



State Policy
Recommendations for
Water Security
in Gujarat
March 2022

Developed by Centre for Environment Education as a part of the Jalsetu project
implemented with support from Hans Seidel Foundation

Credits and acknowledgement

Author: Madhavi Joshi

Guidance and support: Kartikeya V. Sarabhai, Volker Lennart Plän, Sandeep Dubey

Research: Madhavi Joshi, Vandana Pandya

Comments: Suman Rathod

Design: Jogendra Rajora

This paper builds upon initial paper developed as part of the Jalsetu project implemented by CEE in 2020 with support from the Hanns Seidel Foundation.

Copyright: HSS and CEE; March 2022

Hanns Seidel Foundation India

The Hanns Seidel Foundation, founded in 1967, is a German political foundation, working “in the Service of Democracy, Peace and Development”. It has been active for more than 40 years in the field of political development cooperation and is currently taking an active part in 80 projects in 60 countries worldwide.

In India, the Foundation started its work in the year 1996 and undertakes projects to support India's federal democratic structure, strengthen geopolitical relations, water governance and improved access to justice. The projects are implemented with government and non-government partners at regional, national and state level, aiming at increased systemic efficiency. The Foundation seeks to contribute to India's sustainable development by strengthening peace, democracy and rule of law. More information on the work of Hanns Seidel Foundation India can be found at india.hss.de

Centre for Environment Education

Centre for Environment Education (CEE) was founded in 1984 as a Centre of Excellence, of the Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India with a mandate to promote environmental awareness nationwide. CEE is headquartered in Ahmedabad, India and works globally, nationally, and locally to develop innovative educational programmes and materials, with a broad vision to build capacities in the field of education and communication for sustainable development. CEE has regional / state offices in Ahmedabad, Bangalore, Delhi, Guwahati, Hyderabad, Jaipur, Lucknow, and Pune.

CEE's mission is to enhance understanding of sustainable development in formal, non-formal and informal education through its work with schools, higher educational institutions, policy makers and reaching out to youth and the general community. It is to integrate education as a key driver for change in demonstrating and advancing sustainable practices in rural and urban communities, in business and the public sector, and in meeting challenges of global issues such as climate change and biodiversity conservation. CEE also promotes individual and collective positive Handprint actions that are environmentally sound, economically viable and socially beneficial.

Website <https://www.ceeindia.org/>

Facebook <https://www.facebook.com/ceeindia.org>

Twitter <https://twitter.com/ceeahmedabad>

Table of Contents

1. Summary	1
2. Introduction	5
a. Gujarat Water Scenario	5
b. Government Efforts Towards Water Security	7
c. Development of Water Security Plans: A Bottom up Approach	9
3. Jalsetu: Development of Participatory Water Security Plans	10
4. Context and Need for Water Security	11
a. Concerns at the Policy Implementation Level	14
5. Policy Recommendations	16
6. References	20
7. Annexure-1	22
a. List of Experts Consulted	22

Summary

The paper has reviewed water and water related policies, and taken inputs from experts and practitioners including the Panchayati Raj members from villages in Gujarat to formulate the following recommendations in the context of addressing water security at the village level. With the understanding that water security cannot be achieved in its truest sense unless community is involved, and takes ownership of the water resources with an understanding and vision for managing this resource in the long term. Water security plans developed at the village level with a scientific and participatory approach would immensely contribute towards enhancing the efforts of the government and various stakeholders. The policy recommendations focusing on water security planning and community participation and creating supporting mechanisms are provided.

Policy recommendations

In order to enable sustainable management of water, as suggested in the National Water Mission, the Government of Gujarat aims to ensure more equitable distribution of water across the State. Based on consultations with water experts, practitioners and the community, the following recommendations are being suggested:

1. Need for an integrated response to creating water security:
 - a. While the policies recommend an integrated approach to water, the implementation lacks coherence, therefore convergence in implementation should be facilitated through policy instruments. Convergence across themes that are relevant in the context of water such as agriculture, pollution, health, sanitation, climate change is important from the point of view of water security. For eg. solar pumps being promoted under the renewable energy initiative could be counter-productive in terms of water conservation. Convergence of schemes such as the MNREGA with Integrated Watershed Development Programme (IWDP) can support local livelihoods alongwith water conservation and help regenerate local economy.
 - b. Integration of piped water supply schemes with decentralized models of water storage such as small scale water conservation technology, rain water harvesting at local levels must be encouraged.
 - c. Focus on water security in peri-urban areas that are in transition and often under served in terms of basic services.
 - d. Provide incentives for green technologies (zero waste water discharge and capture methane from waste water treatment)
 - e. Make provision for minimizing use of electrical energy

