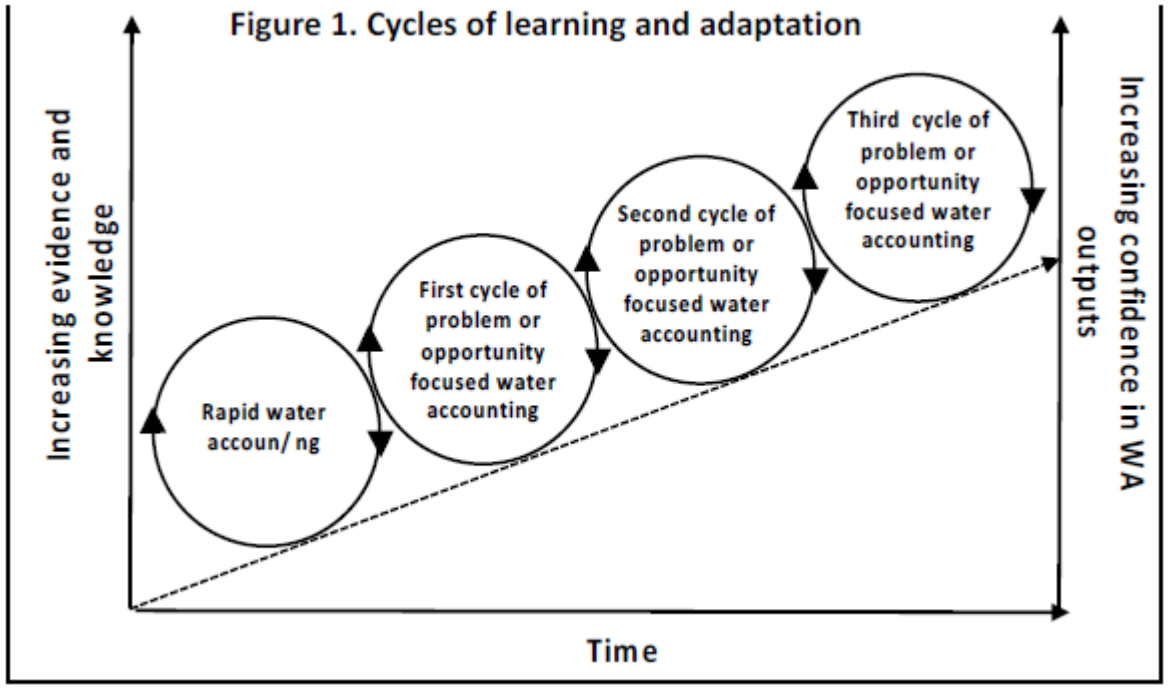


Cambodia and the Mekong river system

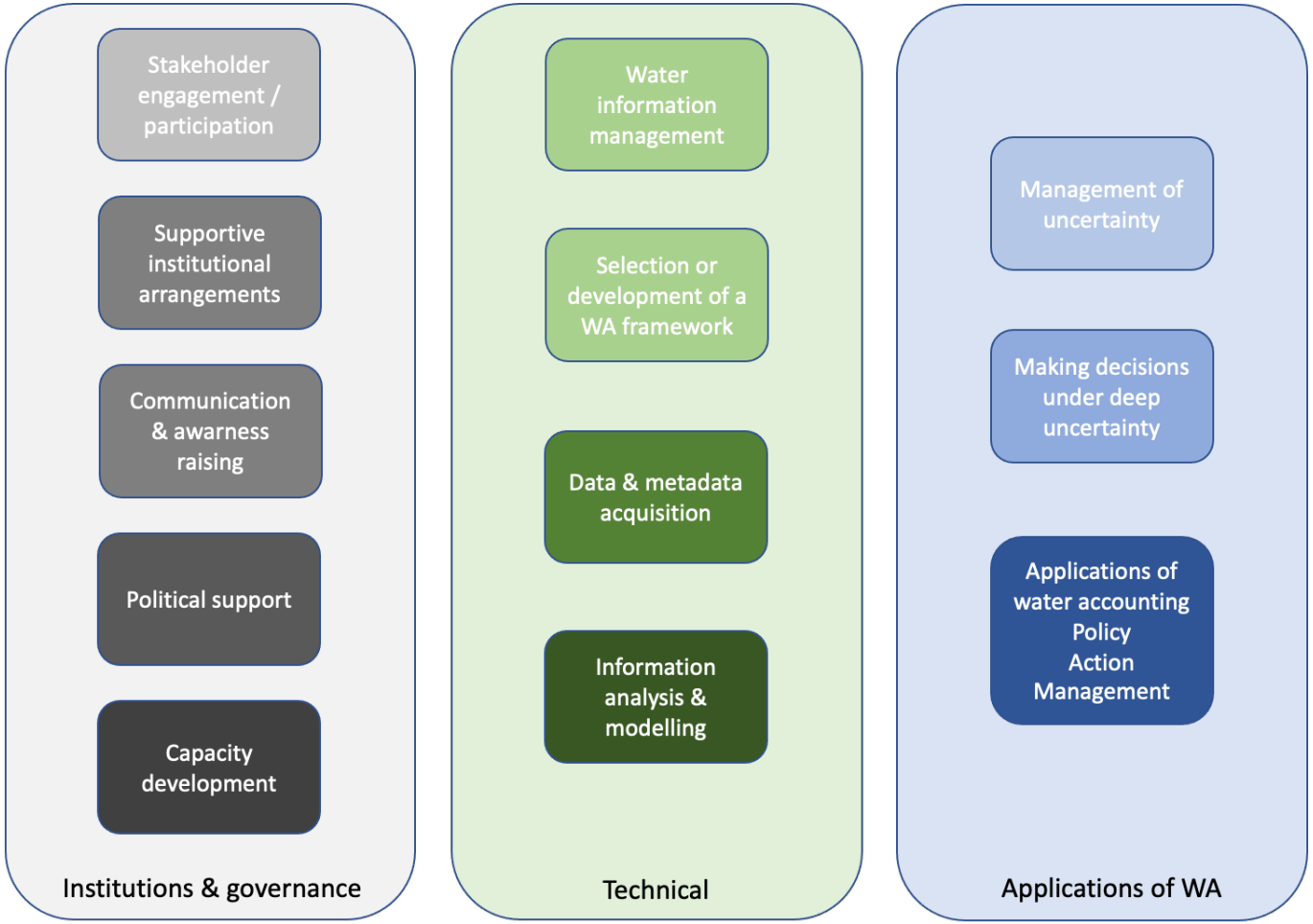
Building a Robust Water Accounting system: Reducing uncertainties and increasing confidence in WA

