

Moving towards water secure and climate resilient cities:

Case of two cities of Gujarat – Anjar and Gandhidham

City's water assessment slide deck: Executive Summary

Center for Water and Sanitation (CWAS), CRDF, CEPT University

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AND SANITATION

CRDF CEPT RESEARCH
AND DEVELOPMENT
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Moving towards Water Secure and climate resilient cities Anjar and Gandhidham

Water Security Assessment for Anjar and Gandhidham is prepared by the Center for Water and Sanitation (CWAS),
at the Centre for Research and Development Foundation (CRDF), CEPT University
in partnership with Empowerment Foundation and Dasra to support Anjar and Gandhidham Municipal Council
To move towards water secure and climate resilient cities.

Acknowledgment

Cities have become more susceptible to water scarcity than ever before. Climate change and resultant uncertain weather patterns are forcing cities to take extreme steps to combat severe water crisis, especially during summer months. Indian cities are no exceptions. Understanding the severity, Gol has launched AMRUT 2.0 (Atal Mission for Rejuvenation and Urban Transformation) which focuses on making cities water-secure and self-sufficient through circular economy of water.

Anjar and Gandhidham cities are located in the arid region at the Kachchh district, Gujarat. It receives around 430 mm of annual rainfall in comparison to the national average of 1152 mm. Large part of the Kachchh region including Anjar and Gandhidham are water stressed with a severe shortage of drinking water in the summer and is characterized as a drought-prone areas. This situation has improved significantly since the long distant Narmada canal water has been made available as drinking water. However, change in rainfall pattern in Narmada catchment may result into water scarcity in Anjar, if the local water resources are not managed well.

In this context, CWAS at CEPT University in partnership with Empowerment Foundation and Dasra will support Anjar Municipal Council and Gandhidham Municipal Council to move towards water security. The key support will include assessment of existing water scenario, developing water security plans for the city and demonstration of pilot projects like rain water harvesting, ground water recharge, revival of defunct wells and reuse of wastewater. A mix of secondary data provided by the city, primary surveys, and stakeholder interactions were done to prepare the assessment slide deck for both Anjar and Gandhidham city.

CWAS team acknowledges excellent support by Anjar and Gandhidham Municipal council officials. Discussions with other stakeholders such as private water suppliers, water sector experts, community groups and slum households have also helped assess existing water scenario in both the cities.

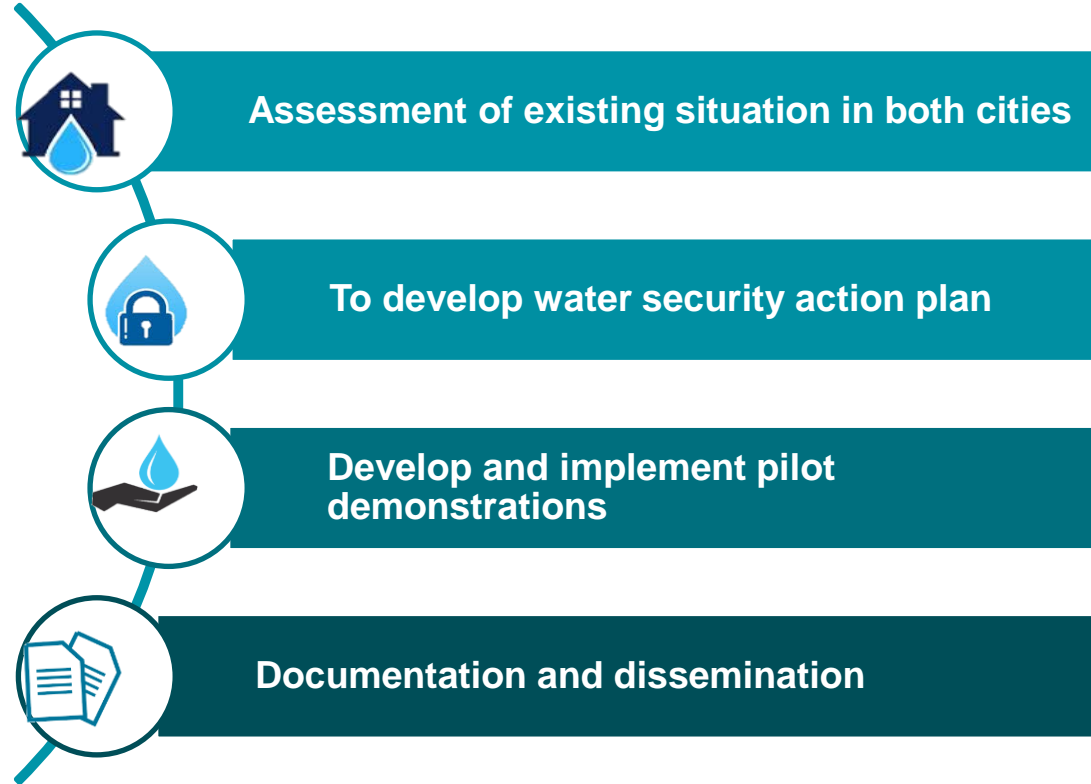
We thank the Dasra team for its support and Empowerment Foundation for its grant to CWAS for this activity.

Meera Mehta and Dinesh Mehta
Center Heads, CWAS

Water Security Program: Objectives

The program for the cities of Anjar and Gandhidham study has four main objectives:

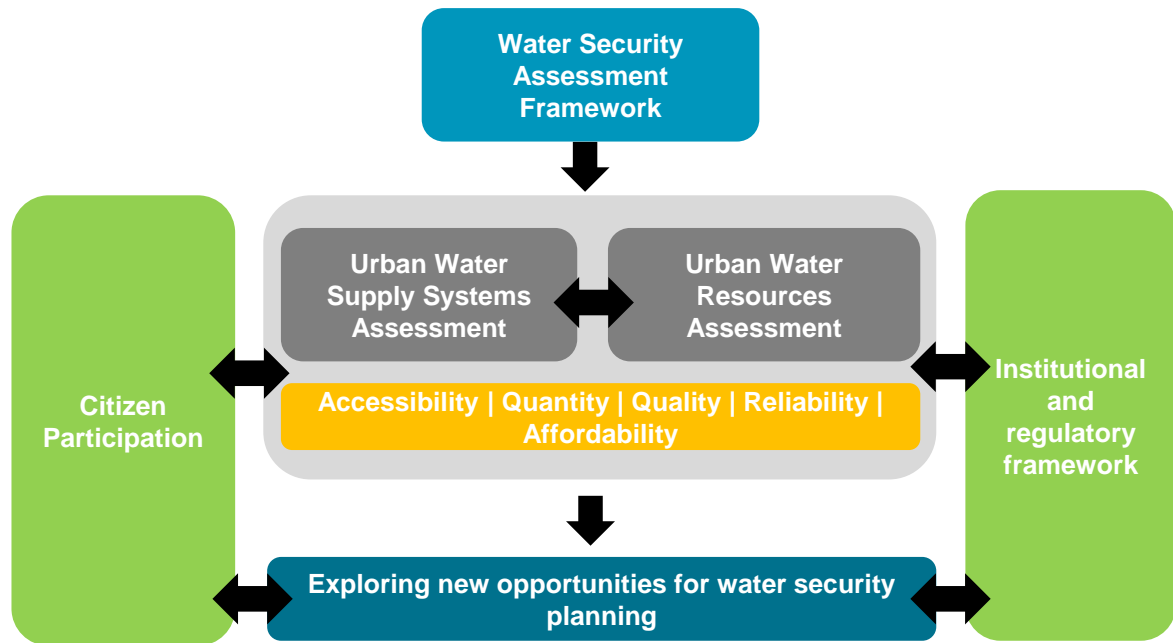
- **To Assess the Existing water situation in both the cities:** through the lens of Accessibility, Quantity, Quality, Reliability and Affordability.
- **To develop Water Security Action Plan:** where new initiatives will be explored to make the two cities water secure.
- **To develop and implement pilot demonstration projects:** for measures such as rainwater harvesting (RWH), ground water recharge (GWR), recharging urban flood spot etc.
- **To document and disseminate the city experiences and plans:** The complete project experience along with a scale up plan will be documented.



