International Water Management Institute

RESEARCH PROGRAM ON Water, Land and Ecosystems

CGIAR

Transformative Futures for Water Security- Science –technology and innovation

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Climate change is water change

From 1998-2017, droughts have affected at least **1.5** billion people

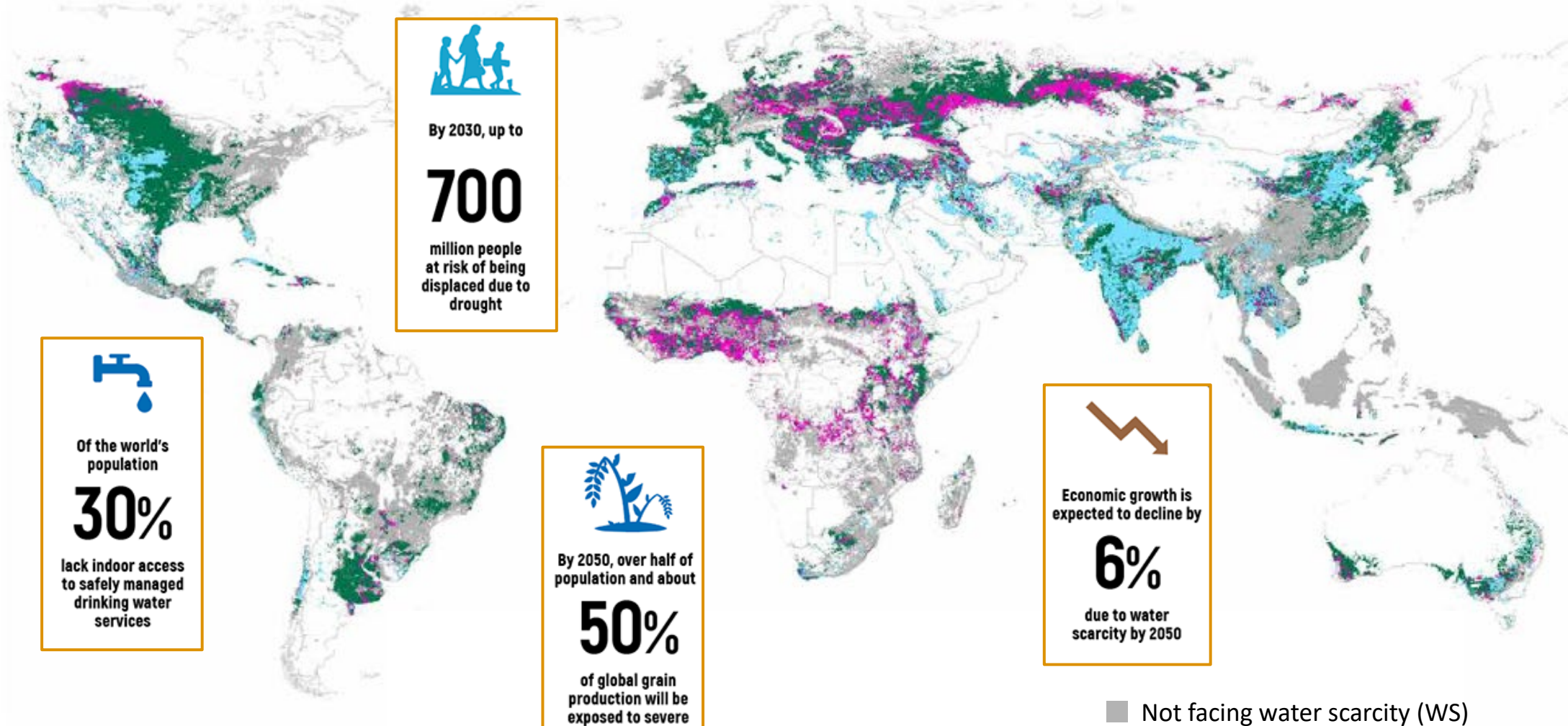
More than **2.3** billion people live in water-stressed countries

Of the world's population **30%** lack indoor access to safely managed drinking water services

By 2030, up to **700** million people at risk of being displaced due to drought

By 2050, over half of population and about **50%** of global grain production will be exposed to severe water scarcity

Economic growth is expected to decline by **6%** due to water scarcity by 2050



Statistics Source: UN Food Systems Summit 2021 | Map Source: Rosa et al. (2020)

