International Water Management Institute

Contribution of Irrigation and Drainage to Asia's Food Security: Position Paper

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Innovative water solutions for sustainable development

Food · Climate · Growth

Centrality of Irrigation to Asia's Food Security

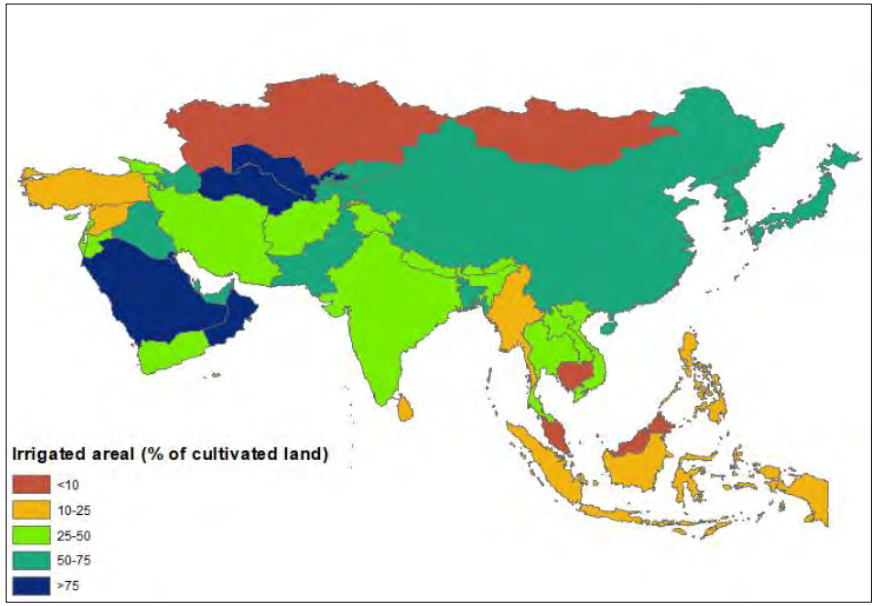
Asia supports **60% of the world's population** with just **39% of the Global freshwater and 30% of Global land**

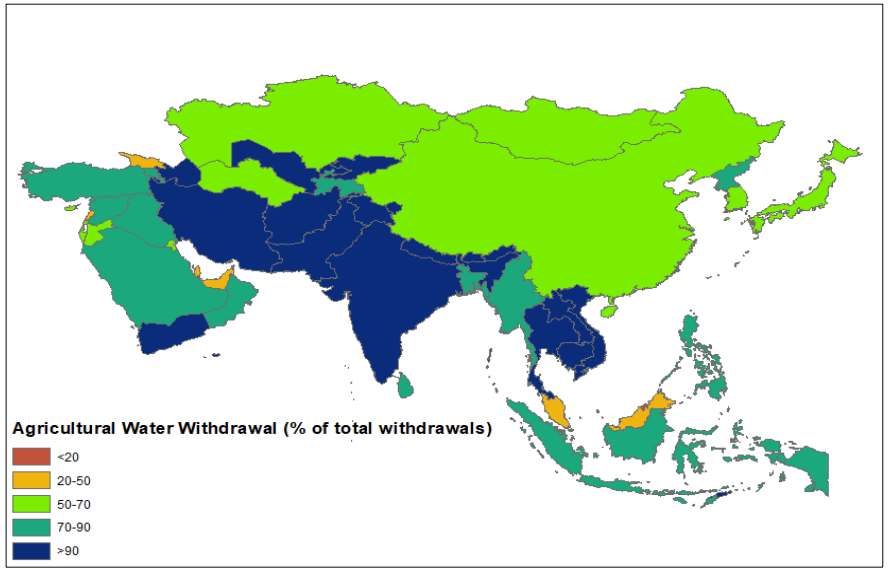
About 41% of the Asia's 570 M ha cultivated land is irrigated- critical to Green Revolution, lifting millions out of poverty and ensuring food security.