Water Security Assessment Framework focuses on four key aspects: Water source study, municipal water services, institutional framework and citizen participation

Water Security assessment framework is based on the **Urban Water Security Management Toolkit** developed by **CWAS** and is further **adapted**. The toolkit is used to assess existing water situation from **Urban water supply system** and **Urban water resources** perspectives. The service chain is analyzed through the lens of five parameters viz., **Accessibility, Quantity, Quality, Reliability and Affordability**.

Based on this assessment, **Water Security Action plans** for both cities will be developed. This will help explore new opportunities to make both the cities water secure.



Approach and Methodology

Desk review



Detailed desk review of various Water security frameworks, toolkits etc. adopted across the globe to make cities water secure

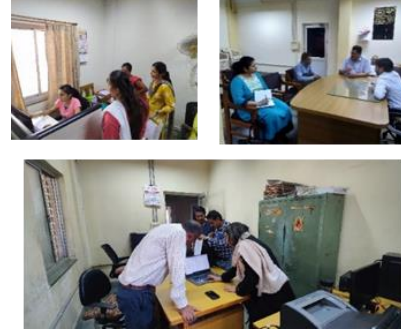
- **Asian Development Bank: Asian Water Development Outlook (AWDO)**
- **United Nations: Framework for Water Security**
- **WaterAid: Water Security Framework**
- **CWAS: Urban Water Security Planning Toolkit based on Bhuj Experience**

Site Visit



- Site visits to all the **water and sanitation** related infrastructures in the entire city
- Survey of all the **slums** to develop **slum profile** and understand equity aspects
- **City survey** to understand the **urban fabric**

Discussion with ULB officials



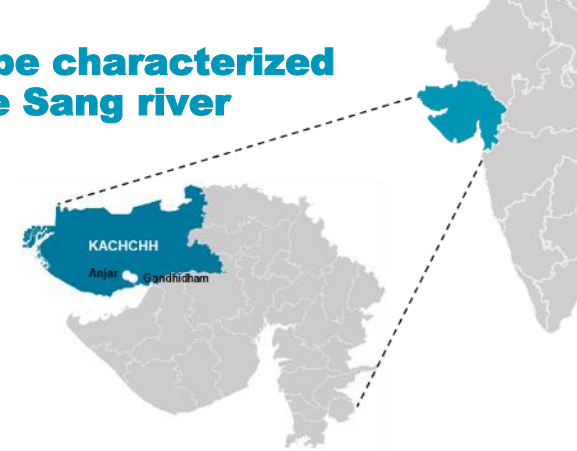
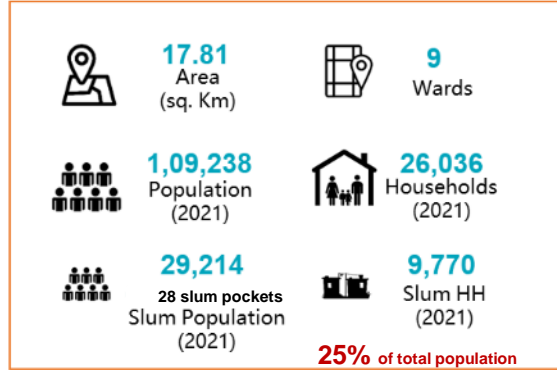
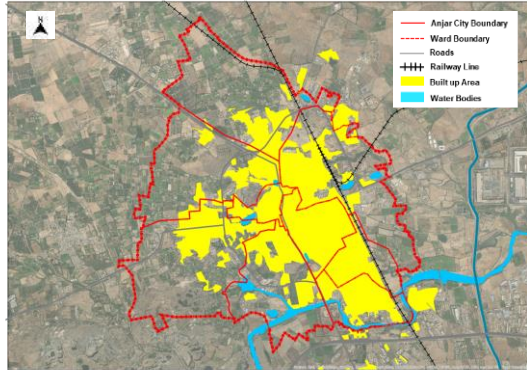
- Discussion with **CO, President, department heads and engineers** to understand the **existing infrastructure and governance practices**
- Visited **various departments** of the ULB like **Water, sanitation, IT, property tax** etc.

Discussion with citizens (including Slum pockets)

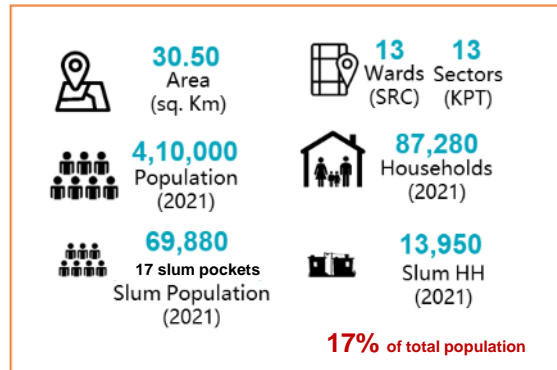
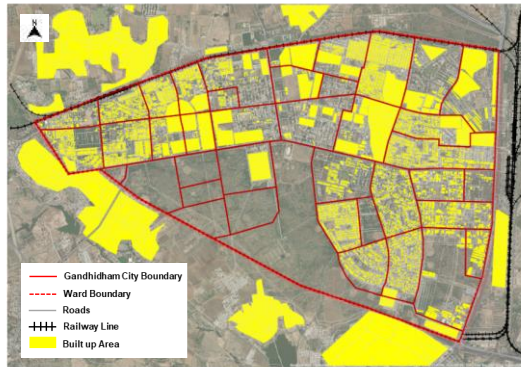


Discussions with **Citizens, slum dwellers, Youth leaders, senior citizens** etc. conducted for better **understanding of the existing water and used water systems** in both the cities.

Anjar and Gandhidham are located in Kachchh district and can be characterized as twin cities (12-15 kms apart) geographically separated by the Sang river



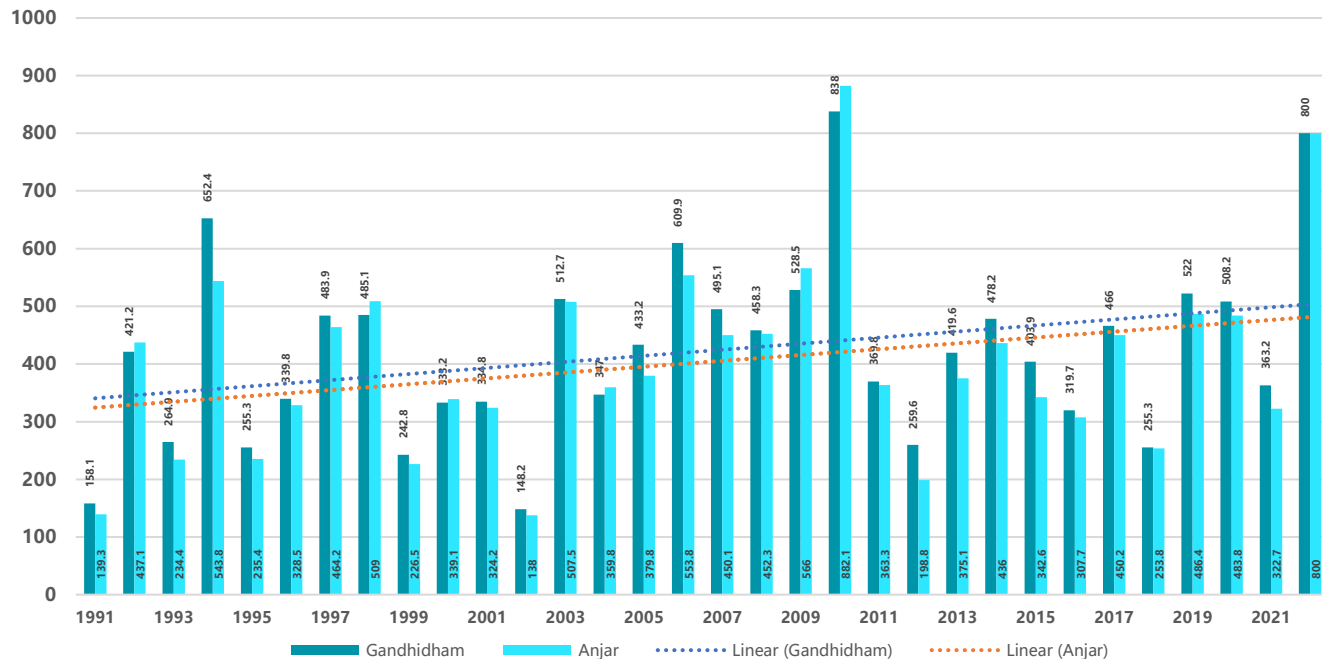
- Kachchh is a largest district of Gujarat State; spread over 45,674 km² with a long coast line of about 406 kms