2. Decentralization of water management and governance strengthening local institutional models such as the Pani Panchayats must be persisted with.
 - a. Demand management strategies can be useful to reduce peak water demand through behavioral and technical solutions, in changing the daily peak demand patterns to reduce the pressure on network pumping energy costs during peak use times. By doing this supply side efficiency will increase specially in water distribution. Persuasion and decentralized approach with steps towards demand management should be taken, based on volumetric supply of water through water metering which should be linked with water tariffs. Water pricing should receive more prominent and explicit place in the policy.
 - b. Panchayats should be legally empowered to help regulate ground water use to prevent its over-exploitation, and manage local surface and ground water resources.
 - c. Pani samiti as a community organization can be a part of the Panchayat structure.
 - d. Decision making through constitutional arrangements such as Gram Sabhas must be made mandatory.
 - e. Local leadership should be created through training and creation of local youth cadres such as Jal doots, Gram Sevaks.
 - f. Corporate and NGO partnership models should be encouraged and institutional mechanisms should be strengthened to enable decentralized water resource management, awareness creation and building capacities of the communities.
 - g. Constitute state level stakeholders forum or user committee for action, policy and implementation. Similar committees at District and talukas/ block levels
 - h. Must shift approach in water resource management from purely engineering works to systems that incorporate traditional practices, local materials and are manageable and maintainable by local communities. The Gram Panchayats as well as the local community need to be involved at all stages of discussion, planning, implementation, management and maintenance. (TERI, 2014)
 - i. Water should be treated as a community asset. Therefore, support to community including that for capacity building at different levels should be provided.
 - j. Need to recognize special role of women for water management and governance.
 - k. Strengthen institutional mechanisms to ensure channelizing of funds to the village level institutions instead of various functionaries and agencies of the government controlling finances for village development. This will enable improved resource management and across different government schemes applicable to the villages.

WASMO did this by channelizing funds through pani samities. In the WASMO projects village community owns, operates and manages the systems.

3. Participatory village level water security planning process using scientific methods of study and participatory methods for involving community leaders, women and youth, and building capacity should be integrated into the policy framework. This would ensure a bottom up approach to water sector planning involving communities not just in management but planning and taking ownership of their village water resources.
 - a. The village level planning process should be undertaken using local and traditional knowledge in planning along with scientific method.
 - b. Village level resource mapping of crops, agrobased activities, aquifers using scientific GIS and Remote Sensing methods should be integrated into the planning of water resources.
 - c. There should be a provision in the policy that supports capacity building of community leaders and youth empowering them as para-geohydrologists, creating a cadre at grassroots.
 - d. Water Security Planning process should be a pre-requisite to development of water infrastructure in a geographical area.
4. "Non-negotiable" standards for community participation in the water schemes should be set to ensure inclusion, participation and ownership by community, and empowering demand-side management instead of supply side.
5. Water Literacy and the means to achieve that should be an intrinsic part of the policy.
 - a. The line departments at the district and block levels involved in implementation of water schemes should be made aware and capacity built to strengthen integration of piped water supply schemes with local water resources conservation; enhance efficiency and reduce waste.
 - b. Awareness and capacity building should be done of Panchayati Raj Institutions, frontline workers, community leaders, women, youth and other key stakeholders in the areas of sustainable water resource management, its efficient use and long-term conservation, technologies available, improving understanding of water and its linkage to energy, agriculture, sanitation and other practices.
 - c. Incentives should be built into the policy to support behavior change in favour of sustainable water use and management at various levels. Introduce accountability for offenders

6. Should facilitate establishing Knowledge and Resource Centre at state, and district levels. These could include groundwater knowledge centres established at geohydrological levels such as ACT in Kachchh. The KRC could:
 - a. facilitate disaggregated localized database on water availability, quality, and relevant information that would support local level decision making in a sharable form as usable knowledge.
 - b. provide knowledge to community for developing water plans with the involvement of local experts.
 - c. act as bridging institution with community based institutions to support informed implementation of policy.
 - d. identify possibilities of linking to other resource agencies and stakeholders particularly for technologies and innovations.
 - e. facilitate, conduct scientific studies in the area of water and climate change especially in the peri-urban areas, impact of changing cropping patterns and water resource planning imperatives and document best practices on community actions at various levels.



Introduction

Gujarat Water Scenario

The decade prior to 2000 in Gujarat was characterized by frequent droughts, water scarcity, drinking water supply through trains and tankers, and conflicts over water in most parts of the state. The decade since 2000 has seen comparatively better rainfall, augmentation of surface water, ground water recharge and support through government policy supporting construction of recharge structures. The Sardar Sarovar Project to enable Narmada river water to reach water stressed areas in Kachchh has been a major project carried out during this time. Initiatives like Sujalam Sufalam that are linked to the project seemed to have eased the pressure on the existing water resources of the state.