(1)

Know your water
establishing robust water accounting systems

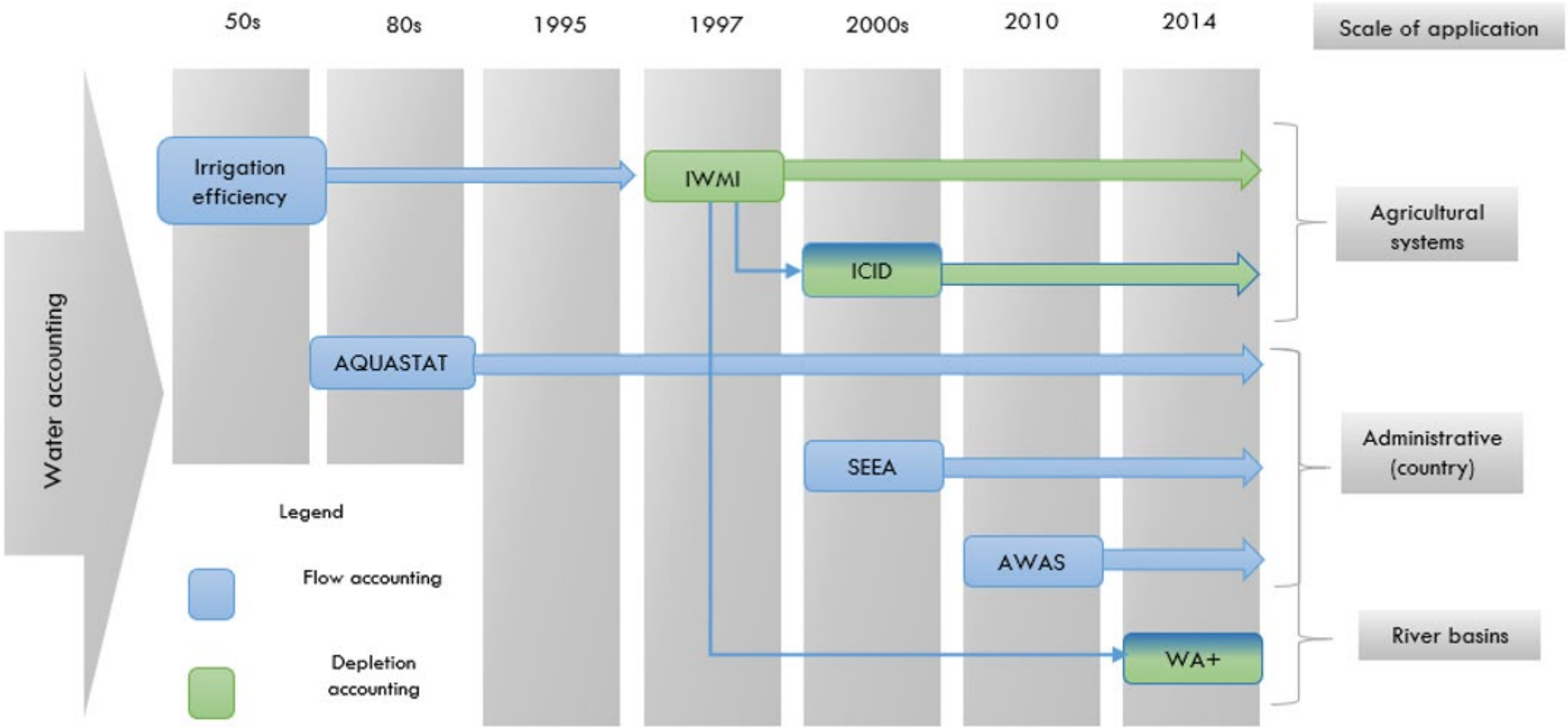


“Water Accounting protocol”: building blocks of water accounting systems to support Water Allocation



“Water Accounting Guidelines” Draft v0.9 (WB & FAO). Publication expected in November 2022

Many different water accounting systems exists



Water Accounting Plus (WA+)

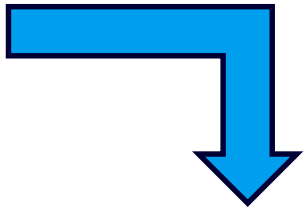
Hydrol. Earth Syst. Sci., 17, 2459–2472, 2013
www.hydrol-earth-syst-sci.net/17/2459/2013/
doi:10.5194/hess-17-2459-2013

Hydrology and Earth System Sciences
Open Access

Water Accounting Plus (WA+) – a water accounting procedure for complex river basins based on satellite measurements

