Increasing resilience in agricultural water management using continental water acconting (CWA+) framework

IWMI DIWASA WA Team

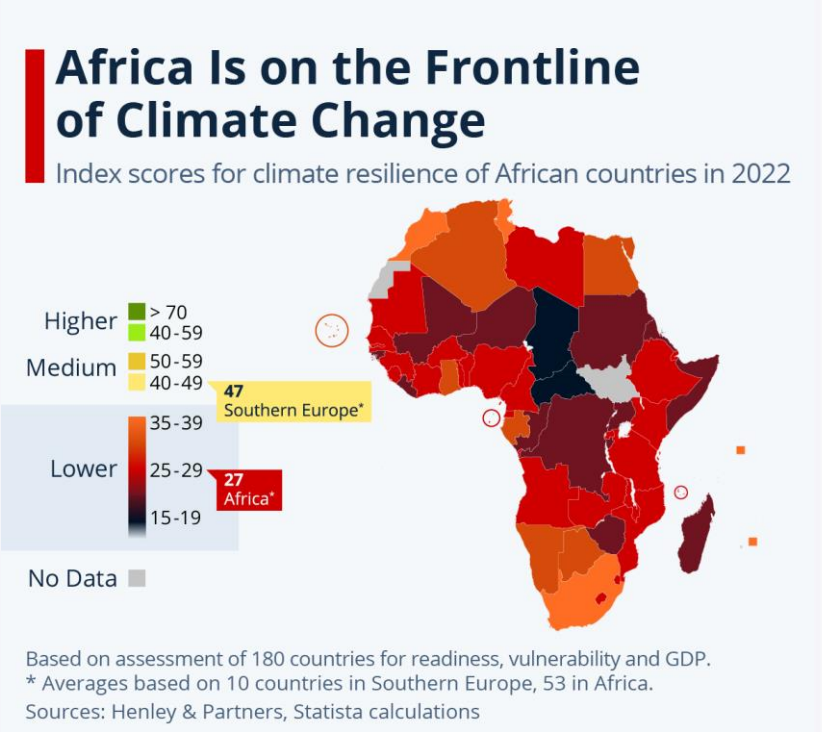
Background

Water is headlining many of the planets most pressing climate challenges → Climate impacts are first felt through water.

About 150 million people will be displaced by 2050 due to droughts and floods.

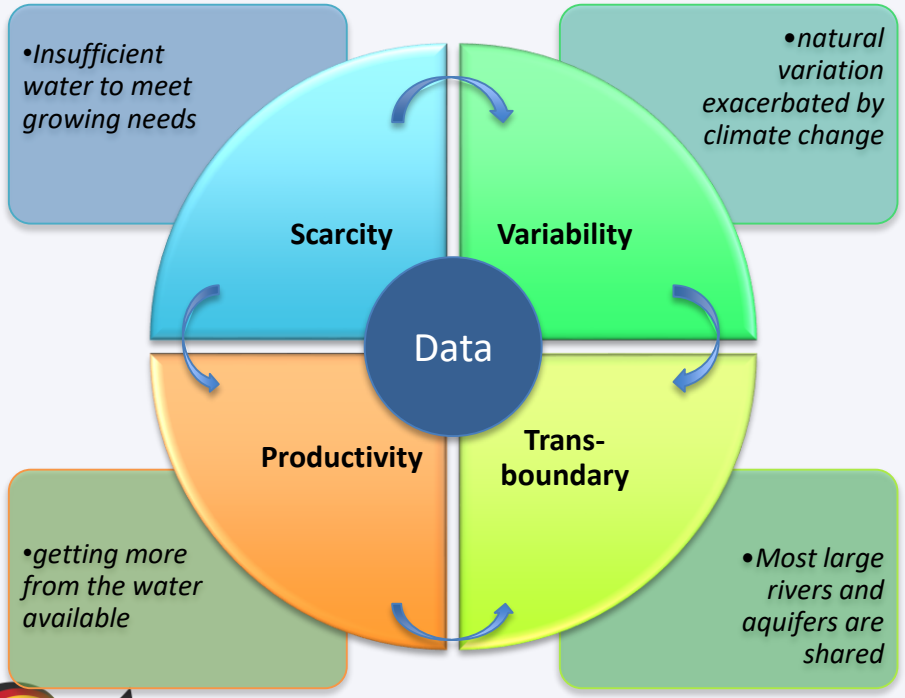
Africa is on the frontline of climate change!

To support developments in planning and investment, digital innovations, data and modelling are required on future scenarios of water availability and allocation.