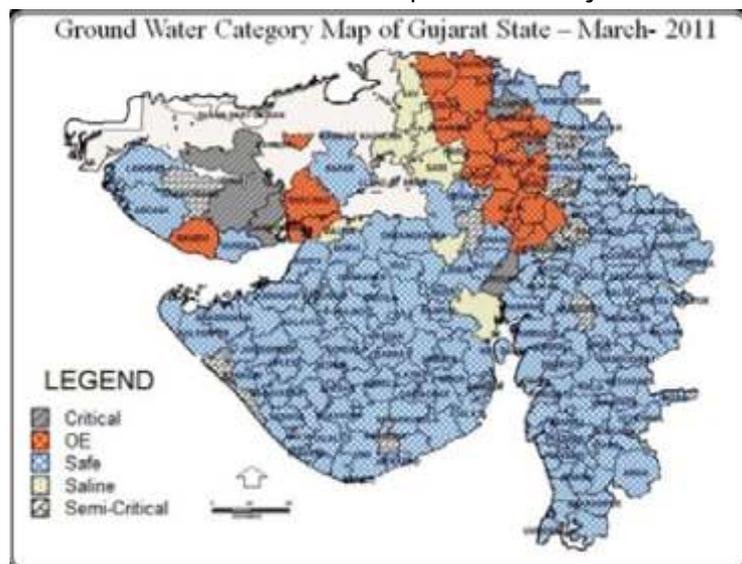
Compared to the situation that existed earlier, water security during the last years has improved, relatively speaking, with an assured water supply aiding rapid economic and agriculture growth, though concerns about erratic water supply in the remote villages remain. Increasing population and the development model adopted by the state has been putting pressure on the resources available, so despite augmentation efforts, adequate availability of water is a concern. Increasing requirement of water in the growing urban areas and industries too puts pressure on the available water resources, at the same time affecting the quality of surface and ground water owing to inadequate management of waste and waste water disposal. Also, despite increasing the availability of water through surface water, ground water, and storage capacity of reservoirs, the inconsistent distribution of water resources coupled with the state's topographic factors has led to only partial utilisation of its water potential. The state has come up with various major and minor projects adding to its surface storage capacity while enabling ground water recharge. Watershed development has been implemented in Gujarat since the introduction of the first set of watershed development guidelines in 1995-96. From Drought Prone Areas Programme (DPAP) to Integrated Watershed Management Programme (IWMP), the focus has shifted from piecemeal solutions to a more integrated approach towards watershed management through GIS-based planning and management of watershed and convergence with other developmental schemes. However, robust grassroots institutions for watershed management are yet to emerge. Demographic change, urbanisation, industrialisation, water pollution have led to severe disruption of most and even disappearance of some of fresh water and coastal ecosystems. Competing demands and conflicting interests amongst stakeholders along with increasing growth rates and increasing water demands have caused inter-sectoral conflicts forcing a change in priorities while designing schemes or allocating water from them.

Gujarat's 1600 km long coastline is an enormous asset, but without appropriate management, these areas are vulnerable to salinity ingress into the ground water aquifers impacting the livelihood of people living in these areas. The problem gets exacerbated owing to over extraction of ground water making availability of safe drinking water difficult in a large number of villages. However salinity ingress in certain areas has reduced considerably due to corrective measures taken by the government, NGOs, communities and favourable rainfall intensity during last decade. A phenomenal population leap in key urban centres over the last few decades has put tremendous stress on their water resources and civic infrastructure necessary for sustaining growth. Over 43 per cent of the population in Gujarat resides in the cities (Demography The State of Gujarat, n.d.). In other words, both the landscape and society are rapidly getting urbanised. Unplanned urbanisation and the resultant concentration of human population in smaller areas are a major cause of water pollution and also place great stress on available water resources. Rapid industrialization along with growing urban centres, changing lifestyles of the population require increasing quantities of water availability posing a challenge to water governance systems in the state.

Urbanization leads to a widening gap between demand and supply of essential services and infrastructure. Rapid urbanization fuelled by industrialisation and expansion of service sectors will exert significant pressure on existing urban centres, expanding them to create new urban areas. Hence, there is a need to balance the process of urbanization with the proper and integrated development of its infrastructure. Today more than half of Gujarat's urban population resides in seven large urban centres. The state government will need to intervene with a multi-department, multi-sectoral approach to ensure that the urban and spatial growth along growth centres/ corridors, ports etc are managed well so that urban services can be provided to all.

Gujarat witnessed increased water availability and a relatively high growth in the agricultural sector over the last decade leading to an increased irrigation demand. Two thirds of the state's total area (125 lakh hectare) is currently cultivable, which has led to a massive irrigation water demand. The percentage of net ground water irrigated area over the last decade has remained very high ranging from 78.7 to 86.7 percent. The shift to crops like cotton, wheat, sugarcane, rice and increase in the net sown areas of crops like groundnut has added to increase in groundwater withdrawal (Climate Change Department, 2014).

