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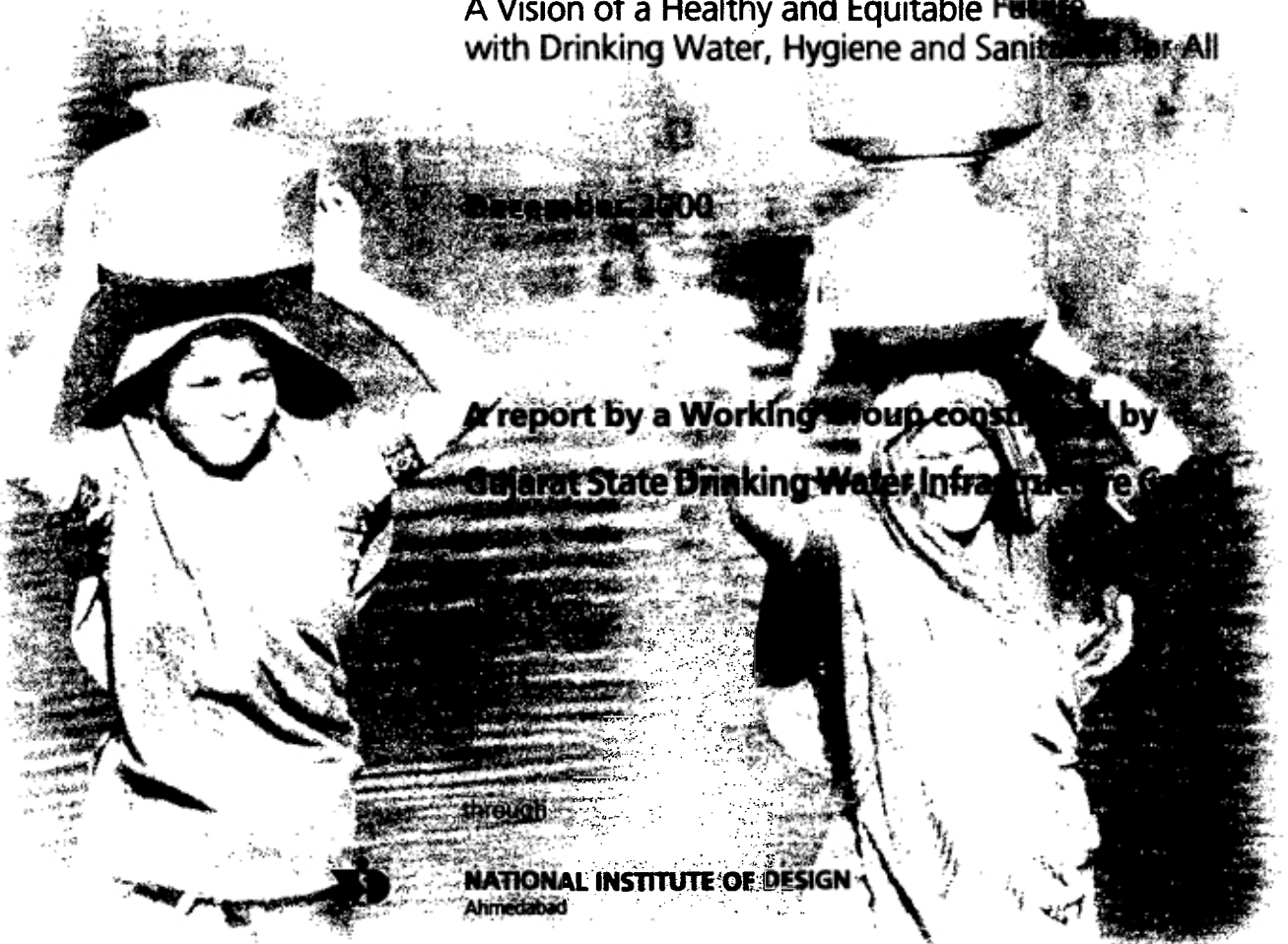


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GUJARAT JAL-DISHA 2010

A Vision of a Healthy and Equitable Future
with Drinking Water, Hygiene and Sanitation for All



December 2009

A report by a Working Group constituted by
Gujarat State Drinking Water Infrastructure Corporation

through

NATIONAL INSTITUTE OF DESIGN
Ahmedabad

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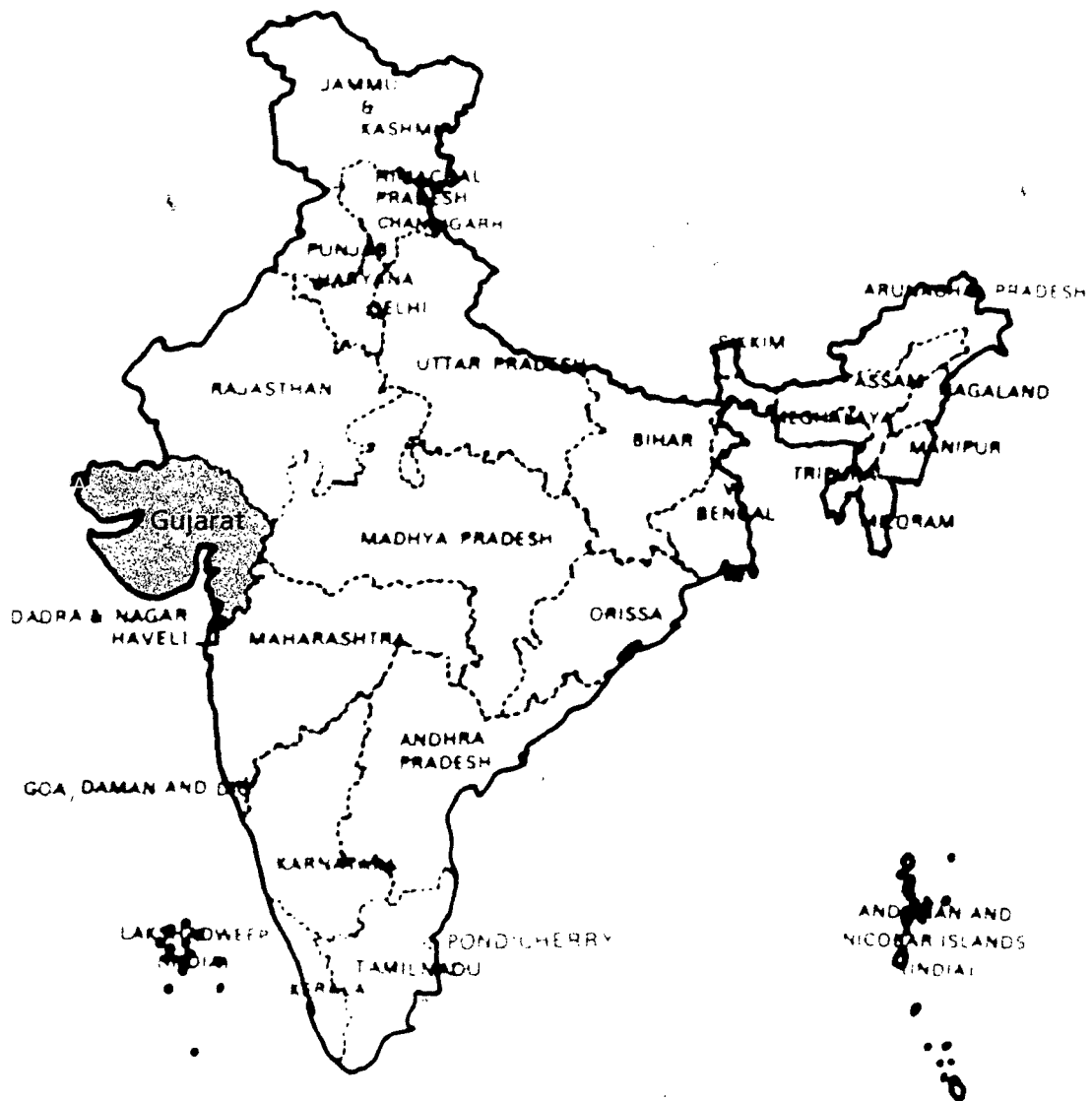


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Contents

Acknowledgements	7
Foreword	8
Summary	9
Chapter 1	
Gujarat in 2010: The Vision	12
Chapter 2	
Drinking Water and Sanitation : Background and Sector Context	13
Water as a Resource	14
<input type="checkbox"/> Rainfall, Hydrology and Geo-hydrology	
<input type="checkbox"/> Overall Water Availability and Demand	
<input type="checkbox"/> Urban Water Supply	
<input type="checkbox"/> Rural Water Supply	
<input type="checkbox"/> Ground Water Availability	
<input type="checkbox"/> Ground Water Quality	
<input type="checkbox"/> Salinity Ingress	
<input type="checkbox"/> Performance of Bores	
<input type="checkbox"/> Surface Water	
<input type="checkbox"/> Availability	
<input type="checkbox"/> River Basins	
<input type="checkbox"/> Surface Water in Saurashtra and Kachchh	
<input type="checkbox"/> Water Conservation	
<input type="checkbox"/> Issues Related to Water as a Resource	
Institutions	20
<input type="checkbox"/> The Government Sector	
<input type="checkbox"/> National Background	
<input type="checkbox"/> State Background	
<input type="checkbox"/> State Institutional Structure	
GWSSB	
SSNNL	
GSDWICL	
GJI	
<input type="checkbox"/> Non-Government Sector	
<input type="checkbox"/> Institutional Issues	
Sectoral Policies and Strategies	24
<input type="checkbox"/> National Water Policy, 1987	
<input type="checkbox"/> State Sector Policy and Schemes	
<input type="checkbox"/> Development and Conservation of Water Resources :	
Governmental Inputs	
<input type="checkbox"/> Drinking Water	
<input type="checkbox"/> Targets and Coverage	

- National Guidelines for Supply to Rural Areas
 - Background
 - NDWM
 - Need for Change
 - Revised Guidelines
 - State Strategies
 - Coverage under Eighth Plan
 - Ninth Plan Strategy
- Policies, Strategies and Schemes : Some Issues

Technology Options for Drinking Water 31

- Technology Options
 - Ground water
 - Boreholes
 - Dug wells
 - Handpumps
 - Piped Water Supply
 - Rainwater
 - Roof Rainwater Harvesting
 - Surface Rainwater Harvesting
 - Surface Water
 - Technological Water
- Impact of Technology on Institutions and Capacity-building

Drinking Water: Financial Background 37

- Investments in Rural Sector
- Investments in Urban Sector
- Institutional and Financial Issues
- Projection of Financial Requirements
 - Rural Water Supply
 - Narmada Canal Supply
 - Supply to Cities & Urban Areas

Private Sector Involvement 41

Water Regulations 42

Sanitation 43

- Rural Sanitation
 - Institutions
 - Community Rural Sanitation Programme
 - Gokul Gram Yojana
 - Issues
 - Recommendations for Improvement
 - Communication Strategies
- Urban Sanitation
 - Role of Municipal Authorities
 - Urban Slums
 - Upgrading Urban Slums
 - Linkages with Services
 - Slum Networking
- School Sanitation

- Technology Options

Chapter 3

The Experience of Drought 55

- Government Action
- Community-based Responses
- Lessons Learned

Chapter 4

Gujarat Jal-Disha 2010: Core Points, Guiding Principles, Policy Framework and Strategies 63

Access to Safe Water, Hygiene and Sanitation as a Human Right 63

Addressing Equity Concerns 66

- Economic/Social Status and Water Deprivation
- Rural, Urban and Regional Dimensions
- Gender Equity
- Gender Equity at the micro level
- Gender Equity at the macro level

Hygiene Promotion: Precondition for Health 70

Decentralisation 73

- Village-based O&M

Participatory Water Resource Management 77

- Need for Change

Government and NGO Institutions as Facilitators and Change Agents 80

Water Resource Management in Gujarat : Is There a Need for a Paradigm Shift? 83

Water as an Economic Resource 86

- Should Water for Domestic Use be Priced?
- Water Use in Gujarat : Domestic Sector
- Regional Water Supply Schemes
- Water Use in Gujarat : Urban Sector
- Making the Domestic Sector Economically Viable
- Making the Regional Water Supply Schemes Economically Viable
- Incentives and Concessions

Gujarat Water & Sanitation Authority: A Proposal 93

- Institutional Structure in the Sector

- Suggested GWSA Status and Structure
 - Functions
 - Composition of Members
 - Nomination of Members
 - Secretariat
- Other Management Structures & Implications

Chapter 5

Assessing Progress Toward Jal-Disha 2010 : Targets, Indicators, Monitoring and Evaluation 98

- Building a Culture of Assessment
- What Can be Assessed/Measured?
- Setting up a M&E System
- M&E in Different Phases
- The Rationale of M&E at Different Levels
 - Complimentarity of Indicators
 - Specificity of Indicators
 - Indicators with a Purpose
 - Customised Measurement Levels
 - Cost of Indicators
 - MIS – Relevance and Form

Chapter 6

Gujarat Jal-Disha 2010: A Framework For Action 107

Next Steps by State Authorities
 Next Steps by Institutions
 Next Steps by Communities
 Next Steps by NGOs
 Next Steps by Private Sector

Chapter 7

Achieving the Vision: What Must Change By 2010 116

Human Rights
 Physical Facilities
 Health and Hygiene
 Information, Education, Communication
 Equity
 Financial/Economic Measures
 Water Technology
 Sanitation Technology
 State Institutions
 Civil Society & Market Institutions
 Inter-organisational Coordination
 Policy, Legislation and Regulation

References	122
Gujarat Jal-Disha 2010: Participants	123
Annex 1 Tables: Background and Sector Context	125
Annex 2 Tables: Sanitation	
Annex 3 Slum Networking : an alternative way to reach the urban poor (Himanshu Parekh)	128
Annex 4 Slum Networking : using slums to save cities – experiences from Gujarat and Madhya Pradesh (Himanshu Parekh)	134
Annex 5 Gujarat 2010 : A Vision of Safe Water, Hygiene and Sanitation for All (Barot, Bhat, Paul), March 2000 (Extracts)	140
Annex 6 Roofwater Harvesting in Urban and Rural areas (M. Dinesh Kumar)	
Annex 7 Private Water Supply Companies in Gujarat Cities (M. Dinesh Kumar)	142

Asia's Water and Sanitation Situation "A Human Tragedy"

The water and sanitation situation in Asia and the Pacific is a "major human tragedy" according to the Asian Development Bank (ADB) in its 1999 Annual Report. Some 830 million people do not have safe drinking water and more than 2 billion lack sanitation facilities. "The acute shortages cause high rates of waterborne disease and death" In 1999 the ADB lent \$1.24 billion, a quarter of its lending, for water-related operations in the region.

ADB, 19 April 2000

VISION 21 in Gujarat

The global VISION 21 process began with a local consultation (one of more than 100 held around the world) in the Indian state of Gujarat. Guided by a Vision 21 facilitator, participants from local NGOs and community groups met to visualise how they would like to see their water, sanitation and hygiene situation change in the next generation. The process was extended via meetings and visits to communities and individual households, and ideas were combined into a recommended action programme for the whole state (with a population of 44 million, Gujarat is bigger than many countries). The result is a comprehensive set of targets and goals accompanied by means of implementation. Among the highlights: a plan to reduce per capita spending from Rs2000-2500 per capita to Rs1000-1500 over the next ten years, by using lower cost technologies and mobilising community resources; an immediate priority to install separate latrines for boys and girls in every school in the state by 2010; and natural resource management groups, managed by women, established in every village (with the State remaining an active partner). All this is not a pipe dream. It is being discussed in a very positive atmosphere with the State Government and the Gujarat Water and Sewerage Board. Resources are being mobilised, and the 'visionaries' are now the action team.

VISION 21, Water Supply & Sanitation Collaborative Council (Geneva), March 2000

Vision 21: Water for People

The essence of VISION 21 is to put people's initiative and capacity for self-reliance at the centre of planning and action. The foundation is recognition of water and sanitation as basic human rights, and of hygiene as a prerequisite. Together they form a major component in poverty reduction. Such recognition can lead to systems that encourage genuine participation by men and women, resulting in the acceptance and practice of hygiene, coupled with safe water and sanitation at the household level. These factors can improve living conditions for all, and most particularly for children and women. They can contribute significantly to sustainable and self-reliant patterns of human development and wellbeing.

VISION 21, Water Supply & Sanitation Collaborative Council (Geneva), March 2000

Acknowledgements

This effort of articulating a practical future for access to safe water, hygiene practices and sanitation services in Gujarat has drawn on the experience and participation of a very large number of individuals, institutions and documents. While it is impractical to try to list each of these supports, special mention must be made of those without whom such a collective effort would have been impossible. The inspiration for this effort came from Shri R K Tripathi (Secretary, Water Supply and Chairman, Gujarat Water Supply and Sewerage Board, Government of Gujarat) and Shri P K Taneja (former Managing Director of the Gujarat State Drinking Water Infrastructure Co. Ltd.). The Working Group received sustained guidance and understanding from his successor, Shri G P. Joshi. The GSDWICL provided support and the resources for team effort. The Gujarat Water Supply and Sanitation Board and the Gujarat Jal Seva Training Institute contributed the experience of their teams and major resources of data and information. The National Institute of Design made its facilities and space available as 'project site'. Collaborating resource persons have represented institutions including the Institute of Rural Management (Anand), Utthan, Pravah, Ahmedabad Study Action Group, Centre for Development Alternatives, Gujarat Institute of Development Research, CHETNA, Aga Khan Rural Support Programme, Environmental Sanitation Institute, Sardar Patel Institute of Economics & Social Research, Nehru Foundation for Development, National Sanitation & Environment Improvement Foundation, Community Management Support Unit (Ghogha Regional Water Supply & Sanitation Project), City Managers' Association Gujarat, SEWA, P&M Research Services, Unicef (Gandhinagar) and PSIU (Bhavnagar).

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Foreword

This vision of a water and sanitation future for Gujarat, as well as the approach articulated on these pages for its fulfilment, represents several cycles of reflection and discussion. Within state institutions, a movement toward visionary thinking and action commenced early in 1999, when a decision was taken at the highest levels to articulate a future for the state in several areas of developmental priority. Interaction between NGOs in Gujarat with the global VISION 21 effort of the Water Supply & Sanitation Collaborative Council (WSSCC) began in 1998, leading to the GUJARAT 2010 document on 'A Vision of Safe Water, Hygiene and Sanitation for All'. This reflected a joint effort of some thirty institutions and their constituencies throughout the state. Partners in Government assisted this process, which was presented for discussion and analysis to the WSSCC's Global Forum, which met in Ahmedabad in November 1999. A few months later, at the World Water Forum in The Hague, a special session on GUJARAT 2010 brought government and NGO stakeholders together with the international community in understanding the state's challenge and the efforts underway to respond them. The deliberations at the World Water Forum were followed by a workshop organised by State authorities in Gandhinagar in April 2000. With the crisis of drought as its backdrop, the focus was on experience and learning that could influence the future of the sector in this state. Work on the current Gujarat Jal-Disha 2010 exercise, bringing together all these partners with other stakeholders, commenced shortly thereafter in an effort initiated by the Government of Gujarat to formulate a joint approach to the decade ahead. Almost imultaneously, two other initiatives got underway: *Vision 2020 : Social Sector* (Gujarat Social Infrastructure Development Board) and a White Paper on drought-proofing commissioned through the Institute of Rural Management, Anand by Unicef. Thus, three studies have simultaneously focussed on issues of water demand and supply. The Jal-Disha 2010 Working Group has concentrated on issues relating to drinking water, hygiene promotion and sanitation while making its findings available to others concerned with planning for water supply and drought control in the state. Hopefully, the richness of experience and information brought together will support all those who now need to work jointly to resolve urgent needs. The effort has attempted to be candid and to avoid glossing over genuine differences of approach and priority. The debate and dialogue must continue while Jal-Disha 2010 can help illumine both discussion and action. The report is probably the first of its kind. It offers a model for others in India and elsewhere.

The vision process does not end with this document, which is a work in progress and a beginning toward a larger goal. It will now be taken back to communities, institutions and authorities for reaction and advice before its recommendations can move into action. Key indicators and a much stronger data base will be needed to ensure participatory monitoring of progress toward goals which are acceptable to all stakeholders. The report's recommendations can then serve as a guideline for planners and implementers at every level of action, assisting new attitudes and behaviours at each of these levels. Such change alone can ensure that the Jal-Disha towards a healthy and equitable Gujarat becomes the reality that it can and must be.

Summary

This report on Gujarat Jal-Disha 2010 ('Flow 2010') represents a process of reflection and learning from experience initiated by a group of stakeholders in the drinking water, hygiene and sanitation sector of the state. They have been brought together under the auspices of the Government of Gujarat, acting through the GSWDCL, in pursuance of a policy of forward planning in key sectors of developmental priority in the state.

The report opens with a vision statement that describes a Gujarat in the year 2010 in which safe water, hygienic behaviors and sanitation facilities are all realities within the access of every citizen. All that follows in the document is directed at the achievement of this vision, turning it from a dream to a practical reality.

The key instrument for change is seen as empowering and placing people and communities at the centre of decision-making and action for affordable services, through the recognition of these services as human rights. This demands new roles and responsibilities within both Government and civil society, with Government moving toward a major role as facilitator, and people's organizations accepting new responsibilities for planning, implementation, resource mobilisation and maintenance. At the heart of the report's recommendations is a sense of partnership between local communities, local NGOs, local entrepreneurs and enlightened local governments toward initiating and managing improved systems and services. These demand a collective decision to put water, sanitation and hygiene improvement programmes at the core of Gujarat's strategies for human development and poverty alleviation.

Chapter 2 introduces the present scenario in drinking water and sanitation within the context of conservation and management in all sub-sectors. It is an effort to bring together the essential knowledge and experience in drinking water and sanitation services in a manner that can make users of this document quickly familiar with the key lessons of past experience, and most particularly the learning that has accrued through recent crises of drought. Indeed, when this study commenced in May 2000, Gujarat was in the grip of one of its worst droughts with a devastating impact on large sections of the population and ecology. Gujarat Jal-Disha 2010 is therefore part of a drive for 'drought-proofing' communities and regions. It calls for a coherent water resource policy for the state. Major aspects of water supply, particularly in rural areas, and of the institutions that manage it are analysed in Chapter 2 in terms of past policies and strategies, and their future implications. These aspects include the current emphasis on Rural Water Supply Schemes, as well as the importance of water harvesting and ground water recharge. The experience in drinking water supply, through a range of technological options, is also examined in terms of financial and regulatory dimensions, and opportunities for resource mobilisation. A case is made for the reallocation of existing resources and increase in allocations for community-based system. Sanitation experiences in rural and urban areas are compared, with the institutional and economic implications of improvement. The urban challenge is subjected to intensive review, with a call for new linkages and approaches through networking among deprived communities. The importance of the School Sanitation programme is underlined.

The experience of the drought during 2000 is analysed in Chapter 3. Responses by Government and community-based organisations provide a rich resource of

experience, from which major lessons are drawn toward future drought-proofing. The greatest lesson learnt has been that human wellbeing was best assured when people were actively involved and in charge of problem-solving. Water harvesting and conservation emerged as essential priorities not merely for crisis management but as sustainable strategies for future resource management. Also important has been the need to understand the impact of many years of neglect, and the need to place drinking water at the top of future agendas. Preparing for conflict resolution such as urban/rural competition for scarce resources is seen as a looming challenge.

The heart of Gujarat Jal-Disha 2010 is to be found in Chapter 4, which extends the learning from background and contextual information into core recommendations of policy, strategies and action. Recognition of access to safe water, hygiene awareness and sanitation as human rights is the foundation for a review of equity issues. Equity is seen as multi-dimensional, and as including geographic, social, economic and gender distinctions. A more equitable future therefore demands working on all these fronts simultaneously. Such a people-centred approach cannot be actioned without a paradigm shift in past roles and responsibilities, moving toward more decentralised, democratic management within the sector. The implications of decentralisation in both rural and urban services and of new roles and responsibilities are seen to demand a move toward participatory water resource management, within which the demands of drinking water and sanitation are given the first priority as essential for human survival. The importance of hygiene promotion as a pre-condition for health is demonstrated through local experience.

The paradigm shift is not restricted to managing decentralised systems. These in turn require a new acceptance of water as an economic resource, and one that is scarce and often non-renewable. Setting out a fresh approach to the understanding of the economics of water is the major contribution of this section. It indicates the need for public awareness and acceptance of the principles of ability and willingness to pay, with clear safety-nets to ensure that those most in need are served through systems of cross-subsidy. Making the sector economically viable is the essential concern in this section, which offers strategies on how this can be achieved.

The report suggests that the changes required through such approaches are not merely changes of degree but of kind. They may be impossible to achieve without basic changes in the institutional structures which currently govern the sector. The need to introduce a Gujarat Water & Sanitation Authority is suggested, as an apex body for the planning and control of water resources in the state, and for the promotion of hygiene behaviors and sanitation services. Such an authority would be comprised of managers drawn from within and outside of government, with a strong and transparent participation of all sections of sector stakeholders. A management approach and structure for such an Authority is set out as a key recommendation. Such an authority could also be a catalyst for an accurate data base and MIS systems. (The paucity of reliable data and dealing with conflicting statistics has been a challenge throughout the Jal-Disha exercise).

The actions toward realising the vision set out in Chapter 1 will demand a strong capacity for assessment, so as to ensure that those now responsible for decentralised management and activity are capable of monitoring and evaluating their activities and thus being accountable to those whose trust is invested in them. The implications of such a culture are discussed in Chapter 5, with suggestions on and reporting.

A Framework for Action follows in Chapter 6, within which immediate next steps are suggested for state authorities, institutions, communities, NGOs and the private sector. These include the establishment of a Gujarat Water and Sanitation Authority and the transformation of the Gujarat Water Supply and Sewerage Board into a technical support and advisory system. A portfolio approach is suggested for technologies that can respond to Gujarat's range of conditions and needs. The rights-based approach to water and sanitation is seen to demand an immediate end to the shame of human handling of excreta, while NGOs must also address the urgent needs of uplifting their technical competence, spreading hygiene education, and supporting the Government's programme of constructing latrines in schools. Communities as well as organisations based within them are urged to give priority to reducing the waste of water and to re-cycling opportunities. It is these suggestions that can form the immediate follow-up to the report, which concludes in chapter 7 with a review of what must change in Gujarat by 2010 if safe water, hygiene and sanitation for all are to be a reality. The concluding Chapter 7 returns to the vision outlined in Chapter 1, and segments the issues and tasks involved. It underlines the need for a massive, statewide mobilisation of society toward the wellbeing and dignity of the citizens of Gujarat through equitable access to safe water, hygiene awareness and basic sanitation.

Gujarat in 2010: The Vision

We are now in the year 2010.

- ◆ Over the last decade, the State and civil society in Gujarat have acknowledged that access to safe water, sanitation and hygienic conditions, is a fundamental human right. These services today reach every citizen and efforts continue to improve their quality and sustainability;
- ◆ as a result, the incidence of diarrhoeal disease in Gujarat is 60% below the level experienced in 2000;
- ◆ the roles of communities, state and Panchayati Raj Institutions (PRIs) and other self-government systems, private sector, and NGOs have been redefined to strengthen and increase their contribution to the sector. As partners, they are working in close coordination with each other;
- ◆ the State has moved from being a monopolistic supplier toward its present role as facilitator and regulator of water and sanitation activity. Wherever they have a strong presence, NGOs have been mobilised to be partners with the State. Community as well as private initiatives are encouraged and supported. Groups earlier marginalised are now at the centre of activity and are empowered as decision-makers. PRIs are actively involved in water and sanitation issues;
- ◆ every citizen is aware of and practices good hygiene behaviour. Schools and media have been mobilised to inform and educate the citizenry;
- ◆ appropriate, eco-friendly, sustainable technologies are widely known and adopted for both drinking water and sanitation;
- ◆ issues of equity, decentralisation, water as an economic resource, water resource management and environmental integrity are understood as principles of water and sanitation projects;
- ◆ Gujarat's achievements in water and sanitation are acknowledged as a model within and outside India, and the state is an active member in networks of sharing experience with others and learning from them.

Chapter 2

Drinking Water and Sanitation : Background and Sector Context

Safe drinking water is becoming a scarce commodity all over the world but more so in India. Cycles of flood and drought characterise some Indian states. Gujarat enjoys a unique environmental setting on account of its geological evolution, climatic variation and rich diversity of ecosystems. It shares only about 6% of the total geographical area of the country but accounts for over 30% of the nation's coastline and is a truly maritime state. The availability of water resources is heavily skewed and large portions of Gujarat are arid or semi-arid, while some portions are moist sub-tropical. South and central Gujarat are relatively water-abundant while north Gujarat, Saurashtra and Kachchh are water-scarce. Apart from the factors that determine the physical availability of the resource, there are social, institutional and economic factors that determine access to fresh water supplies for drinking. The challenge therefore, is far more complex than physical dimensions related to mere water availability.

Drought is typical of Gujarat, coming regularly as it does. During the past 40 years since its inception, as a state Gujarat has faced 12 major droughts, the most severe being those being in the 1985-88 period. It is therefore never a new, unexpected phenomenon. Thus, there are 'buffer' years during which a well-conceived action strategy can easily be devised for conservation and management. However, the approach has remained ad-hoc, reflecting knee-jerk reaction, and worse, avoidable expenditure on water transportation, ever more bore wells, and social conflicts, not to talk of general human misery and political interplay. Yet the nature and impact of drought have changed from famine and starvation in the past to scarcity of drinking water and fodder during recent times.

Drought-Proofing: Thinking Ahead

Bhikubhai Trivedi, who works for an NGO as coordinator, at Moti Dharai in Bhavnagar District's portion of Bhal, echoes what the village teacher is saying, "No one can expect to make any area hundred per cent drought-proof. Nature, with the vagaries of the Rain God, will always play a part. What one can do is to mitigate hardships by raising the shield of drought-proofing consistently, year after year, through advance action".

Tushar Bhatt/Disaster Mitigation Institute, June 2000

There is therefore an urgent need to have a fresh look at drinking water and sanitation as a sector. Such a sector covers the entire paradigm of water conservation and management in all sub-sectors including health and hygiene, use and mis-use of water supply and costs, technology, information, education and communication, human resource development and financial aspects. If one accepts that water is a vital resource, and access to a safe, affordable supply of drinking water as a basic human right, then it is important to understand the present scenario, analyse it and chart a future path of change and positive action.

Water as a Resource

□ Rainfall, Hydrology and Geo-hydrology

The mean annual rainfall varies from 250mm in western Kachchh to about 2000 mm in parts of Dangs - an incredible ten-fold difference within the 0.2 million sq. km. spread of the state. Also, the variability in rainfall varies across the regions. It is highest in the Lakhpat taluka of Kachchh (85%) and lowest in the Dangs (23.9%). The uncertainty of rainfall is thus highest in the low rainfall areas.

The state of Gujarat has some very specific geological and geo-hydrological conditions. Water as a resource is available as ground water and surface water. There are major regional variations in the availability of this water in the state due to variations in physical factors such as climate, hydrology, geology, soils, topography and vegetation. While south Gujarat has a sub-humid climate and perennial rivers, the ground water potential in the hard rocks underlying the region is poor. North Gujarat has very few rivers and they are seasonal. The region has semi-arid climatic conditions, but the alluvial aquifers underlying north and central Gujarat have good ground water storage potential. Saurashtra has hard rock geology and poor ground water potential. The climate is semi-arid to arid. High intensity rainfall of short duration, resulting from cloudbursts, and heavy and medium black soils often create excessive runoff. Kachchh has very low annual rainfall spread over a few rainy days. The region has an arid climate. The ground water potential is very poor except in the coastal alluvial belt.

□ Overall Water Availability and Demand

The Gujarat Infrastructure Development Board (GISDB) has analysed the supply and demand scenario for the state as a whole and has estimated the water balance in the year 2010 as under :

Water Balance in the year 2010

Supply	
Ground water – Existing exploitation (1991 base)	MCM 10416
Surface water – Existing exploitation (1991 base)	9019
Regulation and artificial recharge	6180
Recycling of sewerage water	710
Ground water – Ongoing and proposed schemes (till 2010)	10524
Surface water – Ongoing and proposed schemes (till 2010)	14191
Total Supply	51040
Demand	
Domestic and industrial use	2010
Irrigation	49030
Total Demand	51040

Note: MCM = million cubic metres

Source : GWSSB

The table indicates that meeting demand will depend on urgency in groundwater recharge and development of surface water schemes.

■ Urban Water Supply

GISDB has also analysed the demand and supply positions at six major urban centers in the state. Based on this analysis, it has estimated the demand/supply gap in MLD

as under:

Demand Supply Gap in MLD (assuming no capacity addition)

Year	Albair	Vadodra	Surat	Surat - Municipal	Vapi	Surat - Rural	Total
1998	190.84	-57.43	141.70	7.33	37.20	15.26	334.91
2001	252.44	-36.46	173.90	14.43	49.37	22.83	476.49
2004	319.84	-13.52	209.12	22.19	62.69	31.10	631.42
2007	393.59	11.59	247.66	30.69	77.26	40.15	800.94
2010	474.28	39.06	289.84	39.98	93.21	50.06	986.43

Source : GWSSB

There is a heavy variation in supplies of different municipalities within Gujarat. Only 10 municipalities meet present requirements completely while 38 municipalities have supplies below 50 lpcd. Twenty four municipalities lack water plans and 13% of towns depend on hand pumps or pressure pumps which are unreliable (ref. Vision 2010: Social Sector, Gujarat Social Infrastructure Development Board – GSIDB-, October 2000). Industries, buildings and affluent localities consume the larger proportion of drinking water resources at the high cost of long-distance pipeline. Commercial and institutional establishments grab and consume as much as 70% of water quantity. The GSIDB in its recent study observes that urban drinking water administration is "inefficient, inequitable and anti-poor". It points to the confusion wrought by unplanned urban expansion, non-professional administration and the nexus between the administrators and real estate brokers.

■ **Rural Water Supply**

Saurashtra, Kachchh, north Gujarat and Panchmahals are drought prone areas with a projected population of 29 million people. In these districts, the demand for water (considering a per capita supply of 70 litres for rural areas, 100 litres for unsewered urban areas and 140 litres for sewerred urban areas) has been estimated in 2010 as 2900 million litres per day.

□ **Ground Water Availability**

The natural replenishment of water has been estimated at 10862 MCM per year and the net available ground water for exploitation has been estimated at 11176 MCM per year.

Ground water conditions in Gujarat vary in relation to the hydrological setting. At present, a substantial quantity of ground water is being extracted to support irrigation, industries and drinking water requirements. As a result, the ground water potential in Saurashtra, Kachchh and north Gujarat is continuously falling. Water is being tapped from confined aquifers with limited quantities. The percentage of failure of tube-wells, which have been pinpointed after detailed geophysical investigation supported by Remote Sensing technique, is also more than 20 per cent. The depth of open wells has also reached 25 to 30 meters. The depth of tube-wells in north Gujarat has almost reached the level of 300 to 350 meters. From these facts, it can be appreciated that there is no certainty about the availability of ground water in large areas of the state, even at greater depths, on a long-term, sustainable basis.

An additional problem is that advanced methods of water source investigation and rapid industrialisation has caused over-exploitation of water. The move

toward cash crop production and crude methods of irrigation have intensified the situation.

Unsustainable Ground Water Extraction

The state has witnessed a whopping 104% increase in its ground water extraction during two decades (1978-1997). From 1980 to 1997, the ground water table has dropped by more than 100% in some talukas of Kachchh (162%), Surendranagar (153%), Amreli (132%), Banaskantha (110%) and Mehsana (104%). Over extraction of ground water has affected about 4.06 million ha (21% of the state) in 74 talukas of 14 districts. However, the major impact is in north Gujarat where severe over-draft, coupled with negligible recharge has affected about 2.5 million ha in Ahmedabad, Mehsana, Banaskantha and Sabarkantha. The situation is set to worsen since about 87% of the municipal towns in the State depend on ground water sources. The state is also providing heavy subsidies on electricity tariff to enable farmers in north Gujarat to extract water from deeper aquifers.

Source: Gujarat Ecology Commission

■ Ground Water Quality

The quality of ground water varies from place to place. In saline zone areas, the quality of ground water is saline with Total Dissolve Solids (TDS) ranging between 3500 and 4000 ppm (parts per million) as against permissible limit of 1500 ppm. The concentration of chlorides ranges between 1200 and 1500 ppm as against the permissible limit of 500 ppm. Excessive fluoride in ground water is a matter of major concern in Gujarat. It has emerged as a threat to human health. Out of a total number of 18,594 villages in Gujarat, over 2500 villages are affected with the problem of excessive fluorides in ground water. Table 1 in Annex 1 gives a district-wise picture of the number of villages affected by excessive fluorides. Nearly 800 habitations in 19 districts also face excess nitrate in drinking water supply, constituting a threat of blue-baby disease.

Fire-fighting for Water

In Gujarat, for instance, in areas where digging would have struck water at 150ft farmers now have to drill as deep as 1,000ft. Way back in 1987, the Centre had drafted a model bill to prevent over-exploitation of water resources. It fixed such parameters as the number of wells that can be dug per square kilometre and called for water conservation measures. But so far no state has passed such a law. As a senior Cabinet official points out: "We always do fire-fighting in India, never fire prevention. We always talk of disaster management, never mitigation".

India Today, May 8, 2000

■ Salinity Ingress

Gujarat has the longest coastline of all the states in India - 1,600km or one-third of the total Indian coastline of 4,800 km. Of this, the coastline of Saurashtra and Kachchh covers a length of 1,125 kilometres. Table 2 (Annex 1) gives a district-wise picture of the number of villages where the problem of salinity persists. In Bhavnagar-Madhavpur, and to some extent, in Madhavpur-Okha reaches, the salinity problem consists mostly of sea water intrusion as a result of excessive withdrawal. The north-west coastal belt of Saurashtra is mostly affected

by surface ingress of sea water near the coast. The Government's quality control programme has focused on three districts with the highest salinity affected habitats: Mehsana, Kheda and Bharuch. Out of 113 habitats in Mehsana and 150 in Kheda, only 12 and 32 habitats respectively are yet to be covered (ref GSIDB).

- **Performance of Bores**

In Saurashtra region, tube well yields are constantly depleting and ground water quality is also deteriorating. Ground water sources are therefore not considered as dependable solutions for permanent and sustainable sources of drinking water. However, these sources are like reserves, which can be drawn for emergent use in scarcity situations. These sources have been extensively used in previous scarcity years. Almost every year, new bores are drilled in summer to get drinking water supplies. The failure or success of bores also varies (Table 3, Annex 1).

- **Surface Water**

- **Availability**

Rivers in south Gujarat bring in substantial water drained from catchment areas comparable to the total geographic area of the state. The state is therefore divided into a "water rich" area south of Sabarmati, and "water scarce" region north of the Sabarmati. The water policies of the state have emphasized inter-basin transfers. However, the complexity of problem related to the hydrologic systems in the state suggests that a deeper insight, based on sound ecological principles, is required in the management of issues related to water (ref. Gujarat Ecology Commission - Summary Findings).

The existing surface water potential evaluation published in 1989 is based on monsoon rainfall (runoff correlation established for specific river basins), and adapted for similar adjacent basins. They were reviewed, supplemented, and complemented using the Monthly Runoff Simulation Model (MRS) of Tahal Consulting Engineers (Israel) for specific basins. The surface water potential has been evaluated at 20,486 MCM/year at 75% dependability in Gujarat, 60% in Saurashtra, and 50% in Kachchh. An additional volume of 18,047 MCM/year has been allocated to Gujarat by interstate agreements,, mainly with Rajasthan and Madhya Pradesh.

All the major rivers in the state are regulated through a series of dams and weirs. Impoundment of water has led to increased siltation of the reservoirs. The consequent reduced flow has adversely affected the downstream reaches of the same rivers. High sedimentation has led to severe loss in storage in Meshweo (31.3%), Dantiwada (27%), Shetrunji and Khodiyar (20%) and Kadana (18.3%) project reservoirs.

Stream flow and surface water potential of a basin are the basis for the identification and quantification of unused or surplus surface water at selected sites, required for development of water schemes, inter-basin transfers, artificial recharge, etc.

- **River Basins**

There are only three perennial rivers in Gujarat (Narmada, Tapi and Mahi), all located in the southern part of the state. The non-perennial river Sabarmati flows through the districts of Sabarkantha, Mehsana and Ahmedabad. The salient features of some of the river basins are given in Table 4, Annex 1. The effective storage of the existing and ongoing major, medium and minor schemes is 16080

Impact Downstream of Impounding Waters

The downstream impact is felt in several stretches of Dantiwada, Dharoi, Shetrunji, Bhadar, Dharsi, Hathmatl, Saraswati etc. that comprise about 70% of the talukas in north Gujarat. This has even led to degradation of estuarine ecosystems, causing increased salinity in coastal areas, changed patterns of erosion and sedimentation, and loss of mangroves. Small surface water bodies in rural areas have been allowed to be silted up. The state-wide decrease is about 19% from 3.36 million ha in 1971 to 2.72 million ha in 1992. The reduction in areas of ponds, lakes and tanks by 15636 ha. (i.e. about 44%) was spectacular in the Gulf of Khambhat region between 1965 to 1975. These traditional water sources were a major lifeline in the arid, semi-arid and coastal parts of the State. The failure of the centralized water supply schemes have once again rejuvenated interest in reviving the traditional sources of water, largely through check dams and other watershed management activities.

Source: Gujarat Ecology Commission

■ Surface Water in Saurashtra and Kachchh

Gujarat has given priority to the construction and development of surface water reservoirs in the form of major, medium and minor irrigation schemes so as to tap the rivers and impound water for use in irrigation as well as drinking water. There are 113 surface water reservoirs in Saurashtra. The total capacity of these surface water reservoirs and its replenishment in the last few years is given in the Table 5, Annex 1.

A close analysis of the data indicates that most of the reservoirs in Saurashtra and Kachchh are rain fed. Recent history reveals that during the drought years most of these reservoirs are empty and as a result, serious water problems have arisen in these areas. Emergency pipelines have had to be laid to provide water to several rural and urban areas in Saurashtra. Even during 1999-2000, the replenishment in percentage of the total capacity was 66.24 %, 38.36 % and 12.70% for the Gujarat, Kachchh and Saurashtra regions respectively. This has forced the state administration to take up emergency schemes for towns and cities like Rajkot and Surendranagar.

□ Water Conservation

The demand for additional drinking water supply infrastructure and services arises from growth and from deficiencies in either coverage or service levels, or both. In most urban areas, there is an overriding need to increase the quantity of piped water to consumers in order to reduce intermittent supplies and low pressures. This requires additional sources and strengthening and enlargement of distribution systems.

The Government of Gujarat has already appreciated the emergent need of water conservation. As a step ahead in this direction, leak detection surveys have already been taken up for some of the major cities like Ahmedabad and Vadodara. Such surveys are also taken up by the Gujarat Water Supply and Sewerage Board (GWSSB) for some of the major comprehensive Rural Regional Schemes. Based on the recommendations of these surveys, some modifications and improvements in the distribution and transmission systems need to be planned to save and conserve

□ Issues Related to Water as a Resource

This brief review indicates the range of serious issues which challenge planning in this sector :

- ◆ the variability in rainfall is substantial and inversely related to mean annual rainfall;
- ◆ the demand-supply gap, assuming that there will be no capacity addition, is expected to triple by the year 2010;
- ◆ in Saurashtra, Kachchh, north Gujarat and Panchmahals, the demand for water (considering a per capita supply of 70 litres for rural areas, 100 litres for unsewered urban areas and 140 litres for sewerred urban areas) has been estimated as 2900 million litres per day;
- ◆ the State has witnessed an enormous 104% increase in its ground water extraction during two decades (1978-1997). From 1980 to 1997, the ground water table has dropped by over 100%. Over-extraction of ground water has affected about 4.06 million ha (21% of the state) in 74 talukas of 14 districts, However, the major impact is in north Gujarat where severe over-draft, coupled with negligible recharge, has affected about 2.5 million hactares;
- ◆ there is no certainty about the availability of ground water in large areas of the state, even at greater depths, on a long term sustainable basis;
- ◆ the situation is set to worsen since about 87% of the municipal towns in the state depend on ground water sources. The state is also providing heavy subsidies on electricity tariff to enable farmers in north Gujarat to extract water from deeper aquifers;
- ◆ in saline zone areas, the quality of ground water is saline with Total Dissolve Solids (TDS) ranging between 3500 and 4000 ppm as against permissible limit of 1500 ppm;
- ◆ excessive fluoride in ground water is a matter of major concern in Gujarat and has emerged as a threat to human health. Out of a total number of 18,594 villages in Gujarat, more than 2,413 villages are affected with the problem of excessive fluorides in ground water;
- ◆ salinity ingress is a major issue, particularly in the coastal areas through sea water intrusion as a result of excessive ground water withdrawal. The northwest coastal belt of Saurashtra is particularly affected;
- ◆ in Saurashtra and Kachchh, tube well yields are constantly depleting and ground water quality is also deteriorating. Ground water sources are therefore not considered as dependable solutions for permanent and sustainable sources of drinking water;
- ◆ all the major rivers in the State are regulated through a series of dams and weirs. Impoundment of water has led to increased siltation of the reservoirs. The consequent reduced flow has adversely affected the downstream reaches of the same rivers;
- ◆ no connection exists between the water schemes, command areas, and river basins;
- ◆ there is little or no conjunctive operation of ground water with surface water;
- ◆ there is a lack of inter-annual storage volume while even existing seasonal regulation volume is not sufficient;

- ◆ modifications and improvements in the distribution and transmission systems need to be planned to save and conserve water.

Piped Supply and Costs

Drinking water supply in the rural areas of the coastal region of Saurashtra, desert areas of Kachchh and Banaskantha and high fluoride areas of Mehsana and Amreli districts was required to be brought from distant surface and ground water sources through pipeline networks running into lengths of more than 120 to 150 kms. These schemes are largely dependent on non-perennial ground water sources, which require to be augmented frequently. Such improvements require a combination of superior organisation to facilitate these changes, better mobilisation of resources to pay for them, greater attention to the quality of construction, operation and maintenance of assets, and measures to conserve water including appropriate tariff structures and levels.

Source: GSDWCL

Institutions

□ The Government Sector

■ National Background

In India, the supply of water and sewerage services forms a part of the state list of the Constitution, and is therefore the responsibility of state governments. They have, on their part, passed on these responsibilities to state-level functional authorities or to local bodies.

The Ministry of Urban Affairs of the Government of India, formed in 1985, was set up to review state development plans, and influence the policies and practices of the urban water supply and sewerage sector. The Planning Commission also has a special cell that advises on the sector policy.

The supply of drinking water and sewerage services in India are provided by a variety of functional authorities / local bodies which include the State Water Supply and Sewerage Boards, the Metro Water Authorities / Boards, the Municipal Corporations through their Water Supply and Sewerage Divisions and the Captive Water Supply for large industries. The functional domain and the scope of services of various entities varies, from implementation of water supply projects, responsibility for supply of water, to the maintenance of services and collection of tariffs. For example, whereas the Kerala Water Authority is responsible for the entire range of services, the Punjab Water Supply and Sewerage Board is responsible only for the implementation of projects, with services being the responsibilities of local bodies. Typically, the role of a Water Supply and Sewerage Board is to implement projects, as well as provide services and collect tariffs.

■ State Background

In Gujarat, the water sector is managed by institutions at several levels. The water supply wing of the Narmada Water Resources and Water Supply Department (NWRWSD), headed by a Secretary to the Government, is the key institution at the state level. This institution is responsible for formulating drinking water policy, preparing annual and five-year plans for development of the sector, allocating

funds to implementing agencies, and guiding the sectoral development. Other institutions include:

- ◆ the Gujarat Water Supply and Sewerage Board (GWSSB), the state level autonomous organisation responsible for proper development and regulation of drinking water supply and sanitation services in the state (except for the metro cities and cantonment areas);
- ◆ municipal corporations for the cities of Ahmedabad, Vadodara, Surat, Rajkot, Jamnagar and Bhavnagar. They manage drinking water and sanitation services in city areas;
- ◆ urban development authorities set up for the development of urban agglomerates of the corporation cities mentioned above;
- ◆ area local bodies for the operational management of drinking water services in the urban sector;
- ◆ rural water supply schemes covering more than one village (comprehensive) run and maintained by GWSSB;
- ◆ individual village Panchayats are responsible for the operation and maintenance of village water supply schemes.

The Government is now considering the creation of a state level "authority" to act as an umbrella in the form of a regulating body to develop and regulate the conjunctive use of waters through integrated water sector development (see Chapter 4). Gujarat has also appreciated the need for community participation and for a "demand driven approach" in the management of the drinking water sector, specifically in rural areas. Water committees (Pani Panchayats) have been formed in the districts of Banaskantha, Amreli and Mehsana, and the state government has formulated policy guidelines for such committees. Non-government agencies are actively participating in drinking water programmes in the districts of Banaskantha, Mehsana, Amreli, Bhavnagar and Kachchh. These NGOs are also being involved in water conservation, ground water recharge and rainwater harvesting.