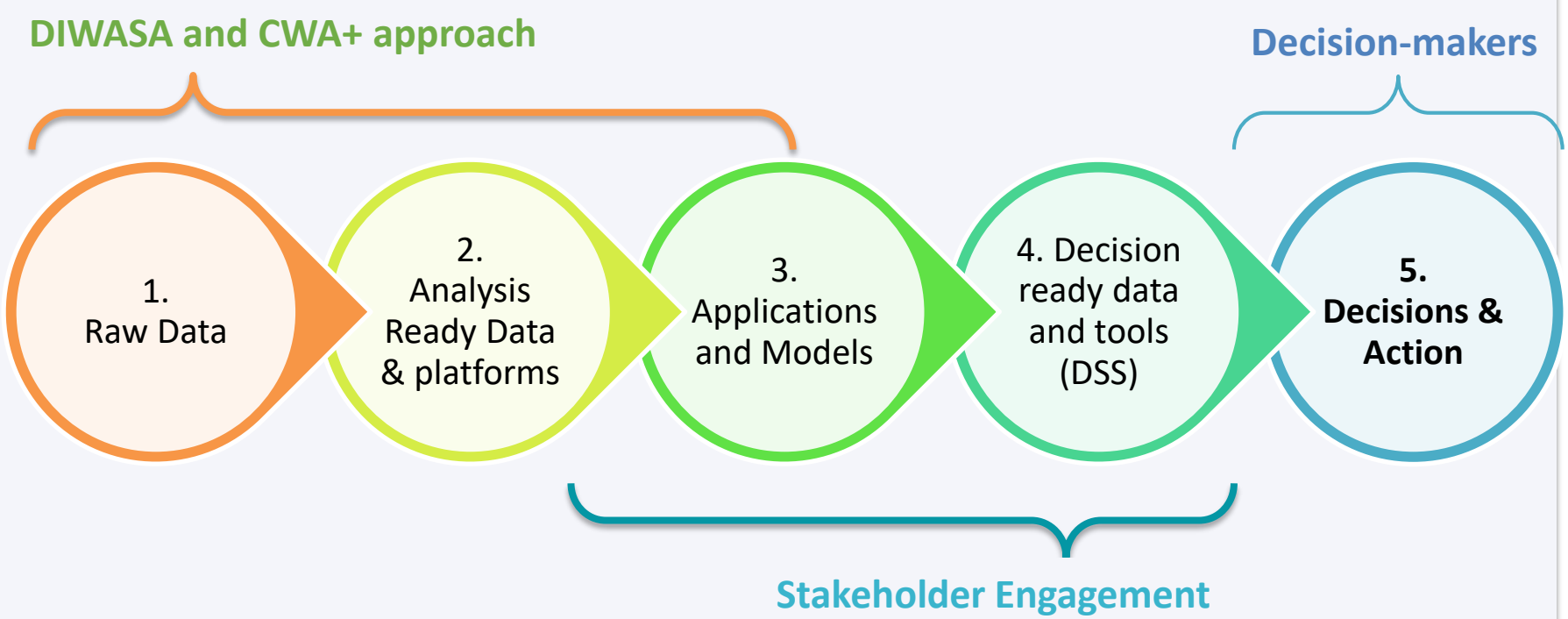


Climate resilient food & water systems

- Digital Innovations for Water Secure Africa is critical towards achieving climate resilience in food and water systems.

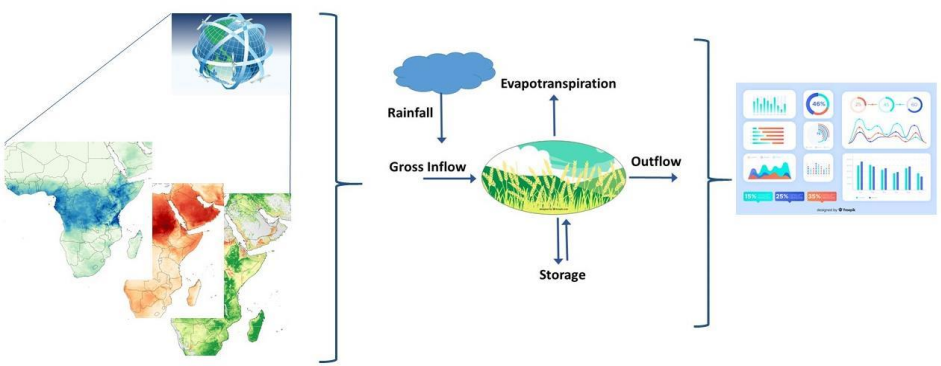


Digital Innovations for Water Secure Africa (DIWASA)



Water Accounting Plus (WA+)

NILE BASIN INITIATIVE
INITIATIVE DU BASSIN DU NIL



Water Accounting+ can provide a basic understanding of a basin's water accounts and establish a baseline.

Limited data? No problem! WA+ relies largely on remote sensing imagery, making it a feasible tool for data scarce basins and a reliable source for transboundary waters.

open source

Using open-source code (meaning anyone can access it!), WA+ uses pre-written code to analyze the remote sensing data.

WA+ produces organized results, categorized into: Resource Base, Evapotranspiration, Agricultural Services, Utilized Flow, Surface Water, Groundwater, Ecosystem Services, & Sustainability.

WA+ outputs can be used to ignite well-informed, transparent discussions on water resource issues.

