
Food and Agriculture Organization of the United Nations
Regional Initiative on Water Scarcity
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Pathways for Leveraging Digital Technologies in Agriculture Water Management
Heba Al Hariry, Water Scarcity Adviser, FAO-RNE

Regional Water Scarcity Initiative (WSI)

Overall Objective: Contribute to inclusive and sustainable development in the context of increasing water scarcity, through:

- Strengthened policy coherence/convergence/coordination between the water and agriculture sectors.
- Enhanced Partnership and Collaboration *(within the Region)*
- **Informed strategic water planning driven by Climate Smart Agriculture (i.e effective water accounting, enhanced water productivity and integrated WEF nexus management approach).**
- Non-conventional water supply alternatives (wastewater reuse) SNE wastewater reuse initiative.
- Higher awareness and collaboration - inter-Regional Technical Platform on Water Scarcity (beyond the Region)

Lack of Information for Decision-Making!

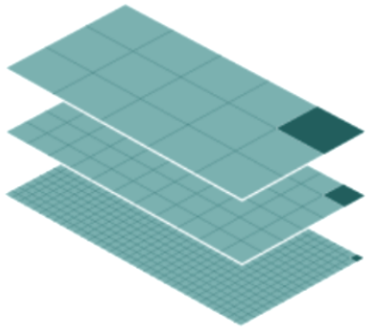
- Solving water problems requires information from many disciplines, and the physical accounts.
- The information has to be coherent and harmonized
- Water services are not well understood to maintain current per capita water availabilities and water footprints.
- The current hydrological data democracy does not provide all the required data necessary for proper water consumer communication, which hampers the development of good water stewardship.

WaPOR: Water Productivity through Open access of Remotely sensed derived data.

Using Remote Sensing in Support of Solutions to Reduce Agricultural Water Productivity Gaps

Spatial Resolution

WaPOR data is available to users at 3 different levels corresponding to different resolutions at which different applications for the data are possible.



Level I	global level	300 m resolution
Level II	continental and national level	100 m
Level III	irrigation scheme and sub-basin	20 m

Water productivity is defined as the quantity or value of output in relation to the quantity of water consumed to produce this output.

Layers

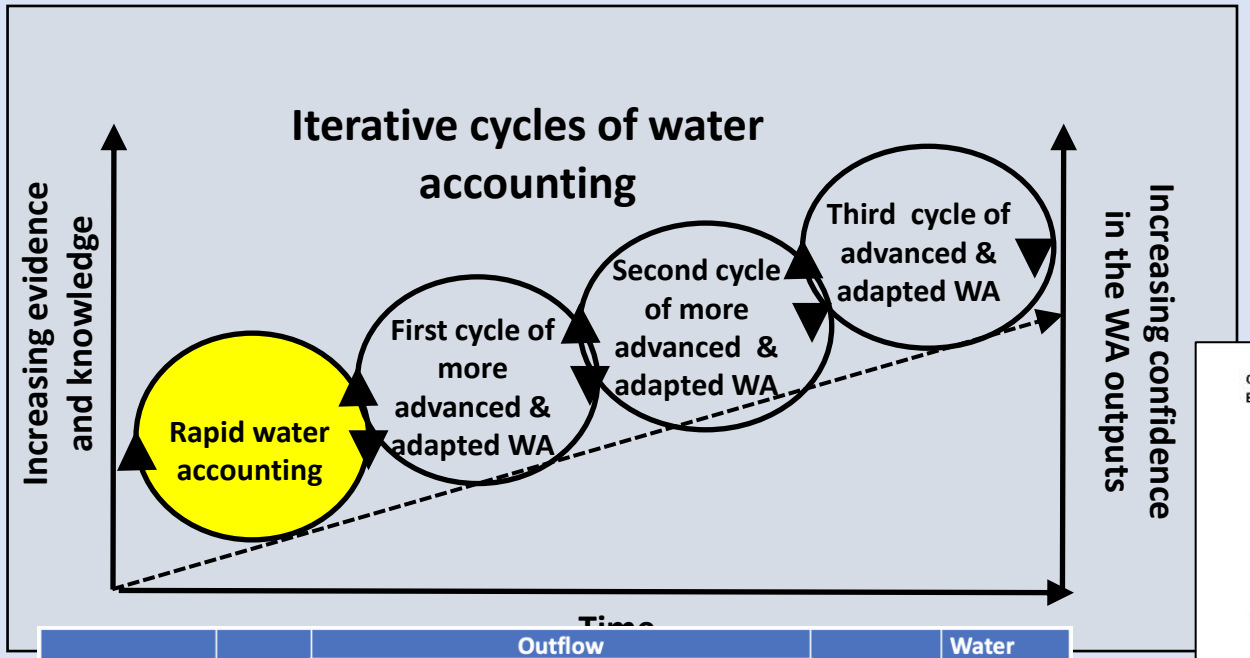
- Evapotranspiration
- Land Cover Classification
- Net Primary Productivity
- Precipitation
- Phenology
- Quality layers
- Reference evapotranspiration
- Relative soil moisture
- Total Biomass Production
- Water Productivity

