# Multiple Use of Water
# In
# Urban Areas

A Case Study in Bhuj, Gujarat, India

(Final Report)

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## Abstract


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| **Objective** | This report present the findings of a case study on the productive use of water in urban areas that was carried out in the low-income neighbourhoods of Bhuj in the final quarter of 2004. The objective of the study was to investigate the links between the quality of the water supply and the income of the poor. It was assumed that there would be two possible linkages:<br>• A sub-standard water supply forces might force women to spend additional time on fetching water for their families and hence less time would be available for productive activities.<br>• Many micro- enterprises use water in the production process. A sub-standard water supply might negatively affect the performance of those micro-enterprises as micro-entrepreneurs need to spend disproportioned amount of time and money on water. |
| **Methodology** | The data for this study were collected from a random sample of 10 low-income neighbourhoods in which the All India Disaster Mitigation Institute (AIDMI) is implementing its reconstruction programme. In each of the neighbourhoods, a series of PRA exercises were done with a group of 7 women. These women were selected through a process of self-selection. In addition, 100 selected micro-entrepreneurs were asked to fill in a questionnaire. The entrepreneurs were selected from the membership list of the Chamber of Commerce for Small Businesses and Industries that has been established by AIDMI. The selection criteria is the use of water in the enterprise activities. |
| **Research Area**<br>*Gujarat*<br><br><br><br><br><br><br>*Bhuj* | <br>Though Gujarat is comparatively well developed there exist pockets of intense poverty especially in tribal and (semi)-arid areas. The 55 million Gujaratis are spread over 25 districts and live in one of the 18,0000 villages or 242 towns.<br>Gujarat's population of 55 million lives in 25 districts that count a total of 18,000 revenue villages. The State Government is headed by the nationalistic Chief Minister Modi of the Bharatiya Janta Party (BJP).<br>Bhuj, with its 135 thousand inhabitants, is not very different from most other small Indian towns. Their complex and untransparent administrative set-up result in sub-standard quality of basic amenities, in particular for disadvantaged groups. These are the places where the large majority of India's urban poor live. |
| **Urban water supply** | Though the Central and the State Governments have launched a number of schemes to address the urban water crisis, Indian towns are increasingly suffering for prolonged spells of severe water shortage. The poor are hit hardest as they not only need the poor water for consumption |

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| | but also to sustain many their fragile livelihoods. |
| **Multiple use of water in urban areas** | |
| *Urban livelihoods* | Though urban livelihoods are distinctly different from rural livelihoods, differences are more complex and subtle that commonly assumed. Generally, it is assumed that urban livelihoods rely less on access to natural resources and are more dependent on labour and access to services. The findings of the case studies pointed out that a large variety of livelihoods of the poor use water as an input in some way or the other. The daily consumption was found to vary between 20 and 1,000 litres. |
| *Quality water supply* | It was found that households, in particular women are using multiple sources to meet their demand for water. The main reason is that low quality of the piped water supply provided by the local Water Board. On average, water is available for slightly more than an hour daily. However, for long periods of time water is not available at all and in some neighbourhoods water is not suitable for human consumption. |
| *Loss of income through loss of time* | Not surprisingly, women spend on average 3.22 hrs daily on fetching water. The opportunity costs of this time are RS. 16 per day. Whenever the water supply breaks down, the time needed to meet household water needs increases to 6.54 hrs. For this purpose, an average of 1.42 hrs is reallocated from economic activities.<br><br>Women estimate that they forgo an income of Rs. 85 per week due to a substandard water supply. In other words, providing people with a reliable and easy accessible water supply has the potential of increasing the income of women with 32%. |
| *Water for micro-enterprises* | Micro-entrepreneurs need to spend almost two hours a day to fetch water for their enterprises. In addition, a large portion of the entrepreneurs complain about the costs and quality of the supplied water. As a result, less time, energy, and financial resources are available for other enterprise activities. Reduced profitability is the obvious result.<br><br>The 2001-earthquake has negatively affected the quality of the water supply. Entrepreneurs estimate that this has reduced their income by INR 500 per month. Finally, 93% of the entrepreneurs stated that their income would increase if the quality of the water supply would improve. |

## Acknowledgements

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Last but not least, we express our gratitude to the women and men living in the low-income neighbourhoods in Bhuj. They have given their valuable time to answer our queries and were always willing to share details of their lives with us.

