Smart Water Management: A Case in Rajasthan, India

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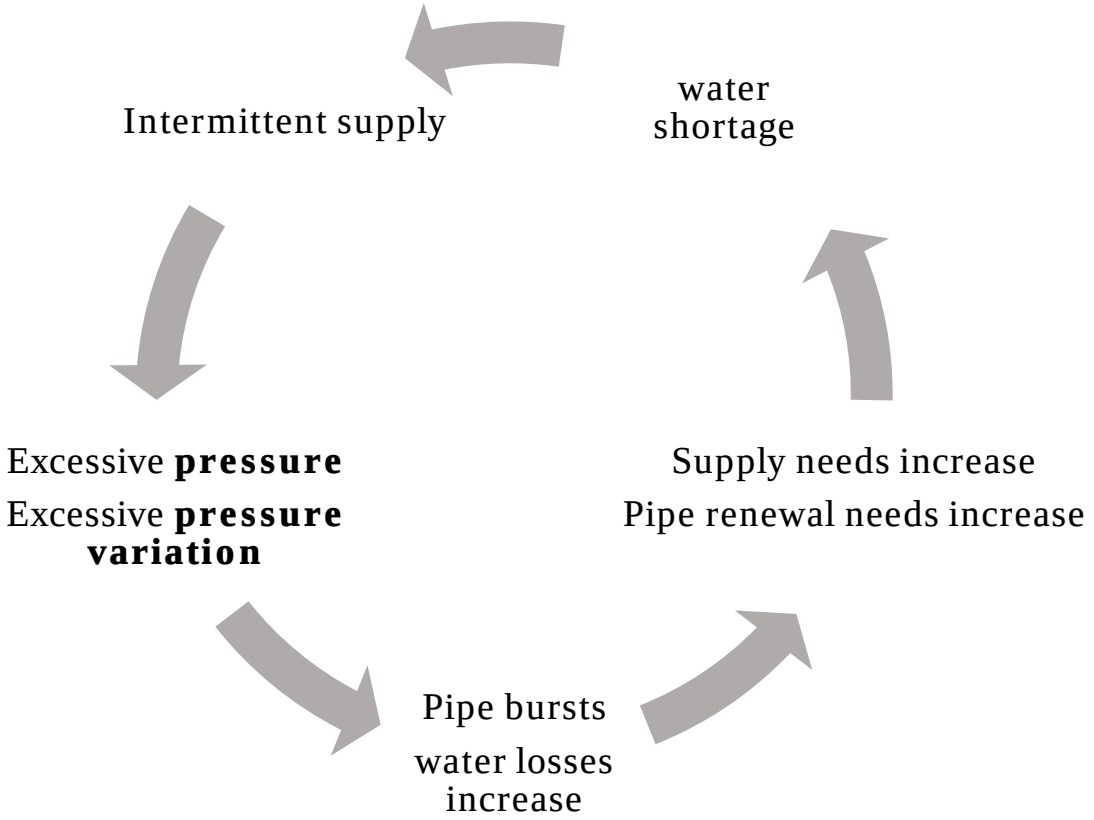
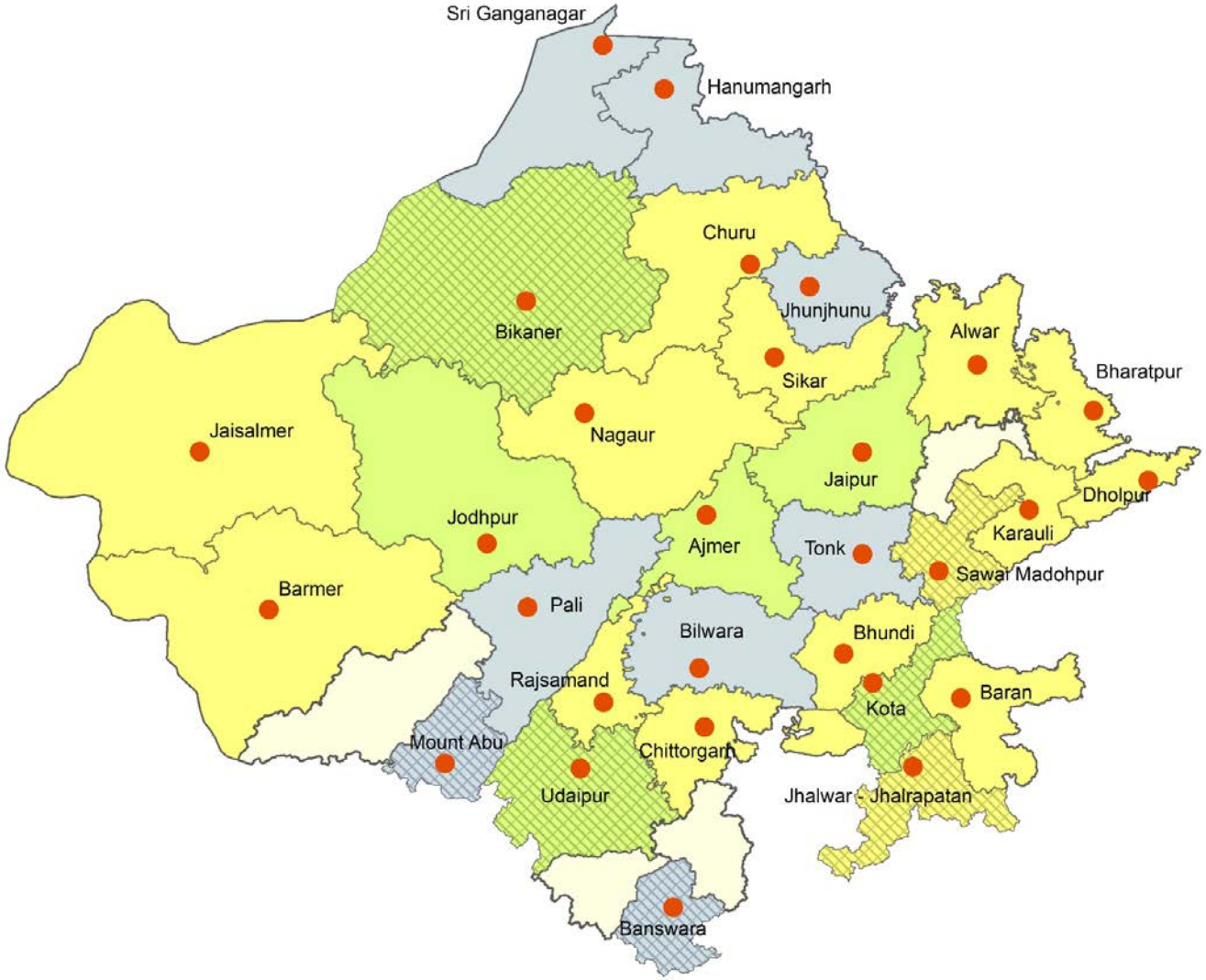
Inefficient Water Supply System: Vicious Cycle