- Kachchh region falls under arid-semi arid zone (classified by average annual rainfall of 250-500 mm)

- Growing economic and industrial hub in the state. The key industries include **Engineering, Power, Steel Pipes, Cement, Handicrafts.** Emerging industry sectors include **Construction, Chemicals, Ceramics and Textiles**

The region is chronically drought prone with a frequency of once every 2.5 years. However the rainfall shows an increasing trend in past three decades



- Kachchh district has faced famine every 2.5 – 3 years
- In the last decade this region faced **severe drought in almost every alternate year (2012,16 & 18)**
- Number of **rainy days** has **increased** (~13 days)

In recent decades the **rainfall pattern shows an increasing trend that can be tapped to augment the own water resource** of the cities in Kachchh Region

~25% population of Anjar and ~17% of Gandhidham reside in Slum Areas

Anjar



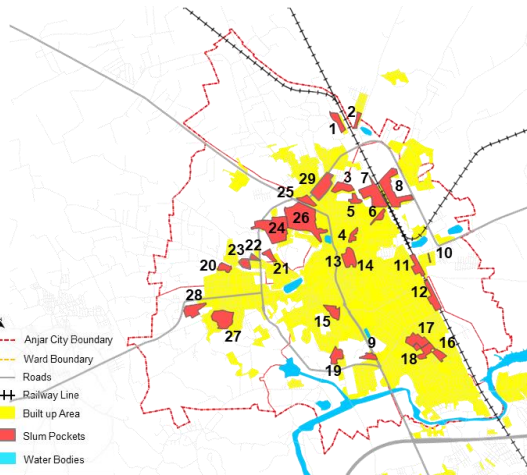
29
Slums



29,214
Population



9,770
Households



Gandhidham



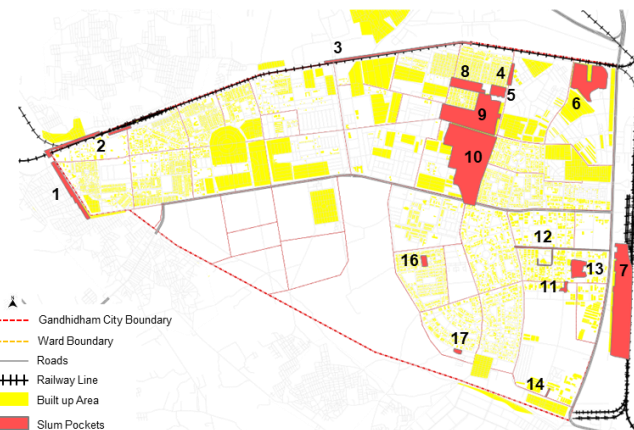
17
Slums



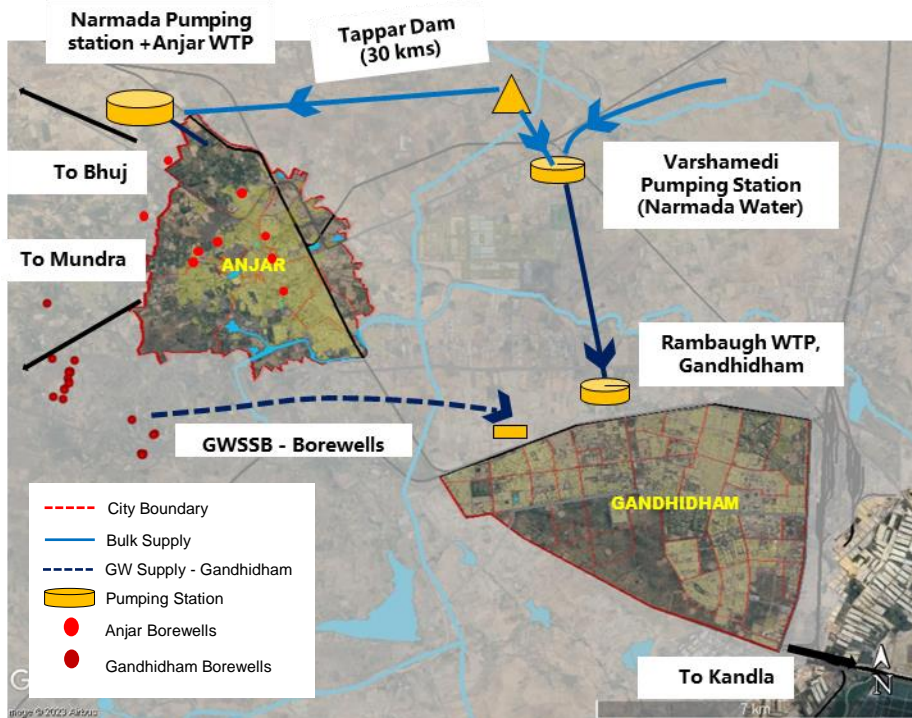
69,880
Population



13,950
Households



There has been a shift in sources of water ground water to distant surface water source with access to water from the Narmada Project



Surface Water



ANJAR – 9 MLD
GANDHIDHAM – 40 MLD

Anjar has **50%** and Gandhidham has **75%** dependency on Narmada water

Ground Water



ANJAR – 10MLD
GANDHIDHAM – 12 MLD

Anjar has **50%** and Gandhidham has **25%** dependency on ground water, which is now **depleting**

ANJAR (Total Supply 19 MLD)

Before Narmada, Anjar had major dependency on ground water, which the municipality supplied through its own borewells

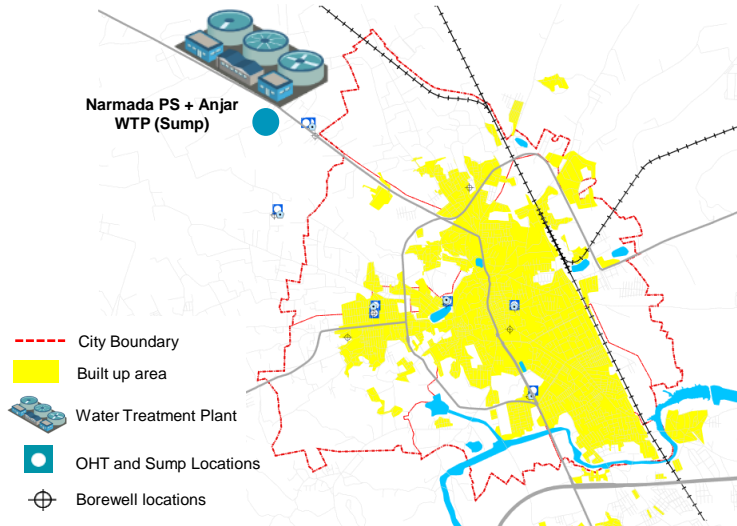
GANDHIDHAM (Total Supply 52 MLD)

Before Narmada, the city had dependency on **40 tube wells (situated in Anjar taluka)**, out of which **12 tube wells** are currently dysfunctional

Also the cities are planning to shift to surface water (Narmada water) over a period of 5-8 years

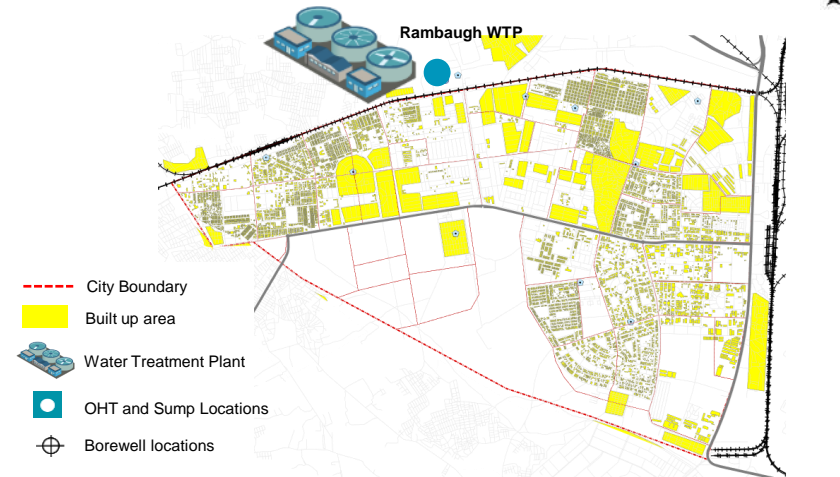
Anjar and Gandhidham both have installed Water Treatment Plant (WTP) of 4.5MLD and 40MLD capacities respectively