Joep Verhagen — Delft
Mihir Bhatt — May 2006

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# 1 Bhuj

## 1.1 Demography

Bhuj is a block situated in Kutch district. It includes a town of the same name (Bhuj) and 159 villages in the block. The town of Bhuj is situated towards the south east of the centre of Kutch, on relatively fertile land around hillocks. According to the 2001-Census, the total population of the district was 1,526,321 inhabitants. The total population of Bhuj city is estimated to be 344,783 or 39.54% of the total population of the district. Total literacy rate is 64.23%l. Though exact numbers are difficult to find, Disaster Mitigation Institute (AIDMI) field work suggest up to 34,000 people live in 32 low-income slums in and around Bhuj.

Bhuj served as the capital of the princely state of Kutch for at least four centuries. Bhuj is linked with smaller towns such as Anjar and ports such as Mandvi. Creation of Pakistan out of India ruled by the British in 1947 cut off Bhuj's trade with Sindh and the creation of a new town of Gandhidham further reduced the economic importance of Bhuj since the late 1950s. However, residents of Bhuj have remained central to the administrative and political processes in Kutch.

## 1.2 The 2001 earthquake in Bhuj

At 8:46 in the morning on January 26, 2001 the lives of thousands of people changed. A massive earthquake measuring 6.9 on the Richter scale hit Kutch and affecting 11 districts of Gujarat. The epicentre was about 20 km northeast of Bhuj. The earthquake destroyed hundreds of thousands of homes. The official death toll was 19,904 people, out of which 18,315 were in Kutch alone. Other sources suggest a much higher number, but the real figures will never be known. 200,000 people were injured, hundreds of villages were completely flattened, and more than a million people were left homeless.

Being close to the epicentre, along with the towns of Anjar, Rapar and Bhachau, Bhuj was most affected and reported the biggest amount of deaths. One of the last official statistics on the losses in Bhuj are given by a United Nations Disaster Management Team (UNDMT) report of January 29, 2001, that reports 5,065 dead persons and 10,925 injured persons [UNDMT 2001].

The old part of the town was severely damaged, with 3 to 4 storey high buildings turning into rubble. Today, there are vast open spaces where before only narrow lanes squeezed through a densely built up area. But not only the walled city was affected, buildings in the new part of the town also collapsed and especially small huts and shelters in the slum areas could not resist the massive trembles of the earthquake.

The poor among the slum dwellers in Bhuj have been bit hit hardest by the earthquake because of: (a) loss of their informal sector livelihoods in the labour market; (b) damage to make-shift and inadequately constructed shelter structures; and (c) poor access to relief and related services including compensation without entitlements of land tenure, ration card or voter's card.

Nearly fiver years after the earthquake piles of rubble and cracked buildings serve as constant reminders of the quake. There are still thousands of people remaining homeless, camping out in tents or temporary shelters. Furthermore, the region was weakened by two consecutive droughts in 2000 and 2001, and the devastating 1998 Kandla cyclone.

## 1.3 Urban Administration in Bhuj

The Seventy Fourth Amendment Act (1992) makes it obligatory for the State Government to set up Urban Local Bodies (ULBs). Depending on the size of the city these are known as as Municipal Corporations, Municipal Councils, and Nagar Panchayat.

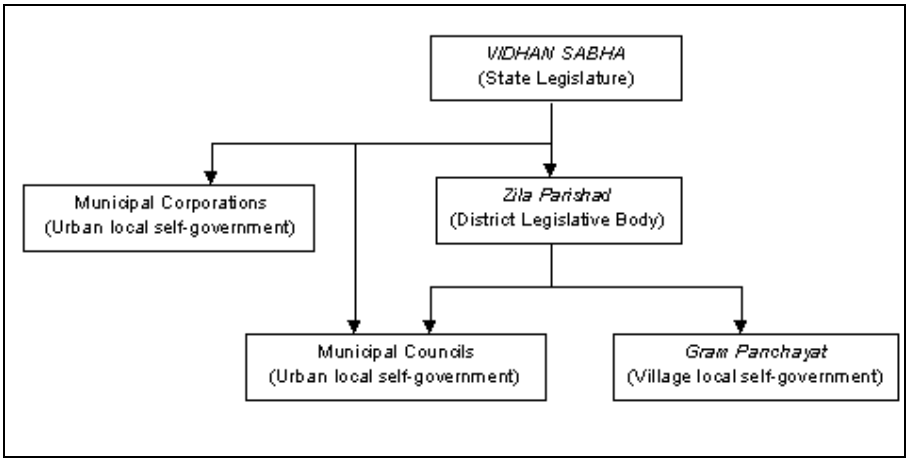


*Figure 1 : Administrative Structure at State Level (source UNESCAP)*

Bhuj is a Municipal Corporation which gives it more autonomy as compared to a Municipality (Nagarpalika). These are more directly under the control of the district collector. Corporations are more autonomous in dealing directly with the State Government. The administrative structure is shown in Figure 2. Bhuj Municipal Corporation consists of two wings:

(a) the Municipal Council which is the deliberative wing. Elected councillors represent each one of the 12 wards of Bhuj. A Mayor heads the council. And,
(b) the executive wing is formed by the Municipal Commissioner who is an Indian Administrative Service (IAS) officer appointed by the State Government.

The Municipal Corporation is allowed to levy taxes such as a property tax, vehicle tax and taxes for services such as water supply, garbage collection, and street lighting.

**Twelfth Schedule of the Seventy-Fourth Constitutional Amendment Act (1992)**

- Urban planning, including town planning
- Regulation of land use and construction of buildings
- Planning for economic and social development
- Roads and bridges
- Water supply for domestic, industrial and commercial purposes
- Public health, sanitation conservancy and solid waste management
- Fire services
- Urban forestry, protection of environment and promotion of ecological aspects

- Safeguarding the interests of weaker sections of society, including the disabled and mentally retarded
- Slum improvement and upgrading
- Urban poverty alleviation
- Provision of urban amenities and facilities such as parks, gardens playgrounds
- Promotion of cultural, educational and aesthetic aspects
- Burials and burial grounds, cremations, cremation grounds and electric crematoriums
- Cattle pounds; prevention of cruelty to animals
- Vital statistics including registration of births and deaths
- Public amenities including street lighting, parking lots, bus stops and public conveniences
- Regulation of slaughter houses and tanneries

*Figure 2 : Functions of Urban Local Bodies in India (Source UNESCAP)*

Next to the Municipal Corporation, the Revenue Department (Collectorate) headed by the District Collector plays an important role. The District Collector reports directly to the State Government. The Revenue Department, amongst others, is responsible for:

- cadastre and land records;
- control land use; collection of land tax; and,
- control over urban water bodies (the Irrigation Department is under the purview of the Collector).

The third and final important urban authority in Bhuj is the Bhuj Area Development Authority (BHADA). Originally, Urban Development Authorities (UDAs) were entrusted with the development of master and zonal development plans for their areas. It needs to be noted however that these development zones normally do not correspond with the boundaries of the Municipal Corporation. The UDAs were brought into existence to coordinate urban development at the State Level and to compensate for the presumed lack of capacity of ULBs. UDAs directly report to the State Departments. This and the fact that UDAs have take over a number of responsibilities from the Municipal Corporations[1] has created a certain level of hostility between UDAs and ULBs.

Normally, an UDA is not found in cities the size of Bhuj. However, BHADA was established by the Gujarat Urban Development and Urban Housing Department in 2001 to lead the reconstruction of Bhuj and nearby towns.

This administrative set-up is fertile ground for institutional conflicts, politicking, and unclear responsibilities. The situation in the urban fringe further complicated matters. Though urban in all their aspects, these areas fall outside the boundaries of the Municipal Corporation and are governed through a typical rural administrative set-up which lacks capacity to deal with typically urban problems.

[1] For example, in Hyderabad the Hyderabad Urban Development Corporation is entrusted with the implementation of a large-scale infrastructure measures such as the construction of flyovers, and the cleaning up of urban lakes.

## 1.4 Reconstruction after the earthquake

**Town Planning in the Walled City of Bhuj**:

In 2001, the Bhuj Area Development Authority (BHADA) was formed to deal with the new challenge presented by the earthquake. For the reconstruction of the widely hit city of Bhuj a Town Development Plan (TP) was developed. The authorities followed a conventional way of preparing such a scheme in a draft version, then presenting it to some residents of the walled city, who were asked to comment on it. As there was no involvement at an earlier stage, people were mostly complaining about the road widening proposed in the formerly congested commercial market areas, which cuts off parts of their property and livelihood basis (i.e. their shops). After this first consultation the urban government made some changes (details not known yet) and again brought the plan forward for comments. Again they failed in achieving an agreement with the inhabitants. In the end, a third draft was prepared and finalised without any public consultation in July 2002. This effort to consult is praiseworthy but was inadequate. More people must be consulted, including the slum dwellers, and more information on the plan must be made available to the citizens.