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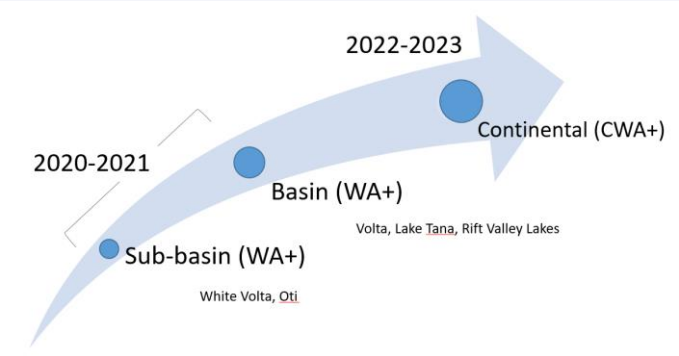
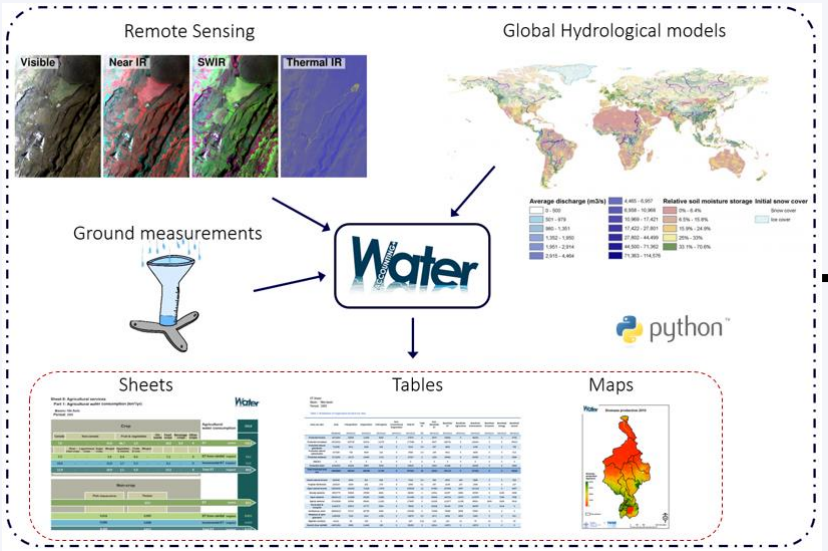
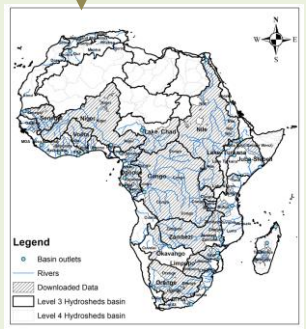
DIWASA Water Accounting





Water Accounting foundation layers and outputs



@river basin scale

@national scale

Continental WA Plus (CWA+) framework

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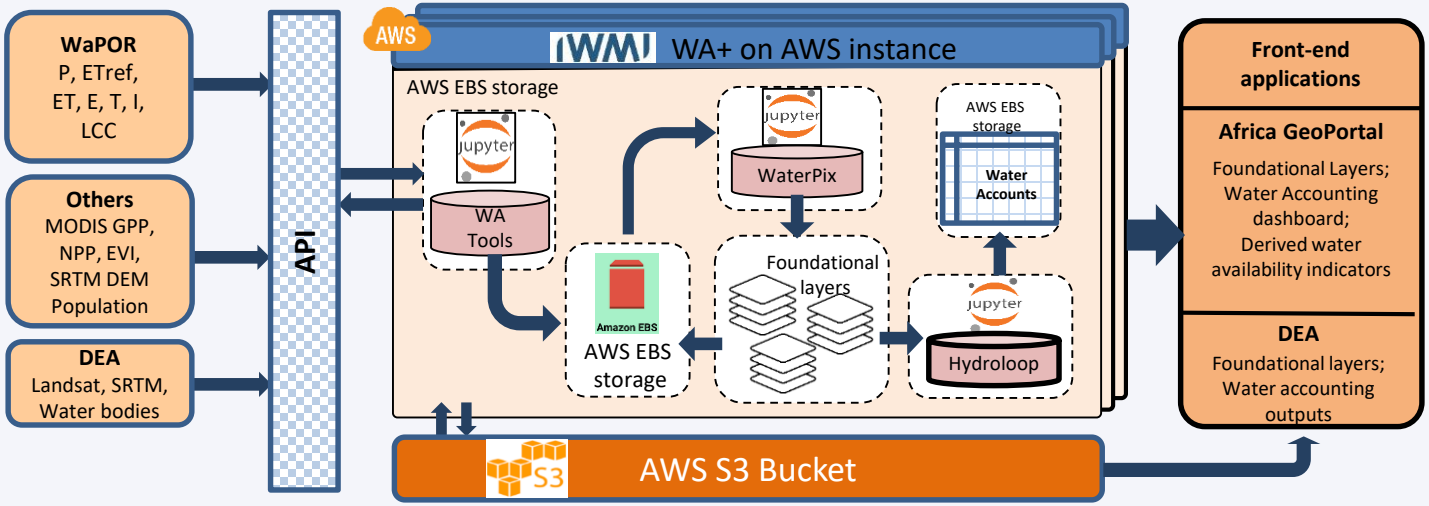
Full CWA+ model run