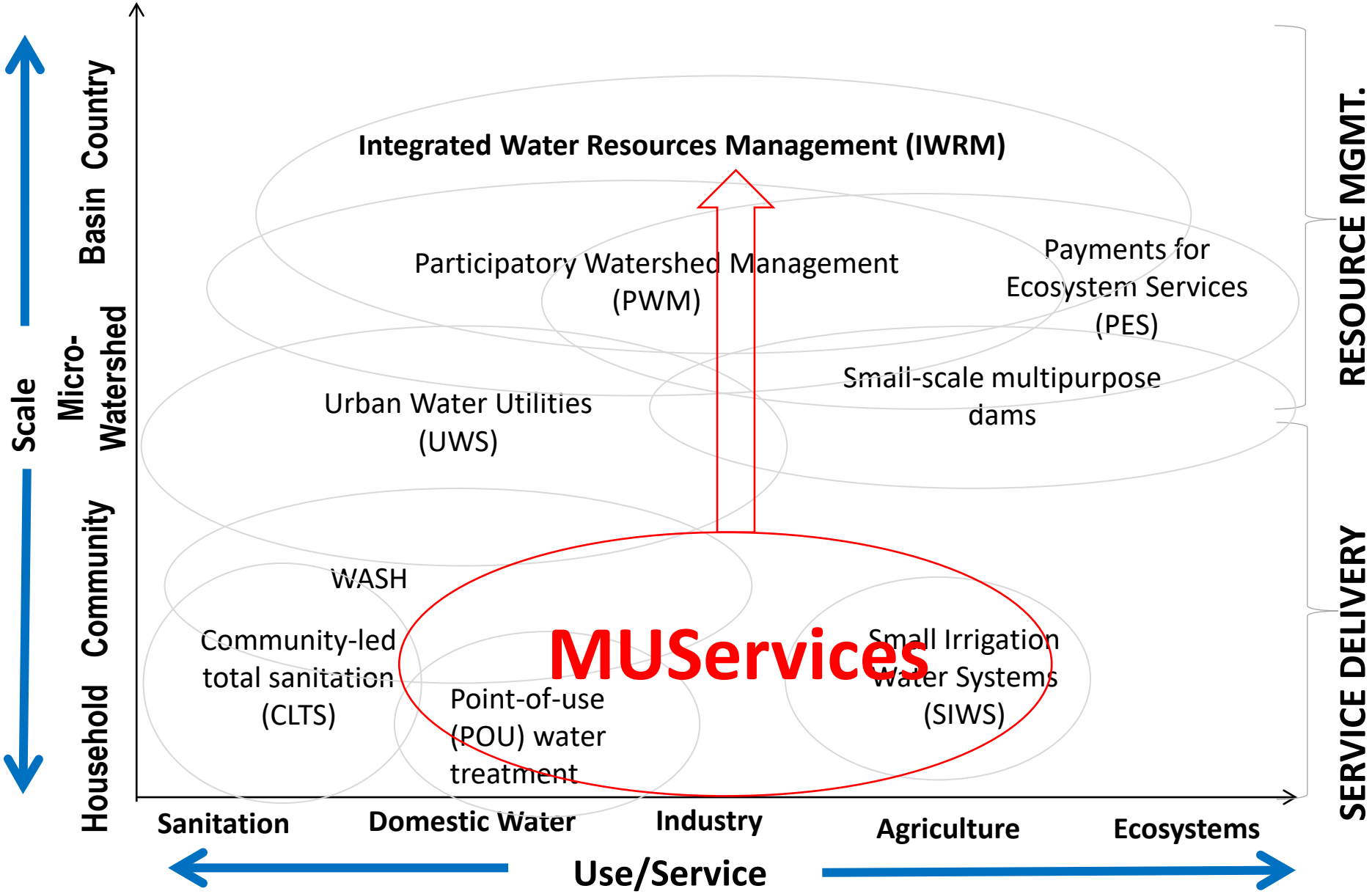

Multiple use services


Circular Economy approaches


Optimize water use

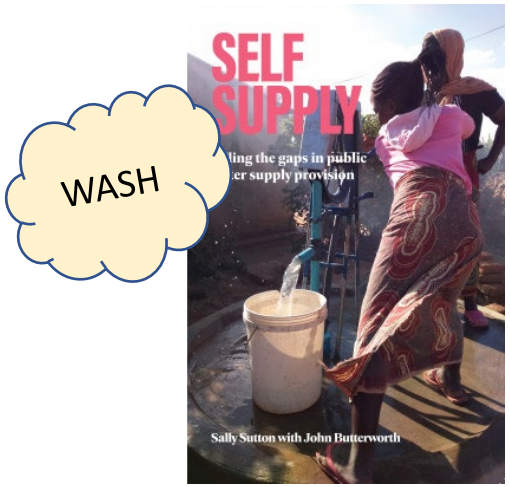

Water accounting, remote sensing and citizen science

Multiple-use services are key

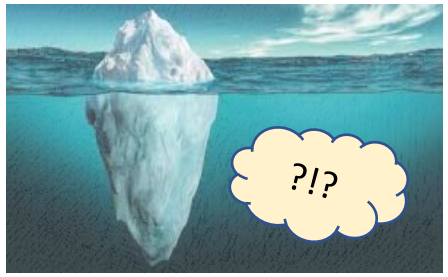


(adapted from Pacific Institute)