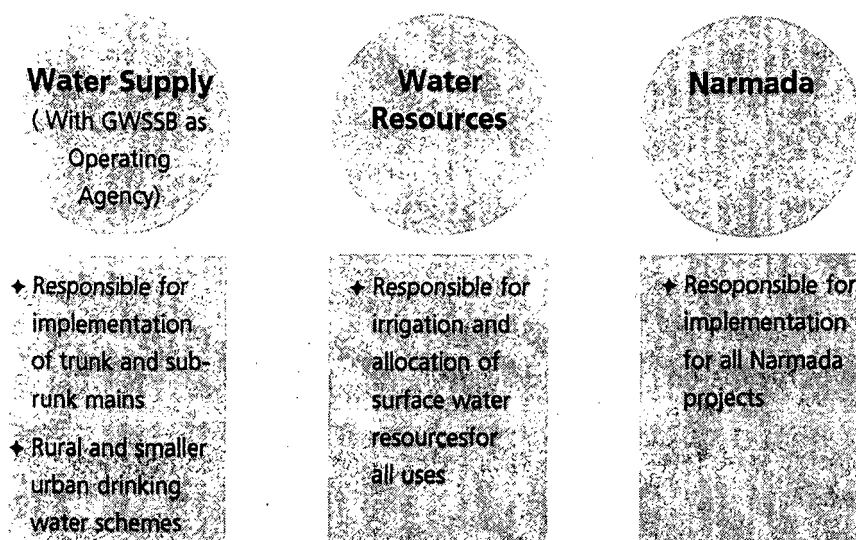
■ State Institutional Structure

Given the shortage of water in the state, the main priority of the Government in the past has been to implement new water schemes. The current institutional framework reflects these priorities.

Roles and Responsibilities for Various Schemes

Schemes	Implementation	Financing	Operation & Maintenance
Municipal Corporation water supply projects	Municipal Corporation	Corporation finances	Municipal Corporation
Small & medium urban water supply projects	40% by Municipalities 60% by GWSSB	75% as grant from State Government	Municipality
Rural water supply projects	GWSSB	State Government grant	GWSSB
Bulk water supply schemes	GSDWICL	GSDWICL	GSDWICL

Narmada, Water Resources & Water Supply Department



Gujarat Water Supply & Sewerage Board (GWSSB)

Gujarat Water Supply and Sewerage Board (GWSSB) has been constituted under the GWSSB Act and its jurisdiction extends to the whole state of Gujarat, excluding cities and cantonments. GWSSB is the nodal agency responsible for implementing bulk drinking water supply schemes to urban and rural areas. Its duties and functions are to:

- ◆ prepare, execute, promote and finance water supply and sewerage schemes;
- ◆ prepare state plans for water supply and sewerage under direction from Government;
- ◆ review and advise on tariffs, fees and water charges;
- ◆ procure and utilise materials;
- ◆ establish state standards for water supply and sewerage services;
- ◆ operate, run and maintain water works and sewerage facilities as may be entrusted by the state government;
- ◆ carry out applied research; and
- ◆ organise manpower development and training.

Sardar Sarovar Narmada Nigam Ltd. (SSNNL)

SSNNL is mainly responsible for planning, development, construction and management of the Sardar Sarovar project and supply of Narmada water for agriculture and non-agriculture uses through a canal network in Gujarat. The Sardar Sarovar Narmada Nigam Ltd. will be the bulk supplier of Narmada water through their canal network both for irrigation and drinking purposes.

Gujarat State Drinking Water Infrastructure Co. Ltd. (GSDWICL)

The Gujarat State Drinking Water Infrastructure Co. Ltd. has recently been incorporated as a Special Purpose Vehicle (SPV) for implementation and subsequent management of the 2600 kms long drinking water trunk transmission mains. The company would work as a "bulk carrier" of drinking water to project areas, while the GWSSB would be the distributor of water to the villages, municipalities and metro cities. The main objects of the GSDWICL are to:

- ◆ prepare, promote, formulate, execute, implement, operate and maintain bulk water pipeline schemes and projects based on ground or surface water sources including the Sardar Sarovar and other canals;
- ◆ buy bulk water from Sardar Sarovar Narmada Nigam Ltd. and Water Resources Department for bulk transmission;
- ◆ sell water at a specific rate or a subsidized rate to bulk water consumers; and
- ◆ operate, maintain and manage water works and water projects.

Gujarat Jalseva Training Institute (GJTI)

The state government and GWSSB, realising the need of human resource development (HRD) and training in the drinking water sector, established in Gandhinagar, a centralised water training institute known as Gujarat Jalseva Training Institute with World Bank (IDA) credit. This institute has been recognised as a key institution by the Government of India, the World Bank, WHO, ODA, and Unicef. It provides in-service training to the engineers, managers and grassroot persons involved in the drinking water sector. The Institute has been conducting courses in maintenance of hand-pumps, source development, pipes and conduits, water treatment, operational management of Rural Water Supply Schemes, finance and management, pumps and machinery, village level caretakers training, and computer based techniques.

The Ghogha Project: Communities and WSS Management

The Ghogha Regional Water Supply and Sanitation Project (GRWSSP) is an experiment in community management of water supply and sanitation, conducted in the Bhavnagar district under GWSSB auspices. The project is part of bilateral cooperation arrangements between the governments of India and The Netherlands, which have a special focus on issues of decentralisation and self-management. The GRWSSP is a third-generation project, building on earlier experiences with Panch Samitis introduced in 1994, and on the involvement of local NGOs in institution-building and hygiene promotion. GRWSSP aims toward more radical changes in strategy through two sub-projects. One of these is the Ghogha Pilot Project, which is a demand-responsive approach to implementing Rural Water Supply and Sanitation (RWSS) schemes. A second is the Community Management Support Unit (CMSU) which was established in January 2000 to disseminate experience and learning from the Ghogha project to other areas of Gujarat. CMSU has developed tools for the promotion and implementation of new approaches. These focus on policy development, training opportunities, communication aids and support for monitoring. The most important learning that has emerged from the Ghogha project is the inadequacy of GWSSB, as an engineering and project-oriented institution, in coping with the social concerns of community management. In response, the Government of Gujarat is currently considering new institutional arrangements that might better respond to future needs for community mobilisation in the state's WSS management (see Chapter 4).

Source: CMSU

□ Non-Government Sector

Conventional government approaches to water resource management focus on large water projects that are capable of meeting supply requirements of large regions for purposes such as irrigation, drinking and domestic uses and industry. They make significant impact in terms of changing the overall water availability situation and use patterns. However, they fail to capture the water management needs and priorities of communities in different localities and hence are not effective in tackling local water problems. They often pose serious threat to the sustainability of the resource base itself, with several negative social, ecological and environmental consequences.

Local community based organisations exist today like Pani Samitis and village water committees under the umbrella NGOs in Gujarat. They include Pravah, Utthan, ASAG, Lokvikas and SEWA. The approaches to water resource management by NGOs and communities and religious groups in Gujarat have been mainly focussed on local water management activities comprising local water harnessing (NMSWDF and Sarthi), small water harvesting and ground water recharging (SVRTI, AKRSP and VIKSAT), and watershed development and management (AKRSP, NMSWDF and Anand Niketan Ashram). SEWA launched its water campaign in 1995 to mobilise women's awareness and action in 11 districts.

During 1998-99, as many as 38 NGOs and individuals in the field came together on a common platform to articulate a vision for the drinking water, hygiene and sanitation future of Gujarat. Their report was published in March 2000 as "GUJARAT 2010: A Vision of Safe Water, Hygiene and Sanitation for All". It was presented to a global forum organised by the Water Supply and Sanitation Collaborative Council (WSSCC, Geneva) in Ahmedabad in November 2000. The report was the subject of a special Discussion arranged at the World Water Forum in The Hague in March 2000. The issues discussed include fundamental rights, health and hygiene, institutional processes, policies, sanitation, economics, technology, gender and education. The publication highlights goals, and strategies in these areas and recommends steps for action (Annex 5).

□ Institutional Issues

This brief review highlights three key considerations:

- ◆ though there are innovative approaches to address local water scarcity problems by several organisations, they are very uneven and localised, and are not implemented at scales where they can make an overall impact on the water situation at a regional level;
- ◆ there are multiple authorities including GWSSB who have yet to act in a synergistic manner, so as to be more focussed and productive;
- ◆ networking between stakeholders outside the government sector, and between NGOs and state authorities, is now a major strength in Gujarat and needs to be fostered.

Sectoral Policies and Strategies

□ National Water Policy, 1987

The National Water Resources Council (NWRC) adopted the National Water Policy in 1987. The policy frame identified by the NWRC recommends :

- ◆ a holistic and targeted basin oriented approach to water development;
- ◆ the promotion of conjunctive use of surface and ground waters, water conservation and appropriate technologies;
- ◆ participation of beneficiaries in water management;
- ◆ treating water as an economic good;
- ◆ water pricing to cover cost of operations & maintenance and part of capital investment costs.

□ **State Sector Policy and Schemes**

The Government of Gujarat has not yet formalised a state-level policy for water management. However, a policy decision already exists which gives priority to drinking water in overall water management. Gujarat has also adopted a policy under which supply of water in the rural areas is taken as a state responsibility with a view to mitigate the water scarcity faced by the rural population. Rural Water Supply Schemes are implemented at 100% cost being provided by the state government under the Minimum Needs Programme (MNP) and the centrally sponsored Accelerated Rural Water Supply Programme (ARWSP).

Rural Water Supply Schemes are implemented either as Individual Rural Village Water Supply facility or Regional Rural Water Supply facility. The differentiation is based on the availability of water sources. There are nearly 7000 Individual Rural Water Supply schemes and 372 Rural Regional Water Supply schemes covering more than 4000 villages/habitations in the state. Individual Village Water Supply Schemes are run and maintained by the village Panchayats for which the government provides grant-in-aid ranging from Rs15000 to Rs25000 per year, depending on the population of the village.

All power bills relating to village water works are paid by the government, relieving the village Panchayat from this responsibility. Thus the state has acted as provider so far because drinking water has been a major developmental constraint in the rural areas and the state believes it has had no option but to provide the required facilities.

Urban water supply has been the prime responsibility of urban local bodies, which have to conceive, formulate, implement, run and maintain water supply facilities created to serve the urban areas. Urban local bodies have to generate their own funds. They normally get loans from the Life Insurance Corporation (LIC) or the Housing and Urban Development Corporation of India (HUDCO) to finance these facilities. However, the state provides grant-in-aid to the extent of 20% to 60% of the project cost, depending upon the size and status of the urban areas local body.

□ **Development and Conservation of Water Resources: Governmental Inputs**

Some of the important activities carried out by the State Government for the development of water resources include :

- ◆ a scheme called "Construct Your Own Check-Dam" being implemented by the state for the first time in the history of Gujarat. Under this scheme, if the beneficiaries or a concerned NGO is ready to bear 10% of the cost of check-dams, the state will bear the remaining 90%. The basic idea is to create awareness of quality of work among farmers, a sense of ownership among users (since they spend 10% of the cost), encourage economic use of water, and transfer the responsibility of operating and maintaining the check dams to user groups;

- ◆ a number of salinity ingress prevention works to prevent salinity ingress in water-scarce coastal areas of Saurashtra and Kachchh, have been taken up such as construction of tidal regulators, bandharas, recharge reservoirs, spreading and radial channels etc.

□ Drinking Water

The Government of India's national norms for supply of drinking water are supply of water to rural areas - 40 litres capita per day, unsewered urban areas - 100 litres capita per day, and sewered urban areas - 140 litres per capita per day.

■ Targets and Coverage

During the international water supply and sanitation decade (1981-1990), it was planned that 100% of the rural and urban population would be provided safe and adequate drinking water by the close of decade. The Decade plan had also set a target of covering at least 80% of the population under sanitation program. Both India and Gujarat had accepted these targets. Due to multiple reasons (non-availability of assured drinking water sources, paucity of funds among them), these targets were not met. Achievements were restricted to just above 70% in terms of water supply (rural 36% and urban 81% according to UNFPA 1995 estimates), and 20% in terms of sanitation (11% rural and 66% urban according to UNFPA). Rural and urban estimates for Gujarat in water supply are 60% and 87%, and for sanitation, 10% and 66% respectively. If other criteria are applied (such as walking to a distant source, year-round functionality and 40 lpcd availability to all consumers), the statistics for water supply would become considerably lower.

■ National Guidelines for Supply to Rural Areas

Background

Drinking water supply is a state subject. Funds are allocated through state budgets. A national water supply and sanitation program was introduced in the social welfare sector in 1954. Taking into account the magnitude of the problem and to accelerate the pace of coverage of problem villages, the Central Government introduced the Accelerated Rural Water Supply Program (ARWSP) in 1972-73 to assist the states and the Union territories with 100% grant-in-aid to implement the schemes in such villages. This program continued till 1973-74. With the introduction of the Minimum Needs Program (MNP) during the Fifth Five year Plan (from 1974-75), it was withdrawn. It was, however, reintroduced in 1977-78 when the progress of supply of safe drinking water to the identified problem villages under the Minimum Needs Program was not found to be satisfactory.

National Drinking Water Mission (NDWM)

The entire program was given a 'Mission' approach when the Technology Mission on Drinking Water and Related Water Management, also called the National Drinking Water Mission (and now as the Rajiv Gandhi NDWM) was established in 1986. Its objectives were to:

- ◆ cover residual problem villages with safe drinking water;
- ◆ evolve an appropriate technology mix;
- ◆ improve performance and cost effectiveness of ongoing programs;
- ◆ create awareness on the use of safe drinking water;
- ◆ take conservation measures for the sustained supply of drinking water.

The objectives of the program could not be attained for a variety of reasons, including lack of sufficient funds and re-emergence of once covered habitations as "Not Covered" habitations. The programme has continued during the Ninth Five Year Plan. Under Mission schemes, Gujarat receives special grants up to 50% to cover the capital costs of efforts to tackle the problems of fluorides and other chemicals in drinking water supply.

Need for Change

The strategies of Rural Water Supply Program hitherto adopted revolve around the basic premise that provision of safe drinking water is the responsibility of the Government. Increased outlay by the Government, particularly in the last one decade and, a change in technology focus to handpumps fitted on tube wells and above wells, has resulted in an impressive increase in the total rural water supply coverage. However, the availability of potable drinking water in rural areas, especially during the summer months, is still not satisfactory. The number of problem habitations has not declined proportionately. Among the reasons identified for uncovered villages are :

- ◆ fast depletion of ground water level, which also increases incidence of quality problems of arsenic and fluoride etc;
- ◆ sources go dry and defunct due to deforestation with consequent reduced recharge and lack of protection;
- ◆ heavy emphasis on new construction and poor attention to maintenance;
- ◆ non-involvement of people in operations and maintenance;
- ◆ neglect of traditional water management practices/systems.

Revised Guidelines

A major focus of the revised guidelines is on the aspects of control on over-extraction of ground water, and the need for more funds for repairs and rehabilitation. These revised guidelines are envisaged as a tool to energise the system towards overcoming the barriers discussed earlier, and to achieve the goal of providing safe and sustainable drinking water to all rural habitations of the country during the Ninth Plan period by means of :

- ◆ increasing people's participation;
- ◆ reservation of 20% funds for states promoting sector reforms;
- ◆ water to be treated as a socio-economic good;
- ◆ stronger links with watershed development programs;

The objective is to ensure coverage of all rural habitations, and most especially to reach the uncovered villages with access to safe drinking water. It is also to ensure sustainability of the systems and sources, and to preserve the quality of drinking water by institutionalising water quality monitoring and surveillance through a 'catchment area' approach.

State Strategies

The Government of Gujarat is fully committed to resolving the problems encountered for the drinking water sector on a long term and sustainable basis. 14,565 villages out of a total of 14,928 no-source villages have been covered with schemes based mostly on ground water. However, these sources are continuously depleting and the water quality is also deteriorating.

Out of 8000 villages, some 4000 and odd villages have the problem of deteriorating

water quality. In nearly 2000 villages, failure of ground water sources necessitates water supply through tankers practically every year. The villages require repeated augmentation of water sources. The state government has decided that a strategy should be evolved to provide safe, assured and adequate drinking water supply to the entire rural areas in the state on a long term basis with particular priority to Saurashtra region. This is regarded as essential to help improve and sustain human health and the quality of life in Gujarat.

The state authorities have formulated a Master Plan for supply of 3,500 mld of drinking water drawn from the Narmada Canal to 8,215 villages and 135 urban centres of Saurashtra, Kachchh, north Gujarat and Panchmahals. Narmada water is to be transferred through bulk water transmission pipelines in this project area at a cost of Rs7,000 crores. In addition, the Government has completed the Rs409 crore Saurashtra Pipeline Project in which 162 km of pipelines aim at the supply of 300 mld of water drawn from the Mahi system to benefit the districts of Bhavnagar and Amreli. The SPP now enters the critical stage of operation and maintenance, requiring the development of a strategy for efficient village-level O&M.

Coverage under Eighth Plan

During the Eighth Five Year Plan, a National Drinking Water Supply Survey was carried out to identify the villages and habitations which were not covered with drinking water or were partially covered taking into consideration the national standards of coverage. The survey results were also revalidated through independent agencies appointed by the Government of India. The survey results are shown in Table 6 (Annex 1). The total numbers of habitations indicated therein are inclusive of the 18,509 revenue villages.

The Government of India had adopted a policy of covering all the NC (non-covered) habitations as well as PC (partially covered) habitations under the category of 0-10 lpcd by the end of March 1998. Though the target was set, it was not possible to achieve this target in Gujarat due mainly to the very special geohydrological conditions wherein location of an assured, dependable and sustainable ground water source is seldom possible. The state has therefore decided that priority efforts should be made to provide drinking water as per national standards to all villages and habitations by the end of the Ninth Five Year Plan.

Status of coverage of habitations upto March 2000

NC habitations	1429
PC habitations(0-10 ltr. category)	444
PC habitations(10-20 ltr. category)	885
PC habitations (20-30 Litres)	1743
PC habitations (30-40 Litres)	349
Total	4855

Source : GWSSB

Habitations requiring coverage as of April 2000

NC	293
PC (0-10 lpcd)	158
PC (10-20)	379
PC(20-40)	1910
PC (30-40)	680
Total	3127

Source : GWSSB

Ninth Plan Strategy

The state Government had set up a Committee of Secretaries, headed by the Chief Secretary, to develop a forward strategy for the Ninth Plan period. Its report included several recommendations for drinking water supply and sanitation :

- ◆ provide assured, adequate, safe and sustainable water on long term basis to all the villages and habitations in the city with a per capita supply of 40 lpcd;
- ◆ concentrate on providing either drinking water source or adequate treatment to the existing drinking water source in fluoride affected areas so as to prevent and control the disease of fluorosis and thereby improve human health;
- ◆ provide adequate and safe drinking water to the salinity affected areas particularly in the coastal regions of Saurashtra and Kachchh;
- ◆ provide safe and adequate drinking water to small and medium towns;
- ◆ provide basic minimum sanitation facilities in rural areas.

The approach of this strategy was based on the following considerations :

- ◆ development and implementation of long-term water supply plan based on Sardar Sarovar Canal network, so as to achieve a long term solution to the problem of drinking water in the state;
- ◆ transfer of drinking water from perennial surface sources to the affected areas of Saurashtra, Kachchh and north Gujarat;
- ◆ implementation of regional schemes based on existing and new surface water sources so as to maintain reliability of drinking water supply in the intermediate stage with facility to dovetail the system with Sardar Sarovar Canal System;
- ◆ provide drinking water to all the non-covered (NC) habitations and partially covered habitations (PC) in the category of 0-10 lpcd;
- ◆ concentrate on providing sanitation facilities in rural and semi urban areas;
- ◆ improve the performance of existing regional schemes by modification and augmentation;
- ◆ concentration on rainwater harvesting and ground water recharge schemes.

□ Policies, Strategies and Schemes : Some Issues

Though significant reforms are taking place in the water sector in Gujarat, several issues remain to be addressed :

- ◆ there is a need for a coherent state water resource policy aiming at planning and management of river basins for all water uses, as spelt out in the World Bank's policy paper on Water Resources Management (1993);
- ◆ the state water system (with the SSP Reservoir and Narmada Canal as the backbone) will no doubt serve to transfer surplus water from the south to the north and north-west. A combined optimal operation and management of the major schemes in general and of those located to the south of the SSP dam in particular will be essential to increase the availability of water;
- ◆ the links between the water systems should include all existing conveyance facilities like channels, irrigation distribution networks, rivers and streams. If necessary, additional new links and additional storage facilities should also be developed;
- ◆ Government of Gujarat appears committed to the RWSS (Regional Water Supply Scheme) strategy. The approach in the Ninth Five Year Plan as well as the

recommendations of the Committees of Secretaries and the general plan of the Department suggest that Gujarat will depend on RWSS strategy for providing drinking water to people. Such a pre-committed approach has the danger of precluding other more viable options of resolving the water crises;

- ◆ current investigations as well as several previous studies, have clearly shown that the regional schemes are economically costly, environmentally nonsustainable (when they depend on ground water), administratively inefficient and institutionally not easy to manage as it is highly centralised. On the other hand, local schemes have several advantages in terms of economic, environmental and administrative costs and efficiency. Several NGOs in Gujarat have successfully shown that local schemes can become viable and can provide sustainable water systems to local communities who are actively involved in their management;
- ◆ alternative sources of water supply are necessary to be created enabling a higher reliability of supply particularly during dry years. This will be a short-term component and will be programmed for immediate implementation. Augmentation and conservation of the water resources will have to be based on storage, induced recharge and artificial recharge through small structures like check dams, percolation tanks, village ponds, river beds, conjunctive use, and wastewater reuse. In this way each drop of water can be tapped and harnessed for surface or underground storage;
- ◆ it is believed that long term and short term measures on a wide front of alternatives and solutions need to be carefully investigated and planned, and later implemented, controlled and monitored. This will also help generate greater public awareness and involvement in rational and efficient water resources development and utilisation. Water harvesting systems at every level, and most particularly amongst the village communities, thus take on particular urgency;
- ◆ this approach to future development of Gujarat's water economy suggests a structured development and management programme, which will bring the water economy, in its ultimate development stage, to a fully integrated inter-connected state system. Incidentally, each transitory stage on the way to such a full integration would secure reasonable immediate additional benefits;
- ◆ several reasons exist as to why people do not/may not pay for water. One additional reason needs to be noted. If they are charged for water to make regional schemes viable, the rates would be very high as the capital costs as well as the O&M costs of these schemes are high. People may not be able to pay this kind of charges just so as to make such schemes economically viable. There is a need to focus on this point;
- ◆ considering the fact that Gujarat has already lost a significant quantum of its ground water resources (about 30 percent between 1980-1987), it is necessary that rainwater is collected and used for recharge. In other words, it is important for a state like Gujarat to have a well-defined rainwater harvesting strategy, particularly in urban areas, and enforced if necessary through appropriate legislations; and
- ◆ rainwater harvesting through watershed development can also lead to comprehensive management of land water and vegetation in the state. This has important implications for overall water management, agricultural growth and sustainable development of the state. Rainwater harvesting is an essential part of a comprehensive strategy for efficient natural resource management in the state.

Technology Options for Drinking Water

Providing water supply and sanitation facilities to the majority of the population living in Gujarat has been a challenge, due both to unreliable water sources that go dry in summer, and to inappropriate technologies. Contemporary back-up systems to ensure community based operation and maintenance of infrastructure are also inadequate.

Delivery organisations in the state often use standardised designs without properly analysing local situations and with inadequate consultation with communities, leading to misapplication of technologies. This results in costly and over-designed systems, and high costs for operation and maintenance. Therefore, it is important to look into various technology options available for community water supply and to make appropriate selection through informed choice. This section aims to introduce technological options suitable for Gujarat, with clarity on key aspects of each technology. It examines how they may be implemented, and looks at the necessary institutional and organizational support required for any technology option.

□ Technology Options

Options for community water supply primarily depend on the sources and the technology used for delivery to the communities. The technology for water supply has been classified here through their sources (ground water, rainwater, surface water and technological water) for easy presentation of options.

■ Ground water

Ground water is normally considered safe as it is generally pollution free at reasonable depth although it contains minerals and chemicals that dissolve in contact with soil and rocks as it infiltrates and flows.

Selection of source points and digging wells/drilling of boreholes for community water supply need to be based on hydro-geological criteria that includes the use of remote sensing techniques and geophysical surveys. Moreover, aspects such as a well's position within the boundary of the village/town, social acceptability, safe site to maintain sanitary conditions and distance from the dependent communities are also important considerations. It is important to consult the local communities who normally know the condition of local ground water. However, this is generally overlooked leading to inappropriate siting of sources and inadequate yield of sources or/and non-use of sources. The absence of a sense of local participation in decision making has major long-term consequences.

Boreholes

Boreholes may be drilled using manual labour, or by use of mechanically operated drilling equipment depending on the soil conditions and depth of ground water availability. The water from boreholes is normally extracted either by use of hand-pumps or through an arrangement of reservoir and distribution system.

Dug wells

If the soil condition is unsuitable for boreholes, dug wells are provided. In case of shallow dug wells, lining either with locally available burnt bricks, stones or concrete rings for a depth of about 3 to 4m should be provided to act as a seal against pollution. Layers of coarse gravel of a maximum thickness of 0.5m help the well to receive filtered water from the bottom. The diameter of such wells may be kept to, say 1.5m to reduce cost of lining and covering.

In case of low yielding aquifers, hand dug wells may be provided. However, as the expense for high depth wells is likely to be equally high, the yield of such sites may be confirmed by drilling boreholes before starting expensive construction. Sometimes it may be essential to provide high diameter wells with/without horizontal bores to increase the yield of the wells.

To prevent entry of external pollution, construction of headwall and a drainage apron is a must. Covering the well is an additional guard against pollution. The use of a windlass instead of rope and bucket system often guards against pollution. This prevents contamination from the bottom of the bucket and from the rope coming in contact with the ground. For shallow wells, the wells may be covered and handpumps may be fitted to prevent possible contamination. In case the well is far from the dependent community, pumping water is usually done to a reservoir from which it normally flows to supply nodes through a distribution system.

Handpumps

In Gujarat, specific rod-operated deep well handpumps (India Mark II and Mark III) have been promoted due to their advantage of lifting water from a moderate depth ensuring safe water and simplicity of their operation and maintenance. India Mark II handpumps are suitable for lifting water up to a depth of 45 meters. Beyond this depth, the extra deep-well version is needed which can lift water from as deep as 90 meters.

Reasons for the Limited Success of Handpump Programmes

The implementing authorities of handpumps are rural development agencies and Gujarat Water Supply and Sewerage Board (GWSSB). These programmes have not been very successful. The reasons include:

- ◆ overlooking aspects of training users for operation and maintenance by the implementing agencies. O&M training programs of Gujarat Jalseva Training Institute (GJTI) are insufficiently integrated with the implementing agencies. As a result the community capacity for operation and maintenance has not reached all the places where these are installed;
- ◆ the lack involvement by communities, especially women, in the planning stages (such as during siting of handpumps) leading to inappropriate location for users and hence to their non-use or misuse;
- ◆ inadequate suction depth as a result of lowering of water table renders many of the installed handpumps dry, during summer. This leads to the abuse of hand-pumps as they run dry and over months the handpumps demand common repairs which are not readily available;
- ◆ insufficient staff and machinery, lack of planning and inadequate priority for maintenance. Implementing authorities take a long time to respond to the request of communities for both major and minor repairs. This leads to abuse to defunct handpumps and to look for alternate sources.

Source: CMSU

■ Piped Water Supply

The piped water supply system usually has a source(s) from where the water is pumped or flows through gravity to a reservoir(s). The water is then distributed through a distribution system to standpoints and/or house connections. Branch systems of water supply are usually economic and appropriate to serve

standpoints. They can also serve house connections in the lanes where pipelines are laid.

A looped system (sometimes called gridiron system) has advantages in supplying water to communities with house connections. This system also reduces the chance for water to stagnate, because unlike branch systems, there are no dead ends. Source, pumping main, storage tank and distribution systems may be designed in a manner that the water supply scheme could be upgraded to meet the demand of population growth and spatial expansion of the area to be served. It helps in providing systems to meet the demand of the immediate future, with the scope for expansion in the long term. There is a need to keep in mind additional storage tanks which can convert the initial branch distribution into a loop distribution network.

Municipalities and development authorities in urban areas and GWSSB in rural areas are primarily implementing the piped water supply system. The most common problem faced in such a system is the lack of involvement of community in planning, designing and implementation.

Involvement of Community at the Planning stage

In the planning stage, community involvement for siting standpoints to ensure adequate coverage, access, security and safety of users are normally overlooked. Technical considerations such as siting standpoints to have adequate pressure and to use washout or air release points in the distribution system as standpoints may be carried out with community consultation. Further design aspects of stand-posts such as the height of standposts and type of taps to be fitted need special attention, as these are to face maximum community interface. Other important aspects such as implication in operation and maintenance for the selected technology viz., training of local plumbers and masons to meet the requirements of both minor and major repairs, establishing contribution system for immediate and future O&M, etc. should be institutionalised with appropriate capacity building.

■ **Rainwater**

Rainwater can be collected directly by channeling water falling on roofs, or other impermeable surfaces, into storage vessels and tanks. The quantity of water available from this source depends on the rainfall pattern, the area of the collecting surface, and the available storage capacity. Rainwater collection is promoted in places where water sources are inadequate or unreliable or the quality of water available is low, especially in dry seasons. This needs to be promoted in the case of scattered communities who travel long distances to collect their water.

Roof Rainwater Harvesting

The essential components of a roof rainwater collection system are roof, gutter, down pipe and a storage tank of appropriate capacity. Tiles of baked clay, micro-concrete and sheets of corrugated or galvanized iron are most suitable roof materials to collect safe water with high runoff. Roofs painted with lead-rich paints or rusted roofs should not be used for collection of water for potable purposes as they may cause serious problems to health. Thatched roofs capture

organic materials and have a very low runoff coefficient. Therefore, such collected water is not suitable for potable purposes.

In case the roof size is inadequate, artificial roofs may be made of plastic sheets and collected water directed to the storage tank.

Gutters should be designed with adequate capacity and slope to carry collected rainwater without overflow from roofs, during intense rainy periods. The position and method of hanging gutters should be such that they can collect trajectory of flowing water from roofs during heavy rain without overshooting it. Care needs to be taken so that the gutter does not bend while carrying the peak flow. Gutters should be made of material like galvanized iron so that they do not rust easily and should be able to sustain high tropical temperatures. They should be well constructed to prevent leakage. The down pipe should be of adequate size and capacity to collect water in the storage tank. The down pipe may be fitted with a rotating spout to avoid the entry of initial showers that are polluted as they clean the rooftops.

The storage tank should have adequate capacity to store water required for dry season use. The capacity of the tank is estimated by taking the average monthly rainfall over at least the last ten years or a rainfall of the driest year. The tank may be constructed over-ground or underground. The advantage of over-ground tank is that water can easily be collected through a tap without polluting it. The advantage of underground tanks is that they restrict evaporation loss. The water from an underground tank may be accessed making an arrangement of steps to reach a tap or by providing a small hand pump on the top of the tank. The provision of handpump will restrict users' direct contact with the tank water, limiting the possibility of pollution. The tank may be built of masonry or reinforced cement concrete or ferro-cement.

As the construction of storage tank at household level is expensive, and rainfall pattern in water scarcity areas is not adequate to collect enough water from rooftops for all purposes, the roof rainwater collection system is generally designed for potable water.

Surface rainwater harvesting

As explained above, the roof area is not sufficient to capture water for all domestic water requirements in low rainfall areas. In such cases, the ground may be used to capture rainwater in separate collection tanks that may be used for livestock or for irrigation.

In places where materials used for roofing are not appropriate for roof water collection, large-scale surface water systems may be constructed for collection and storage. This water is normally filtered through slow sand filters and chlorinated before use. As the storage tank is of large size, it is difficult to cover the tank. The open surface of water in a reservoir leads to high evaporation losses. Therefore, the tanks are oriented adverse to the wind direction in the dry season so that loss due evaporation is restricted. This type of infrastructure needs overall users support and trained operators.

■ Surface Water

Surface water from streams, rivers, lakes and reservoirs may be plentiful, but is likely to be of poor quality (unless abstracted from the upper reaches of the catchment) because of bacterial and chemical pollution. It may be abstracted and distributed for use with proper treatment either by conventional mechanically

operated plants or by use of combinations of sedimentation and slow sand filtration. For large-scale water supply especially for urban areas, conventional mechanically operated plants are used as their operation and maintenance must be carried out by professionally trained operators. Also, the area required for building slow sand filtration units would be large to meet high demand. However, for rural supply, a combination of sedimentation and slow sand filtration is often suitable.

Roof Rainwater Harvesting: Gujarat's Success

Gujarat has successfully experimented with rooftop water harvesting since efforts began in 1998-99 with a project that included almost 12500 families. GWSSB worked as a nodal agency and facilitator, with implementation carried out by NGOs through community mobilisation and information campaign. The importance of this project was highly appreciated by communities during the 1999-2000 scarcity. The Government of Gujarat has decided to promote the concept through a household subsidy scheme ranging from 75-90% of storage tank costs. An outlay of Rs 10 crore has been provided for the year 2000-01.

Source: GSIDB, Vision 2010

Several organisations in Gujarat (Utthan, Mahiti, AKRSP are among them) have actively promoted this programme with GWSSB assistance up to 70% of the total cost. The programme provides a strong demonstration of the demand-driven approach, and of active community participation and management, particularly by women. Experience this year in the Bhavnagar and Ahmedabad areas indicate that communities adopting this alternative have been able to absorb the technology as well as its O&M implications, learning from regions of the state where this tradition is still maintained. Changes in hygiene behaviors are also noticed, such as the use of a long-stemmed dipper for removing stored water, the use of clean vessels and filters, and efforts to protect/clean storage tanks with lime. Some families have installed handpumps on sealed tanks, a practice that needs promotion. Experience has also indicated the importance of close attention to gutter and pipe arrangements, and for training in monitoring water quality.

Source: Pravah

■ Technological Water

Fresh water may also be created or reclaimed by the use of capital intensive technology. Such re-claimed water is called 'technological water'. Desalination and defluoridation plants are example of such technology. These technologies may become the only alternatives to supply water to the community in places where high salinity and fluoride level exists. Desalination plants have been installed and operated by Central Salt and Marine Chemical Research Institute (CSMCRI) in collaboration with GWSSB. Unfortunately, none of these are functional, as sufficient attention was not given to understanding the appropriateness of village technology. Institutional development, training and capacity building were overlooked.

A successfully operated defluoridation unit completely managed by the community, installed by Ion Exchange (India) in collaboration with an NGO, has been operational for over three years in Methan village of Mehsana district. The reason

for success has been the complete involvement of the community in the stages of planning, installation and O&M. Adequate efforts have been made to train local operators for minor repairs and quality monitoring of water. Capacity building of Panchayat members, for transparent collection of revenue and accounting systems, has been established.

NGO in Surface Rainwater Harvesting

The drought crisis has served to remind Gujarat of its traditional wealth of rainwater harvesting and storage practices using ponds, well, step wells and tanks. The challenge now is to ensure that neglect and disuse of this knowledge is never again allowed to dominate. All over the state efforts have been invested in several methods of rainwater harvesting and recharging. NGOs, panchayats and community groups have received assistance from GWSSB as well as CAPART, and traditional technologies have been used to address problems of salinity and high fluoride content. Women have taken a lead in this movement, sometimes in the face of opposition, and have helped communities respond to issues of gender and equity in drinking water supply.

Source: Utthan

The Debate on Sustainability

The whole recharging and rainwater harvesting debate needs to be critically examined and certain issues addressed. For instance, is groundwater recharge the only solution to water scarcity? Can increased pollution and changes in consumption patterns be tackled through groundwater recharge alone? The long term sustainability of the current approach is questionable, especially with regard to the appropriateness of current institutional structures for groundwater management and recharge. Many legal issues related to ownership or water rights, especially with regard to groundwater, have yet to be addressed. In addition, interventions would vary from area to area, depending on the precipitation and groundwater level. Hardly any data is available on the range of groundwater extraction, rate of aquifer recharge and water quality. The method of irrigation currently being adopted and the types of crops being grown also need to be considered. Serious thought needs to be given to the widespread introduction of drip irrigation, especially in drought-prone areas. A scientific and planned strategy is required to tackle all these issues. However, rainfall failure is only part of the drought story. The key to the success of all these and other conventional strategies is people's participation and management.

Gourisanker Ghosh (UNICEF) in Jalvaani, June 2000

□ Impact of Technology on Institutions and Capacity-building

Important examples exist of the basic influence of technology choice on institutional development and capacity building and back-up support mechanisms. These include :

- ◆ in the case of handpump-based water supply and village based piped water supply scheme, the requirement of standpoint attendants is similar. However, in village-based piped water supply schemes, regularly engaged operator(s) to carry

out minor repairs is a must. Some trained community members are also required for minor handpump repairs, though not always on a regular basis. For major repairs, trained artisans/ mechanics for a cluster of villages or a taluka level is desirable. In case the implementing authorities take responsibility of major repairs, the referral system needs to be simple and effective;

- ◆ the cost of O&M of piped water supply is likely to be high especially when villagers pay for electricity for operation of schemes, demanding a high level of attention to transparent collection and accounting of revenue;
- ◆ implementation of a regional scheme supplying water to a group of villages and/or towns may need a federation of Pani Samities in the region along with village/town level Pani Samities. However, this may not be important in the case of village-based point sources;
- ◆ roof rainwater collection systems in houses may not require strong institutional back up, at least during operation and maintenance, as care is likely to be taken at individual household levels. However, in case of a community level surface rainwater collection (storage, filtration and distribution), a strong and functional community level institutional set-up (with training for operation O&M and transparent collection and accounting of revenue) is a must for long term sustainability;
- ◆ for communities where supplied water needs desalination or defluoridation, operators need to be trained and monitored constantly for O&M to ensure sustainability of such units. In this case, a back up referral system for complicated repairing of units should be established within the delivery agency or in some nearby commercial enterprises so that emergencies are met.

Problems of Single-Source Supply

GWSSB has implemented several regional schemes to supply water from a single source to several villages through distribution networks. Major problems faced in these schemes are:

- ◆ unreliable and inadequate water supplies to communities especially to tail end users;
- ◆ illegal tapping of water and lack of appropriate action against culprits;
- ◆ ineffective collection of water charges from users;
- ◆ lack of community involvement in planning, implementation, and O&M of water supply schemes has lead to inadequate attention to village level distribution systems.

Drinking Water: Financial Background

□ Investments in Rural Sector

The Government of Gujarat has in the last seventeen years, spent Rs.86,036 lakhs as a part of the State Plan (1982-83 to 1998-99) and Rs.41,862 lakhs under the Accelerated Rural Water Supply Programme sponsored by the Government of India. The total investment made for providing drinking water as a part of Government's developmental plan in last seventeen years has been of the order of Rs.1,27,898 lakhs. Over and above this, Gujarat has spent Rs.84,375 lakhs for providing bare minimum drinking water during scarcity conditions prevailing in different parts of the State.

Apart from cost, the physical and mental stress that rural communities, particularly women, have to endure for fetching water from a distance source or from tankers is a major issue affecting the overall social and economic development of rural areas in Saurashtra, Kachchh and north Gujarat. Saurashtra and Kachchh region have not developed rapidly primarily because of inadequate water supply.

□ Investments in Urban Sector

Urban water supply and sewerage facilities for the urban areas other than the corporation cities are mainly financed through loans from Life Insurance Corporation of India (LIC) and supported by grants-in-aid from the Government of Gujarat. Loan funds to the extent of Rs.114 crores have been spent for urban water supply and sewerage in last two decades (1979-1980 to 1998-1999). Gujarat has also allocated Rs.98.49 crores as grants-in-aid for the purpose during this period.

□ Institutional and Financial Issues

The experience describes the need to now address a wide range of concerns, which include these:

- ◆ the sectoral development for water with its uses for irrigation, drinking etc. is required to be brought under one umbrella;
- ◆ there is a need to pay greater attention to improvements in financial, managerial and technical performance;
- ◆ there is a need for full autonomy and increased user involvement in management matters;
- ◆ inadequate cost recovery is a major constraint to improved sector performance;
- ◆ charging for water and sewerage;
- ◆ such charges will only be effective if based on the volume of water consumed, with proportionate charges for sewerage. Presently, the charging system is on a volumetric basis. While this principle is widely accepted in India, these systems of charging do not exist fully in any of the larger Indian towns or cities;
- ◆ linked to a system of continuous supply at acceptable pressures, a charging system is technically possible to organise;
- ◆ a fully metered system in cities of supply would permit greater control over leakage, waste and other forms of unaccounted for water, encourage effective conservation and reduce operating costs;
- ◆ financial strengthening as an integral part of institutional strengthening is required. Improved engineering, accounting and management procedures are also required;
- ◆ the GWSSB, as a part of its first IDA Credit, had carried out a 'Socio Economic and Tariff Study' in seven towns and nearly 365 villages (for Comprehensive Regional Schemes). A Tariff Plan was also formulated. It was however not possible to implement the plan fully.

□ Projection of Financial Requirements

The financial resource requirements over the coming decade for drinking water, health and sanitation for Gujarat are foreseen in the context of the basic approach and design spelt out in this vision. People must first be enabled to develop local-specific drinking water systems and sanitation facilities. External sources and

technologies should be in addition to, and not in lieu of, local possibilities. The financial requirements have been worked out in this specific context, which represents a major paradigm shift in thinking and action.

■ Rural Water Supply

The Government of Gujarat is implementing drinking water supply schemes/projects as a part of its Minimum Needs Programmes (MNP), and of the Accelerated Rural Water Supply Programme (ARWSP), which is a centrally-sponsored programme. It has formulated an action plan for providing drinking water to not covered (NC) habitations and partially covered (PC) habitations as on 1 April 2000. The plan is to provide safe water for 3127 habitations and 1480 villages, which are presently getting non-potable water due to excessive fluorides/salinity/nitrates in the ground water.

All in all, the government plan remains partial. This vision has set out an objective of drought-proofing all villages in Gujarat with respect to drinking water availability. It has extended the concept of NC or PC villages to all villages because practically every village in Gujarat has problems. At any time only about 10 per cent of some 18,000 villages either do not have or are not likely to have problems. All the rest face difficulties with respect to water access, equity or scarcity. Therefore, the first resource commitment that needs to be made is for the development of possible drinking water sources and sanitation facilities that can be developed by some 10000 village communities. It is appreciated that Gujarat's villages are not homogenous. Caste biases are known and so also the problems in creating and delivering services such as drinking water, drainage and sanitation. Thus, realistic planning should reflect the provisions for more local sources within villages and abitations so as to improve access.

It is visualised that the basic effort must involve ground water recharge and rainwater harvesting for collecting as much water as possible for drinking and sanitation needs. Lined ponds, unlined traditional ponds and tanks, small check dams and other water harvesting surface structures, ground water recharge, hand pumps, shallow aquifer recharge, roof water collection and several other existing or possible alternatives need to be considered first. It is estimated that for creating and maintaining such sources, the per capita cost will be in the range of Rs400 to Rs1700 (at year 2000 prices) depending upon the selected alternative. With 70 percent weight to higher costs to make ample provisions for the basic approach and philosophy of the vision, it is envisaged that for a rural population of 33 million in 2010, Rs 4323 crores will be required at Rs1310 per capita at 2000 prices. These estimates reflect recent NGO field experiences in Gujarat with lined ponds, roof water harvesting structures, check-dams and recharging efforts. It is expected that this financial commitment would help a great deal in drought-proofing villages against regular cyclical droughts. This provision will also take care of the villages that have non-potable water. The estimate includes part of the operation and maintenance cost as well. However, it is suggested that contribution from people must also be mobilised as part of the policy and wherever possible, either in cash or in kind (material and labour) or both.

■ Narmada Canal Supply

The Narmada water for drinking and sanitation is visualised for augmenting the supply significantly from a bare minimum of 25 to 40 lpcd through local sources to at least 100 lpcd. Unless Gujarat's villages get 100 lpcd of water it will not be

possible to sustain water needs for drinking, domestic use and most importantly sanitation.

■ **Supply to Cities & Urban Areas**

By 2010, about 45 per cent of the total population may be living in urban areas. Urban areas will thus create tremendous pressure on already thinning supply sources. According to this Vision, the Government should pass an act to the effect that all buildings in urban areas should be so designed as to facilitate roofwater collection. Storm water drainage is emerging as a major problem in the event of heavy rainfall. Therefore, each urban area should also explore the possibility of storing storm water in surface storage such as ponds and tanks near urban areas. An estimated Rs 2895 crores may be provided, at Rs1310 per capita for a population of 2.21 crores in 2010.

The requirement of funds based on the demand-supply gaps in case of city corporations as has been estimated by the Gujarat Social Infrastructure Development Board (based on "The Gujarat Urban Profile" CEPT, 1997) as under :

(Figures in crore rupees)

Activity	Ahmedabad	Vadodara	Surat	Jamnagar	Rajkot	Bhavnagar	Total
Water supply and distribution	410.11	42.92	247.49	35.67	80.64	43.90	860.72
Sewage collection	445.86	148.80	310.89	121.38	196.69	49.94	1273.56
Sewage treatment	155.77	66.41	82.29	15.04	30.68	17.51	367.70
Total	1011.74	258.13	640.07	172.09	308.01	111.35	2501.98

Estimates for water supply to urban area development authorities (per Gujarat Infrastructure Master Plan 2010-GIDB) are :

(Figures in crore rupees)

Jamnagar Area Development Authority	34.00
Ahmedabad Urban Development Authority	163.78
Vadodara Urban Areas	105.20
Surat Urban Areas	164.75
Bhavnagar Urban Areas	56.00
Total	523.73

Total estimated requirement of funds for rural and urban drinking water supply :

(Figures in crore rupees)

Rural water supply	2000
Ground water recharge and rainwater harvesting	400
Narmada Canal-based water supply project	7400
Water supply and sewerage to city corporations	2501
Water supply to urban area development authorities (per GIDB estimates)	254
Total	12825

Private Sector Involvement

So far, there has not been any concentrated action or initiative to open up the water sector for organised, large-scale private sector participation. Private operators have been familiar in some urban markets (such as the AUDA areas of Ahmedabad, Rajkot and Jamnagar) as well as through the water tanker business. Water has been accepted by society as well as the legislature and the executive as a social service and not as an economic good. Although the private sector has been involved through large-scale contracts for construction and implementation of projects, involvement of the private sector in rural areas has not taken place. This is because water is a complex sector to privatise. The issues that have a direct impact on privatisation of the water sector have been identified as under :

- ◆ water has been accepted as a natural monopoly and it has been found very difficult to create enabling conditions on the basis of the competition due to the need of large capital investment;
- ◆ the water institutions in the state are fragmented and there is multiplicity and overlapping of institutions. As a result, pricing of water in absence of regulatory framework to protect the interests of both the investors and consumers has been very difficult;
- ◆ water assets last 30 to 50 years. If tariff levels are kept to be low, the pay back period for water investments would need to be amortised to 15 – 30 years which requires long term financial investments.

To encourage private investments and initiatives, the state Government needs to address several issues. The following directions may be essential before the private sector can participate in the water sector:

- ◆ introduction of efficient and effective practices in implementation and management of water supply facilities;
- ◆ conceiving and formulating a pricing mechanism as a part of overall water policy through sustainable tariff increase in a phased manner with a long term agenda of recovering at least O&M expenses from the beneficiaries;
- ◆ introducing market based finance mechanism;
- ◆ management contracts and short-term lease of facilities, with the ultimate objective of developing the experience necessary for moving towards full scale privatisation.

Encouraging private sector partnership in the water supply sector requires concerted efforts in several directions. These include defining roles and responsibilities for the private sector, firm regulation by public authorities of private initiatives, transparent system of decision making within which the interest of civil society are strongly represented, and understanding and deciding the range of circumstances within which private initiatives need to be encouraged.

There is need for careful attention to a major study prepared this year by Tata Energy Research Institute (TERI) on behalf of the Gujarat Infrastructure Board which has examined the scope for private sector participation in Gujarat against a backdrop of experience elsewhere in India and overseas (*ref. Regulatory framework for water services in the state of Gujarat*). The study includes legal and regulatory issues, tariff setting, quality standards and recommendations for legislative changes (see also Chapter 4).

Note needs to be taken of the growing market for bottled water and emergence of major players (including multinationals) in this sector. The impact of an expanding market awaits serious study, most particularly on its implications for future state responsibility in drinking water supply.

Privatisation also raises the issues of ownership of natural resources. It is often only the rich who can afford to dig deeper establishing their ownership over a resource that should belong to all. The political, legal and ethical dimensions of this challenge need to be addressed. More importantly, there is need to understand the meaning of the term 'privatisation' in the context of water as a natural resource which is meant for all. That this does not necessarily mean 'corporatisation' must be clearly understood to avoid unnecessary controversy. Privatisation, in the present context, must be understood as participation of user groups, CBOs, NGOs and individuals as well as of private, for-profit enterprises directly in, or facilitating, the management of water resources towards equitable distribution. Each element in non-government participation requires a policy framework that can facilitate its activity and contribution.

Water Regulations

There is a felt need for having a legal regulatory mechanism for ground water development and control in Gujarat. Presently, there is no legislation in this regard. Consequent upon a Supreme Court judgement (December 10, 1996), the Ministry of Environment and Forests, Government of India, constituted a Central Ground Water Board Authority for the purpose of regulation of ground water management and development. The Government of Gujarat can consider constituting a similar authority. The national authority is composed of its Chairman, Central Ground Water Board (an officer not below the rank of the Joint Secretary to the Government of India appointed by the Central Government), Member (Exploratory Drilling and Materials Management), Member (Sustainable Management and Liaison) and Member (Survey, Assessment and Monitoring) of the CGWB. This authority exercises the following powers and perform the following functions :

- ◆ exercise of powers under Section 5 of the Environment (Protection) Act, 1986 for issuing directions and taking such measures in respect of all the matters referred to in sub-section (2) of Section 3 of the Act;
- ◆ resort to the penal provisions contained in sections 15 to 21 of the Act;
- ◆ regulate indiscriminate boring and withdrawal of ground water and to issue necessary regulatory directions with a view to preserve and protect ground water resources.