**Town Planning outside the Walled City of Bhuj:**

Although some residents from the walled city area were involved in the Town Plan, it is evident that there were difficulties between the urban authority and the general public. Slum dwellers living in the surrounding areas couldn't contribute to the Town Plan; they were simply left out of the process. The Town Plan is only valid for the Walled Town area, wards 1–8. The wards 9–12, in which all the slum areas are located, are not part of the reconstruction plan, though both areas are part of Bhuj town.

The slum dwellers are affected by the Development Plan (DP) however, which comprises the entire area of Bhuj municipality. The public has not been involved in this plan and there has been no participatory approach at all that is known to the slum dwellers, volunteers, AIDMI Bhuj office or AIDMI. The DP predominantly gives standards and layouts especially for a new extensive road network as well as streetlights. As such, the slum areas are affected marginally by these proposed road developments. This is the only way in which they are included in the planning schemes.

A main concern of the slum dwellers is their land tenure and therefore the uncertain future of their current homes. It is interesting how the authorities dealt with slum areas in terms of service provision and the legal status. The definition of slums given in the Development Plan refers only to the material and size of buildings and their temporary character. There is no reference at all regarding their legal or illegal status. Such a view is far from reality and obviously falling short of the reality of the situation of growing slum areas. It is not sufficient to apply a single criterion like construction material to define slums, notwithstanding the fact that some areas have well consolidated buildings that are by no means sheds any more.

In contradiction to the above-mentioned definition, one of the arguments of the authorities is that the slum areas are illegal structures and thus not eligible for reconstruction on the same plot. On the other hand, in at least some areas (e.g. Bhimravnagar) people are paying taxes to the government, and additionally, they get water supply too. In doing so, a quasi semi-legal status is produced while denying people the right of further development. This semi legal

status adds to the already confusing situation with the TP, leaving common people totally puzzled about what is happening with their lives. And for those who are without legal land status, even a normal development plan and national housing policy provides alternative sites or what is called “in-situ” regularisation. Why this normal practise is abandoned in this new planning process is not clear.

In short, city planning in Bhuj is suffering from a crisis of confidence, growing failure in its ability to deal with rehabilitation of the citizens, and a consultation process without providing basic information. The most important question is how much of the new development will actually reach the poor in Bhuj.

## 1.5 Synthesis on Bhuj

Trying to understand the structure of the Urban Administration in secondary towns in India, one runs into a complex web of intrinsically interwoven and overlapping administrative and political, jurisdictions and boundaries. The functioning of this structure can only be partly understood through literature and even for local people the ways of Indian bureaucracy often remain shrouded in the clouds of mystery. Baken concludes: “Attempting to provide an overview of the local institutional set-up, one cannot escape the conclusion that it is very complex. For an outsider it takes months to unravel the administrative structure, and even then much remain unclear.” [Baken 2000: 139].

In such an environment, the urban poor are likely to fall through the rather wide mazes of the urban services providers. The reconstruction of Bhuj is a case in point.

# 2 Urban Water supply in the state of Gujarat

## 2.1 Urban Development and Spatial Planning in India

Though India is still predominantly a rural society, the total urban population more or less equals the entire population of the United States. During the last century, the urban population grew by a factor of 10 to a total of 285 million or 28 per cent (Figure 3). In most cities, 20-40% of the population lives in slums. It is estimated that India's urban population will increase to 435 million (35% of the population) by 2015 [United Nations Population Division, 2001]. Similar to other developing countries, these urban areas are the motors of economic growth; 28% of the population generate approximately 50% of the Gross Domestic Product (GDP) [Ilorente et al: 2003].

A quarter of the urban population lives in one of 27 cities with a population of more than 1 million. The remaining three quarters are spread over 3,600 small and medium cities. However, most attention is focused on the large metropolitan cities whilst small and medium cities lack the resources and capacity to keep pace with the increasing demands for improved urban infrastructure such as water, power, and sanitation. Moreover, poverty levels in these towns has found to be higher than in the larger cities: in towns with less than 50,000 people 43% of the population lives below poverty line as compared to 20% in town with a population of over 50,000 people. [DFID undated]