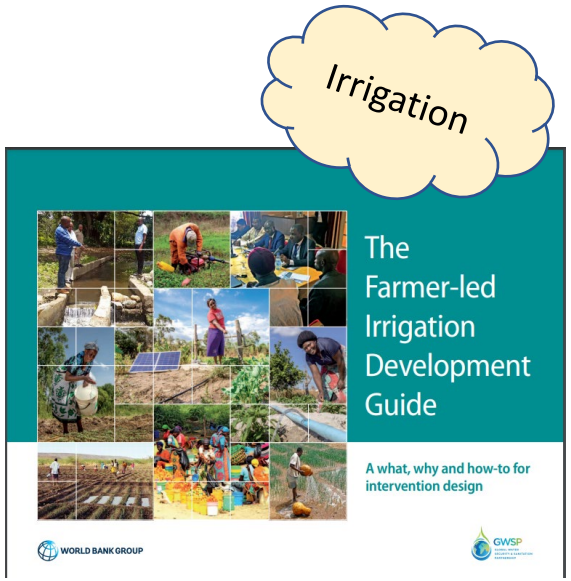
Supported self-supply



- Domestic uses – priority
- Leaving no-one behind
- Water quality 3 lpcd, hygiene



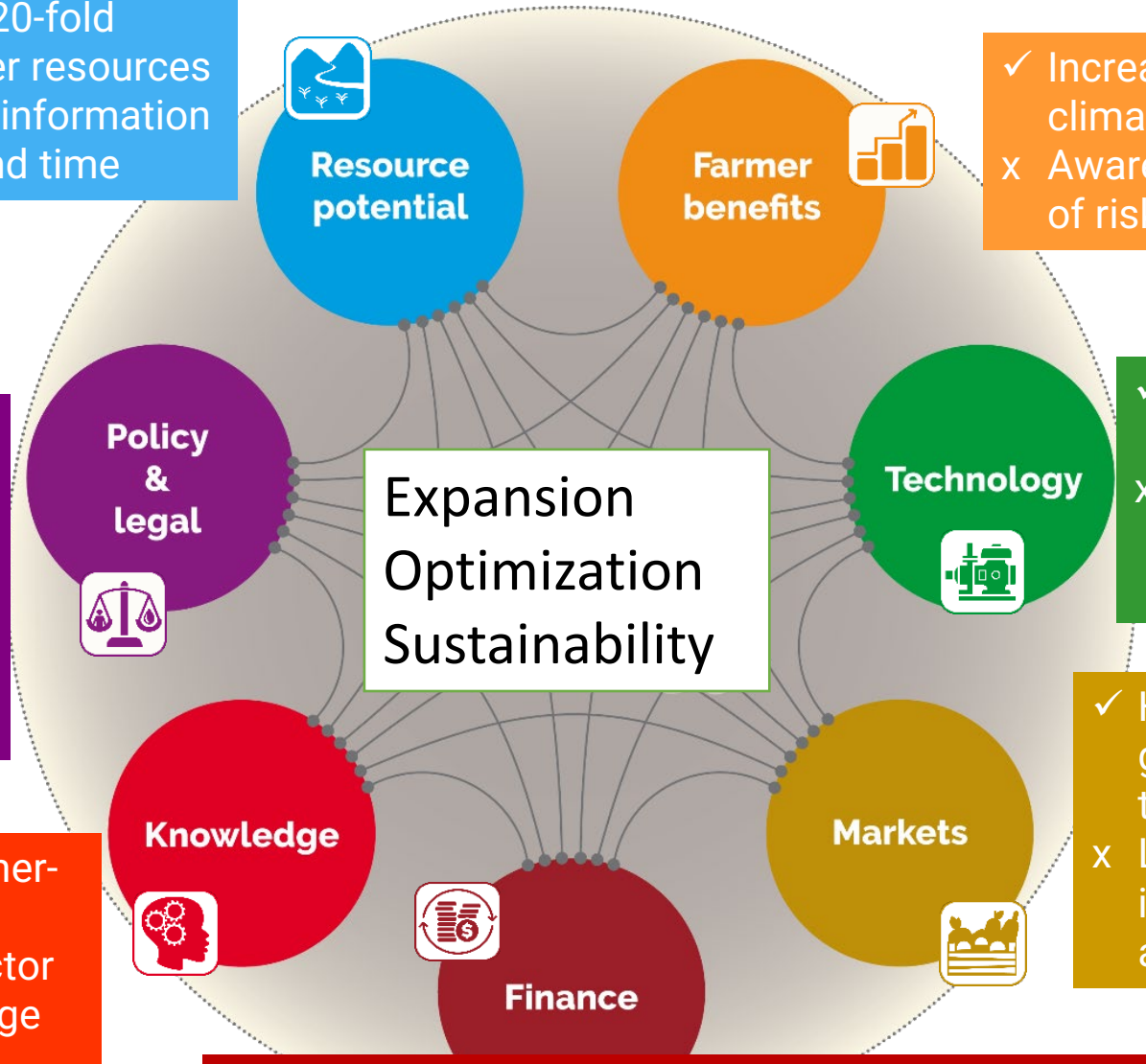
- Affordable technology& energy at homesteads
- Individual & collective
- Training artisans
- Financing