A meeting to discuss the methodology and functioning of a Central Ground Water Authority and modus operandi for implementation of the Supreme Court's orders was held under the Chairmanship of Additional Secretary (WR) and Chairman, CGWB in February 1977. Representatives from the states of Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Tamil Nadu and West Bengal besides experts from Ministry of Law, Ministry of Rural Areas and Employment, Ministry of Environment & Forests and NABARD participated. The decisions taken during the meeting are summarised below :

- ◆ the State governments may send their suggestions and reactions which would be examined by the Ministry of Water Resources in consultation with the concerned Ministries/Departments of Central Government;

- ◆ based on the suggestions received from the States, the Model Bill may be revised, if considered necessary, and re-circulated to the State Government for enabling them to bring out suitable legislation in the light of the directives of the Supreme Court;
- ◆ rules relating to Central Ground Water Authority will be finalized and circulated to make the Ground Water Authority operational;
- ◆ An inter-Ministerial Group may be set up to look into the problem of co-ordination;
- ◆ a high level meeting with the Ministerial representatives from the State Governments may be convened to go into the whole question of implementation of the Supreme Court's order;
- ◆ the state Governments may evolve suitable action plans for involvement of people, Panchayats etc. in regulation and control of ground water management and development.

A subsequent meeting was held in August 1997 with Ministers in charge of water resources of all states. The consensus reached was that there shall be emphasis on projects for conservation of water and recharge of aquifers rather than regulatory measures on control of withdrawal of water.

It is now necessary that the Government of Gujarat takes a holistic view and develops a strategy for evolving and enacting a special legislation for Ground Water Control and Regulation. This is the need of the day to preserve, protect and optimally utilize the state's available ground water resources. Constitutionally, water is a state subject and therefore it is the state Government which will have to decide about the structure and framework of such legislation.

The Gujarat Infrastructure Development Board appointed TERI to recommend a modus operandi for setting up a Water Regulatory Authority in Gujarat. The TERI report includes a review of regulatory frameworks elsewhere in India and overseas, as well as recommendations for a framework specific to the needs of Gujarat. These recommendations should now be jointly reviewed by stakeholders. It is necessary to set up such an Authority so as to regulate and control water as a resource and all different uses. Such an Authority will also be able to develop a pricing policy for water and its different uses so as to gradually make the water sector self-reliant. The Government of Gujarat is already considering this issue and a High Level Empowered Committee chaired by the Chief Secretary in March 2000 decided to set up such an Authority. Its importance and possible structure is analysed in Chapter 4. The Water and Air Pollution Acts and the Environmental Protection Acts which exist now, need a review for the protection of water as a resource. It would also be worthwhile considering enactment of a Water Act with the concept of integrated river basin management so as to control and regulate the use of surface water in the state. Legislation should also provide that in setting priorities, supply of water for drinking should be given the first position.

Sanitation

The history of sanitation in India is synonymous with the movement for the liberation of scavengers which Mahatma Gandhi made an integral part of the freedom movement. However sanitation has never been given the same importance as water supply. Yet without sanitation and hygiene education, improved water supply alone cannot improve health, and indeed may even promote the spread of water-borne diseases. The concept of sanitation was earlier limited to disposal of human excreta through cesspools, open ditches, pit latrines,

service latrines etc. Today, it connotes a comprehensive concept which includes liquid and solid waste disposal, food hygiene, personal hygiene, domestic as well as environmental hygiene.

Dignity and Decency

After 50 years of independence, at the most only 15 percent of the population have lavatories; the rest must use streets, rivers, fields or railway tracks, and women with modesty must wait until it gets dark to relieve themselves. Our civilisation as a whole, in spite of all its great technological triumphs, has failed to look to the most basic of amenities, like sanitation, as if human dignity and human decency were below its concern.

Ved Mehta, *The Asian Age*, August 15, 2000

On January 6, 1999 the national committee to commemorate the 50th anniversary of the martyrdom of Mahatma Gandhi decided to launch a scheme for Bhangi Mukti through "conversion of dry latrines into wet latrines in a mission mode *within a year*". Famous last words, or probably not the last yet.

L. C. Jain, *Mainstream*, July 8, 2000

A direct relationship exists between health, water and sanitation. Improper disposal of human excreta, inadequacy in the provision of safe drinking water, lack of personal and food hygiene have been the main causes of many killer diseases in India. Eighty percent of the diseases are said to originate in polluted drinking water. The pollution of water is due to open defecation and poor sanitation. The lack of hygiene awareness and practice is thus a critical issue. The sanitation coverage in Gandhi's land remains as one of the lowest in the world. The recent plague in Surat underlined the urgency of awareness and action in Gujarat. The GSIDB cites several reasons for inadequate performance in the state. Foremost of these is the lack of awareness about the negative impact of poor sanitation, combined with unsystematic and slow implementation of development schemes. Limited financial allocations are compounded by the continuous increase in the cost of toilet construction. The National Sample Survey (1998) estimated sanitation coverage in Gujarat at an average of 37% (rural: 20%; urban: 79%).

□ Rural Sanitation

The Census of India has brought out two publications in 1981 and 1991 on housing, electricity and toilet facilities. While the 1981 report provides information for urban areas, the 1991 report is for both urban and rural areas. According to the census findings, only 23.55% of the total number of households in both urban and rural areas have toilet facilities. Of the 26.1% population living in such households in rural areas, only 9.48% of the households have toilet facilities. The population living in such households was 11.4% in rural areas.

Households with toilet facilities in rural areas in 1991 was 9.48%. The results of the National Sample Survey 1989 indicated that around 11% rural household had access to latrines while according to the reports available with the Government, the sanitation coverage through official programmes is not more than 3%. This 8% difference could be attributed to households constructing latrines on their own without any subsidy (see Annex 2). After accounting for the non-government and private initiatives, the total coverage as of date is 18.4% in rural areas, with

81.60% of the Indian population remaining uncovered. Moreover, according to the Planning Commission, 20% latrines are connected to sewers, 14% connected to septic tanks, and 33% are dry latrines. UNFPA estimates (1995) set rural sanitation coverage in Gujarat at 10% and urban coverage at 66%, corresponding closely to national figures. The NSS survey in 1998 raised these Gujarat estimates to 20% and 79%. The GSIDB in its Vision 2010 for the social sector sets a target of 80% coverage within the next decade, or reaching almost 51 lakh families from a coverage by 20000 of some 8 lakh families.

■ **Institutions**

Community Rural Sanitation Programme (CRSP)

Gujarat has implemented a low-cost sanitation programme in urban centers since 1986 with World Bank assistance. This was extended to rural areas as well. The results of implementation of this programme were encouraging. Hence, construction of low-cost latrines in rural areas was taken up under Minimum Needs Programme (MNP) from 1993. The GWSSB implemented this programme and constructed 2,47,828 low-cost latrines up to March 1998. Out of these, 64,039 latrines have been constructed in urban areas and 1,83,789 latrines in rural areas which includes 82,111 latrines under the CRSP. The year-wise physical and financial details under CRSP is given in Annex 2.

The rural sanitation programme was started in the state in 1989. The programme was purely need-based. Although the actual cost of construction was higher than the subsidy provided to the beneficiary, people came forward to adopt this technology as is clear from the achievements during these years. In the year 1989-90 only 11,000 latrines had been constructed. The number reached 26,758 by 1997-98. This showed the acceptance of the programme in rural areas. The central and the state Governments have encouraged this programme with adequate funds for implementation.

The present pace of construction of low-cost latrine in Gujarat is 25,000 to 30,000 latrines per year. It was planned to construct 65,000 latrines in 1998-99 and 2,50,000 latrines during the Ninth Plan period.

The present status of coverage of sanitation facility in rural areas is about 12%. By the end of the Ninth Plan, it is expected to reach 25% through state, central and private efforts. Yet, the situation in 2000 remains unsatisfactory.

Latrine construction in Gujarat

Agency	Latrines in rural areas	Latrines in urban areas	Total
CAPART	14,000	—	14,000
E.S.I	1,65,557	33,199	1,98,756
GWSSB	—	30,871	30,871
UNICEF & OTHERS	48,88813,	440 62,	328
Total	2,28,445	77,510	3,05,955

To provide all the houses with latrines in 20 years, it is necessary to construct 1,88,000 latrines per year. For construction of latrines to this extent, Government would be required to provide finance to the tune of Rs. 37.6 crore as subsidy each year (at a rate of Rs. 2000/- per latrine) as against present investment of a few crores.

Gokul Gram Yojna

Gokul Gram Yojna of Government of Gujarat is a further step in the improvement of sanitation in rural areas. The programme is under the authority of the Rural Development Department. It constructs individual latrines in villages declared as Gokul Grams. The state has entrusted this work to the Gujarat Gram Vikas agency. In turn, it has appointed five nodal agencies, one of which is to execute this work with the help of NGOs working in rural areas. In this programme Government provides a subsidy of Rs1500 to each family belonging to SC, ST and handicapped category and Rs1200 to each family of other categories.

■ Issues, Goals and Action Plans

A variety of factors have contributed to regrettably low achievements in this sector. They include a lack of sufficient political and administrative will and commitment, a general absence of felt need for sanitation compared to the high felt need for food and water, a consequent lack of a high order of priority, and limited and untimely allocations. Additional barriers are ignorance or inadequate and unscientific understanding of the concept of sanitation, absence of knowledge of various technical options, absence of HRD activities, and non-availability of low-cost materials. The need has been recognised for a demand-based approach in which users decide what they want as well as how toilets should be provided and maintained. Consumers' willingness to pay and ability to accept responsibility for improved services will also require transparency and information on costs as well as alternative technical options.

The GSIDB recommendation (October, 2000) of 80% coverage by 2010, sets a target of 3-4 districts to be covered each year under the rural CRSP covering all districts by 2008, and all primary schools by 2005-06. It suggests an action plan in which aggressive communication campaigns are to be launched to educate public opinion on the importance of sanitation and its link to the quality of life. The resource requirement for the rural sanitation programme (including almost 43 lakh individual toilets and over 21,000 school toilets) is estimated at about Rs 2373 crores.

■ Recommendations for Improvement

Among the steps needed to boost the rural sanitation programme are:

- ◆ Mobilising and securing the involvement of a much larger number of voluntary organizations/NGOs who are committed to social action in general, and to rural sanitation in particular. It is essential to orient and train them in the development of software and hardware;
- ◆ greater community involvement in the process of planning and preparation;
- ◆ emphasis on awareness and demand generation;
- ◆ Panchayati Raj Institutions involved actively in implementation of rural sanitation programmes;
- ◆ village households covered regardless of rank, income, caste, community etc.;
- ◆ mother agencies /nodal agencies persuaded to take interest in rural sanitation work;
- ◆ exhibitions (including models) in schools, colleges, public offices and market places to demonstrate in a simple manner the technological options available in sanitation, the process of construction and installation of low-cost sanitary latrines, their use and maintenance systems;

- ◆ communication materials on sanitation should be prepared in Gujarati;
- ◆ training facilities provided at a grassroots level so that existing demand in remote places and rural areas is satisfied while also providing employment opportunities for local skills;
- ◆ curriculum prepared for training different categories of sanitation skills at the grassroot level (master masons, primary school teachers, anganwadi workers, health workers, gram pradhans, motivators etc.) where change agents have the contacts and influence for change;

Privatised Sanitation

The RSM programme in Uttar Pradesh aimed specifically to shift from a subsidy-based programme (the traditional Government approach) to a privatised one. Over the years, it was noted that offering a much lower subsidy actually increased the sanitation coverage. The idea was replicated in several other states. In Allahabad, the RSMs went further to nil subsidy. Between 1993 and 1998 they sold over 35,000 latrine sets. Under the traditional subsidy scheme, this would have cost the Government \$17.5million. Under the new system, it cost only \$60,000 of external support plus managerial support for one and a half years. After that time the RSMs broke even and became commercially viable. The RSMs have spread across India. National statistics indicate that four times as many people have constructed latrines through private initiative as through the Government's traditional subsidy programme.

Unicef:

- ◆ Rural Sanitary Marts (RSMs) and Material Banks should be started in rural areas. It is experienced that rural people do not easily get materials for construction of latrines such as pans, traps, pipes, covers, doors etc. They have to bring such materials from distant markets, which proves costly. Moreover materials of standard size and good quality are not available at all the places. This discourages latrine construction. Establishment of RSMs and Material Banks at rural centers will eliminate these shortcomings and stimulate construction;
- ◆ bye-laws for provision of sanitary latrines and abolition of dry latrines to be strictly enforced by civic bodies (in spite of having sewer connection, some households continue to use dry latrines);
- ◆ dry latrines converted into sanitary latrines, to eliminate the inhuman practice of manual excreta handling and pollution of air, food and water (Annex 2);
- ◆ compost type or share-and-care type latrines installed and properly maintained in villages and towns;
- ◆ all primary schools provided with sanitation units (to cultivate the latrine habit from childhood and motivate parents toward improved hygiene and sanitation);
- ◆ a pilot project for total sanitation for all the districts of the state, prepared by the Rural Development Department (as has been done for Mehsana, Rajkot and Surat districts);
- ◆ the survey by the Indian Institute of Mass Communication (New Delhi) be given due importance while planning for the future. This base-line survey on water and sanitation in 1996-97 covered 65 districts of 25 states. In each district 20 villages and in each village 30 households, were selected randomly. By this survey, quantitative and qualitative data on water and sanitation on selected parameters

and indicators were obtained. Relevant information was collected from households, schools, anganwadis and panchayats of selected villages. Information on operation and maintenance of public water supply and latrines was also collected. In addition to this, focused group interviews and case studies were conducted in order to understand problems and obtain suggestions to resolve them. Annex 2 shows the results for Gujarat and India.

Gujarat Plans Rural & Urban Sanitary Marts

The State Government will set up over 2,500 "sanitary marts" to construct public toilets and supply various sanitation implements to local self-government bodies. These marts will be managed by co-operatives of scavengers and their dependents, under the Rs128 crore Pandit Deendayal Upadhyaya Antyodaya Sanitary Mart Scheme jointly funded by the Centre and the State. The Scheme was inaugurated in January 2001. A target of 2,568 of them has been fixed in the first phase, which would cover all nagar panchayats as well as nagar palikas with a population of more than 20,000 as well as municipal corporations in the State. Under the scheme, a co-operative of a minimum of 25 persons can form a society and be eligible for loans up to Rs5 lakhs to set up a mart. Central and state contribution will be 49% and 51% respectively. Of this, half would be a subsidy and 35% a loan from the National Scheduled Caste Finance Development Corporation, with 15% as margin money. All district Government hospitals and municipal bodies would be required to buy sanitation equipment from these marts, benefiting an estimated 64000 persons in the state. Stipends will encourage technical training. The marts will produce sanitary wares, undertake toilet construction and conversion of dry latrines, and provide household service. In addition, they can purchase wares from the open market, and every municipal corporation is required to guarantee purchases of at least Rs2 lakhs from these marts.

Source: ESI

■ Communication Strategies

A strategy for information, education and communication (IEC) can help create awareness and motivation of individual households for acceptance of sanitary facilities. The Environmental Sanitation Institute (ESI, Ahmedabad) has conducted a Mass Awareness Project in Panchmahal district and a low-cost sanitation project in the entire state. ESI has also provided software support to rural sanitation efforts launched by National Dairy Development Board (NDDB) in collaboration with Unicef and ESI.

Based on this experience, as well as the recommendations of the GSIDB, a strategy has emerged for mass awareness, the formation of water and sanitation (watsan) committees, orientation programmes, group contacts and the indispensable component of inter-personal communication. This strategy offers a blueprint for effective communication toward behaviour change in sanitation attitudes and practices.

□ Urban Sanitation

In Gujarat, the percentage of household having toilet facilities in urban areas was 60.11% and 65.71% for 1981 and 1991 respectively (Annex 2). According to the GSIDB, 23% of towns in 25 urban districts of the state have been covered.

There are 264 urban centers in Gujarat. The urban population of the state in 1991 was 142.46 lakh from a total of 413.09 lakh. According to census figures, there are 26 lakh houses in urban areas. In order to maintain sanitation in rural and urban areas, it is necessary to dispose liquid and solid waste from habitation areas without creating environmental and sanitation pollution. To achieve this, it is essential to provide water carriage underground systems in all the urban and rural habitations. Looking to the large number of urban centers, and the very high capital and O&M cost of water carriage systems and the financial position of local bodies, it is clearly beyond the reach of the state to provide such facilities in the near future. For successful running of underground water carriage system, water supply at a rate of 135 litres per capita per day is essential. This quantity of water is not available in most towns and villages. Hence, to overcome this situation, the implementation of the low-cost sanitation programme involving construction of 'Pour Flush Water Seal Latrine' with two 'leach pits' is one of the solutions being promoted in Gujarat.

■ Role of Municipal Authorities

There are six municipal corporations and 143 municipalities in Gujarat, with a very important role in sanitation. The Gujarat Municipalities Act 1963 under Article 87 on duties of municipalities, prescribes that each municipality shall provide public latrines and urinals in municipal limits for the use of people. Moreover under Article 167, the chief officer of the municipality is to regulate the owner of a house to provide a latrine with a water closet or conversion of a dry latrine into a water seal latrine.

Thus, municipal corporations and municipalities have a major responsibility in providing latrines in slum areas and public places. As economically weaker sections stay in chawls, huts and slums, they do not have their own sanitation facilities. They use public latrines or open ground for defecation. Open defecation causes a nuisance to the public and spreads disease. The Ahmedabad Municipal Corporation has constructed 2,258 blocks consisting of 10,348 latrines so far. In the past, AMC had introduced a subsidy scheme popularly known as IDA-1643 N Scheme. Under this scheme, a beneficiary had to pay 20% of the total cost, and 80% was to be borne by AMC, provided the beneficiary's yearly income did not exceed Rs10,000. Under the scheme it was planned by the Corporation to construct 21,000 latrines. Although the target was achieved to a large extent, whether they are properly used is doubtful.

As of 2000-2001, the urban sanitation programme has been transferred to the Urban Department and Urban Housing Department of Narmada Water Resources and to Water Supply Department (GWSSB). Provision for the programme for the year is Rs.3 crore with the target of 15,000 latrines.

■ Urban Slums

A high rate of growth of slums is a dominant social transformation of the day. It has a direct relation with urbanisation. Rural people have been migrating towards urban habitats right from 1951 onwards. As a result of high rate of urbanisation and the slums along with it, the total demand of drinking water has increased from 40 liters per capita per day to 130 LPCD. Migration from rural pockets being one of the dominant factors, annual increase in urban population is estimated at 5 million per annum i.e. 3.78% as against 1.78% in rural population.

The unprecedented growth of crowded urban slums is creating enormous pressure on civic amenities of towns and cities and depriving low income families

of basic services. Poor women and children are the first to suffer from the adverse environment. Poverty, morbidity and malnutrition are widespread, taking a heavy toll of lives. Studies have indicated that nearly 50 per cent of infant deaths occur in first couple of months of life, mainly due to complications arising from malnutrition, lack of sanitation and personal hygiene and other diseases. Illiteracy, ignorance, low income and above all, inaccessibility and non-availability of civic and health facilities are prime reasons for the present state of affairs. Slum conditions continue to be a serious threat to the health and sanitation of cities. The environment in and around the slums needs urgent attention. For improving the quality of life of slum dwellers, upgradation of the physical environment, provision of health services, improvement of the level of education and creating income-generating opportunities with active participation of the slum dwellers are very essential. These issues require fresh policies and strategies, discussed below and in Annex 3 and 4.

It is to be noted that the emphasis here is on physical and financial targets. Sanitation and hygiene practices are not reflected and do not get due importance. Without changed behaviour, physical targets can be meaningless. Prevention of pollution of water sources, quality of drinking water, storage and educational inputs towards good hygiene practices and similar inputs need therefore to be integrated in a manner that will drastically reduce the incidence of water-borne diseases. This demands new targets of improved health and new monitoring and evaluation systems that can track awareness and behaviour change.

Funds for Slum Improvement Programmes in Gujarat

(Rs. in lakhs)

Year	Provision	Fund released
8th Five Year Plan	2100	2148.42
9th Five Year Plan	3000	—
1997-98	600	720.16
1998-99	1100	1095.17
1999-2000	1586	1502.03
2000-2001	1590	—

National Slum Development Programme +++

1997-98	2795	2600
1998-99	1500	1368
1999-2000	1500	1500
2000-2001	1500	—

Urban Development Fund ***

8th Five Year plan		
9th Five Year Plan	500	—
1997-98	100	100
1998-99	100	100
1999-2000	400	400
2000-2001	250	—

+++Introduced in the Year 1997-98

***Slum Development is also covered under the scheme, Source : GWSSB/ESI

Under provision for the Total Sanitation Programme in the Ninth Five Year Plan, an outlay of Rs. 10.00 crores has been provided for urban sanitation with a physical target of 50,000 beneficiaries.

Budget provision, expenditure, physical target and achievement

Year	Budget provision (Rs.lakhs)	Expenditure (Rs.lakhs)	%	Physical targets	Achievements	%
1997-98	300	113	37.67	15000	5332	35.57
1998-99	400	211	52.75	20000	9974	49.87
1999-00	300	270	90.00	15000	12671	84.47
Total	1000	594	59.60	50000	27977	55.55

■ Upgrading Urban Slums

There are 1,875 slums in the six corporations of Gujarat. The task of slum improvement is a gigantic one. The following steps are suggested to improve the overall condition of slums through physical changes, community involvement and new partnerships. Improving the physical environment requires :

- ◆ roads and paving
- ◆ water supply to individual households
- ◆ underground sewerage to individual households
- ◆ storm water drainage
- ◆ street lighting
- ◆ solid waste management
- ◆ landscaping.

Mere provision of these physical services will not in itself change the overall quality of life for slum dwellers. A lot is required to be done towards community development and involving the slum population in the decision making process and in maintaining services which are created for their welfare. Among the community development activities that can be taken up are these :

- ◆ establishment of neighbourhood groups, women's groups and youth activities.
- ◆ mobilisation of community savings through saving and loan groups;
- ◆ initiation of community health education and other interventions focused on diseases prevalent in slums, and maternal and child health;
- ◆ support for vocational training, job access for unemployed persons and improving access to formal sector finance for small enterprise;
- ◆ 'earn-while-you-learn' programmes.

An element of partnership with slum dwellers should be introduced in plans for the provision of physical services. Small contributions from citizens towards a corpus for the maintenance of these services could also be made. Such steps can create a sense of ownership which can help motivate slum dwellers to keep their services in good condition.

■ Linkages with Services

Slums are usually treated as separate entities, devoid of linkages with the city-level services. As infrastructure connecting the slums is inadequate, without such additional infrastructure it may not be possible to establish such linkages. Therefore it is essential that the infrastructure around the slums and establishment of linkages of all services should be provided. Encroachments should be not be

allowed and where they exist, they should be removed.

Actions toward such linkages can include :

- ◆ provision individual services as opposed to shared or common ones;
- ◆ a special crash programme should be taken up for utilising the services created usefully and continuously;
- ◆ after installation of water supply system or sanitation facilities, careful attention to people's participation;
- ◆ all efforts to strengthen NGOs/voluntary participants and to involve them in mass awareness, motivation, education and confidence-building efforts, as well as for supervising the upkeep of facilities;
- ◆ strong encouragement to women's participation in water supply and sanitation sector, which is still negligible and represents a tremendous potential waiting to be tapped;
- ◆ artisan training for low-cost construction of water supply and sanitation facilities, with young people recruited and trained in this essential skills;
- ◆ stress laid on the construction of individual latrines instead of public latrines;
- ◆ in all the above activities, NGOs actively involved as they are working at grassroot level and know the pulse of the people. Gujarat is fortunate in this regard as a network of NGOs committed to upliftment of the poor exists in the state. For the effective implementation of environmental improvements schemes, local bodies and panchayats should be actively involved.

■ Slum Networking

Because urban slums are seen in isolation rather than as integral part of city systems, there is a need to look afresh at slums as a resource and as stressed areas of the city. Slum networking is an innovative concept which uses linkages between the slums and natural drainage paths to influence urban infrastructure and the environmental fabric of the city. Thus slums, instead of being a resource-draining liability as in the conventional approach, actually become opportunities for a quantum change in infrastructure levels and environmental quality. Slum Networking is an initiative driven primarily through community control. Within a holistic frame (which converges scales, activities, agencies and resources) it exploits the slum fabric in a total city context for sustainable and cost effective improvement in the quality of life of its people as a whole. It is a concept with a strong potential for Gujarat (Annex 3 and 4).

The GSIDB sets a target of 100% urban coverage in sanitation by 2010, with sewage systems fully installed. A supporting action plan calls for central assistance which can ensure underground drainage systems for urban centres having a population over 50,000. A separate utility is suggested to manage the sewage system on a no profit/no loss basis. The second phase should cover centres with 30 to 50, 000 persons while smaller urban centres should be covered with low-cost sanitation systems. The plan includes subsidies to stimulate acceptance. The Board estimates the resource requirement for urban sanitation until 2010 at Rs 5270 crores. The total resource requirement for water supply and sanitation is estimated at Rs 19,228 crores (water supply at Rs. 11,585; rural sanitation at Rs 2373 crores and urban sanitation at Rs. 5270 crores). These resources are to be raised mainly from state and central allocations supplemented by donor assistance, loans from financial institutions and other schemes.

□ School Sanitation

Particular attention is needed to the important initiative by the Education Department (Government of Gujarat) to ensure latrines in all schools in the state. In cooperation with the Rural Development Department, 34,000 schools are to be covered, with a minimum facility of a toilet block equipped with one toilet and two urinals, at an approximate cost of Rs9,000. By 2000, some 6000 schools had been covered. Sustaining this momentum is a task that must involve all sections of Society, and strong NGO support. Over 21, 000 schools are to be covered by 2006 at a cost of Rs20,000 per unit (60% of this amount is to be met through central assistance with the state contributing 30%, and parent-teacher associations mobilising the balance 10 percent. These basic facilities can help ensure that hygiene education in schools can take practical application, and spread from schoolchildren to parents and households. In addition, functional latrines can help end the severe problem of dropouts and non-attendance, most particularly by girl children. Some ,850 latrines for girl students were constructed in 2000 with the involvement of over 70 NGOs, and at a cost of Rs295 lakhs. The school-wide programme is an initiative that demands a massive state-wide mobilisation campaign.

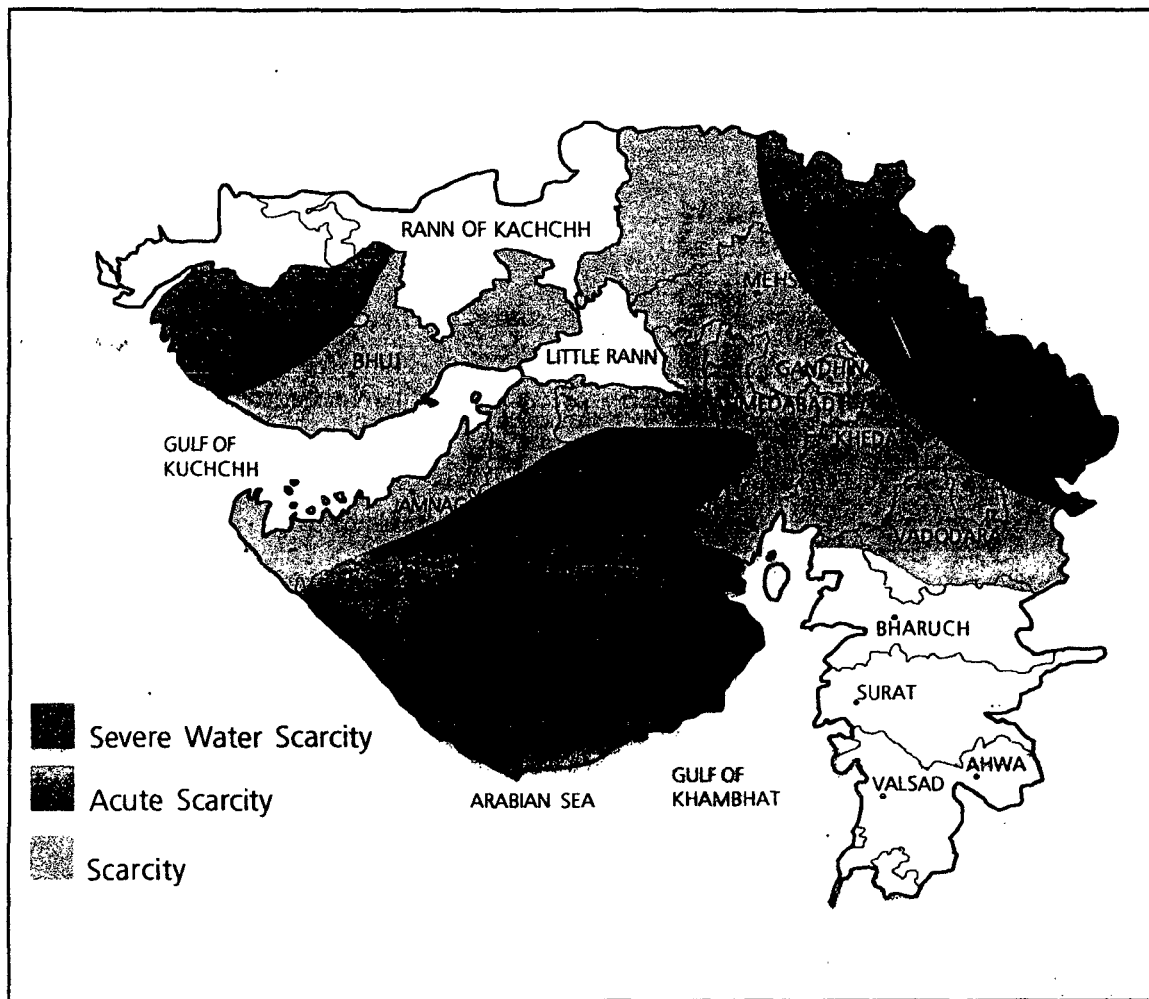
□ Technology Options

Twin-pit, single pit and direct-pit (with hand flush) latrines are the popular options in rural Gujarat. A major effort is toward connections with bio-gas plants and some 15,000 of these have been constructed. In towns and cities, the options most widely adopted are latrines with septic tanks, aqua privy single pit and twin-pit alternatives, with drainage connections wherever possible.

Drought-hit Gujarat: Scripts Water Harvesting Miracle

It's celebration time in Saurashtra. Visitors to the villages are offered laadva sweets, which they can wash down with tumblers of water! Yes, water. Even one month back the most hospitable villager in Suarashtra would have thought twice before parting with water after a failed monsoon last year, and a monsoon that nearly didn't reveal itself this year. Driven by drought, they launched themselves into a frenzy of building check dams. In the past three months, more than 10,000 check dams were build in 2,400 villages of Saurashtra under a scheme in which the State government bore 60 percent while the villagers paid the rest. An interesting spinoff has been that the water collected this way is sweet, as villagers in Rajkot, Junagadh and Bhavnagar will vouch. "Our bores yielded brackish water for years. This year, surprisingly, the water is sweet, obviously because of recharging"; says P George, executive engineer of a district panchayat.

Indian Express, 24 July 2000



The Experience of Drought

The unprecedented drought during 2000 has challenged every resource and capacity for managing drinking water supply in Gujarat. With the spectre of scarcity moving into its second year, the state has witnessed a massive mobilisation and, in many ways, unusual partnership toward immediate relief as well as longer term strategies. The Government of Gujarat's Water Supply Department has articulated an action plan of massive proportions, while non-government activists have striven to take local solutions to a scale where they can impact not only the crisis but future policy frameworks as well.

The causes of the crisis and its implications are being debated throughout the state: geo-hydrological and ecological concerns, prospects for massive transfers of water resources across the state, revival of traditional conservation knowledge and infrastructure, the implications of rapid urbanization, issues of equity (between regions, communities, sectors and usages), participation and empowerment (of local communities and authorities toward decentralised water management systems), and the changing roles of and responsibilities of authorities and people. In this debate and in the action on the ground which has accompanied it, there have been unusual opportunities for forging new partnerships. These provide the greatest hope and resource for Gujarat's future.

Equally, basic and real differences of approach have also emerged which need to be resolved if the current crisis as well as the future is to be faced with confidence. In the process, it is not only the drought that has been unprecedented. Perhaps never before has such concentrated attention been given to the deeper reasons and meaning of drought and how water should be managed for future generations. Many lessons are being learnt and many are still emerging, with relevance not only to Gujarat but also to the nation.

This chapter is an attempt to summarise the experience of 2000, and to relate it to the paradigm shift that seems inescapable if a vision of safe and equitable future is to be realised.

□ Government Action

Authorities have stressed the impact of eight years of severe water scarcity in the state. Even in years considered less critical, villages dependent on tanker supplies have ranged anywhere between 1200 and 4500. Conditions have been accelerated in 2000 by scanty rainfall of only 528mm against an annual average of 858mm: only 14 percent (three out of 19 districts) received normal rains. Saurashtra and Kachchh have been the worst affected while Junagadh, Amreli, Bhavnagar and southern Rajkot have also been severely affected. Most cities and towns in these districts have no water resources beyond December. Seventy-two urban centres were affected by scarcity conditions. Surendranagar, Bhavnagar, Junagadh, Jamnagar and all of Kachchh face a deficit between demand and availability of between 70 and 85 percent. 6,545 villages with 13 million inhabitants are facing an acute crisis. Women and children have, as always, been the major sufferers. Hundreds of schools have had to reschedule their educational programmes.

The official response to this crisis has been focussed on the transfer of water resources through massive investment in pipelines, bores, handpumps and tubewells (see box). Water management capacities have been sought to be strengthened in

five municipal corporations and 68 urban municipalities, in addition to strengthening the GWSSB's rural outreach. Available technical expertise is being supplemented through access to major private companies (such as L&T, Essar and Punj Lloyd), with an emphasis on speed, reduction in project costs and quality control through independent agencies. In addition, the new Gujarat Water Infrastructure Co Ltd has been mobilized to generate resources for the future through rational distribution of Narbada-based water supplies. The Government cites a major success in 2000 through the commissioning of the Dharoi Regional Water Supply Project, the largest of its kind in India with an outreach to 550 villages. The 532 km long Mahi pipeline (to serve Ahmedabad, Bhavnagar, Amreli, southern Rajkot and Junagadh) is to be completed by February 2001, setting a national record for projects of this kind (see box). Limited supplies are to be augmented by the transfer of water from the Narmada Dam through the Narmada canal into the Mahi canal and pipeline.

To supplement this water grid, state authorities have encouraged a decentralised, community-based approach (see below) on a scale that is entirely new. The most dramatic demonstration of this has been in the implementation of rainwater harvesting and groundwater recharge schemes through village committees that have shared costs in many instances. These committees have been handed responsibilities of implementation, management and monitoring of some 11,000 check dams and over 13,000 rooftop harvesting structures completed during 2000. Over 2,500 watershed management projects have been initiated. In addition, the operation and maintenance of handpumps as well as management of distribution through water tankers has seen a fresh level of community-based operation. In the tribal regions of Panchmahal, Dahod and Baroda, experiments are underway with check dams and mini water supply schemes. A special emphasis is placed on the needs of schools in these dispersed settlements (see box).

Action Plan: Tribal Areas of Panchmahals, Dahod, Vadodara

	Phase I (2002)	Phase II (2007)
◆ Tribal Villages	3511	2743
◆ Population in million (Year 2000)	5.61	6.30
◆ Check Dams	948	1075
◆ Mini Water Supply Schemes	882	1018
◆ Schools to cover	1800	2610
◆ Cost (million US\$)	48	57
Water Harvesting: 2000		
Check Dams 10700.		
Village Tank Renovation 1895		
Rooftop Harvesting: 13694		
Watershed development projects: 2501		

Source: Approach and Action Plans, Water Supply Department, October 2000

Plan of Action: 2000-2001

- ✦ Pumping of 1000 cusecs from Narmada dam into Saurashtra pipeline
- ✦ Completing 532 kms of pipeline
- ✦ Transporting water through 3344 tankers to 3224 villages
- ✦ 3814 new bores with handpumps in 2607 villages
- ✦ 2175 bores (1500 mm) in 1275 villages
- ✦ 529 deep tubewells for 477 villages
- ✦ rejuvenation of 990 individual village water schemes
- ✦ special repairs/revitalisation of 158 rrws, covering 1530 villages
- ✦ repairs and rejuvenation of 72500 handpumps in 7160 villages

Source: Approach and Action Plans, Water Supply Department, October 2000

□ Community-based Responses

The launching by the state government of its Sardar Patel Participatory Water Conservation Programme (SPPWCP) is symbolic perhaps of the paradigm shift which many in the sector, both within and outside government, see as essential to a sustainable future. This is the widespread acknowledgement that large water supply schemes would never by themselves be able to resolve the crisis of drinking water supply. The SPPWCP represents a bold venture into the relatively uncharted territory of major cooperation with civil society. Its outcome offers reason for optimism, as well as for concern. Some regard it as desperate measure for short-term crisis management, while for others it is the symbol of a genuine paradigm shift. If these differences in policy emphasis become serious, they will represent the most basic challenge to genuine cooperation and consensus based on experience and demonstration with a range of options. Building such an environment of trust and partnership can be the foundation for a vision turned to reality.

It is in Saurashtra and Kachchh, the regions most seriously afflicted by drought, in which the clearest indications have emerged of the success of the government-sponsored SPPWCP programme. Despite a poor monsoon 8,000 check-dams of the 10,500 built in 2000 were overflowing. Ground water tables improved, and dugwells filled with water. The SPPWCP received over 25,000 project proposals. The original target had been 2,500 check dams built at a cost of Rs100 crore. The target was exceeded four times: 10,500 checkdams were built, and at a cost of Rs. 200 crore. From 2,500 villages served by tankers, the number was reduced to 1,400. A remarkable outcome has been in resource mobilisation. The 10,500 checkdams represented an average of 40% voluntary contribution by village communities. (During the period between 1997 and 2000, 62 check dams had been built with only 10% local contribution to costs). A major breakthrough was in discarding the old procedures for contracts and tenders and instead handing over these decisions to village committees, whose designs could be approved after technical assessment. In a detailed assessment of the SPPWCP experience, the Centre for Science and Environment (CSE) has praised the positive impact of the programme, saying that for the first time a government had let people decide their own response to drought. Decision-makers and activists were quoted as recognising the importance of work accomplished by villagers, with no interference from anyone" and the positive effect of villagers realising that alternatives can and do work if responsibilities are accepted.

"We will be able to manage!"

The experience of drought has encouraged village after village in Gujarat to demand support for self-management of drinking water supply, for what the Gujarat Social Infrastructure Development Board describes as the "demand responsive approach which allows consumer demand to guide key project decisions". This is the voice of one consumer, Savitaben, who leads a women's group in Natthugadh village in the drought-prone district of Bhavnagar.

"We would like to demand Government support for building our own roof water collection tanks, instead of providing us with tankers during the drought. All the families here are willing to contribute with their labour. Even if the rainfall is low, our tanks can secure water for four to six months. There are a number of villages such as Mithiviradi where the Water Committee has received funds from the GWSSB. They have built 200 tanks, and see how self-reliant they are! They manage their own water and do not depend on tankers sent in by the Government. We all feel that this is the best investment for us, not only for meeting the drought crisis but also for preventing such a crisis from happening again. If we have these collection tanks, then we will be able not only to manage our own needs, but also organise our own private tanker services if we need them to supplement what we collect."

But how will they meet the cost of tanker services on their own?

Savitaben replies: "When we have our own tanks and we have secured water in them, we will obviously save a lot of our time that now goes in hours of fetching water from distances or in water queues. We could use our time much more productively by working on watershed projects which we have planned in our village with the help of Utthan. We could easily earn the money that we need to pay tankers. The biggest relief would be the relief from the constant tension of irregular tanker supplies, and relief from the dependency on others. We would be on the way to our own dignified survival"

Source: Savitaben, Natthugadh

The CSE analysis also points to problems experienced in the course of these remarkable achievements. The need for building capacities through training had not yet been adequately recognised in a rush toward decentralisation, and monitoring had often been haphazard. A target-orientation persists despite the emphasis on a process of social mobilisation. These mobilisation efforts also appear to have been hampered by inadequate attention to the vigorous involvement of gram-sabhas, panchayats and women members. In the insistence on 11-member village committees, these key players were often overlooked.

Project procedures too require review. One view is that official rates for check-dam constructions are too high, discouraging community contribution and involvement, and leading to slipshod work by contractors. Failed check-dams due to faulty construction and corrupt practices could damage experiments essential to future strategies that will offer communities a range of practical and proven options. (Suspensions of corrupt practices led to the suspension of work on some 800 dams in 25 talukas, according to CSE). Reports of irregularities in the selection of sites were received in several places, pointing to the need for stronger systems of local involvement not only in decision-making but also in monitoring quality.

Gujarat's Victory for People's Participation

In the current monsoon, farmers of Saurashtra will cash more than Rs2000 crores of crops. Last year, farmers of this region were fighting to get water to save their crops. Not this time. When the writer visited Rajkot and Jamnagar districts last week, it was found from farmers that there was only one solution to save crops: harvesting water. Behind this awareness was the efforts of Mathurbhai Savani, who deals in diamonds in Surat. Every Diwali he visits his village of Khopala in Bhavnagar district. In 1999, he spoke to local leaders of his desire to do some constructive work. One of them quickly said that if you really want to do something, you should solve the problem of drinking water. Mathurbhai is not an engineer. However he took the advice of others and reached Rajsamndhiyala village in Rajkot where people were harvesting rainwater through check dams. He was impressed, and the very next day returned to visit each household in his village to request their cooperation. With the trust and contributions of his own people, within six months 200 check dams were constructed in Khopala. He then toured other villages of Bhavnagar to spread the message of check dams. Soon he established the Saurashtra Jal Dhara Trust under which a series of dams have been constructed. In Saurashtra more than 10,000 check dams have been constructed under the Government of Gujarat's water conservation programme, with beneficiary farmers contributing 40% and Government 60% of total costs. The result is that ground water levels in nearby wells have risen five to seven feet and in some cases the rise in water level is reported to be 35 to 50 feet. Government Ministers have hailed this unique example of people's response. NABAARD sanctioned Rs57 crores as financial assistance, after seeing the successful implementation of the programme and its impact on recharge of groundwater. Some experts believe that Gujarat will become a model in the entire country in water conservation. Officials of Unicef and Union Ministers were also deeply impressed. Gujarat's CM Kushubhai Patel has invited the Prime Minister to see the water harvesting activities done by the state government with the help of people's participation.

Source: Nilesh Shukla in Mainstream, August 5, 2000

Political wrangling has been heard on the meaning, as well as on the pros and cons of decentralisation. If wrangling is not quickly replaced with dialogue, there could be major barriers to the clear need for open thinking and for building opportunities for partnership and demonstration.

There is a clear need to distinguish the particular demands of drinking water management within the larger concern of overall water resource planning and control. Important differences exist between proponents of large scale transfers of water resources through pipeline schemes and those who appeal for a first priority to local, water harvesting systems. While the need for massive transfers for irrigation and industrial purposes as well as for urban needs cannot be denied in the present crisis, the lessons of 2000 suggest that rural communities can and have managed their drinking water needs in a period of severe scarcity. One example is the Sabarkantha taluka in Amreli district where crops failed but drinking water was not a problem. While the drought experience has brought acknowledgement of the importance of water harvesting, official plans and investment patterns remain focused on piped water supply.

A serious symptom has also emerged during these efforts of discontent among urban groups over check-dams which can prevent the flow of water from

upstream. With the major thrust toward urbanisation throughout Gujarat, this points to the need for concentrated thinking on urban water supply needs and for strategies specific to them. This becomes even more urgent with the concentration of political clout in urban centres, and the visible resentment among rural communities over the 'hijacking' of water to cities. The warnings of serious conflict have appeared in 2000, and they deserve the most serious attention of planners and activists.

□ Lessons Learned

Perhaps the most important lesson that seem to have emerged from the suffering of 2000 are that there are *no short-cuts* to sustainable drinking water supply, and evidence of an ability among all stakeholders to learn from past mistakes. The success of *partnerships* between civil society and state authorities through the SPPWCP is one major evidence of this ability. It provides the most important resource for Gujarat's future in this sector.

Another lesson is that the state (like much of the rest of India) is paying a huge price for many *years of mismanagement* of water, now clearly understood as a scarce and often non-renewable resource. Even in areas where rainfall has been adequate, as in southern Gujarat, the spectre of scarcity exists. Not even the most massive schemes for regional transfer can succeed if the basic resource is missing or neglected.

Institutional reform will be essential if inter-departmental coordination can replace the current duplication and overlapping of authority. This continues as a serious barrier to effective partnerships in the field.

Past approaches did not place *drinking water at the top of the agenda*. Irrigation and industrial needs exercised far more powerful political pressure. The crisis in 2000 indicates the importance of priorities (and technologies) that put drinking water first, and for systems that can be managed by women who bear the major responsibility for household needs. This will need to be matched by dialogue and greater consensus on the respective roles of community-based water harvesting and conservation on the one hand, and massive water transfer to scarce areas through a grid system on the other.

The future thus demands an *integrated understanding* of the resource and its equitable allocation between competing sectors. Drinking water must be accorded the first priority as a *human right* essential for survival. Such a management approach to water allocation between sectors also requires a concept and the practice of *budgeting water*. Budget allocations can then lead to systems of water charges that are equitable and mobilise resources for future needs.

The controversy on priorities to be accorded for rural drinking water supplies between the local, community-based management and massive transfer schemes now needs to move to a new level not dominated by crisis situations. *The importance of replenishing ground and surface water sources for future years and generations* requires greater understanding of action. It is here that water harvesting and conservation assumes additional significance.

Any new approach (such as rain water harvesting in rural and urban settings, or recharging aquifers to provide future supplies) will require time - at least three to five years - to demonstrate its impact. Therefore, *water harvesting and onservation* cannot succeed as mere crisis measures. They need to be at the core

of sustainable strategies for the future.

It has been clearly evident that villages with *roof water harvesting* structures have fared much better than others, providing a major impetus to a concept now recognised nationally, and around the globe, as basic to the management of drinking water supplies. This technology requires community-based management strategies, clearly essential to dealing with drought. This experience in itself offers the catalyst for the paradigm shift so essential to the sector. Yet it is also clear that water harvesting alone cannot succeed without adequate attention to basic *groundwater realities*, as well as to protecting nascent experiments from corruption and bureaucratic interference. Mismanagement now could threaten important and still emerging prospects. A watershed approach (including revision of existing guidelines) is now essential to ensure the life of water conservation systems as well as to respect upstream implications for other regions and communities. One knowledgeable estimate indicates a 20% rise in groundwater recharge in areas where check dams have been installed successfully (as against 10% recharge in other areas).

The need to invest adequately in the *planning* of implementation processes has emerged as an important need. Good management will also require not only good procedures (such as rational systems of contracts and rates that communities can understand and operate) but new capacities in technology, monitoring and other aspects of water management. *Decentralisation* to succeed demands genuine *transparency and accountability*, qualities which have most often to be acquired through training and experience. Building leadership abilities among village and urban institutions and individuals will be the most important of these. This will place heavy demands on institutions for *capacity-building* and training, and particularly those in the non-government sector which have so far had to deal with small numbers.

Symptoms of an emerging *conflict between rural and urban needs* of drinking water (as well as of intense competition between different sectors of demand which can seriously impinge on drinking water availability) are clearly evident. These have the most serious implications for the future, and could be a political time-bomb. This is an area of conflict which cannot afford to be neglected.

Drinking water as an economic activity will take increasing importance in the years ahead. It is here that there is a need to better define the *role of the private sector*. This remains too often confined to concepts of large-scale corporate activity. The importance of equity, income-generation and entrepreneurship at every level, beginning with communities, demands recognition and study. Gujarat has a distinct ability to provide a lead in this.

Perhaps the greatest lesson of all comes from Gujarat's impressive experience in social mobilisation during the crisis of 2000. *Where people have been put in charge and where genuine partnerships exist, the wellbeing of communities has been far better assured.* The need therefore is for the SPPWCP and the paradigm which it represents, to be accepted as the core approach toward the future, and not merely as a temporary measure innovated at a moment of crisis. This would make Gujarat an example not merely to the rest of India but indeed to communities all over the world.

Sidhpur: A Community Mobilised Against Drought

Located in a region of perennial drought, Sidhpur in north Gujarat has been a notable example of community action for drinking water during the crisis of 2000. Not a single village in this block was in need of tanker supplies, demonstrating the enormous potential of decentralised strategies that are genuinely participatory. The catalyst here was a local CBO, Lokvikas, with an established record of service in Sidhpur. Using the trust which it enjoyed in the area, Lokvikas helped establish a Tuluka Sankalan Samiti (Block Coordination Committee) which brought citizen representatives together with block officials (including the deputy magistrate), the GWSSB, the Gujarat Electricity Board, and senior taluka officials. Together, the Committee analysed community needs and resources, including that of funds and technology, as well as a frank appraisal of abilities in tackling scarcity of this scale. An information-sharing system was established, through which requirements could be authenticated, documented and articulated for discussion with decision-makers. The Committee accepted responsibility for monitoring the quality of construction, once plans were approved and sanctions received. Water storage devices that had lain defunct for years were rejuvenated at minimum cost and at a major saving of public expenditure. Most important, for the first time the total community was involved in problem-solving, including all local Panchayats. Participation was led by representatives of communities that had been marginalised for generations. Sidhpur's youth clubs took an active role. As the scarcity moved into its second year, an important indicator of sustainability emerged: the confident ability of Panchayat leaders to independently charter their strategies and action, and to deal with levels of decision-making at the district and state levels.