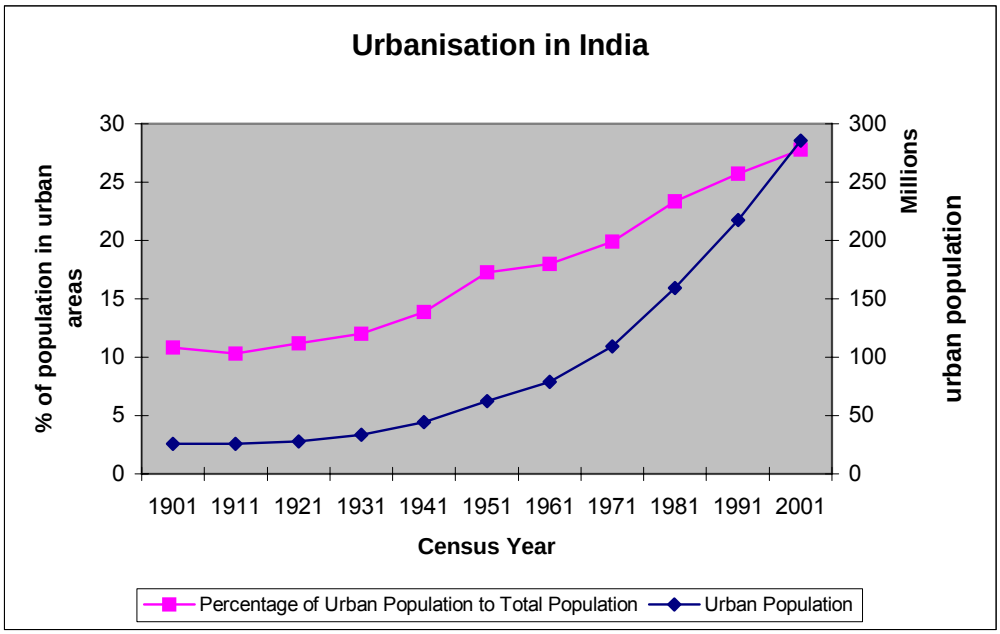


*Figure 3 : Urbanisation in India (source: GOI 2001)*

Urban development in India has not been guided by spatial planning '[On the contrary], in the large share of the Indian cities, the delivery of residential land takes the form of squatting or semi-illegal land subdivision. Urban growth is an unplanned process.' [Baken 2000: 9]. Lack

of control on the part of the urban authorities can be traced back to a number of factors [adapted from Verhagen 2004]:

- Rapid growth of the urban population and high pressure on urban land have caused wide-spread speculation in land and a sharp increase of land prices. The commercial interests of (semi)-illegal land brokers are the driving force behind spatial development rather than the urban master plans. Urban infrastructure is provided, under pressure of the new settlers, after occupation of the land.
- Urban master plans are basically land use plans that pay little attention to social and economic factors. Plans start from an assumed but unrealistic leading role of public agencies in the development of land and the supply thereof. They do not allocate the resources or specify responsibilities to realise them and hence are unrealistic from the onset [Baken 2000]. Moreover, drawn out legal procedures make it almost impossible for urban authorities to obtain the land needed to realise urban master plans.
- A large part of the legislation and regulations pertaining to urban development and land-use stem from the pre-independence period and hence are ill suited for the current circumstances. Responsibilities of different public bodies are not clearly demarked and there is a lack of coordination between these bodies. In Calcutta, 107 agencies are involved in urban management issues.

The uncontrolled urban development of the last decennia has completely disrupted the existing urban watersheds and destroyed existing water sources contributing to the growing incidence of urban floods and droughts. Ground water tables are further depleted by the numerous, and often illegal, private bore wells. Consequently, except for in the urban fringes urban areas are mainly dependent on piped water supply which is often brought in from large distances[2]. Bangalore depends on water from the Cauvery, 95 kilometres away and some cities such as Chennai and Rajkot depend on water brought in by train during drought periods.

Though 92% of the urban population has access to potable water [United Nations Statistics Division, 2002], it is estimated that only 20% of the water meets required health standards [Neeru Singh nd]. Moreover, the supply is often erratic and unreliable. Water is typically available for only 2 to 8 hours a day and the situation even gets worse during summer when water is not available for days at end. Distribution networks are outdated, poorly maintained, and simply lack to capacity to serve the ever increasing urban population. Contaminated groundwater siphons back into the network because of low pressure and irregular supply. During the monsoon period this often leads to a sharp increase of water born diseases [CSE 2004].

[2] A fact that is often overlooked is the large amounts of energy that is needed to transport water of such distances and to treat the water. Municipalities spend up to 60% of the energy budget on the transport and treatment of water.