ANJAR



- Anjar has **4.5 MLD Water Treatment Plant (technology – Rapid Sand Filter)** which treats Narmada water and supply to the headworks
- Anjar is **augmenting its treatment capacity by 15 MLD** under “Nal se Jal” Project at Nagalpar

GANDHIDHAM

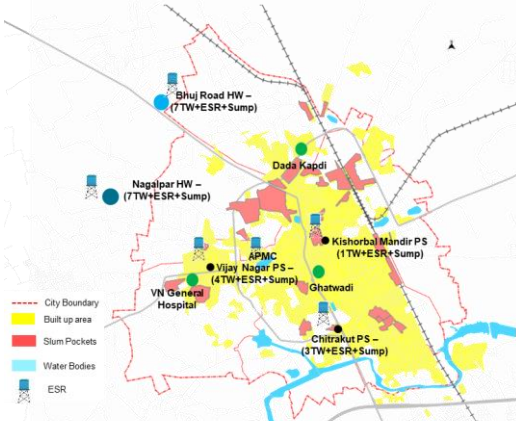


- Gandhidham has **40 MLD Water Treatment Plant** The city is augmenting its **treatment capacity by 27 MLD** under “Nal se Jal” Project

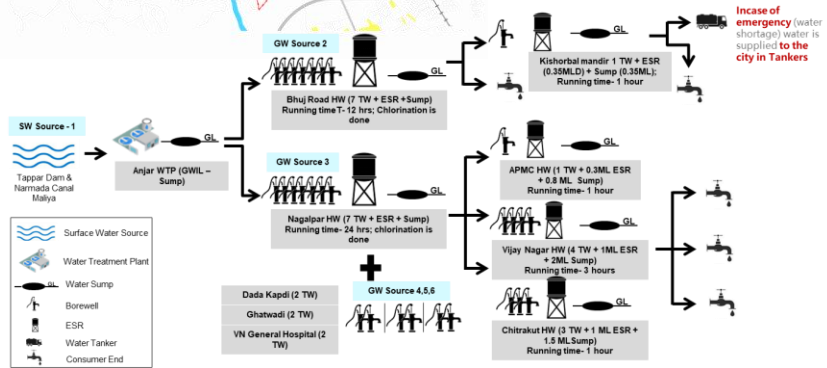
The **WTP at Rambaugh, Gandhidham is non-functional** since more than a year, however Chlorination is done at WTP

Cities are augmenting their water storage capacities under Nal se Jal scheme

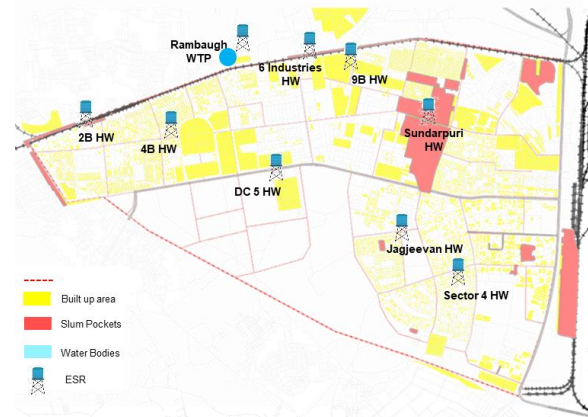
Anjar has ~5 ML ESR and ~14 ML Sump storage capacity



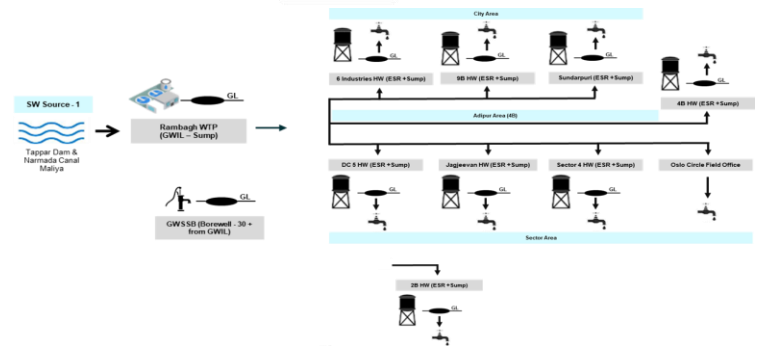
Anjar city is further strengthening their storage capacity by 5.8 ML under “Nal se Jal” project



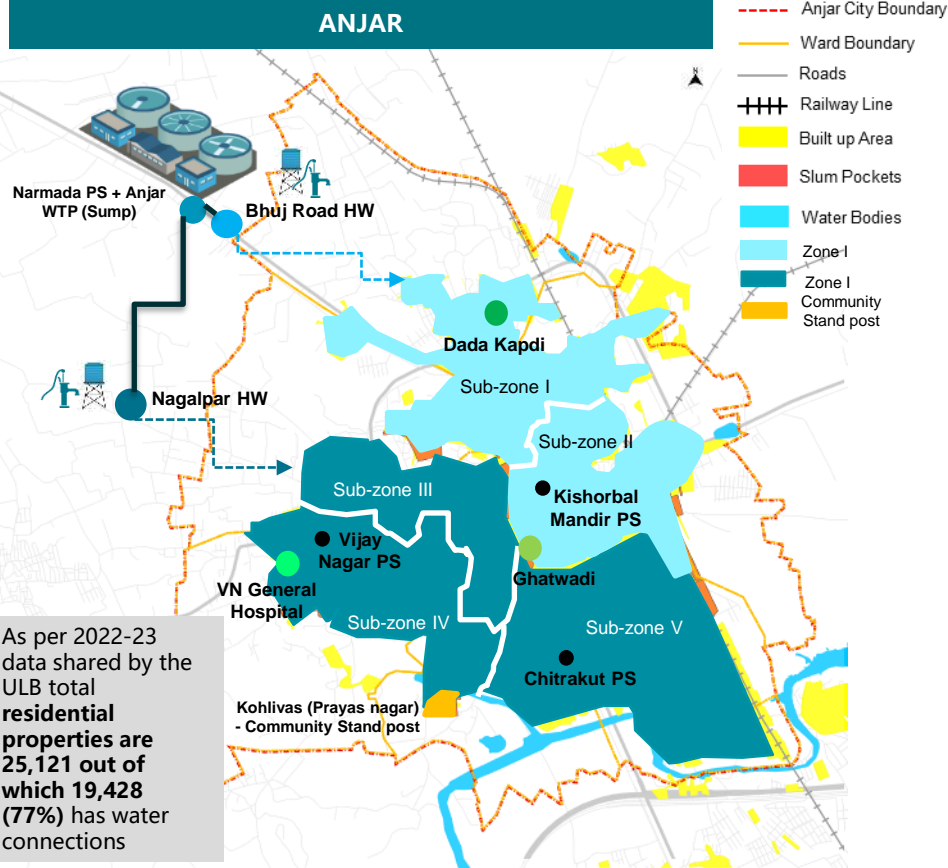
Gandhidham has ~7 ML ESR and ~11 ML Sump storage capacity