Ground water utilization pattern of Gujarat



Source: *Dynamic Ground Water Sources of Gujarat State, 2014 In Gujarat SAPCC*

Government Efforts Towards Water Security

The government and other stakeholders took steps towards the augmentation and management of available water in Gujarat in the last decade. The government's vision of strengthening Jalshakti as part of its overall developmental approach called Panchamrut has had a positive impact on drought-proofing and water harvesting. Its efforts have yielded positive results partly due to favourable climatic conditions. The state witnessed a trend of increasing rainfall in almost all its regions over the last decade, despite many regions being chronically drought prone due to erratic rainfall. Factors like good rainfall, the arrival of Narmada waters, and the massive recharge effort undertaken by communities and the government through watershed treatment have all come together to play an important role in the increased water availability, which has improved ground water tables, and increased access to drinking and domestic water in most parts of the state.

Gujarat being a drought prone State, providing safe and assured drinking water supply to a large population in Kachchh, Saurashtra and North Gujarat has been a great challenge for the State Government. Narmada Canal based drinking water supply project was taken up in the State to cover about 75 percent population of the State through a State Wide Drinking Water Grid. The Narmada Master Plan is aimed at covering 9490 villages and 173 towns in Gujarat, which is being executed by Gujarat Water Supply and Sewage Board (GWSSB) (www.gwssb.gujarat.gov.in, n.d.) and Gujarat Water Infrastructure Ltd (GWIL) (www.wasmo.org, n.d.). The Narmada Nigam supplies water to Gujarat Water Supply & Sewerage Board and Gujarat Water Infrastructure Ltd. Up to end of the March-2019, 8911 villages and 165 towns have been covered by them under the benefit of drinking/domestic water from Narmada through pipelines. In addition to this, the Narmada Nigam has been directly supplying water to Vadodara Municipal Corporation, Ahmedabad Municipal Corporation, Bharuch, Kapadvanj and Tharad Nagarpalika and 28 Industries in the state. (www.sardarsarovardam.org/domestic-water-supply.aspx, n.d.).

The Water and Sanitation Management Organisation (WASMO) as a special purpose vehicle emerged in early 2000 for the implementation of the Government of India supported Swajaldhara scheme. The state government also pitched in with sector reform schemes in selected districts. Kachchh, for instance, was covered by the Earthquake Rehabilitation and Reconstruction (ERR) scheme funded by the Government of India, GWSSB provided the infrastructure for these schemes and their implementation and maintenance was monitored by WASMO at the village level. Although drinking water quality remains an issue in some parts, particularly quantitatively, a lot has been achieved in terms of the substantial number of villages covered by WASMO. Gujarat's strategy for water security will have to revolve around Narmada waters for a long time. If complemented well with other augmentation efforts like watershed treatments and adoption of water efficient practices, water scarcity may become a thing of the past.

There is a credible effort on in terms of addressing salinity issues in the state through the Integrated Coastal Zone Management Project (ICZMP), a comprehensive assessment of affected areas in all the saline blocks as part of HLC-1 and HLC-2 (High Level Committee) covering the entire Saurashtra coastal belt. The state government responds to the situation through the initiatives by the Salinity Ingress Prevention Cell (SIPC) along with other NGOs and community efforts. Water management in the state needs to take cognizance of these pressures and challenges while devising their strategies, first, to meet the water demands by augmentation of water. Yet given the context of today, nothing is more important than safeguarding the existing and already - created precious water resources against 156 types of pollutants. This would not only save us from a range of complexities arising due to poor water quality but also help in saving people's hard earned money in the public exchequer for better use (GEC, 2012).



Development of Water Security Plans: A Bottom Up Approach

Gujarat is one of the priority states identified for implementation of the Atal Bhujal Yojana (ATAL JAL), an initiative for ensuring long term sustainability of ground water resources in the country. The Department of Water Resources, River Development & Ganga Rejuvenation, Ministry of Jal Shakti is adopting a combination of 'top down' and 'bottom up' approaches in identified ground water stressed blocks in seven states, representing a range of geomorphic, climatic and hydrogeologic and cultural settings. Gujarat is one of them. ATAL JAL has been designed with the principal objective of strengthening the institutional framework for participatory ground water management and bringing about behavioral changes at the community level for sustainable ground water resource management. The scheme envisages undertaking this through various interventions, including awareness programmes, capacity building, convergence of ongoing/new schemes and improved agricultural practices etc.

ATAL JAL has two major components:

1. Institutional Strengthening and Capacity Building Component for strengthening institutional arrangements for sustainable ground water management in the States including improving monitoring networks, capacity building, strengthening of Water User Associations, etc.
2. Incentive Component for incentivising the States for achievements in improved groundwater management practices namely, data dissemination, preparation of water security plans, implementation of management interventions through convergence of ongoing schemes, adopting demand side management practices etc. (Ministry of Jal Shakti, Department of Water Resources, River Development & Ganga Rejuvenation, n.d.).

The Atal Jal Scheme was launched in June 2020 by the Prime Minister of India. The mention of water security plans comes explicitly in this scheme. While the water security concerns are being addressed by the state government through its different initiatives and efforts are made by various organisations, corporates and others in this direction, it would be important for water security planning to be a bottom up process where communities are involved in understanding the water regime and planning for water security at the local levels. As observed and documented in various studies, water security plans need to consider the entire water basin approach including water resources on ground and underground. Communities most often do not make the connection between surface and ground water. Also that water is a common resource is not easily understood.