- Financing
- Ag value chains & extension
- Technologies

✓ Groundwater availability 20-fold greater than surface water resources
x Lack of higher resolution information on availability in space and time

✓ Increase in production, income and climate resilience
x Awareness on benefits and perception of risk



✓ Removal of trade tariffs, tax exemptions, subsidy schemes
x Poor integration and coordination of water, energy and agricultural policies

✓ Range of technologies; ICT4Ag and IoT
x Poor quality standards and assurance; poor pre-and after sale services

✓ High market potential and steady growth for small-scale irrigation technology markets
x Lack of integration of the irrigation equipment/service and agricultural value chains

✓ Growing experience in farmer-led irrigation across water, energy and agricultural sector
x Limited knowledge exchange across sectors

✓ Increased private investment and public funding; emerging consumer financing models
x Poor coordination across financing mechanisms; increased risk by the private sector to fill consumer financing gap

Source: Durga et al. (in prep.), Pavelic et al. (2021), EforA (2021), Izzi et al. (2021), Lefore et al. (2021)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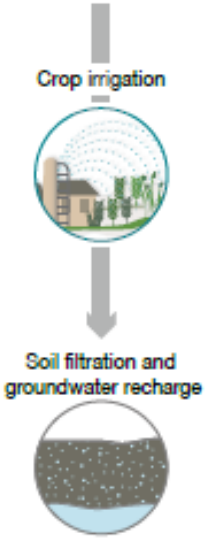
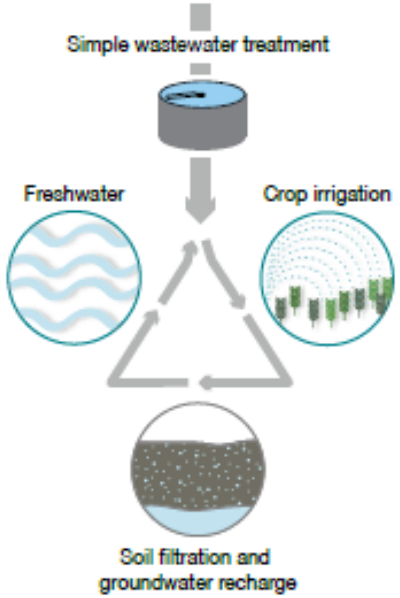
Circular Economy Approaches to address water scarcity has multiple benefits

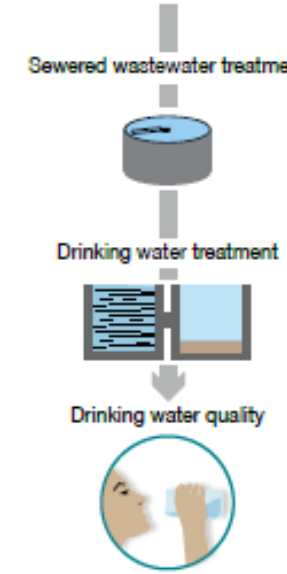
1. Apply treated or untreated wastewater to the soil for crop production and allow groundwater recharge as an additional benefit.