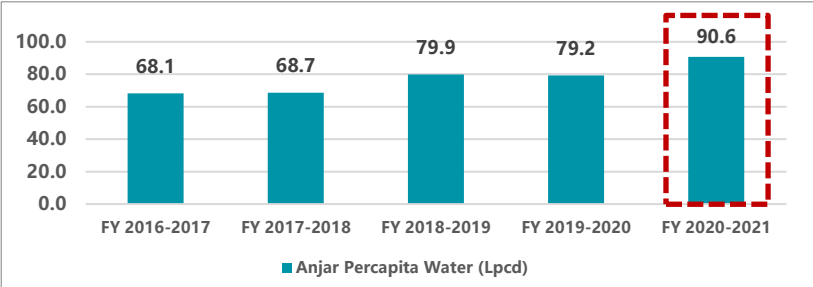
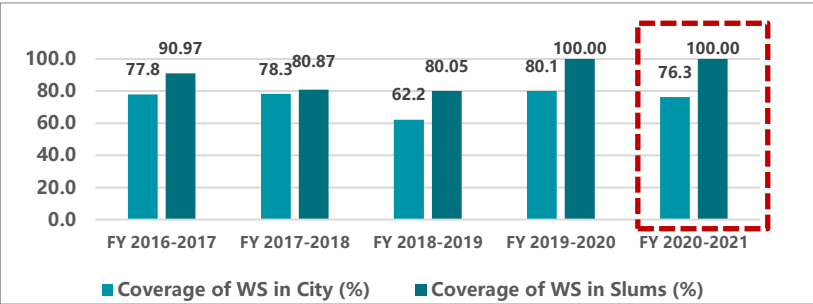
The city is augmenting its storage capacity by constructing 7 ESR/UG sumps under the “Nal se Jal” Project



Anjar city have good coverage of water supply with Per Capita water supply of 91 lpcd



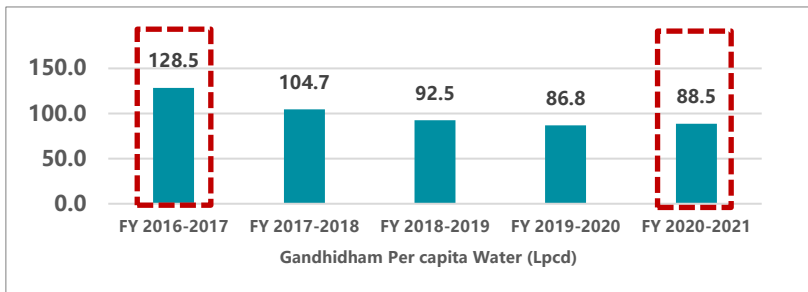
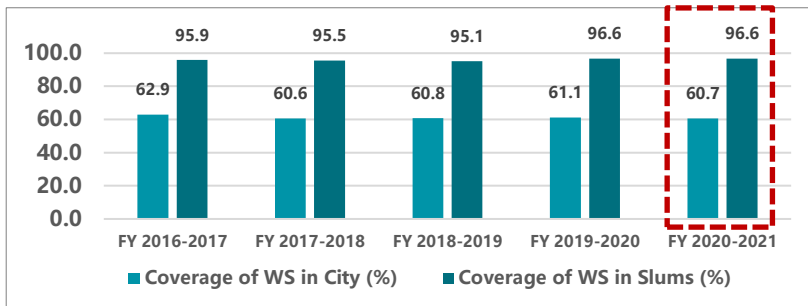
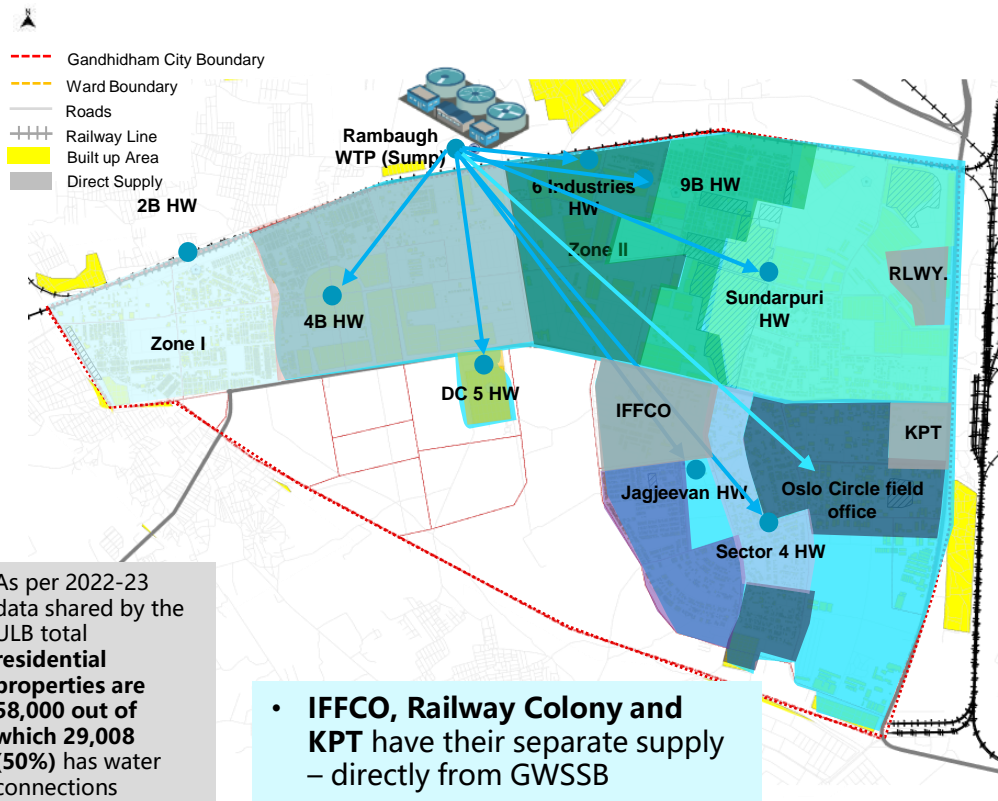
As per 2022-23 data shared by the ULB total residential properties are 25,121 out of which 19,428 (77%) has water connections



- The reported residential coverage of water supply connection is 76%, however on field the city seems to be fully covered with WS connections
- The per capita supply has increased from 68 to 91 LPCD over the period of 5 years mainly due to increase in bulk supply from Narmada

Gandhidham has good water supply coverage with only Khodiyar Nagar slum with partial supply connections

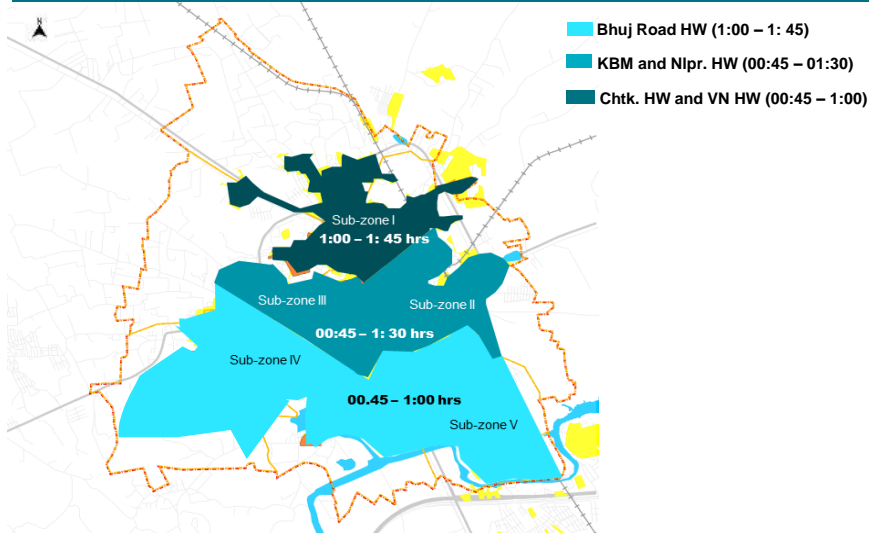
GANDHIDHAM



- The coverage of water supply connection is 60%, however on field the city seems to have full coverage
- The per capita supply has decreased from 128 to 89 LPCD over the period of 5 years which is mainly due to increase in population in the city

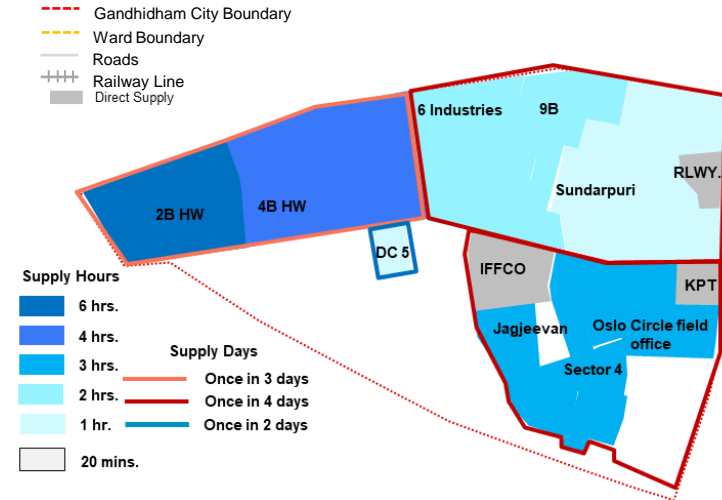
Anjar city supplies water on alternate day whereas Gandhidham city supplies water once in 3 - 4 days