**Urban Droughts in Rajkot**

Urban droughts have been a common phenomena in the city of Rajkot. Traditionally, the city depended on surface water to meet its demand for water. The river Aji, with four reservoirs, used to be the source of municipal water. But lack of rains saw the reservoirs severely depleted, and the city plunged into a perennial thirst.

In its search for water, Rajkot's municipal corporation found water in the forest areas of Jamudia village in Wankaner at a depth of 21-24 metres (m). In three months time, the Gujarat Water Supply and Sewerage Board (GWSSB) bored 120 wells in the area and laid a 70-km pipeline to bring the water to the city. The Jamudi Wadi area became the city's potable water lifeline, supplying about a million gallons daily. As the water began to be pumped out, villagers of Jamudi and other nearby villages such as Palas and Virdi in the taluka began to face a water scarcity completely.

*Adapted from Down to Earth, Dec 15, 2002*

## 2.2 Water Supply in Gujarat

In quantitative terms, India has made major strides in providing its people with safe drinking water: 92% and 86% of the urban and rural population respectively have been covered [United Nations Statistics Division, 2002]. However, the World Bank estimates that only 65% of the population of officially recognized slums has access to water infrastructure [World Bank 2006]. Target-driven approaches have also supplied water in places that are inconvenient to the local population, many schemes are poorly designed and maintained, and the sustainability and quality of the water supply are issues for major concern [World Bank; 1998]. Future scenarios are bleak as increased population pressure, falling ground water tables, increasing competition from the industrial and agricultural sector, and unsustainable water management practices are pushing India towards a major drinking water crisis.

In Gujarat out of the 17,188 villages, 11,339 suffer from a drinking water shortage, especially in the Northern Western part of Gujarat, according to the Official Master Plan of the Government of Gujarat (GoG) [Kapoor et al, 2001]. The 2002 drought affected more than 100 million people in India. That year (2002), 13 of the 25 districts in Gujarat have received less than 40% of the normal annual rainfall. Some of these districts have not seen a normal monsoon for the last 4 years.

In some villages, women spent up to six hours a day on average fetching water which adversely affects their health, economic productivity, and the social well-being of the entire household. Often girls are taken out of school during summer to fetch water or to take care of their siblings while their mothers are searching for drinking water. Tensions in the communities increased as a result of the water scarcity and sometimes entire villages are forced to migrate in search of water, work, and fodder for their cattle.

The main development responsibilities and part of the legislative powers in the water sector rest with the State government. Though the central government has some leverage, in general it does not have enough power to coordinate institutional issues. The problems of ensuring the sustainability and quality of the drinking water supply and enhancing the participation of local communities are further hampered by the fact that "legislative power, technical capabilities, planning skills, and operational responsibilities are dispersed across

government layers [which is why], water institutions in India remains legally weak, functionally disjoint, sectorally biased, and regionally uncoordinated." [Saleth and Dinar 1999: 28].

In Gujarat the responsibility for domestic water supply is shared between the elected local governments—the *Gram Panchayat* (village council) and *Zilla Panchayat* (block council)—and the Gujarat Water Supply and Sewerage Board (GWSSB). The GWSSB is responsible for the construction and maintenance of large-scale piped water supply schemes. Small water supply schemes are built either by the *Gram Panchayats* or the GWSSB but are operated by the local *Gram Panchayat.* Over the last 3 to 4 years, participation and decentralization have been strengthened and more responsibilities have been transferred to the local water boards and *Pani Samittees* (village water committees) or *Gram Panchayats.*

A project of great controversy is the construction of the Sardar Sarovar Dam on the Narmada River. Water from this dam is brought over a distance of 700 kilometres to the water-starved regions of Kutch and Saurashtra.

## 2.3 Urban Water Supply in Gujarat

**The National Context**

It is often assumed that Urban Water Supply is typically the responsibility of the State. The 74$^{th}$ amendment to the constitution ratified a decentralisation process that sought to transfer powers, resources, and tools to the ULBs so as to improve their responsiveness to locally felt needs. However, the ground level reality is more complex as water is dealt with at all three tiers of government—Central Government, State Government, and local bodies levels at the village level (Panchayats) and cities (Nagarpalikas) [Joshi, 2004].