Many lessons emerge from Sidhpur. They include the importance of trusted, local leadership to initiate change, and of strong knowledge of local conditions and capabilities. The priority need for patient investment in building pressure groups with the capacity for managing change, prior to action plans and implementation, has been strongly demonstrated. The result has been a surge of confidence and self-esteem among local institutions as well as among communities traditionally regarded as backward. This move toward true empowerment has great significance for the future. The experience has also underlined the importance of effective monitoring of water quality through local skills, and of Government agencies re-planning their staff to better cope with the changing nature of their field responsibilities.

Source: Lokvikas

Chapter 4

Gujarat Jal-Disha 2010: Core Points, Guiding Principles, Policy Framework and Strategies

The foregoing discussions suggest the need for building consensus in Gujarat on the attitudes and value systems that must underpin sustainable and equitable systems of drinking water supply, hygiene and sanitation.

Access to Safe Water, Hygiene and Sanitation as a Human Right

The immensely powerful link between human development and water, sanitation and hygiene has hastened the recognition of access to these basic services as fundamental human rights. The World Water Forum held in The Hague in March 2000 was the most recent of several international measures toward such recognition, commencing with Article 25 of the Universal Declaration of Human Rights (1948) and including the Convention of the Rights of the Child (1998) with its specific reference to the "provision of clean drinking water as well as measures to ensure hygiene and environmental sanitation". The fact that 3 billion of the world's people are denied adequate sanitation, one billion lack safe drinking water and two million children die each year from water-related diseases (many of them on this subcontinent) underlines the urgency of remedying this gross inequity. Gujarat is in a position to give the lead, possessing as it does the experience, wisdom and resources for action.

Water Rights

The remedies against violation of water rights are both statutory as well as common law. The statutory remedies are found under the Environmental (Protection) Act, 1986; the Water (Prevention and Control of Pollution) Act 1974; the Indian Penal Code, 1860; and the Criminal Procedure Code, 1973. A writ petition can also be filed under Article 32 in the Supreme Court or under Article 226 in the High Court for seeking remedy against violation of water rights.

Source: Manjula Batra, Seminar 492, August 2000

Article 39 of the Indian Constitution defines as state policy that "the ownership and control of material resources of the community are so distributed as best to subserve the common good" and to protection of the health and strength of workers, men, women and children. In Andhra Pradesh, the Public Health Act (Water Supply) directs local authorities to ensure continuous water supply that is "wholesome and fit for consumption". Under its National Plan of Action (NPA) for women and children (1992), India accepted the global goal of universal access to safe water and provision for sanitation facilities for every child by 2000. These goals were subsequently incorporated into Gujarat's State Plan of Action (SPA). Despite official as well as non-government efforts, however, the statewide crisis of drinking water in the summer of 2000 has underlined the urgency of unfinished tasks. Gujarat has an estimated 14,000 'no-source' villages, and the rural sanitation coverage gap is estimated at 88%. In the greater Ahmedabad area alone, it has been calculated that over two million citizens defecate in the open each day. The implications of this situation on the wellbeing, and therefore the rights of millions

Clean Drinking Water: A Fundamental Right

Clean drinking water is a fundamental right of all citizens under Article 21 which guarantees the right to life. The Supreme Court recently ruled that this includes the right to safe water and the state is duty-bound to provide it. The apex court has asked the Ministry of Law to review existing environment laws so that environment courts could be set up for enforcement. More importantly, the apex court has directed the Law Commission to explore the legal possibility of involving environmental scientists and experts in the green courts. Quoting the 1977 resolution of the UN Water Conference that pledges access to clean drinking water to everybody to which India is a signatory, the apex court said that environmental rights are described as 'third generation' rights, the first and second generation rights being the social and economic rights respectively. The verdict was given by a division bench of SC that set aside the earlier order of the Andhra Pradesh High Court on polluting industrial units near Hyderabad city's two major water reservoirs.

Source: Down to Earth (CSE), Jan 15 2001

of citizens is therefore clear and startling. Gujarat must be the model for change, representing the region from which Mahatma Gandhi, almost a century ago, incorporated these concerns of health and sanitation in his agenda for India's freedom.

That the principle of human rights cannot in itself guarantee their delivery is apparent world wide. Yet a legal obligation of governments to provide access to safe water and sanitation needs acceptance as a matter of principle, and to help empower the weak. Without clear rights, those who are more powerful, better educated and better connected have the advantage in obtaining services over those most in need. Inequities of accessibility in Gujarat exist between regions, communities, and between the age-old divide of the rich and poor, of those living in villages and those in cities. Once the principle is accepted, the exact nature of services and the conditions under which they must be provided can be translated into state goals. These can reflect clear plans and commitment of resources. Progress toward the realisation of goals can be measured through qualitative and quantitative indicators, helping to transform goals into achievable rights. Monitoring and reporting on progress then becomes the task of authorities and civil society, working in partnership.

Water As A Human Right

The Pani Panchayat movement launched in 1972 by the Gram Gourav Pratishthan in Maharashtra's Pune district, is an effort to create an equitable system. The idea being that no individual should be deprived of his rightful share of the limited water resources. Water is treated as a community resource, not as private property. Water rights are based on the number of family members, not on the size of land holding. While members of the panchayat are free to decide how to use their water allocation, sugarcane cultivation is banned because it is inconsistent with the principles of responsible resource use.

Times of India, April 30, 2000

Inspired by a global effort at mobilisation toward safe water and sanitation goals, a group of local NGOs has recently articulated a vision for "GUJARAT 2010". Their vision includes a picture of a state in which, by 2010, "communities and authorities in Gujarat have worked together to realise access to hygienic conditions, safe water and sanitation as fundamental rights for all. While these services today (2010) reach every citizen in the state, efforts continue to improve their quality and sustainability..." (Annex 5). The present document confirms that goal and reiterates that vision of a healthy and equitable future.

It may be useful to review some of the inherent inequalities in the state water supply and sanitation systems that demand action toward such a future. One of these is the impact of a highly centralised Regional Water Supply Scheme that relies on capital intensive technologies, high subsidies, and maintenance by central authorities rather than through local services and community effort. Urban demands for domestic water supply inevitably take priority over rural needs, due to the concentration of population and political clout. Certain areas of Gujarat have achieved national and indeed international notoriety, for the ability of powerful groups to seize groundwater resources, a phenomenon of water mining that is apparent as well in urban centres where the rich can dig deeper for this scarce resource. Scarcity in urban slums represents a time bomb of unrest and violence, and 'water wars' are not unknown in the daily lives of thousands of citizens. Women and children are the ones most seriously affected, and yet are the ones most often ignored or disempowered by those who control water usage. In addition to these crises, Gujarat also faces the disgraceful misery of scavengers, condemned by society to remove head-loads of night soil from dry latrines. Their suffering continues, despite constitutional guarantees and the efforts of social reformers, commencing with the Mahatma himself. Removing this disgrace from the state must surely be a human rights campaign of the first priority.

Strategies toward the achievement of these rights would need to begin with the development of the basic services toward which this document is directed, and priority accorded to their achievement. It should be possible to develop a basic water, sanitation and hygiene requirement for different parts of the state, setting a minimum consumption figure (say, 20 litres per day based on international experience) that could be used for monitoring progress. Partnerships with activists for other human rights, such as those of slum dwellers in India and elsewhere, can strengthen the capacity of local institutions. Working groups can be established to bring together experience and wisdom toward translating the concept of rights into improved and sustainable services, with special attention to the challenge of urbanisation in Gujarat's development process. Emphasis on the needs of women and of those in urban slums would require empowerment efforts that help these citizens to securing their rights. An attitude may need to be advocated among planners that would begin to regard slums as a resource and as a unit of development rather than as a threat to progress. Statewide campaigns, with media support, could communicate the responsibilities that must accompany rights, including the responsibility of citizens to assist in raising resources and share in the task of design and implementation of maintenance services. The need for adequate legislation would have to be reviewed and administrative structures strengthened toward improved accountability, transparency and the genuine participation of stakeholders in both decision-making and implementation.

Urgent attention to the conditions of the scavenger community must be a priority. Local and state-level pressure groups would need to be organised and mobilised for

immediate enforcement of existing laws than ban this shameful practice, as well as for the effective rehabilitation of the present and future generations of this community. Such a campaign could be symbolic of the commitment of both government and civil society to a concept of human rights in which hygiene, sanitation and water are keys to human development.

Addressing Equity Concerns

In Gujarat, as indeed in most parts of the world, water resources are unevenly distributed as a result of spatial differences in topography, climate, geology and availability of rainfall. Overlying this hydro-geomorphology is a regionally differentiated pattern of development characterised by increasing urbanisation, industrialisation, water-intensive agriculture and a growing demand for domestic water consumption arising from natural population increase and changes in lifestyle. Not only has this model of development led to regional inequalities, it has been based on the systematic exploitation of water resources in certain areas causing ecological degradation, scarcity and vulnerability.

Responses to scarcity have typically been technologically centered and supply dominated rather than addressing critical concerns, principally equity across and between regions (spatial and temporal), within communities (class and caste) and at the level of the household (men and women users). Equity connotes fairness in access to water for sustaining livelihoods and to equal opportunities and benefits arising from the development and management of water resources. The core issues determining equity in water allocation merit attention.

□ Economic/Social Status and Water Deprivation

Poverty is commonly defined as multi-dimensional deprivation, or welfare below the threshold that is minimally required to meet human welfare. Water deprivation is typically one of its dimensions (Koppen 2000). This is reflected in sub-minimal access to safe water and sanitation facilities, resulting in time-consuming and laborious efforts to obtain water for domestic use in rural areas, the increasing incidence of water-borne diseases and the exorbitant costs of paying for potable water for many urban poor households. Water has never been a 'free good' for the poor, particularly women, who bear a disproportionate burden with respect to their access to and control over water resources as well as sanitation facilities.¹

Water also critically affects income-generation which is another aspect of human wellbeing. Poor people's self-employment and wage employment opportunities, especially rural areas, are dependent on access to water. This is true not just for agriculture and food security, but also for other income /survival needs e.g. small scale industries, livestock raising and fishing. SEWA's Women, Water and Work Campaign illustrates the diverse, multiple and overlapping (domestic/productive) water needs of women workers, particularly self-employed and home-based, whom SEWA has been mobilising around their water rights.

Apart from class and gender (see below) as determinants of access to water, there is the additional dimension of caste which restricts access to community water sources by lower castes on the grounds of ritual pollution. However, there is a broad social understanding that water cannot be denied to anyone – upper castes can claim rights to wells and to the privilege of extracting water, but not to the

¹ Control in this sense refers to both legal ownership as well as a say in decision-making about water supply infrastructure or sanitation facilities and how to manage them.

water itself (Moench 1998). In addition, economically powerful groups in villages do have significant decision-making power about where, for example, to locate a community water source so that it serves their interests primarily.

Equity Issues in Rural & Urban Gujarat

- ◆ The rich own tube wells and extract fossil water by competitive extraction, whereas the poor cannot compete in deep drilling and are compelled to purchase water at proprietary rates fixed by the rich.
- ◆ Non-rational policies have encouraged and directly supported rich farmers in over-exploitation, and water sold for profit as a commodity.
- ◆ The per capita consumption of water in rich households of north Gujarat is estimated at a very high level of 400 lpcd.
- ◆ The official policy to subsidise power tariffs for water supply schemes has led to house connection facilities used by the affluent 15-20% while the remaining 80% utilise only 20% of the water resources. Thus, those who can afford to pay are today grabbing 80% of the water subsidy.
- ◆ Urban drinking water administration is inefficient, inequitable and anti-poor.
- ◆ Per capita availability for the poor and the lower middle class has gone down, whereas, per capita availability for the rich has risen by more than 100 percent.
- ◆ Per capita water wastage is 50% of consumption in the case of more affluent sections, while wastage by the poor is only 5% of the total consumption.
- ◆ Despite sufficient quantity of water in tribal areas (Panchmahals, Sabarkantha, Surat), local citizens do not have water rights.

Source: Vision 2010: Social Sector, GSIDB

In the slums of Ahmedabad, the per capita water use is often close to 5 litres per day. But people living in the posh Shahibaug area in the city get 500 litres per day. In Bhuj town, slum dwellers get an average of 14 litres per day for all uses from standposts while those living in upper class societies manage an average of 108 litres a day. This year in Rajkot, people living in upper class societies manage to get 84 litres a day of which 24 litres was purchased from private water companies. An average upper class family spends Rs300 per month for water purchases. Slum dwellers were found to be using an average of 19 litres per day, through full dependency on municipal tanker supplies.

Source: IRMA Draft White Paper on Water for Gujarat, November 2000

□ Rural, Urban and Regional Dimensions

Not only are the poor, particularly in rural areas, affected by minimal access to potable water, the overexploitation of water for agricultural and industrial development and increasingly, domestic consumption in urban areas also has an impact on the availability and quality of water. During periods of water scarcity, it is the rural poor and their livestock who are the primary victims, compelling many of them to migrate and/or adopt other coping strategies which includes relying on larger social networks, non-governmental organisations and government relief programmes. In addition, competition for scarce water between sectors and between users, is leading to conflict, often violent, as different stakeholders begin

to assert their rights. While the state's ability to allocate water equitably or to enforce pollution control is limited, it has begun to recognise the need for long-term sustainable strategies involving community participation, locally appropriate technology and a stronger role for women as critical agents of change in the water sector.

Figures Speak

I have consistently argued that there is no village in India that cannot meet its basic drinking and cooking needs through rainwater harvesting. Figures speak for themselves. The average population of an Indian village today is about 1,200. India's average annual rainfall is about 1,100 mm. If even only half this water can be captured, an average Indian village needs 1.2 ha of land to capture 6.57 million litres of water it will use in a year for cooking and drinking. If there is a drought and rainfall levels dip to half the normal, the land required would rise to a mere 2.4 ha.

Anil Agarwal, *In Down To Earth*, May 31, 2000

□ Gender Equity

Gender equity requires paying attention to the complex relationship between productive and domestic uses of water, to the importance of participation in decision-making by both men and women and to the equitable distribution of benefits from improved infrastructure and new (decentralised) management structures (SIDA 1997). Evolving a gender perspective in water management necessitates understanding the different starting points of women and men - the institutional structures which determine their roles, rights and responsibilities in terms of their access to and control over resources, as well as their different needs and priorities and decision-making capacities. These, in turn, are differentiated by class, caste, prevailing socio-economic and environmental factors and age (life cycle).

Within the family, the cultural practice of seclusion (purdah), household composition (joint/ nuclear/ single) and the gender division of labour influences the division of water collection work. Girls become involved in this activity at an early age, depending on the workload and mobility of their mothers as well as access to and perceptions about the relevance of education for the girl child. Men in upper caste households (e.g. the darbar community) are largely responsible for water collection, though their access to transport (e.g. cycles, tractors) facilitates this task. In joint families the burden of work falls on young daughters-in-law, while single women and men, especially the elderly or those with no dependents or very young children, are the most vulnerable during water scarcity (Wijk 1998).

Gender and equity concerns need to be addressed at several levels. These include policy formulation, design, implementation and monitoring/evaluation of projects and programmes, and in organisational practice and procedures towards institutional change. In terms of guiding principles for the state and civil society actors, this means:

□ Gender Equity at the Micro level

This can be achieved by:

- ◆ creating and enforcing women's rights to water either through legal or new institutional mechanisms. Normally, women's rights to water and to 'ownership' of water infrastructure is restricted because of their limited access to land rights or to

their recognition as 'heads of households';²

- ◆ facilitating women's participation in decision-making at the community level by addressing structural constraints (for example, the time and opportunity costs of participation as well as the cultural context underlying women's ability to participate);
- ◆ ensuring that women's participation in terms of health and hygiene education, does not increase their already heavy workload without addressing the gender division of work (roles, rights and responsibilities) within households. A gender-aware approach to water management means addressing men's roles and responsibilities too, as well as their support for women's participation;
- ◆ a demand management approach to the provision of water based on water user fees and community contributions for O&M, which takes into account women's unpaid or underpaid contributions to the economy and avoids adding further burdens to their workload. Assessment of willingness and ability to pay by water users must take into consideration women's contributions to the household, particularly in low-income groups, as well as their access to labour. This is important in the context of women-headed households, since 'labour' is one of the critical elements of user contributions to water infrastructure development;
- ◆ training and capacity-building efforts for women and men, based on participatory, gender-sensitive approaches which not only seek to develop women's technical and financial potential for water supply maintenance and management, but equally address gender parity in water-related work, access to benefits and participation in decision-making.

I want to argue that women's work is a key to turning our vision on the water sector into action. More specifically, it is poor women's work, their access to water and their leadership in management of water resources that will help us turn the vision into action. SEWA's experience in the deserts of Gujarat shows that women are active in large numbers as workers in the water sector and as users of water in rural areas...yet most water studies or plans do not look at women as water users. To make water sector activities meaningful to women at the local level, we must link it with their activities that build work, income and assets.

Reema Nahavati, SEWA, March 2000

□ Gender Equity at the Macro level

Building on a foundation achieved at the micro level, an overarching environment requires:

- ◆ gender awareness training for all staff is a key factor towards gender transformative organisational change. A gender-aware approach needs to be translated to all levels of water management from catalyst organisations such as NGOs which seek to facilitate women's participation at the community level, to the administration which is responsible for the allocation of resources and overall sectoral planning;
- ◆ the need to strengthen women's participation in management and their decision-making abilities through both increasing their presence (particularly in water management organisations where there are no women) and involving them in consultation processes and capacity-building efforts. A key question here is: where are gender-sensitive women and men located in such organisations and to what

extent are they able to influence the choice of water technology or the allocation of resources;

- ✦ effective strategies, which address gender equity, need to be supported by research and gender-disaggregated data collection as well as greater networking and communication between organisations sharing similar concerns. The International Reference Centre for Water and Sanitation (IRC) recommends the establishment of a global /regional knowledge-based, collective memory bank, where organisational information about 'best practices' in the water sector is accessible to all who want to share and learn from each other, thus enhancing their organisational efficacy.³ Such a 'bank' would also be important for strengthening policy advocacy efforts.

In summary, addressing equity requires a multi-pronged, integrated and holistic approach to water management which is based on a realistic planning unit (e.g., a watershed or basin) and takes into consideration the needs of all users regardless of their economic status or gender. It must also address water demand and need between different sectors and regions, as well as standards for water quality and the creation of just and enforceable water rights.

Hygiene Promotion: Precondition for Health

Global experience has shown that provision of clean water alone may lead to only minor health improvements unless accompanied by sound hygiene behaviour. Indeed, without such behavioral change, it can even cause a decline in general health through the spread of waterborne diseases. There is therefore a priority need in water-starved Gujarat to recognise hygiene as a core issue in its own right, with adequate sanitation and clean water as supporting components. Field experience in the state confirms that while each of the three components alone has some benefit, it is their combined effect that alone can deliver better health. Future strategies will need to ensure a much stronger integration of these components if hygiene behaviours are to undergo a sustainable change. While the demand for water is the central issue throughout Gujarat, hygiene and sanitation are yet to acquire social and political priority. As elsewhere in India, water programmes here have been dominated by an engineering approach within which sanitation and hygiene are seldom priorities. Thus hygiene promotion and sanitation can either be ignored or added on almost as an afterthought. The medical profession also concentrates on care rather than prevention, neglecting the critical importance of hygiene and sanitation. The need to re-order priorities in this sector is therefore a revolutionary one, not only in Gujarat but also throughout India. Fortunately, Gujarat has a commendable infrastructure for and experience in hygiene training and promotion. Strategies will now need to concentrate on strengthening these and on taking them to scale as a precondition for a safe and healthy future.

While improved hygiene behaviours are impossible without a source of safe water and of safe means for the disposal of excreta, the individual and social processes of behaviour change need specific understanding. They begin with awareness and education efforts, and demand patient and sustained investment in mobilisation, communication and demonstration. Many people do not understand the link between poor hygiene and sanitation and disease. A healthy environment is seldom understood in these terms. Sanitation and hygiene continue to involve difficult issues of taboos and shyness, as well as of socially discriminatory practices still widespread in the state. A key paper prepared by the Environmental Sanitation

³ This recommendation was made at the Second World Water Forum (The Hague, March 2000) by the IRC Gender Mainstreaming Project.

What is Hygiene Promotion?

Hygiene promotion is a systematic and planned approach to preventing diarrhoeal diseases through the widespread adoption of safe hygiene practices. Key practices proven to reduce diarrhoea include handwashing, proper latrine use, and management of children's excreta. Parallel with the development of new and alternative technologies, tools are being produced to assist with designing and implementing effective hygiene promotion programmes to compliment water supply and sanitation programmes. For example, Unicef has recently produced a manual on school sanitation and hygiene education that deals with aspects needed to bring about changes in hygiene behaviour of students and, through these students, in the community at large.

Source: "Vision 21: Shared Vision to Shared Action", WSSCC, Geneva November 2000

Institute (Gandhi Ashram, Ahmedabad) cites the removal of fads, taboos and superstitions as the most important step toward improved sanitation in the state. Treatment of the scavenger community as outcastes and the abominable practice of headloading remain major human rights challenges to be addressed in Gujarat.

In March 2000 almost forty NGOs in Gujarat jointly articulated a vision of safe water, hygiene and sanitation for all (ref GUJARAT 2010, Barot, Bhat, Paul et al). It drew on the pooled experience of several institutions and individuals that have concentrated on hygiene promotion in both rural and urban conditions. A goal of 70% reduction in morbidity by water-borne diseases in the state by 2010 was supported by a strategy of training in hygiene for schoolteachers and of hygiene education programmes to reach every teacher and school within the decade. Strong support by community-based organisations was recommended for the school latrine programme introduced under the Gujarat Education Policy, with separate facilities for boys and girls in all schools. The group recognised that without the provision of these basic facilities, hygiene education could never lead to hygiene practice.

A seminal experience in Gujarat has been through the Health Awareness Campaign related to water and sanitation in Banaskantha district between 1990 and 1995. The campaign was coordinated and led by the Ahmedabad-based CHETNA organisation, which has worked since 1980 in Gujarat and other states on issues of health and nutrition for women and children. The Banaskantha project, conducted by the state authorities with assistance from The Netherlands, was implemented in three blocks: Santalpur, Radhanur and Kankrej. CHETNA's role was to devise a health education strategy at two levels: village citizens and government functionaries. Its partners included the local Bhansali Trust. Activities began with a study of prevailing knowledge, attitudes and practices (KAP) in relation to water, hygiene and sanitation. The results quickly confirmed that unless the consumers of water practice hygiene, provision of safe drinking water would not make any difference in the health status of the community. CHETNA's education and communication skills (it has a major resource of training and communication aids) were applied to the identification and use of local opportunities. Mahila Melas and village-level workshops were organised to reach women with health messages, along with Bal Melas for children and health awareness and communication training for women members of the Pani Panchayats. A special effort was made to mobilise lari gallawallas, the mobile food sellers who could carry health messages

from door to door. CHETNA also reached linesmen, who are paid employees of the GWSSB. Their technical focus was sought to be extended to issues of hygiene and sanitation, applying their intimate knowledge of local conditions and their regular contact with village residents.

At the end of the project, a KAP study compared the situation in Banaskantha to that of five years ago. Management of drinking water at home, supply and management of standposts, change in personal habits and environmental sanitation all showed improvement. The change in personal health habits was particularly noteworthy. However, environmental sanitation practices in one block had not altered significantly, pointing to the need for sustained and long-term campaigns.

Hygiene education is a priority within the health security efforts of the Self-Employed Women's Association (SEWA), which reach out to its membership of 318,000 throughout Gujarat. The need for hygienic practices and the prevention of water-borne diseases is a cornerstone of the education component within SEWA's 'Know Your Body' approach. In 1997 SEWA undertook a base-line survey of health needs and expenditure of its members in Ahmedabad city and nine rural districts. Water-borne diseases topped the list of health concerns in every area, attributed to inadequate quantity and poor quality of water. SEWA learned also of the need to promote simple dos and don'ts that could be promoted through child-care workers and crèches. In these hygiene education starts with time-tested and healthy practices such as the use in Gujarat of a long-handled doyo for ladling water out of a vessel. Personal hygiene, including the importance of hand-washing with soap and/or ash and of keeping fingernails clean, is stressed along with the awareness of oral-fecal transmission of bacterial infection. Children are a particular focus of these efforts. SEWA reports that many mothers now say that their children ask them if they have washed their hands properly after morning ablutions and before eating!

SEWA points to the impact of water scarcity on women's health. The drudgery of fetching water over long distances in severe conditions is compounded by inadequacy of water for personal hygiene and the bias that favours male requirements for bathing and cleaning. In some areas of Gujarat, the low priority for women and girls can deny them a bath for a week or more. Inadequate water and insanitary conditions contribute to skin diseases and reproductive/urinary tract infections. Hygiene promotion, while a precondition for health, itself requires the prior availability of adequate water, in both quantity and quality.

The integration of hygiene into SEWA's health education efforts is concentrated through training sessions that reach 25 to 30 women, adolescents and men at a time. In 2000, the organisation's training covered some 20,000 persons. As a trade union, SEWA uses multiple fora and structures for hygiene promotion. These include workers' meetings, SEWA Bank workshops, health and child care discussions, village meetings, gram sabhas and urban mohalla meetings. In 2001, it intends to study the impact of these efforts on behavioral patterns in health and hygiene. The campaign will be reviewed and strengthened on the basis of what the study will reveal on barriers and opportunities for behaviour change.

Another important experience has unfolded through the Ghogha project in Bhavnagar (Chapter 2). There the Utthan network has worked in cooperation with its local membership at community mobilisation for improved hygiene and sanitation. It has used focus group discussions and workshops to develop hygiene promotion tools. In the village of Mithi Viridi it has cooperated with CHETNA on

awareness and education on issues of household and environmental sanitation, personal hygiene, water-borne diseases and the integration of these concerns with pre- and neo-natal care. Training of local activists is an important part of Utthan's objectives.

The Environmental Sanitation Institute (ESI or Safai Vidyalaya) has a major component of hygiene education linked to its training and demonstration activities in sanitation. ESI attracts trainees from all over the state and elsewhere in India and the region to its opportunities, and has developed a large resource of trainers and training materials. Its programmes have included intensive training in hygiene and sanitation for primary school teachers. To support the Government's School Sanitation programmes (see Chapter 2) ESI offers training programmes for headmasters, teachers, NGOs and masons, as well as demonstrations for community and children. The Centre for Environment Education (CEE) is another Gujarat-based organisation with mature experience in field health education. Hygiene promotion has been linked to several of its water-related efforts, including the pioneering work it has done on fluorosis control in Amreli district. The Centre has worked on the Jalsahitya Project at Ghogha on communication strategies for personal hygiene, safe water and sanitation. Extensive field testing of its materials was conducted in cooperation with two other NGOs, Utthan and Medhavi. CEE's communication and training resources offer a useful resource for future efforts in the state. The National Sanitation & Environment Improvement Foundation (NASA, Ahmedabad) also offers awareness and training facilities with an emphasis on urban needs.

These experiences are evidence of the potential within Gujarat for giving hygiene promotion the recognition and status it must have. The strength of local institutions working on hygiene promotion can be a significant asset in the advocacy challenge that lies ahead if priority is to be achieved for this sector. The challenge also demands serious acceptance of communication as a social and behavioral process that is not limited to providing information or distributing media products. A strategic approach to communication for hygiene behaviours (demonstrated in Gujarat for fluorosis control, in Rajasthan for guineaworm eradication and elsewhere in India reproductive health and HIV/AIDS awareness and control) will have to provide the foundation for improved practices. Gujarat's infrastructure of communication agencies and institutions offers another important advantage that must be strengthened and extended.

These revolutionary changes clearly demand a statewide strategic approach. So far, this has been missing despite the commendable work of particular organisations and schemes. Gujarat does not have a comprehensive plan for hygiene promotion with specific financial allocations, to cover its population. Without this, efforts at water supply and sanitation coverage cannot yield better health. The financial implications of a sustained hygiene campaign need particular attention, as behaviour change is a long-term process. Innovating a strategic approach for hygiene promotion and a network of partnerships for this process is thus an urgent need.

Decentralisation

Decentralisation has become the order of the day, whether as an instrumental value or as an end in itself. After much experimentation in the various forms and degrees of centralisation, the Government of India has finally endorsed local self-governance with the 72nd and 73rd amendments to the Constitution and passing of the Panchayati Raj Act.

On the one hand, hopes that large centralised systems, including large bureaucracies, provide economies of scale and efficiency have been belied. The advantages of economies of scale are wiped out by tardy, inflexible systems, slow in decision making. The Weberian ideal of bureaucracy has remained an ideal, with differentiated roles, functions and task differentiation, promoting efficiency. Yet on the other hand, fears that decentralised local systems would be powerless to counter unfair power balances and will only promote the highly inequitable status-quo, have turned out to be unfounded. Numerous examples are testimony to the effectiveness of decentralised systems, where user groups are empowered to take decisions, make plans and influence policies that affect them. In Gujarat, there is Amul, a home-grown model of people's power and decentralisation. The success of the Annasahab Hazare's experiments in Ralegaon Siddhi, traditional *van panchayats* of the Uttar Pradesh hills and the community-protected forests of Orissa, are all illustrations.

Apna haath jagannath

The realisation that the key to drought-proofing lies in water stored underground has sparked off an enthusiasm for check dams and percolation ponds. It's not just the politicians who have been converted. Dinesh Raja, editor of the Saurashtrian daily *Phoolchhab*, said a people's movement to harvest water was underway. "They have realised *apna haath Jagannath*" — they are in control of their own destiny.

Mark Tully, Times of India, June 12, 2000

If anything, large systems have not been able to promote even equity, whether class, caste, gender or regional. This is because the large systems are not islands but an integral part of a complex and inequitable, larger socio-political context and are beset by the same problems. Secondly, larger systems are inherently less responsive to the ground, and either delay or even deny justice. The voice of the discriminated or marginalised cannot cross the geographical, procedural or informational boundaries, and willy nilly, the status-quo sustains itself. Therefore, large centralised systems promote neither efficiency nor equity nor are they effective.

The decentralised smaller systems are still an improvement, though beset with problems of their own and not still perfect examples of efficiency, equity and effectiveness. They hold much larger promise with problems that seem more tractable. This being the generalised case for most developmental sectors, the experience of the drinking water and sanitation sector also is similar.

The drinking water supply and sanitation (DWS&S) systems in India traditionally depended on local sources and consequently, the distribution and upkeep was also localised. The post-Independence eagerness for centralised, top-down planning created large bureaucracies for DWS&S that eagerly embraced modern technology. Inevitably, this led to technocrat-driven plans, sidelining of indigenous systems, even if effective. Dug-wells, somehow retained their popularity though innumerable others like *virdas*, *tankas*, *vavs* (*stepwells*), etc. got overlooked by the technocrats schooled entirely in western science and technology. Ponds continued to be dug only as drought-relief and employment-generation measures. Handpumps and piped water systems became the popular technological choices. Handpumps necessarily tapped local sources but in fact, remained in the ownership and control of the state agency which monopolised the skills of repairs and maintenance. Piped

water systems could be local or regional depending on the source and the number of villages covered. Besides repairs and maintenance, the operation of piped water system also stayed in the hands of the state through the linesman, appointed and paid by the state agency.

Operations and maintenance (O&M), arguably, became the biggest casualty of this system. Some statistics illustrate this:

- ◆ 459,887 (22.2%) of a total of 2,071,569 handpumps require repair or rehabilitation;
- ◆ 254,000 (12.3%) of the handpumps are defunct;
- ◆ 26% of all piped water schemes require repair or rehabilitation;
- ◆ 278,000 (18.2%) of the 1,528,000 standposts are in need of repair or rehabilitation and without taps;
- ◆ the GWSSB spends Rs. 10 crores annually on the 343 rural regional schemes covering 3453 habitations;
- ◆ the GWSSB spends Rs. 450 per handpump and it had almost 70,000 of them in 1998.

In Gujarat, the GWSSB is responsible for the operations and maintenance of the regional piped water schemes and for the handpumps installed by it. The piped water schemes for individual villages are handed over to the local village Panchayats for operations and maintenance.

The problem of O&M with such centralised systems is common to most developing countries. This has compelled funders, international bodies and governments to rethink their positions. The general consensus that has emerged worldwide is that decentralised operations and maintenance in the hands of local user groups such as pani samitis, task groups within the Panchayat, water and sanitation committees, stand post committees, is the system that holds promise as being most effective. The new thinking is captured in the following components that many new DW&S programs are trying to include in their projects:

- ◆ demand-driven approach
- ◆ cost recovery for O&M
- ◆ cost sharing for investment/capital cost
- ◆ community participation
- ◆ village -based O&M.

These measures make some headway in increasing the control of users in the WS&S systems. Despite these apparently radical measures, one can remain a long way from achieving decentralisation in the true sense. The measures listed above are applied to projects planned centrally with no feedback from the community regarding its needs, priorities and choices. "Demand driven" remains understood as a system that people are willing to pay for. It does not address the issue of dissemination of data regarding source availability, resource constraints, technology constraints, to the users and stakeholders. This deprives them of an opportunity to make informed choices and be partners in decision making at the level of planning itself. It does not address the issue of top-down policy making where there are no mechanisms to systematically incorporate the citizen's voice. Nor does it address the rights of a community to take over the O&M of the system at anything higher than the village distributional level.

These concerns take priority now with the completion of the 162 km Saurashtra pipeline project to assist Bhavnagar and Amreli districts as well as through the

Master Plan to draw drinking water from the Narmada canal to 8,215 villages and 135 urban centres. The success of these schemes will greatly depend on the ability to mobilise communities and local managers toward efficient O&M.

□ Village-based O&M

Village-based O&M has emerged from the failure of the larger centralised bureaucracies to deliver effective O&M. This again does not address the issues of poor workmanship, poor material and the consequent frequent break-down of systems, unduly burdening communities with choices that did not involve them. It does not address the right of the community to appoint its own contractors and supervise them, or to choose the quality of material and construction.

Cost-recovery and cost-sharing is a mechanism to make village based O&M effective. This does not capture the illogic of the community having to share the costs and bear the O&M costs of a technology that it never actively chose. Informed choice by the user community and the consequent moral responsibility for the upkeep of the system is a possibility that is not explored in the current thinking. Community participation has to be understood in its depth to mean sharing of physical and financial data that helps constrain choices, community partnership in analysis of data and choice of technology, and participatory institutions. It must be understood that community participation is more than forming user groups and training them in O&M of centrally planned systems. Community participation is achieved in the true sense where the community becomes an active partner making informed choices in the policy-making, planning, monitoring and evaluation stages.

Decentralisation acquires its appeal through maintaining checks and balances within a bureaucratic system prone to inefficiency, delays and leakages.

Drought-Proofing : Mewasa's Reality

For many years, people used to migrate out of Mewasa (Bhal area) during the peak period of droughts. After 1998, migration has declined sharply. Road tankers are no longer required to visit the village every third day. This year the villagers apprehend that there may be a marginal drinking water shortage if the next monsoon too gets tardy. But if the next monsoon is good, the village would have said goodbye to the potable water shortage days. Even now the major difference is that even after mid-May they did not have to depend on outside sources for water. On the other hand, villagers from some four or five nearby settlements would trudge their way everyday for their drinking water supply to the village tank at Moti Dharai.

Tushar Bhatt/Disaster Mitigation Institute, June 2000

Decentralisation does not necessarily mean the complete dismantling of existing bureaucracies. It means a devolution of power to stakeholder communities, active partnership with the community at all levels (from policy making to evaluation) and abandoning the comfortable top-down approach for a more complex organic bottom-up approach.

Addressing the issue of decentralisation involves addressing the problem of the level of disaggregation and the appropriate unit for various activities. These would be influenced by hydrological, technological, institutional, socio-economic and political factors. For example, the O&M of handpumps can conceivably be handled by user communities if they have access to spare parts. Similarly, the O&M of individual piped water schemes is well within the capacity of the local community. Skills for

distribution-planning, repair of taps, pipes, small pumps and even small leakages in the reservoir tanks are available locally, especially where extensive pump irrigation is practiced. But decentralisation may be fraught with difficulties in systems that have large treatment plans or cross administrative boundaries or are situated in highly volatile socio-political contexts, or are in regions with seasonal migrations.

All data-based decision-making requires collection and analysis of data which may involve special technical expertise. This by its very nature can exclude the community. In such cases special efforts have to be made to demystify the data, rendering it the more comprehensible to the layperson, although collection and analysis may remain centralised. This certainly runs the risk of only motivated options being presented to the people and for selective concealment of data. But these could be overcome by the exercise being done by independent, objective parties who are not stakeholders in the system.

The decision-making, implementation, monitoring and review aspects are prime candidates for decentralisation. These require a paradigm shift in thinking and approach, and in the attitudes of current power holders (including the bureaucracy and the politicians) as well as an overhaul in the mindset of communities from passive dependency to active partnership.

Lastly, the issue of decentralisation within the bureaucracy itself needs to be addressed. The issue of greater autonomy to State Boards for revenue generation, setting of tariffs, human resources policies etc. needs attention. The right of the district, taluka and village panchayats to generate resources should be widely accepted to make them financially capable.

All these O&M concerns acquire particular urgency in the context of Master Plan for drinking water from the Narmada canal to villages and towns of Saurashtra, Kachchh, north Gujarat and Panchmahals as well as the recently completed Saurashtra pipeline project

Participatory Water Resource Management

Water is so essential for life that at times it is called as equivalent to life. The draft National Water Policy (1998) describes water as "a prime natural resource, a basic human need and a precious national asset". Several issues related to drinking water have been discussed earlier. To involve community-based organisations and people themselves, three of them need particular review. One is the lack of coordination. Water at the government level, for administrative purposes, is divided into many departments and institutions. These were created to deal with problems at a micro level. In the process, a holistic perspective is not receiving proper attention. Coordination among various departments and agencies that manage water resources is unsatisfactory.

A second issue is the absence of large-scale conservation efforts. It is true that the need for water conservation is felt and understood by all those who look after management of water. However, efforts made do not match the awareness. Efforts by Government as well as NGOs have begun in this direction. However non-availability of funds, absence of planning and of participation by communities and their organisations are among the reasons for slow and less efficient efforts. Water conservation is yet not integrated with every aspect of water management looked after by various government departments.

The third factor is the limited or non-involvement of user groups in water management. Roles and responsibilities of various government departments as of

today do not provide space for involvement of user groups in management related tasks. This results in to a situation where users do not feel responsible for misuse or waste of water. In fact, users are allowed to get away from paying charges that are highly subsidised. "The present approach is that systems are designed and executed by the department and imposed on end-users...There is no attempt to ascertain demand or to respond to demand for higher (or even lower) level of service levels. As such planning is not done on the basis of demand and does not take in to account user preferences (and willingness to pay) for different service levels...Water is today perceived by the rural public as a social right, to be provided free by the government, rather than as a scarce resource which must be managed locally as an economic good in order to ensure its effective use".

It is important to note here that lately Panchayati Raj institutions (PRIs) have relieved themselves from responsibility of making arrangements for providing water to the villagers. This is more visible particularly in large Rural Water Supply Schemes (RWSS). Under the revised 20-point programme (1986), efficient use of water for irrigation, safe drinking water, and health for all were included. Supply of water for domestic purposes and maintaining proper sanitation conditions are among primary responsibilities now assigned to PRIs.

This brief review suggests several important points for evolving a strategy for the future:

- ◆ ground water alone is not sufficient to meet growing demands for water;
- ◆ over exploitation has resulted in quality related problems. This in turn affects other activities like agriculture negatively;
- ◆ water conservation must get its due place and broad based efforts must enable managers to meet growing demands for water on sustainable basis;
- ◆ space for involvement/participation of user groups needs to be created in water management activities at all levels;
- ◆ Panchayati Raj institutions should be supported to take on responsibilities in management of water resources at local levels.

□ **Need for Change**

The points mentioned above make it clear that institutions that presently manage water resources will have to review and bring about changes necessary as a response to new needs. These institutions have so far been acting as implementing agencies. Now they will have to give greater emphasis to coordination and facilitating roles. This shift, if accepted, will call for repositioning of institutions and changes in their mission. There is growing awareness about participation of user groups in the management of natural resources. Some efforts are made in case of water conservation and harvesting through the watershed development programme, involvement of people's institutions in O&M of water supply schemes, participatory irrigation through cooperatives etc. Some experiences are very encouraging and have created opportunities for replication on a larger scale. Successful involvement of users and their groups through the support of Community Based Organisations (CBOs), government departments, NGOs, and PRIs suggest these steps toward achievement of the vision articulated in this document:

◆ **Reviewing the mission of institutions that manage water resources**

Government institutions managing water resources will need to reformulate their mission to take on new and additional responsibilities. These include the shift from

being implementing agencies to becoming partner organisations that facilitate others and help coordinate toward common goals.

- ◆ Repositioning of institutions

Change and alteration in the mission of institutions would imply repositioning. This would also include merger of some as well as creation of new institutions such as a Gujarat Water Authority (see below), changes in systems and structures of existing institutions, changes in roles and responsibilities within and outside the state sector, design for sharing of control mechanisms, identifying new human resource needs and strategies for capacity building of human resources in-house and among other partners.

From an institutional perspective, there is a need to transfer the management and financial responsibility to the lowest appropriate level, i.e. the PRI and, in particular, user community groups. Transfer of responsibility would require corresponding provision of management and financial autonomy to local administrations and user communities.

- ◆ Creating space for people's participation

Participation of users will create a stake on their part and therefore a willingness to pay also increases. Field research has shown that only when the stakeholders are involved in decision-making, do they pay for O&M. Non-involvement of people in the design and execution of projects leads to sub-standard quality of materials used, poor workmanship and insufficient maintenance. This confirms an observation that the users will manage available water resources in such a manner that demands will be met and cost will be recovered. In Gujarat, lift irrigation cooperatives facilitated by the N.M. Sadguru Water & Development Foundation (NMSWDF, Dahod) are examples of this.

Creating space also means providing opportunities for capacity building, and time so that community groups can effectively contribute in meaningful ways and do not remain mere spectators at large gatherings or at meetings called for purposes of head counts. Stakeholders' analysis and design for their possible participation would also enable facilitating organisations to prepare a blueprints than can win their support.

- ◆ Creating awareness at a societal level

Large scale awareness programmes, primarily educational in nature, will motivate and prepare people for contribution at individual as well as collective levels. Awareness activities need to be linked to action programmes so that people can experience the impact of their contribution. Information dissemination, increasing understanding, developing positive attitudes and developing skills among selected groups of people can be objectives of such programmes.

- ◆ Networking for learning and collective action

Water as a resource is so integral to human life that it cuts across all activities. However for practical purposes it is divided into different categories. There is a need therefore for integrated awareness through forums for dialogue, exchange of ideas and experiences. Lessons of other sectors (e.g. forestry) can be absorbed through such forums.

- ◆ Formation of a task group

There are no arguments against the usefulness of user groups' participation in

management of water resources. However without an enabling environment and proper planning it can neither take place nor yield results. Therefore a task group (consisting of representatives of people's institutions, NGOs, administrative departments and academic and research institutions) can help facilitate development of a strategy for implementation and development of systems for monitoring and evaluation. Such a group could facilitate the process of integration of participatory approach into the working of state as well as non-government agencies.

While participation of user groups in management of natural resources is getting wide acceptance, concepts of participatory approach also demands changes within traditional implementing institutions. The GWSSB has initiated a process of involving user groups and also of joining hands with other institutions that are also involved in management of water resources. This process needs to be accelerated. Formation of village Pani Samitis to take over tasks of O&M in some of the water supply schemes was a welcome beginning. The Ghogha Regional Water Supply and Sanitation Project has gone a few steps further in this direction (see box below).

GWSSB is presently developing its own guidelines to achieve new levels of efficiency in terms of creating conditions, through collaborative efforts, for people in rural Gujarat to get safe drinking water on sustainable basis. It is hoped that this initiative of GWSSB to act as an agent of change will prove to be a milestone in the state's water supply and sanitation sector.

Government and NGO Institutions as Facilitators and Change Agents

State institutions engaged in rural and urban water supplies in Gujarat are centralised bodies dealing with planning, infrastructure development and management of infrastructure and services. The focus and emphasis of these institutions has been on technical issues related to prospecting of good sources of water and building of water supply infrastructure.

In the case of rural drinking water supply, the centralised approach to planning of drinking water supply sources does not encourage the agency to identify the needs and priorities of the user groups/communities within the socio-cultural context, especially caste/class differences, which determine social ownership of the resource. This reduces the effectiveness of planning not only in terms of community's physical access to water sources, but also in terms of social ownership and equitable distribution.

There is enough evidence available from different parts of the world to show that the creation of water supply infrastructure alone will not ensure increased access to water supplies for drinking and sanitation in the rural households. One reason is that women's time spent in collection of drinking water is more important than the physical availability of the resource.

Several issues are being encountered in water supply services at the local level such as poor reliability of water supply, inadequate water supplies, poor quality of water, non-sustainability of water supply infrastructure, and the physical sustainability of the source. The root causes are poor operation and maintenance (resulting from lack of attention to water supply infrastructure), poor quality power supply in rural areas and frequent power failures, and competition from irrigators who drill wells around successful handpumps and bore wells resulting in fast depletion of the source.

Transforming CMSU into WSMO: Facilitating Reform

The Community Management Support Unit (CMSU) of the GWSSB may emerge as an autonomous 'Water and Sanitation Management Organisation' (WSMO). The Government of Gujarat is currently engaged in reviewing CMSU's experience toward decentralisation that can be truly demand-responsive. Independent of the GWSSB, the new institution would have strong links with related departments. Its activities would extend beyond the Ghogha Project, to at least 150-200 communities representing 1% of panchayats in the state.

CMSU was formed in January 2000 within the GWSSB with an evolving mandate or facilitating village-level management. A sub-project of the Ghogha Regional Water Supply and Sanitation Project, it has over the year demonstrated and promoted community management concepts, and helped to build capacity for this need within GWSSB and NGOs. It has worked on documentation, networking, communication and training, and support to projects and efforts at sector reform.

A major role for the proposed WSMO would be as Gujarat's think-tank for the sector, bringing official and non-government partners together toward policy development, capacity building, networking and communication. Experiments with new concepts and models to match the variety of Gujarat's conditions would be united by the intention to demonstrate community abilities for sector self-management in ways that are sustainable and efficient. Another important objective is for the new institution to act as a knowledge centre for WSS, strengthening linkages and collaboration between all stakeholders. Developing a modern MIS system would be a key responsibility, providing at last an accurate database for decision-making at all levels. Documentation would provide a critical resource for sharing experience. It would contribute through innovating and demonstrating technical alternatives and options in drinking water supply and sanitation. These must be the essence of a demand-responsive approach that is sympathetic to Gujarat's range of geographic, economic and social needs. The concept of sanitation would be extended from alternative latrine options to the application of waste water disposal and treatment, solid waste management and encouragement of new sanitary marts (see Chapter 2). The WSMO would also seek to foster partnerships with the private sector, and help define its future role. Perhaps the most important role envisaged for the new institution is that of a catalyst that can help promote new mind-sets capable of a genuine paradigm shift in the sector. Communication skills and human resource development opportunities within the WSMO will therefore be a critical factor. It is these that must ultimately encourage all stakeholders — community leaders and organisations, government functionaries, women's groups, technicians and panchayat members — to accept new roles and responsibilities upon which change now depends.

Source: CMSU

In addition to these common problems in village water supply schemes, there are other issues in the case of the large-scale RWSS. These include inequity in distribution of water across villages, and heavy system losses. Often, water supplies to the tail end villagers is very erratic and inadequate, while the villages in the head reach tap large quantities from the system. The competition faced by drinking water needs from other rural sectors of water use (mainly irrigation and cattle use) is severe. The farmers often resort to breaking of water supply pipelines to divert water for irrigation and cattle drinking.

It can be concluded from the above analysis that many of the problems facing water supply schemes and projects are due to the lack of institutional arrangements at the local level that can take care of the management of infrastructure and services. As institutions engaged in drinking water supply services have been technically oriented, they have not been much concerned with social factors that actually determine a community's access to water supply. There is a clear need for building institutional capabilities for addressing the social issues that often impede the success of water supply projects.

The process of institutional capability building for ensuring more equitable, efficient and sustainable water supplies in rural areas requires several factors. First, before new water supply sources are planned at the village level, the agency could take up local institutional development activities such as creation of village water committees (VWCs).

The agency could involve NGOs in local institutional development—including awareness creation and community organisation. The NGOs could take up programmes for creating awareness about the project benefits and the need for water conservation among the community members, and facilitate the process of identification of stakeholders who could constitute the VWC. While doing so, the existence of different social units within the village administrative boundaries needs to be recognised. In many instances, separate water supply sources or stand posts will be required for each one of the falias and therefore separate VWCs may have to be created for each social unit.

This can be followed by a participatory planning process, which the NGOs could facilitate using some of the tools such as Participatory Rural Appraisal (PRA). This could lead to identification of the best location for the water source, storage tanks, stand posts etc.