ANJAR – City Area Supply Hours



- The water is distributed in **3 water zones and 5 subzones**
- Supply hour varying from **45 minutes to 1:45 hours**
- Some slums at the **tail end** receive water at very low pressure
- Due to **lack of Human resources**, ULB is **unable to supply on daily basis** (as discussed with ULB officials)
- ULB also has the perception, that if we provide daily supply people will waste the same

GANDHIDHAM – City Area Supply Hours



- **Spatial discrepancy** in supply hours is observed in city areas
- Slum pockets have **pressure issues**; some slums have continuous supply for **2 days** and then supply is **skipped for 2 days**
- **Storage is the major issue** which the ULB cited for not supplying daily water
- Post implementation of **“Nal se Jal”** city may plan to shift to once in **2-3 days**

Leakage is a major cause of Non Revenue Water(NRW) in both cities

ANJAR System Input Volume (19 MLD)	Authorized Consumption (11.95 MLD) 62.89 %	Billed Authorized Consumption (10.15 MLD) 53.42 %	Billed Metered Consumption (NA) Billed Unmetered Consumption (10.15 MLD) 53.42 %	Revenue Water (10.15 MLD) 53.42 %
		Unbilled Authorized Consumption (1.80 MLD) 9.47 %	Unbilled Metered Consumption (NA) Unbilled Unmetered Consumption (1.80 MLD) 9.47 %	Non-Revenue Water (7.05MLD) 37.10 %
	Water Losses (7.05 MLD) 37.10 %	Apparent Losses 0 %	Unauthorized-Consumption 0 %	
		Real Losses (7.05 MLD) 37.10 %	Metering Inaccuracies (NA) Leakage on Transmission and/or Distribution mains (7.05 MLD) 37.10 %	

Anjar' s (online) complaint redressal system also indicates that most of the complaints are related to **leakages** in the system

GANDHIDHAM System Input Volume (52 MLD)	Authorized Consumption (36.9 MLD) 70 %	Billed Authorized Consumption (36.0 MLD) 70 %	Billed Metered Consumption (NA) Billed Unmetered Consumption (36.0 MLD) 70 %	Revenue Water (36.0 MLD) 70 %
		Unbilled Authorized Consumption (0.9 MLD) 1.73 %	Unbilled Metered Consumption (NA) Unbilled Unmetered Consumption (0.9 MLD) 1.73 %	Non-Revenue Water (15.1MLD) 30 %
	Water Losses (15.1 MLD) 30 %	Apparent Losses 0 %	Unauthorized-Consumption 0 %	
		Real Losses (15.1 MLD) 30 %	Metering Inaccuracies (NA) Leakage on Transmission and/or Distribution mains (15.1 MLD) 30 %	

Need to **switch** from ad-hoc to **permanent** solutions which can be identified by conducting **water audits**

Due to intermittent supply, Private Water supply tankers have gained in importance in Gandhidham city, which the citizens find more reliable



Pvt. Water Tankers



Water supply in Gandhidham city is once in 2-4 days, so people have to store water for that duration and in case of delay in water supply or sudden increase of usage, private water suppliers play a crucial role.



It was observed that approx 5 to 10 such suppliers were present within 1 km road length in many areas.



These tankers charge around 300-450rs per Tanker (5000lit water)



These suppliers generally have inhouse/ pvt. Borewells from where they draw water, however there is no control or regulation over ground water extraction



At times there is inspection from municipal authorities and penalties are levied from suppliers. However, they were reluctant to share any information.



In Gandhidham, though the ground water is saline and unfit for use, as per district GW report, we observed that many households have their individual borewells or handpumps which is used for domestic purpose



Ground water in Gandhidham is available at 50-70 ft., with one time cost of installation at Rs. 50,000- 1lakh, thus people find it more economical than private water suppliers



High Dependency on RO water for drinking is observed in Gandhidham



● In **Gandhidham**, citizens are highly dependent on RO water suppliers for drinking purpose. Dependency on these is even higher in slum areas. These water suppliers are spread across the city and specially around slum areas which makes it more convenient option.



RO Water



● Bottled water cost around Rs. 10-25 for normal water and around Rs. 30-40 for cold water (its cheaper if one goes to collect from shop). An average Household spends **Rs. 600-1000/ month on RO water bottles.**



● The main reasons identified for the same are-

- Odd supply hours (3am to 8 am)
- Poor quality of water (bad odour, pale color are observed)
- Low water pressure (quantity of water is not sufficient)
- Dependency on community stand post (lack of individual connection)



● There is **no control or regulation or check** over quality of water supplied

● **People in Non slum Areas also prefer using Ro water bottles** as water supply frequency is once in 3-4 days and there is 30-40% wastage of water in Regular RO.



Water ATM



● Alternate to RO bottles, there are **Water ATMs**, the source of water is ground water (inhouse borewells) but these are open 24x7 and bottles of various sizes can be filled directly. This facility is used by **both Slums and Non-Slum areas.**



● Water tarrif remains **Rs. 1 / liter for normal water and Rs. 2/ liter for cold water** and machine installation cost is around Rs.1 Lakh



Human stories for understanding water situation from stakeholder perspective

Citizen perspective



Bindu Suman –
Resident Khodiyar Nagar; Gandhidham

“
...We do not have individual water connection.... So we depend upon private tankers...
”

- **No individual municipal water connection**
- Depends upon **community stand posts**
- Water is available for **once in 3 days** for **1 hour** at **low pressure** at the stand posts.
- **Long waiting queue** for fetching water
- **Timings** are very **odd** – 2:00 to 3:00 am (post mid night)
- Prefer **private water tankers** than municipal water



Geeta Ben –
Resident Lilashanagar; Gandhidham

“
...we have good water supply system provided by the Municipality...
”

- **Individual municipal water connection** since more than 15 Years
- Water is available **once in 3 days** day for **1 hour** at **good pressure**
- The system has **improved post Narmada**
- Geeta ben is **happy** with the **Municipal service**



Lilaben –
Resident Zundviastar; Anjar

“
...We are completely satisfied with the municipality service... specially post Narmada ...
”

- **Individual municipal water connection**
- Water is available **every alternate** day for **1 hour** at **good pressure**
- **Quality** of water has also **improved**
- Lilaben is **happy** with the **Municipal service**



Shakina –
Resident Paridhivas; Anjar

“
...poor municipal services, pressure is low ...so we often procure water from pvt. water tankers
”

- **New individual municipal water connection**
- Water is available for **alternate day** for **1 hour** at **low pressure**
- The water collected is **insufficient** for their daily needs
- Prefer **private water tankers** than municipal water



Service provider perspective



Anil Joshi–
Department; Gandhidham Municipality

“
...Municipal services have improved post Narmada ...we now supply sufficient quantity of water...
”

- **Do not face water scarcity**, post Narmada
- Now Municipality is **supplying sufficient** water in the city
- Supply is for **once in 3 days**, which we plan to make **daily post implementation of Nal se Jal project**
- The **“Nal se Jal”** project will **strengthen** the water system



Bore operator –
Chitrukut; Anjar Municipality

“
...the ground water level is depleting...every year we have to lower the pump...
”