Status of WS Operations in Rajasthan Before Project Interventions (Phase III)

- ❑ 1 hr every 3 days to 2 hours per day
- ❑ NRW from 36% to 76% (poor quality networks, unauthorized connections & ineffective metering)
- ❑ House service connections from 57% to 96%
- ❑ Tariffs are very low

ADB's Past & Ongoing Interventions

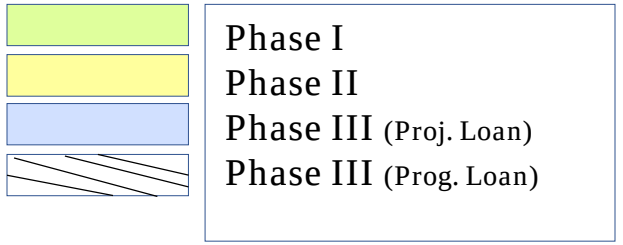


Since 1999:

Phase I : $250 million (6 towns) – 7.0 million population

Phase II: $273 million (15 towns) – 2.3 million population

Phase III: $500 million (13 towns) – 3.6 million population



ADB's Proposed Interventions

Proposed Phase IV:

- $500 million
- ≈40 secondary towns – 2.6 million population
- Sector loan modality

Phase I: Rajasthan Urban Infrastructure Development Project

- Water Supply System Component:
  - ❑ Supply augmentation by 641 mld through additional WTPs and TW
  - ❑ Source augmentation of water from Bisalpur reservoir
  - ❑ Rehabilitation and extension of 1,763 km of distribution system
  - ❑ Introduction of PPP in the form of long-term O&M service contracts
- Impacts:
  - ❑ 7 million people provided with improved water supply
  - ❑ 100% chlorinated water, >120 – 150 lpcd average, >900 mld supply
  - ❑ Reduced dependence on ground water
  - ❑ Access to safe water sources for women / reduced time spent

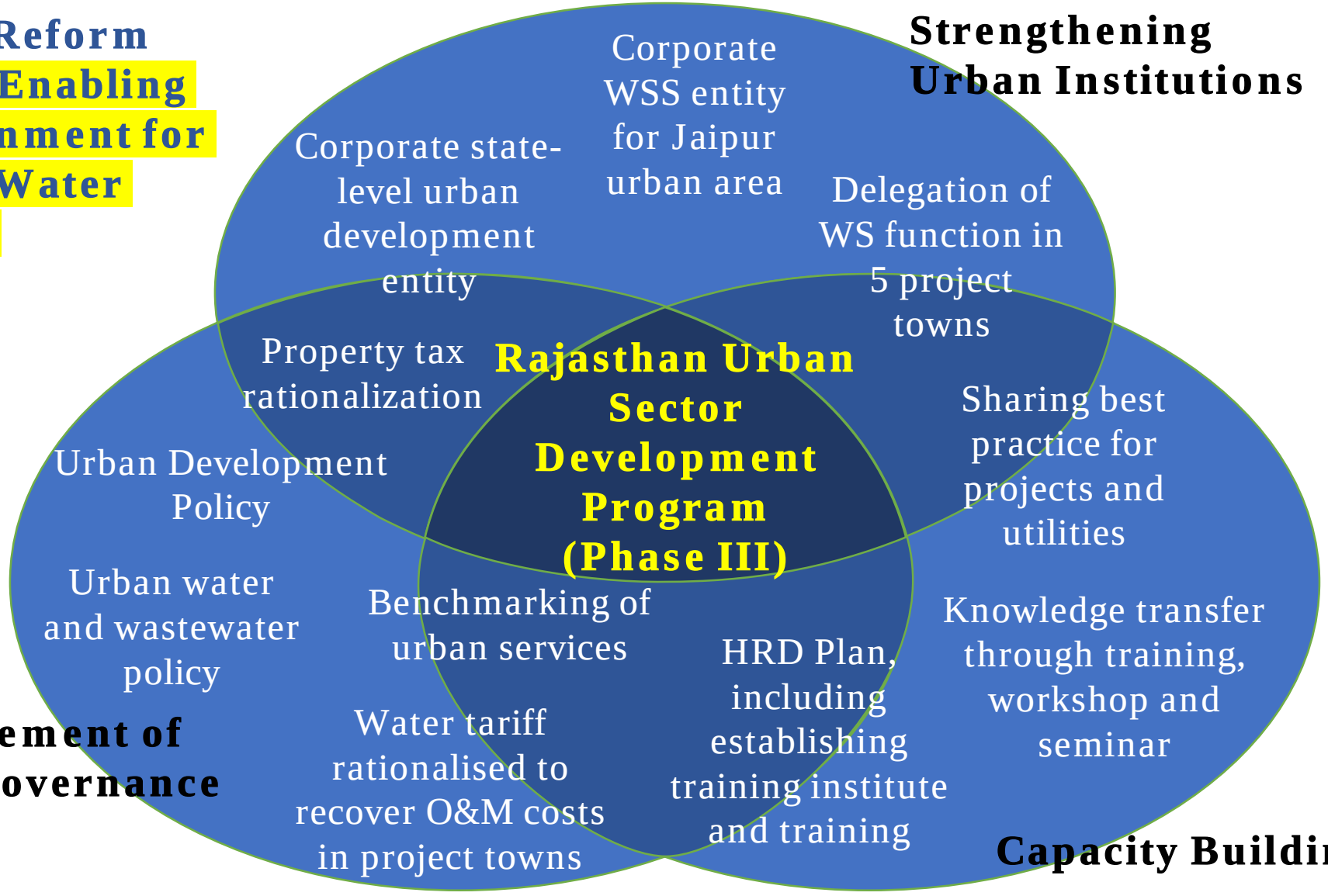
Phase II: Rajasthan Urban Sector Development Improvement Program