Partner Countries

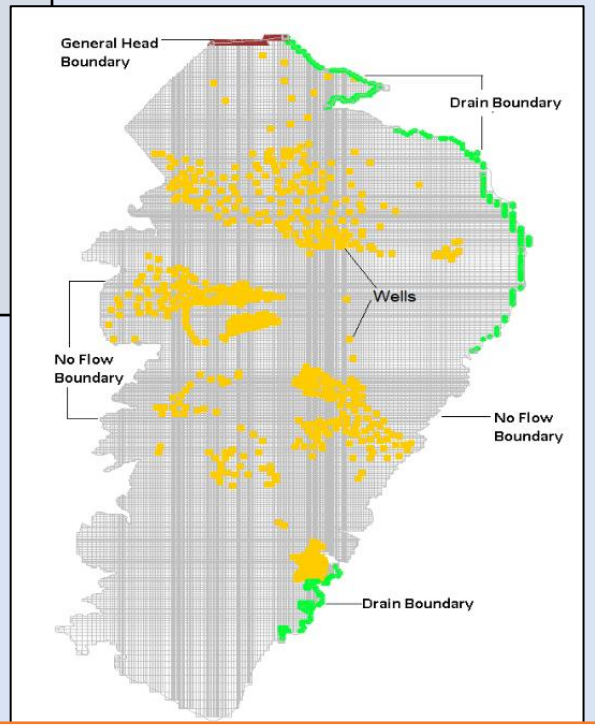
- Algeria
- Palestine
- Ethiopia
- Colombia
- Mali
- Iraq
- Kenya
- Pakistan
- Tunisia
- Jordan
- Mozambique
- Egypt
- Sudan

Why Water Accounting?

Water accounting is the systematic study of the status of, and trends in, water supply, demand, accessibility and use in specified domains.



	Inflow	Outflow			Storage	Water exchange between areas inside and outside the West Bank
		WELLS (Pumping)	Lateral Flow (East: Al Faraah)	Lateral Flow (North and East North)		
	Mm3/yr					
Inside the West Bank	66	-28.9	-12.4	-1.1	-7.7	-17.4
Outside the West Bank	11.1	-8.2	0	-16.9	-1.9	17.4
Totals	**77.1**	**-37.1**	**-12.4**	**-18.0**	**-9.6**	**0**



