Sectoral water demand in Goa

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Objectives of the study

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- Estimation of sector-wise water demand and supply
- Projections for future water demand under BAU
- Projections for future water demand under alternate scenario

Sectors

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- ✓ Domestic
- ✓ Tourism
- ✓ Agriculture
- ✓ Mining
- ✓ Industries
- × Construction

- Data used for the study: 2010- 2012

Water Demand for Domestic sector

Scheme	Source	Water Treatment Plant		Talukas served
		No. of Plants	Total Capacity	
Salaulim	Salualim dam fed by Sanguem river	1	180MLD	Mormugoa, Salcete, Quepem, Sanguem
Opa	Khandepar river	4	114 MLD	Ponda, Tiswadi
Chandel	Kalna river	1	15 MLD	Pernem
Assonora	Assnora river, Volvanti river, Amthane dam	2	72 MLD	Bardez
Sanquelim	Volvanti river	3	52 MLD	Bicholim
Dabose	Madei river	1	15 MLD	Sattari
Canacona	Chapoli dam	1	15 MLD	Canacona

Source: PWD & WRD, GoG 2011

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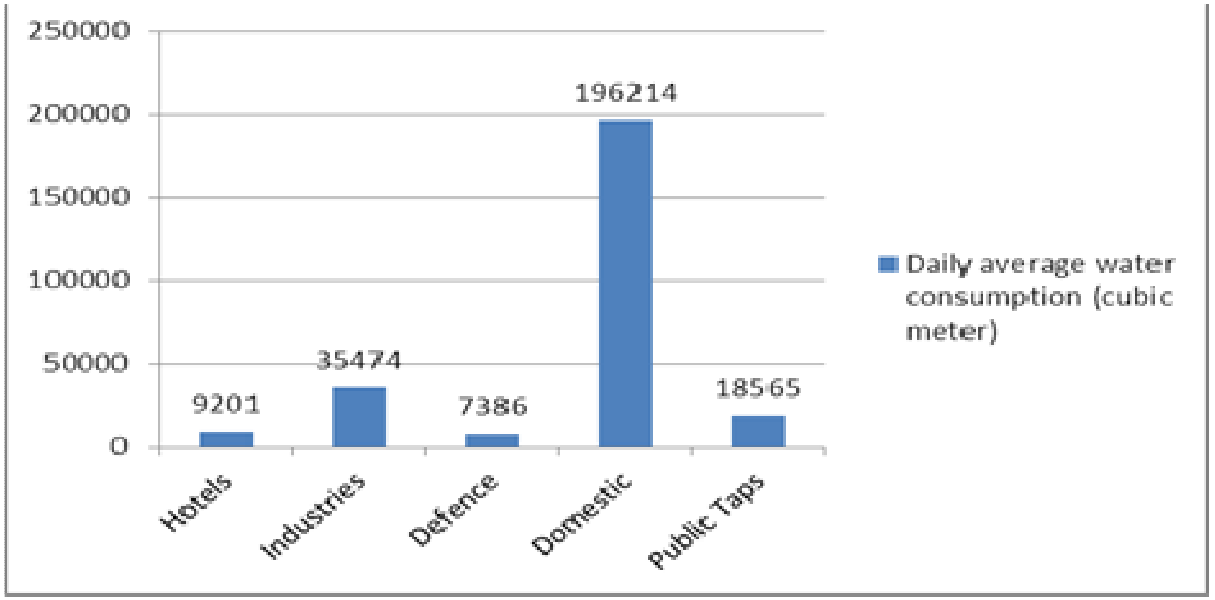
Some villages covered through rural water supply scheme which source water from borewell/dugwells



Brain Teaser

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- How many hotels are there in Goa?
- Hotels in Goa = 2641