- Water Supply System Component:
  - ❑ Source augmentation and new WTPs
  - ❑ System rehabilitation and UFW reduction: replace all water meters in existing connections; refurbish/replace old pumps; install bulk meters; provide chlorination facilities
  - ❑ Rehabilitation and extension of distribution pipelines
  - ❑ Development of district water quality testing laboratory
- Impacts:
  - ❑ 2.2 million (95% population) provided with improved water supply
  - ❑ 100% chlorinated water, at 131 lpcd average supply, 304 mld supply
  - ❑ Increased piped water supply by 1,893 km pipeline
  - ❑ Water security in desert towns

Phase III: Rajasthan Urban Sector Development Program

- Project Loan Component on Water Supply:
  - ❑ Distribution network improvement on District Metering Area (DMA) basis
  - ❑ Each DMA is ring-fenced with its bulk water meters, house service connections and consumer meters
  - ❑ Functional guarantees of NRW reduction (less than 10 or 12%)
  - ❑ 10 years O&M embedded in construction contract improves operational sustainability using DBO contract modality
- Program Loan Component :
  - ❑ Implement policy reforms, including institutional development and governance improvement in Rajasthan

Policy Reform Areas: Enabling Environment for Smart Water System



Phase III: DBO Contract Features

- One integrated contract for each city ($50-70 million
- DBO Contract using FIDIC Gold Book
- Single-stage, two-envelope bidding procedure; Large Works SBD with modified PCC
- Uses e-Procurement system of Govt
- Adequate emphasis on Social mobilization and Community Participation (DMA work is 50% technical and 50% social)
- Bid evaluation based on cost of DB + Net Present Value of O&M
- Minimum O&M amount specified to avoid front loading
- Partial performance-based payment for DB and O&M; bonus for early completion of DB

Smart Water Features

- GIS-based mapping for project towns
- Complaint registration and resolution system – online, mobile, app-based and integrated with state level system
- Online progress monitoring – physical, financial, time-factored and issue-based – used for risk assessment, planning and mitigation planning
- Reducing public inconvenience by contract stipulations
- Electronic measurement book, integrated billing and payment
- Reforms – (i) corporatization of utilities (ii) tariff policy, (iii) accounting reforms, (iv) institutionalization of capacity building activities, (v) benchmarking of services, (vi) nodal agency at state level for urban development initiatives, etc.

Smart Water Features

- 15-days water security for desert town of Jaisalmer & Barmer
- 4.6 km long Mansi Wakal tunnel for gravity-based supply to Udaipur
- SCADA based Bisalpur Jaipur Water Supply Project (BJWSP)
- SCADA based 100 km transmission, WTP and pumping stations under BJWSP
- Groundwater table depletion arrested in Jaipur, and recharge commenced
- Consumer-driven meter reading proposed (newspaper validation)
- Establishment of control and command center in Jaipur