P. Karimi[1,2], W. G. M. Bastiaanssen[2,3], and D. Molden[4]

[1]International Water Management Institute, Battaramulla, Sri Lanka
[2]Faculty of Civil Engineering and Geosciences, Water Management Department, Delft University of Technology, Delft, The Netherlands
[3]eLEAF Competence Centre, Wageningen, The Netherlands
[4]International Centre for Integrated Mountain Development, Kathmandu, Nepal

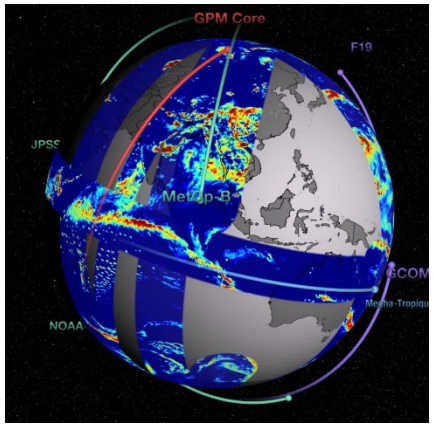


FAO FIAT PANIS
IWMI International Water Management Institute
CGIAR RESEARCH PROGRAM ON Water, Land and Ecosystems
UNESCO IHE DELFT
UNESCO United Nations Educational, Scientific and Cultural Organization
World Water Assessment Programme