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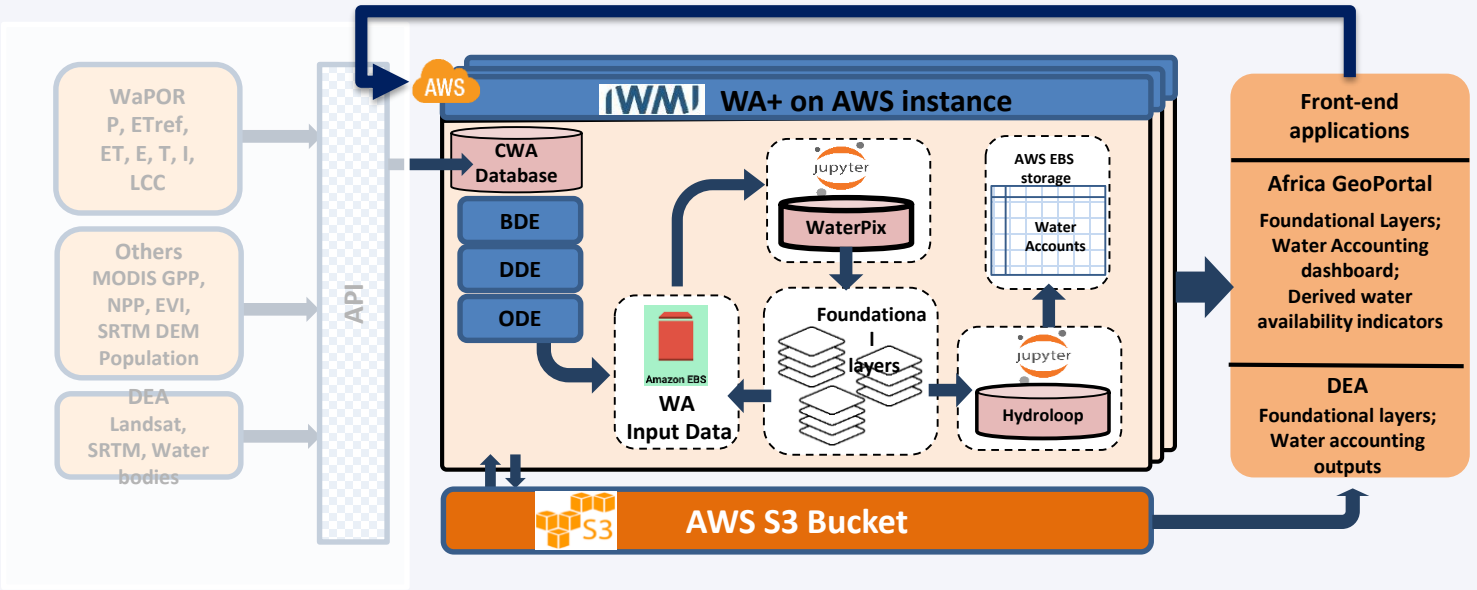
CWA+ for Expedited WA assessments

CWA+ input files + full WA+ model run

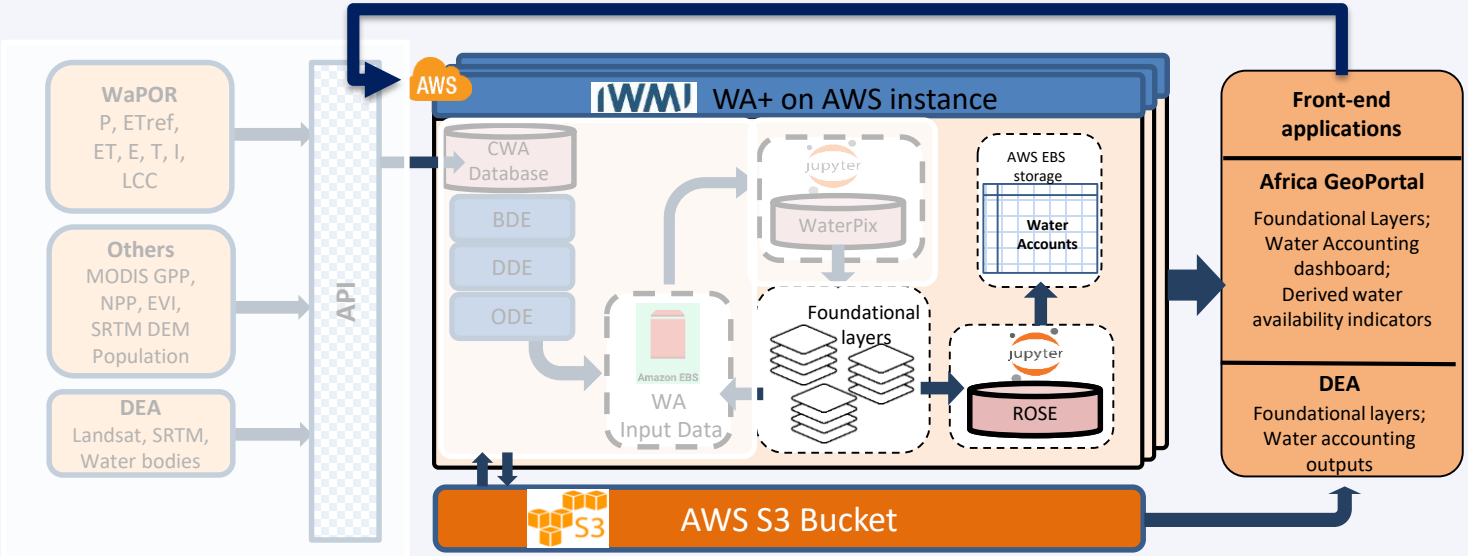


Cuts down WA Assessment time by half

6 months → 2-3 months

CWA+ for rapid WA assessments

CWA+ input and output files + partial WA+ model run



Further cuts down WA Assessment time

6 months → 1-2 months

ROSE – Rapid Optimized Sheet1 Extractor

This can generate sheet 1 for any boundary based on the outputs from continental WA+

