

SAFE DRINKING WATER SECURITY IN THE STATE OF GUJARAT

RAVI SOLANKI
Chief General Manager
Gujarat Water Infrastructures Limited
Water Supply Department
Govt. of Gujarat

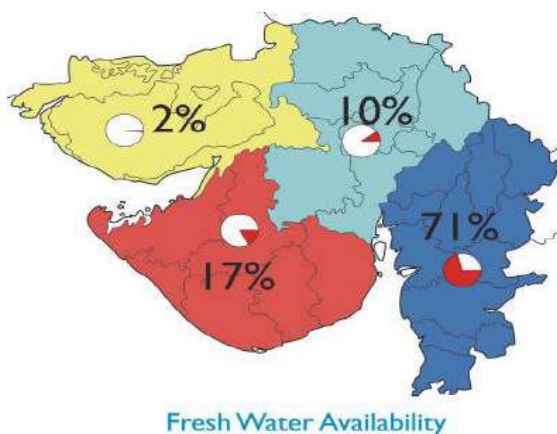
So as In India, the Right to water has been protected as a fundamental human right by the Indian Supreme Court as part of the Right to Life guaranteed under Article 21 of the Indian constitution. The right to life has been expanded significantly over the last three decades to include the right to health and the right to a clean environment which can include the right to clean drinking water. parallel to this, to provide safe drinking water to each living being is the state subject.

Looking to the amplitude of the problem statement in quality and quantity of the drinking water the state government has planned a sustainable and techno economical solutions. in this chapter I try to cover up the situation before 2000 and the successful implementation of state government initiative one by one.

The problem statement

Gujarat has diverse geological, hydrological, climatic and soil conditions, all of which had implications on the status of surface and groundwater resources in the State. Gujarat has already lost "Sarasvati", "Indus" and "Luni" rivers due to climatic and geological adversities. Major rivers such as Narmada, Tapi, Mahi pass through narrow line of South Gujarat. The State has historical evidences of water scarcity like large capacity underground rain water storage tanks in heritage buildings. There are 185 rivers in Gujarat out of which only 8 are perennial located in Southern Gujarat.

There is varied distribution pattern of rainfall in the State ranges from about 200 mm in Kachchh to over 2000 mm in the Dangs in South Gujarat. The rain received in different areas of the state is also not of the same pattern. the scanty erratic and unreliable rain fall has not left the catchment of drinking water as an assured surface water reservoirs. Typical geological formations across the State make water storage in the aquifers and percolation for ground water recharge difficult. Gujarat has long coastline and two huge gulfs – the Gulf of Cambay and the Gulf of Kachchh . The entire Little Rann of Kutch and Greater Rann of Kutch are inundated with saline sea water for a long period of the year which deteriorates the ground water quality in adjoining areas. In a large area of the State, over drafting of ground water mainly for agriculture and subsequent depletion of aquifers has had a great impact on the water availability during the recent past.



The State has 5.96 percent of nation's geographic area with 5% percent population but only 2.63 percent of country's water resources. The per capita fresh water availability in the State is about 920 M3/Annum as against the country's per capita freshwater availability of 1545 M3/Annum. In the past 75 years, 26 years were declared as drought years in the state. The State Government spent about 125 to

300 crore rupees annually on making emergency arrangements of drinking water to overcome the scarcity during droughts upto 2002. More than 75 percent of the drinking water supply was dependent on the groundwater sources. The water quality problem in terms of excessive fluoride and nitrate content as well as salinity was observed in significantly high number of habitations.

As per RGNDWM survey in year 2003, more than 50 percent of total habitations were facing either low water availability or the water quality problems. Gujarat has 31 Talukas that are declared as Over Exploited and 12 Talukas are identified as Critical zones as per Central Ground Water Board.

Very high TDS, NITRATE and FLUORIDE were found in the ground water due to its over exploitation, the deteriorating situation of the ground water. If the proficient efforts by state government would have not been implemented positively in this direction, the fundamental right of people might not have been accomplished.

Due to not having a sufficient water for drinking and Irrigation, people of SAURASTRA and KUCHCHH, migrated from their native to SURAT and other part of the country.

INITIATIVES;

“Statewide Drinking Water supply Grid”

It was an established fact that the availability of the safe and sufficient drinking water was unevenly distributed in the state. The five perennial river of south Gujarat were delivering ample water every year in sea and other part of state was facing shortage and intolerable quality day by day.

Before welcome of NARMADA canals, several Drinking water supply schemes with intra-basin transfer of water like DHAROI in Banaskantha, Mahesana, Patan and Tubewell based RWSS of DEESA were generated a greater impact as a sustainable outcome of state government's initiative. Dharoi Regional Water Supply Scheme was covering 578 villages and five major towns like Palanpur, Visnagar, Kheralu, Unjha, and Vadnagar as well. the scale of this work has change the dimensions of success. Administrator and Engineers started looking for the dependable source of water from which the safe drinking water may exploited for the Pumping and Piping.

