Smart Water Management for Enhancing Resilience at Multiple Scales

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Water in agriculture

- Scale-based AWM is misleading, e.g., field or farm or scheme-based improved WUE or WP leads to land expansion and shift to water-intensive high value crops.

- COP26: net-zero emissions by 2050

Need for AWM across scales:

- Temporal
  - Season / Year
  - Month
  - Week
  - Day
  - Hour

- Spatial
  - Watershed
  - Scheme
  - Farm
  - Field

Global Water Use

- Agriculture 70%
- Others 30%
Smart agricultural water management solutions

Water demand management - potentially reducing non-beneficial evaporation and non-reusable return flows
Supply augmenting interventions - increase soil moisture, surface, and groundwater storage to build water resilience

Field based evidence demonstrated potential contribution of AWM interventions at
• enhancing resilience via increased land and water use efficiency
• increasing productivity, and
• reducing GHG emissions via reduced energy use and efficient fertilizer usage
Water use efficiency and water productivity

Working across scales

Physical and Economic WP

National → Basin → Irrigation command area → Farmers field

Water accounting

Economic water productivity

- Focus on a larger Water Influence Zone
- Reallocate water from lower to higher value water use (mixed combination)
- Allocate fixed area/Consumptive Water Use under perennial crops that can withstand dry years

Building Resilience: Odisha, Assam
South Asia Drought Monitoring System (SADMS)

Equipping nations to effectively manage drought

- SADMS- a satellite-based online resource that provides farmers, extension workers, and agriculture and water resources authorities with all the information needed to forecast, monitor and manage drought.

- Provides seasonal, sub-seasonal and seven-day weather forecasts; monitoring tools to indicate when drought is present; and district-level agricultural contingency plans that can be put into action if the system indicates that particular triggers have been reached.

www.dms.iwmi.org
Smart Aquifer Management: Building Water Resilience

Managed Aquifer Recharge (MAR)
Underground Transfer of Flood Water for Irrigation (UTFI)

- Aquifer recharge using excess wet season flows
- Reduce flood risks downstream
- Dry season irrigation – e.g. rabi wheat
- Pilot scale demonstrations – Rampur district
- Buffering water supply for climate resilience
Mainstreaming Innovation in Irrigation Management

- Bringing piped network, pressurized irrigation/micro-irrigation as adjunct with canals

- Use of sensors, space technology and ICT in precision irrigation management

- Dialogic tools (DSS) linking canal operation and on-farm water management bridging gap between the two

- Improving irrigation services delivery and asset management

- Direct cash incentive for electricity saving on irrigation water usage – Example: Punjab example Reduced irrigation hours for enrolled farmers, no negative impacts on paddy productivity
High Throughput Maize Field Phenotyping for understanding crop health and yield

PRECISION AGRICULTURE
- Measures and responds to spatial and temporal variability of soil and crop growth
- Enhances profitability and reduces environmental impact
- Improve water use-efficiency
- Reducing water usage
- Yield forecasting

Utilisation of drones in monitoring crop health, water stress, crop water requirements
Agricultural water management under CC will require, among other things, cross-sectoral and cross-scale innovative approaches and technologies.

A daunting and complex task, which calls for:
- managing rather than meeting demand,
- transformative and systems approaches,
- landscape-level management, and
- transitioning food systems towards being resilient and sustainable.

Need to look beyond the water system – consider social, equity and inclusion dimensions.

This requires coordination and collaboration across all AWM stakeholders/actors and scales.
Thank you

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