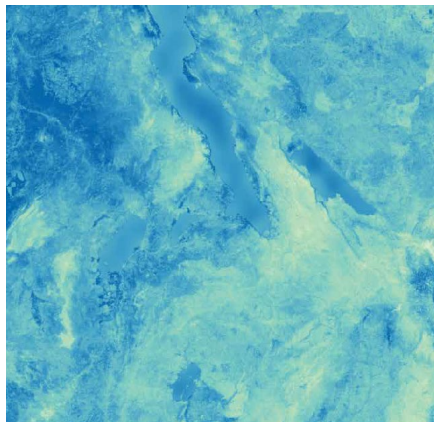
UNESCO IHE DELFT

Water Accounting Plus (WA+): using RS for water resources management

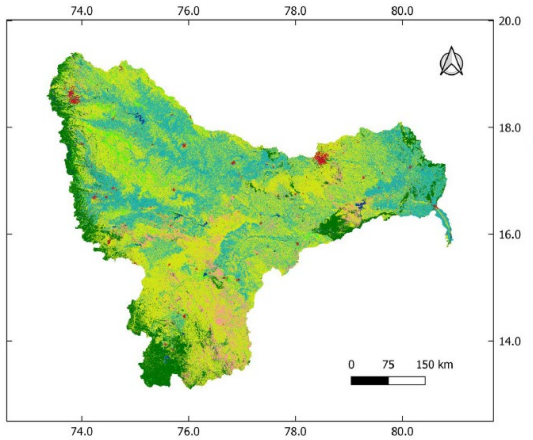
Rainfall



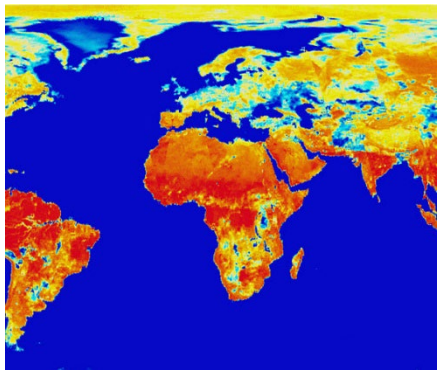
Evapotranspiration



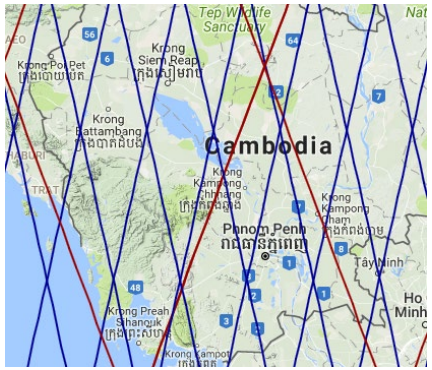
Land use



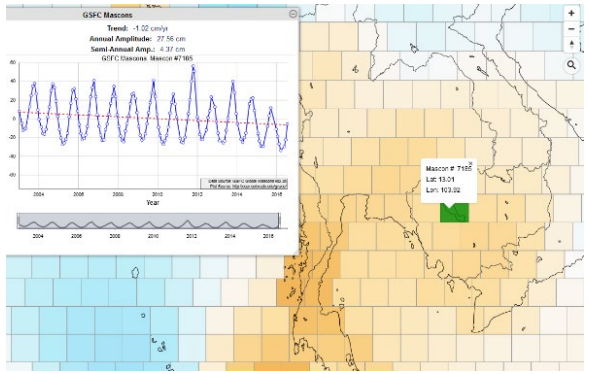
Soil Moisture



Water Levels



Groundwater

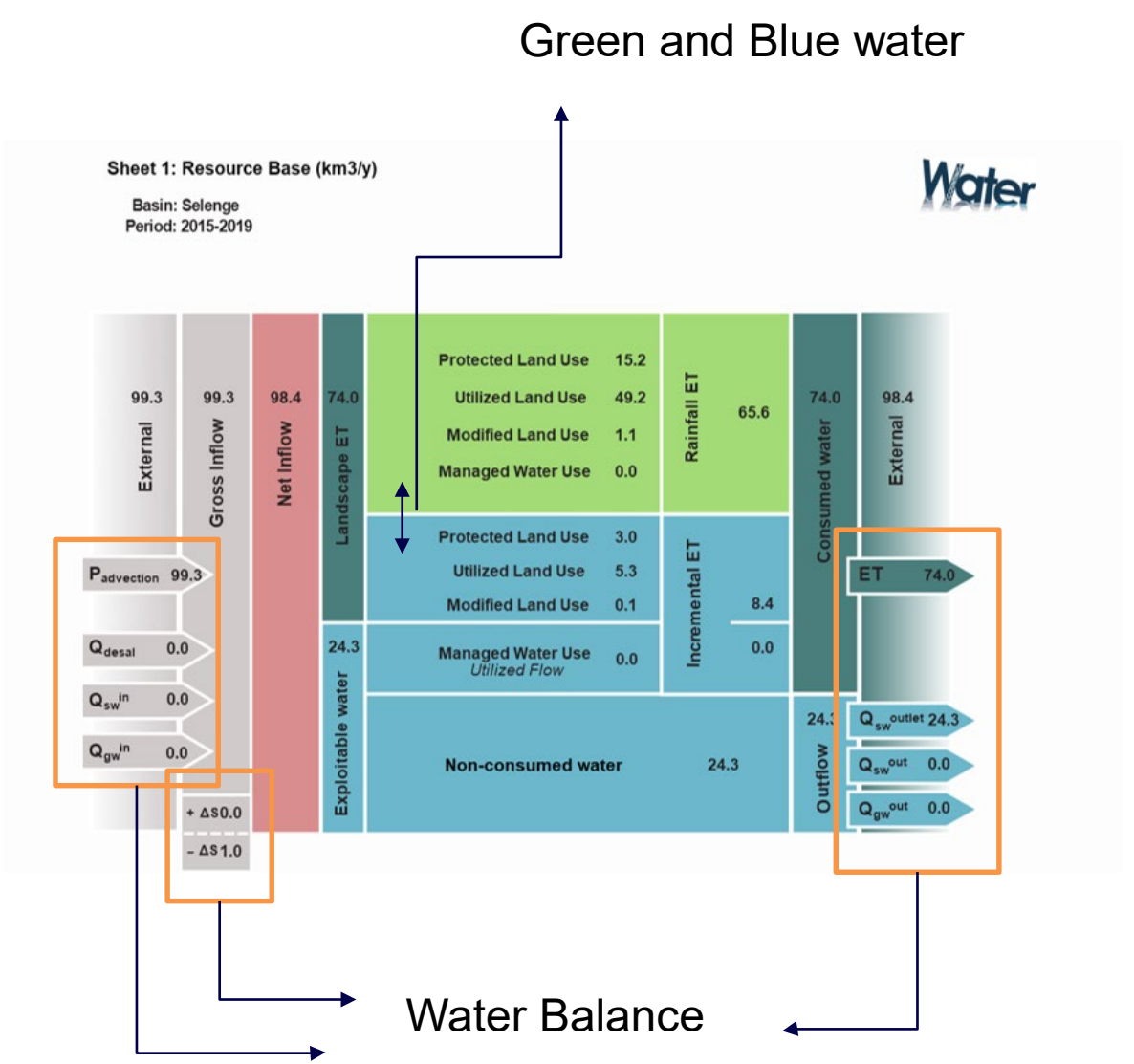


Rainfall, GPM: NASA Goddard Space Flight Center from Greenbelt, MD, USA [Public domain]
Evapotranspiration, and biomass WaPOR: FAO, IHE-Delft.WaPOR quality assessement
Soil Moisture, SMAP: NASA/JPL-Caltech/GFSC. https://www.jpl.nasa.gov/spaceimages/details.php?id=PIA18057