Agriculture uses over 70% of water withdrawals in most countries, over 90% mostly in South Asia

About **60-80 % of irrigated area being serviced by groundwater** in India, Bangladesh, Pakistan

Irrigation helping to maintain crop productivity amid erratic rainfall and water deficits, and **resilience to climate change**

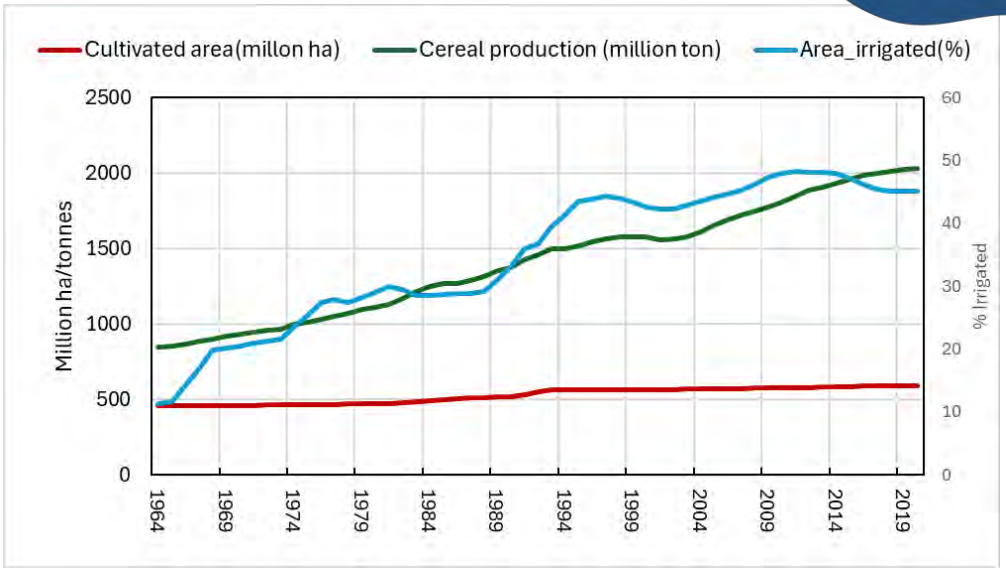


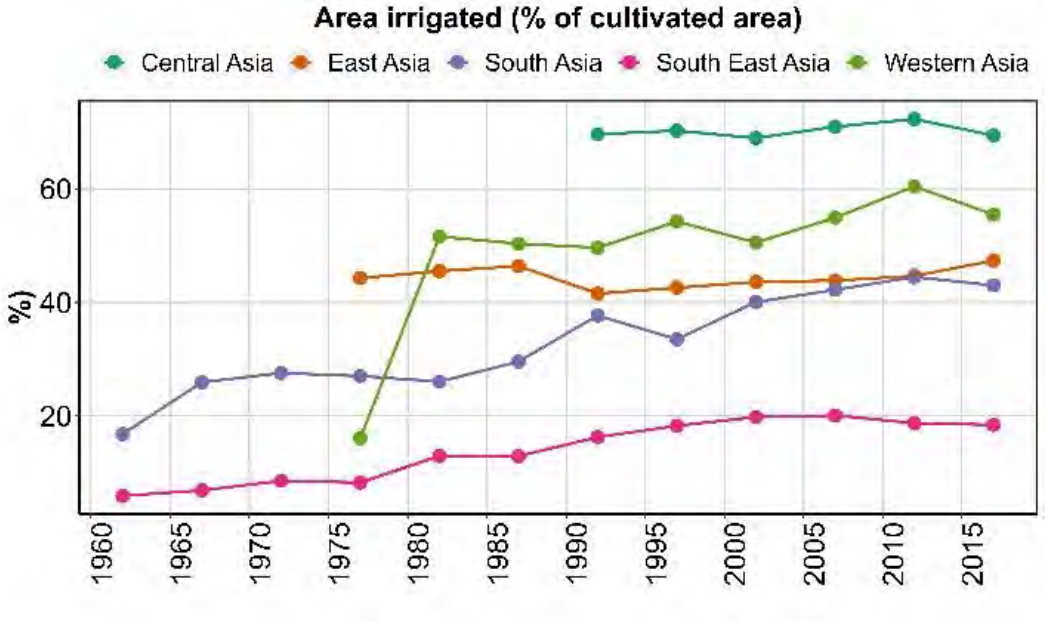


Asia's Irrigation and Food Security Trajectory

- About 570 M ha is cultivated
  - India and China have 29.6 % and 23.8 % of the cultivated land (about 54%)
  - South Asia has highest cultivation intensity (~ 30 %)
  - No significant change in cultivated area, except Southeast Asia with increase from 15 % (1960s) to 22 % (2020s).