Training could be imparted to the members of the VWCs about their roles and responsibilities, and technical issues related to the operation and maintenance (O&M) of water supply scheme. NGOs also could facilitate this process wherein the officials of the government agency could provide technical inputs. However, this is just one aspect of institutional capability building. The village community organisation should be empowered to protect the water supply system from threats to its physical sustainability from external sources like growth of irrigation wells in the surrounding area, and contamination due to pollution.

The ability for water quality monitoring is critical to strengthening local institutional capability to ensure sustainable supplies of good quality water. Special training can be imparted to a few members of the VWC to collect water samples periodically and analyse them for various water quality parameters (physiochemical and biological) stipulated by the official agency. This will help ensure maintenance of minimum quality standards and promote a sense of partnership with the Government. The presence of VWCs can also ensure collection of water cess from village households.

Unlike in the case of village based water supply schemes (where VWCs can fully take care of the O&M of water supply infrastructure and services), in the case of Regional Water Supply Schemes (RWSS), the nature of institutions required for managing rural water supplies will be very different. The physical systems involved are more complex and cut across administrative boundaries and several externalities

influence the performance of water supply system. There are often hundreds of villages served by a RWSS.

As of today, the agency officials are responsible for operation and maintenance of water supply system. In some of the RWSS that were having bilateral funding, village *pani samitis* were promoted. In the new institutional model that is suggested, there could be one more level in the institutional hierarchy in between the official agency and the village water committees.

This institution will be a federation of VWCs and can be constituted by representatives of the VWCs of villages being served by the water supply scheme, representatives from local NGOs involved in awareness programmes and institutional development, and the village panchayats. This federation will act as an interactive institution between the official agency and the VWCs. Its roles and responsibilities should be to lobby with the agency to evolve water supply norms (such as hours of water supply and quantities) that are people friendly, and to decide upon norms of pricing that strike a balance between the financial viability of the project and people's ability to pay. It can decide water distribution patterns with consideration to equity, especially from the point of view of women. The federation of VWCs can also be responsible for resolving conflicts between villages, and also represent the villages in situations of conflict over sharing of water from the source by other users.

Finally, the official agency concerned with water supply and sanitation needs to be oriented on social and institutional aspects of managing water supplies for community benefit. There are several social and cultural realities that influence the success of water supply projects in rural areas. These include the existence of social units within the village administrative boundaries and the community's own perceptions about quality aspects of drinking water. Agency representatives need to be aware of these aspects. They also need to be aware of the importance of community involvement in planning, operation and maintenance of supply schemes and of issues related to community participation. This will help build rapport between the official agency and field agencies (such as NGOs) that can play the role of facilitators in drinking water supply projects. It will also help change perceptions of the official agency among beneficiaries regarding the performance of water supply projects.

Training can play an important role in changing the attitudes and perceptions of the official agency. These can include participatory planning methodologies, community organising and institution building. In states such as Gujarat, Maharashtra, Karnataka, Uttar Pradesh and Kerala, there are several drinking water supply projects being funded by foreign governments (under bilateral arrangements) and other international. In such projects, donors have played a crucial role in changing the style of functioning of agency officials. Regular training on social engineering skills should now be made mandatory for officials of the water supply agency rather than confined to donor-funding.

Water Resource Management in Gujarat : Is There a Need for a Paradigm Shift?

Gujarat is one of India's water scarce states. The demand for water in the state for various uses (such as irrigation, drinking and domestic uses, industry and environmental and ecological services) is growing rapidly against the limited supplies of freshwater, increasing the magnitude of water scarcity over time. One of the ways to meet the increasing demand is water resource management. The thrust is to make water available in adequate quantities and quality for all beneficial uses

where and when it is required, with maximum efficiencies of utilisation through alterations in the natural water systems.

Both surface water and groundwater together constitute the water resources of Gujarat. In addition to the geo-hydrological features discussed earlier, there are several socio-economic features that induce major variations in the demand and use of water across regions. Several large and small urban centres dot Gujarat. They create concentrated points of high priority demand for good quality water for drinking and domestic uses. These apart, there are major regional economic imbalances that induce major variations in the demand and use of water and the ability of the communities to access water. In most parts of north Gujarat (especially Mehsana, Ahmedabad, Gandhinagar and Banaskantha), the demand for water is very high due to extensive adoption of modern agricultural practices, cash crops, and heavy investment in groundwater development through tube wells. Favourable economic conditions and the enterprising nature and drive for collective action of the farmers have facilitated this. In the backward districts (Dahod, Panchmahals and the Dangs), the demand for water is very low due to limited irrigated farming and very few industries. In an area of approximately 500 sq. km in the "Golden Corridor" between Vapi and Baroda, there is a heavy concentration of demand for water for consumptive and non-consumptive uses due to the presence of large industrial estates. Hence, the key to water resource management in Gujarat lies in reducing the spatial imbalances in the water availability with reference to the pattern of distribution of water demands across various regions.

The conventional approach to development of water resources has been segmented, with both surface and groundwater resources treated separately for the purpose of exploitation. While the government initiated large and small reservoir schemes to harness surface water, groundwater development took place almost entirely in the private sector.

Lack of adequate scientific basis in planning of surface water systems—including inadequate time series data on runoff and its dependability—and a piecemeal approach to development, which has looked mainly at water availability in catchment areas rather than in the entire river basin, has led to several problems. These include over-appropriation of runoff and increasing reallocation of water from previously wet areas to dry areas. Such an approach has had several social and ecological consequences. The Sabarmati River Basin is a classic example of this (ref. Kumar *et al* 2000).

In the case of groundwater, several factors have led to uncontrolled exploitation. There is a lack of well-defined property rights regimes and institutional financing for well development. Subsidised electricity for groundwater pumping and extensive rural electrification provides incentive for exploitation and waste. In many areas with a rich groundwater potential (especially in the alluvial areas of north and central Gujarat), at the aggregate level, the rate at which groundwater is being pumped is far exceeding the average annual replenishment. Therefore extraction is highly unsustainable. This has led to alarming drops in groundwater levels, enormous increases in pumping depths, astronomical increases in the cost of well construction and a resultant increase in the cost of extraction per unit volume of water (Kumar 1996). According to official figures, water levels are dropping at a rate of 1-2 metres a year throughout Mehsana, with 5-8 metres in some pockets (GoG 1992). The well yields are fast declining to levels that are no longer economically efficient.

The conventional government approach to water resource management focuses on major water projects that are capable of meeting water supply requirements of large regions for uses such as irrigation, drinking and domestic uses and industry. They make significant impact in terms of changing the overall water availability situation and use patterns. However, they fail to capture the water management needs and priorities of communities in different localities and hence are not effective in tackling local water problems. Also, they often pose serious threat to the sustainability of the resource base itself, while resulting in several negative social, ecological and environmental consequences.

In contrast to official approaches, water resource management by NGOs and communities and religious groups in Gujarat have mainly focussed on local water management activities. These comprise local water harnessing (by agencies such as NMSWDF and Sarthi), small water harvesting and groundwater recharging (SVRTI, AKRSP and VIKSAT), watershed development and management (AKRSP, NMSWDF, Anand Niketan Ashram). Although these innovative approaches address water scarcity problems, they remain localised. They are not implemented at scales which can make an impact on the water situation at a regional level (Ballabh *et al.* 1999). Moreover, local water development projects may not be capable of meeting the large, concentrated demands of urban areas. For instance, the municipal water supply requirement of Ahmedabad city alone is estimated to be nearly 200 MCM per annum. No single local water project can harness this much water.

In sum, the approaches to water resource management in Gujarat are highly polarised between large water projects and local water resource development, leaving little room for technological innovations.

Presently, the demographic changes (especially of fast growing urban populations), expansion in irrigated agriculture, and rapid industrial growth are causing major changes in the demand profile for water in the state. The scope for augmenting the supplies are, by and large, very limited. According to the Government of Gujarat (1996), total supplies from surface and groundwater in the year 2010 would be only 26,240 MCM against an estimated total demand of 67,300 MCM. Further, a total of 15,360 MCM water will be made available from import of surface water from neighbouring states and another 5,080 MCM from surplus water. Return flow from irrigation will contribute another 14,470 MCM. The rest will have to come from regulation of multi-annual storage and inter-seasonal flow of reservoirs and demand (4,000 MCM), inter-basin transfers (1,000 MCM), artificial recharge.⁴

Given these large gaps in the demand and supply, it is clear that the local water development projects—such as watershed development, water harnessing and groundwater recharging – alone will not be adequate to address water scarcity problems in Gujarat in the coming decades. The dependence will continue on water projects involving large-scale storage and transfer of water within river basins and transfer of water from water abundant basins to water scarce basins. Such projects may involve serious social and environmental risks. Therefore, there is a need for approaches that can integrate the concerns of local communities (such as addressing local water scarcity, environmental protection and ecosystem management) with regional concerns of balancing overall supply and demand.

The basin approach to water resource management is a major departure from the conventional approaches. It integrates various physical systems affecting water

⁴Artificial recharge is expected to contribute only 150 MCM of water in the entire state.

availability—groundwater, surface water, base flows, catchments- etc—so as to estimate the effective supplies within the river basin and also the amount of water that can be sustainably harnessed. It incorporates socio-economic systems affecting the use of water so as to analyse various demands existing within the basin that need to be met. The approach also helps identify “problem areas” or water abundant/water scarce areas, where local interventions are needed, as well as the types of possible interventions possible (watershed treatment, water harnessing, groundwater recharging). Such an approach can optimise the number and size of large projects, and also other interventions for water resource management such as inter-seasonal and multi-annual storage of reservoirs, conjunctive management of surface and groundwater and evaporation control from reservoirs. The basin approach can thus help minimise the negative social and ecological consequences of water development.

Water as an Economic Resource

□ Should Water for Domestic Use be Priced?

Water is an economic resource. It is no longer a free resource. It is no longer abundant, and is getting scarce by the day. It is not free. It costs money to develop it, to process it, to make it potable, to distribute it, and to manage it.

Water resources or hydrologic regime in a state basically refers to the occurrence and circulation of water in the atmosphere, hydrosphere and lithosphere. The regime continuously changes over space and time within some broad regular movements. The use of this resource in different human activities, including economic activities, has increased at a fairly rapid rate in recent decades leading to some basic changes in the quantity and quality of water spread over time and space. Some of these changes are now adversely affecting the sustainability of development as well as the sustainability of the resource use. It becomes an urgent necessity therefore to manage this resource efficiently. Efficient management must include efficient development, distribution, recycling, recharging, conservation and more efficient consumption of the resource. Pricing or charging for water use can be an important tool of such efficient management.

Water as a human right is at the core of development and poverty alleviation. If human development is a ‘process of expansion of choices in life’, access to water for drinking, sanitation and domestic use has to be an important capability essential

The Value of Water

In a country like India where water rights are not clearly defined, water is difficult to manage and govern. If water is considered to be public property and an economic resource rather than a free good, it will be easier for the community and the government to restrict its extraction and limit wastage. The over-utilization of surface and groundwater has reopened the debate on the value of water. My view is that the issues of drinking water cannot be looked at independently from irrigation and industrial usage. In India, while we are adding value to drinking water, the bulk of the water that is used for irrigation is virtually free. We need to develop an integrated approach to water management. Moreover, pricing must be seen in the context of the degree of consumption and demand-supply management: the greater the consumption, the higher the price should be.

Gourisanker Ghosh (Unicef) in Jalvaani, June 2000

User Will Pay for a *Reliable* Supply!

There is a felt need of reliable, dependable and sustainable supply of drinking water to rural and urban areas. Unless this is done, it would be almost impossible to convince the user community to come forward and pay water tariffs. Safe, reliable and dependable water supply in Saurashtra, Kachchh and north Gujarat (which comprise more than 2/3rd of state population) is a matter of serious concern due to non-availability of assured water sources locally. At present the drinking water supplies are contaminated with high fluorides and are brackish. This is one of the major de-motivating factor for the user community to pay increased user charges. Nearly 1500 villages in Saurashtra, Kachchh and North Gujarat need to be served through water tankers in summer in a good year also. Community cannot be expected to pay for water if the supplies are not adequate.

Source: GSDWICL

, for access to opportunities or choices in life. It is thus a human right that is basic to poverty reduction.

As a basic necessity of life, or as a basic public good:

- ◆ water has to reach every region, every section of the population and every household and individual;
- ◆ water must be available in adequate quantity and quality in a regular fashion;
- ◆ water should be affordable to every one. It should be supplied free to sections of the population who cannot afford to pay for it.

As a public good used for drinking, sanitation and domestic use, production and management of water should not be treated merely as a profitable venture. But at the same time, it can be an economically viable venture. Drinking water and water for domestic use needs to be priced, as water is an economic resource, yet as a human right, and as a basic capability for human development, water has to be accessible to all the sections of the population. Therefore, price discrimination (through dual pricing) or cross-subsidies may become necessary.

□ Water Use in Gujarat : Domestic Sector

Demand for water in the state has increased several times for agriculture as well as in industries and in the domestic sector. All these uses of water, however, are highly subsidised, with the result that:

- ◆ total consumption of water in the state has increased dramatically;
- ◆ water use efficiency is very low; resulting in wastage of water of upto 50% in some municipalities;
- ◆ water resources in the state are most unevenly consumed/distributed between rural and urban areas, and across regions and socio-economic groups;
- ◆ there are severe shortages of water across time and space, particularly for drinking water and for water for domestic use;
- ◆ government bodies like GWSSB and GWRDC are therefore incurring heavy losses in their business of water development and water distribution.

The supply of drinking water and sewerage services in the state are provided by several organisations:

- ◆ Narmada Water Resources and Water Supply Department (NWRWSD) is the key institution at the state level responsible for formulating drinking water policy. It prepares annual and five year plans for development of the water sector, allocates funds to the implementing agencies and guides the sector development;
- ◆ the Gujarat Water Supply and Sewerage Board (GWSSB) is the state level autonomous organisation responsible for proper development and regulation of drinking water supply and sanitation services in the state (except for metro cities and cantonment areas);
- ◆ Municipal Corporations for the cities of Ahmedabad, Vadodara, Surat, Jamnagar and Bhavnagar manage drinking water and sanitation services in these city areas;
- ◆ Urban Development Authorities for development of urban agglomerates of the corporation cities mentioned above are also responsible for managing drinking water.

The operational management of drinking water services in rural areas is done by GWSSB in cases of Regional Water Supply Schemes (RWSS) and by village panchayats in cases Individual Village Schemes. In the case of urban areas, the local schemes are managed by local bodies, or by GWSSB when the water is supplied

The No-tax Culture

Surendranagar. The laying of a new network needed money. There was none; nor was there any visible plan to do so. The municipality got an annual income of around Rs4.75 crore of which as much as Rs4 crore came from octroi. For a long time, the city did not even levy a house tax. Once a Member of Parliament from here boasted in the House that his city was one of the rare cities here there was no house tax. For a long time, civic finances in Gujarat have been in shambles owing to an attitude like this. In Surendranagar, for instance, the water tax per month was Rs5, or Rs60 a year. The total earnings from the tax came to Rs12 lakhs. Nobody loves to pay taxes, even at a low rate, lamented a government official. Since urban centres represented concentrated vote banks, politicians resorted to the gimmick of promising as low taxes as possible. This was at root of the abysmally inadequate water tax. In Surendranagar, the annual expenditure even in providing inadequate water supply was Rs60 lakhs, of which the electricity bill alone amounted to Rs24 lakhs. The municipality had run arrears of as much as Rs11 crores to various bodies such as the Water Supply Board and the Gujarat Electricity Board. This meant that if the civic body did not have money to meet the running costs, where on earth would it find money for renovating the total water supply scheme to ensure a daily supply. "It is a dream that cannot be realised because it will call for a tremendous political will to become unpopular in the short run" conceded a top district official.

Tushar Bhatt/Disaster Mitigation Institute, June 2000

through a regional scheme.

□ Regional Water Supply Schemes

GWSSB is primarily responsible for constructing such schemes as well as for operating and managing them. Under these schemes as well as for operating and managing them. Under these schemes, water resources located in one place are used by a large number of villages where the water is transported through

pipelines. In some cases water is transported to distances of more than 200 km.

The RWSS is a very costly strategy as huge investments are made in developing water resources, and in transportation through pipelines to distant places. In addition, costs are also incurred at each village for storage and distribution. The capital costs of such schemes are estimated to be 6 to 10 times higher than the individual village schemes, and O&M costs are estimated to be 8 to 9 percent of capital costs.

The schemes, however, are highly subsidised at the village level. Electricity charges for operating the schemes are fully paid by Government. As against Rs.50 to Rs.100 O&M costs per person per year, only Rs.14 is charged while the rest is subsidised. Most villages, however, do not pay even these charges, the rate of recovery being 3 to 5 percent! In short, neither the village nor the villagers covered under the regional schemes contribute much towards their costs.

At present there are about 392 regional schemes which cover about 4,432 villages in the state. About 165 new schemes are under construction which are expected to cover 5,200 more village. In addition, some new schemes have been implemented recently to meet the crisis situation of the drought this year. Thus, about 55 to 60 percent of villages in Gujarat are likely to be covered by regional schemes very soon. If one adds the SSP project, the coverage of the regional schemes will go up to about 65 percent to 70 percent!

The RWSS strategy seems to be the mainstay of the drinking water supply policy of the state government. At a time of drought and acute shortages, massive transfers by pipeline can be essential to crisis management. Yet longer-term planning demands a detailed investigation into both the economic as well as the social costs of this and other alternatives. The present strategy is expensive in terms of both capital costs as well as O&M costs, and the policy of subsidy along with the poor recovery has raised the financial burden of the scheme on the state exchequer. In addition, several studies have shown that the RWSS suffer from the following weaknesses:

- ◆ the schemes are not maintained well at the village level, largely because it is a top-down scheme from the GWSSB, without much local involvement (though there are a few exceptions where NGOs and local groups are active). As a result, breakage of pipe lines, leakage, low pressures in the pipelines, contamination of water supply, poor maintenance of hand pumps are found to be common problems (ref Moench 1992, Hirway and Patel 1994). Since the schemes do not assure regular water supply, it becomes difficult to recover water charges from people;
- ◆ the RWSS are environmentally not sustainable and therefore not desirable. It has been observed that about 70 percent of the schemes use ground water, resulting in large-scale withdrawal of ground water without any recharge facilities. For example, the Netherlands-funded RWSS in Radhanpur-Santalpur area has changed its source of ground water a few times after the old source produced non-potable water. In other words, the dependence of the RWSS on ground water is not a desirable feature from the point of sustainability and economy of the source.

The other scheme of the GWSSB is the Individual Water Supply Scheme (IWSS) which is also highly subsidised. The electricity charges of the schemes are fully paid by the Government of Gujarat. In addition, Rs15,000 to Rs35,000 per year are paid to each village panchayat for covering the O & M costs. Most village panchayats charge about Rs20 per person per year for providing water against the actual costs of Rs100 to Rs150 per year. Not more than 5 % of villages are able to recover these

charges. The individual schemes therefore also become a heavy burden on the state exchequer.

There is a tendency on the part of village panchayats to demand that their respective villages are covered under a regional schemes so that the responsibility of providing water supply is shifted to GWSSB. Several powerful panchayats have been able to get attached to regional schemes in the recent years.

To sum up, GWSSB's strategy of providing water almost free to the population under a highly centralised structure in the state is a very costly strategy. On the one hand, it is a financial burden on the state, while on the other hand, it leads to wastages of water resources without assuring water supply to the population.

□ Water Use in Gujarat : Urban Sector

Urban water supply is another area that exerts a burden on the state exchequer. The first major aspects here is the rural-urban divide with respect to water supply policy. The major gaps in rural-urban areas with respect to water supply are:

- ◆ the norms of water supply discriminate against the rural population. While the per person per day need for water is fixed at 40 lpcd (70 lpcd in some cases) in rural areas, it is 100 lpcd to 140 lpcd for urban areas (depending on the class of the city);
- ◆ since urban population is more visible and vocal, urban centres are rarely deprived of water supply. Water is somehow managed for urban centres from distant irrigation dams or from deeper aquifers. Villages, however, may suffer from severe shortages without any immediate support from authorities;
- ◆ the urban population is neither forced to pay for costs of acquiring water supply nor are they forced to recycle or recharge water. They are not even aware of the water crisis in the state. In fact, they are most unaffected and indifferent to the overall water shortages in the state;
- ◆ the economics of urban water supply is also loss-making due to high costs of water development, low water charges, and huge water losses due to leakages and wastage.
- ◆ In Porbunder and Gandhidham, commercial houses and ice factories are getting indirect subsidy through municipality of between Rs50,000 and Rs2 lakhs.
- ◆ The total requirement of water for industrial purpose is estimated at 208 mcm per annum. Industrial water supply in Gujarat is highly subsidised compared to other states. The rate in Gujarat of Rs6.50 per 1000 litres compares with Rs65 in Karnataka, Rs45 in Tamil Nadu and Rs38 in Maharashtra.
- ◆ 748 units have been given water rights without recharging facilities.

Managing Urban Drinking Water

Water supply falls under the jurisdiction of urban local bodies who are often unable to provide professional management in drinking water supply. Urban drinking water administration is inequitable and anti-poor. Municipalities do not have professional engineers for management and water distribution. Therefore, up to 50% of total supply is wasted through losses.

Source: Vision 2010: Social Sector, GSIDB

□ Making the Domestic Sector Economically Viable

It is clear that the present state of affairs is unsustainable – economically, environmentally and institutionally. The present strategy is a drain on the state exchequer on the one hand and inefficient in terms of assuring water supply to people on the other. There is therefore a need to shift to a sustainable strategy of providing water supply to the population of Gujarat. Fortunately, economically sustainable strategies tend to be environmentally and institutionally sustainable as well. There are no serious trade-offs between the three kinds of sustainability. The major components of such a strategy need to be understood with a focus on economic viability and sustainability.

The first component of a sustainable strategy is to determine the most cost-effective approach of providing water to rural and urban areas in Gujarat. Which is the most economical way of assuring water supply to people? One can say that these alternatives are available for supplying water to any area: accessing ground water, accessing surface water (from tanks, ponds or nearby river) transporting water from a distance, and collecting rainwater.

The first two approaches are cheaper than the third one, as transporting water involves high capital and O&M costs. The first two approaches, however, can assure sustainable water supply only if the water resources are recharged. When the ground water resources in the state have been depleted and badly degraded during past decades, it is only feasible to depend on ground water (preferably through dug wells) if the ground water is recharged regularly.

A tank and a well, and if necessary, a few tanks and a few wells have been a common traditional method of providing water supply in most villages in Gujarat. Due to several reasons, including neglect, these methods disappeared in many regions (ref Hirway and Patel 1994). The same can be revived again by digging tanks and assessing water collection in them. Local schemes of providing water for drinking and domestic use have several advantages:

- ◆ such schemes are less expensive as the capital costs of the schemes are lower;
- ◆ such schemes are locally controlled, and therefore managed better in the sense that problems are immediately attended;
- ◆ since the schemes depend mainly on rainwater, they are environmentally sustainable;
- ◆ local management, including management by local women, can take care of the problems of distribution, timings and maintenance very well.

The Government of Gujarat has made some beginning in the last five years toward promoting such schemes. The local schemes of recharging wells, check dams, roof water collection in tankas, and lined ponds have been recognised by GWSSB for financial support. The main issue, however, is that these schemes are still treated as least important, to be supported as and when applications from NGOs are received. The mainstay of policy is still the RWSS strategy, and it seems to be progressing over the years.

Some of the important points to be kept in mind while implementing local strategies are:

- ◆ selection of a local system of harvesting rain water needs to be done carefully keeping in mind the geohydrological conditions, topography, climate etc. NGOs as well as technical experts have presented several models for the different regions in

the state, and these need to be identified and adopted. Research and development in this area also needs to be promoted;

- ◆ water harvesting structures do not give immediate results in terms of water collection. Low water tables, erratic rainfall and geo-climatic conditions may need 3 to 5 years or even more to give results in terms of ground water recharges. Also, one may have to use innovative ideas for storing water on upper aquifers to avoid water going down into deep aquifers, particularly in the areas where water mining has taken place;
- ◆ it is certain that water harvesting will give results, sooner or later. It is important therefore to begin such works in all the regions in Gujarat without delay. In fact, it should be made mandatory to do so.

Capital costs of water harvesting structures may be shared by the state government and the village. If necessary, the government can provide easy loans for the purpose. The O&M costs could be borne by the village. However, this can be done by the rich subsidising the poor. That is, the financial charges should be made in a way that poor localities (of the SC/ST/OBC) get free common hand pumps, those who want a tap within the house may pay for the installation charges, and water charges are fixed on the basis of water meters or the number of persons in the household.

Since the maintenance and management is done locally, and since the source of water is local, it should not be difficult to assure regular water supply. Collection of water charges therefore could be strict with punishments and penalties for default. Thus the promotion of local structures can put the economy of water on a sound footing with the poor getting subsidies on the one hand and management being efficient on the other.

The local water system should also be accompanied by efficient sanitation systems, re-use or re-cycling of water whenever possible, and standardised sanitary wares and pipelines.

□ Making the Regional Water Supply Schemes Economically Viable

Though regional water supply schemes need not be predominant, they may be needed in situations where local resources may not be adequate to meet the demand. It is important, however, that the higher costs of such schemes are shared by local people. This may act as a disincentive for RWSS, and as an incentive to explore local possibilities. Each RWSS should be managed independently with the participating villages sharing capital and O & M costs. Easy loans may be given to the local panchayat to share the capital costs. Water charges may be fixed the same way as discussed earlier. The amounts may change depending on the total O & M costs. The management of a RWSS should be decentralised to the village level with the village panchayat taking the O&M responsibility. The panchayat could be given support in training personnel for the purpose so that the routine management and repairs are carried out locally.

□ Incentives and Concessions

It is necessary to provide incentives and encouragement to local bodies to undertake local schemes, and even to bear the burden of a RWSS locally. Village panchayats willing to undertake local water based schemes can be given 10 percent of the total costs as grants or incentives. Villages able to collect more than 80 percent water

charges may be given some lump sum incentive. Villages able to manage their water scheme successfully for five years may also be given a larger sum as an incentive. Those able to manage their waters supply locally under a RWSS may also qualify for incentives. They should be given additional incentives when they show their willingness to undertake local water harvesting systems. Villages may also be given easy loans for undertaking schemes like recycling of water and better sanitation systems.

Gujarat Water & Sanitation Authority: A Proposal

□ Institutional Structure in the Sector

As indicated above, the Narmada Water Resources and Water Supply Department is the main department in the water sector of Gujarat. There are three major divisions under the department i.e., Water Supply (with GWSSB as Operating Agency responsible for rural and smaller urban drinking water schemes), Water Resources (responsible for irrigation and allocation of water resources for all uses) and the Narmada Division responsible for implementing all Narmada Projects. Domestic water supply and sanitation is under GWSSB for villages and small towns, under municipal corporations for major cities (Ahmedabad, Vadodara, Surat, Rajkot, Jamnagar and Bhavnagar) and urban development authorities set up for the urban agglomerates of these corporation cities.

In addition, there is the Sardar Sarovar Narmada Nigam Limited (SSNNL) which is responsible for planning, development, construction and management of the Sardar Sarovar Project and supply of Narmada waters for agriculture and non agricultural uses in Gujarat. Recently the state government has also set up the Gujarat State Drinking Water Infrastructure Co. Ltd. (GSDWICL) as a 'Special Purpose Vehicle' for implementation and subsequent management of the 2600 km-long drinking water trunk transmission mains. This company would work as a "bulk carrier" of drinking water to the project area.

This elaborate institutional structure in the state suffers from several weaknesses. It is unlikely that this structure can deliver the new approaches and partnerships which implementing this vision will demand. The present structure does not have an apex body that can view the total water resources in the state in a comprehensive fashion or formulate an overall water policy for the state and regulate the pattern of utilisation of water supply effectively and efficiently. The problems in the field of water supply and water use in the state have been largely created by a fragmented institutional structure.

Secondly, existing institutions in the water sector are over centralised and over bureaucratized, with the result that people's organisations (including Panchayat bodies) do not have enough scope for genuine participating in planning and management of water resources. Nor do local water resources and water needs receive enough attention in water management.

The present institutional structure in the water sector in the state also does not seem to be capable of implementing this vision because it does not give enough weightage to local rainwater harvesting/collection systems. By focusing on centralised water systems and bulk transfers of water, it tends to neglect the local systems which need to play an important role in future drinking water augmentation and management in the state.

The setting up of a Gujarat Water and Sanitation Authority (GWSA) and the resultant restructuring of present institutions in the state may therefore need to be

Drought or Floods: Too Many Hands Muddy the Water

As many as 11 agencies and government departments in Gujarat have been involved with improving water supply for years, but the situation is going from bad to worse. Some of these agencies and departments function under different ministries and sometimes even at cross-purposes. The GWSSB's primary job is to arrange for the supply of drinking water, Gujarat Water Resources Development Corporation makes tubewells for irrigation, Gujarat Land Development Corporation these days is digging wells and ponds, and Gujarat Rural Development Corporation is engaged in watershed management and other micro-level works. The recently set up Gujarat Drinking Water Infrastructure Company is setting up projects worth Rs 4,700 crore to lay pipeline networks to distribute Narmada dam waters. This supplements the Sardar Sarovar Narmada Nigam Ltd, set up specifically for the SSP. Then the ministries of Agriculture, Minor Irrigation, Major Irrigation and Panchayats also have roles to play in water besides the District Rural Development Agency in every district. There are programmes like the Salinity Ingress Prevention Programme, handled by the Agriculture and Irrigation Departments, as well as the Desert Development Programme and the Drought Prone Area Programme. (The latter two programmes) cover a mind-boggling 65 percent of the state, while only three districts (Gandhinagar, Kheda and Surat) are in none of the programmes. In 1984-85, only one district, Mehsana, was in the 'grey category' of groundwater extraction between 65 and 85 percent. While no district was under the 'dark category' where extraction rate is more than 85 percent, all others were in the white category with extraction less than 65 percent. Now there are six districts under the 'dark category', five under 'grey' and eight under the 'white' category. The State's average extraction is 75.6 percent. As for no-source villages, almost all the villages in Amreli, Jamnagar, Bhavnagar and Surendranagar districts, 90 percent of villages in Rajkot and Junagadh districts were declared as no-source in the mid-nineties.

Indian Express, May 15, 2000

a basic step in the direction of implementing the vision articulated in this report.

□ Suggested GWSA Status and Structure

The GWSA should be an autonomous statutory body set up under a special act passed by the State Assembly. It will be the apex body in charge of regulating the total water resources being used by all sectors in the state. Its main objective will be to see that these resources are developed and managed in an equitable and sustainable manner, as per the needs and priorities across different uses and across time and space. The GWSA should be funded by the state.

■ Functions

The main functions of the GWSA should be to formulate policies about development and utilisation of water resources so as to translate a 'water vision 2010' into reality, and to monitor and regulate the use of resource effectively and efficiently.

The major specific functions of the GWSA can be to:

- ◆ assemble, collate and disseminate sector data to meet an urgent need for accuracy and consistency;

- ◆ formulate water policy for the state for equitable and sustainable development and use of water resources in the different sector across space and time in a decentralised and participative manner;
- ◆ formulate guidelines for the development and use of water resources in the state for different sectors and different geo-hydrological regions;
- ◆ establish rules and regulations as well as incentives and penalties for
 - ◆ extraction, use and recharge of ground water
 - ◆ distribution and use of major, medium and minor irrigation schemes
 - ◆ water harvesting structures and recharge structures in different geo-hydrological regimes
 - ◆ rational pricing and subsidies in the field of water resources
 - ◆ sanitation and hygiene in the state
 - ◆ promoting innovations and experiments (research and development) in the water sector.

This will call for designing a management information system (MIS) to monitor the water situation on a continuous basis, and organising periodical evaluation and monitoring of the policies and schemes implemented in the water sector.

The GWSA should also be responsible for designing policies for promoting research and innovation, training and capacity building, as well as for awareness generation and extension work to facilitate the implementation of the vision. This will include policies for:

- ◆ attracting and involving as well as equipping local rural and urban bodies to undertake responsibilities for augmentation, distribution and management of water resource
- ◆ promoting research and development - technical and socio-economic - in the field of water resources
- ◆ promoting efforts of NGOs and the people's organisations in this sector.

■ Composition of Members

The GWSA should be headed by a Chairperson who will be from outside the Government and will be a person with an outstanding status in public life, a clean public image, and a person with well recognised experience and expertise in the sector.

There could be in all 15 members of the GWSA with the following composition: 5 members from the State administration (Secretary, Water Resources /GWRDC / Ground Water Division, Secretary, GIDB (Gujarat Infrastructure Development Board)/ SIDB (Social Infrastructure Development Board), Secretary, Health & WS/GWS Infrastructure Board / GPCB, Head, GWSSB / GJTI, Head, Sanitation and Hygiene (from RD Department or Education Department), 5 members from elected bodies (concerned Minister, two MLAs, and two representatives of PRI bodies), and 5 experts and NGO representatives.

■ Nomination of Members

In order to ensure that the right persons are appointed on the GWSA, it will be necessary to establish criteria with respect to qualifications, expertise and experience as well as the processes of nomination to the Authority. The criteria for eligibility of the 10 members coming from elected bodies, NGOs, and others can be as follows:

Members from Elected Bodies:

- ◆ recognised experience and expertise in the field of water resources and sanitation;
- ◆ outstanding contribution to public life.

Members from NGOs & Experts:

- ◆ recognised experience and expertise in the field of water resources and sanitation. (minimum 3 to 5 years of work experience).

The Chairperson of the GWSA should nominate the members in consultation with a small panel of three members consisting of the Chairperson, a senior administrator and an outside expert. The process of selection should be transparent and objective.

The duration of the membership to the GWSA should be for five years.

■ Secretariat

The GWSA should have a small secretariat to support its functioning. It will be composed of a Member Secretary (a senior administrator appointed as Member Secretary of the GWSA) and an Expert Cell of experts set up to assist the GWSA. The cell will include full-time experts in geology/hydrology/hydro-engineering and related fields, community water management, hygiene and sanitation, economics/planning, finance and marketing, and experts for social processes/social engineering.

□ Other Management Structures & Implications

Consequent to a Gujarat Water & Sanitation Authority, it may be necessary to set up Utility Service Organisations (USOs) at different levels for operationalising policy in the domestic sector, i.e. for managing water supply for drinking and domestic use and for hygiene and sanitation. The main objective of these organisations will be to plan, implement and regulate water supply and use for drinking and domestic purposes, and to plan and manage public hygiene and sanitation.

USOs should be set up at different levels, viz. at the state, district, taluka and local/ village levels, including Nagar Palikas and Municipalities. These bodies can be linked with corresponding elected bodies at all the levels in the sense that they can work under the overall supervision and control of the corresponding elected bodies.

The main functions of USOs will be to plan, implement and regulate programmes and schemes for water supply and sanitation. They will be required to:

- ◆ estimate demand for water (projections for 10 years) and plan supply - augmentation and development of water resources i.e., to plan water supply as well as hygiene and sanitation in a dependable, sustainable, regular and equitable fashion;
- ◆ distribute water supply across time and space;
- ◆ undertake costing and financing work for water supply, and formulate rules regarding rates/subsidies as well as regarding incentives and penalties;
- ◆ collect charges and take action for recovery, including penalties;
- ◆ formulate and implement schemes for public hygiene and sanitation.

The composition of USOs should include a Chairperson, who will be from outside the government and who will have an outstanding record in public life along with a good experience in the field of water resources. The Chairperson could be appointed by the head of the corresponding elected body in consultation with

Water Regulatory Authority and Private Capital

A report on "Regulatory framework for water services in the state of Gujarat" prepared this year for the GSIDB by TERI (see Chapter 2) says inadequate planning and financial insolvency are the most serious of many weaknesses in public water supply services. TERI recommends the establishment of a Water Regulatory Authority in charge of capturing water sources as well as water transmission and distribution. The functions of such an Authority should include setting tariffs, ensuring water quality, promoting competition, adjudicating disputes and ensuring economy and efficiency within the sector. The report suggests that the Authority absorb the regulatory and advisory roles of the GWSSB and that it "should maintain an arms-length relationship with stakeholders". Legal and institutional changes should be promoted to attract private capital, while GWSSB should concern itself with the execution and cooperation of projects. Nothing that there are no legal barriers to private sector participation in Gujarat's water services, TERI calls for a tariff structure in which "all consumers should be charged on the basis of actual metered consumption" (and assessed consumption where meters are not available). "Lifeline rates" are recommended for marginal consumers through a targeted subsidy scheme. The report cites the experience of Baroda with 'willingness to pay', and other national and international examples.

Source: GSIDB

other members of the local body. The other members of USOs will be from government, elected bodies, NGOs and experts for Pani Panchayat/local bodies at the village level or Nagar Palika level. Half of these could be from elected PRI members and half from people's organisations and others. Half of this total should be women members, and one or two from the government machinery at the local level. For taluka, district and municipality USOs, one third of the members may be from government, one third from elected bodies and one third from NGOs and experts. Women members should comprise one third of the total membership.

It will clearly be necessary to restructure the GWSSB in the context of the new institutional structure suggested above. The restructuring will need to be designed on the basis of three main concerns: downsizing the GWSSB, decentralisation and de-bureaucratisation.

The main function of a reformed GWSSB will now be to implement the policy and programmes/rules coming from the GWSA. Since the new USOs will be in charge of planning and regulation in a decentralised framework, the GWSSB will need a much smaller staff at the state level. GWSSB will have to decentralise its structure to strengthen the lower levels. This will enable the GWSSB to contribute to planning and implementation of water schemes at these levels. It will be necessary to help transform the GWSSB by creating space for the entry of outside experts and NGO representatives into the Board. It will also be necessary to recruit women to the Board for gender sensitisation and gender justice. At least one third of its members should be women.

Assessing Progress Toward Jal-Disha 2010 : Targets, Indicators, Monitoring and Evaluation

□ Building a Culture of Assessment

Participants in this Jal-Disha vision process have painted a picture of wellbeing and sustainable development in sectors of safe water, hygiene and sanitation. It is a picture (Chapter 1) that describes a shared view of a future that is possible, and worth working toward. It is this picture, this vision, which has become a basis for setting goals toward which the actions in Chapter 6 must be directed. The vision becomes the basis of defining goals and objectives - the yardstick against which efforts at assessment must be made. Targets, indicators and monitoring methods that are rooted in the vision become management tools for such assessment. Without their intelligent use by all stakeholders, there can be no way to ensure that efforts and resources are directed where need is greatest, or for knowing if what was expected to work actually works.

Assessment in the context of this vision must be a process of diagnosis, monitoring, analysis and evaluation in which all stakeholders, at every level, are actively involved. It cannot be left as data restricted to a few. It must become a means for improving decision-making in a new, participatory and decentralised environment in which what is happening on the ground is communicated from the bottom to the top, and the overview and collective experience is communicated down and laterally. Assessment must make hypotheses explicit and help stakeholders to test them. It must help, in a way that is simple and understandable, to achieve goals and promote reflection that can help each participant learn what combinations of human and ecosystem wellbeing can sustain a water and sanitation future of Gujarat.

Such an assessment process must begin with a diagnosis of key issues in water, hygiene awareness and practice, and in sanitation. This report is a first step in that direction. The context has been described, and major issues have been underlined. Indicators will now need to be selected that can analyse causes, consequences and implications as well as draw conclusions. The brief span within which the report has been compiled has not allowed for such a detailed exercise, but it is possible to suggest how it can be done as an immediate next step in a participatory process. The attempt here is to indicate what some of these indicators and methods of monitoring can be, and how these can be used to develop a culture of assessment that can pervade the entire sector with a shared understanding of water and sanitation for the wellbeing of Gujarat's citizens.

Measurement demands a core of systematic information, without which assessment would be impressionistic and anecdotal. Judgments need to be made about whether the results of analysis are good, bad or neutral for stakeholders. Discussions leading to this report indicate a serious lack of organised sources of information, and of any clearinghouse facilities from which information can be quickly drawn, used or checked. Building such a resource centre is clearly an immediate and urgent need, without which the vision cannot be achieved.

If assessment is to become a culture within the sector, it will be need to be seen as essential to several levels of activity. One of these is in understanding the condition of the human and ecological systems which underpin issues of access to safe water and sanitation. Indicators will be needed which can measure the impact and relevance of

projects and programmes, and that are capable of demonstrating what difference they make to people as well as to the natural resource. The absence of experience in such measurement has been apparent in the reviews which have taken place of major policy and programme decisions. The larger picture is too often a matter of opinion (however informed) and guesswork, too seldom corroborated by measurement.

Understanding of ecological and human systems must lead on to assessing specific activities and their results — to project/programme assessment — and to the assessment of institutional capabilities. Analysis of goals, missions and organisations will be essential to new roles and responsibilities implicit in the recommendations of this report and in the paradigm shift that is intended in the sector. New and existing institutions will both have to review whether they are effectively carrying out their mission and addressing the issues identified by the assessment of systems and projects.

What clearly emerges from recent experience is the need to create a culture of assessment that places equal importance on people and on the natural resource upon which they depend for safe water and sanitation. Questioning and reflection will be important to the future. The more people can be encouraged to reflect on their assumptions and expose their judgements to questioning and scrutiny, the more robust their assessments will be. This is a quality that has not been sufficiently recognised or encouraged over the years, with the result that dialogue on crucial issues in the sector has often been the dialogue of the deaf. Action based on reflection is more likely to learn from experience, the very purpose of this report, and so to be more effective. Systems, projects and institutions need to be brought together through such synergy that can work at every level of activity. If this vision is to be achieved, organisations in Gujarat must be able to learn from their activities and from the wider context of political, economic, social and physical environment in which they operate. Targets, indicators and monitoring methods will need hypothesis-led planning, feedback mechanisms, and strong horizontal linkages across peer groups. It is these linkages that can provide the shared analysis and overview of the total system, as well as the ability to indicate simple, focused action toward shared goals. This report is an attempt at an explicit view of Gujarat's past, present and future in water and sanitation, in which the constructive identification of failure is as important as the strength drawn from success. The report and its recommendations are an effort to analyse the vision that must motivate actions toward tomorrow:

- ◆ where are we now?
- ◆ where have we come from?
- ◆ where do we want to be next year, in 2010, in 2050?
- ◆ what has to change if our objectives are to be met and our vision realised?
- ◆ what does such change involve?
- ◆ who has to change?

□ What Can be Assessed/Measured?

The vision suggests key areas in which such assessment is needed. It looks forward to a future in which communities practice appropriate water use, in which differential water quality is used optimally within a multi-source/multi-use system. In this vision, all water sources are respected and protected by and through community ownership. There is a strong emphasis on water harvesting and conservation that ensure stability in drinking water supplies. This vision can be translated into targets, such as a daily per capita consumption in Gujarat of 70 litres, of which at least 15 litres is potable. In

urban unsewered areas, the target could be 100 litres, and 140 litres in sewerred locations. Indicators used could include coverage data (based on a time line), water quality, the introduction and use of pollution control measures, the spread of rainwater harvesting structures and measuring the improvement in community health. Achievement of targets adopted from those of the Rajiv Gandhi National Drinking Water Mission on the proximity of services to households in rural locations (one standpost for every ten dwellings) and urban homes could be monitored through annual surveys.

Sanitation targets can be set with a time-line to achieve universal coverage by 2010. These targets could include the presence in every rural household of a two-pit latrine, and a sanitary latrine in every urban household. Every school in Gujarat should have at least two latrines (one reserved for girls) with adequate water supply for sanitation needs as a basic pre-condition for hygiene education and equity.

Rapid urbanisation demands the spread of public conveniences (on the Sulabh or NASA model) with adequate facilities for women, children and the disabled. Coverage indicators could be established and assessed through surveys, the monitoring of solid waste management and through indicators of better health. Proxy indicators can be easy and useful to monitor change in behaviors, such as location-specific use and sale of soap as an indicator of hygiene behavior. School surveys and monitoring the dropout rate of girl children would indicate whether the State's school latrine programme is delivering results. The rates of waterborne diseases would be the most obvious indicator of whether sanitation targets are being met in terms of real health.

Targets and indicators must track the rate of social change that can seldom be measured with physical and financial statistics. The scandal of headloading in the state demands a decrease in the use of dry latrines as well as in the social discrimination which the scavenger community endures today. The targets could be physical (numbers and use of dry latrines) or social (alternative employment opportunities, improved occupational health, use of safety equipment, access of communities into mainstream society, public awareness of their needs), and tracked by indicators relevant to these objectives. The elements of the vision given in Chapter 1 can each be translated into goals, targets and indicators that can help assess progress toward the achievement of the overall vision. For each of the issues set out in the vision and in Chapters 2 and 4, an objective can be selected with an explanation of why that objective was chosen. For example, inadequate cost recovery is cited as a major constraint to improved sector performance. Chapter 4 suggests alternative approaches to the issue of water treated as an economic resource, and of application of the 'user pays' principle. Cost recovery goals and targets can be set, most immediately among users with a clear ability to pay. Indicators of recovery can reflect a time line approach. The challenge then is to identify who knows what: sources of information, statistics, data, and expertise will need to be identified at several levels. Who will collect data, analyse it and use it as well as the frequency of data collection will need to be set out and responsibilities assigned. It is here that the participatory nature of the sector, as envisaged in this vision, will be tested. Each stakeholder must feel the need for information, assessment of progress and for accountability.

The indicators selected will need to be measurable and representative of aspects of an issue. For example, if the issue is of water quality, the indicator could be faecal coliforms per 100ml of water. If it is health, the indicator could be rates of morbidity due to diarrhoea. The indicators will need to be representative, covering

the most important aspect of the water/sanitation issue concerned. They must be capable of showing trends over time and differences between places and communities. The indicators must be reliable, directly reflecting how far the objective concerned is met. Therefore, for example, standpost or handpump or latrine coverage data is not enough unless backed by information on maintenance and use. Above all, the indicators selected must be few, simple to use and feasible. Data that is not readily available or obtainable at high cost is of little use.

For some aspects of the vision, performance criteria will be important. The participation of women in decision-making within the sector is one example. Past, current and expected representation of women in water committees and Panchayats could be a criterion, and it would need to be supplemented by indicators that reflect if participation is genuine or token. Reduction in daily time invested and distance covered in fetching water could be such a measure, or an improvement in women's health.

A culture of assessment such as that proposed here recognises that assessment is a never-ending cycle. Assessment leads to plans that are implemented and monitored and then evaluated against goals and targets with the use of indicators. Such assessment leads on to fresh plans and activities that draw on experience, led by people with the capacity and confidence to reflect and to learn from their reflections. This was a capacity that the Mahatma perfected, tested and gave to the world from Gujarat. The concerns reflected in this vision are close to the concept of wellbeing to which he was devoted. His use of water, hygiene and sanitation behaviors as indicators of a people's capacity for liberation should not be lost on his state or his country as they enter a new millennium. The ultimate concern must be in monitoring progress in these sectors as value systems upon which much of human progress still depends.

□ **Setting up a M&E System**

The basis of Jal-Disha 2010 is a "new approach" in the water sector. This essentially implies that the indicators for the assessment of programmes and policies have to be seen as a means for verifying the hypothesis underlying the action plan and for monitoring the plan's progress and results. Thus, for the acceptability of the culture of assessment, the design of such a system has to be carefully evolved — giving free spaces where needed to grow/evolve organically, while at the same time putting infrastructure and policies in place to establish a framework for action. Such a framework should recognise that:

- ◆ M&E has to be organised in different phases;
- ◆ M&E at different levels will be established with horizontal and vertical integration within the sector;
- ◆ a management information system will be organised and integrated with the existing systems already in place at the inter and intra sector level.