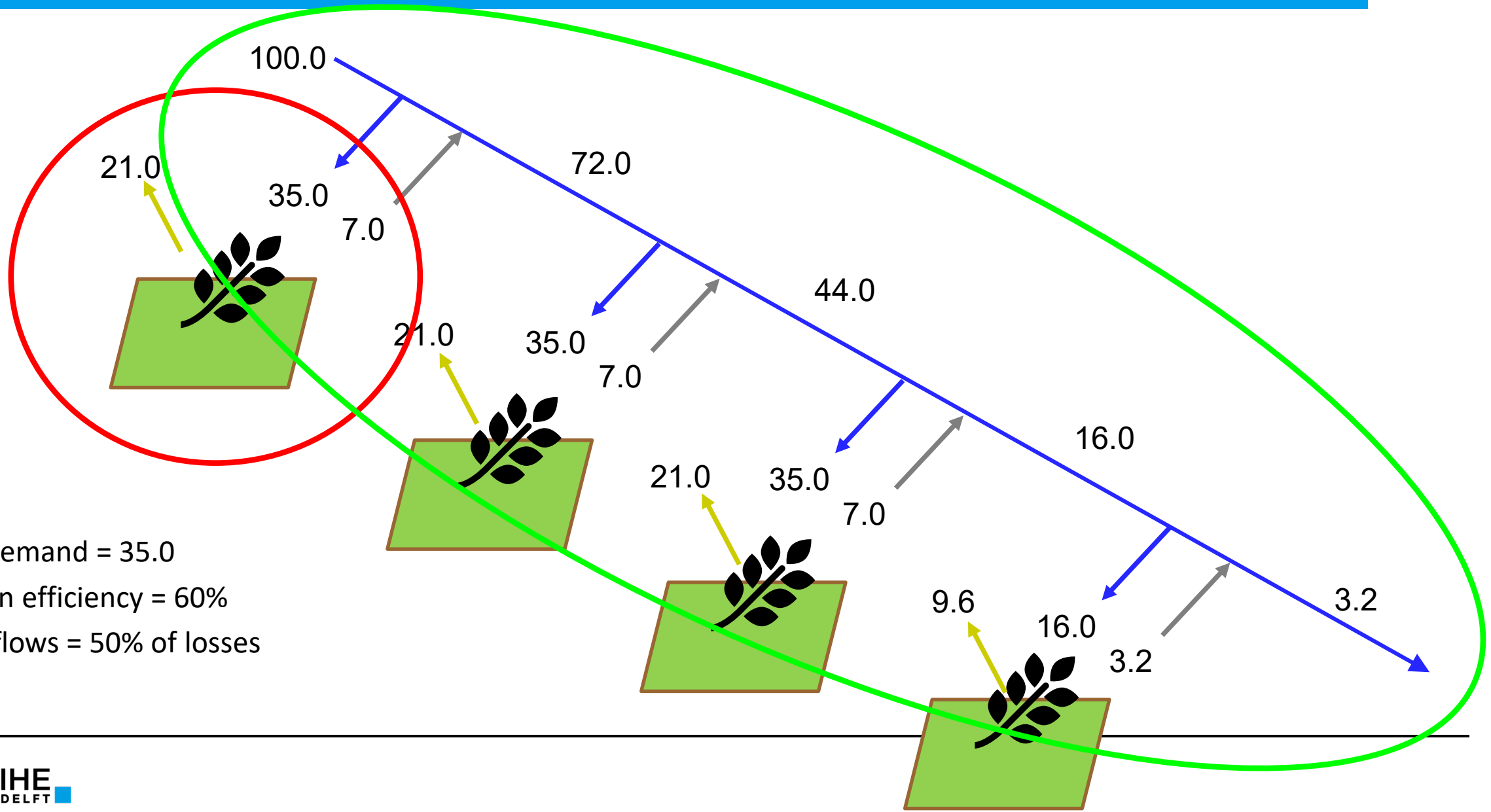
WA+: Sheet 1
Resource base

General overview at river basin scale of

- water availability vs water consumption
- non-consumed flows
- manageable vs unmanageable flows
- over-exploitation
- green and blue water