  With cultivated area remaining more or less same, increased irrigation access powered production increase





- About 216 million ha equipped with irrigation (~ 41 %)
  - India and China have 32.6 % and 29.1 % of irrigated land, respectively (52%)
- Irrigated area has shown a significant increase in
  - South Asia, 20 % to 40 %
  - Southeast Asia (< 5 % to ~ 20 %)
  - Central and East Asia remained constant.

- Central Asia highest irrigation intensity with ~ 65 % coverage followed by Western Asia (~ 60 %)

Asia's Irrigation and Food Security Trajectory

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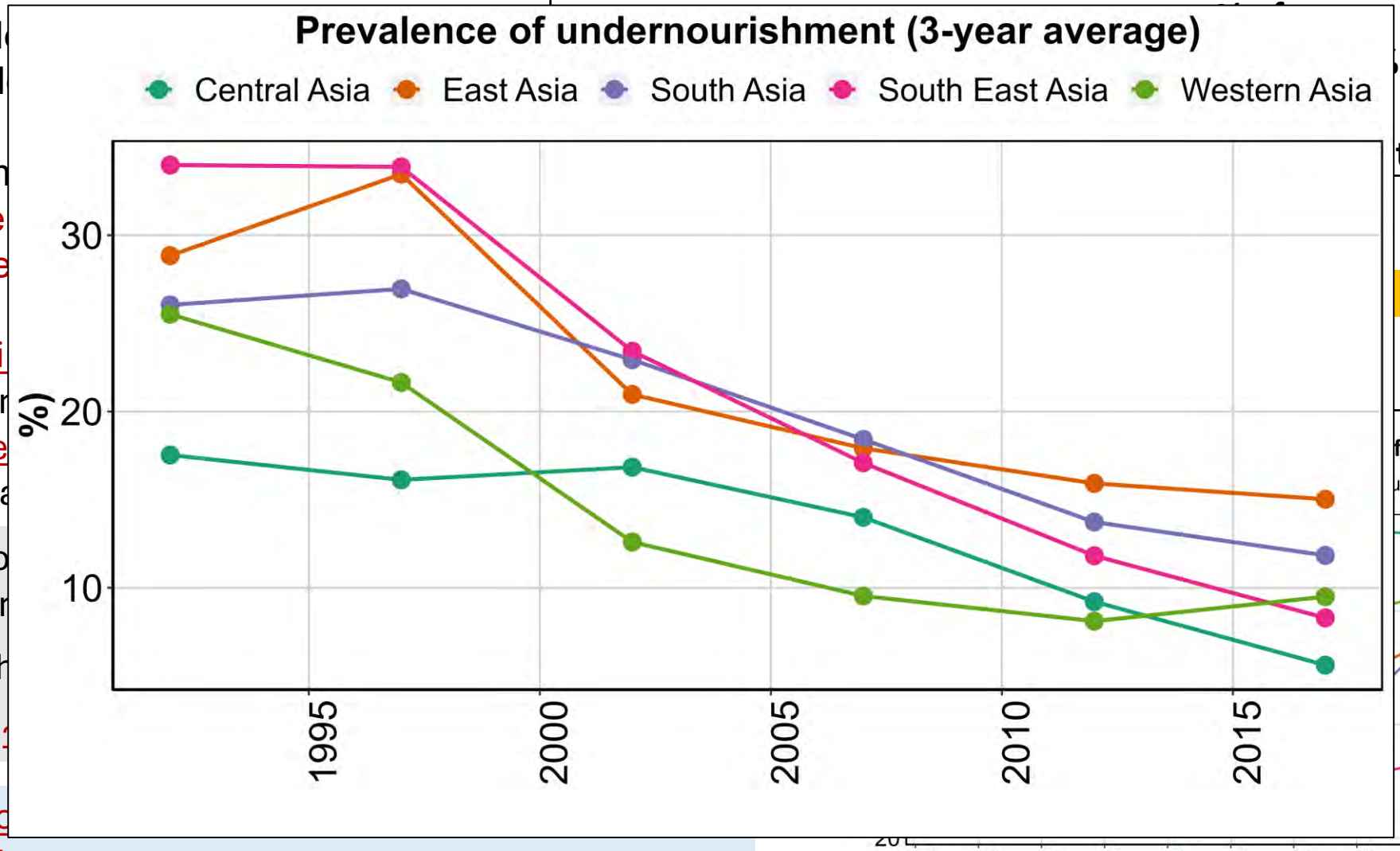


of total water thdrawal	Population density
76.7	38.8
63.9	242.9
81.2	527.4
70.4	140.0
63.8	299.6