Water Demand for Tourism sector

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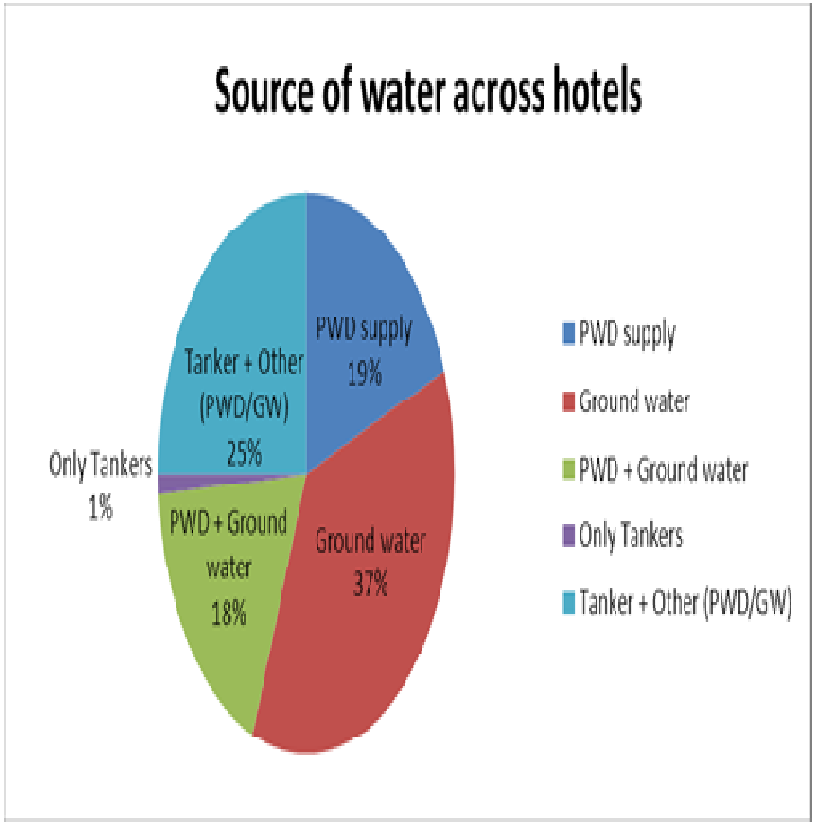
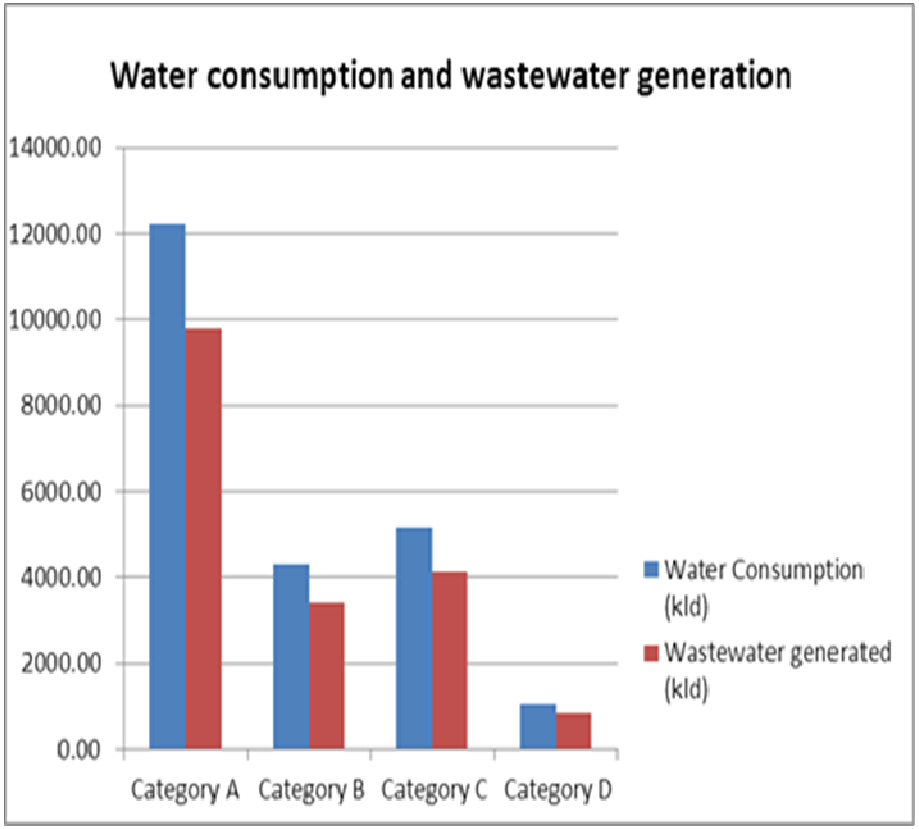
Demand = 23 MLD





Water Demand for Mining

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- Often work below groundwater table
- Accumulated water in pit is used for ore washing and dust suppression, rest is pumped out
- Average water used for beneficiation is 1.4 m^3/ton
- Water consumption of 89 mines in 2010-11 was 161 MLD