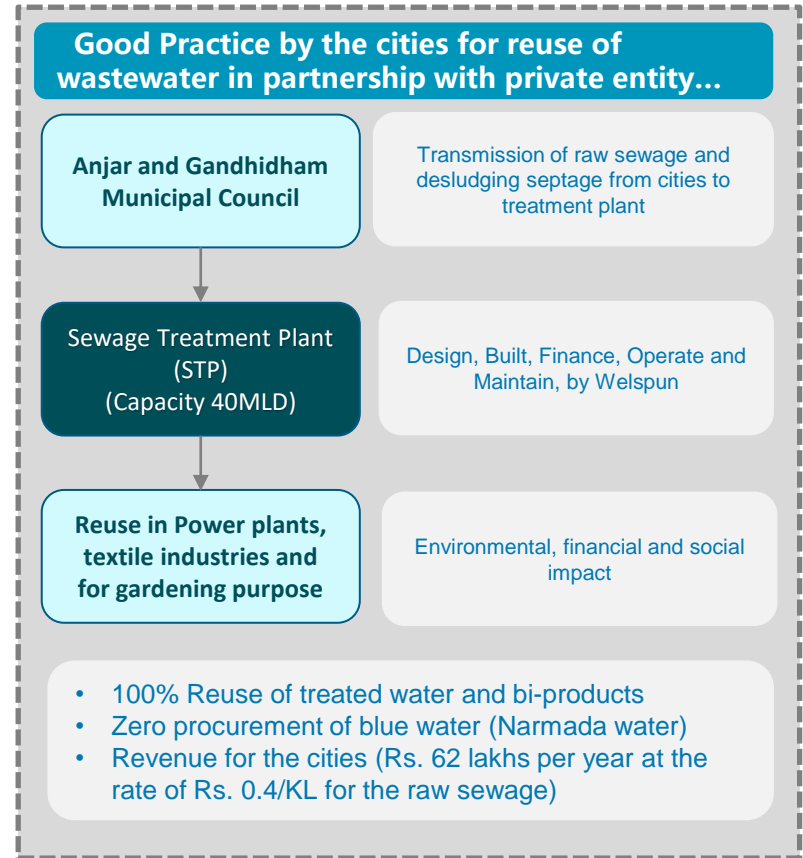
- Municipality has **50% dependency on ground water**
- Ground water is available at **400 to 600 feet depth**
- The **ground water** is **depleting ever year**
- Municipality has to **lower the pumps every year** due to this
- We soon may **run out of ground water**



Mixed perception and responses from stakeholders . . .

The cities showcase 100% reuse in Circular economy of wastewater management...

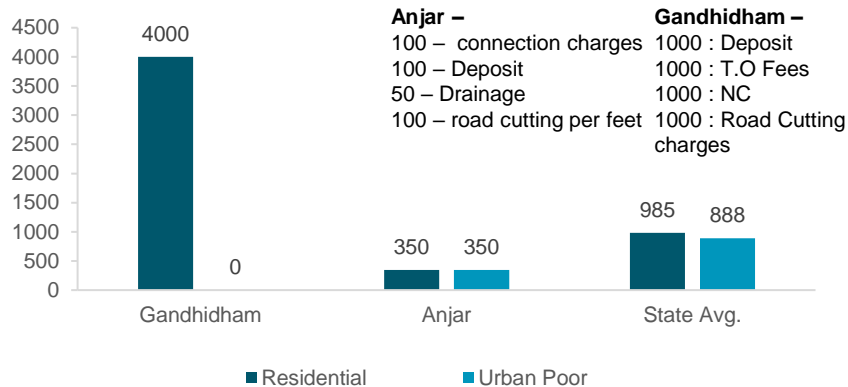
- **Anjar and Gandhidham Municipalities** have entered in a **concession agreement** with **WIL** (Welspun India Limited) for a period of **35 years**
- Welspun has used a **Design, Build, Finance and Operate (DBFO)** model for this Sewage Treatment Plant
- Welspun is paying **40 Paisa/KLD** to the municipalities through which Cities receive a **revenue of Rs. 62 lakhs per year**
- Sewage from both the cities is **treated in the STP**, further the treated water is **used by the textile industry** (Welspun)
- Benefits of the project:
 - ✓ Elimination of dumping of untreated sewage into the Nakti Creek
 - ✓ Revenue to municipalities through royalty from Welspun
 - ✓ Entire waste water is being recycled for production activities at Welspun
 - ✓ Zero water pollution and sludge generation
 - ✓ Excess bio-sludge is used as manure for plantation



Gandhidham has high Water connection charges as compared to Anjar while both cities have same flat annual water tariffs

Water Connection Charges – One time charge in INR

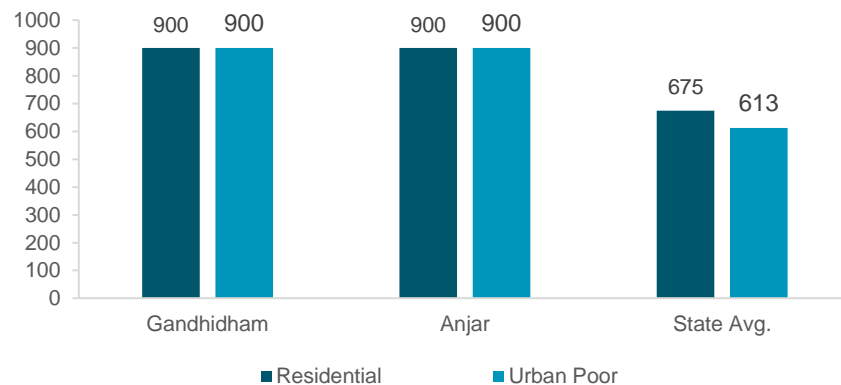
Water Connection Charge



- The state average for water connection charges is Rs. 985/- and Rs. 888/- for residential and urban poor respectively
- Gandhidham have high connection charges, however no charges are levied from Urban Poor for same
- Anjar have low connection charges and it levies equal charges from both sections of the society

Water Tarrif – Annual Charge in INR

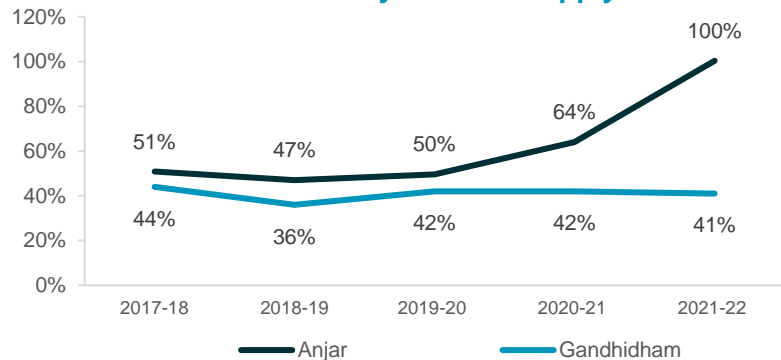
Annual Water Tariff



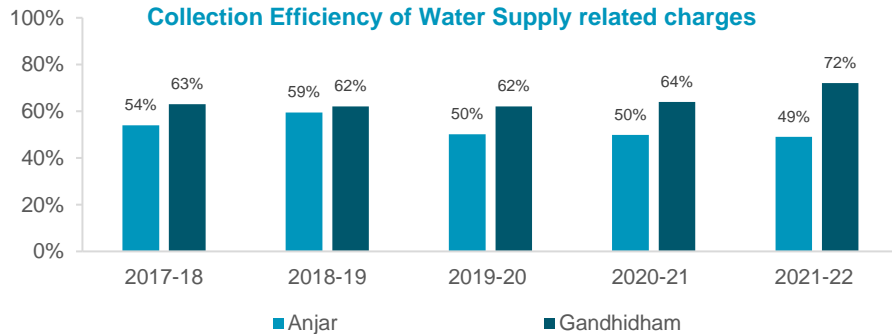
- The cities charge Rs. 900/- annually, which is same for slums and non slums households.
- Anjar has revised their water tariff in year 2021-22 while Gandhidham has same water tariff since 2015-16.
- Cities can pass special circular or GR to link water tax with property tax to have progressive tax system. This will allow the tax to be more equitable as those with larger and better properties pay a higher property tax and water tax.

Anjar has high cost recovery of water services while Gandhidham has high collection efficiency of water charges

Cost recovery of water supply services



Collection Efficiency of Water Supply related charges



- Anjar's cost recovery for water supply service has been consistently rising since 2018-19 with **64% in year 2020-21** and 100% in year 2021-22
- Gandhidham's cost recovery has **remained low at around 40%** against the State average of 92%.
- In Anjar, Water tax collection efficiency has been consistently at 50% which is lower than state average of 62%.
- In Gandhidham, Water tax collection efficiency is steady at 62% till year 2020-21 and increased to 72% in year 2021-22.
- Both cities should revise water tax to **recover operation and maintenance cost** and move from flat rate charge to % property tax to make it equitable and inclusive.
- Cities can introduce **One Time Settlement Schemes** to collect its property tax and water tax arrears. Cities can also organise arrear collection drives and can offer rebates or relax the penalties.
- Cities should include **online collections of property tax** through UPI or linking with leading banks.