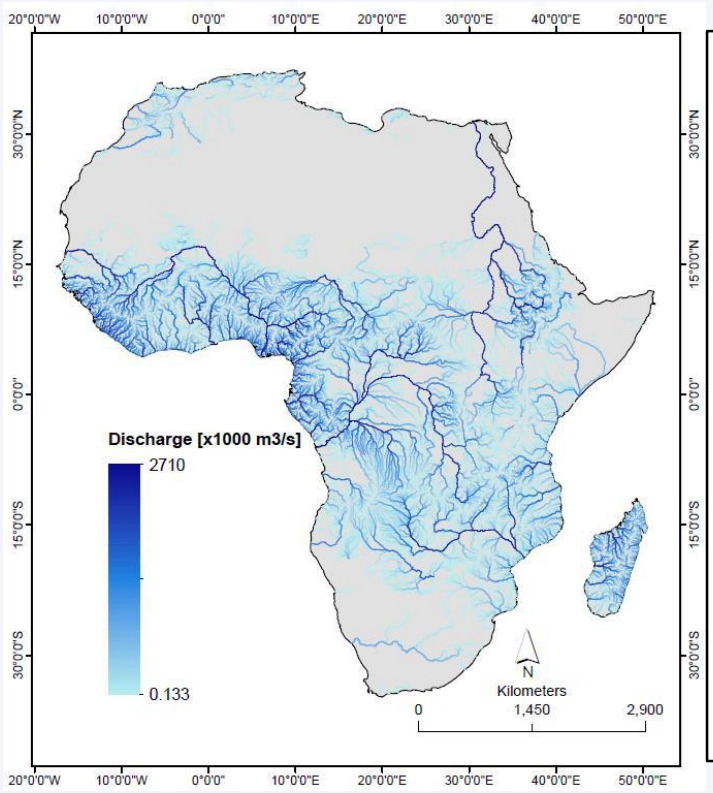
DIWASA WA Suite of Products

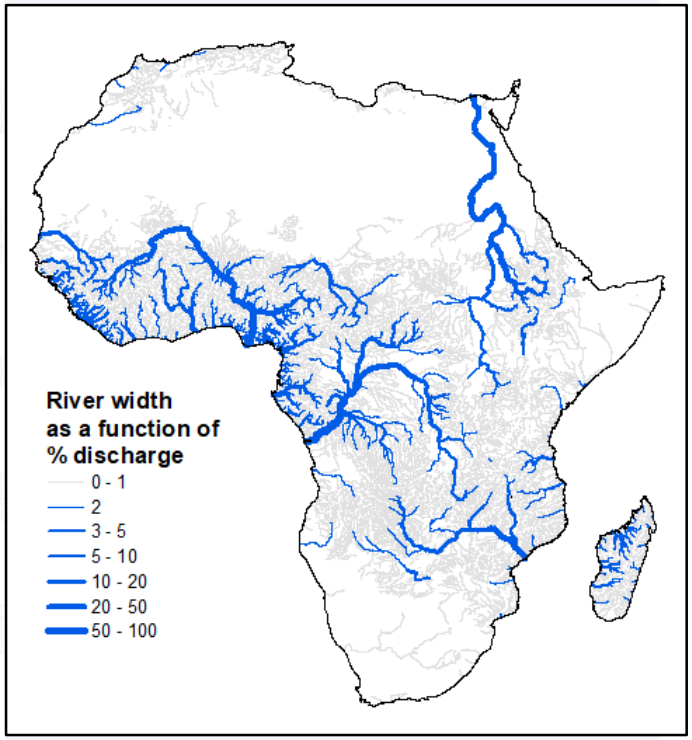
A variety of products are generated for continental Africa

1. Database of gap-filled GRDC Discharge data (1980 – 2020)
2. High-resolution Continental Discharge (2003-2020)
3. Desalination database for Africa (1980-2020)
4. Bias corrected rainfall data for Africa (2003-2020)
5. Cropland, irrigated and rainfed crop maps for Africa
6. Water Accounting products and results (2003-2020)