Jalsetu: Development of Participatory Water Security Plans

CEE initiated Jalsetu, where participatory water security plans were developed in 10 selected villages of Vichhiya block of Rajkot district. The water security plans were developed through participation of key stakeholders in these villages. Consultation with Panchayati Raj Institution members from these villages and across the state, and with NGOs provided insights into challenges and suggestions to improve water security as a part of overall strategy for water. The need to inform the state water policy came about owing to CEE's long time work in the water sector especially the work around gender, water governance and climate change during 2017-19. This paper is an attempt to come up with recommendations on the water policy implementation process in Gujarat from the lens of creating water security at the village level.

CEE involved an expert having a long experience in the water sector to prepare the draft of the recommendations. The process involved consultations with water experts in Gujarat, and study of national as well state level documents. The first level draft was shared with over 40 practitioners and experts in this sector for their inputs at a consultation with the NGO and domain experts. An expert group identified to examine the paper and recommendations provided detailed inputs. These include Mr. R.K.Sama (Formerly Head of WASMO), Mr. Yogesh Jadeja (ACT), Mr. R.N.Shukla (Geohydrologist formerly associated with WASMO), Mr. Balkrishna Pandit (WASMO), and Prof. Keshab Das (Gujarat Institute of Development Research - GIDR). The recommendations and the water security plans prepared for the 10 villages were presented to the government officials and CSR groups to ascertain their interest in taking this idea forward.



Context and Need for Water Security

As far as water sector is concerned in the current situation, Gujarat is following the National Water Policy 2012 guideline and has set up a decentralized water governance system. A draft Gujarat Water Policy 2018 has been prepared by the Narmada, Water Resources, Water Supply and Kalpsar Departments in consultation with 18 departments concerned with water. This policy though is yet to be formally announced. Water administration in Gujarat is organized around three state departments, Department of Water Resources (also includes minor and medium irrigation systems), Department of Narmada and Major Irrigation, and Department of Water Supply. The Gujarat Water Resource Development Corporation is an autonomous body whose primary responsibilities are survey, monitoring, and development of groundwater. The Sardar Sarovar Narmada Nigam Ltd. (SSNNL) is an autonomous body that is responsible for the implementation of the Sardar Sarovar project, one of the most ambitious multi-purpose projects of modern India.

The institutional structure of the water supply sector in Gujarat is complex. The administration and regulation of water supply, covering domestic and industrial sectors, is provided by a number of different government departments, municipalities local governments and public private enterprises. Water and Sanitation Management Organization (WASMO) was created to empower village level institutions to manage their own rural water supply facilities. It has brought about effective citizen engagement through its innovative governance model for community-led water supply program throughout the State of Gujarat.

Gujarat has made efforts to put in place the systems for developing water resources, distribution and delivery for various competitive uses. However, the major reforms on the legal and policy front have not effectively addressed the concerns of equity, efficiency and sustainability of the water use. Yet, at this point, it would be important to highlight some of the state's efforts and achievements.

Gujarat leads in community-based approaches

Mentioned below are a few examples of initiatives, where engagement of NGOs, Pani Samitis, watershed committees proved successful.

1. Paradigm shift in drinking water supply through WASMO

Prior to 2002, community participation in management of water supply systems was negligible and the services were unable to meet people's demands. With the formation of WASMO in May 2002, systemic changes were brought in for decentralized governance and effective citizens' engagement in drinking water services in rural areas. By developing Village Water and Sanitation Committees (VWSCs), a sub-committee of Village Panchayat through a

social process driven approach, communities were mobilized and their capacities built so that they can undertake a participatory approach to plan, implement, operate and maintain a village water supply system such that all citizens get adequate, regular and safe drinking water. The strategy adopted in the scheme for drinking water supply was that communities were expected to pay 10 per cent of the cost of water infrastructure while 90 per cent was borne by WASMO. To ensure drinking water security, communities have adopted different technical designs and a variety of measures such as augmentation of local sources through rainwater harvesting (including rooftop harvesting), use of dual sources (local and external) and user participation in monitoring of drinking water quality. The result is that people served by the drinking water schemes under WASMO in rural areas of Gujarat today realize the need for their involvement in managing their natural resources and the impact that community-led action can have on their environment. According to Government of Gujarat reports, around 90 per cent villages are interested in taking care of their water supply systems by forming Pani Samitis, more than 17965 schemes are completed including in hamlets, and another 1826 schemes are in progress.

2. Participatory Irrigation Management

Pilot projects in Participatory Irrigation Management (PIM) have demonstrated that many of the problems faced by the agriculture sector in terms of realizing the irrigation potential, if not all, can be reduced if active participation of farmers is encouraged in all aspects of the development and management of irrigation. Under PIM, some of the important irrigation management responsibilities in government owned irrigation projects are transferred to farmers' water users associations.