Policy level initiatives have been taken by authorities to augment own water resources however ground implementation is very limited

Inclusion of Rainwater Harvesting in Building Permission...

- Anjar Area Development Authority (AADA)
- Inclusion of Rainwater harvesting as part of **Environment Management** (Adapted GDCR)



- Gandhidham Development Authority (GDA) (Est.1957)
- Inclusion of Rainwater harvesting as part of **Environment Responsiveness**

Anjar

- **Online** building approval system
- **No records** available on **RWH structures** approved under the plan
- **No ground** implementation **monitoring** practiced

Gandhidham

- **Manual** building approval system
- Records of only **total building** approved available
- **No ground** implementation **monitoring** practiced

Policy initiatives needs to be supported by **ground level monitoring system** and **incentives** for **property owners** to invest in **RWH . . .**

Rain water harvesting is mandatory for all buildings with ground coverage of 80 sq.mts and above

Building Plot Area (Sq.km)	Harvest Infrastructure Type
Between 80 to 500	Percolation Pit or Bore Recharge
Between 500 to 1500	Percolating Well with Rain Water Harvesting System
Between 1500 to 4000	Percolating Well with Rain Water Harvesting System (up to ground second river)
4000 and above	Percolating Well with Rain Water Harvesting System (up to ground second river) for every 4000 sq.mt area

Key Findings across supply chain for both the Cities...



Water Source

QUANTITY

- The cities are **dependent upon distant water source** – Narmada **water (Anjar – 50% and Gandhidham 75%)** which has **improved the water supply system** in the cities as perceived from the discussion with city officials and citizens, but **cities are not ready to cope emergency situation** like less rainfall in Narmada catchment or maintenance/damage in main supply line etc.
- **Other source of water** in both the cities is **ground water (Anjar 50% and Gandhidham 25%)** indicating city's reliance on its own water source, however **over draft** of ground water has lead to **ground water depletion** (Anjar 3/29 and Gandhidham 12/40 borewells are dysfunctional). This if not **regulated and monitored** properly can further lead to ground water depletion and increased dependence on surface water source. The situation is further aggravated Anjar as **Gandhidham is also dependent upon Anjar's aquifer** for ground water.
- **Anjar has natural water bodies in form of lakes** which can be **leveraged as a source of reinforcing ground water** by constructing GW recharge structure in and around the lakes and developing **buffer zone to control urban flood**
- **Gandhidham** has a huge **market of private water suppliers, which source their water from ground water, with no regulation** on the same
- As per discussion with city officials, **the cities are planning to shift 100% on Narmada** (distant source) water supply under "Nal se Jal" project in next 5 years
- City authorities also has **no plans to augment own water sources**

Key Findings across supply chain for both the Cities...



Coverage

ACCESSIBILITY

- The cities will achieve **100% individual water supply** connections **post implementation of “Nal se Jal”** project under AMRUT 2.0. Currently the individual water supply connections are **75% for Anjar and 65% for Gandhidham**
- The **per capita water supply** has **increased** over the period **from 68 LPCD (2016-17) to 91LPCD (2020-21)** in case of Anjar city which is mainly due to increase in procurement of bulk supply from Narmda, however the **per capita water supply** has **decreased** over the period **from 129 LPCD (2016-17) to 90LPCD (2020-21)**, in case of Gandhidham city which is mainly due to increase in population in the city.
- Both the cities have plan to provide **140 LPCD on daily basis post implementation of “Nal se Jal”**



Water Treatment

QUALITY

- Both the cities have sufficient water treatment capacities with **Anjar 4.5 MLD and Gandhidham 40 MLD treatment capacity**, which the cities are further augmenting by **15 MLD and 27 MLD** capacity respectively under “Nal se Jal”
- However in case of **Gandhidham the existing WTP is non- functional** for more than an year
- **Water quality testing regime** is required to be followed by both city administration so as **to ensure safe supply**, however the city does **not follow any quality testing regime** apart from chlorination at Head Work level.

Key Findings across supply chain for both the Cities...

RELIABILITY



Intermittent Supply

- Water is supplied on **intermittent basis in both the cities**, in **Anjar water is supplied every alternate days** and in **Gandhidham water is supplied once in 3 – 4 days**.
- In **Gandhidham** it was found that there is **huge dependency on private water tankers**, due to intermittent supply from municipality
- **Supply hours in Anjar varies from 1-2 hours** across the city including slum pockets with **uniform distribution**, however in **Gandhidham supply hours** range from **1 to 6 hours with spatial variations**. The supply hours was high in **low lying areas of the city**.

AFFORDABILITY



Cost Recovery

- **Water tariff** in both the cities is **Rs.900/- annually** for household connections, however the **one time connection charges in Gandhidham** is very **high as compared to Anjar**, which is **Rs. 4000/- and Rs. 350/-** respectively.
- **Anjar** levy the **same connection** charges of **Rs.350/- in slum pockets**, where as **Gandhidham exempt** connection charges for slum pockets
- In **Gandhidham**, citizens incur **additional expenses** in **procuring water from private vendors** majorly due to huge **gap in supply** (once in 3-4 days)

Key recommendations to explore in the Water Security Action Plan...(1/3)

Findings



High dependency of distant water



Possible recommendations to be explored

AUGMENTATION OF OWN WATER RESOURCES

- Implementation of RWH/ GWR structures
- Initiating the implementation from **educational buildings, public buildings, parks and gardens** and further scaleup to **community and individual HH Levels**
- **Strengthening existing policy** frameworks for successful implementation and monitoring
- **Building awareness** for Government officials, experts and citizens



Intermittent water supply



MOVING FROM INTERMITTENT TO DAILY SUPPLY

- **Technical evaluation** of existing water infrastructure to move towards daily supply
- **Awareness generation** towards **benefits of daily water supply** over intermittent water supply – Reduced NRW, less wastage of water due to excess storage, contamination reduction etc. – to **change perception** issues and **behavioural pattern**
- Explore **automation of valve operations** (pilot water supply zone) to address resource crunch

Key recommendations to explore in the Water Security Action Plan...(2/3)

Findings



Prevalent presence of Private water market



Possible recommendations to be explored

REDUCING DEPENDENCY ON PVT. WATER MARKET

- As per field observation and FGDs dependency is due to - **intermittent supply; odd supply timings, pressure issues at tail end HHs and quality of water supplied**
- **Quality of water** supplied needs to be **assessed**, this will drive the next step; if **quality is poor** –ULB need to follow **quality testing regime**; if **quality is good** - **awareness** among citizen needs to be generated



Urban Flood due to changing climate pattern



MITIGATION MEASURE TO ADDRESS CLIMATE CHANGE

- Identification of **urban flooding spots** in the entire city
- **Strategic approach to mitigate urban flooding: Institutional measures**– pre monsoon cleaning of stormwater drains; **Awareness** – pre monsoon cleaning drive; citizen engagement; **GWR structures** (low-cost structures in slums identified with water logging situation, society level GWR structures)
- **Community participation** for O&M of structures to develop a sustainable system

Key recommendations to explore in the Water Security Action Plan...(3/3)

Findings



Issues related to Water supply in Slum pockets



Possible recommendations to be explored

COMMUNITY WATER SUPPLY SYSTEM FOR 24X7 - SLUMS

- Though the coverage of water supply connections in slums is 100%, issues related to water supply such as **intermittent water supply, pressure issues at tail end HH, odd supply timings** etc. were identified, **community ESRs/ reservoirs** can be developed for pilot slum
- The system will **provide water to the slum dwellers for 24X7**, thus resolving the issues faced on day to day basis
- **Good practices** from across the globe supports such community systems

THANK YOU

CWAS CENTER
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AND SANITATION

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About us

The Center for Water and Sanitation (CWAS) is a part of CEPT Research and Development Foundation (CRDF) at CEPT University. CWAS undertakes action-research, implementation support, capacity building and advocacy in the field of urban water and sanitation. Acting as a thought catalyst and facilitator, CWAS works closely with all levels of governments - national, state and local to support them in delivering water and sanitation services in an efficient, effective and equitable manner.



cwas.org.in
pas.org.in



cwas@cept.ac.in
tiny.cc/pasenews



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