But the NARMADA water was a far of an availability.

In 2001-2003, there was a draught like situation in south Saurashtra. Water supply engineers started looking at the PARIEJ and KANEWAL lake which were consistently feeded in by the KADANA based MAHI river water. An emergency work of laying pipeline up to Amareli, Bhavnagar was casted and completed in that summer only to mitigate the scarcity.

Unfortunately there was no rain in the MAHI catchment and saurashtra following that there was a consecutive scarcity, but there was a hope that in Narmada Dam there was a water. NARMADA canal was completed but the height of Dam as well as the level of water in dam was not enough to have a gravity flow in the canal. Emergency pumping machinery were installed in the Dam to have flow in NMC up to PADAL (a crossing point of NMC and MAHI canal) from which the water got diverted in to MAHI canal to fill PARIEJ and KANEWAL lake and again the system was augmented further up to Junagadh district.

Now, there was an enough experience and technical capabilities with the Department of water supply engineers to establish a state wide network. The pragmatic and positive leadership of State Government's administrative and political will has taken initiative to create "Statewide Water Supply Grid" with an aim to address the water scarcity situation of the state on a sustainable basis.

After completion of P&K pipelines, Narmada Main Canal has commissioned. the first diversion of Saurashtra Branch canal and first two Branches of Malia branch canal and Vallabhipur Branch Canal were completed, but the Pumping station-1, at Dhanki was remaining to complete by SSNNL. State Government decided to use MBC before pumping station. At Dhanki in SBC the negative suction HSCF pumping station was erected in the three months time and water made flow in to the MBC up to KHIRAI 134 KM.

From KHIRAI to Bhachau, Vaarshamedi, Anjar, Bhuj pipeline was completed and water made available in KUCHCHH as a sincere service to the earthquake effected people. This task has created the base foundation for the redevelopment of new KUCHCHH.

Quantum of work done ;

An implementation of projects one by one in the state, looking to the necessity of people and availability of the resources, the huge infrastructures to the tune of 3000 KM of Bulk water pipeline, and 40 Pumping Stations are created as a bulk water net work. This net work delivers water to each node of the filter plant situated at various RWSS connectivity and after filtration of this safe water it is further distributed to each village sump. The cumulative network of RWSS is more than 1.20 lacs KM in length and about 730 Pumping station in GWSSB. WASMO , the three award winner Premier institute of Government is taking care for the in-village distribution after having water in the village level sump with people's participation.

out of 17843 villages and 350 towns in the state, More than 12000 villages and 196 towns re covered under the state wide water supply pipeline network. The cumulative effect of implementation has the satisfaction of 2,32,47,853 Rural and 98,70,296 Urban population i.e. 3,31,18,149 people are covered under this state ide Grid.

More than 3000 MLD of water is being supplied and distributed. GWIL's pumping stations are working 24X7.

This may be a unique effort wherein water supply was assured to livestock also. People and livestock in these areas get assured safe water supply due to availability of dual source. The grid arrangement, which serves as supplementary source ensures uninterrupted water supply round the year. The initiative is sustainable due to required infra-structure in place, Government with all possible resources and strength works diligently and community in true sense participate to manage in-village water distribution arrangement including income generation through water tariff collection, incentive from Government etc.