Which system and which “efficiency”? Water Accounting at irrigation scheme level



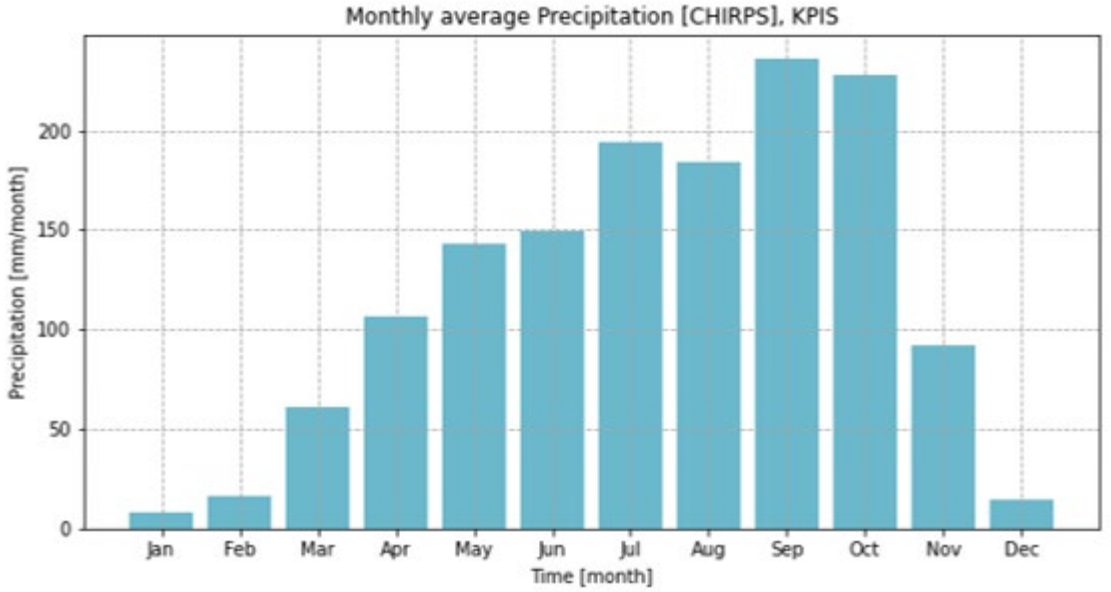
Water demand = 35.0

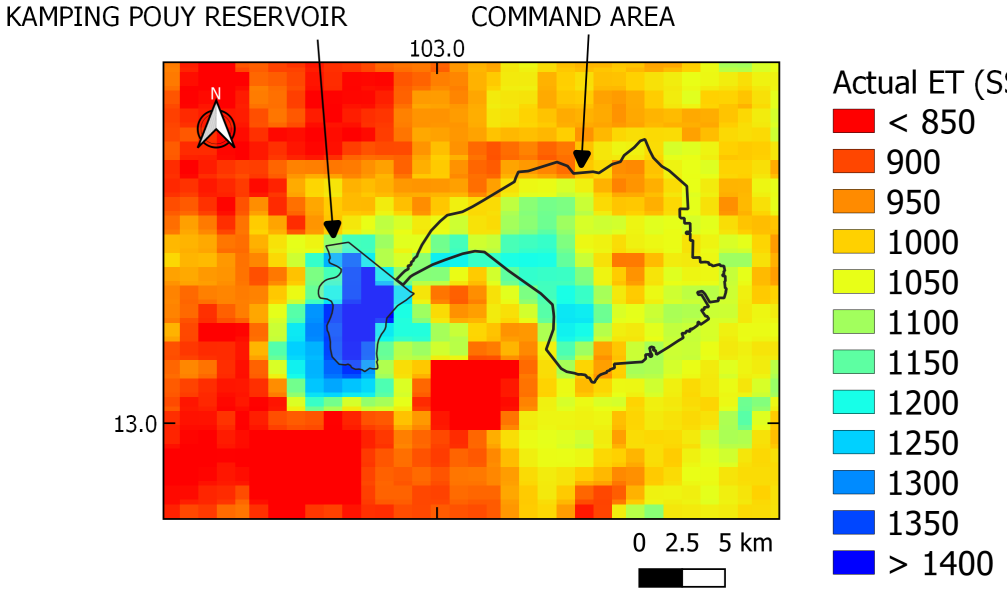
Irrigation efficiency = 60%

Return flows = 50% of losses

Remote Sensing data can provide vital information about agriculture

Precipitation over command area:
1,432 mm/year



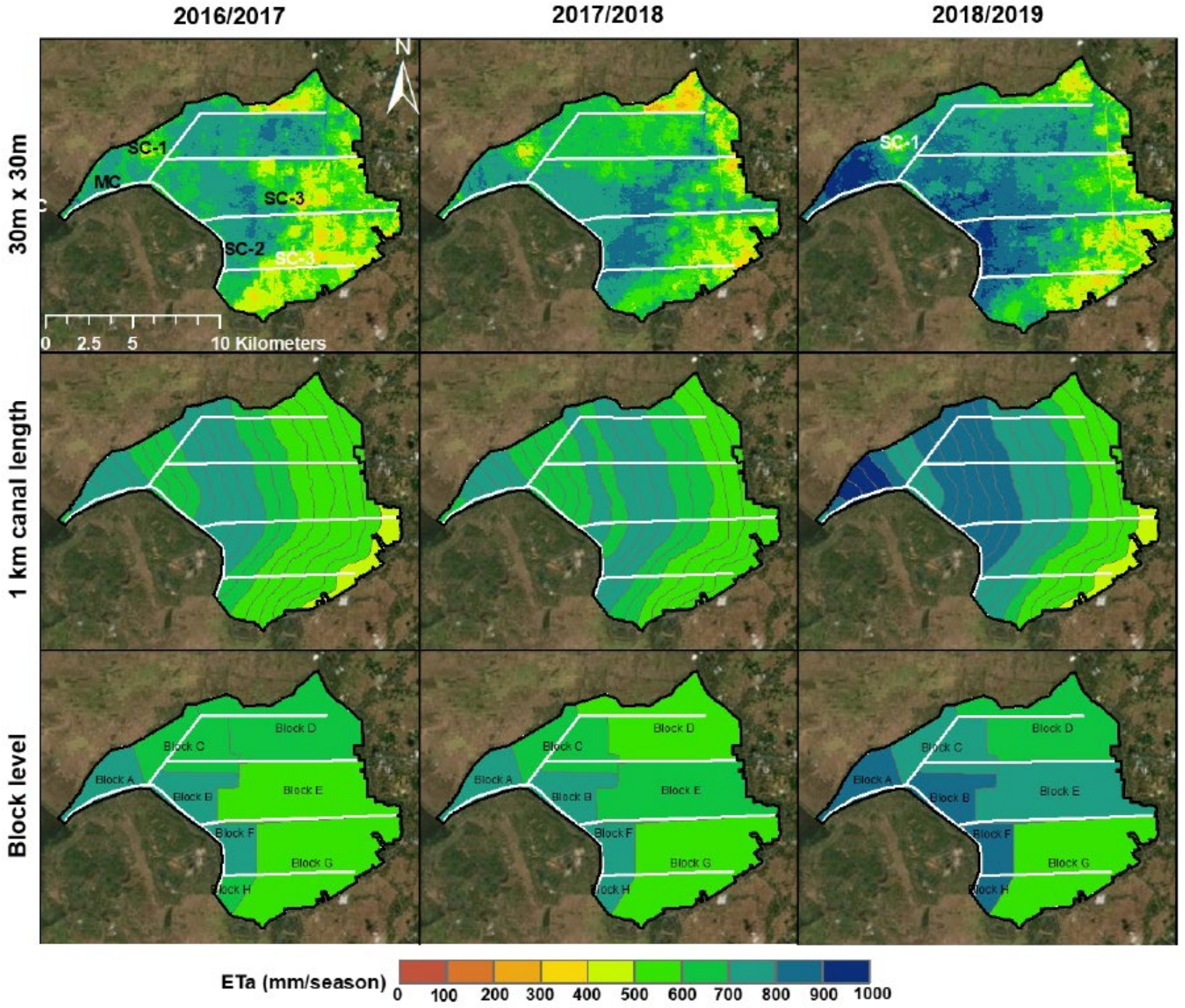


Actual ET (SSEBop) mm/yr
- < 850
- 900
- 950
- 1000
- 1050
- 1100
- 1150
- 1200
- 1250
- 1300
- 1350
- > 1400

Annual water consumption over command area:
1,065 mm/year

Salvadore et. Al, 2020. Water Accounting and Productivity. Tonle Sap and Kamping Puoy, Cambodia, Project report for ADB by IHE Delft

Seasonal water consumption



Matheswaran et al., 2020. Water Accounting and Productivity. Assessment of four irrigation schemes, Cambodia. Project report for ADB by IWMI