Challenges ahead for Meeting Increasing Food Security and Climate Change

Climate change

- Significant yield losses (up to 32 %) across key crops, driven by temperature and precipitation shifts
- Irrigation water availability highly vulnerable (meting glaciers) to changing hydrological regimes
- Impact on operation of existing Irrigation infrastructures & increased water demands
- Reduced number of rainy days with high intensity storms may influence natural groundwater recharge

Natural Resources competition and degradation

- Natural resources degradation (e.g. GW depletion, drying streams, water quality), land degradation
- Reduced capacity of natural resource base to provide reliable water
- Increasing industrial and domestic demand, Agriculture already > 90 % of water withdrawals
- Drainage, waterlogging and salinity

Low irrigation efficiency and water productivity

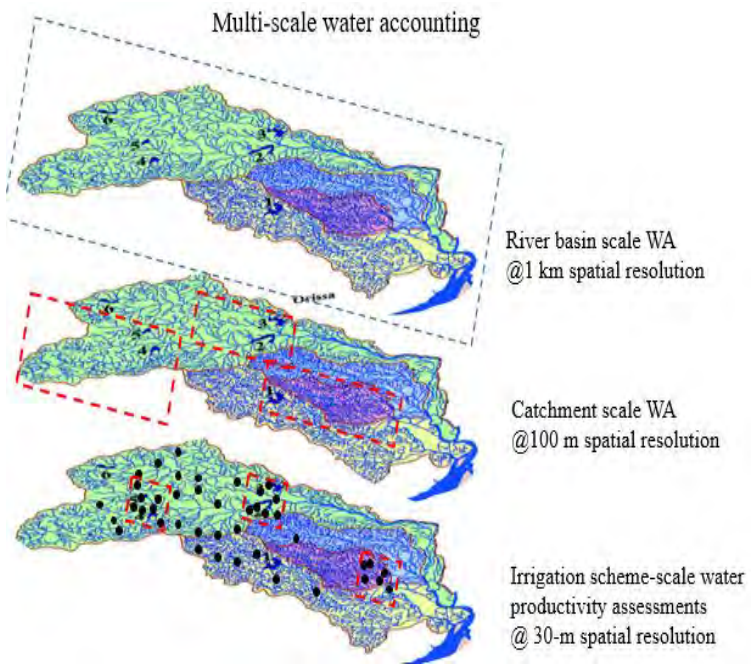
- Low irrigation efficiencies, exacerbated by outdated irrigation techniques and aging infrastructures
- Low water productivities resulting from inadequate land and crop management (e.g., crop varieties, crop choices)
- Poor institutions, governance and policy issues
- Lack of monitoring, benchmarking, poor service delivery, lack of active community participation,

Opportunities and way forward

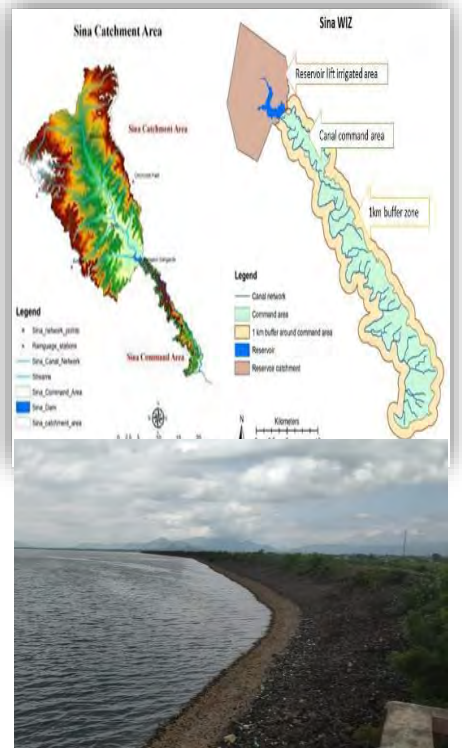
Improved Water Productivity: Physical, Economic & Nutrition WP

