



ICID-CIID

INTERNATIONAL COMMISSION ON IRRIGATION AND DRAINAGE (ICID)

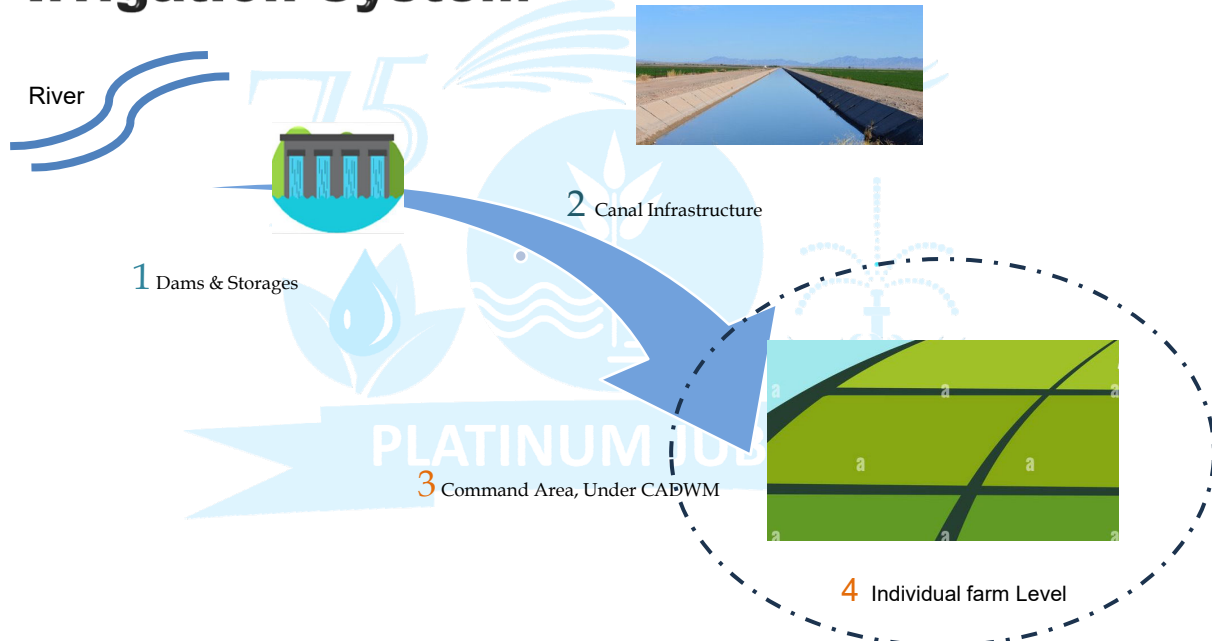
Water Security in India through Modernization of the Comand Area Development (MCAD)

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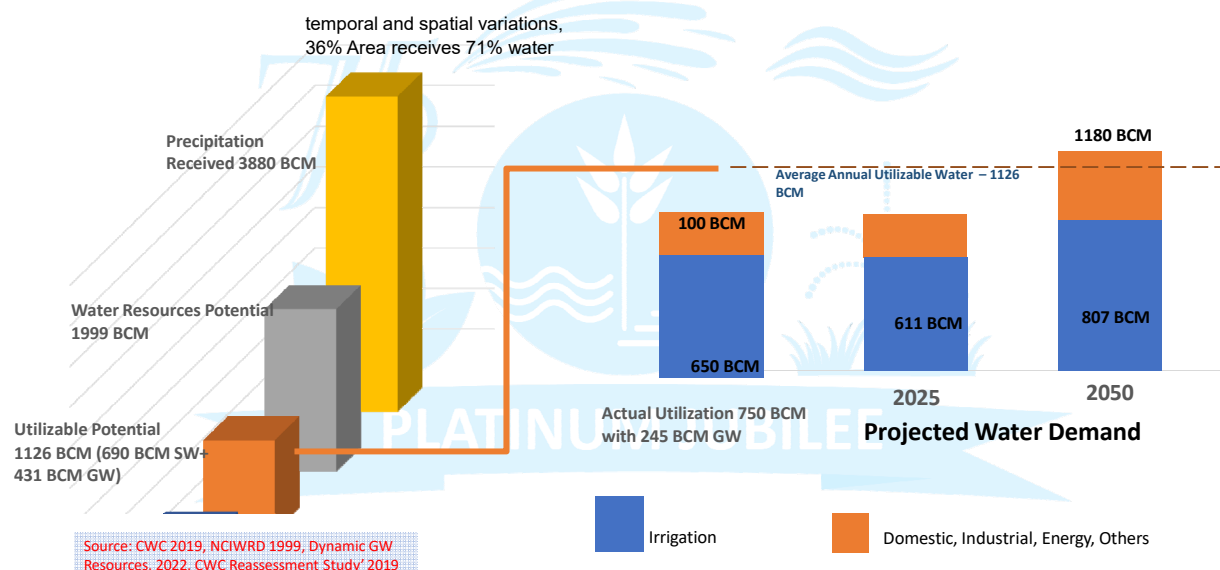