Brain teaser

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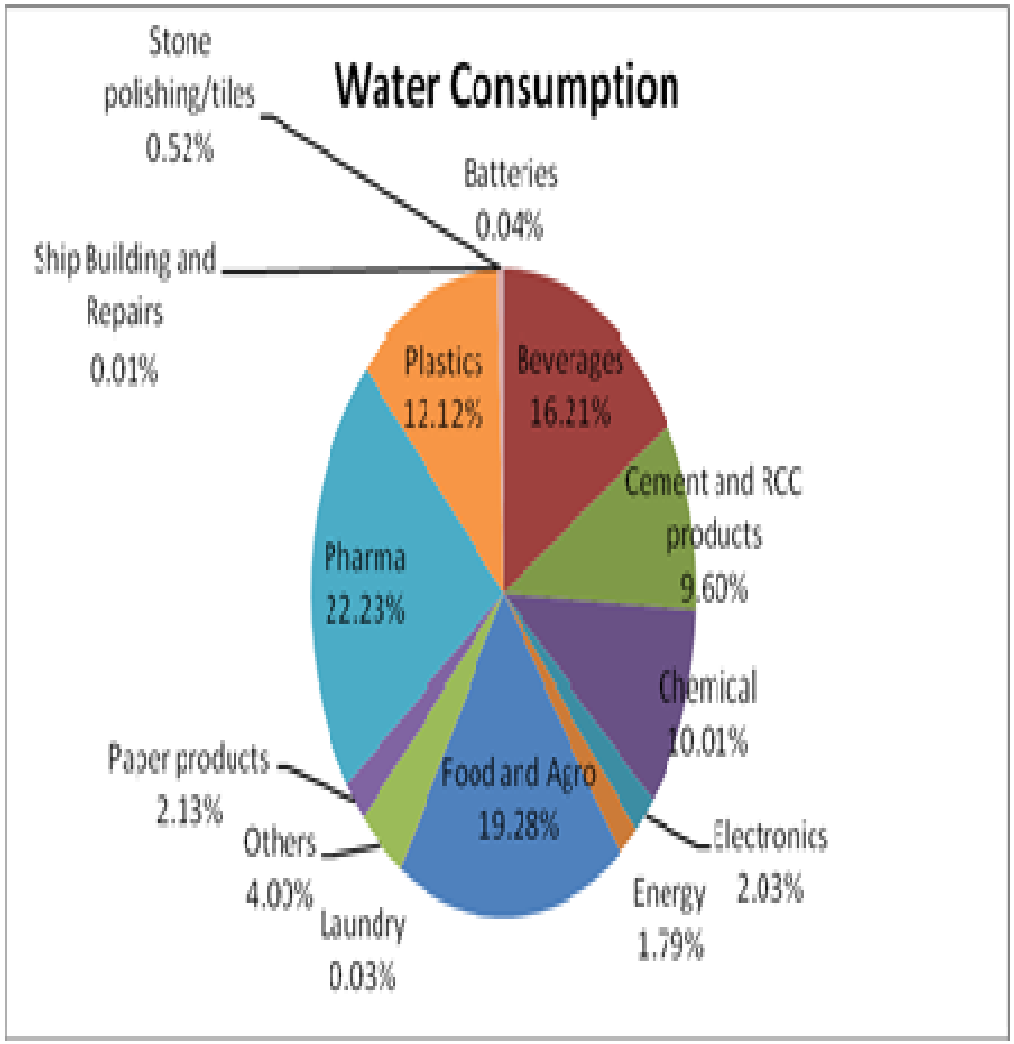
- **How many industries are present in Goa?**

- MSI and LSI = 160
- SSI within industrial estates = 242
- SSI outside industrial estates = 1850
- TOTAL = 2252

Water Demand for Industries

- **Estimated water demand is 484 MLD**
- **PWD supplies 35 MLD**
- **Groundwater exploration = 448 MLD**