- Decision making power in certain parts of the water sector such as irrigation, hydropower, flood control, and so on rests partly with the Central Government.
- The Central Government plays an active role in policy reform. "While recognizing that the urban sector is a State subject (administered by State governments), and water and sanitation are local issues with predominantly local solutions, the Government of India (GoI) believes it has an important and useful role to play in facilitating reforms in urban water supply and sanitation services." [ The Ministry of Urban Development and Poverty Alleviation (MoUD&PA): 1]. Specifically, the MoUD&P seeks to increase the role of the private sector in improving the urban water supply.
- The Central Government has initiated a number of programs to support reform and up-grading of the quality of urban water supply such as:
  - The '*Urban Reform Incentive Fund*' has been established to enhance the creation of efficient urban land markets and develop the legal and tariff framework to advance urban governance and utility reforms.
  - The '*City Challenge Fund*' to fund part of the transition costs for a city government or public service provider to advance systematically towards creditworthiness and a sustained improvement in public services.
  - The *Pooled-Finance Mechanism* to enhance the ability of small towns to access capital markets in a cost-effective manner and on better terms than if each tried to access the market individually.
  - The *Accelerated Urban Water Supply Programme* which was initiated in 1993 – 1994 to improve the water supply in small towns with a population of less

than 20.000. This program is jointly funded by the Central and State Government.

Table 1 shows that the allocation of public funds has gradually shifted toward Rural Water and Sanitation. This shift becomes even more pronounced when the rapid growth of the urban population is taken into account.

*Table 1: Plan Outlays on Water Supply and Sanitation in India (in millions of Rupees –current prices). Source : Padwal*

| Plan Period | RWSS* | % public sector outlay | UWSS* | % public sector outlay | Total Amount |
|---|---|---|---|---|---|
| 1951-56 (1st plan) | 60 | 0.18 | 430 | 1.28 | 490 |
| 1956-61 (2nd plan) | 280 | 0.42 | 440 | 0.65 | 720 |
| 1961-66 (3rd plan) | 163 | 0.19 | 894 | 1.04 | 1,057 |
| 1969-74 (4th plan) | 1,550 | 0.98 | 2,820 | 1.77 | 4,370 |
| 1974-79 (5th plan) | 4,812 | 1.22 | 5,494 | 1.40 | 10,307 |
| Annual | 2,322 | 1.85 | 1,979 | 1.58 | 4,302 |
| 1980-85 (6th plan) | 22,803 | 2.34 | 17,667 | 1.81 | 40,470 |
| 1985-90 (7th plan) | 35,557 | 1.98 | 29,658 | 1.65 | 65,225 |
| 2 Annual Plans(1990-92) | 27,059 | 1.97 | 17,214 | 1.26 | 44,272 |
| 1992-97 (8th plan) | 107,288 | 2.47 | 59,823 | 1.38 | 1,671,110 |
| 1997-2001 (9th plan) | 209,140 | 2.43 | 186,240 | 2.16 | 395,380 |

RWSS : Rural Water and Sanitation UWSS : Urban Water and Sanitation

It is clear that the public funds made available do not? nearly suffice to meet the demand for investment to keep up with the fast growing urban population. ADB estimates that around Rs. 10,000 Crore (€ 2 billion) annually is needed to provide the entire urban population with basic amenities such as water, sanitation, street lighting, and drainage. However, an ADB study found that the performance of ULBs is weak in financial terms [ADB 2002]:

- 40% to 60% of the produced water is lost due to leakage and theft.
- 50% of revenues are lost due to inefficient billing and collection.
- Tariff are too low and do not reflect the actual costs of operation and maintenance costs (O&M).

Consequently, costs of water supply are in excess of the recoveries in around 76% of the Indian cities. In Delhi water rates are among the lowest in the country and as a result the Delhi Jal Board ran into a deficit is 46.8% in the financial year 1999 – 2000.

**Water Tariffs Structures**

A uniform volumetric charge: irrespective of the actual consumption an annual or monthly fee is charged for a connection to the water supply network. This tariff structure does not provide any incentive to save water but is common in low-income areas where water meters are often not installed.
A linear water charge,: water charges rise linear with consumption. Water utilities in Kerala have adopted such a tariff structure.
Increasing block tariffs: in this price structure the consumer is billed an increasing higher rate per unit of water when his consumption exceeds certain volumes. This tariff system provides incentives to limit consumption. Water utilities in Bangalore, Delhi and Hyderabad use block tariff for domestic and non - domestic supplies.

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Similar to many other countries, India seeks to increase the involvement of the private sector to meet the shortfall of available funds and improve the performance of ULBs. The (ideological) debate whether privatisation of the urban water supply will actually improve the quality of the water supply for the urban poor is beyond the scope of the case study.