Model Results (2008 -2019) – Budget

WATER Productivity Efficiency, and Sustainability in the NENA countries

Period : 2017-2022

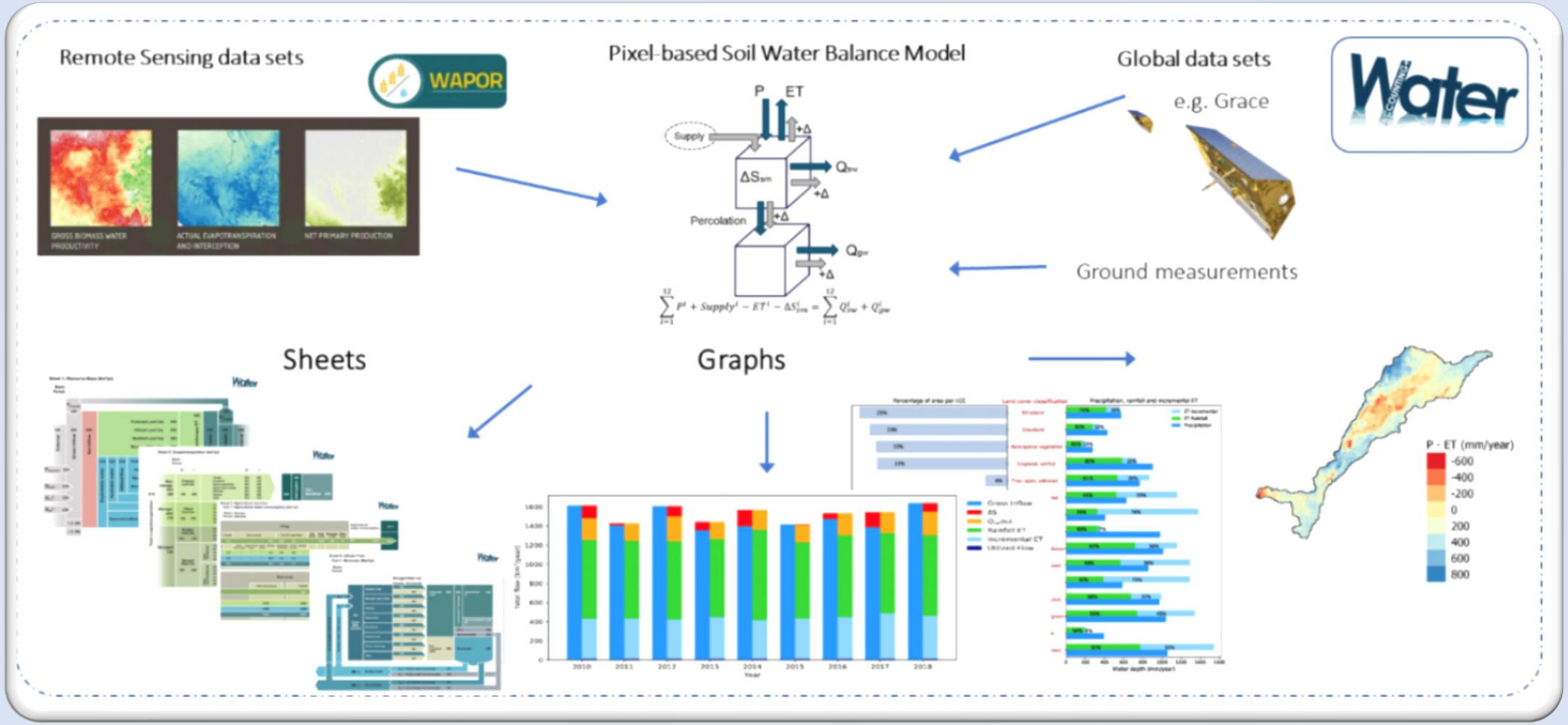
Budget: 14 Millions USD

8 Countries *: Algeria, Egypt, Iran, Jordan, Lebanon, Morocco, Palestine, Tunisia*

Water accounting enables describing water resources in a standard context, using clear terminology and a standard data collection system with known quality standards.

Water Accounting+” (WA+),

A framework was developed to use open-access remote sensing-based data for water accounting at the basin level



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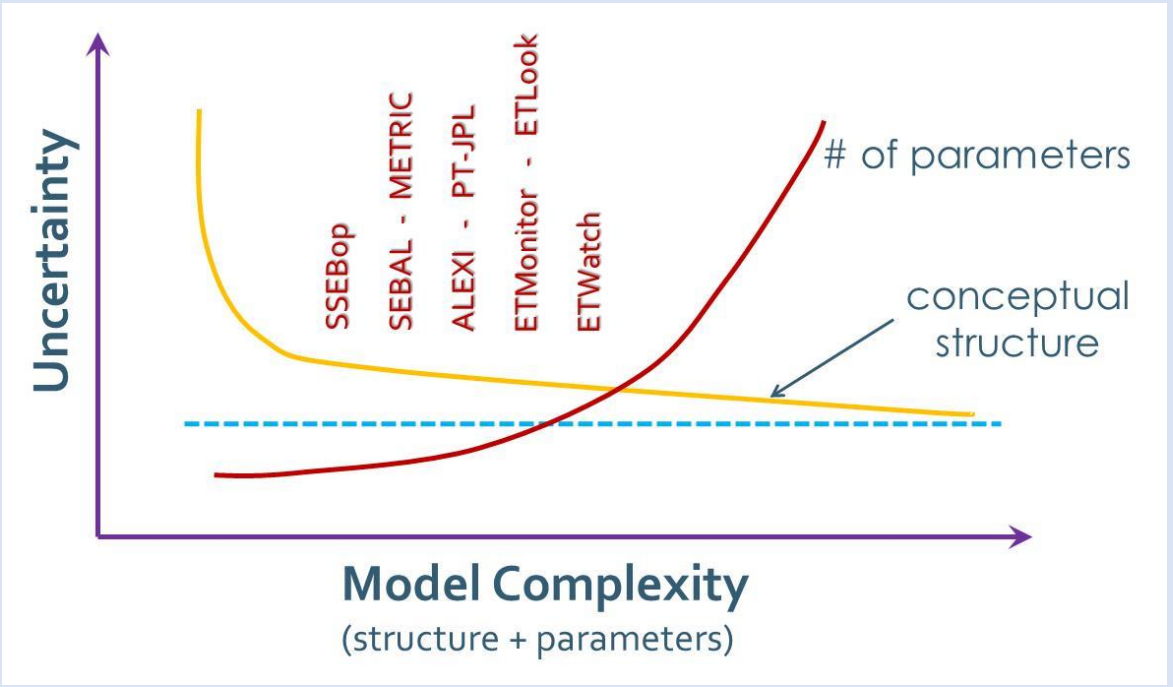
REMOTE SENSING DETERMINATION OF EVAPOTRANSPIRATION