The support service of PIM cell of SSNL focuses on building farmers' organizations at village as well as project levels and enhancing their capacity through various means such as training and community organization. Moreover, it helps sensitize the staff of Irrigation Department to participatory processes.

Development Support Centre (DSC), a Gujarat based NGO is playing a pivotal role in promoting PIM in Gujarat as well as in the country. DSC is providing policy support to the various State Governments and the Central Government for wider adoption of participatory approaches to irrigation management.

3. Integrated Watershed Development Programme

The main objective of the Integrated Watershed Development Programme is to restore the ecological balance by harnessing, conserving and developing degraded natural resources such as soil, vegetative cover and water. The process leads to prevention of soil run-off, regeneration of natural vegetation and recharge of the ground water table. It enables multi-cropping and diverse agro based activities. This promotes sustainable livelihood option for the nearby population. As per data available with Rural Development Department, the

programme reaches more than 300 watersheds every year since it started.

Community involvement through Watershed Committees is being implemented through this programme where watershed development activities are undertaken through this Committee.

4. Participatory Water Resource Mapping

Arid Technologies Centre (ACT) has been developing village-level, participatory models and tools to assist in improving groundwater supplies and reducing demand through the direct involvement of farmers and other affected stakeholders in villages in Kachchh, Gujarat. This is being done through use of scientific measurement by villagers, applied together with their local knowledge, to make sense of village groundwater availability. Capacity building of local participants is an important part of this approach to participatory groundwater monitoring and management.



Concerns at the Policy Implementation Level

Despite the achievements thus far, it is increasingly evident for a number of reasons outlined below, that water security cannot be achieved in the absence of adequate systems and a long term vision, despite having policies that include water security and community participation as a component.

It is recognized that a demand-driven approach in the place of supply-driven approach is necessary to ensure water security at the local levels. People's involvement in planning and management of water at the local level giving them ownership over their natural resources to create water resource maps and water security plans is at the crux of a demand-driven approach. This is at variance with the supply-driven approach where communities are mere receivers of water supply.

Institutional mechanisms would need to be set up and existing ones strengthened to strongly encourage community participation especially women, in the water planning, management and conservation efforts.

Funds meant for the community do not always reach them due to gaps in the facilitation processes. Where the communities are expected to pay for User fees, incompetent service delivery affects their willingness to pay. There is also a lack of mechanism to be able to measure the amount of water usage by the communities which would enable efficiency in water use.

Along with the supply driven approach, the focus on hardware with little or no attention to awareness, education and capacity building of communities or setting up institutional mechanisms to ensure its management post project, has led to failure of many such projects once implemented.

The water supply schemes still struggle to provide a regular water supply to remote villages especially during summer months. The recent schemes therefore, have been also focusing on augmenting local water resources and creation of storage structures in villages.

There are gaps in addressing challenges where interlinking of rivers projects are in progress. Some of these are loss of land, forest and fisheries, displacement and the resultant trauma for the people, and the implementation of the rehabilitation programme, all of which need addressing.

Assured irrigation has encouraged farmers to change their cropping patterns to more water intensive crops. For eg. Halvad, which is an arid region has taken to cash crops since the advent of Narmada canal passing through its villages. Changing cropping patterns not in sync with the agro climatic zone and water availability in the long term would have repercussions on the farm productivity and stress water resources. Extraction of ground water too is fairly common and a much in use irrigation practice in Gujarat. The knowledge of critical or dark

zones and the need to have a more careful approach to water use seems to be lacking among farmers except for efforts made by organisations working with the farmers. Use of solar pumps while seen as a renewable energy source has resulted in overdraw of water by the farmers. Though the government of Gujarat has adopted a participatory irrigation management policy to promote farmers involvement in irrigation management at the tertiary level of canal systems, there has not been an effort to introduce volumetric pricing of water. Hence, the farmers have no incentive to use water efficiently in both physical and economic sense.

In terms of legal frameworks, Ground water usage laws and their enforcement has been poor. The policies do not reach the end users who are expected to be key stakeholders, in a way they would understand its provisions and their role. In the absence of a withdrawal strategy in projects, the villages slip back to their original condition, which is a strain on resources spent by the government. Also indicates the need for strong institutional mechanisms and efforts at education and capacity building of all key stakeholders from the initiation. The implementation of various government schemes takes place independently without convergence at the local level. The state's water policy has been formulated involving 18 departments which says a lot about the need for convergence and integration of efforts. The policy imperatives for convergence get lost in achievement of targets at the local level.

There is limited promotion of available technologies like the GIS and remote sensing, though there are examples from the work of the ACT in Kachchh where water security plans encompassing a watershed have been made for a large number of villages. Yet the water security concept in its true sense has not become institutionalized enough.