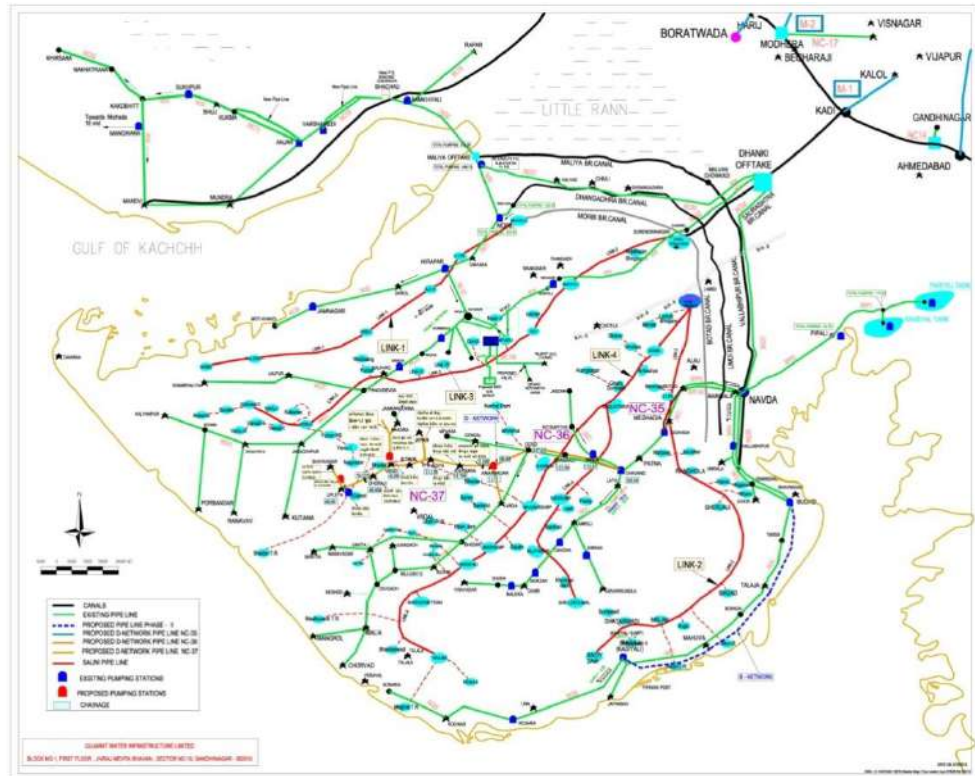
During last two decades, the State has carried an ambitious planning based on surface water for drought proofing and water security by establishing "**Statewide Drinking Water Grid**" and tried to address the water scarcity

situation on a long-term basis by bulk water transmission from sustainable water sources to the drought prone areas. This is one of the largest inter-basin water transfer system.

Strategies adopted for bringing about the transformation and positive impact

To achieve goal for providing long term water security the initiative has the following inbuilt strategies and the State has directed all possible resources and strength to provide adequate, regular, and safe water at convenient place/ time:

- Paradigm shift from ground water to surface water has been made through inter-basin bulk transfer from water surplus area to water scarce area.
- Regional water supply schemes have options to use dual/ multi sources, whatever possible to be ready for meeting challenges or to resume services in case of break-down of one source. Narmada water, being secured supplementary source covers entire Saurashtra and Kachchh and more than 2/3 villages of north Gujarat.
- Distribution network has been taken up parallel along with bulk transmission pipeline to provide benefits to people.
- Advanced technologies have been used for selection of alignment resulting into viable and techno-economical grid.
- Prevailing technical criteria, background experience, and introduction of alternative materials have been kept in mind.
- The selection of various kinds of pipes has been done based on the soil conditions, operating conditions and background experience of different kind of materials.
- The implementation of project has been taken up on turnkey basis, which also includes defect liability for one year and operation & maintenance for a period of two years. For the inspection of materials as well as construction supervision, the implementing agency would be hiring qualified consulting agencies those have got earlier experience of such projects in the State.
- The water transported through bulk water transmission pipelines and distribution network to the doorsteps of villages and towns. Community manage in-village distribution of drinking water; thereby citizens' engagement has also been promoted for efficient service delivery.
- The system has been designed to provide assured potable water supply to the population for the next thirty years.
- Required independent institutional set up has been established with necessary authority and clear cut roles and responsibilities. Special Purpose Vehicle has been launched to create Statewide Drinking water supply grid with state of art infrastructure.



Role of various stakeholders – most importantly, role and details of involvement of the nominee(s) in the initiative

The experience gained in the past proves beyond doubt that water supply with efficient service delivery and users' satisfaction can only be achieved, when the philosophy "Building partnership and working together" is followed in letter and spirit. Keeping this in view, efforts have been made as an integrated approach to involve Government organizations, institutions, individuals and beneficiaries. The water supply was unbundled into three different need based organizations to implement the policies of Government. The major stakeholders are as follows:

- Gujarat Water Supply and Sewerage Board (GWSSB): A Board constituted through an Act of Govt. of Gujarat is responsible for implementation and management of Regional Water Supply Schemes, filtration, chlorination and treatment of water and its distribution upto village / habitation level and to certain towns. The Board, being the prime water organization, responsively planned for Statewide Water Supply Grid and had initiated the process and had set up GWIL (Gujarat Water Infrastructures Limited) as a special purpose vehicle.
- Gujarat Water Infrastructure Ltd (GWIL) a Special Purpose Vehicle: GWIL has been registered as a company under Indian Company Act responsible for creation of infrastructure for bulk water transmission across the State.
- Water and Sanitation Management Organization (WASMO): WASMO has been established as an autonomous organisation in 2002-03 under Indian Society Act. WASMO facilitates Pani Samitis and village community, generates awareness and builds up their capacity to enable them for planning and management of village water supply arrangements.