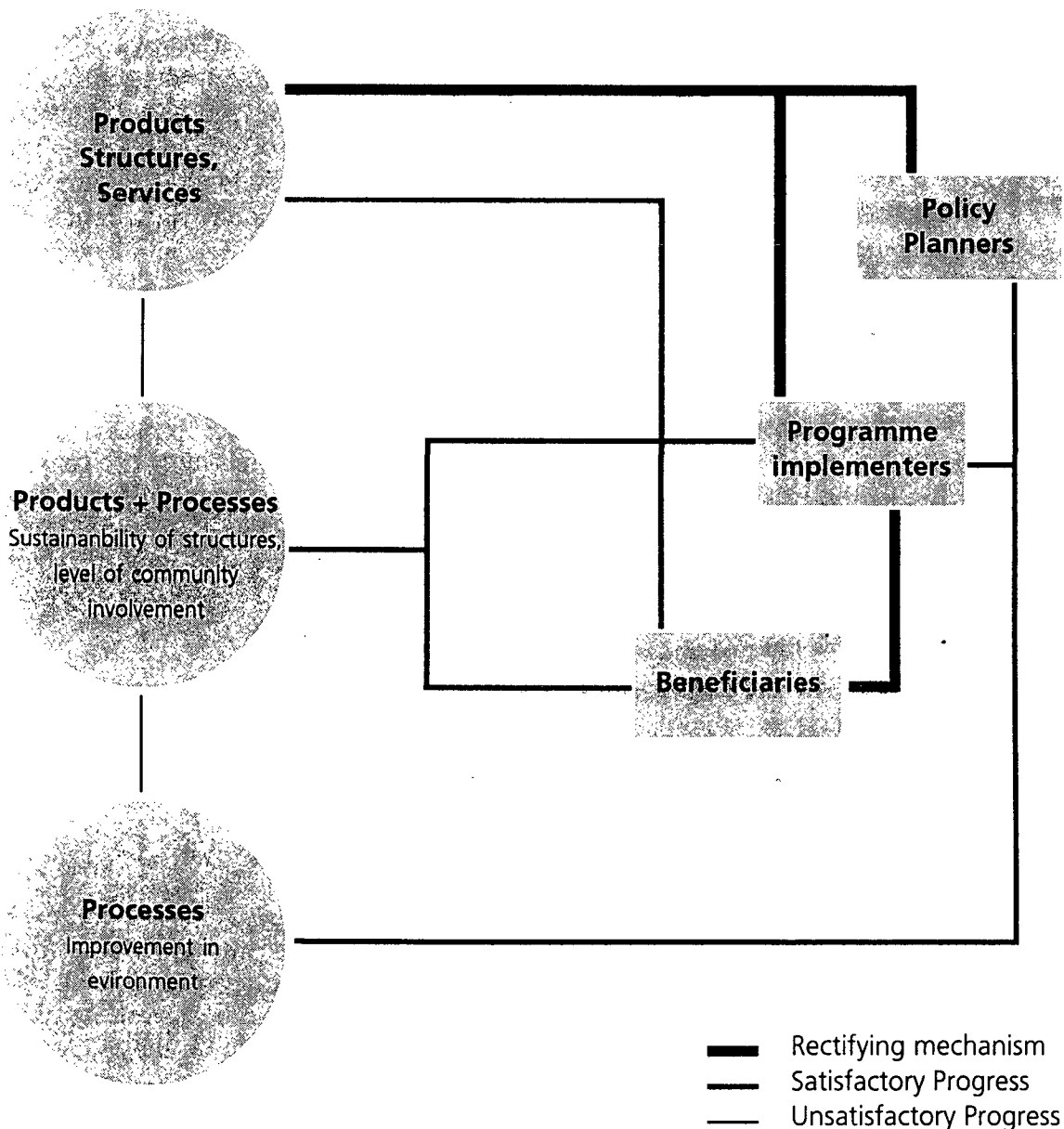
□ **M&E in Different Phases**

The basic need is to institutionalise the cycle of action and reflection. The reform in the water sector, like any other developmental intervention has the short-term objectives (providinglpcd of water by) and the long-term goals of communities and regions achieving overall improvement in the quality of life and health of the people or drought-proofing. In other words, it has both the *products*, in the form of water supply structures, latrines, soak pits as well as *processes* in the form of improvement in personal hygiene, betterment of environment sanitation etc

as its components. The achievement in the products would basically constitute the monitoring in the initial phase, which would range from the quality of construction to the level of utilisation of the new facilities. A satisfactory result of the initial phase would mean that the next phase of assessment could be taken up which would consist of functioning of the available structures, people's involvement in operation and maintenance, and improvement in the personal hygiene behavior of the target population. This would in turn make it necessary to go to the next phase which would be taken up after a considerable period of time since the initiation of the intervention, perhaps even of 8-10 years. The essential parameters of assessment in this phase would be the percentage reduction in the incidence of water-borne diseases in the area, increase in the water table, and enhancement in the capability of the concerned bodies in maintaining an equilibrium between demand and supply of services and utilities. A suitable feedback loop at each phase (see below) would ensure that the effectiveness and relevance of the monitoring system for each stakeholder group is maintained.

This process if followed would go a long way in legitimising the culture of assessment. It can acquire a self-sustaining procedure in which action and reflection in each phase would be seen as a part of the cycle in which assessment guides action, and action in turn determines assessment.

Phases of Monitoring and Feedback Mechanism



□ The Rationale of M&E at Different Levels

To establish the utility of the system and practices, data collected from the smallest part of the administration has to be integrated into the largest unit at the district, and subsequently at the state level. This becomes a tool for monitoring of activities and also as an input for policy planners. This is already taking place at a large scale, primarily by government organisations as well as by some NGOs. However, the reliability and verifiability of data collected is a big question mark. It needs greater resource commitment and planning at all levels. Aggregation and disaggregation of collected data has to take place at various levels. For example, a percentage increase in the water table at the village level may not mean much to local people in terms of immediate benefits, yet when seen at a larger scale (like that of the state) it would be a significant achievement. Thus aggregation of data to show performance in certain areas is desirable. At the same time, collection and processing of data about improved hygiene behaviours (increase in the use of soap, boiling drinking water etc.) is of little use at the macro level because it does not show any trend, neither does it serve any purpose at that level. Such data is useful only for the people working in the field. For them, this data shows the direct impact of their daily work and the measures that can be taken locally. At the state level, the desired information would be the status of the water-borne diseases and trends which should affect policy planning and implementing strategies.

Thus, certain features can be associated with measuring the performance of vision-led interventions. These include complementing of indicators, their specificity and purpose, measurement levels and cost of collection.

■ Complimentarity of Indicators

The monitoring programme requires evolving general as well as community-based indicators. For example, if a hygiene promotion programme aimed at improving the health of the people in an area is initiated, one of the most obvious indicators for measuring the outcome of the programme would be the percentage reduction in the incidence of water-borne diseases in an area. However, community-based indicators would also be necessary to gauge improvements in personal hygiene practices (hand cleansing, water storage/handling/usage patterns in households, handling of infant faeces, body cleansing practices, etc.). Thus, two sets of indicators would not only complement each other, giving a real picture of what is happening as a result of the intervention, but would also reinforce the results shown by each. Community-based indicators, apart from giving data from a micro-level, would also act as a verifiable tool for trends/results at the macro-level. For example, if a survey conducted at the village level does not show any marked improvement in hygiene practices from a baseline survey, while the trends show a drastic reduction in the incidence of water-borne disease, then there is some snag in the data collection process, either at the micro- or at the macro-levels. Thus, this awareness would help in establishing the system of checks and balances at both ends.

■ Specificity of Indicators

The indicators for measuring the output or intended objectives have to be precise and clearly spelt out. For example, if the desired output is increasing the role of women in management of water resources or decision-making, the indicator cannot be just the number of women in the committees but also whether the percentage of women in the committee is at least the same as the percentage of women in the total population of the area.

Selecting Indicators

In 1983 the World Health Organization (WHO) developed the Minimum Evaluation Procedure (MEP) for WSS Projects. The MEP and a few additional indicators relevant to Gujarat are presented here:

■ Evaluation of functioning

Community water supply

Indicator W1: water quantity

Indicator W2: water quality

Indicator W3: reliability of the water supply

Indicator W4: convenience of water points

Sanitation

Indicator S1: proportion of households that have improved latrines

Indicator S2: sanitation hygiene

Indicator S3: sanitation reliability

Hygiene

Indicator E1: understanding the language of the messages

Indicator E2: understanding the content of the messages

Indicator E3: access to the messages

Indicator E4: face-to-face contact with project staff and other educators

■ Evaluation of utilisation

Community water supply

Indicator W5: proportion of households using the facilities

Indicator W6: volume of water used and for what purposes

Sanitation

Indicator S4: proportion of people using the facilities

Hygiene

Indicator E5: water storage habits

Indicator E6: handwashing after defecation

Indicator E7: knowledge of oral rehydration

Additional indicators may be needed, such as:

Institutional Development

Indicator I1: proportion of villages that have a Village Water Committee

Indicator I2: percentage of water fees collected from water users

Indicator I3: number of professional staff (Government + private) available per capita

Indicator I4: Percentage of Village Water Committees that have extended WSS services

Indicator I5: Percentage of WSS services realised without government contribution

Water resource management

Indicator R1: cubic meter/year water used for domestic purposes from local water sources

Indicator R2: percentage of Panchayats that make reservation for domestic water use by restricting use of water for commercial use

Indicator R3: number of local sources with protection against pollution measures

- **Indicators with a Purpose**

Data is often collected for the sake of collecting data with no clear picture of 'why'. People involved in data collection may have no idea why they are doing so. Therefore it is not surprising that in the administration there is an absolute lack of perceived use for data collected at the lower levels. This is because those who collect data have no role in interpreting or using it. Thus, people who do village-level surveys do their job mechanically and are unable to appreciate the significance of the number of handpumps in the village and then the number of functional handpumps in the village. What does such a comparison mean for action? Information without having the power to use it for any kind of decision-making is bound to be perceived as useless. It must be hoped that in a changed scenario of greater decentralisation in decision-making, village-level functionaries would find such data really useful. A relevant example of this could be that the same data-collecting exercise about the number of dysfunctional handpumps in the village being carried out by a panchayat would be perceived to be useful, because they would have the power to sanction the money for repair and not just pass the data on to the next higher authority for scrutiny and approval as in the past. This would be applicable at every rung in the administration. It would work from the bottom-to-the top like a ripple effect as against the earlier model of top-to-bottom trickle down. Therefore, the mandate of M&E must include suitable changes in policies and procedures so that those who collect information are empowered to use it. This would not only ensure the accuracy of information but also its *utility*.

- **Customised Measurement Levels**

Clarity about the definition and measurement of indicators is required because there can be no pre-determined standards. What is considered to be a good, average or bad achievement would essentially be a function of subjective judgement of evaluator(s) founded on baseline surveys, area characteristics and levels of resource commitment. For example, whether an increase (40%, 50 %, 60 % ...) in per capita availability of potable water as a result of a scheme is considered good, average or bad need to be decided on an objective assessment of factors such as the level of input, prevailing conditions of water availability in the area, and the social-cultural set-up. A 5 % increase in the level of available ground water in Mehsana, with a given level of resource input, can be comparable with an increase of 7-8% is achieved in Panchmahals. This is because the strain on resources (due to the demographic-industrial set-up) is entirely different for these two areas. Thus, indicators can be universal or basic in nature but they also need to be customised or tailor-made to an area.

- ◆ **Cost of Indicators**

If the cost of data collection exceeds that of the utility of the data being collected, it is totally useless. Thus, short-list of simple cost-effective indicators have to be devised which do not cause a strain on the budgetary resources and do not end up as an academic exercise.

- **MIS – Relevance and Form**

Who is to decide what needs measurement, where and how? Monitoring as a *management* tool largely rests on the accuracy of the assessment of the needs of the stakeholders in the project, design of the information flow, and the capability of people who would be carrying out the exercise of collecting information at different levels in the system. MIS in the view of this vision should be seen in terms of three

components: People (users, people involved in filling the formats), Processes (direction of flow of information, technology etc.) and Formats (in what form data is transferred/available). Clearly, these three are interdependent and it is the relationship between these components that characterises any MIS system.

Since 1983, several national and international bodies have worked on the development of indicators useful to water and sanitation M&E. This experience includes WHO, the World Bank, UNDP, USAID's Environmental Health Report and the International Reference Centre for Water & Sanitation (IRC) in the Netherlands. A beginning toward development of indicators specific to Gujarat was made by NGOs in the GUJARAT 2010 vision document (November 1999).

Gujarat Jal-Disha 2010: A Framework For Action

The vision articulated on these pages, and the recommendations made in its support, suggest a major shift in the attitudes and behaviors of all stakeholders in Gujarat's water, hygiene and sanitation future. While many of the observations concern the role of state authorities and institutions, the change that is sought cannot come from Government alone. If roles and responsibilities are to change, then much will now be expected of those who are to act as empowered change agents in a decentralised, people-centred approach. None of this will be easy. Building capacities and experience for managing change is a long and patient process. However, Gujarat's advantage is a demonstrated history of people-based action, constructive partnership between the state and civil society and a practical, entrepreneurial bend of mind that can help resolve problems rather than compound them. A framework for action can therefore be set out which suggests what actions can now be expected of key stakeholders in water and sanitation. What is needed today is mobilisation toward a movement, not mere projects. Such a movement will require the support of leaders within and outside government — in private institutions, donors and communities in every part of Gujarat. Each community and region of the state will have its own aspirations, capacities and needs. So the purpose here is not to prescribe actions, but rather to offer guidelines that reflect the core issues as shared hopes, as a joint vision.

Next Steps by State Authorities

The first change required of state leaders is the **political acceptance of access to safe water, hygiene and sanitation as basic and fundamental rights**. The state which gave Mahatma Gandhi to the world, and in which the Mahatma launched his efforts toward these goals as part of his campaign for national emancipation, should have little difficulty in appreciating the importance of such a commitment.

Changes in policy, legislation and regulations will then need to move toward the realisation of these basic rights in an environment within which the **Government acts as a facilitator**, supporting the initiative of people through policies and activities that are decentralised and based on community needs, aspirations and capabilities. The proposal for a **Gujarat Water and Sanitation Authority (GWSA)** is therefore a critical one. **Inter-departmental and inter-sectoral coordination** will be essential for change, replacing a multiplicity of authorities with a more rational management structure. Policy and legislative backing will be needed to ensure that **drinking water receives first claim** in scarce water resources. **Empowered local institutions** will be essential for this, as will mechanisms in place to deal with conflicting claims from communities, regions and uses. **Sector reform programmes** will need to be extended to all districts rather than left as experiments in a few. Water and sanitation issues should be protected under the **Consumer Act**, and a regulatory framework developed to oversee the role of the private sector in improving and hastening better service to users. A **dual supply policy** can encourage proper use of non-potable water, reducing the strain on treated water supply. **Industrial pollution must be far more effectively controlled**, through active enforcement of regulations. **Regional Water Supply Schemes** must become a back-up system **used as a last resort**, rather than as the primary activity. The particular shame of **manual handling of human waste** by scavengers, which continues in many parts of the state, **must be**

ended with priority attention to this disgrace, and to the rehabilitation of those who have been condemned to an inhuman practice. Occupational hazards in other sanitation activities must also move up the agenda for concern and response. The state also has a role to play in **recognising achievements in the water and sanitation sector**, and drawing public attention to praiseworthy efforts. This can serve as an incentive for public awareness and mobilisation.

Policy shifts of this magnitude require institutions in tune with the intended shift from the state as supplier to a new role of facilitator of people's initiatives. A major need will be to **transform the Gujarat Water Supply & Sanitation Board (GWSSB)** into a policy advisory body, and to **introduce a Gujarat Water & Sanitation Authority** that can bring together the coordination and integration that is needed between the present multiplicity of authorities and controls. Each district in the state should have its own water and sanitation authority that can act as a catalyst for local cooperation and joint action. **The principle of subsidiarity** (decisions taken at the level where problems occur) must operate at these levels toward genuine decentralisation. Participatory approaches must be supported by recognition of **Panchayats, water committees** and other **empowered community bodies** as the engines of change. A first responsibility of such authorities must be in monitoring water quality and in water accounting and auditing. They can also be mobilised as an early warning system to guard against drought, learning from the bitter experience of recent months. Establishing O & M Responsibilities will also be key, particularly for the success of massive, expensive pipeline projects.

The ultimate test of these shifts will be in the improved health of Gujarat's people through a reduction in water-borne diseases. **Hygiene education** and attention to such challenges as **fluorosis** demand the most immediate priority, and an urgent concentration on schools as well as on sharpening communication skills within the sector.

Perhaps the most important indicator of the equity which this vision seeks, will be in the **empowerment of rural and urban women** and their active involvement in every level of sector activity. The **needs of children**, and most **particularly of the girl child**, must be part of this concern. Current efforts to ensure adequate latrine facilities for schoolgirls are a beginning that demands urgency. Equally significant will be the improvement in the wellbeing of citizens in **urban slums through uplift of water and sanitation conditions**. The importance of this challenge at a time of rapid urbanisation cannot be overstated.

Physical infrastructure that can deliver access to safe water and sanitation must begin with efforts to **protect Gujarat's delicate groundwater resources**. A portfolio of technologies that can respond to the range of local needs and capacities will be essential, along with building **maintenance services** that can be more readily controlled and operated at a **local level**. The monitoring and surveillance of water quality will require both laboratories and trained human resources, with stakeholders working together to ensure that quality can be sustained even under conditions of stress so prevalent in many parts of the state. **Sanitation will require much greater** priority than it has so far received, responding to the separate needs of both rural and urban areas. Rapid implementation of the Gujarat's **school sanitation programme** must be a priority. There is important experience available in tackling the challenge of urban sanitation, and city slums deserve the most immediate attention of planners and implementers within and outside Government if public health is to improve and human wellbeing and dignity lifted, particularly for women citizens. Problems of infrastructure development demand new approaches that must include innovative **partnerships with private initiative**, including the corporate sector.

Technological innovation can be a key to such change, with research and development activities encouraged so that area and location specific alternatives are offered that can be **simple cost effective and ecologically acceptable. Rainwater harvesting**, both in rural and urban areas must now be in the vanguard of such progress. Gujarat's infrastructure of technical institutions needs to be strengthened with a larger number of **testing facilities** that can back water supply efforts. Local efforts combined with the Narbada-based schemes and inter-basin transfers must be reflected in a sharply **reduced dependence on Regional Water Supply Schemes and on the use of tankers**. Meanwhile, the community aspect of O&M for these schemes requires immediate planning and mobilisation.

Efforts at infrastructural and technological change will have important financial implications. **A fresh approach to the economics of water and sanitation** is therefore a pre-condition for change in these sectors. The essential factor here must be recognition of water as a scarce and often non-renewable resource, the use of which inevitably involves **environmental, social and economic costs**. This awareness must be combined with a human rights approach that understands the ability and capacity to pay at every level of society. **Cost sharing** and the principle of **'the user pays'** can be far more actively applied if the political will exists. A beginning can be made in urban and industrial uses, through rational systems of water charges and enforcement.

All these requirements demand that **inter-sectoral and inter-departmental coordination** and integration take high place on the official agenda for action. The synergy is needed not within government alone, but between authorities, community based organisation, NGOs and the private sector. The Vision exercise is one demonstration of what such partnership can achieve, and it offers a beginning that should be sustained and supported.

Such joint action and approaches will need **public awareness and education** on water, hygiene and sanitation issues on a scale quite distinct from the current apathy of those protected by location or influence. **Schools** must be mobilised as the catalysts for future change, with their syllabi examined and strengthened toward issues of hygiene, sanitation and safe water. The media can play an enormously important role in building awareness and a public conscience on equity issues, as well as serving as a watchdog and early warning system. Hygiene promotion on an organised, state-wide basis can be achieved through Gujarat's infrastructure of training and communication institutions. Financial provisions for this task must be distinct.

State authorities will need to urgently address the importance of an accurate and **up-to-date** database, without which sound management is impossible

Next Steps by Institutions

Ensuring access to safe water, hygiene and sanitation as basic rights will require a transformation within the institutional framework of Gujarat's water and sanitation sector. While needs within the official institutions may be the most obvious, there is an equal challenge to build institutions outside Government with the capacity to absorb new roles and responsibilities.

If Government's role as a monopoly and as a supplier must shift toward facilitating and supporting people-centred activity, the first step may well be to transform the **Gujarat Water Supply & Sanitation Board** into a centre of policy formulation rather than delivery action. **A Gujarat Water and Sanitation Authority** is

recommended to replace the multiplicity of departments and organisation now impinging on water and sanitation. Such an integrated authority would need to be reflected at the district level as well, to support local level planning and action with citizen involvement and support as well as the improved integration of local decision-making authorities. **Water and/or natural resource management** committees would be a key institution, taking the principle of subsidiarity into action and assisting capacity building among stakeholders in talukas and districts, particularly among women. Water accounting and auditing should become major concerns for such local institutions. **Empowering Panchayats** in sector matters would help take community participation into the planning and implementation process. This might speed the political support for policy, legislative and regulatory changes.

The technological implications of institutional reform would include the ability to mainstream the **know-how** for such needs as **rainwater harvesting and sanitation** systems that can reduce water consumption, as well as the importance of re-cycling used water. Building capacities for R&D and for **water-quality testing** should be important institutional responsibilities.

Strong institutions can flourish only if the **economics of the sector** are reformed, as discussed above. Principles of water charges, cost sharing and the 'user pays' principle will all require efficient institutional back up. Institutional support for awareness generation and public education as well as for advocacy on equity concerns can become an important factor in hastening the improvement in health and human wellbeing, the ultimate goal.

All sector institutions will need to strengthen their data and **MIS systems** if efficiency is to be ensured.

Next Steps by Communities

In the people-centred approach that is at the heart of Jal-Disha 2010, the roles and responsibilities which communities accept and can exercise are the key issue and concern. Translating a human rights approach into actual services delivered and used will require a **new level of awareness and capacity for management**. A need such as putting an **end to shameful scavenging practices and improving occupational health** of sanitation workers will depend on community awareness and pressure. Upon community support will depend not only the advocacy and political will for a rights-based approach to water and sanitation, but its implementation through a variety of governmental and non-governmental institutions that must take their legitimacy from the trust which communities invest in them. New experiences such as partnership with and regulation of the private sector will be testing grounds for needed capacities. Communities will need to take the lead in **hygiene awareness and behaviour change**, with improvement in community health as the prime indicator of change. Health conditions in urban slums will demand special attention to **community mobilisation in Gujarat's cities**, drawing perhaps on the lessons which Surat can teach the rest of the state and country. With other water-borne diseases, the control of fluorosis in Gujarat and **mobilising children** toward improved health practices will depend on a high level of community support and involvement. The same will be true of every issue of **equity**, including the involvement of women, service to their needs, and encouraging **men to share a larger responsibility** in drinking water and sanitation management.

Sanitation Management & A Legendary Gandhian

Just whom would you vote for as the greatest Gandhian in the Indian subcontinent of the post-Independence era? Our vote will unhesitatingly go to the Pakistani social scientist Akhtar Hameed Khan whose first death anniversary was marked on October 12. Khansaheb taught us that poverty arises not out of lack of money but out of constant disempowerment. What the poor need is empowerment in the form of some technical knowledge, some catalytic financial support, but most of all, institutions that give them the right to decide on all issues that affect their lives. Khansaheb's work, and the Orangi Pilot Project (OPP) in particular, has clearly shown that participatory institutions are required in our cities. Orangi is Karachi's biggest katchi abadi (illegal squatter settlement). Spread over 3,240 hectares, its 800,000 population is larger than that of Oslo or Edinburgh. In 1980, Khansaheb visited Orangi to assess the residents' problems. He found that sanitation was their biggest worry, with excreta and wastewater from bucket latrines spread all over the streets. Khansaheb decided to organise the people to improve their surroundings and this led to the birth of the OPP. By the end of 1991, OPP had become a world-renowned endeavour. Nearly 73 percent of the 6,347 lanes had sewer lines and 75 percent of the 94,122 houses had indoor sanitary latrines. What was remarkable was that no money was provided to the residents of Orangi. They financed and constructed their own sewer lines. Since then, OPP has moved on to issues of housing, health, family planning, employment and education. OPP never tried to be a development project. It was conceived as a research institution that tried to analyse people's problems and understand solutions that they themselves proposed. For instance, OPP worked to explain how poor sanitation affected health and the purse. It suggested lane committees, which then asked for underground sewers and flush toilets like those of the rich, instead of sanitary pits. OPP tried to see how this was technically possible. Investigations revealed that the cost of such works quoted by government agencies was four times higher than usual because of corruption, inefficiency and inappropriate design. The UN Centre for Human Settlements disagreed with the OPP. But Khansaheb went ahead. Each lane committee selected a manager who collected money from residents and oversaw construction work with OPP's technical advice. It was a truly unprecedented and outstanding achievement. Khansaheb had shown so remarkably well that Gandhian principles are the answer not just to our rural problems but also to our urban problems.

Source: Anil Agarwal and Sunita Narain in *Down To Earth*, December 15, 2000

Improving the physical infrastructure for water and sanitation services in the state will now depend greatly on strengthening community capacities for more self-reliant management of the sector. **Protecting water resources** of the state must become a concern of people, not merely of the government. Integrated water resource management and the reduction of waste will demand **technical capacities** of testing, monitoring, surveillance and preventive maintenance as well as enhanced capacities for innovating technologies best suited to local needs and aspirations. **Sanitation** is a sector neglected by authorities and communities alike, and will need **strong advocacy** at the local level so that community support accelerates hygienic behaviors and latrine usage, and supports such efforts as the Government of Gujarat's school latrine programme. The **urban challenge** will demand community mobilisation on a war footing.

As technologies move toward local needs and accessibility, communities will have the key role as **managers of services and maintenance**, and in the development of technologies that respond to **cost-effectiveness and simplicity**, as well as to the protection of the environments in which people live. Communities will also need to be actively involved in the local O&M responsibilities attached to massive pipelines schemes. The stress **on rainwater harvesting, water-quality monitoring and surveillance as well as sanitation systems** that minimise water use will all require building knowledge and technical skills within communities.

If a new dispensation demands that communities undertake such a range of greater responsibilities, does an institutional infrastructure exist to support such a shift in roles? Clearly, authorities, NGOs and communities will have to work together to build on present institutions and create new ones where necessary. Active partnership toward reform is therefore the key, with communities acting as the conscience and watchdog for good governance, transparency and accountability. **Local water and sanitation committees** that now exist and Panchayats are clearly the major potential for change toward greater empowerment and action. **Legal empowerment** of such community-based organisations can help ensure that they are better informed and better able to influence policies and their implementation. Water committees working with local water authorities (as suggested above) can offer a new and powerful synergy. These committees and **Panchayats**, strengthened by active involvement by women, can be important centres for training in new skills and capacities.

A major need will be for community institutions to focus on **the economics of the sector** and act as energetic **mobilisers of resources**. Proficiency in organising water and sanitation services, including operation and maintenance, can lead to insights and attitudes which can encourage **cost sharing**, application of the 'user pays' principle, cross subsidies and promoting **water charges**, particularly in urban settings. The **entrepreneurial abilities** of Gujarat's people as well as the state's historic ability to build peoples institutions now must combine to address these needs.

Next Steps by NGOs

Mobilising communities for change will depend very largely on the ability of non-governmental organisations to build on existing relationships and past experience. Gujarat is rich in such NGO capacity, much of it invested in the water and sanitation sector. The quality of this knowledge and wisdom has been reflected in the **GUJARAT 2010 vision** articulated by a network of state NGOs. Their agenda for action has anticipated many of the changes described on these pages. Perhaps the most important of these is the advocacy task that lies ahead in establishing access to **safe water, hygiene and sanitation as basic rights** to which every citizen is entitled. Working toward goals of a more equitable society will require the vigorous pursuit of agendas that can ensure a stronger place for **women at every level of decision-making**, a better **sharing of household responsibilities** between men and women, and active support for official efforts such as the **school latrine programme**. The proof of effective decentralisation may rest largely in community capacities for generating resources of skill and finance. Here, the mobilisation strengths of NGOs will be tested in the reality of the sector's **resource requirements**.

Improved **community health** is the ultimate indicator of success in this sector. Gujarat NGOs have won national distinction for their work in health, hygiene and

sanitation promotion. These capacities will need to be enhanced and shared toward the **awareness and education goals** that can reduce the spread of water-borne diseases, **promote hygiene behaviors** and assist in the control of challenges such as fluorosis. Training capacities should be regarded as a major resource not just for Gujarat but for the nation. Every effort must be made to build and expand this potential.

Health awareness and practice will demand from NGOs a strong concentration on physical infrastructure, perhaps nowhere more important than in sanitation. Mobilisation for the **school latrine programme** and for **urban sanitation**, particularly for slum communities, are clear priorities. Here, as in water supply, a portfolio approach to technologies will be needed that can respond to local needs with appropriate and sustainable models. NGO capacities for **reducing water wastage** and toward **improving the water table through integrated water resource management** have been strongly demonstrated over recent months of crisis. It is important that this experience and demonstration be taken to scale, with strong official support reflected in a relevant policy framework.

Advocacy and action for policy change by the NGO community must reflect its own acceptance of **new roles and responsibilities** for the management and delivery of services. The ability to deliver on policy change will be critical to the credibility of NGOs in a fresh environment. Theirs will be the key role to ensure that the human rights approach is reflected in State policies and legislation and is delivered to citizens as improved service. Advocacy must provide **drinking water the first priority** in resource allocation and **give sanitation the importance and attention** which it has lacked all these years. The scandalous neglect of the **scavenger community** in Gujarat is an obvious shame that NGOs must ensure is eliminated, along with other efforts to minimise the occupational hazards which sanitation workers endure. New partnerships and capacities will also be needed to help NGOs work with the private sector both as *partners and as regulators*.

Working towards good governance in a new policy and working environment, institutional reform for NGOs will need to begin at home through the improvement of their own **managerial capacities**. NGOs will need to become the role models of the **transparency and accountability** they and the communities they serve will demand from others. The **principle of subsidiarity** will depend on this for its effectiveness, as will the local water committees and the apex Gujarat Water and Sanitation Authority proposed above. Building the capacities of communities, as well as their own, will be essential if 30% of larger water schemes are actually to move through non-government initiatives, if women are to be given a major role in decision-making and if panchayats and other community-based organisations are to be truly empowered. It is the NGO strength for **ensuring participatory structures** that must guarantee that planning that starts at the bottom is actually used by the top. Intersectoral and inter-departmental coordination will need to reflect NGO abilities to work more effectively not just with official agencies but increasingly with a variety of bodies emerging from communities and the private sector.

Technological competence will be essential to deliver on a new role in water and sanitation services. Building on existing strengths, as demonstrated in sanitation and water harvesting and resource management, NGOs will need to build a statewide consensus on a range of technology options.

It is their advocacy that must ensure that an obsession with large schemes (including tanker supplies) is replaced with a variety of technology choices that are **location/region specific, simple for communities to access and use, and that are**

ecologically and economically sustainable. Rainwater harvesting and household sanitation are obvious examples. They represent approaches that NGOs will now need to advocate through wide demonstration in both rural and urban areas, along with an ability to market both the approach and the means to achieve it. Technical competence will need to include establishing and working with testing laboratories that can build NGO roles in water quality maintenance.

New behaviours toward reducing water waste, recycling of waste water and reduction in occupational hazards will also require strong understanding and use of **communication skills**, a capacity that must be built among NGOs in a thoroughly professional manner. Indeed, there is a need to recognise the goal of decentralisation as an exercise in **changing attitudes and behaviours**, and therefore as a **communication challenge** of enormous importance. Statewide media campaigns in which NGOs are strongly involved can hasten the awareness and practice that improved water and sanitation services demand. Working with schoolchildren and their teachers must be an important arena for communication action and support.

An important competence that will be essential within the NGO community will be that of **managing the financial and economic implications** of a paradigm shift in the sector. The acceptance of water as an economic good and of the 'user pays' principle will be new experiences for many. A great deal will now depend on NGO capacities for resource mobilisation and resource management. Mobilising communities toward participating in O&M costs, monitoring service charges and maintenance responsibilities, recommending progressive rates of water charges, cost-sharing and cross-subsidy opportunities will all require new attitudes and abilities for financial management and economic analysis among NGO activists.

Next Steps by Private Sector

The thrust toward decentralised planning, management and activity in water and sanitation will be reflected in the quality of private initiatives which the sector can attract. Non-government organisations have so far been understood almost exclusively to be service organisations working on a **non-profit** basis. **Other private initiatives** (ranging from local artisans essential for sanitation service, mechanics that can attend to routine maintenance needs and local water vendors to small- and medium-scale enterprises and contracting companies) have largely been left undefined. Thus the 'private sector' is almost invariably understood as larger-scale profit-motivated activities that are exploitive and therefore best left at arms length. It would be a pity if this kind of ideological fixation were to persist. Few states can boast of the **entrepreneurial talent** that is Gujarat's hallmark. Mobilising talent and initiative at every level toward resource mobilisation and better service certainly demands recognition of private enterprise, with 'private' understood as the full spectrum of resources available outside of government. This will be critical to understand if, as recommended, some 30% of larger water schemes are to move through private initiatives. To harness this initiative, it will be essential to ensure that **regulatory frameworks** exist and are effectively used, with maximum participation by civil society. This can help ensure that access to basic rights and services is not inhibited by crass commercialism. In turn, the ability to run enterprises successfully demands the ability to earn from them. Entrepreneurial success should therefore be welcomed and encouraged within the framework of genuine community service.

One of the clear possibilities in encouraging private initiatives is to open avenues for **income-generation for women and weaker sections**, through water and sanitation services. Economic empowerment can therefore be a strong factor in encouraging

non-government participation. Improvement in the economics of the sector, as discussed above, will greatly depend on introduction of more **commercial attitudes and practices at many levels. Water charges** at progressive rates, imposed on users with the **ability to pay**, will be an important means for subsidising those who lack this capacity. The private sector must help champion such policies.

Technological competence in the private sector must assist the promotion of appropriate options. Location/region-specific approaches may depend greatly on the availability of local enterprises with the expertise to deliver, build and maintain simple, affordable services. R&D capabilities will be important, both in hi-tech areas such as the promotion of desalinisation and in the improvement of household water harvesting and latrine construction.

Private industry must accept a major responsibility for **pollution control** and for the recycling of wastewater, grey water and biodegradables. This demands the active involvement in Gujarat's water and sanitation future of industrial units and associations, and close dialogue and joint monitoring with them.

Coordination between institutions will be essential to the encouragement of private initiative, with entrepreneurs working in partnership with communities, NGOs and state authorities. There is little evidence yet of this synergy so far, and it is essential to the future. Gujarat's pride of place as an industrialised state must be reflected in the professionalism that participates and supports the mobilisation for safe water, hygiene and sanitation.

Suggested Targets for 2015 and 2025

2015

Universal public awareness of hygiene

Percentage of people who lack adequate sanitation halved

Percentage of people who lack safe water halved

80% of primary school children educated about hygiene

All schools equipped with facilities for sanitation and hand washing

Diarrhoeal disease incidence reduced by 50%

2025

Good hygiene practices universally applied

Adequate sanitation for everyone

Safe water for everyone

All primary school children educated about hygiene

Diarrhoeal disease incidence reduced by 80%

Source: VISION 21, Water Supply & Sanitation Collaborative Council (Geneva), March 2000

Achieving the Vision: What Must Change By 2010

This chapter attempts to identify the separate issues and achievements which together must become the building blocks of a future of health and equity in Gujarat. Each element in the vision articulated in Chapter 1 is examined for its implications of change. Together, these changes can ensure that safe water, hygiene and sanitation are no longer a vision but a reality accepted as rights and duties by every citizen in the state. By 2010, we must be able to record these changes:

Human Rights

- ◆ Access to safe water and sanitation has been recognised and accepted as a basic human right. The duties that come with this right have been acknowledged by all citizens. They are active partners and managers in water and sanitation services.

Physical Facilities

Water Supply and Use

- ◆ Everyone has access through a connection to regular, reliable and affordable supply of adequate safe water through systems that are socially acceptable, environmentally sustainable, technologically and economically viable, and people-centered/ managed.
- ◆ Wastage of water is minimised by change in behavior and technology.
- ◆ Inexpensive, water-efficient equipment is widely available.

Water Resources

- ◆ Ground water table has risen to 1980/84 levels.
- ◆ Integrated Water Resource Management is practiced at all levels.
- ◆ Water quality monitoring & surveillance is a regular practice by Government, communities and NGOs

Drinking Water Infrastructure

- ◆ Every public tap gives potable water.
- ◆ Preventive maintenance of water and sanitation infrastructure is in position.
- ◆ 'Portfolio' approach to technology is used in order to spread risk from breakdowns, i.e. multi-technology rather than monotecnology.
- ◆ Location-specific, appropriate, sustainable models are used instead of universal models.

Sanitation

- ◆ Everyone has access to a latrine connected to a waste disposal system, which is reliable, affordable, socially acceptable, environmentally sustainable and economically viable. Ninety percent of rural households and all urban households are using individual toilets of appropriate, location-specific designs.
- ◆ Government's School Latrine Scheme is implemented fully. All schools have at least 2 toilets, one each for boys and girls. The enrollment of girls has increased dramatically as a result and dropouts greatly reduced because of this facility.
- ◆ Urban sanitation exemplifies the positive attitudinal change of the authorities towards slums. The authorities provide safe sanitation through accessible household and community models as well as protection of slum dwellers' rights. The corporate sector is a principal partner in urban slum sanitation programmes, reflecting a strong social commitment.

Health and Hygiene

- ◆ Hygiene promotion on a state-wide, sustained basis has imparted awareness and behavioural change throughout the population.
- ◆ The incidence of water-borne diseases has decreased by 25% with the concerted efforts of households, communities, voluntary organisations and State agencies in improving hygiene and sanitation. Especially, child morbidity and mortality status has been improved.
- ◆ Fluorosis, which for many years was a major challenge in several districts of Gujarat, has been controlled by use of appropriate technologies and community water quality monitoring and surveillance facilitated by Government and the voluntary sector.

Information, Education, Communication

- ◆ Communication is recognised as a social process, and not merely as distributing information and media products. Planning and action skills for behaviour change are developed at every level of decision-making to ensure a strategic approach.
- ◆ Gujarat has a generation of people who are aware, informed and educated on water and sanitation issues.
- ◆ Schools are effective centres of disseminating information and education on water use, sanitation and hygiene behaviour. Teachers are trained in hygiene education and this is actively demonstrated in and outside classrooms, leading to higher usage of existing facilities and increased coverage.
- ◆ School curricula reflect water and sanitation messages.
- ◆ Media campaigns have also been instrumental in changing health and hygiene-related behaviors as well as water-use practices in order to conserve water and reduce water-related diseases. It has also been an active partner towards awareness generation and advocacy of policy change. It has also helped sustain pressure on all the stakeholders to perform their roles responsibly.

Equity

- ◆ Women are involved in decision-making and management.
- ◆ Equitable systems of access and distribution are in position for all regions, classes, castes and communities.
- ◆ Slum settlements have been integrated into urban water and sanitation systems
- ◆ Gender-related concerns receive attention.
 - ◆ In most villages, women have a strong presence in the decision-making process for natural resource management. Household responsibilities for drinking water and sanitation are now better shared between men and women. The daily burden of fetching water from distance places has been dramatically reduced by improved community water management services.
 - ◆ With active participation and facilitation of village women's groups, working funds have been generated, benefiting economic empowerment of women and providing impetus to higher sanitation coverage.
 - ◆ Dropouts by girl children is nil. Enrolment in schools by girl children has increased because of time freed from water collection and other activities arising in the past from poor water and sanitation systems.

Financial/Economic Measures

- ◆ Users are paying for water and sanitation services that are reliable, affordable, socially acceptable, environmentally sustainable, economically viable, and people-centered/

managed. They pay according to the level of service they want and are willing to pay for. Increasing self-reliance has emerged.

- ◆ The economics of water supply has improved through community participation in rural and urban areas. Operation and maintenance costs as well as responsibility for drinking water services now actively involve client communities.
- ◆ A cost-sharing structure has emerged in which household contributions towards both capital and service costs, routed through communities, making the water supply system more sustainable. Community groups monitor service charges as well as maintenance responsibilities.
- ◆ In urban areas, water charges are now at a progressive rate. They reflect a growing ability to pay and higher consumption levels. Cross subsidies are at work to protect poorer groups.
- ◆ The economics of alternative sanitation strategies (in terms of costs and prices) has been understood and used to develop a range of sanitation packages and models.
- ◆ In urban areas the importance of pay-and-use sanitation systems has been widely applied.

Water Technology

Rainwater harvesting

- ◆ Traditional/local /appropriate rainwater harvesting systems have been revived/used optimally in the rural areas. Rainwater capture has increased over 300%.
- ◆ All urban structures have rainwater-harvesting facilities.

Mainstream technology

- ◆ Local sources predominate in drinking water supply. Piped Water Schemes are now used as back-up wherever local sources are inadequate.
- ◆ Coverage by Regional Water Supply Schemes has been reduced to 10-20% from 60-70%.
- ◆ Testing laboratories throughout the state ensure quality and hardware maintenance. Every district has a laboratory.
- ◆ Tanker supplies are reduced to a minimum and have been abolished in many areas
- ◆ Water from the Narmada has reached intended users.
- ◆ Inter-basin transfers have been initiated.

Technology Development

- ◆ Government and the corporate sector lay adequate emphasis and allocate enough financial resources for research and development. This helps in evolving new technological options and for new innovations in existing ones.
- ◆ A broad consensus has been evolved towards use of area and problem-specific, appropriate technologies. Eco-friendly, cost-effective, simple and down-to-earth technologies are explored to enable local communities to manage upkeep and maintenance on their own.
- ◆ Desalination has been introduced and used as a viable option, especially in dry, coastal parts of Saurashtra and Kachchh.

Water recycling

- ◆ All high-rises/large structures have recycling facilities. At least 50% of water used is recycled. Municipal water supplies are supplemented by extensive use of reclaimed urban wastewater for non-potable uses.

- ◆ Wastewater, grey water and biodegradables are recycled using user-friendly and cost-effective technologies. Storm water in both rural and urban areas gets recharged into underground aquifers, helping small and marginal farmers and urban agriculturists.

Sanitation Technology

- ◆ Sanitation technology used minimises water use: standardised technology is available and easily accessible to all.
- ◆ Technology that does not pose an occupational hazard to sanitation workers is adopted. The scandal of manual handling of human excreta has been banished.

State Institutions

- ◆ Government monopoly is transformed into facilitation. Government employment in the sector is drastically reduced from the 2000 level.
- ◆ GWSSB is transformed into a policy advisory body.
- ◆ The CMSU experiment begun in 2000 has grown into an internationally recognised resource centre for this sector acting as a catalyst for innovation and reform.
- ◆ Good governance, transparency and accountability are the norms.
- ◆ Every district has its own water authority, and Panchayati Raj institutions are active in drinking water and sanitation management.
- ◆ In Government, a single authority (the Gujarat Water Authority) has been constituted to oversee the water sector, replacing the multi-department approach.
- ◆ The Gujarat Water Authority practices water accounting/auditing.
- ◆ An early warning system for drought is in place.

Civil Society and Market Institutions

- ◆ A Gujarat Water Authority, set up as an autonomous body with full stakeholder participation, is the apex organisation in charge of regulating all water resources in Gujarat. Civil society is an active participant in it.
- ◆ Water committees are functional in every habitation.
- ◆ The principle of "subsidiarity" for planning, implementing and managing water and sanitation systems has been widely accepted and implemented. Gram panchayats are managing rural water and sanitation systems following the principle of "subsidiarity". NGOs and sector professionals have accepted and exercise new roles and responsibilities.
- ◆ Skills, capacities and confidence of user groups have been raised through training and other capacity-building exercises making community based organisations self-reliant. Consequently, local initiatives are flourishing and local/people's institutions are legally empowered.
- ◆ 30% of larger water schemes are maintained through private initiatives.
- ◆ An independent resource centre assists training and networking, and provides advisory services.

□ Institutional Processes

- ◆ In most villages, women have a strong presence in local groups for natural resource management. These groups function as the first tier in a participatory structure that extends to taluka and district committees for natural resource management. Each of these committees is well informed and active on issues of water supply, sanitation, health and hygiene through support from NGOs.
- ◆ Policy makers have been sensitised to creatively incorporate suggestions from these committees. State water and sanitation plans have been made over the decade with

- the help of such participatory, bottom-up planning.
- ◆ In this participatory structure, the local self-government structure of Panchayats (including their women members) at each administrative level has been an active participant in planning, implementation and monitoring. NGOs have played a major role in capacity building of Panchayats in Gujarat since the introduction of the 73rd and 74th Constitution Amendments in 1993.
 - ◆ Empowerment through this participatory structure has been reflected in district and state-level water, sanitation and health education plans, which are formulated and operated through village level groups.

Inter-organisational Coordination

- ◆ People work closely with local governments and non-governmental organisations to manage water and sanitation systems so as to meet basic needs while protecting the environment.
- ◆ Communities and NGOs have worked together with Government agencies on water quality monitoring and surveillance.
- ◆ The 'Vision' efforts which began in Gujarat in 1999 led to a sustained mechanism for networking among stakeholders. This unity has provided strength to organise opportunities for policy intervention with state, central and other donor agencies. A positive and synergistic partnership between communities, government, private sector and NGOs has been established.

Policy, Legislation and Regulation

- ◆ Government's role has increasingly facilitated and supported people's own initiatives. Services are largely provided by trained para-professionals at the community level.
- ◆ A people-centred policy framework towards decentralised control as well as responsibilities has given the opportunity for employment creation, leading to greater self-sufficiency and sustainability of drinking water and sanitation programmes.
- ◆ Safe water and sanitation are accepted as basic rights in Gujarat and all over India. The Consumer Protection Act covers water and sanitation issues.
- ◆ Gujarat has a water policy and adequate legislation to back it. Drinking water gets first claim on water supplies. The new policy is more comprehensive and holistic in nature and thereby establishes better convergence of sectoral activities and elicits better inter-departmental coordination within Government at all levels.
- ◆ A sector reform programme covers all districts.
- ◆ A regulatory framework has been developed to encourage and control private operators of water and sanitation services.
- ◆ Recognition/incentives for drinking water and sanitation performance/initiatives are given.
- ◆ Regional Water Supply Schemes are adopted as a last resort/back-up system.
- ◆ A 'dual supply' policy is appreciated and introduced (drinking water plus other domestic use, potable/non potable supplies).
- ◆ Industrial pollution has been controlled. The Pollution Control Act and other applicable rules, regulations and orders are strictly enforced. The new policy provides for improved enforceable measures to control contamination of drinking water sources.
- ◆ Local/people's institutions are legally empowered.
- ◆ Mechanisms for resolving conflicts are in place.

- ◆ All scavengers (head loaders) have been rehabilitated. The inhuman practice of manual handling of human excreta has been completely eliminated. The communities involved in this practice in the past are now well into alternative occupations and their children are supported by special educational and occupational opportunities.
- ◆ Occupation health/working conditions of sanitation workers have been improved through state initiatives on health welfare measures.

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Annex 1

Tables: Background and Sector Context

Table 1: Villages affected by excess fluorides in ground water

District	No. of villages
Ahmedabad	170
Gandhinagar	20
Sabarkantha	310
Mehsana	447
Banaskantha	386
Surendranagar	41
Baroda	261
Kheda	176
Panchmahals	311
Bharuch	26
Surat	23
Valsad	14
Junagadh	48
Rajkot	15
Bhavnagar	75
Jamnagar	11
Amreli	70
Kachchh	4
Total	2413

Table 2: Villages where ground water is saline

District	No. of villages
Ahmedabad	88
Gandhinagar	11
Sabarkantha	52
Mehsana	113
Banaskantha	74
Surendranagar	47
Baroda	65
Kheda	150
Panchmahals	56
Bharuch	108
Surat	42
Valsad	42
Junagadh	51
Rajkot	30
Bhavnagar	29
Jamnagar	87
Amreli	10
Kachchh	74
Total	1129

All data provided by GWSSB. See also Vision 2000: Social Sector (GSIDB), water in Gujarat (IRMA/Unicef), Water Supply Dept. Approach & Action Plan, Narmada Water Resources & Water Supply Dept Water scarcity 2000-2001

Table 3: Performance of Bores

Year	100 mm				150 mm				DR			
	Drilled	Success	Failure	%failure	Drilled	Success	Failure	%failure	Drilled	Success	Failure	%failure
1994-95	5568	4297	1271	22.82	494	266	228	46.15	72	69	3	4.16
1995-96	4562	3917	645	14.13	105	67	38	36.19	143	138	5	3.49
1996-97	8949	7301	1648	18.41	761	406	355	46.64	380	366	14	3.68
1997-98	16453	15459	994	6.04	724	409	315	43.50	602	593	9	1.50
1998-99	15912	14079	1833	13.01	756	534	222	29.36	573	558	15	2.61

Table 4: Salient Features of the River Basins in Gujarat

River Basin	Length In Gujarat	Average Annual Rainfall
Narmada	212.52 km	40705 MCM
Mahi	206.08	8500
Sabarmati	310.73	3200
Tapi	202.86	17982
Shetrunji	170.66	280
Macchu	119.14	2515
Bhadar	186.76	350

Table 5: Year-wise Live Storage of Saurashtra Region

Year	Design Live Storage (Mcm)	Live Storage as on 31 July (Mcm)	%
1985	N.A.	N.A.	-
1986	1982.44	488.08	24.62
1987	1848.59	85.26	4.61
1988	1847.71	1505.87	81.50
1989	1982.44	1067.84	53.67
1990	1999.45	140.39	7.02
1991	1995.45	675.73	33.86
1992	2004.91	972.66	43.52
1993	2034.30	485.23	22.85
1994	2041.16	1576.13	77.21
1995	2075.72	503.70	24.26
1996	2075.59	1377.98	66.39
1997	2076.28	996.54	47.99
1998	2122.24	675.25	31.81
1999	2229.07	283.00	12.70
(20.10.99)			
2000	2229.07	252.56 (14/08/2000)	11.33

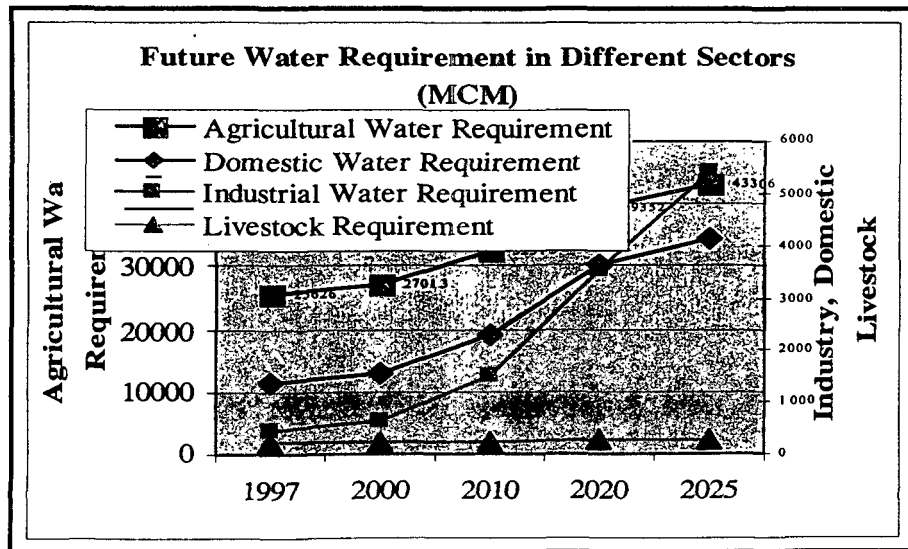
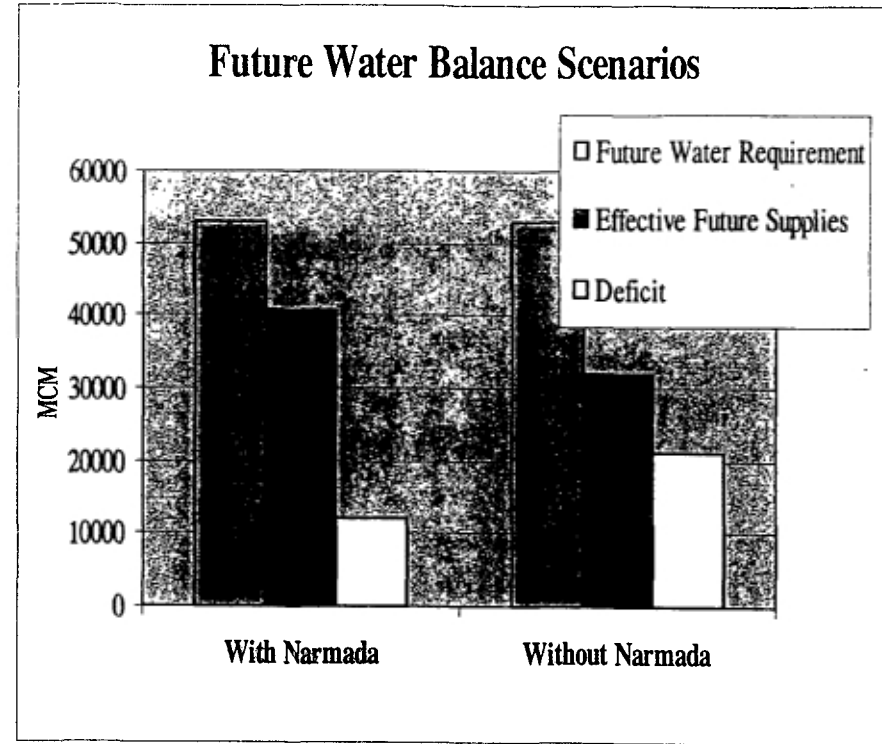
Table 6: Villages and habitations either fully or partially covered by drinking water

Description	No.
Total habitation	30269
Habitations fully covered upto March 1995(FC)	21994
Habitations not covered (NC)	1722
Habitations partially covered(0-10 LPCD) (PC)	602
Habitations partially covered (10-20LPCD) (PC)	1264
Habitations partially covered (20-40LPCD) (PC)	4687
Total PC habitations	6553

Gujarat's Water Future?