Policy Recommendations

In order to enable sustainable management of water, as suggested in the National Water Mission, the Government of Gujarat aims to ensure more equitable distribution of water across the State. Based on consultations with water experts, practitioners and the community, the following recommendations are being suggested:

1. Need for an integrated response to creating water security:
 - a. While the policies recommend an integrated approach to water, the implementation lacks coherence, therefore convergence in implementation should be facilitated through policy instruments. Convergence across themes that are relevant in the context of water such as agriculture, pollution, health, sanitation, climate change is important from the point of view of water security. For eg. solar pumps being promoted under the renewable energy initiative could be counter-productive in terms of water conservation. Convergence of schemes such as the MNREGA with Integrated Watershed Development Programme (IWDP) can support local livelihoods alongwith water conservation and help regenerate local economy.
 - b. Integration of piped water supply schemes with decentralized models of water storage such as small scale water conservation technology, rain water harvesting at local levels must be encouraged.
 - c. Focus on water security in peri-urban areas that are in transition and often under served in terms of basic services.
 - d. Provide incentives for green technologies (zero waste water discharge and capture methane from waste water treatment)
 - e. Make provision for minimizing use of electrical energy
2. Decentralization of water management and governance strengthening local institutional models such as the Pani Panchayats must be persisted with.
 - a. Demand management strategies can be useful to reduce peak water demand through behavioral and technical solutions, in changing the daily peak demand patterns to reduce the pressure on network pumping energy costs during peak use times. By doing this supply side efficiency will increase specially in water distribution. Persuasion and decentralized approach with steps towards demand management should be taken, based on volumetric supply of water through water metering which should be linked with water tariffs. Water pricing should receive more prominent and explicit place in the policy.

- b. Panchayats should be legally empowered to help regulate ground water use to prevent its over-exploitation, and manage local surface and ground water resources.
 - c. Pani samiti as a community organization can be a part of the Panchayat structure.
 - d. Decision making through constitutional arrangements such as Gram Sabhas must be made mandatory.
 - e. Local leadership should be created through training and creation of local youth cadres such as Jal doots, Gram Sevaks.
 - f. Corporate and NGO partnership models should be encouraged and institutional mechanisms should be strengthened to enable decentralized water resource management, awareness creation and building capacities of the communities.
 - g. Constitute state level stakeholders forum or user committee for action, policy and implementation. Similar committees at District and talukas/ block levels
 - h. Must shift approach in water resource management from purely engineering works to systems that incorporate traditional practices, local materials and are manageable and maintainable by local communities. The Gram Panchayats as well as the local community need to be involved at all stages of discussion, planning, implementation, management and maintenance. (TERI, 2014)
 - i. Water should be treated as a community asset. Therefore, support to community including that for capacity building at different levels should be provided.
 - j. Need to recognize special role of women for water management and governance.
 - k. Strengthen institutional mechanisms to ensure channelizing of funds to the village level institutions instead of various functionaries and agencies of the government controlling finances for village development. This will enable improved resource management and across different government schemes applicable to the villages. WASMO did this by channelizing funds through pani samities. In the WASMO projects village community owns, operates and manages the systems.
3. Participatory village level water security planning process using scientific methods of study and participatory methods for involving community leaders, women and youth, and building capacity should be integrated into the policy framework. This would ensure a bottom up approach to water sector planning involving communities not just in management but planning and taking ownership of their village water resources.
- a. The village level planning process should be undertaken using local and traditional knowledge in planning along with scientific method.

- b. Village level resource mapping of crops, agrobased activities, aquifers using scientific GIS and Remote Sensing methods should be integrated into the planning of water resources.
 - c. There should be a provision in the policy that supports capacity building of community leaders and youth empowering them as para-geohydrologists, creating a cadre at grassroots.
 - d. Water Security Planning process should be a pre-requisite to development of water infrastructure in a geographical area.
4. “Non-negotiable” standards for community participation in the water schemes should be set to ensure inclusion, participation and ownership by community, and empowering demand-side management instead of supply side.
 5. Water Literacy and the means to achieve that should be an intrinsic part of the policy.
 - a. The line departments at the district and block levels involved in implementation of water schemes should be made aware and capacity built to strengthen integration of piped water supply schemes with local water resources conservation; enhance efficiency and reduce waste.



- b. Awareness and capacity building should be done of Panchayati Raj Institutions, frontline workers, community leaders, women, youth and other key stakeholders in the areas of sustainable water resource management, its efficient use and long-term conservation, technologies available, improving understanding of water and its linkage to energy, agriculture, sanitation and other practices.
 - c. Incentives should be built into the policy to support behavior change in favour of sustainable water use and management at various levels. Introduce accountability for offenders
6. Should facilitate establishing Knowledge and Resource Centre at state, and district levels. These could include groundwater knowledge centres established at geohydrological levels such as ACT in Kachchh. The KRC could:
- a. facilitate disaggregated localized database on water availability, quality, and relevant information that would support local level decision making in a sharable form as usable knowledge.
 - b. provide knowledge to community for developing water plans with the involvement of local experts.
 - c. act as bridging institution with community based institutions to support informed implementation of policy.
 - d. identify possibilities of linking to other resource agencies and stakeholders particularly for technologies and innovations.
 - e. facilitate, conduct scientific studies in the area of water and climate change especially in the peri-urban areas, impact of changing cropping patterns and water resource planning imperatives and document best practices on community actions at various levels.