Basin → Irrigation command area → Farmers field

Water accounting & WP



Economic Water Productivity

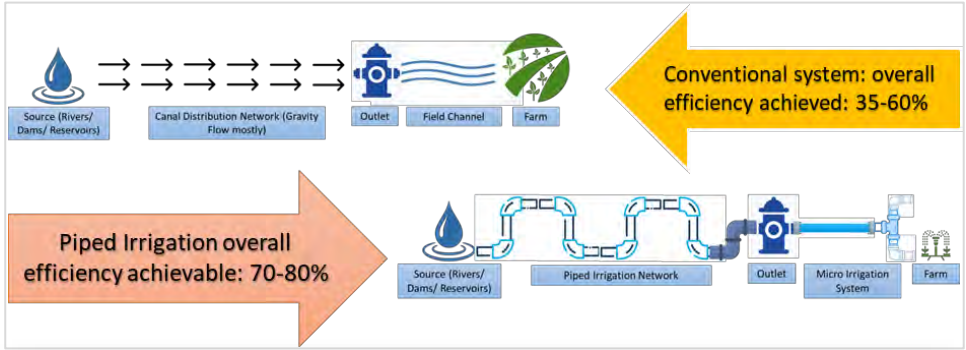


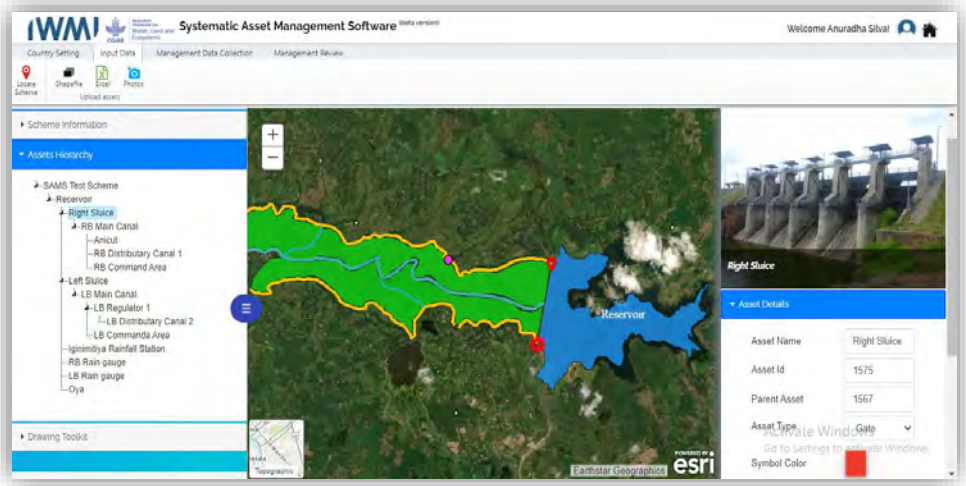
Chameleon sensor-based irrigation scheduling

Supportive policies , efficient institutional arrangements and improved market access

Irrigation Modernization

- Bringing piped network, pressurized irrigation/ micro-irrigation as adjunct with canals
- Use of sensors, space technology and ICT in precision irrigation management
- Mainstreaming innovative AWM for demand management
- Dialogic tools (DSS) linking canal operation and on-farm water management bridging gap between the two
- Improving irrigation services delivery
- Incentivization for water savings
- Strengthening irrigation systems monitoring, benchmarking and asset management





Opportunities and way forward

Bridging gap between canal management/water suppliers and on-farm water management/water users (OFWM)

- Institutional mechanism for regular dialogues between them
- Simple decision support tools to aid their discussions and decision making

Gene to Basin Approach

- Integrating breeding technologies, genes and crop varieties to the basin's natural resource base
- For example, breeding rice varieties apt to direct seeded rice (DSR) for a given geography

Strengthening institutions, governance & convergence

- Policies and institutions are vertically and horizontally fragmented, compartmentalised and disconnected
- Need for convergence and coordination
- Convergence of resources, institutions and coordination And encourage Multidisciplinary approach

IWMI International Water Management Institute

Thank you…

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Introduction

- **Irrigation** is essential for food security
  - Expanding agricultural areas
  - Boosting productivity
  - Increasing production to meet the needs of a growing population

- Irrigation delivers Multiple co-benefits
  - Increases incomes
  - food availability, lowers prices,
  - creates jobs, helping to alleviate poverty.

- **Asia's Challenge**: With 30% of global land, Asia must support 60% of the world's population.

- **Irrigation in Asia was** critical in the Green Revolution, lifting millions in Asia out of poverty and ensuring food security.

- **Key to Climate Adaptation**
  - Helps maintain crop productivity amid erratic rainfall and water deficits.