Continental discharge

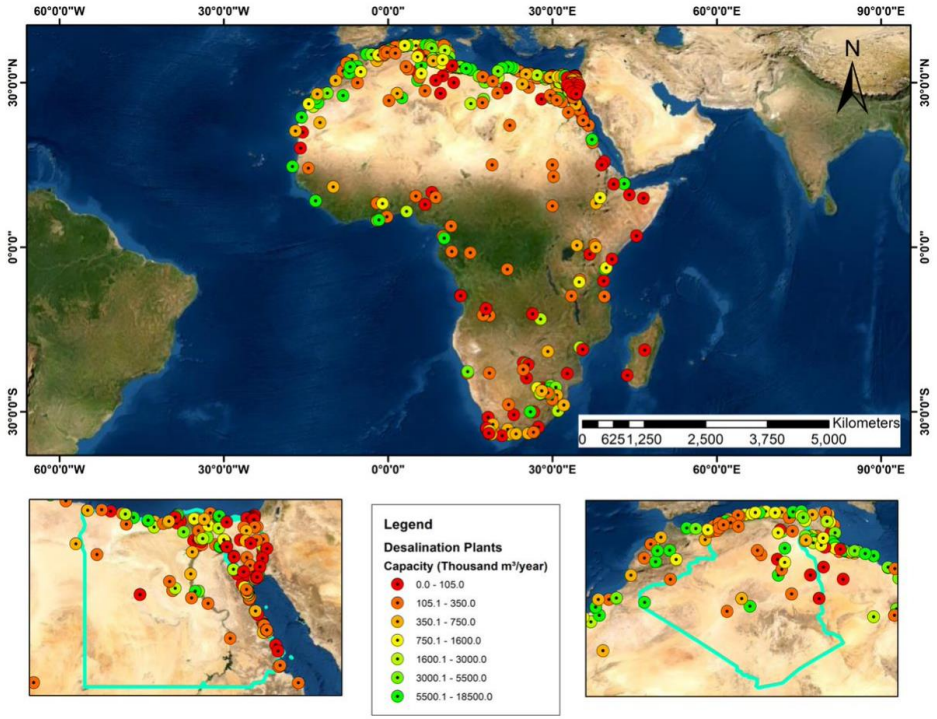
Mean of long-term (2000-2021) annual total discharge using Kinematic wave tracking (KWT) routing scheme.



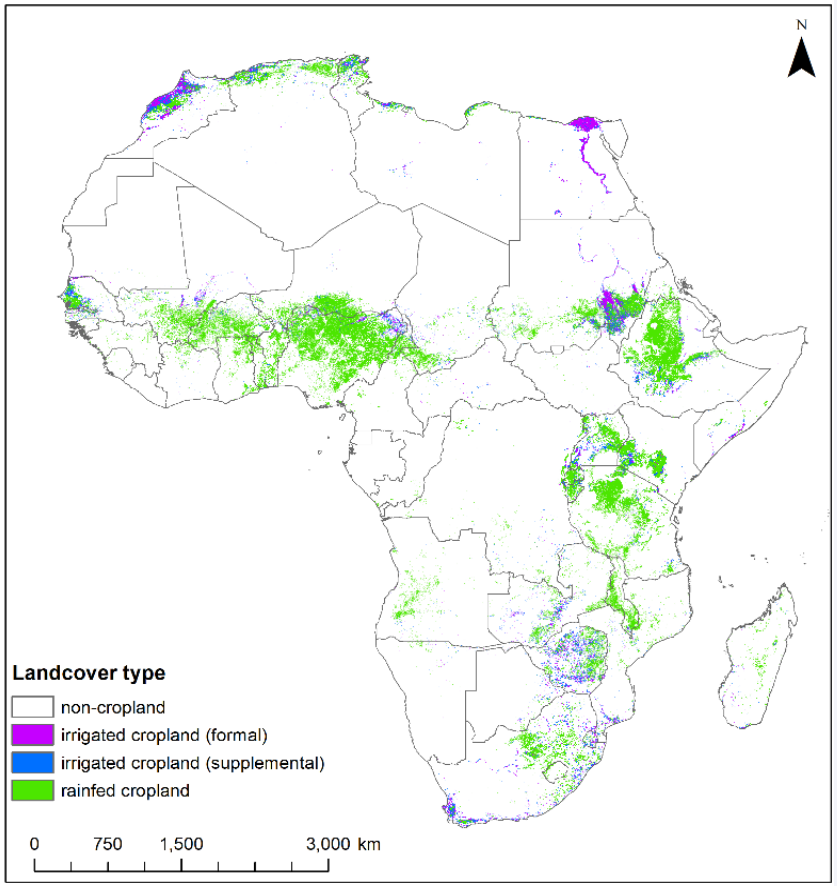


Desalination database for Africa

- ✓ 1342 Desalination plants
- ✓ Top 3 countries Algeria, Egypt and Libya have 75% of the plants by capacity in Africa
- ✓ Egypt has the highest number of plants; Algeria produces most desalinated water;
- ✓ 86% from Sea water but 14% from other sources