Indo-Global Irrigation Summit 2025
24-25 June 2025, New Delhi, India

Irrigation System



Water Use



Development of Storages

- 10,500 rivers and their tributaries with 12 major rivers ~ large dams: 5701 (> 30 years age: 3800)
- Current with upcoming Storages 305 BCM
- **Promising New Sources of water by Techno-Economic Criteria**
 - Adopting Efficient Application in Irrigation (100 BCM)
 - Reuse of waste waters in India (72,368 MLD/ 31,841 MLD Treated= 12 BCM)
 - De Sedimentation of existing Dams (0.72% Avg loss = 30 BCM)
 - Interlinking (175 BCM for all links)

Issues of Storages

- Economics and Finance
- Finding New Sites
- Source Sustainability
- Lifts and Mega Lifts : Energy issues, Lifecycle Costs
- Inter-State Collaboration for Basin level Planning & Management
- Predicted 25% loss by 2050
- Catchment area treatment & Floods
- Dam Safety: Dam Safety Act, 2021 for Proper surveillance, inspection, O&M

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The Conveyance System

- Long Lined Canals 95% Efficiency
- 27.5% of total irrigation by irrigation.
- World's Longest Irrigation Canal 650 km and World's largest Capacity Irrigation Canal (1133 Cumec)
- Canal Irrigated Area in order Uttar Pradesh, Madhya Pradesh, Andhra Pradesh, Maharashtra, Haryana, Punjab, Gujrat and Bihar
- Structural transformation by agricultural productivity gains and not factories drawing more workers into the urban spaces nearby.

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Canal Modernization

- 50 year old canals :Urgent need for Extension, Renovation & Modernisation
- Channel Control for appropriate service levels to water users from head to tail considering demand
- Remodel the Canals for Micro-Irrigation ready Infrastructure
- Increased use of Technology for Remote Management & by SCADA, IoT
- Energy + by Small Hydro & Solar
- Measurements of flow, levels & Climate
- Adequate funds for O & M
- Utilizing Private Finance
- Monetization of the converted lands
- Irrigation Service Providers

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Assumed WUE on Project

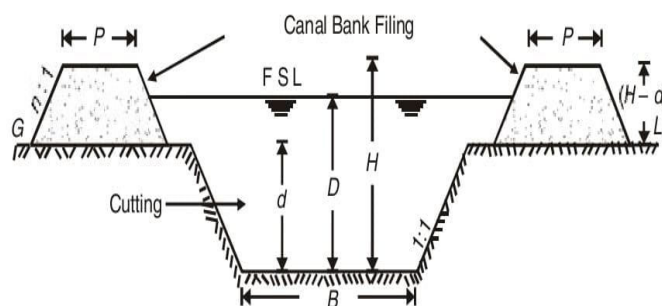
- Entire Hydraulics and Levels
- Cost Estimates

Cost of New Project

\$ 1 Million /MCM

At 35% Efficiency

5% change in WUE huge impacts on Costs



MCAD: On Farm WUE

1. W_{F1} : Field Channel application
CADWM Control

Unlined field Channels	40%
Lined Channels	55%
Pipe	95%



2. W_{F2} : On Field Water application
Precise Irrigation / Farmer Intelligence

Surface irrigation (border, furrow, basin)	60%
Sprinkler/Centre Pivot irrigation	75%
Drip irrigation	95%

$$W_{F1} \times W_{F2} = W_F$$

$$0.95 \times 0.80^* = 0.75$$

*[30% Drip and 70% Sprinkler]

on Farm WUE ~75%
Overall Project WUE 50%
(+15%)

Increasing WUE in Irrigation



Water Use Efficiency in Agriculture can be enhanced from 35-60% in conventional system to 70-80% in modernized irrigation system, and water savings can be utilized for irrigating additional areas.

कच्ची चैनल



WUE 35-60%

UGPL चैनल



WUE 70-80%

प्रेशराइज्ड चैनल