Water Demand for Agriculture

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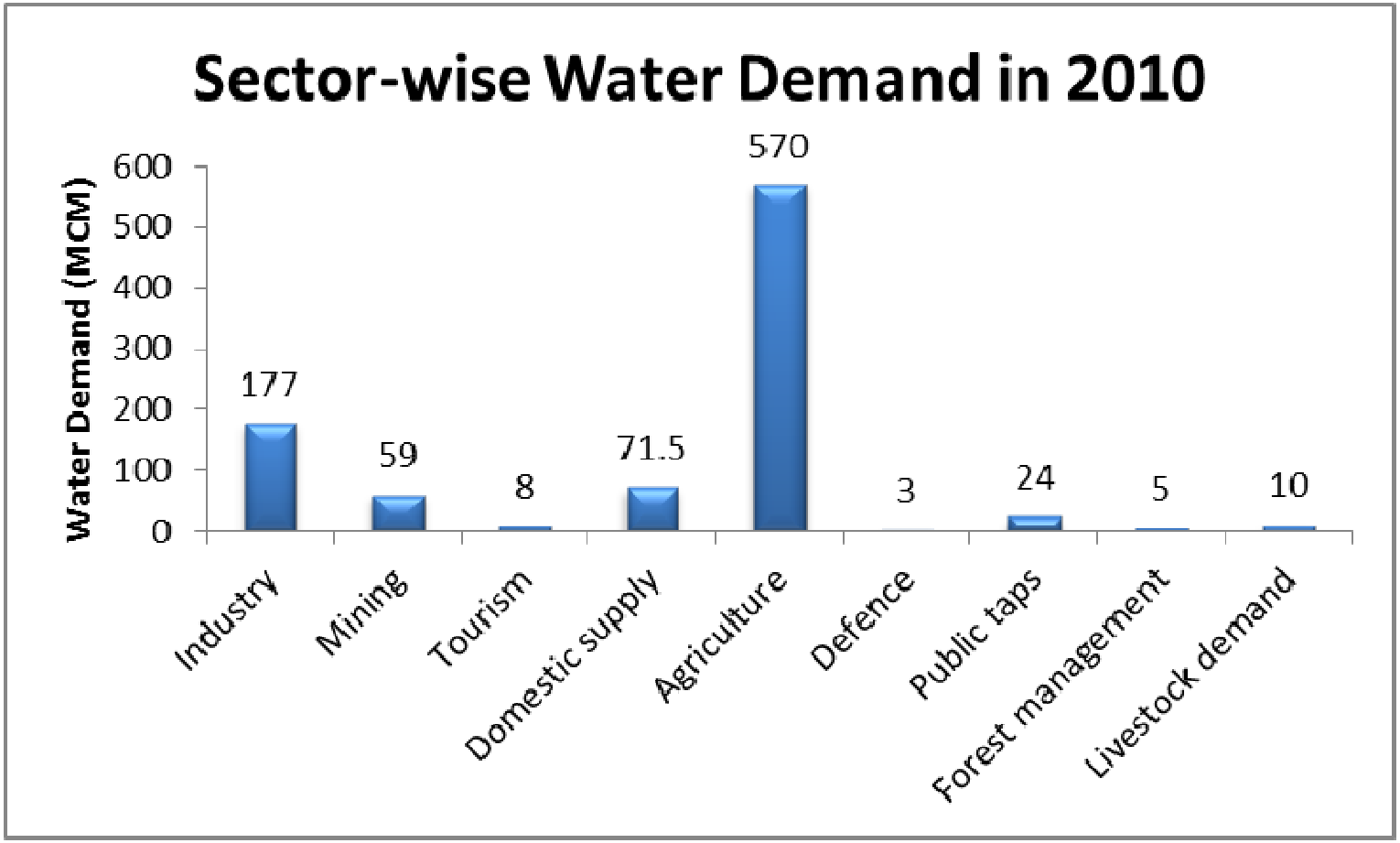
- Area under irrigation: 15938 ha for rice, 24000 ha for other crops
- Based on crop-water requirement, water used for irrigation in 2010 was 570 MCM
- Irrigation potential through bandharas and minor irrigation schemes is 342 MCM
- Rest is through groundwater and rainwater stored in ponds

Total Water Demand



Estimated total demand = 927 MCM

Overall water availability

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Source	Amount of water available (MCM)	Source/ Remarks
Ground water extraction	43.89	CGWB (Feb 2011)
Dams/storage structures	754.28	WRD, storage status till 2010-11
Bandharas	42.35	WRD, storage status till 2010-11
Minor irrigation	300	WRD, storage status till 2010-11
Direct drawing of water from rivers by 9 supply schemes	143.33	WRD, storage status till 2010-11
TOTAL as of 2011-12	1283.9	
Additional Bandharas planned	4.74	WRD, Govt of Goa
Expected water availability in 2020	1288.6	