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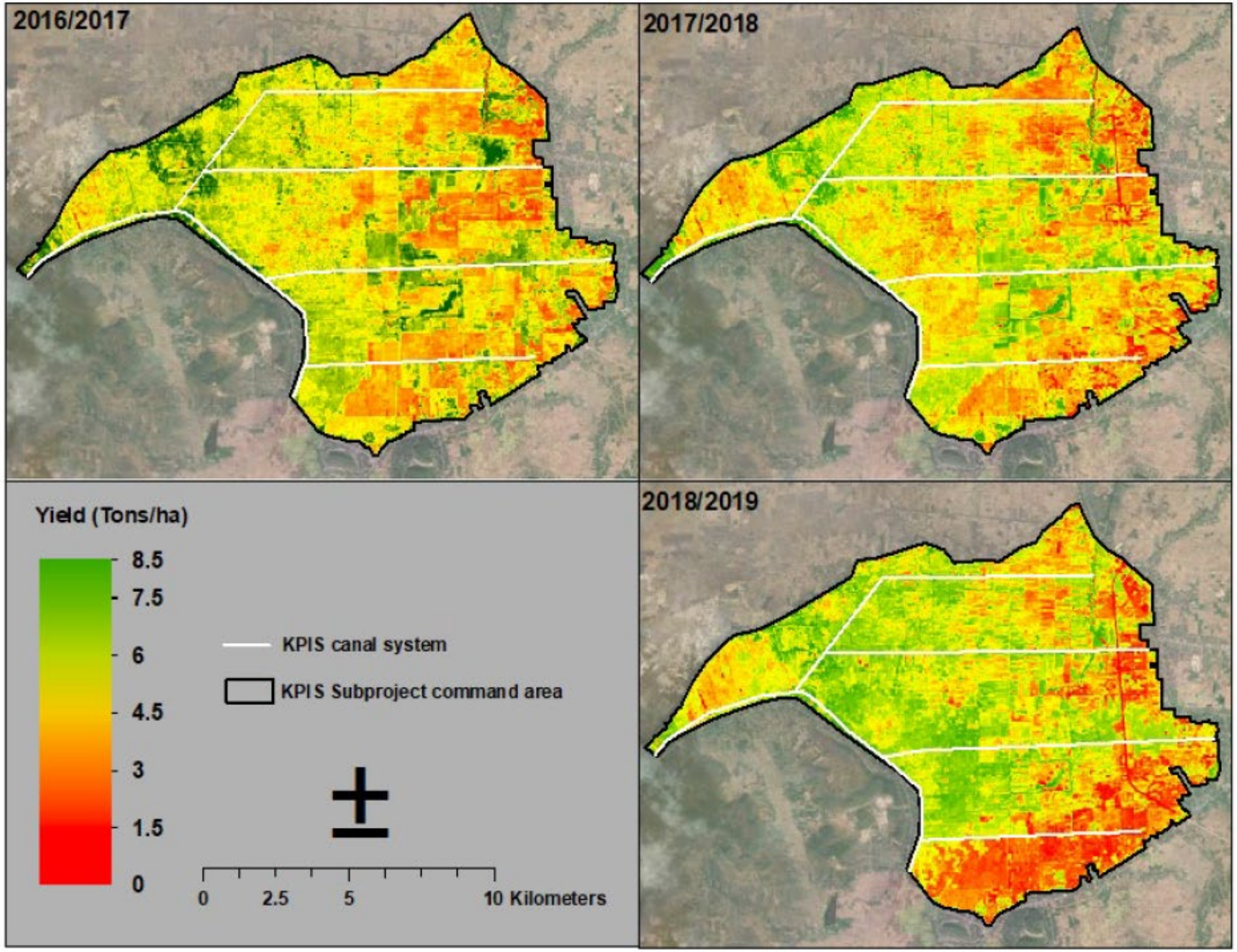
Detailed Water Productivity analysis

Rice yield



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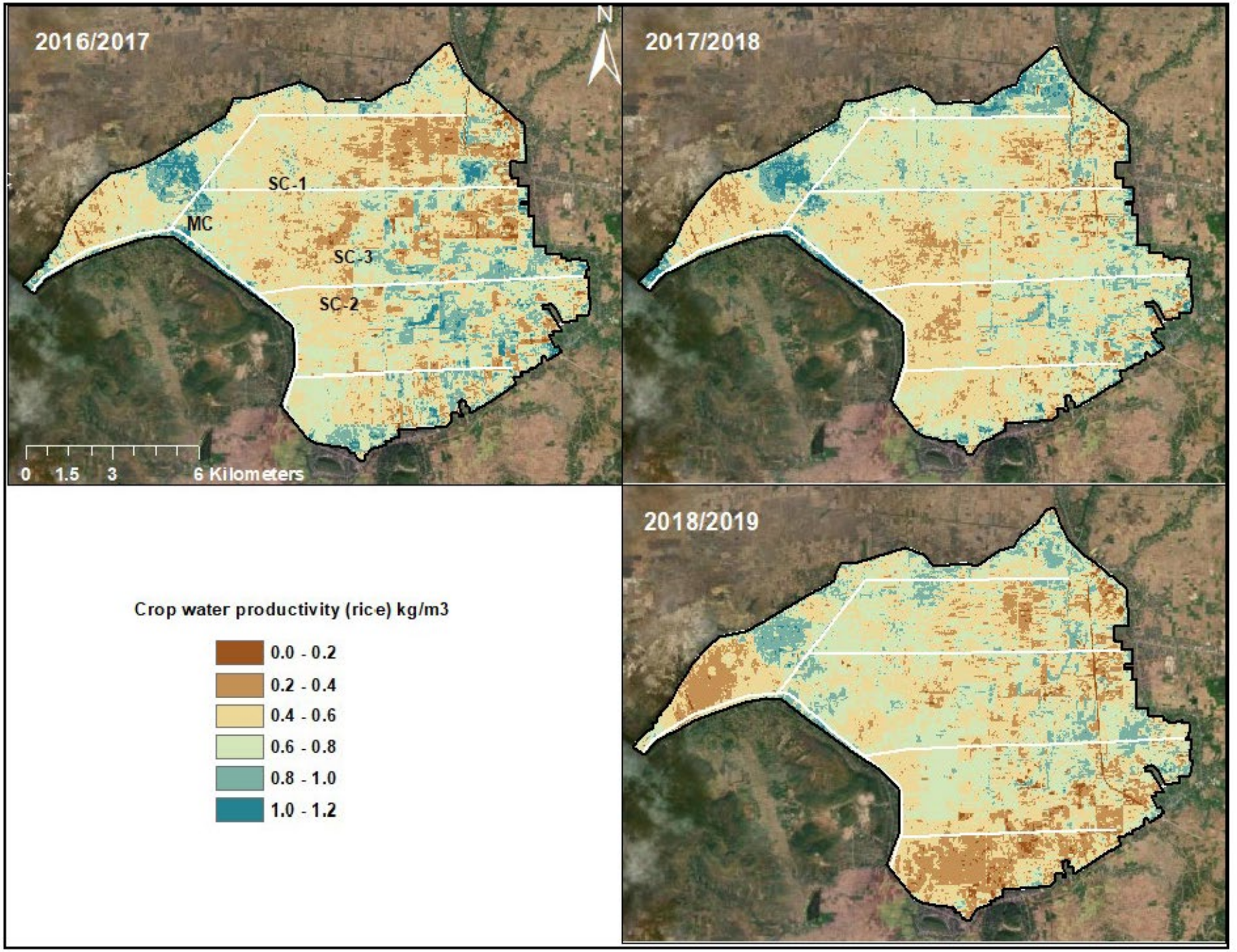
Detailed Water Productivity analysis