Algorithms, strengths and weaknesses, uncertainty and best fit-for-purpose

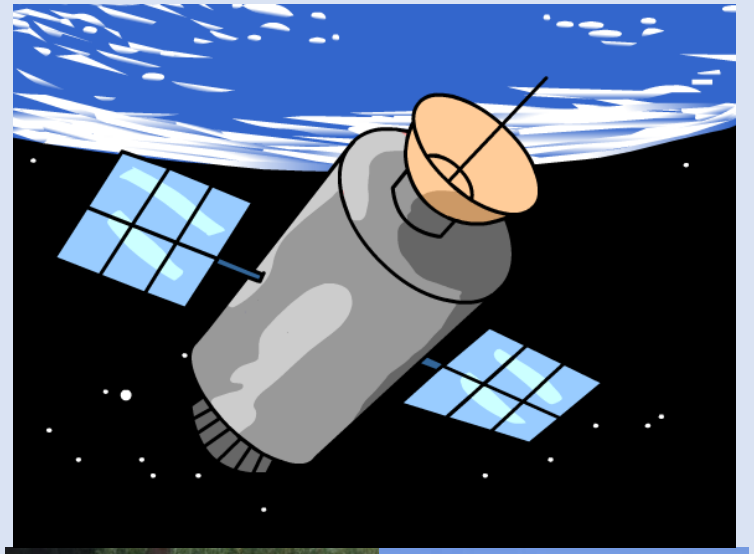
Regional Initiative on Water Scarcity for the Near East and North Africa

Evapotranspiration (ET)

- keystone climate variable linking the water, energy and carbon cycles



Quantifying ET in space and time is therefore extremely relevant for several purposes in water resources management from national water accounting all the way to farm irrigation



Satellite remote sensing (RS) represents the most suitable method to capture the large variability in ET over extensive areas and over time

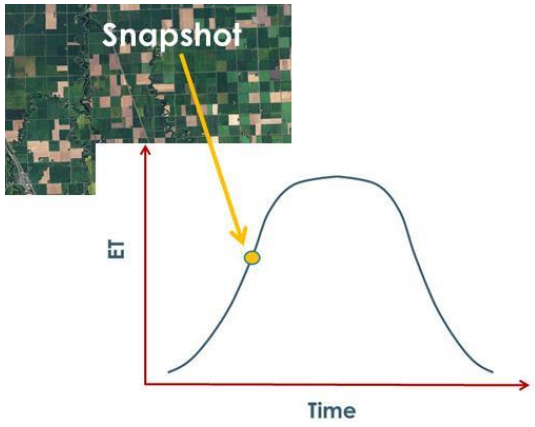
Though, the determination of ET through RS comes with *several challenges*, while ample and diversified RS models and platforms are provided

Users concerns with operational issues, including appropriate spatial and temporal scales for given applications; accuracy; criteria for selecting RS ET data sources that best fits a given purpose; testing and validation of RS ET data

Objective of this publication is addressing these challenges and users' concerns

Establishing and Operating a Regional Network for Field Measurement of Actual Crop Water Consumption (Evapotranspiration)

NENA Regional ET-Network



Different *sources of error* affecting the RS ET models:

- cloudiness and contamination of the atmosphere
- variability of the underlying land surface
- wind patterns
- vapor pressure of the atmosphere
- uncertainty of surface roughness
- atmospheric stability
- propagation and compounding of uncertainties due to computational procedures such as data fusion, data sharpening, could masking, gap-filling and time integration/interpolation.
- others (e.g., calibration of parameters)

- RS ET models are then compared

- Distinctive *features* and peculiarities (e.g., strengths, weakness, sensitivities)