- With all the utilisable surface water and 90 per cent of groundwater harnessed, the gap will be around 11.5 BCM.
- The gap will be 23 BCM without water from Narmada
- Inter-basin transfer and demand management seems to be inevitable

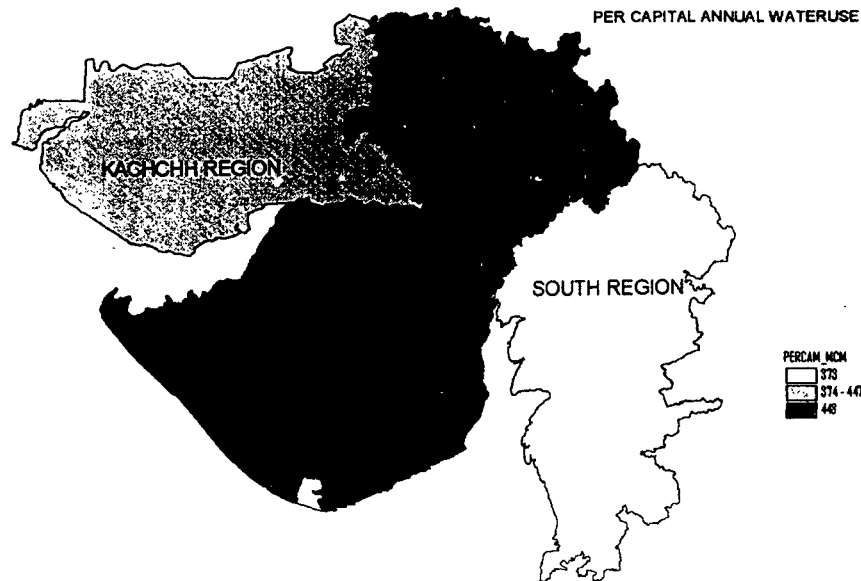
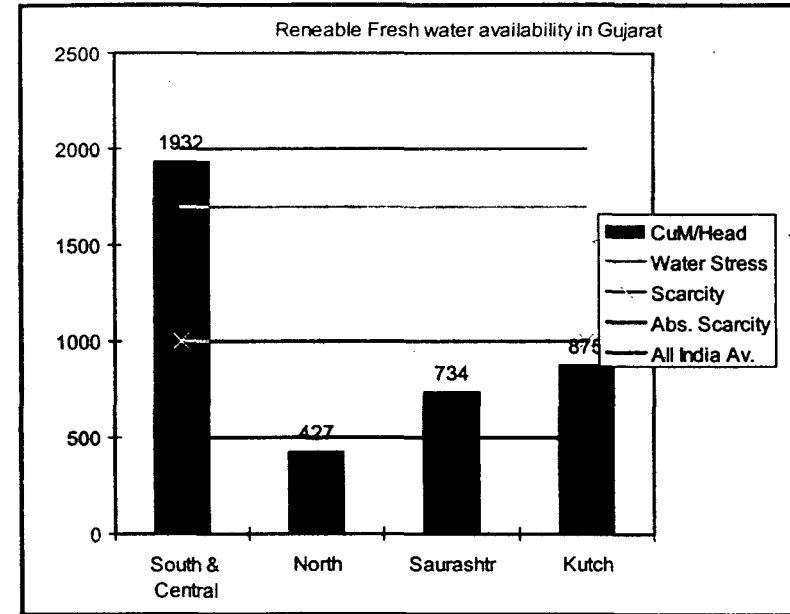
Future Water Requirement 2025



- Agriculture : 2.5 times the 1997 levels.
- Industry: 12 times the use in 1997.
- Total requirement: double in 28 years.

Per capita Renewable Freshwater

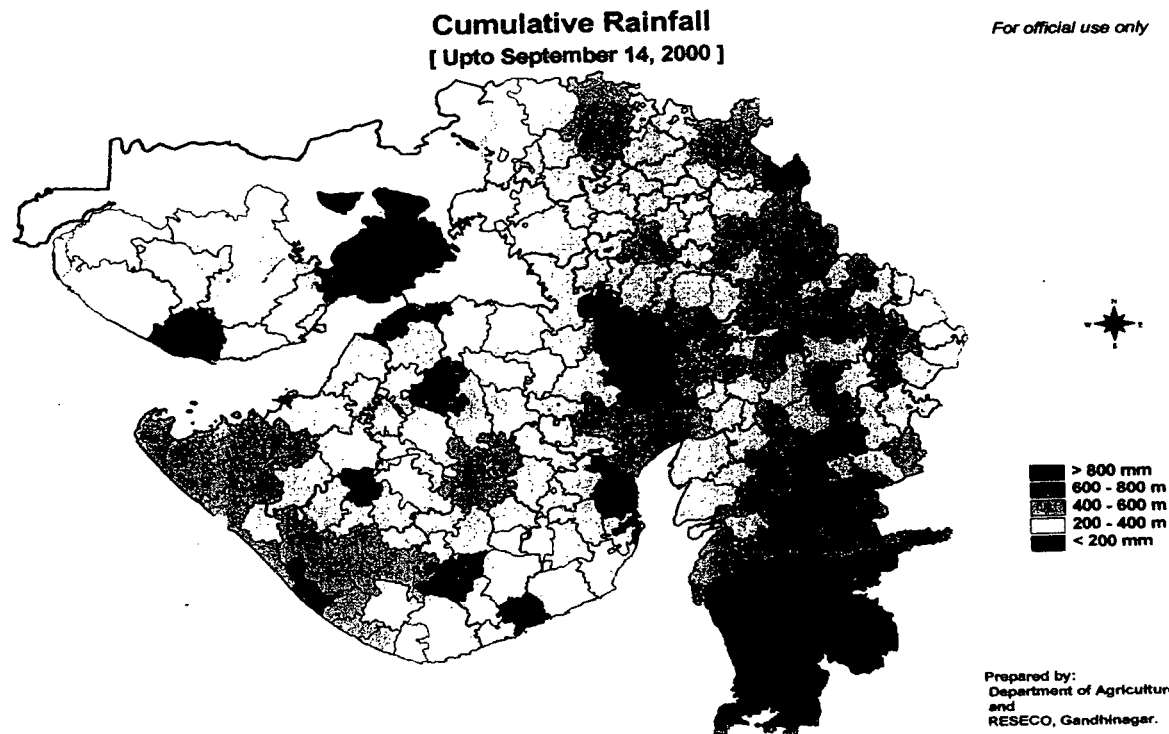
- North Gujarat is *Absolutely Water Scarce*
- Saurashtra and Kutch are *Water Scarce*.
- South and Central Gujarat is *water abundant*



- Maximum water availability is in South Region.
- Per capita water demand in North Gujarat and Saurashtra is approximately 1.3 times more than South Region.

Second consecutive water scarcity year

- 1999-2000 was a severe water scarcity year.
- State is reeling under second unprecedented consecutive water scarcity in 2000-2001.
- Total Rainfall During the season – 528mm against annual average of 858 mm. (61.49%)
- Only 14% of the state area has received normal rains (only 3 districts).
- Saurashtra & Kachchh worse affected



Gujarat – A Water Scarce State

- One of the worst water scarce states in India
- High variation in rainfall.
- 26 years out of last 76 years have been drought years.
- Ground water table depleting @ 2 to 3 Mtrs. depth every year
- 74% of the State area unsuitable for ground water withdrawal due to rocky terrain and coastal region.
- Ground water in the districts of Amreli, Bhavnagar and Junagadh contains excessive fluorides.
- Most of the Saurashtra region comprises of hard rock where ground water is available from cracks and crevices
- Ground water on the coast is saline with salinity ingress into the land areas.

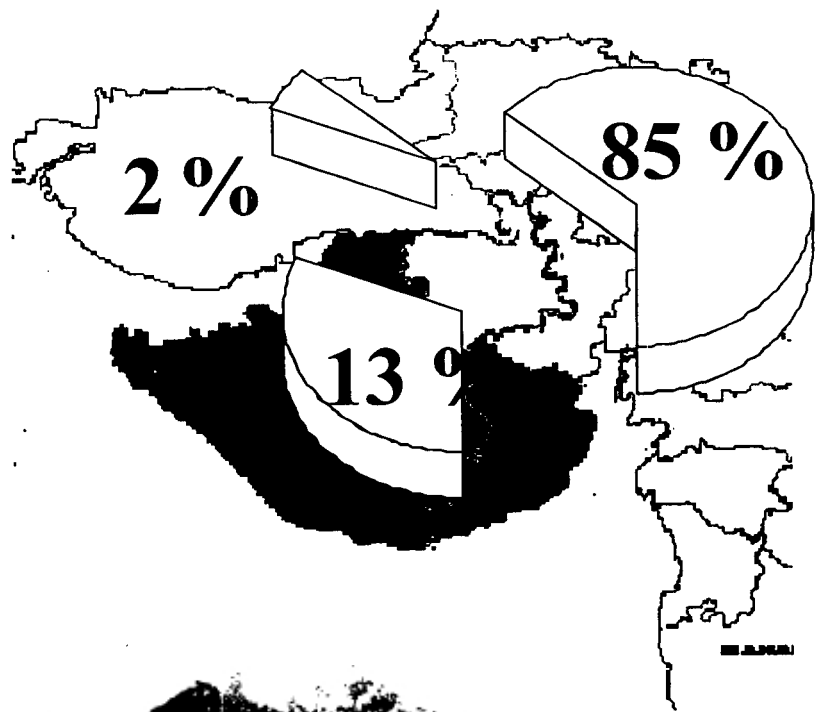
Availability of Water Resources

Region	Percentage of Total State Area	Percentage of Total Available water resources
South, Central and North Gujarat	47	70
Saurashtra	35	20
Kachchh	18	10

Per Capita Renewable Fresh Water Availability in Gujarat by Region

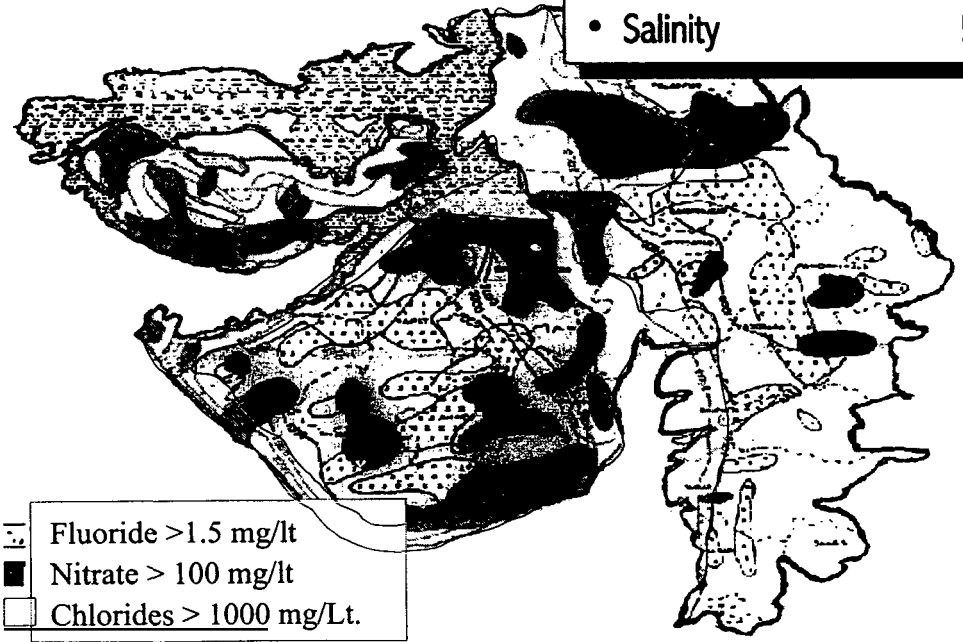
Name of the Region	Total Fresh Water Availability MCM	Expected population in the Year 2001	Expected per capita fresh water availability in 2001 (M ³ per annum)
S & C Gujarat	36793.11	19.62514	1874.79
North Gujarat	5286.33	14.301765	369.62
Saurashtra	8152.23	12.648321	644.53
Kachchh	1149.60	1.456348	789.37
Gujarat	51304.5	48.031574	1069.74

Source: Draft White Paper on Water – UNICEF / IRMA



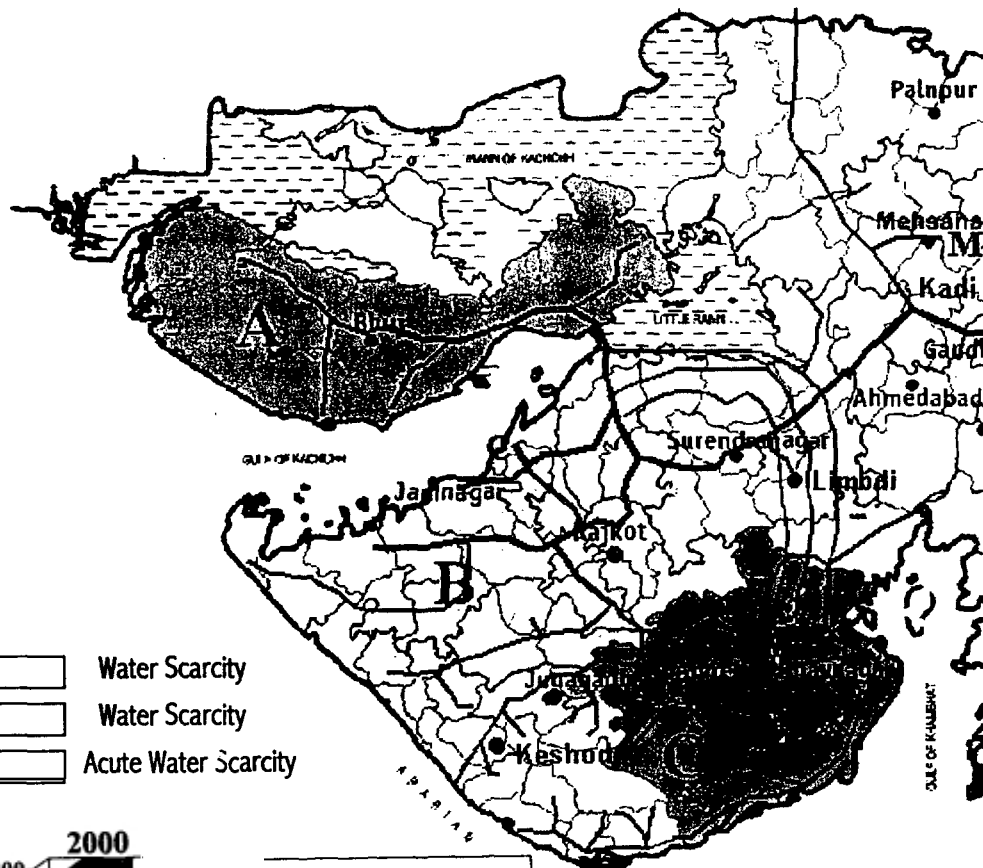
Availability of water per year		
Region	Total	Per capita
• Gujarat(main land)	42079 MCM	1155 CM
• Kutch	1149 MCM	789 CM
• Saurashtra	8152 MCM	789 CM

Water Quality Problem	Villages Affected
• Fluoride	2413
• Nitrates	655
• Salinity	593

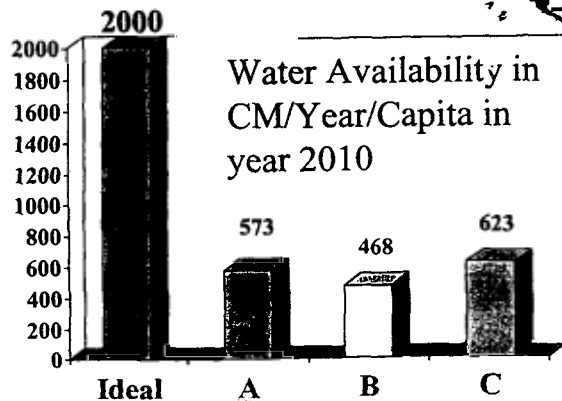


▨ Fluoride >1.5 mg/l
 ■ Nitrate > 100 mg/l
 □ Chlorides > 1000 mg/Lt.

WATER SCENARIO IN SAURASHTRA



- A Water Scarcity
- C Water Scarcity
- B Acute Water Scarcity



- 8 years of severe water scarcity in the last 15 years
- Even in normal years 1230 to 4534 villages supplied water by tankers
- Rs. 9200 Million spent on water scarcity
- Schedules of schools affected

There is no alternative to bringing drinking water by pipeline from South Gujarat

Habitations affected by drinking water scarcity

Sr. No.	Years	Affected Habitations
1	1994-95	1800
2	1995-96	10825
3	1996-97	11265
4	1997-98	7655
5	1998-99	10201
6	Proposed 2000-2001	8508

Surface Water Availability in Saurashtra

Year	Total surface water storage capacity (MCM)	Available storage in October (MCM)	Percentage Availability of water %
1991	1995.45	675.73	33.86
1992	2004.91	872.66	43.52
1993	2034.30	485.23	23.85
1994	2041.16	1576.13	77.21
1995	2075.72	503.79	24.26
1996	2075.59	1377.98	66.39
1997	2076.28	996.54	47.99
1998	2122.24	675.25	31.81
1999	2229.07	283.00	12.70
2000	2228.15	170.39 (as on 31/10/2000)	7.64

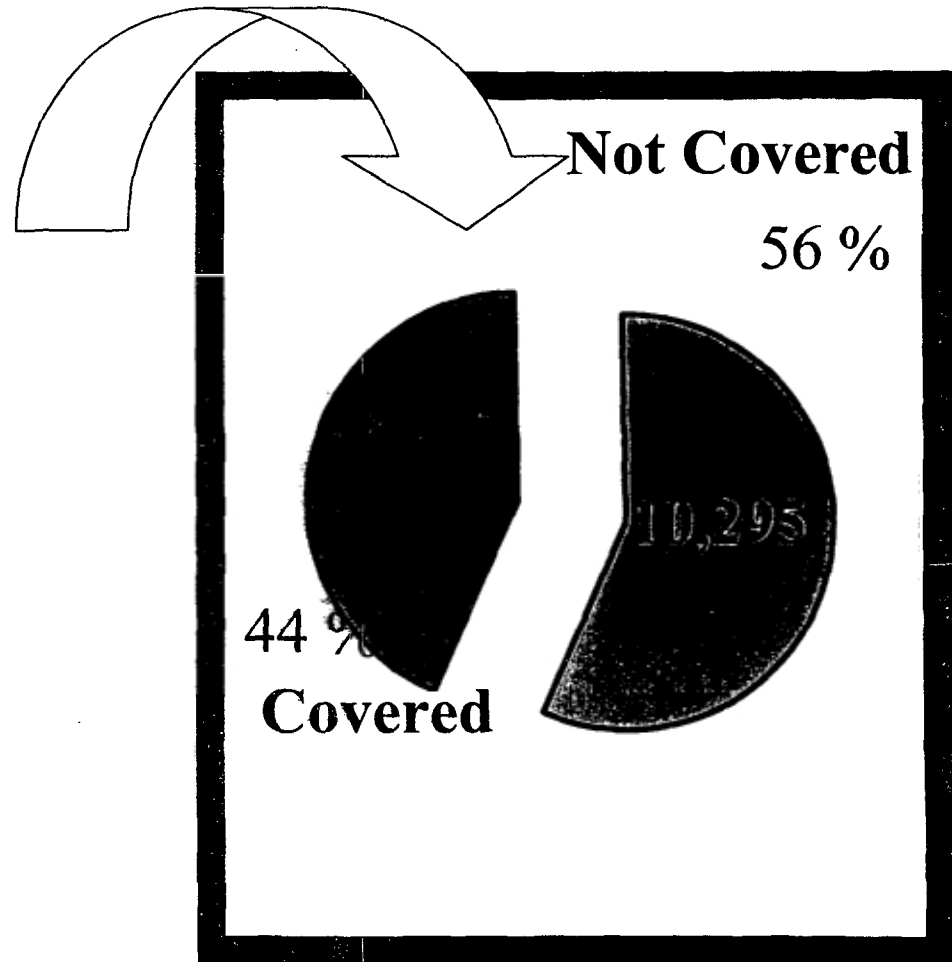
Towns & Cities facing Acute Drinking Water Shortage

City	Population
•Rajkot	5.50 Lacs
•Bhavnagar	4.80 Lacs
•Junagadh	2.50 Lacs
•Amreli	1.00 Lac
•Keshod	0.50 Lac

- ***This cities and towns will have no water beyond February 2001.***
- ***In all 68 Urban centres plus 5 Corporation cities are affected.***

Narmada – A Permanent Solution for drinking water

- The Narmada tribunal has allocated 1.06 MAF (3500 MLD) water for domestic and industrial use in Gujarat (0.86 MAF – 2900 MLD for drinking and 0.20 MAF – 675 MLD for industry).
- Government of Gujarat has conceived and formulated a Master Plan for supply of drinking water from Narmada Canals.
- 8215 villages and 135 urban centers to be benefited.



Drawal of Water from Narmada Canals

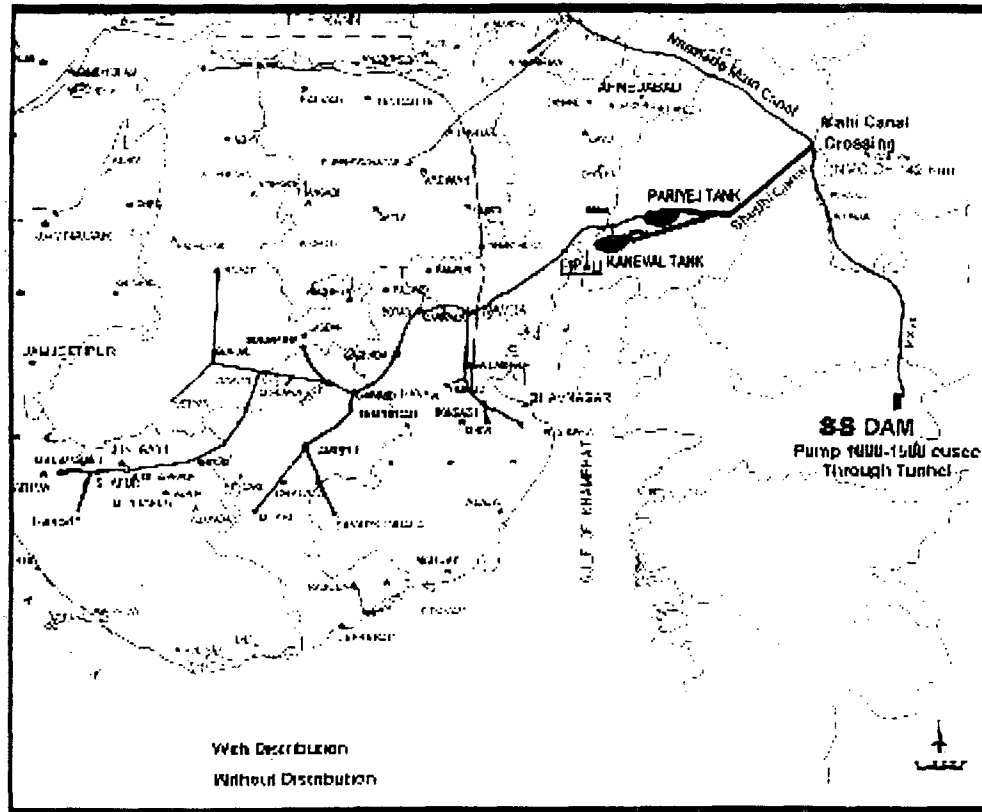
- Saurashtra Branch Canal (SBC) has a capacity of 400 Cumec.
- Vallabhipur Branch offtakes near Dhanki in Viramgam Taluka from SBC.
- Sardar Sarovar Narmada Nigam has agreed to allow drawal of water from canal offtakes as under:

Sr. No.	Canal	Point of drawal	Agreed drawal in MLD		
			Domestic	Industrial	Total
1	Saurashtra Branch Canal	Dhanki	500.99	45.46	546.45
2	Vallabhipur Branch Canal	Navda	620.28	45.46	665.74
		Vallabhipur	418.00	45.00	463.00

- Adequate quantity of water will be available from Narmada Canal offtakes latest by December 2001.
- Canals are being lined by SSNNL – bottom and 1 meter depth on the slide slopes will be completed on priority to facilitate flow for drinking water needs.

Saurashtra Pipeline Project

Project to supply 300 MLD of water to 1697 villages of Ahmedabad (Bhal Area), Amreli, Bhavnagar, Rajkot and Junagadh districts.



- Length - 532 Kms. – Cost Rs. 995 Crores
- Covers Ahmedabad, Bhavnagar, Amreli, Southern Rajkot and Junagadh districts.
- Bulk transmission pipelines to be ready by March 2001.

This pipeline project will be dovetailed and integrated with Narmada Canal Based Drinking Water Master Plan Project and water drawn from Navda and Vallabhipur canal offtakes will be supplied through these pipeline.

Saurashtra Pipeline Project

Bulk water pipelines				
Pipeline Sections	Dia. in MM	Length in Km	Cost in Crores	Target Date of Completion
Pariej - Pipli	2050	52	106.68	01-01-2001
Pipli - Navda	1950	40	89.00	01-01-2001
Navda - Botad	1650	31	57.00	01-01-2001
Navda - Vallabhipur	1550	36	52.60	31-01-2001
Vallabhipur - Budhel (Bhavnagar)	1600	40	61.00	31-01-2001 03 ✓
Botad - Chavand	1950	59	102.68	31-01-2001 ✓
Chavand - Babra - Amreli - Koldapitha	1200/ 600	68	59.00	01-01-2001 ✓
Amreli - Savarkundla	914/ 700	34	21.00	15-12-2000
Amreli - Dhari	600	35	26.00	31-01-2000

**STATEMENT SHOWING THE PHYSICAL AND FINANCIAL STATUS OF RURAL SANITATION PROGRAMME IN GUJARAT STATE
(FROM APRIL'89 TO MARCH'98)**

SR #	YEAR	MNP		CRSP			TOTAL			REMARKS
		PHYSICAL	FINANCIA	PHYSICAL	STATE GOVT.	CENTRAL GOVT.	PHYSICAL	STATE GOVT	CENTRAL GOVT	
1	1989-90	11114 (WB)	187.83	-	-	-	11114	187.83	-	
2	1990-91	12182 (WB)	205.88	-	-	-	12182	205.88	-	
3	1991-92	14721(WB)	248.78	-	-	-	14721	248.78	-	Released fund from GOI
4	1992-93	16168(WB)	273.24	-	-	-	16168	273.24	-	94.370
5	1993-94	10380(WB)	175.42	4621	55.45	49.68	15001	230.87	49.68	49.680
6	1994-95	6955(WB)	117.54	9849	118.19	105.88	16804	235.73	105.88	242.000
7	1995-96	11817	200.05	24683	296.20	265.34	36500	496.25	265.34	105.935
8	1996-97	8288	139.44	21253	255.04	228.47	29541	394.48	228.47	186.435
9	1997-98	5053	85.14	21705	260.46	233.33	26758	345.86	233.33	165.85
	TOTAL	96678	1633.68	82111	985.34	882.70	178789	2618.92	882.70	

UNICEF PROGRAMME
TOTAL

5000
183789

STATEMENT SHOWING FINANCIAL & PHYSICAL ALLOCATION UNDER RURAL SANITATION PROGRAM DURING 1999-2000

SR #	DISTRICT	Total Rural Population	FINANCIAL ALLOCATION (RS. IN LAKH)			PHYSICAL TARGET (LATRINES IN #)		
			Total Financial Allocation During 1999-2000	Out of col 4 Allocation for SCP	Out of col 4 Allocation for TASP	Total Physic Target durin 1999-2000	Out of col 7 Target for SCP	out of col 7 Target for TASP
1	2	3	4	5	6	7	8	9
1	MEHSANA	2291309	129.67	12.97	0	7521	752	0
2	RAJKOT	1330156	75.27	7.53	0	4366	437	0
3	SURAT	1679779	95.06	9.5	15	5513	551	870
	SUB-TOTAL	5301244	300	30	15	17400	1740	870
4	AHMEDABAD	1215127	39.08	3.91	0	2267	227	0
5	AMRELI	982933	31.62	3.16	0	1834	183	0
6	KACHCHH	874650	28.13	2.81	0	1632	163	0
7	KHEDA	2656272	85.44	8.95	0	4956	519	0
8	GANDHINAGA	241773	7.78	0.78	0	451	45	0
9	JAMNAGAR	932716	30	3	0	1740	174	0
10	JUNAGADH	1615483	51.96	5.2	0	3014	302	0
11	DANG	128180	4.12	0	4.12	239	239	
12	PANCHMAHAL	2642916	85.01	8.5	8	4931	493	464
13	BANASKANTH	1942294	62.48	6.25	2.2	3624	363	128
14	BHARUCH	1217317	39.16	3.92	6.11	2271	227	354
15	BHAVNAGAR	1487186	47.84	4.78	0	2775	277	0
16	VADODARA	1761546	56.66	5.67	5.35	3286	329	310
17	VALSAD	1641817	52.81	5.28	7.11	3063	306	
18	S.KANTHA	1575918	50.69	5.07	2.11	2940	294	122
19	S. NAGAR	846149	27.22	2.72	0	1579	158	9
	SUB-TOTAL	21762277	700	70	35	40600	4060	2030
	GRAND TOTA	27063521	1000	100	50	58000	5800	2900

LOW COST SANITATION PROGRAMME IN GUJARAT STATE

As on 31/3/1998

Sr.No.	Period	Name of Deptt./ Nodal Agency	World Bank Aided Programme		UNICEF aided pro- gramme Latrines completed in Nos.	Normal Plan		C.R.S.P.	Total latrines com- pleted in Nos.
			IDA Credit 1280-IN (Urban) Latrines completed in Nos.	IDA Credit 1643-IN (Rural) Latrines completed in Nos.		(Rural) Latrines completed in Nos.	(Urban) Latrines completed in Nos.		
1	2	3	4	5	6	7	8	9	10
1	Year 86-87	G.W.S.S.B.	2055	--	--	--	--	--	2055
2	Year 87-88	G.W.S.S.B.	2382	--	--	--	--	--	2382
3	Year 88-89	G.W.S.S.B.	2302	--	--	--	--	--	2302
4	Year 89-90	G.W.S.S.B.	7946	--	--	--	--	--	7946
		E.S.I., Ahmedabad	--	11114	--	--	--	--	11114
5	Year 90-91	G.W.S.S.B.	8714	--	--	--	--	--	8714
		E.S.I., Ahmedabad	--	12182	--	--	--	--	12182
6	Year 91-92	G.W.S.S.B.	7472	--	--	--	--	--	7472
		E.S.I., Ahmedabad	--	12706	--	--	--	--	12706
		PWS, Dumiyani	--	2015	--	--	--	--	2015
		Nutan Bharti	--	--	2752	--	--	--	2752
		MACT, Keshod	--	--	595	--	--	--	595
7	Year 92-93	E.S.I., Ahmedabad	--	11865	--	--	--	--	11865
		PWS, Dumiyani	--	4303	--	--	--	--	4303
		Nutan Bharti	--	--	248	--	--	--	248
		MACT, Keshod	--	--	1185	--	--	--	1185

8	Year 93-94	E.S.I., Ahmedabad	--	10380	--	--	2582	1792	14754
		PWS, Dumiyani	--	--	--	--	--	2829	2829
		MACT, Keshod	--	--	220	--	--	--	220
9	Year 94-95	E.S.I., Ahmedabad	--	6145	--	--	6136	6921	19202
		G.W.S.S.B.	--	--	--	--	62	--	62
		PWS, Dumiyani	--	--	--	246	--	1902	2148
		S.R. Sam, Rajkot	--	--	--	188	--	257	445
		G.R.G.V. Sangh	--	--	--	347	--	293	640
		Bhal Kantha	--	--	--	29	--	317	346
		Anand Nik. Ash.	--	--	--	--	--	159	159
		NASA Foundation	--	--	--	--	150	--	150
10	Year 95-96	E.S.I., Ahmedabad	--	--	--	8114	9215	18621	35950
		PWS, Dumiyani	--	--	--	175	--	1611	1786
		S.R. Sam, Rajkot	--	--	--	1846	--	1552	3398
		G.R.G.V. Sangh	--	--	--	1019	--	1458	2477
		Bhal Khantha	--	--	--	167	--	505	672
		Anand Nik. Ash.	--	--	--	227	--	792	1019
		NASA Foundation	--	--	--	--	1405	--	1405
		Janpath, Ahmedabad	--	--	--	269	--	144	413
11	Year 96-97 (Upto 03/97)	E.S.I., Ahmedabad	--	--	--	5747	--	17875	30973
		PWS, Dumiyani	--	--	--	23	1974	1748	3745
		Nutan Bharti	--	--	--	914	565	1630	3109
12	Year 97-98 (Upto 03/98)	E.S.I., Ahmedabad	--	--	--	503	1795	10396	12694
		Lok Niketan	--	--	--	597	333	1597	2527
		S.R. Sam, Rajkot	--	--	--	2636	855	2614	6105
		G.R.G.V. Sangh	--	--	--	87	231	565	883
		PWS, Dumiyani	--	--	--	338	884	3579	4801
		V.L.K.M.	--	--	--	372	1234	2005	3611
		MSK GVS, Khedbrahma	--	--	--	520	--	949	1469
			30871	70710	5000	25968	33168	82111	247828

GUJARAT						
Physical Progress						
Year	C R S P		M N P			
	Target	Achievement	Target	Achievement		
1985-86	--	--	--	--		
1986-87	1200	--	--	--		
1987-88	560	--	560	--		
1988-89	1148	--	0	--		
1989-90	502	2060	5300	9054		
1990-91	1245	9530	11852	2731		
1991-92	4977	8520	25000	13568		
1992-93	2489	0	15000	13502		
1993-94	5367	4621	15000	10600		
1994-95	12500	3438	12500	3756		
Total	29988	28169	85212	53211		
Financial Progress						
Year	C R S P		M N P			
	Allocation	Release	Expend.	Provision	Expend.	
1985-86	--	--	--	--		
1986-87	29.500	15.000	29.500	--		
1987-88	61.000	7.000	61.000	7.00		
1988-89	56.440	0.000	56.440	0.00		
1989-90	49.800	0.000	29.000	40.00	67.22	
1990-91	49.800	20.000	129.060	100.00	200.00	
1991-92	99.540	0.000	100.000	8.00	205.78	
1992-93	47.370	52.370	0.000	300.00	302.00	
1993-94	71.010	35.505	105.130	300.00	198.49	
1994-95	142.000	71.010	78.210	400.00	64.50	
Total	606.460	200.885	588.340	1155.00	1037.99	

Gujarat: WatSan Coverage

1998

Households with a toilet: Rural: 20 %
Urban: 79 %
Total: 37 %

Households taking d/water from tap or handpump:
Rural: 78 %
Urban: 98 %
Total: 84 %

Source of Information: National Sample Survey, 54th round

PROFILE OF SAMPLED VILLAGES

S. No.	VARIABLES	TOTAL
1.	Total Population	26,91,401
2.	Average Size of a Village Population	2,242.83
3.	Total No. of Households	2,57,530
4.	Average No. of Households in a Village	214.60
5.	Households Having their Own Water Sources	No. 76,595
		% 30.0
6.	Households Having their Own Latrines	No. 51,513
		% 20.0

Districts - 60


Villages - 1,200

PROFILE OF GUJARAT

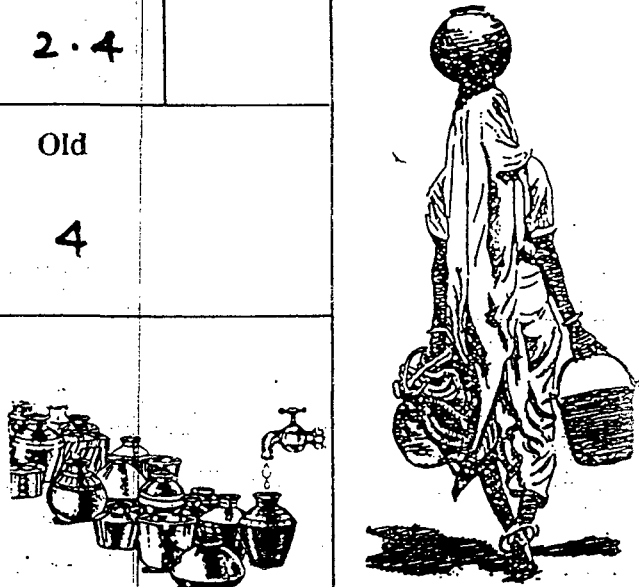
(1)

(DRINKING WATER, HEALTH & HYGIENE HABITS, LATRINE FACILITIES IN % age)

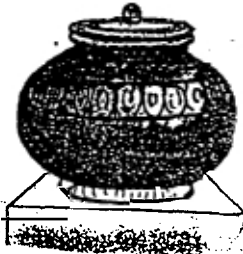
I. DRINKING WATER

Sources of Drinking Water	Tap	HP	Sani. Well	Open Well	Lake	River/canal	Pond	Spring	Rain harvesting	
	48	28	15	9	0	5	1	0	0	

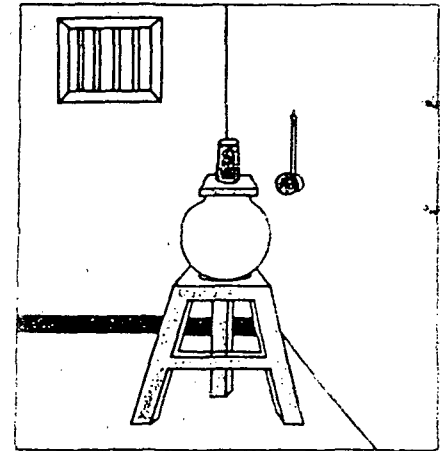
II. Private Water Sources


Private Water Sources	Tap	HP	Sani. Well	Open Well	Others	Total	
2. Private Water Sources	25.7	6.5	2.2	2.6	2.4		
3. (a) Who Fetches Water	Adult (F) 69	Adult (M) 2	Child (F) 0	Child (M) 1	Old 4		
(b) Distance	0-500mtrs 75	500-1k.m. 4	1-1.5km 1	1.5 k.m.+ 1			
(c) Quantity of Water fetched	1.50ltrs. 19	50-100ltrs. 27	100-200ltrs. 34	200 ltrs.+ 16			

(6)

(d) Sotrage of Water	Metal Pots	Earthen Pots	Plastic Pots	Cement Tank	Metalic	Bucket	
	6	50	0	0	39	0	

(e) Cleaning of Sotrage Vessels	Water	Water & ash	Water & Soap
	46	8	9
(f) Covering of Storage Vessels	Always	Mostly	Sometimes
	84	11	2



(g) Purification	Cloath filter	Chlorine filter	Candle	Boiling	Alum	Seeds	
	93	4	2	0	0	0	

(h) Adequance of Water throught Year

II. HEALTH & HYGIENE HABITS

1. <u>WASHING HANDS</u>	Water	Water & Soap	Water & Ash	water & Sand
a. Before Eating	93	2	0	0
b. Before Feeding Child	53	1	0	2
c. After Defecation	29	21	14	23



2. <u>DEFECATION PRACTICES</u>	Wash	Wipe	Wipe & Wash	
	a. After Defecation	91	1	4
b. Hands are washed with	Water	Water & Soap	Water & Ash	Water & Sand
	37	25	16	26



3. <u>REASON FOR WASHING HANDS</u>	Tradition	Removes dirt	Protection against diseases
	15	75	16

III. DISPOSAL OF WASTE WATER

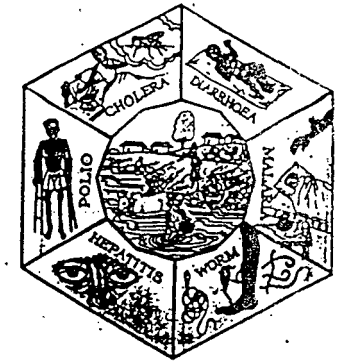
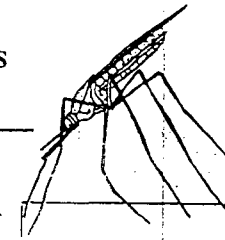
1. <u>Disposal</u>	Soak Pit	Open Pit	On the street	In Backyard	In drain connected with main	In drain ending in open
	9	16	46	24	5	3



2. <u>Perception of Safe Method of Disposal</u>	Kitchen Garden	Soak Pit	Open Pit	Drain	Do not Know
	13	15	11	24	6



3. <u>Stagnant Water Causes</u>	Spread diseases	Causes inconvenience	Smells Bad	Breeds Mosquitoes
	36	4	37	67



GUJARAT

IV. SICKNESS PROFILE %

1. Pain/ Headache 4.6

2. No of illness episode	One	Two	Three +
	55	21	23

3 Treatment 95

4. Expenses	up to Rs. 500	Rs. 500 +
	75	23

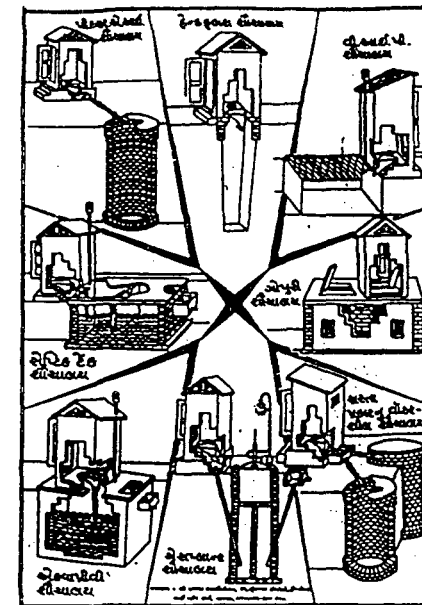


5

6

V. PRIVATE LATRINES

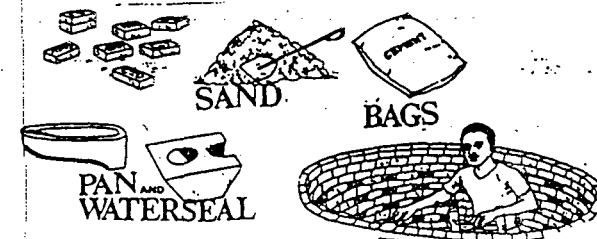
1. PRIVATE LATRINE	Service Dry	Septik Tank	Single Pit	Double Pit
	0.1	1.5	4.7	1.3
2. WHEN CONSTRUCTED	Last yrs.	2-5 yrs.	5-10 yrs.	10+ yrs.
	33	24	11	18



3. WHO MOTIVATED	Family member	Neighbour	Elected panchayat member	Govt. official	Self	
	4	0	0	10	62	
4. WHAT MOTIVATED	Subsidy	Convenience	Cleanliness	Privacy	Status	Old Age
	1	25	2	15	0	4



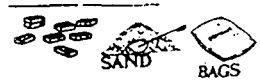




5. COST OF CONSTRUCTION	Upto Rs.3000	Rs. 3000-5000	Rs. 5000 +
	27	19	39



GUJARAT

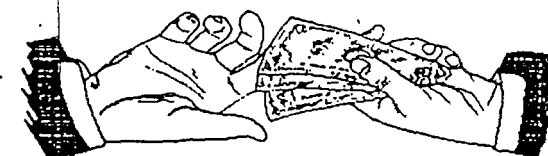
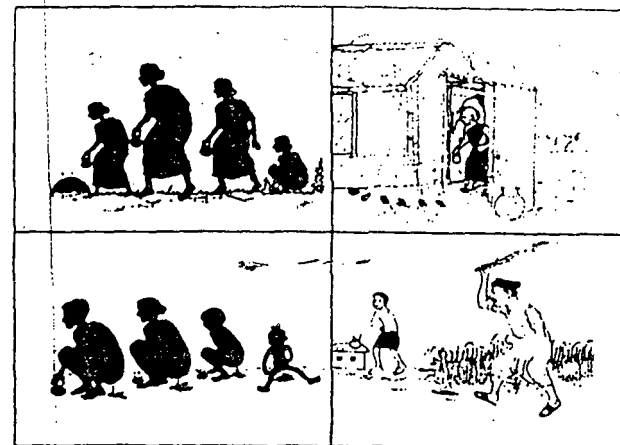
(7)

<p>6. UNDER WHICH SCHEME</p> 	<p>IRDP</p> <p style="text-align: center;">1</p>	<p>JRY</p> <p style="text-align: center;">2</p>	<p>I. AWAS YOJNA</p> <p style="text-align: center;">3</p>	<p>UNICEF</p> <p style="text-align: center;">1</p>	<p>NONE</p> <p style="text-align: center;">4</p>
<p>7. SUBSIDY RECEIVED</p>	<p>Upto Rs. 2500</p> <p style="text-align: center;">77</p>	<p>2500-5000</p> <p style="text-align: center;">1</p>	<p>Rs. 5000 +</p> <p style="text-align: center;">0</p>		
<p>8. MATERIAL USED</p> 	<p>Bricks</p> <p style="text-align: center;">79</p>	<p>Stone</p> <p style="text-align: center;">15</p>	<p>Mud</p> <p style="text-align: center;">0</p>	<p>Roof</p> <p style="text-align: center;">83</p>	<p>Door</p> <p style="text-align: center;">93</p>
<p>9. WHO USED</p>	<p>All</p> <p style="text-align: center;">94</p>	<p>Female</p> <p style="text-align: center;">0</p>	<p>Children</p> <p style="text-align: center;">1</p>	<p>Old</p> <p style="text-align: center;">1</p>	
<p>10. WHO CLEANS</p>	<p>Sweeper</p> <p style="text-align: center;">6</p>	<p>Female member</p> <p style="text-align: center;">76</p>	<p>Male member</p> <p style="text-align: center;">6</p>		

VI. FELT NEED FOR LATRINE

GUJARAT

REASON FOR NEED	Better Health	Privace	Convenience	Old age	
	21	34	52	23	
REASON FOR NOT HAVING LATRINE	Cant afford	Non availablity of materal	No knowledge	No Subsidy	Problem smell & disposal
	80	1	12	25	0
WILLINGNESS OF SPEND	Upto Rs.500	Rs.500 to 1000	Rs.1000 to 3000	Rs.3000 +	
	67	16	6	0	
REASONS FOR NOT FEELING THE NEED OF HAVING LATRINE	Smell	Open difecation better	Problem of resource	Problem of space	
	5	68	3	1	



Slum Networking: an alternative way to reach the urban poor - Himanshu Parekh

Introduction

The policies and programs targeted to the urban poor in India ever since independence have failed to produce any significant impact. The slums have proliferated in our cities and recent studies by Unicef have shown that the quality of life of our urban poor is now worse than their rural counterparts. This paper questions the patronising approach of branding development as 'pro-poor', together with the all the platitudes that follow, instead of dealing with the issues as a matter-of-fact consequences of normal urban development. If cities have slums, it is not a 'slum' problem but a 'city' problem, and it is necessary to get away from solutions which draw apart the urban poor rather than assimilate them. The paper contends that the slums are not liabilities but, instead, opportunities for transforming our cities. It also argues that resources are not a constraint. Hence, it follows that instead of the cliches of 'pro-poor' development, a holistic and a businesslike approach at city level will automatically focus on its distressed areas as top priorities. The paper makes recommendations for this new approach and describes the practice of 'Slum Networking' developed by the author which attempts to demonstrate some of its concepts.