Rice crop water productivity



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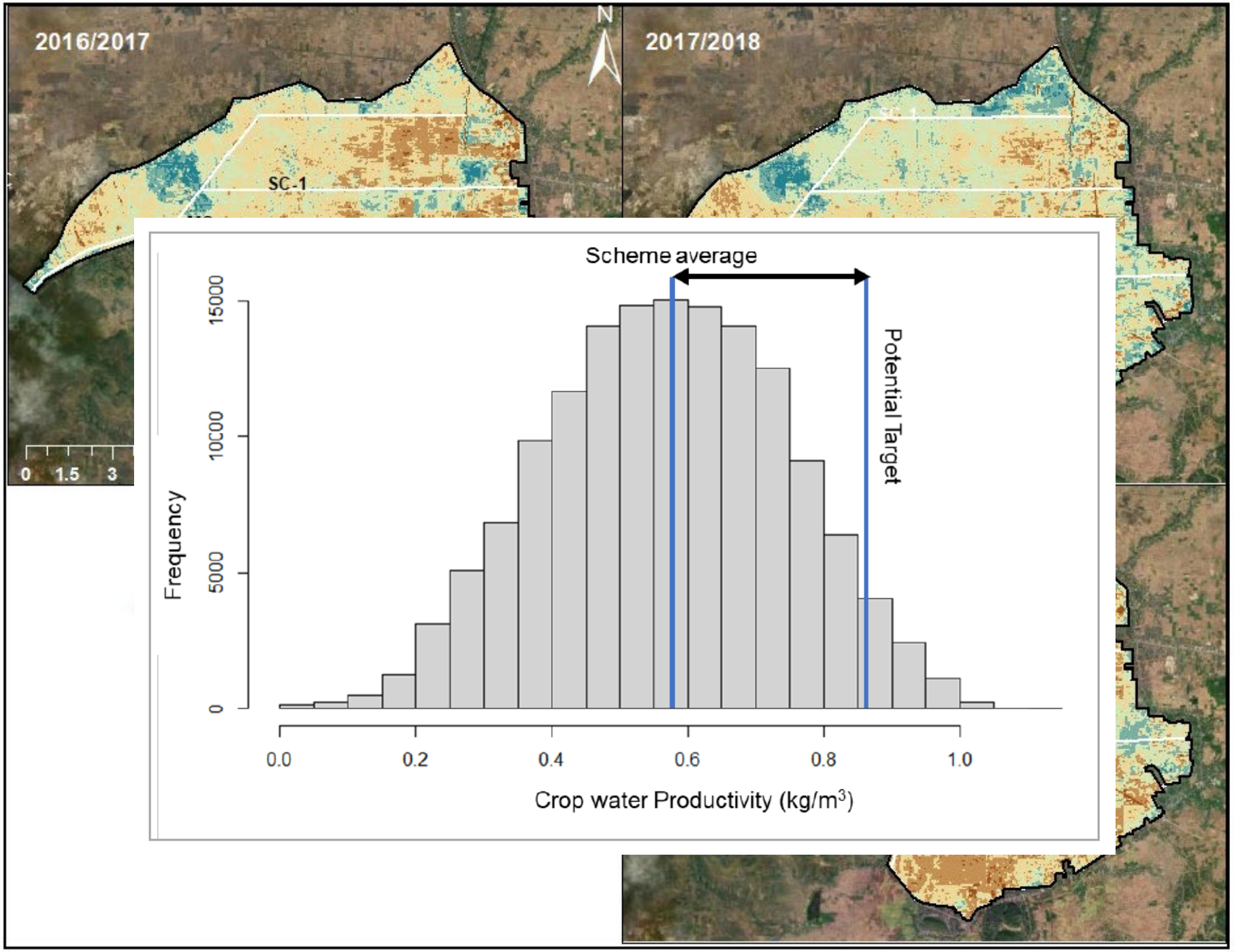
Detailed Water Productivity analysis

Rice crop water productivity



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