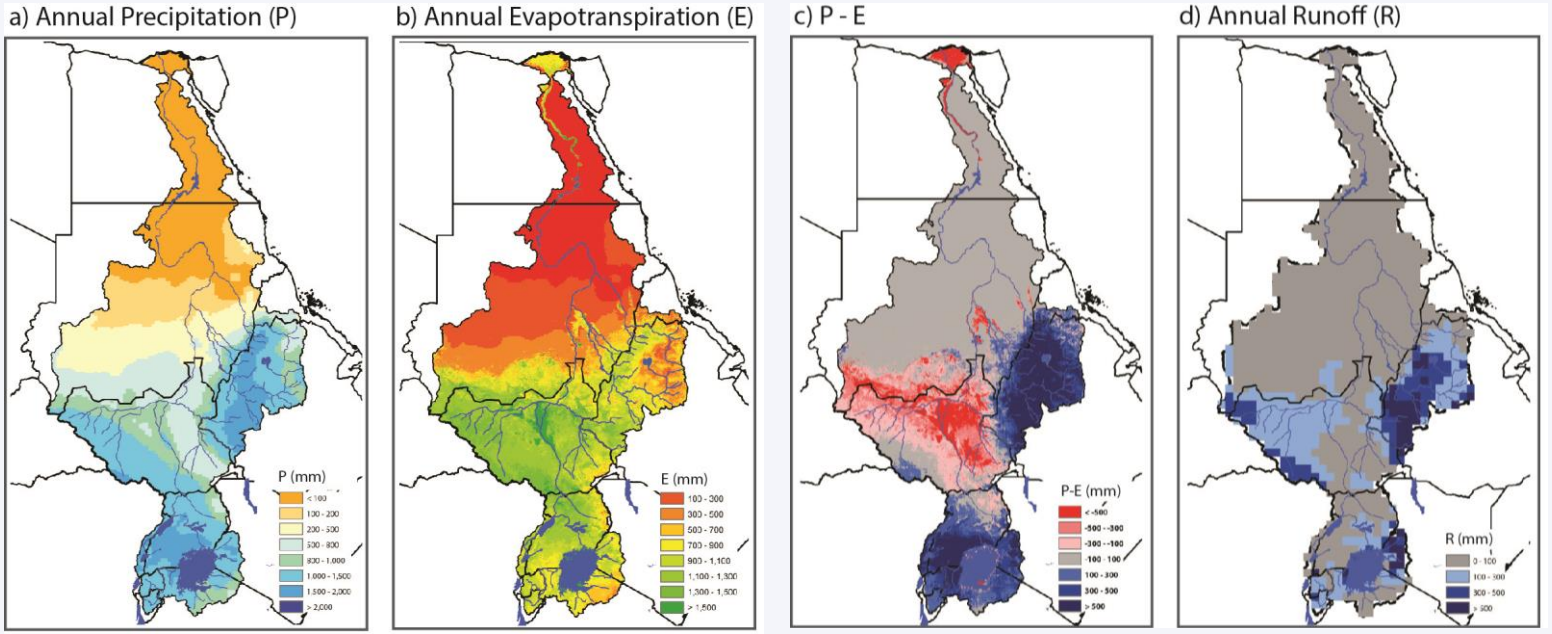


Cropland (Irrigated and Rainfed) maps for Africa

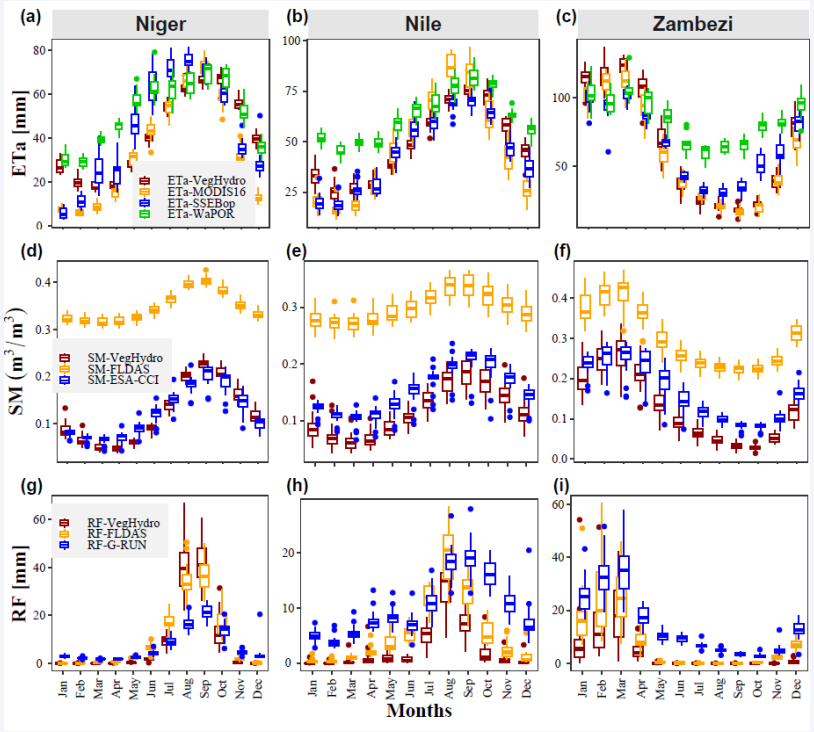


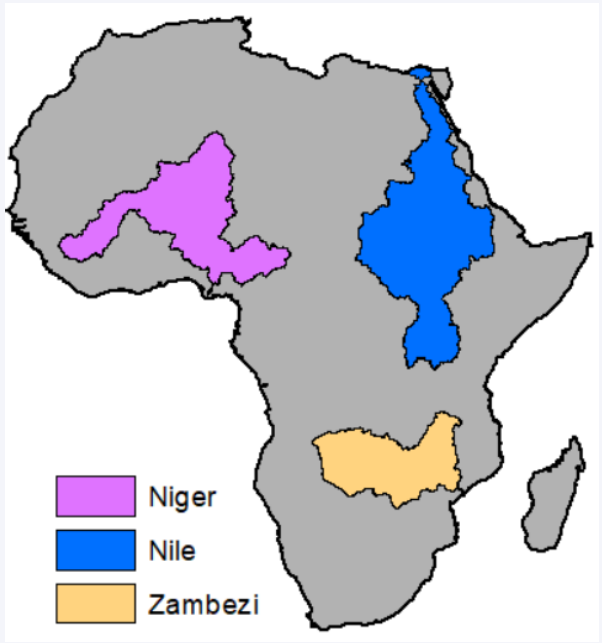
WA for Nile Basin

Water Accounting Data is used to summarize basin hydrology



Seasonal data analysis





WA for Nile Basin countries

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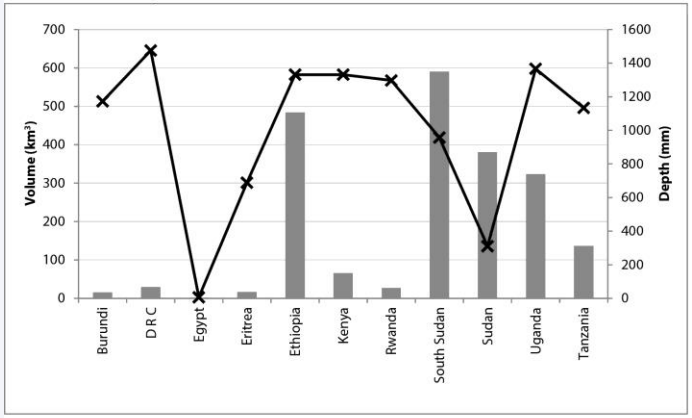
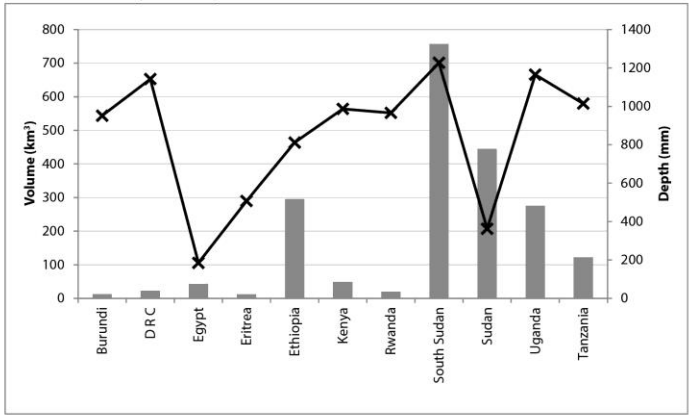
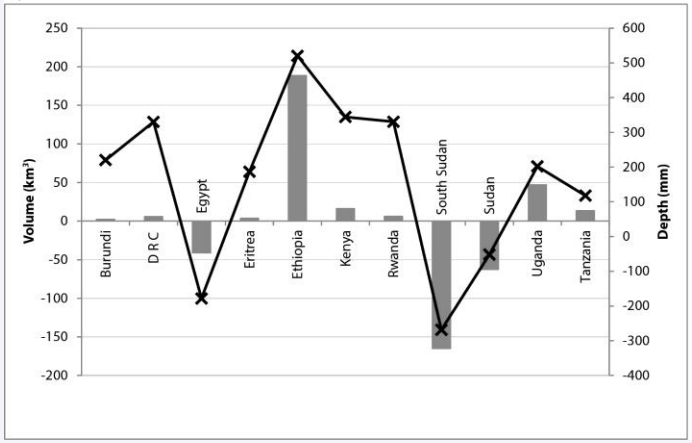
a) Annual Precipitation (P)



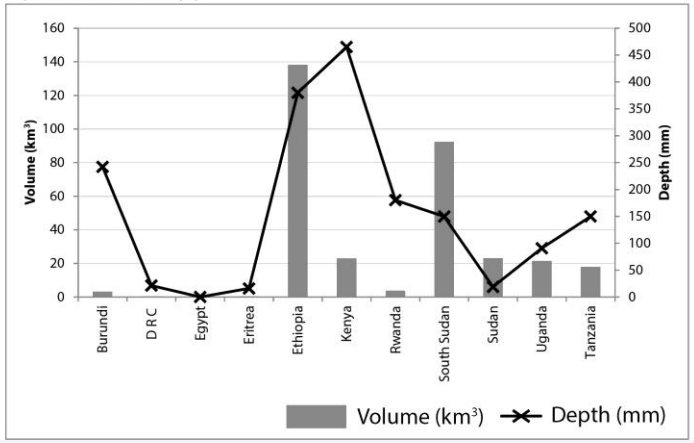
b) Annual Evapotranspiration (E)



c) P - E



d) Annual Runoff (R)



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WA data dissemination

Tableau
Power BI

ESRI web based technologies

Reports and publications

IWMI Resources

Conclusions

- International Water Management Institute's DIWASA initiative is generating reliable and systematic analysis-ready water data products for the Continental Africa.
- The continental WA+ is designed to extract water accounts using continental water accounting data products (1 km) for any boundary (country or basin).
- The water accounting data and products can be embedded directly into decision support systems and enable integrated water resources management.
- The CWA+ data will aid in identifying and addressing challenges in water management required for building climate resilience.


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THANK YOU!
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