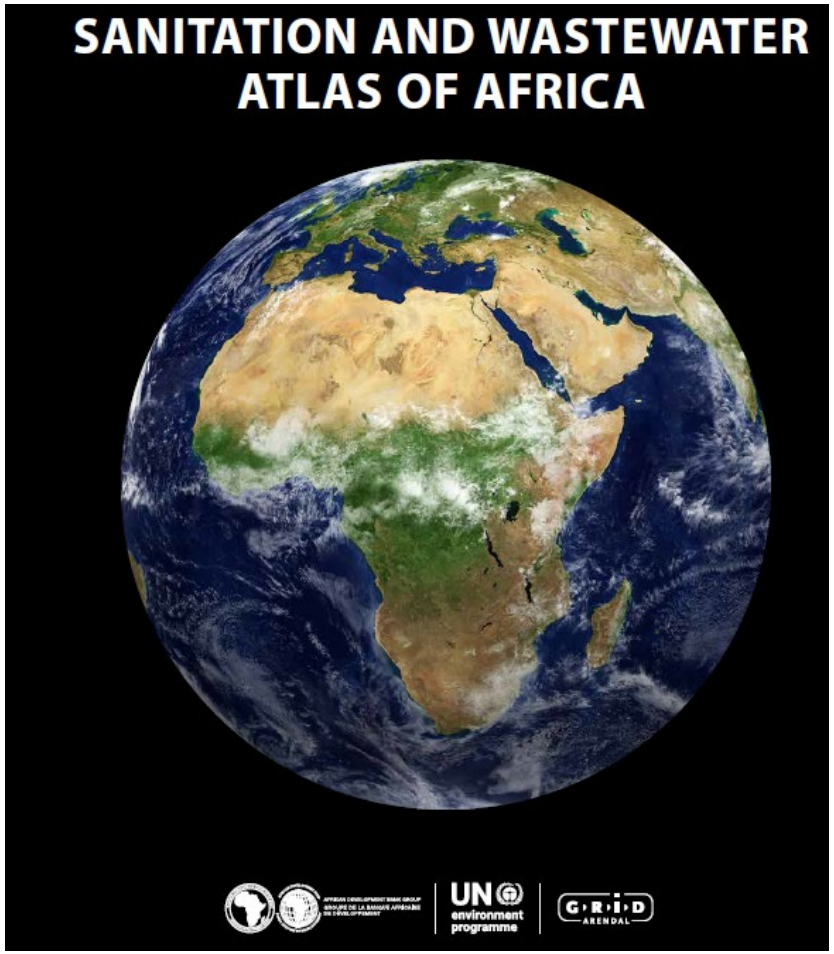


2. Treat wastewater using simple technology and swap the treated wastewater produced in urban areas with freshwater from rural areas.



3. Treat the urban wastewater with advanced technology to meet drinking water quality standards.



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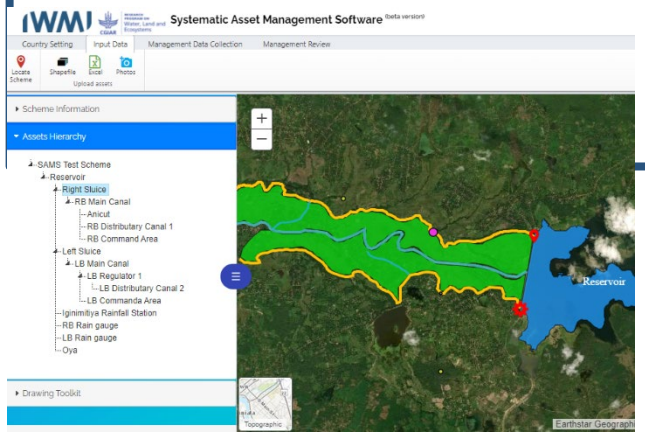
Enhance water use at farm level

Rainfed agriculture

- Soil & water conservation
- *In situ* soil moisture storage
- *Ex situ* storage
- Rainwater productivity
- Multiple use systems for water productivity

Irrigation system performance

- Break the build – neglect – rehabilitate cycle
- Irrigation service delivery
- Asset management – SAMS
- Performance benchmarking
- Private sector operators