References

(n.d.). Retrieved from www.gwssb.gujarat.gov.in.

(n.d.). Retrieved from www.wasmo.org.

(n.d.). Retrieved from www.sardarsarovardam.org/domestic-water-supply.aspx.

(n.d.). Retrieved from Ministry of Jal Shakti, Department of Water Resources, River Development & Ganga Rejuvenation: www.jalshakti-dowr.gov.in

(n.d.). Retrieved from <https://www.drishtiiias.com/daily-updates/daily-news-analysis/jal-shakti-abhiyan-1>

(n.d.). Retrieved from [https://sardarsarovardam.org/Participatory-Irrigation-Management-\(PIM\)-Cell.aspx](https://sardarsarovardam.org/Participatory-Irrigation-Management-(PIM)-Cell.aspx)

(n.d.). Retrieved from <https://www.gidb.org/water-supply-scenario-in-gujarat>

(n.d.). Retrieved from <https://www.google.com/search?q=Rural+development+department+Gujarat>

Central Ground Water Board Ministry of Water Resources, River Development & Ganga Rejuvenation Government of India (July 2014). Dynamic ground water resources of India

Climate Change Department, G. o. (2014). SAPCC-final after approval. Retrieved from www.gujenvnis.nic.in: gujenvnis.nic.in>PDF>Gujarat-SAPCC

Demography The State of Gujarat. (n.d.). Retrieved from www.gujenvnis.nic.in: http://www.gujenvnis.nic.in/PDF/demo.pdf

GEC. (2012). Retrieved from gujenvnis.nic.in: gujenvnis.nic.in/pdf/soe-water.pdf

Global Water Partnership (December 2014). A Report on Review of Draft Gujarat State Water Policy in line with National Water Policy 2012 with regard to Climate Change, Review by India Water Partnership (IWP), with support of Institute for Resource Management and Economic Development (IRMED)

Green Jennifer, Amit Gandhi, Eadaoin Ilten, Brennan Lake, Vandana Pandya, Sara Lynn Pesek, Jonars B. Spielberg and Christina Sung (June 2017). Solar Water Pumps: Technical, System, and Business Model Approaches to Evaluation-India, Myanmar and Sudan. Comprehensive Initiative on Technology Evaluation at MIT, Product Evaluation Report

Government of Gujarat. Gujarat at a glance, Hydrology <https://www.drishtiiias.com/loksabha-rajyasabha-discussions/policy-watch-national-water-policy>

Ministry of Drinking Water and Sanitation and Water and Sanitation Program, Government of India (February 2015). Toolkit for the Preparation of a Drinking Water Security Plan

National Water Policy (2012). Government of India. http://jalshakti-dowr.gov.in/sites/default/files/NWP2012Eng6495132651_1.pdf 2015 National Water Mission - <http://nwm.gov.in/>

Pandya Vandana (February 2020). Sustainable Rural Water Supply A case of Gujarat, presented at the Conference: 'Water A focus on future and innovation' Sophia college.

Sama, R.K. Water Resource Management and Rural Drinking Water Supply Scenario in India

Water and Sanitation Management Organization (2019). Annual report 2018-19

List of experts whose insights and thoughts contributed to enrich this paper.



Anexure -1

Sr. No	Name	Designation
1.	Shri R.K.Sama, IFS	Former Head of the Watershed programme and the Water and Sanitation Management Organization, Gujarat
2.	Shri R N Shukla	Former Head of the Geo hydrology department of the Gujarat Water Supply and Sewerage Board, and former Head of the Water Resource Management cell, WASMO Gujarat
3.	Dr. Balkrishna Pandit	Dr. Balkrishna Pandit, Hydro geologist, Water Supply and Sewerage Board, Gandhinagar
4.	Dr. Yogesh Jadeja	Director, Arid Communities and Technologies, Bhuj
5.	Shri. Keshab Das	Gujarat Institute of Development Research
6.	Shri. Biren Dalal	T.C. Engineers
7.	Shri. Kartikeya V. Sarabhai	Director, Centre for Environment Education
8.	Jalsetu project team Members	From CEE and Jalsetu project villages.

Hanns Seidel Foundation (HSS)
4/6, Siri Fort Institutional Area, New Delhi 110049, India
Phone: +91-11-4168040
Email:delhi@hss.de, Website:www.ceeindia.org

Centre for Environment Education (CEE)
Thaltej Tekra, Ahmedabad 380054, Gujarat, India
Email:suman.rathod@ceeindia.org, website: www.ceeindia.org