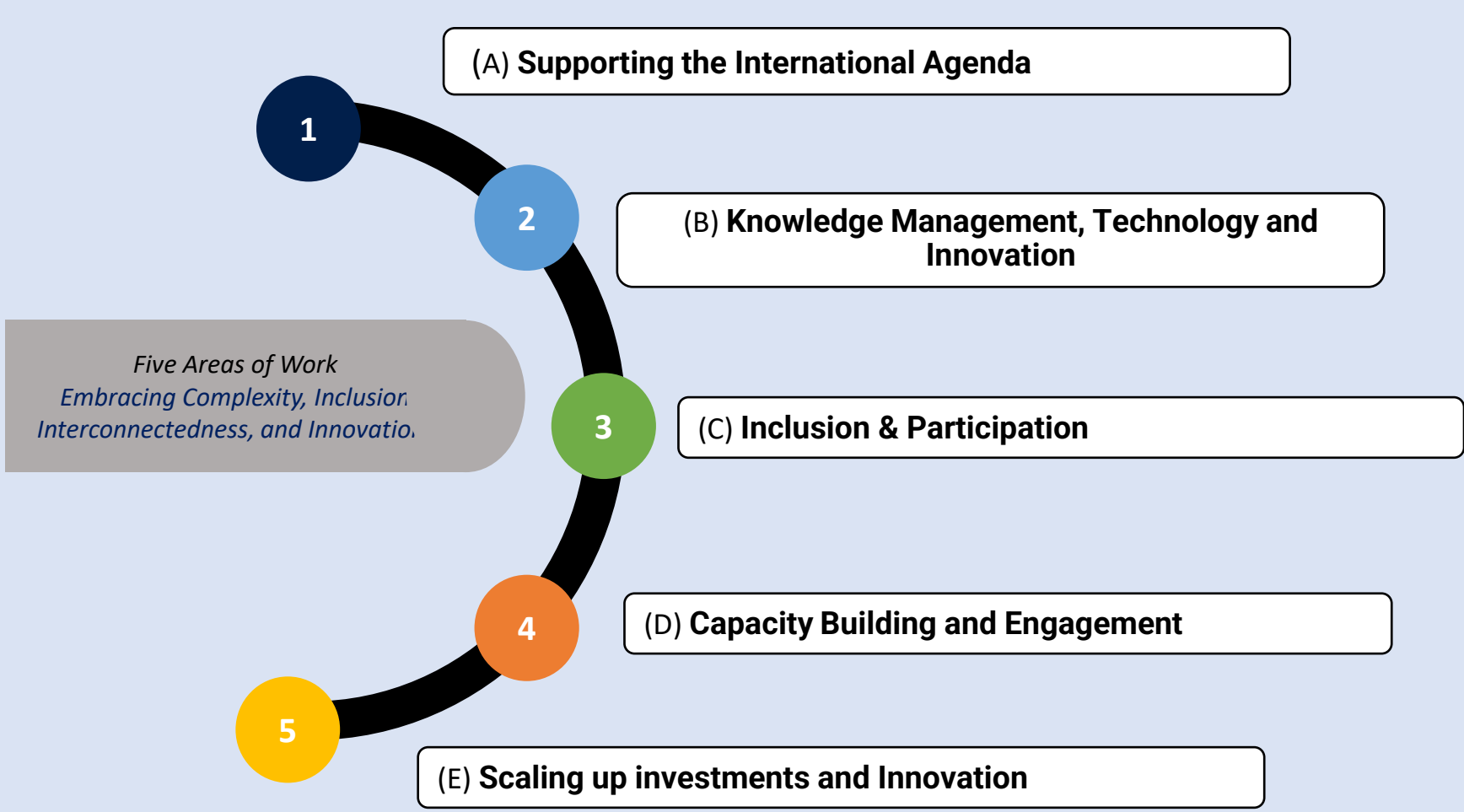
- Output *spatial* and *temporal scales* (10, 30, 70, 375, 1000 m; 1, 2-5, 8 days)

- *Input variables* (e.g., LST, NDVI, albedo, cloud cover; elevation; wind ; etc.)
- *Satellite* data source (e.g., Landsat, VIIRS, MODIS, ECOSTRESS, Sentinel, etc.)

- Major *applications* (e.g., national water accounting, district water balance; on-farm irrigation; etc.)

A call for Collaborative efforts towards Up Scaling Water-Related Actions

inter-Regional Technical Platform
Water Scarcity
A Gateway to Cope with Water Scarcity



https://www.fao.org/platforms/water-scarcity

An *inter*-regional partnership of international organizations, national and local governments, and non-government organizations working together across silos in an action-oriented and result-based approach to overcome the development challenges experienced in the context of water scarcity & food and climate security in consultation with affected communities.

(*In support of the Implementation Sustainable Development Goals 2015, 2030)*

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THANK YOU