Irrigation transitions

- Dislocation in areas with high-risk water futures
- Farmer-led irrigation development
- Innovation bundles, finance and value chains
- Technologies and sustainability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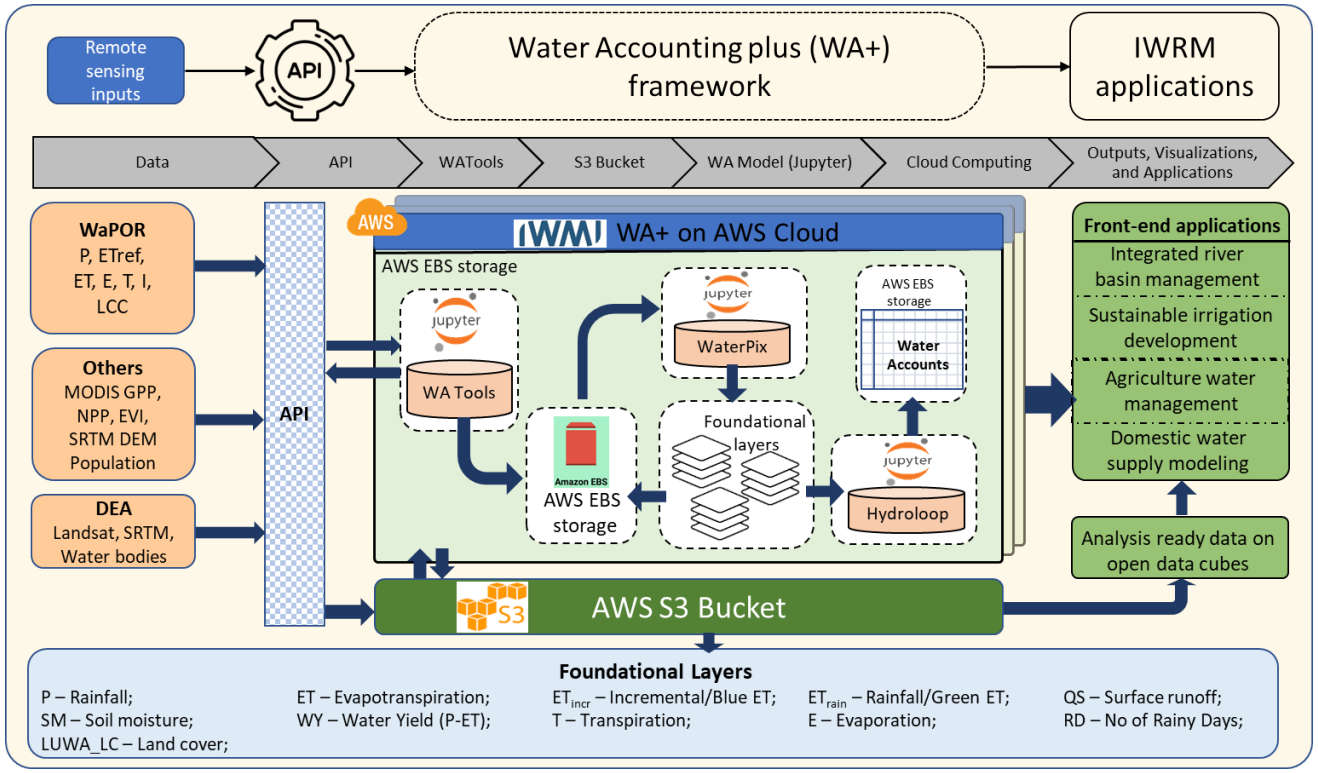
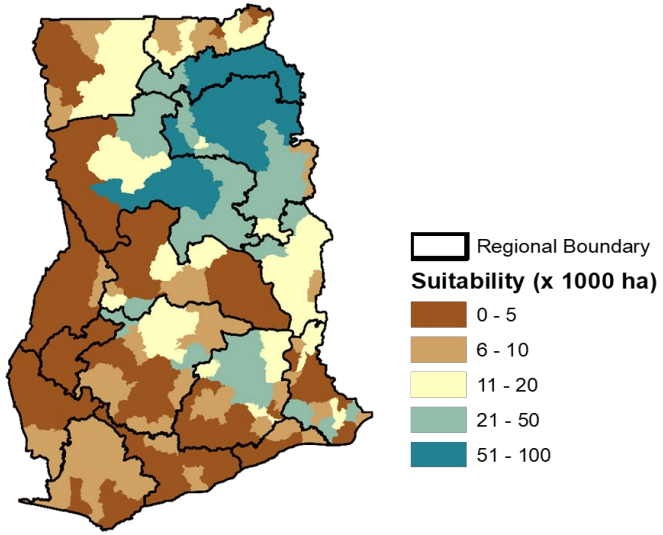
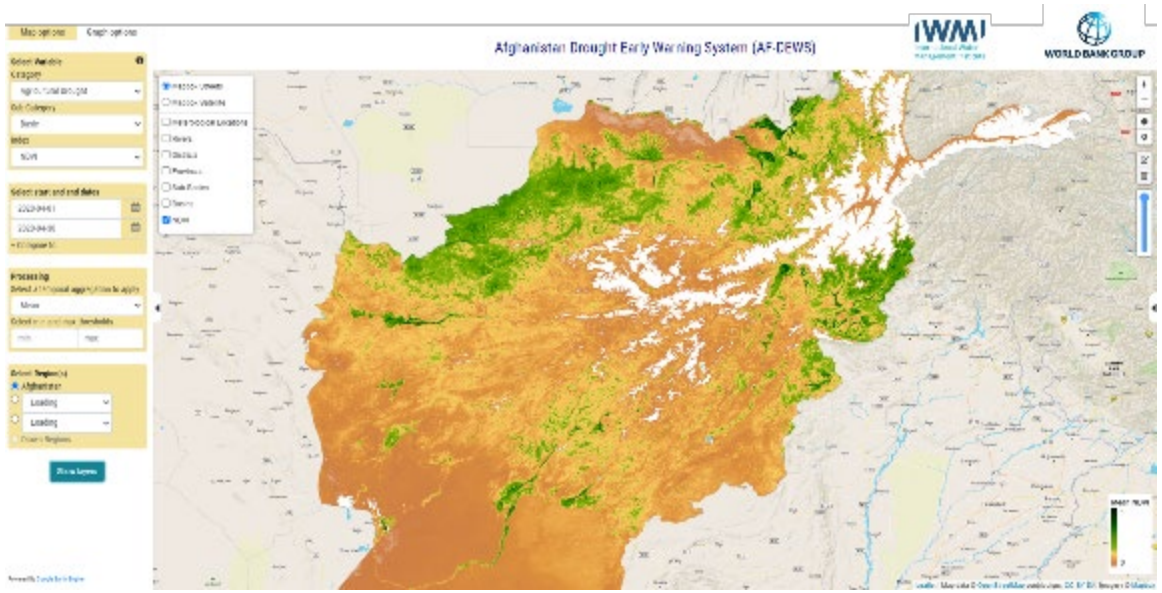
Supporting IWRM through better monitoring and investment planning