Gram Panchayat, Pani Samiti and Community: User's are the Best Managers. Gram Panchayat, Pani Samiti, Village Community are empowered to plan, implement,

manage, own and arrange operation of in-village water supply systems and services.

Irrigation Department & Sardar Sarovar Narmada Nigam Limited for providing raw water at various planned off takes.

For distribution total grid constitutes of more than 1,20,000 kms of pipeline network. Farmers rightly understood the impact of water development work and they extended whole heartedly support by allowing laying of pipeline work peacefully in their agricultural land with "Right to Use provision.

Contractors & Suppliers is for executing and providing timely service to complete the task as per planning and schedule.

Revenue Department: The Revenue Department smoothened the process for making land available for creation of infrastructures such as pumping stations, treatment plants, storage reservoirs and laying of pipelines

Highlights/positive features of the initiative under each of the following important dimensions:

▪ Transparency and stakeholder participation

Transparency, being effective tool for achieving accountability, has remained focal consideration. All the works under State water grid were executed through tendering by wide publicity in local as well as national print media. E-tendering procedure was adopted for all works. Open discussions with experts, brain storming for adopting new technologies were the part of the process of finalization of tender documents.

Effective efforts have been made for assuring quality of works e.g. supervision by the departmental officials in charge of the project, Third Party Inspection of materials and works by reputed consultants of the country and inspection by enforcement wing and senior level officers.

▪ Innovativeness of the initiatives

The Canal Network of most reliable source of water Sardar Sarovar Dam is used as basic off take point for bulk water transmission making optimum use of Narmada Canals and phase wise shifting of off-take for better management.

Judicious planning was made for laying pipelines. Need based pipes were laid and subsequent to it parallel lines are also planned and laid.

The bulk water transmission pipelines are laid for intermediate demand in some sections and planning for parallel pipelines in phased manner is done.

Bulk water carrier through statewide water supply grid has access to all project areas covering about 75% population of the State. It has enabled service provider to have effective alternate sustainable source. In case the service of main source is broken down due to any reason, consumers get the uninterrupted water supply through the grid arrangements. Availability of dual/multi-source options has ensured water security.

The grid initiative considering the population coverage is the largest intervention in the World. Delegations by Government of Andhra Pradesh, Karnataka, Madhya Pradesh, Maharashtra, UP, Delhi etc have visited Gujarat to study and assess suitability for replication in their States. Karnataka and Andhra Pradesh States are pursuing the matter for similar sort of arrangements for providing water security to people of their States.

Sea water Desalination plants as Second Initiative ;

The pipe water supply network is efficient, assured, reliable and creditworthy task by the government and for the government, but it is also generates very huge cascaded responsibility in turns, to the government in terms of all resources and expenses. The water reach to the tail end is always be a thermometered as a performance benchmark as an access to all. The production and transportation cost of water is also from the pocket from the Government. The capital budget provision of government is being consumed as a revenue expenses. In other way if we see 75 % of population of the state is on a single source as NARMADA, this may also going to become a weakness (rather than strength) if any kind of untoward eventuality in future. Also the 1600 KM longest sea coast of Gujarat is never been exploited for the purpose of drinking water by desalination process. Parallel to this the very big network creates many challenges of operation and maintenance and repair. the contingency of repair and shutdown of the part of loop also creates dissatisfaction among beneficiaries and answerability to In-charge engineers.

Hence, in order to have an excellent tail end water security, Government of Gujarat has decided, and ordered to establish 100 MLD Desalination plant at JODIA in JAMNAR district. the project implementation is awarded on PPP mode, in order to reduce the O&M responsibility on government shoulder.

Again, seven tenders to receive rates on competitive bidding process are floated for (1) devbhumi Dwaraka (2) porbandar (3) Sutrapada - Gir somanth(4) Pipavav-Amareli (5) Ghogha- Bhavnagar (6) Mandavi- Kuchchh (7) Mundra- Kuchchh district's locations.

Above all eight points are strategic location of desalination by (1) access to the sea water with minimum physical and turbid impurities, (2) Good availability of land on seacoast (3) excellent connectivity to the state wide water supply grid network and (4) transport facilities.

An additional parallel ideology to impregnate the Non conventional energy source to generate electricity as per demand, will induce the production cost of water more economical. This will benefitted to the people of Gujarat.

Conclusion;

Looking to the whole Ideology of the strategic implementations of all projects , it reveals that the State wide water supply Grid is becoming the baseline network as an accessibility of the drinking water to each soul of the state, where as various resources like NARMADA, Resources of Local Reservoirs which are regularly filled in by SAUNI pipeline network, Desalination plants, and good yielding Tube wells in

several areas in the state are providing an excellent reliance and sustainability to the people of Gujarat as a water secure state.