Projections: BAU Scenario

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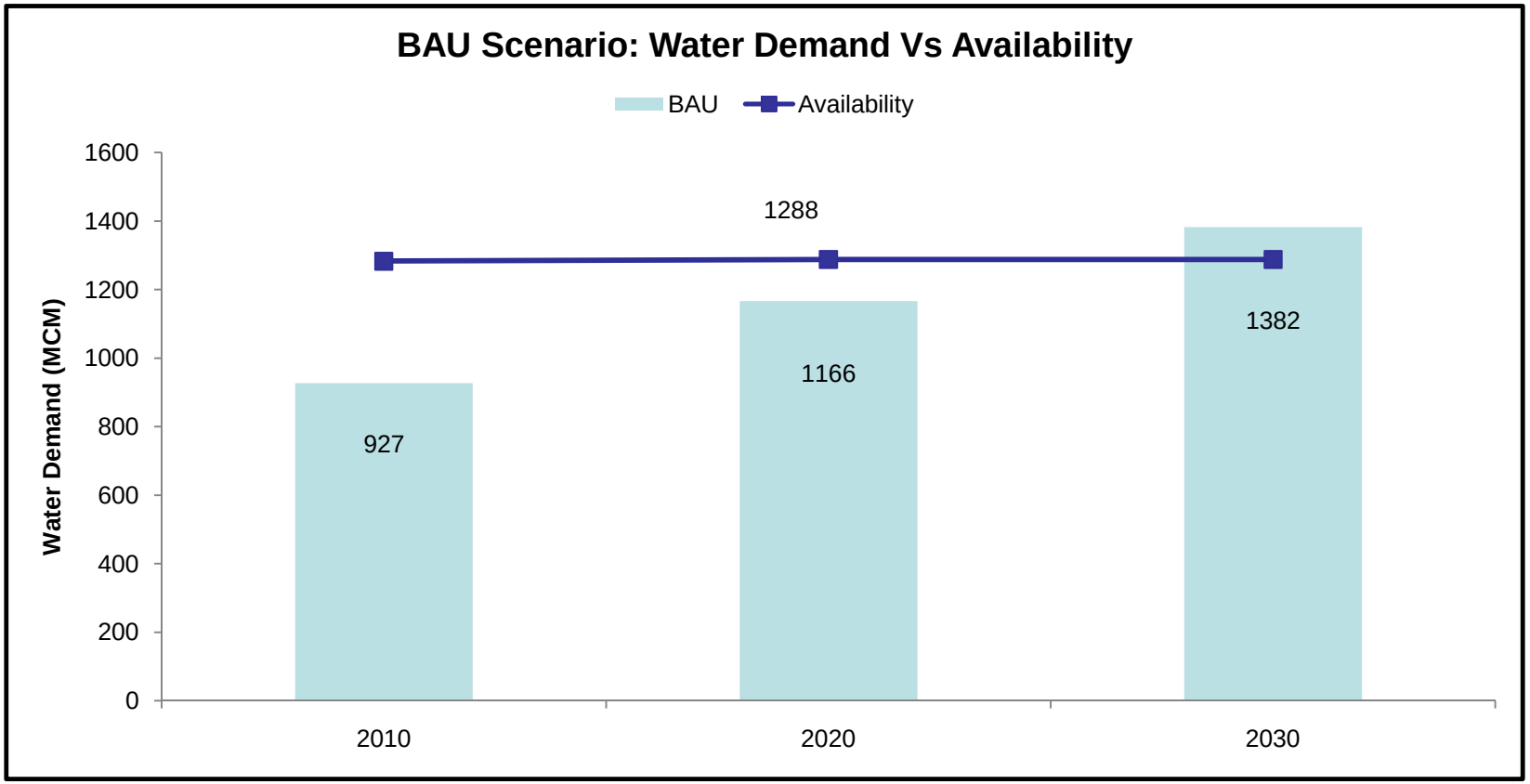
- **Domestic**
  - Using population and urbanization projections
- **Tourism**
  - Using projected number of rooms under different category of hotels
- **Mining**
  - Using projections based on demand from international markets
- **Industry**
  - Increase in number of industries forecasted using growth in GSDP, type of industry that will be promoted and availability of land
- **Agriculture**
  - Using regression analysis, area under irrigation was predicted

Cumulative demand Vs availability



- Does not include water demand from construction sector, hence on lower side
- Projections does not include impact of climate change on availability

Solution???