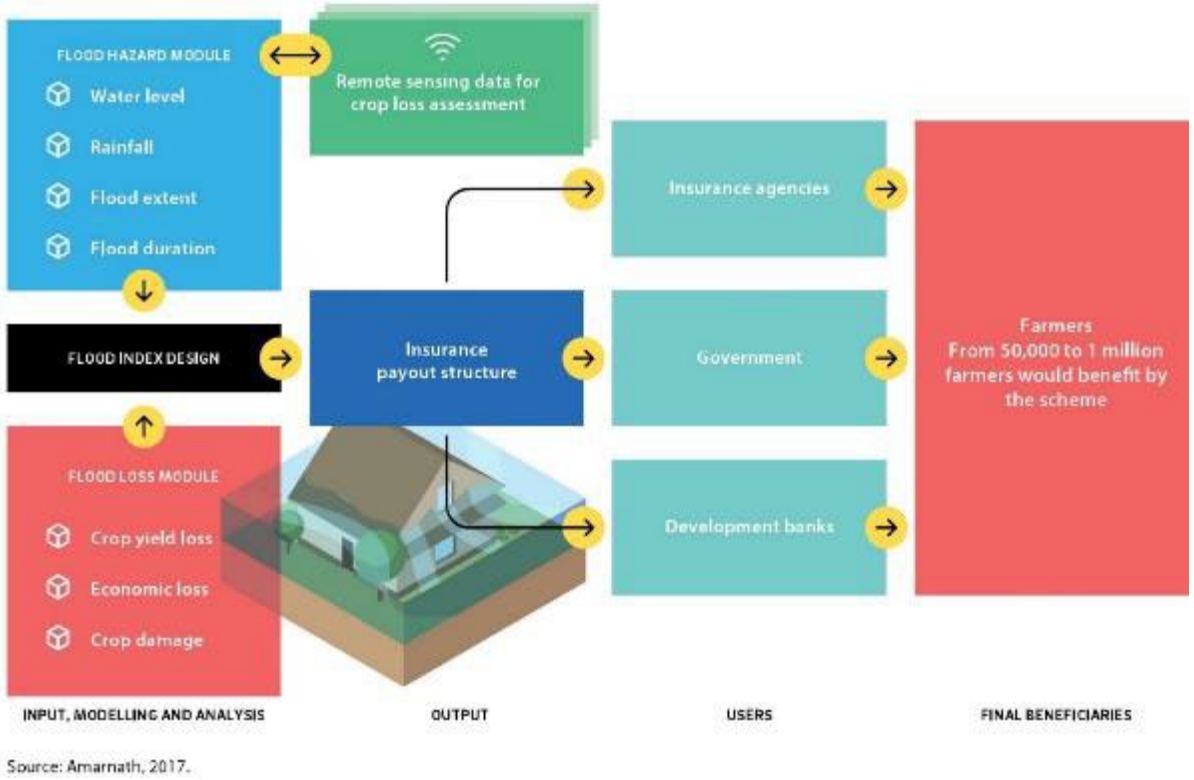
Irrigation suitability using shallow groundwater (25 m) & off-grid solar (2020)



De-water risking through remote sensing and insurance



Afghanistan Drought Early Warning Support (AF-DEWS) tool



Source: Amarnath, 2017.

Bundled insurance solutions with flood and drought tolerant seeds and climate information services

Enhancing community governance and preparedness for water related risks

Risk Knowledge

Co-generate knowledge by combining communities experiential and traditional knowledge with scientific knowledge

Monitoring and warning

Co-generate flood warning information with magnitude and lead time in a range of 12-24 hours by integrating community level with the formal warning information.

Citizen science approach

Communication and dissemination

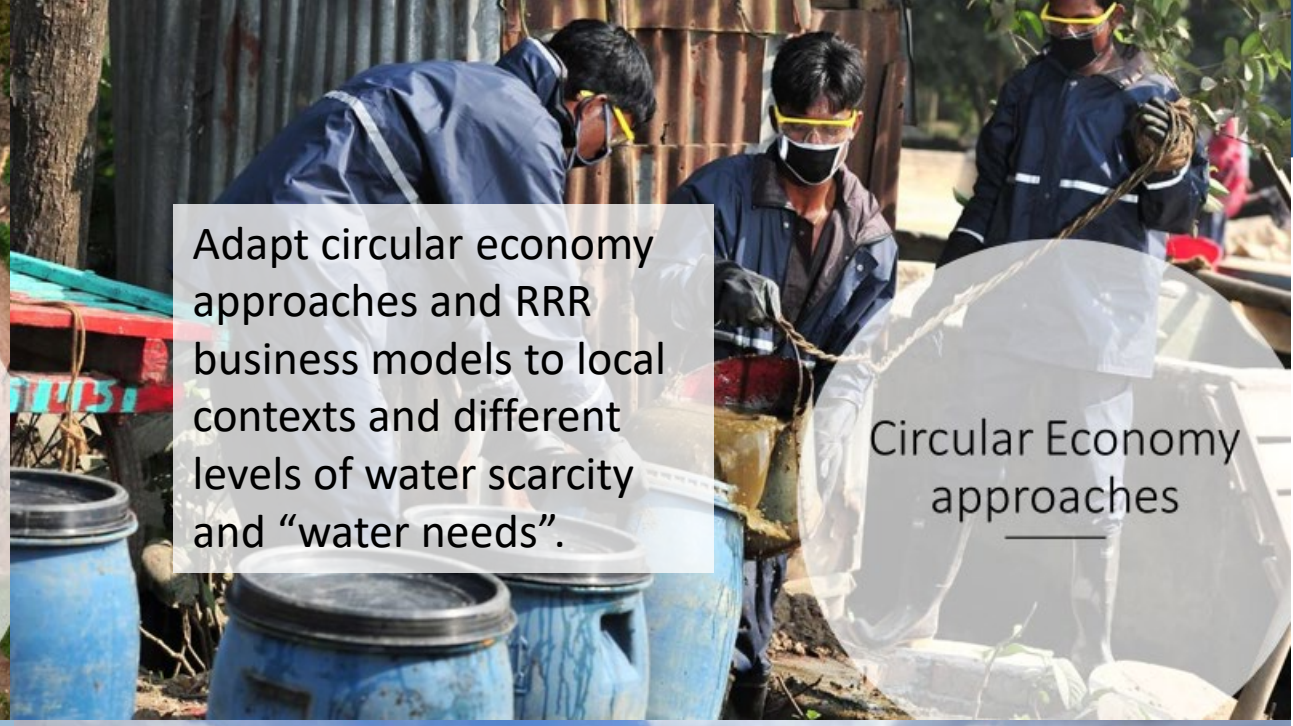
Two-way communication link between communities and other stakeholders