An Alternative Approach

In the last fifty years the urban development policy in India has changed significantly. From the 'provider' of subsidised housing to the urban poor in the post-Independence decade of the fifties, the government increasingly sees itself as a 'facilitator' in a much wider sense in its present approach.

On the failure of the public sector to deliver appropriate housing at affordable rates using the technological paradigm, the emphasis has now shifted to enabling measures such as the improvement of urban infrastructure, development of serviced land, clearing of administrative and legal bottlenecks, development of small and medium towns, strengthening of local bodies, promotion of new financial institutions and implementation of socio-economic programs for the urban poor.

The policies with regards to slums have also shifted from clearance and rehousing to upgradation and assimilation. Parallel programs of "sites and services" have been introduced to make new serviced plots available to the Economically Weaker Sections (EWS) in order to meet the additional demand. Physical programs like Environmental Improvement of Urban Slums (EIUS) and Low Cost Sanitation (LCS) are complemented by social welfare and income generation schemes such as Urban Community Development (UCD), Integrated Child Development Scheme (ICDS) and Nehru Rojgar Yojna (NRY).

In 1991, Urban Basic Services for the Poor (UBSP) was launched to supersede the previous social welfare schemes so as to bring functional integration between the physical inputs of EIUS and the economic support of NRY as well as to encompass new social concerns. It aimed to achieve this by organising the communities to assess their own needs, initiate development and be active partners in the development process. At the same time, a comprehensive and integrated convergence of all related programs was envisaged to maximise the benefits and target them specifically to match the needs of the poor. For active community participation, UBSP was complemented on the legislative front by the enactment of the 74th Amendment to the Constitution which aims to devolve decision making power to the ward level committees. However,

well before the UBSP structures were established, it was absorbed into a new Prime Minister's Urban Poverty Alleviation Programme which in turn was superseded by the present programmes. Now, it is proposed that yet another National Urban Slum Policy be formulated. It appears that 'urban poverty' has become a political football and we lack both the consistency and long term stability in the manner in which we address the issues.

In a way, the pendulum has swung the other way. From physical works, the shift is now towards 'poverty alleviation'. Whilst this swing towards the softer development is understandable, practical experience is already putting in doubt the efficacy of this approach. This is principally because community development measures such as health, education and income generation are only effective at a superficial level unless underpinned by massive national investments in those sectors and supported by major shifts in micro/macro economic policies, land reforms, budget allocations and alternative structures of governance. Under these circumstances, evidence is emerging that of the four principle areas of intervention for the urban poor (health, education, income generation and physical infrastructure), the last is producing the quickest, most tangible and cost effective turn around in all indicators of poverty. Where slum infrastructure has been improved, economic and social indicators have automatically improved substantially in periods of just a couple of years i.e. far faster than using the other mechanisms of intervention. Thus whilst budget allocations to health and education must increase in the long term, this should not happen at the expense of expenditure on the physical infrastructure.

There is a growing understanding of the crucial role of the cities to national prosperity and the consequential impact on poverty alleviation. In India, the 27% urban population generates over 50% of the National Domestic Product. Thus, in preference to containing urban growth, the focus is shifting to harnessing the urbanisation process so as to achieve both greater productivity and equity of distribution between the rich and poor. Comprehensive development of urban infrastructure is considered to be the key tool for realizing this twin goal. At a macro level, this stimulates economic growth, which in turn percolates to all citizens, whilst at a micro level, the access to better services alleviates the daily hardships of the poor. If every city has an audit of the quality and reach of its infrastructure and prioritises its development according to worst distresses, not only would the city as a whole improve but the poorer areas would automatically see greater investments.

The most recent trends have been in the direction of liberalisation and globalisation with greater participation of the private sector in the planning, execution and operation of projects. Together with that, the importance of creating new financial instruments to service the needs is also realised. However, the attitude of "liberalisation" in urban affairs has yet to transcend beyond policy discussions.

The above changes in perceptions and policies have in the past not been reflected adequately in the national Plans. Before the Seventh Plan, the main preoccupation in the urban sector was to meet the increasing gap between housing supply and demand. The public sector was expected to play a direct role in meeting the shortfalls. The emphasis was on "low-cost" technologies to bridge the gap between the high costs and low affordabilities.

A major change in direction was augured by the National Commission for Urbanisation which recognised the futility of government supplied mass housing for all. It stressed more on enabling measures and laid a special emphasis on the poor. The urban sector was opened out to embrace new legislative, administrative and fiscal mechanisms to

deliver results. Development of urban infrastructure, particularly water and sanitation, was seen as one of the key issues. The Seventh Plan reflected many of these concerns. However in the allocation of budgets, the concepts were diluted significantly.

The Eighth Five Year Plan (1992-97) clearly sees Indian cities as the engines of economic growth and views the ensuing infrastructure deficiencies with greatest concern. The plan recognizes the strong linkages between physical, infrastructural, environmental, social, health, educational and economic developments in relation to urban poverty and urban degradation. At the same time, it envisages greater participation of the private sector and communities in the process of development. However, the stated policy objectives are yet to translate into tangible results. The two major impediments are that, firstly, the legislation has not gone far enough to facilitate urban regeneration, and secondly, there is a reluctance on the part of the Government to boldly cut loose from its interventionist and ambivalent legacies. The Ninth Plan has not yet managed to achieve this, and it is time now for some bold actions. The Rent Control Act, designed to offer tenurial security, and the Land Ceiling Act, to provide affordable urban land for the poor, have not only starved the cities of shelter and land but in the bargain encouraged widespread malpractices and corruption. These counterproductive legislations are, nevertheless, retained for political expediency. The argument often is that these legislations are quite good but they are not properly enforced. However, experience in other countries has also shown that in spite of best efforts, these constraining legislations do not work. The Land Use Act of Nigeria, like the Land Ceiling Act, has failed to release cheap urban land for development. Similarly, the 74th Amendment to the Constitution to empower the people does not have commensurate legal teeth to mobilise and control resources at the micro scale.

It has long been recognised that secure land tenure is perhaps the best stimulant for investments in housing and infrastructure by the slum dwellers themselves. In an environment of resource constraints, any lever that mobilises self-help of the communities is of great value. In the states of Madhya Pradesh and Andhra Pradesh where progressive frameworks exist, the improvement has been marked. Many other states in India do have notification procedures for intervention in slums. However, these are limited in scope. The time is ripe for legislation which gives unequivocal tenurial right to all slum dwellers irrespective of the location of settlements or the length of occupation. Desperate circumstances call for equally desperate remedies.

State agencies such as Slum Clearance Boards, Housing Boards, Water Supply and Sewerage Boards, Public Works Departments etc. have not proved to be the most efficient, competent or sensitive instruments of implementation. At the city level, the Municipalities and Development Authorities monopolise the scene in the same manner. To ensure that these authorities fulfil their obligations, a minimum quality of life should become a basic right of a citizen and at the same time agencies should be held accountable for its implementation. There is no reason why the services provided by the authorities, or the lack of them, should not be brought under the purview of the Consumer Protection Act.

Many countries have successfully transferred the execution and management of public housing and utilities to the private sector. India needs to emulate these precedents and enact suitable legislation to open the doors of the public sector works to private enterprise. At the same time, the constraints on government agencies should be removed so that they can compete against the private sector on a level playing field. Ideally, the best framework would be the one which encourages partnership between the government, private sector and the communities.

The importance of the 'enabling' legislations above cannot be overemphasized. Without them, the government will continue to retain a stranglehold over urban development and undermine its professed role of a 'facilitator'. The legislation in turn has to be buttressed by appropriate executive actions. The greatest need at present is to mobilise finance and channel it into the urban sector. Attempts have to be made to raise capital from the open market. Dedicated apex and intermediate banks have to be formed to provide finance to all the actors of urban development, namely, the local authorities, the private sector, the communities and NGOs. The present rules for lending to the poor have to be relaxed to replace securities by peer pressure and to make repayments more flexible. Gramin Bank in Bangladesh and SEWA Bank in Ahmedabad are good role models. To reinforce the multipartite approach, the right to plan, manage and connect into the municipal services must be extended to the private sector and to communities. However, it should be noted that the concept of 'public/private partnership in practice has not shown many tangible results because of the very difference in their cultures, and it may even be worth creating an environment where they actually compete, but on a level playing field.

The scarce public resources have to be deployed more imaginatively and judiciously. The share of the urban sector was a paltry 3.3% of the total Eighth Plan outlay. The resource base can be significantly increased by converging the budgets allocated to urban development with those expended by the states and the central government for poverty alleviation, health, education and other programmes, spanning across all concerned ministries and departments. The local authorities have to revise their rate structures to match the outlay and also find new instruments for raising finance. At the same time, superfluous expenditure has to be ruthlessly pruned. For example, substantial public resources are still poured into housing, ostensibly for the needy, although the past experience has shown that a large proportion of these do not reach the target groups. In any case, both in terms of the costs and quality, the performance is far from satisfactory. Similarly, whereas most towns and cities in India do not have even the rudimentary sewerage and storm drainage, grants under Integrated Development of Small and Medium Towns (IDSMT) were dissipated on relatively peripheral expenses such as construction of ring roads and building of shopping arcades. The budgets for water and sanitation sectors are also wasted on uneconomic and grandiose schemes which are not affordable to users.

Clearly, instead of spreading public resources too thinly across a large spectrum of activities, they should be focused on enabling measures such as research, planning, documentation and dissemination, creating appropriate financial and banking structures and setting up venture funds for promoting and replicating innovative practices and projects. Development strategies, such as Slum Networking described here, which are holistic, cost effective, sustainable and community sensitive partnership ventures are at present few and far between. The government should identify such innovative practices and promote them, even at the risk of occasional failures.

The most important change in the mindset is to stop seeing slums as separate entities from the rest of cities, and to deal with them with special 'pro-poor' programmes, aids and grants. The sooner they are seen as a normal fabric of the city with conventional infrastructure and support systems reaching them through good governance, the faster they will be assimilated into the urban fabric. The best attitude of the present development and aid agencies would be to promote

actions whereby their existence becomes dispensable. This involves moving away from the clichés of development (community making informed choices, demand driven, affordability, community empowerment and management, institutional strengthening, institutionalising good practices, low-cost technologies, experts, participatory learning, good governance, NGO and voluntary actions, poverty alleviation, public/private partnerships etc. etc..) to having a much more businesslike attitude to development strategies they support. Recent pilot projects have shown that the urban 'poor' can in fact mobilise huge resources and the charitable attitude to them has to be replaced by the approach which increases their self-sufficiency and dignity in such a manner that they do not become a group apart to be pitied.

Principal Thrusts

- ◆ Focus on the urban poor, not in isolation, but as a function of the city.
- ◆ Development of urban infrastructure as a whole with emphasis on distress areas.
- ◆ Removal of legal and administrative constraints to development.
- ◆ Greater private sector and community role in planning, implementation and management.
- ◆ Facilitation of alternative resource mobilisation mechanisms.
- ◆ Basic minimum infrastructure to be made a citizen's right.

Recommendations

- ◆ Scrap the Urban Land Ceiling Act.
- ◆ Scrap the Rent Control Act with adequate safeguards for a short transient period.
- ◆ Change building bye-laws to permit shelter planning and infrastructure development by communities and the private sector. Enshrine their right to plan, execute and connect to municipal services.
- ◆ Link municipal tax structure with the actual costs of providing services.
- ◆ Promote secure land tenure for all slum dwellers.
- ◆ Scrap resource allocations to IDSMT, Housing and other superfluous capital intensive measures.
- ◆ Review organisations such as Slum Boards, Housing Boards, PWD, Water Supply and Sewerage Boards, Road and Building Works, Pollution Control Boards etc. These have lost their cutting edge and are no longer efficient or innovative. Either let the private sector take over or turn them into independent entities with no government interference or support so that they have to survive on merit.
- ◆ Make the 74th Amendment effective with commensurate resources.
- ◆ Avoid a plethora of overlapping and contradictory development measures.
- ◆ Avoid frequent changes in the policy directions with a succession of 'poverty alleviation' programmes which lack continuity.
- ◆ Open up public and municipal infrastructure sectors to the private sector.
- ◆ Make access to basic urban infrastructure a citizen's right and bring public services under the Consumer Protection Act.
- ◆ Promote multipartite partnerships of the communities, private sector, finance institutions and the local and state governments.
- ◆ Do not frame policies which assume that the urban poor cannot generate huge resources.
- ◆ Identify professionals as well as NGOs with a proven track records and encourage them to initiate and execute major urban development programmes related to the poor. However, understand the limitations of NGOs and do not use them as

substitutes for good governance.

- ◆ Use Plan resources as well as bilateral aid as catalytic levers to facilitate the above changes instead of as charitable grants.
- ◆ Create Venture Funds to promote innovative ideas.
- ◆ Promote financial instruments and banks (preferably private sector) dedicated to the urban poor (eg SEWA).
- ◆ Promote infrastructure and environmental audit of cities.
- ◆ Support solutions which tackle slum problems within the context of the whole city. Avoid 'slum' solutions such as public latrines and common handpumps. Avoid clichés of development.
- ◆ In the short term, reaffirm the importance of tangible physical infrastructure development instead of spreading resources on all embracing multi-activity interventions.
- ◆ In the long term, plan investments in the education and health sectors.

Slum Networking: using slums to save cities - experiences from Gujarat and Madhya Pradesh - *Himanshu Parekh*

Introduction

Rapid urbanisation has led to an alarming deterioration in the quality of life of the city dwellers. Our cities suffer from infrastructural deficiencies, poor sanitation and solid waste disposal, water shortages, water-logging in monsoons, poor transportation and congested roads. The urban environment has deteriorated with dust and air pollution, depletion of green areas and polluted natural water courses. The slums have proliferated. Inadequate support for social and economic development of the disadvantaged communities has led to growing illiteracy, deteriorating health care and frequent epidemics. The aggregate impact of distress is specially debilitating for the urban poor living in slums. Women and children bear the worst brunt as they continuously manage their daily lives and chores in this environment.

It is taken for granted that in cities of developing countries, environmental degradation, strained service infrastructure, and the growth of slums are inevitable. The policy makers are often conditioned into the 'poverty syndrome' in which the problems are perceived to be too overwhelming in terms of scale and complexity in relation to the resources available. The concept of Slum Networking does not accept that constraints, both physical and financial, are insuperable. It is underpinned by a fundamental belief that slums need not exist in India, and this massive transformation can be achieved in a short time span. This confidence is based on the lessons learnt from the Indore Habitat Project and on the subsequent evolution and replication of Slum Networking in pilot slums of the cities of Baroda and Ahmedabad.

Slum Networking is an innovative concept which exploits the linkage between the slums, natural drainage paths which influence urban infrastructure and the environmental fabric of the city. Thus slums, instead of being resource-draining liabilities as in the conventional developmental approach, actually become opportunities of a quantum change in the infrastructure levels and environmental quality of the city. Slum Networking is an initiative driven primarily through community control. In a holistic frame which converges scales, activities, agencies and resources. It exploits the slum fabric in the context of the total city for sustainable and cost effective improvement in the quality of life of its people as a whole.

Strategy

Slum Networking has some unique facets which lock together to make it an enduring and replicable development mechanism. The main features are that the approach is holistic in the context of the city, costs reduce significantly, substantial human and material resources are mobilised and converged, community control increases and the overall quality of life improves with an integrated mix of physical, educational, health and economic activities.

All cities have strong natural drainage paths. Without these, villages and towns would drown in their own waste long before they ever grow into cities. The paths are nature's own means of disposal and, if properly exploited, also become ideal routes for manmade urban infrastructure systems of sewerage, storm drainage, water supply and roads. The environmental skeleton of city greens and water bodies also lies on the same paths. Studies of several cities in India and in other parts of the world shows that slums are consistently located along these natural paths. Once this connection between

slums, urban infrastructure and environment is clearly understood, it is easy to see how slums can be used to transform cities.

The slum fabric is seen in the context of the whole city and interventions proposed are mutually beneficial to the slums as well as the rest of the city. The objective is not to find solutions unique to the slums but, instead, explore the commonality between the slums and the better parts of the city in order to integrate the two. As slums are not causes of urban degradation but the consequences of distorted development, the solutions likewise must treat the slums as mere symptoms and use them to work back into the city fabric to the origins of the problems.

Physically, Slum Networking is an integrated upgradation of the entire city using slums, not as isolated islands but an urban net. The spatial spread of slums over a city together with contiguity between slum settlements gives an opportunity to strengthen the city level infrastructure networks. There is a close correlation between the slum locations and the natural drainage paths of a city. This again helps to build up low cost service trunks, particularly for gravity based systems of sewerage and storm drainage, together with environmental improvements such as creation of fresh water bodies, cleaning up of polluted rivers, development of green pedestrian spines and restoration of waterfront structures. The slums naturally benefit from the improved city level support. For the city too, the slums offer opportunities of change through this symbiotic process.

Unconventional concepts such as topography management, earth regradation and constructive landscaping are introduced. These coupled with the locational attributes of the slums with respect to the water courses and the marginal lands have certain ramifications. The natural water courses and low lying areas tend to form nuclei around which slums cluster. By sensitive treatment of these lands several advantages are possible.

First, areas prone to flooding and water-logging can be lastingly improved by earth regrading at marginal costs. For example, a storm drainage system for Baroda, planned to alleviate the frequent flooding in the city, needed over Rs500 million and the proposals are lying on the shelf for want of funds. And yet there is already a natural drainage system permeating deep into the city which can be activated with nominal efforts to relieve the flooding. The cost implications of the latter are only Rs40 million.

Secondly, the natural drainage paths are the most efficient routes for gravity-based city drainage, with the added advantage that the problems of land acquisition and demolition normally encountered in built up areas during installation are avoided here. In Indore (Madhya Pradesh), just by providing the missing links between the slums, it was possible to build up city level sewerage at costs less than half those for the conventional system proposed by the Public Health Engineering Department. This in turn intercepted the sewage from polluting the water bodies and paved the way for creation of water bodies and gardens around them.

The integration of both the scales and the activities intrinsic to Networking opens up exciting possibilities missing in other development strategies. Many solutions at first thought unviable at the micro level become quite economic. A comparative study for Indore showed that the cost of house-to-house piped sewerage by networking was about Rs1500 per family for the lines and Rs1000 for the off-site collection and treatment. Against this, the cost of a shared UNDP twin-pit latrine, often considered to be 'appropriate' for developing countries, worked out at about Rs2500 per family. Whereas the sewers also take care of foul waters from kitchens and bathrooms, UNDP latrines do not. The additional advantages of the networked sewers were, firstly, that

all the families had individual facilities and, secondly, that the families other than in slums could also be connected to the same system without recurring the off-site costs - i.e. the cost per family decreased as the contributing families increased. In an extension of the concept to the micro level, coordinating the roads, storm drainage and sewerage to natural gradients in each settlement results in better function and economy. As far as possible, all roads are placed in cut and have positively downward slopes from high points to the water courses. The surface cleanliness of the margins is achieved with grading and soft landscaping instead of expensive paving. The service infrastructure is simplified and modified so that individual services (instead of shared facilities) can be offered to slum families at low costs. Thus, the communities can participate in the execution of the works as they have the best knowledge and sensitivity of their surrounding environment. At the same time, the maintenance burden is reduced and can be shifted from the local government to individual householders.

The strategy prescribed requires sensitive and intense participation of the public in the development process through self-help. An iterative design process is adopted in joint consultation with the community. This not only prepares the communities for the changes to come but also increases their willingness to pay for and to maintain the systems. NGOs play an active role in motivating the communities, mobilising resources from the slum dwellers and converging the efforts of the people with inputs from the local government and business community. The mechanisms evolved for community interaction are equally gainfully extended to health, education and income generation programmes. The net effect is a holistic development which changes the functional, physical, socio-economic and environmental qualities of a city at a fraction of the cost of the conventional approach.

Impact

As per the 1991 census, the population of Indore city was 1.25 million out of which slum dwellers accounted for 0.35 million. The slums in Indore were characterised by overcrowding, dilapidated housing, unhygienic conditions, grossly inadequate basic amenities, unplanned layouts and poor accessibility. These areas housed economically weaker sections of the community often engaged in casual service occupations. According to a 1990 survey, over two thirds of the slum families in Indore lived below the poverty line. On average 40% of slum dwellers were illiterate, with the female illiteracy rate as high as 53%. A large proportion of persons reported being sick within the fortnight before the survey. In addition to the working days lost, about 8% of monthly income was reportedly spent on medical expenses.

In a project executed by the Indore Development Authority and financed by the Overseas Development Administration (UK), the Slum Networking concept has been demonstrated successfully. Over a period of six years, the slum matrix of Indore covering 450,000 persons has been upgraded with quality environmental and sanitation improvement together with extensive community development programmes related to health, education and income generation. The quantum of physical work in each slum pocket may be small but, as seen in the following table, the aggregate impact on the city as a whole is high.

Most development alternatives designed for urban poor rarely transcend beyond slum boundaries. In contrast, as a byproduct of Slum Networking, Indore now has 90 km of piped sewer mains installed in non-slum areas in a city which, until recently, had no underground sewerage to speak of. As a result, the polluted rivers of the city are being converted to fresh water lakes in stages and associated with that, the historical riverside structures are restored and new pedestrian greens formed. A recent study

Total length of new roads	360 km
Total length of new sewer lines	300 km
Total length of new storm drains	50 km
Total length of new water lines	240 km
New trees to be planted	120,000
Total area of grassing/shrubbing	500,000 sqm
New community halls	158

has shown that the quality of water in the wells around these areas has improved. Out of the 360 km. of roads provided in slums, about 80 km. on the slum peripheries were linked up at the city level to reduce the traffic congestion on the existing trunk roads. Similarly, the storm drainage runs in the slums were placed in such a manner that large areas of the remaining city were also relieved of flooding.

A mid-term evaluation of the Indore project showed that 79 neighbourhood committees had already registered under the Societies Registration Act and 70 youth clubs formed. Many slums were heading towards full literacy, frequency of epidemics had dramatically reduced and incomes, particularly of women, were increasing. The costs of improvements in Indore slums are a fraction of those of conventional methods and the benefits extend well beyond the slum fabric.

The soft underbelly of the Indore project is that it is financed from a grant. The replicability value of the work can, therefore, be questioned. Further, bilateral grants are normally channelled through government structures. Hence, in spite of all intentions, the project is eventually delivered by the agency and not executed by the community. Community participation cannot be sustained without commensurate responsibilities, controls and financial commitments of the people.

Baroda is a city similar in size to Indore and with equally pressing problems. In 1992, under the banner of 'BARODA 2000', integrated upgradation of the entire slum matrix of Baroda was planned together with corresponding improvements in the environment and infrastructure at the city level. Baroda represents a critical step in the evolution of Slum Networking. Having demonstrated at Indore that complex and large scale urban renewal programmes can be sensitively executed, it was necessary in Baroda to move towards self-sufficiency and also a greater degree of community control over the programme. Hence, it was agreed that 50% of the resources for slum level works be mobilised internally and that the development, both physical and socio-economic, be undertaken through the community medium with intermediation of NGOs. To test the methodology, it was decided to take up the programme in two phases, starting with a pilot in the Ramdevnagar slum of the city.

In this pilot project covering 4,000 persons, Rs2.2 million have been mobilised by the slum dwellers themselves with a matching support from Unicef, Baroda Municipal Corporation and local industry. The initiative has been taken up jointly by the Baroda Citizens Council, a highly reputed NGO, and the author, an engineer specialising in slum upgradation and urban infrastructure. The status of slum dwellers is that of the 'clients'. They not only determine the nature of development but also play an active role in the execution process and the subsequent maintenance of the assets. The role of the external funding agency has shifted from that of a 'benefactor' to a 'catalyst'. Ramdevnagar explodes the myth that slum dwellers are not willing or able to contribute towards their own development.

Compared to Indore and Baroda, Ahmedabad is a larger city with a population of

over 3.3 million out of which about 1.5 million live in slums. Here, the Slum Networking approach has been taken one stage further by replacing external aid with contributions from the city's industries so as to augment the resources generated by the slum dwellers and the Municipal Corporation. The framework for the multi-partite contribution of the community, local economic forces, Municipal Corporation, NGOs and professionals is now established. A pilot project at Sanjay Nagar slum in the industrial heart of the city has already been successfully executed.

The Ahmedabad project was again initiated by the author and has been a joint effort between the communities living in the slums, Ahmedabad Municipal Corporation and Arvind Mills Ltd, a major industrial house. They jointly determine the development and also share the costs. Local NGO 'Saath' and professionals are involved as intermediaries. The implementation mechanism proposed in Ahmedabad combines the strengths of all the participating parties with roles varying according to nature and scale of the tasks. At the slum level, the community plays a pivotal role in the implementation process. Consortia of reputable industries and NGOs take up the execution on behalf of the communities within the design framework established by the Corporation. In a country where city development falls strictly within the purview of the state and local governments, this is a very bold transition which can have far reaching consequences. The Corporation too has set up a parallel execution cell to bid for the works. This competition will improve the overall quality and also enable the Corporation to build up a long-term implementation structure which is both efficient and sensitive.

Replicability and Sustainability

This innovative practice has made a tangible impact on the quality of life of a large population living in slums of Indore. It has demonstrated its replicability potential with respect to upgrading the entire slum matrices within a finite time-frame as well as revitalising the service infrastructure and environment of the city as a whole. The projects show that the slum fabric can be used effectively to transcend from the community scale to the city level. Indeed, the transitions from Indore to Baroda and then to Ahmedabad have taken comparatively shorter time in spite of the fact that at each stage, the level of self-sufficiency and the degree of community control have increased. Demand has now started coming from other cities such as Bombay, Delhi and Bhopal for similar replication. Thus with the proactive participation of the slums in the development process, the activity of urban renewal is being weaned away from aid support to self sustenance.

Slum dwellers have consistently demonstrated that they are very keen to change their living conditions. Instead of harnessing the greatest resource, namely, the slum dwellers themselves, the present programmes spread scarce public resources too thinly over a large slum population. Further, they impose solutions which are inappropriate and have failed in the past and, to boot, use agencies which have proved ineffectual. In the projects described, the slum dwellers give such a high priority to environmental improvement, particularly individual water supply and toilets, that they are willing to mobilise resources for this need in spite of poverty.

Dovetailing them into other related schemes in existence increases the sustainability of the programmes. They include Urban Community Development (UCD), Urban Basic Services for the Poor (UBSP), Environmental Improvement Schemes (EIUS), Town Planning Schemes (TPS), land development under Urban Land Ceiling Act (ULC), Nehru Rojgar Yojana (NRY), health and education schemes undertaken by the state departments, Integrated Child Development Scheme (ICDS), the state government's

low-income housing loans, Low Cost Sanitation (LCS), and cleaning of rivers under National River Action Plan (NRAP). City level proposals exist for water supply, sewerage, treatment, storm drainage, solid waste management and landscaping. The development funds allocated to the Corporators and Members of Legislative Assembly are also integrated into the whole.

Similar convergence is also used for resource mobilisation. With the help of NGOs, community thrift groups are being organised into savings and loan societies. Linkages are now established between these societies and dedicated financial institutions such as Self Employed Women's Association (SEWA) and Friends of Women's World Banking (FWWB). Indeed, the pilot at Ahmedabad would not have been possible without SEWA providing the bridging finance to the community. At the national scale, the apex housing finance body, Housing and Urban Development Corporation (HUDCO), has now shown willingness to finance all the partners (ie industrial houses, NGOs, communities and the Municipal Corporations) to meet their share of the costs.

The Gender Aspect

The urban poor are trapped in a vicious cycle of poverty, ill health, miserable living conditions and illiteracy in which the 'causes' cannot be clearly distinguished from the 'effects'. Physical improvements in environmental and sanitation conditions alone cannot break the cycle and a holistic outlook is required. Care has, however, to be taken to avoid the other extreme of a plethora of random social sector actions in hope that some may work. Instead, it is much better to target the endeavours to specific objectives and groups with a balanced package of complementary physical and socio-economic interventions. In Slum Networking many of the community development interventions are focused on women and girls, who will in turn be tomorrow's mothers. The reason for doing so is to stem the carry over of the disadvantages from one generation to another. For example, there is a clear correlation between the female literacy rate and an array of other indicators such as infant mortality rate, birth rate, educational levels of children and family incomes. Thus, activities such as mother and child care, female literacy, income generation, vocational training and legal literacy assume special importance in Slum Networking. Some of these activities are specially designed to empower the women to control their destinies. This is reinforced by majority representation of women both in terms of the numbers and also the key positions held in all the projects. In Indore, not only are the majority of members in all the 79 neighbourhood committees women but they also predominantly hold the positions of chairpersons, secretaries and treasurers.

On the physical front, women in slums face the worst hardships of environmental and sanitation degradations. Sometimes hours have to be spent just to fetch enough water for the day. Often girls miss school to help with the daily chores of cleaning the house and its insanitary environs. Women are, therefore, highly motivated to initiate development and play a more mature role in reaching consensus and resolving differences which arise in the community. They also show a greater degree of responsibility in managing money and making repayments. The Baroda project came to fruition in spite of a long incubation period of three years simply because of the persistence of the women there to have individual water taps and toilets.

GOALS, STRATEGIES AND RECOMMENDATIONS FOR ACTION

Fundamental Rights

Goals 2010

Access to hygienic conditions, safe water and sanitation as fundamental rights to be achieved for all citizens of Gujarat.

Strategies

Advocacy for the development of basic services and for priority toward investment in programmes, and capacity-building essential for their achievement. Coalitions and partnerships with those in India and elsewhere experienced in human rights advocacy toward campaigns for building and sustaining political will for water, hygiene and sanitation action. Specific attention provided to the urgent need to arrest and reverse deteriorating trends in urban and peri-urban areas.

Action

Coalitions and partnerships toward recognition of these basic services as human rights at the state, national and international levels.

Working groups established to bring together experience and wisdom toward translating concepts of rights into improved and sustainable services.

Statewide campaigns initiated toward the advocacy of these rights, with media support.

Responsibilities that must accompany rights defined clearly, including new responsibilities for raising resources and for the design and implementation of maintenance services.

The need for adequate legislation to be reviewed.

Administrative structures reviewed toward improved accountability, transparency and involvement of stakeholders.

Special attention given to the urgent need to improve conditions in urban and peri-urban communities.

Health and Hygiene

Goals 2010

From 13,000 no-source villages in 1999 to almost no village without reliable, perennial drinking water source.

70 % reduction in morbidity by water-borne diseases.

Child mortality rate reduced to 45 per thousand from 137 per thousand around the turn of the century.

80% reduction in fluorosis affected regions.

Salinity ingress halted completely.

A near foolproof drought plan evolved by the State with adequate emphasis on watershed management, water harvesting and waste control.

Strategies

Awareness and control campaigns on water-borne diseases by NGO networks and State authorities.

Emphasis on health and hygiene training of rural/urban water committees and health workers and Panchayats.

Hygiene education programmes in every school. Hygiene awareness and training for school teachers.

Active monitoring of water quality and quantity and hygiene behaviour at block level by citizens' groups.

Promotion of reverse osmosis and water harvesting technologies to meet the challenge of drought.

Action

Mobilisation of community health groups through existing networks, with special emphasis on community mobilisation toward behaviour change.

Training of health workers and teachers to be intensified through appropriate educational strategies and materials. State Health Dept strengthened toward these efforts.

Promotion of water-harvesting techniques throughout the state, in both rural and urban situations.

Initiate community action for monitoring water supply, both quantity and quality.

Base-line survey undertaken to provide data for monitoring and evaluation.

Active support by community group to the school latrine programme initiated under Gujarat Education Policy.

Institutional Processes

Goals 2010

Existing NGO networks for water and sanitation action replaced by similar networks of community-based organisations, empowered as initiators and implementers, linked together and to authorities through alternative networks.

State policies on water supply and sanitation evolved with community participation reflecting area-specific issues, designed for devolution of planning and implementation through communities.

The State's role places emphasis on facilitating and encouraging peoples initiatives and as a resource provider. The state accepts its responsibilities for the provision of basic services while planning, management and implementation systems reflect genuine participation and decision making by communities and citizen groups. Community initiatives are actively supported and encouraged by the state system.

Media resources in the state mobilised for awareness, Media acts as a monitor on goals.

Strategies

Rural sanitation in Gujarat reflects synergistic partnership between communities and the State, while urban sanitation shows the same between communities, the State and the corporate sector.

Members of every Panchayat as well as other community-based organisations given opportunities for training related to water supply, hygiene; sanitation and health.

Public awareness and support mobilised through sensitising mass media.

Use of all media opportunities, including local and folk media toward behavioural change.

Outreach to media persons through awareness and information opportunities.

Consultations with persons in the performing arts toward their support and action for goal achievement.

Action

NGOs mobilised for awareness and capacitation toward these goals. Information exchange systems established and used through networks with a better range of stakeholders.

Support systems innovated and positioned, drawing on the experience of the Area Resource Groups now identified to assist water-harvesting efforts through State-NGO partnerships.

Efforts at raising resources strengthened and extended.

Outreach to policy makers toward change, using networks and Gujarat 2010 and Vision 21 for advocacy.

Immediate documentation of the Vision effort as an awareness and training tool. Seminars for media persons on the Vision and its implications.

Development of media alternatives (docu-dramas, Bhavai performances, songs, street dramas etc) through networking with stage/cinema/TV artists, folk performers. Formulation of a media campaign, and resource-raising toward its implementation.

Policy Change

Goals 2010

Current centralised policies on decision-making and technology in water and sanitation as well as in maintenance and management issues shift to greater sharing of responsibilities with communities.

Hygiene given priority as a precondition for health.

In rural communities, the natural resource management committees become active partners. In urban areas, citizen committees take on this role.

Financial resources are diverted toward citizen groups with demonstrated capacity for good management. Experience in 1999/2000 with Pani Samitis is used as a foundation for such change.

In dry areas, all buildings have basic water-harvesting facilities through legislation on the Chennai pattern, with guidelines for rural and urban conditions.

Strategies

Advocacy and lobbying with decision-makers, and through public-opinion building.

Media support recruited for such awareness.

Water-harvesting techniques and hygiene behaviour actively promoted and training opportunities organised for NGOs and field workers.

Action

Advocacy campaigns planned and initiated through existing networks. Policy reviews encouraged through articulating and debating alternatives.

Financial implications worked out to assist application and demonstration of alternatives.

Opportunities developed for sensitising planners and decision-makers. Immediate attention given to institutional restructuring essential for change, with alternatives worked out in cooperation with authorities.

Responsibilities for planning, decision-making and action at each level clearly spelled out. Such changes discussed and promoted through citizen groups. Advocacy with donors initiated for active support.

Sanitation

Goals 2010

Ninety percent coverage and usage achieved.

A range of technology alternatives provided to suit the variety of rural and urban needs.

Households identified and accepted as the catalysts for behavior change and action.

Households, authorities and industries capacitated for water and waste recycling.

Urban alternatives innovated and promoted.

Private initiative mobilised for service provision and maintenance.

Payment structures developed to encourage ownership and responsibility while protecting the poor.

Ban on manual handling of human excreta strictly applied through awareness, monitoring and rehabilitation efforts.

Strategies

Technology options promoted actively, with financial options/alternatives clearly communicated.

Financial resources mobilised through incentives for private initiative and through user-friendly schemes as incentive.

Strong awareness and hygiene education efforts coupled to the mobilisation of women as beneficiaries and as pressure groups.

Training facilities strengthened and promoted.

Building legislation directed at improved sanitation facilities.

Education sector mobilised as partners and current efforts for school toilets supported and extended.

Promotion of stronger male involvement in sanitation management responsibilities.

Human rights approach aggressively used to protect sanitation workers and to enforce laws prohibiting human handling of excreta. Networking with other macro issues to strengthen this human rights advocacy.

Action

Training and information aids developed for accessing technology options, coupled with strong campaigns for awareness and action.

Contribution schemes developed and tested by existing networks toward minimum contributions, ranging from 10 to 20 percent of basic costs.

Village committees, managed by women, organised and mobilised with training facilities extended at each level of need.

Alternative models developed and communicated for urban needs, reflecting both technology and financial options. The 'pay-and-use' model actively promoted.

Particular attention given to the special needs of women and the disabled, including action to cover such needs through legislative action.

School programme accepted as an immediate priority by all water and sanitation networks in the state.

Economics

Goals 2010

Per capita capital cost investment in the state reduced from Rs 2000-2500 to Rs1000-1500 through the promotion of lower-cost rural technologies and resource raising at the community level.

Maintenance costs in rural areas reduced to Re1 per litre, through user-friendly, lower cost technologies and community participation.

The bulk of maintenance costs accepted as a community responsibility.

Equity in the distribution of water resources between urban and rural needs, and within cities between household/industrial, rich/poor consumption.

Latrine finance schemes for households that are user-friendly and reflect ability-to-pay aspects.

Strategies

Developing and articulating the economic alternatives through existing partnerships.

Special attention paid to commercial-use pricing systems for industrial usage of water.

Promoting these options for the understanding of planners and communities.

Advocacy for policy change with authorities and public, stressing water as a scarce, often non-renewable resource.

Building community capacity for resource mobilisation and management, both for water and for sanitation.

Promotion of user-friendly schemes with households and communities.

Action

Advocacy of alternative economic models with state authorities, particularly politicians and engineers.

Introduction of alternative schemes through demonstration projects.

Advocacy at the community level to prepare citizens toward new attitudes and responsibilities.

Capacity-building of community organisations for the new economic roles/responsibilities.

Rational pricing policies introduced for commercial uses of water, including cross-subsidy schemes on ability-to-pay basis. Development of alternative, user-friendly finance schemes for sanitation.

Promotion of such schemes with households and communities.

Technology Development

Goals 2010

State to accept and encourage appropriate and area specific technological options for both water supply and sanitation in each of the geo-agro-climatic regions of the state.

A cadre of professionals is trained for operation and maintenance (O&M) aspects of water supply and sanitation delivery system.

Technical Support Centre established at district level to back up the efforts of professionals.

Strategies

R&D functioning through appropriate and area-specific technological options.

Training for sector professionals in technology options intensified.

Funding partners to lay as much emphasis upon technical research as on other aspect of water supply and sanitation delivery systems.

State and corporate sector to evolve an action plan to set up district level technology back-up centres.

Action

Academic and research organisations as well as corporate sector to encourage vigorous research in appropriate technological options for water and sanitation.

NGOs to start training of para-professionals and facilitate them for application of their skills.

NGOs to mobilise international, national and corporate partnerships for achieving these goals.

Gender

Goals 2010

Women in the forefront as initiators and managers.

Natural resource management groups with adequate representation of local women operative in all villages of Gujarat.

District and State-level planning for drinking water, sanitation and health education formulated, operated and monitored through citizen groups with adequate representation of women.

Strategies

Gender-sensitive natural resource committees in every village.

Citizen/women-led water committees in urban areas of need.

Mobilising women in the state as stakeholders.

Action

NGOs to work on ensuring women's participation in natural resource groups, organised at village levels.

Training of natural resource groups members in the areas of gender sensitive micro-planning towards sustainable water supply and sanitation delivery systems. Male responsibility for maintenance of water sources to be actively promoted.

NGOs to work on advocating policies and programmes geared towards strengthening women's participation in water supply and sanitation delivery systems.

Schools

Goals 2010

A target of one toilet per 300 children, with separate facilities for boys and girls, achieved in all schools.

Hygiene awareness and training reaches every teacher in the state.

Strategies

Active support by community-based organisations to current school latrine programme introduced under Gujarat Education Policy.

Child-to-parent hygiene awareness and education encouraged.

Supplementary efforts through mobilising women's committees and social service organisations in towns and villages, toward generating resources and training efforts.

Donor support mobilised.

Action

School programme accepted as an immediate priority by all water and sanitation networks in the state.

NGOs take the lead for public awareness campaign, teacher training, resource mobilisation and monitoring.

An initial three-year project drafted for donor support.

Roof Water Harvesting in Urban and Rural Areas

(M. Dinesh Kumar)

Roof water harvesting appears to be the best alternative for households in both rural and urban areas for domestic water security where private water sources are absent and other public water systems fail to supply water. Roof water harvesting systems can also supplement existing public water systems and reduce the stress on them. The most ideal condition for adoption of roof water harvesting systems is that the area having reasonably high rainfall and the housing stock has sufficient per capita roof area. The amount of water that can be made available through roof water harvesting technique is directly proportional to the total quantum of rainfall, the runoff coefficient of the roof and the per capita roof area.

The different components of a roof – water harvesting systems are : (1). A roof catchment (2). Gutters (channel fixed to the edge of roof to transport rainwater from roof to the storage tank). (3). Down pipe (to carry rainwater from the gutters to the storage tank), and first flush pipe (to dispose off the rainwater carrying dust and debris); (4). A filter unit containing coarse sand, charcoal, coconut fibre, pebbles, and gravel (to filter out the debris and dust particles that come along with rainwater); and (5). A storage tank (either surface or sub-surface).

Table 1 : Coefficient of runoff values for different roof types

Type of Roof	Runoff Coefficient
Galvanised Iron Sheet	0.90
Asbestos Sheet	0.80
Tiles Roof	0.75
Concrete Roof	0.70

Assume that an urban area that receives 1000 mm of rain. If the per capita roof area is 2 M² (for a lower middle class urban housing stock), the amount of water captured from the structure would be sufficient for meeting the basic survival needs (at the rate of 50 litres per capita per day) for 4 weeks. For an independent bungalow, if the total roof area is 200 sq mts, the water captured would be sufficient for a five-member family to meet all their domestic water requirements (at the rate of 150 litres per capita per day) for more than 200 days of the year. For a poor rural household with a total roof area of 30 sq mts. and family size of 6 and with the same magnitude of rainfall, the amount of water that can be captured from the structure would be sufficient for meeting the basic survival needs (at the rate of 40 litres per capita per day) for 100 days. Hence, rooftop water harvesting will be most suitable for ordinary rural households and families living in large urban bungalows, provided there is enough rainfall.

Rooftop water harvesting will be physically most feasible for the rural households in heavy rainfall areas such as the Dang district which face acute drinking water scarcity due to poor natural storage of water resulting from the steep terrain. As the mean annual rainfall is close to 1800 mm in Dangs, the amount of water that can be captured by a household with a roof area of 15 M² will be 24000 litres in a normal year. A tank with a storage capacity of 6000 litres will be sufficient to take care of the drinking and cooking requirement (5 litres per day) of a 6- member family for 200 days.

The domestic roof top water harvesting requires an investment of Rs11,700 to Rs15,800, depending on tank storage capacities ranging from 5000 to 10,000 litres. The cost of production of water works out to be 2.5 paise to 1.5 paise per litre of water if we consider the life of the system as 50 years. This is very high when compared to the almost free water available from public water systems. Hence, many a rural household will find it unaffordable, hence subsidies from the Government will be essential for large-scale adoption of rooftop water harvesting in rural areas.

In urban areas, water supplies are only partly metered in cities. Water tariff is incredibly low and does not reflect the volumetric consumption. In such a situation, if roof water harvesting is subsidised, it will only increase the inequity in access to water across socioeconomic groups. The reason being that only the rich people having large roof area will be able to adopt it, who will continue to access water from public systems at a very low cost. Therefore, if roof water harvesting is to be promoted, incremental block rates have to be introduced for municipal water supplies to create incentive among rich families to minimise the use of water from the public systems.

Private Water Supply Companies in Gujarat Cities

(M. Dinesh Kumar)

Gujarat has a long history of water markets. Groundwater markets are common in many parts of rural Gujarat. There are essentially social arrangements through which the well owners offer irrigation services to farmers who do not have access to irrigation facilities and charge certain amount as the fee for the services provided. In rural areas, the water markets served certain economic groups, which do not have the resources to invest in irrigation facilities.

In urban areas of semi arid and arid parts of Gujarat, the rapid growth in population and industrialisation is putting enormous pressure in and around urban localities. With the depletion of irrigation reservoirs that the urban areas tap to meet their requirements, urban water supply facilities are stretched far beyond their capacities. This is compounded by rapid expansion in area and population of the cities, due to which the water supply infrastructure is often not adequate to cater to different parts of the city. The result is a secular decline in the average per capita water supplies, and irregular and erratic supplies, severity of which increases as the summer advances.

In Ahmedabad city, for instance, the areas that are not covered by the Ahmedabad Municipal Corporation (AMC), come under the Ahmedabad Urban Development Authority. In these areas, the domestic water supply is to be provided through the Gram Panchayats. But, given the dramatic increase in population and the mushrooming of multi-storeyed flats in the city outskirts, the Gram Panchayats are not able to provide water supply to the residences in these areas. Thus, the societies maintain their own bore wells. However, break down of these systems is very common, resulting from excessive draw down in water levels, collapse of well packing, burning of motors etc. In such circumstances, the private societies have to look for other sources of water supplies.

This apart, there are several hundreds of party plots that cater to the city population for wedding and other ceremonies which need huge amount of water during seasons, industries and construction sites are the other sources of demand for water in the city. One of the most energetic responses to urban water scarcity is the emergence of private water companies. Over the last few years, several hundreds of private entrepreneurs have invested in water sources and tankers meant for supplying water to the needy urban population. There are most extensive in the cities of Ahmedabad, Rajkot and Jamnagar.

It is estimated that the city of Ahmedabad alone has nearly 500 tankers companies. The water sale is highest in summer. A survey of 21 water companies in Ahmedabad showed that on average, a tanker company supplies 5 to 6 tankers a day in summer, against approximately 3 in monsoon and winter. They drill bore wells in their compounds and take water through tankers to the localities that need water, upon demand, often, the entrepreneurs are those who are having their own farms in and around the cities. They use the electricity connections meant for agriculture pumping to lift groundwater for commercial purposes. In some other cases the water companies get water from other private well owners on payment of charges and transport it to the city. Some of the situational demands, which the private tankers meet, are: provisions of water supply to upper middle class residential societies and bungalows, private plots, industries, and construction sites. The water charge ranges from Rs150 to Rs200 per tanker of 6000 litre capacity. The private water supply companies are scattered across the city and the outskirts and therefore, and therefore the distance between the source and the locality is 3-4 kilometres only. Thus, it takes very little time to supply water on demand.

Gujarat Jal-Disha 2010: A Global Significance

World attention has been focussed on recent efforts in Gujarat to articulate a future vision of hygiene awareness, sanitation and safe water for all its citizens. The global VISION 21 initiative of the Water Supply & Sanitation Collaborative Council (Geneva) had its first application in Gujarat, where NGO activists began in 1998 to envision a safe and equitable future and formulate an action plan that could realise it. GUJARAT 2010 was the result. It became the focus on an international consultation held in Ahmedabad in November 1999 under WSSCC auspices. Delegates from every continent had an opportunity to understand the Gujarat experience and aspirations, and most particularly the on-going challenge of water scarcity after a failed monsoon. Gujarat was the first location anywhere in the world to experiment with VISION 21's people-centred approach, and had literally tested it by fire. Following the Ahmedabad gathering, the NGO team was invited to make a special presentation of GUJARAT 2010 at the World Water Forum and Ministerial Conference in The Hague in March 2000. Some 6,000 delegates heard WSSCC Chairperson Richard Jolly extol Gujarat's "shining example" at ceremonies which ratified VISION 21 as the 'water for people' agenda for the international community. Soon after The Hague meeting, the Government of Gujarat held a workshop in Gandhinagar, with support from The Netherlands, to focus on lessons learnt in the State's water sector. It was at this workshop that the idea of *Jal-Disha 2010* was first mooted, to bring together stakeholders within and outside Government toward a shared approach to future action.

The Working Group constituted to draft *Jal-Disha 2010* was then invited by the Collaborative Council to share this and other developments in the state with its global membership, gathering in Iguacu (Brazil) in November/December 2000 for the WSSCC's Fifth Global Forum. Gujarat was featured at the opening ceremony as an example of the VISION 21 approach in action. Each delegate received a resume of the Gujarat experience prepared by the conference secretariat. A special session was arranged to acquaint participants with the learning that has emerged over the years in Gujarat, and from the unfolding of the *Jal-Disha 2010* initiative. Gujarat became an important benchmark used by this international gathering to measure progress toward the understanding and application of VISION 1. Great attention was given to the consultative processes set in motion through recent years and through *Jal-Disha* to widen the areas of cooperation and consensus. These were seen as the most important lessons that international stakeholders could draw from Gujarat, in addition to its enormous experience in the sector and in dealing with severe scarcities. The Iguacu Action Plan includes much that has been inspired by Gujarat and India. An appeal was made for organised opportunities that could encourage activists from other parts of the world to draw on the learning in Gujarat.

Source: WSSCC, Geneva, November 2000



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