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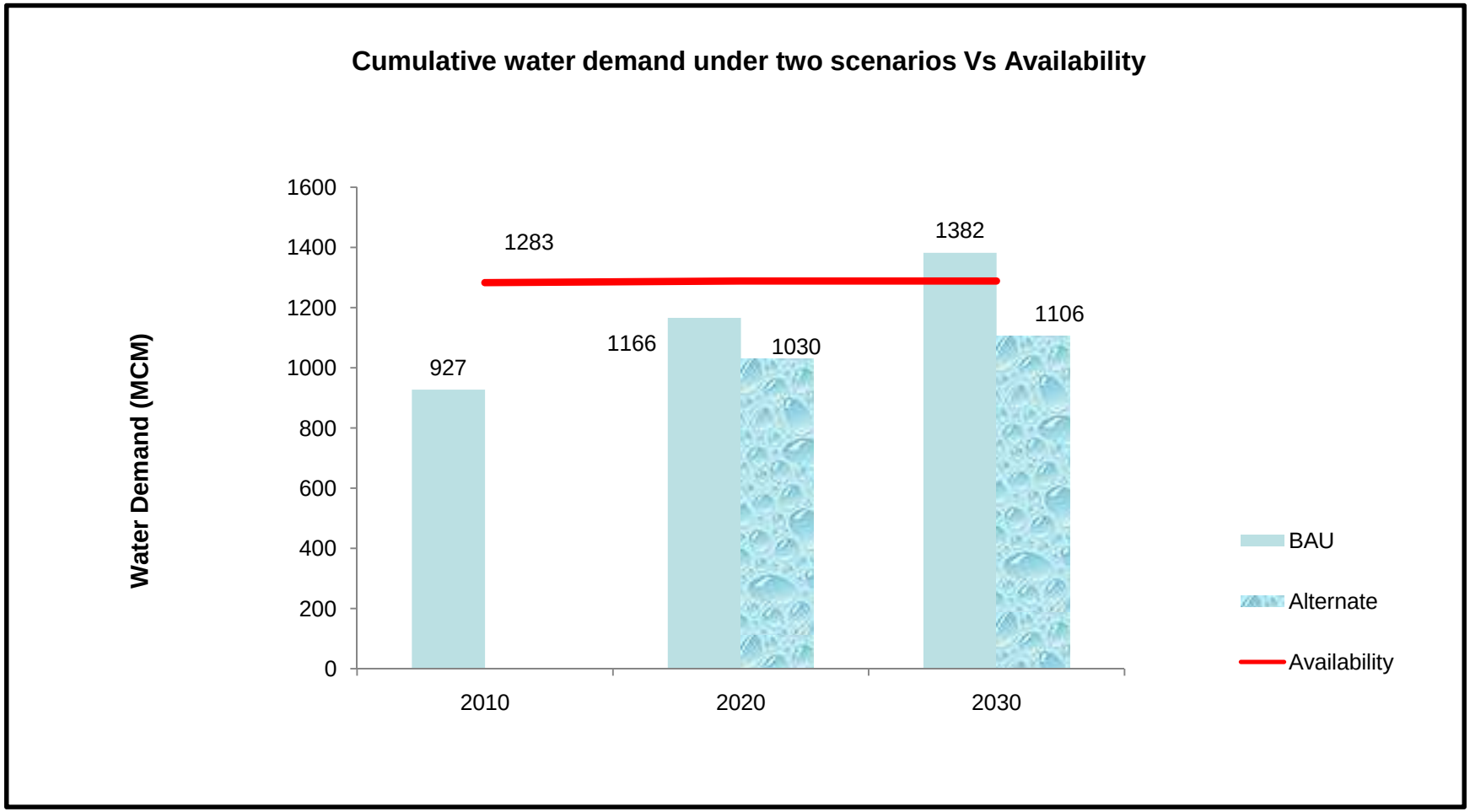
- **To increase water-use efficiency of all the sectors**

Alternate Scenario



Solutions to improve water-use efficiency

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- Domestic & Tourism
  - **Use of water efficient fixtures**
  - **Improving service level benchmark**
  - **Plugging of leakages and conservation**

- Mining
  - **Reduction in mining**
  - **Recycle and reuse of water**

Solutions to improve water-use efficiency

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- Industries
  - **Regular water audits, fixing leakages**
  - **Process change and water efficient measures**
  - **Rainwater harvesting**
- Agriculture
  - **Micro or drip irrigation**
  - **Adoption of measures that increase the crop yield with less water. Example SRI**

Solutions to improve water-use efficiency

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- Construction
  - **Minimizing the load on groundwater and municipal supply by reducing the demand during 3 phases i.e. construction, landscape and building use**
  - **Control waste of curing water**
  - **Xeriscaping**
  - **Dual pipe plumbing**
  - **Use of water efficient fixtures**


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Thank You