Response capacity

Improved awareness and access to warning information on flood magnitude and lead-time

Invest in overcoming systemic barriers in households self-supply as this has multiplicative benefits in the WASH and Agricultural sector.

Multiple use services

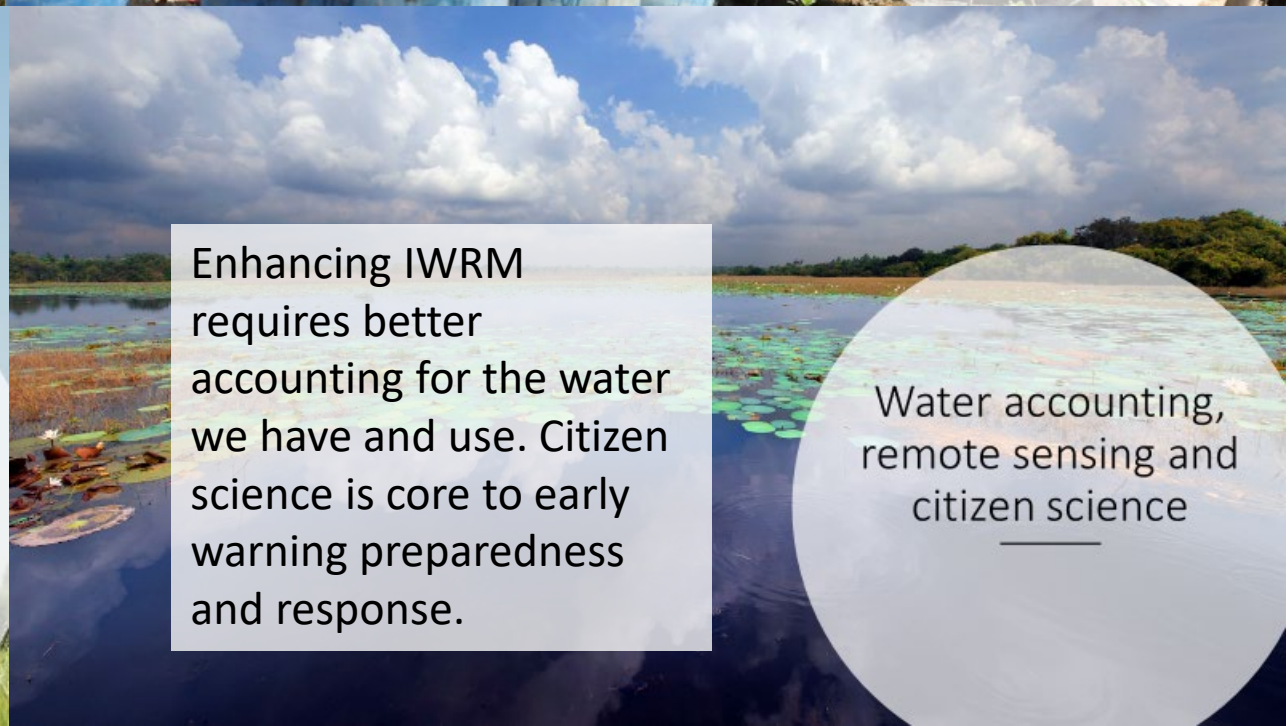


Adapt circular economy approaches and RRR business models to local contexts and different levels of water scarcity and “water needs”.

Circular Economy approaches

Bundle innovations to tackle issues of agricultural water management issues across ag systems.

Optimize water use



Enhancing IWRM requires better accounting for the water we have and use. Citizen science is core to early warning preparedness and response.

Water accounting, remote sensing and citizen science

IWMI International Water Management Institute

Thank you

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