However, in any case privatisation is likely going to give small and medium scale cities—accounting for 75% of India's urban population—a go bye as:

- Engaging the private sector in a meaningful manner requires skills and capacity that are generally not available with smaller towns.
- Economies of scale make it more interesting for private companies to focus on India's metropolitan cities.

Finally, the private sector becomes invariably a synonym for very large (multinational) corporations while small and medium-scale private water providers are hardly considered despite that private water suppliers already play an important role.

**The Local Context**

Within the State of Gujarat there are a multitude of institutions that involved in urban water supply (see Table 2). However, the most important institutions are the Gujarat Water Supply and Sewerage Board (GWSSB) and the Municipal Corporations (larger cities) or Municipalities (small and medium cities).

*Table 2 : State and Local Institutions that are involved in (urban) water supply*

| Agency | Jurisdiction | Role |
|---|---|---|
| **Administration and regulation** | | |
| Department of Narmada, Water Resources, & Water Supplies | State level | – Regulatory oversight of the water sector in the State<br>– Oversight of State government owned corporations involved in the Implementation and operation of water schemes. |
| Department of Urban Development | State level | – Oversight of urban local bodies, excluding corporations, in matters of financial, planning and management issues.<br>– Regulation of political and administrative appointments in the local authorities. |
| Municipal Corporations | Major cities | – Provision of retail water supply services for domestic and industrial purposes in the area of their jurisdiction |
| Municipaliities & Nagar Palikas | Smaller Cities | – Provision of retail water supply services for domestic and industrial purposes in the area of their jurisdiction. |
| Gram Panchayats | Villages | – Provision of retail water supply services for domestic and industrial purposes in the area of their jurisdiction. |
| Gujarat Industrial Development Corporation | State level | – Provision of retail water supply services in industrial estates owned by GIDC. |
| **Implementation and Operation** | | |
| Gujarat Water Supply and Sewerage Board (GWSSB) | State level | – Mainly Implementing water supply and sewerage schemes for urban local bodies.<br>– Operation of some schemes.<br>– Inspection of schemes where State government fund is provided. |
| Gujarat State Drinking Water Company Limited | | – Bulk transmission and bulk supply of drinking water to local bodies, GWSSB, and Industrial estates. |
| Sardar Sarovar Narmada Nigam Ltd. | State level | – Wholesale supply of water. |
| Department of Narmada, Water Resources, and Water Supplies | State level | – Operation and maintenance of some river schemes like the Ukal Dam. |

The role and responsibilities of the GWSSB and local urban authorities vary according to the size and legal status of the city: in large cities the municipal corporations play a lead role while GWSSB's role is prominent in medium and small cities (see Table 3)

*Table 3 : Responsibilities of GWSSB and local authorities (source : Gujarat Infrastructure Development Board)*

| **ROLES AND RESPONSIBILITIES FOR VARIOUS SCHEMES** | | | |
|---|---|---|---|
| Schemes | Implementation | Financing | Operations & 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 | GWSSB | GWSSB | GWSSB |

Notably, Ahmedabad was the first Indian city to issue municipal bonds to attract financial resources needed to finance an expansion and upgrading of basic amenities. However, these developments are limited to Ahmedabad with its 5 million people.

## 2.4 Urban water supply in Bhuj

Within Bhuj the local water board is responsible for the piped water supply. Water is being pumped from various places within and just outside the city. However, the inner city, within the old city walls, gets water from a different source than those areas at the periphery of the city. Surveys carried out by the All India Disaster Mitigation Institute (AIDMI) hint that the quality of the water in the inner city is considerably better than elsewhere.

Chapter 1.4 already illustrated that the poor never figured in the reconstruction plans. The reconstruction of the piped water supply is not exception to this. Till date, the piped water supply that was severely damaged during the earthquake has still not been repaired in the low-income neighbourhoods in Bhuj. Moreover, alternative water sources such as rainwater harvesting were never considered during the planning of the reconstruction of Bhuj.

## 2.5 Synthesis Urban Water Supply in Bhuj

Except for its historical inner-city and the devastation caused by the 2001-earthquak, there is little that separates Bhuj from any other of India's countless small towns. These are the places where the large majority of India's urban poor live.

Droughts are no longer rural phenomena only; an increasing number of Indian cities are facing increasingly severe water shortages. In particular, during the hot Indian summer. The Central and the State Governments have launched a number of schemes to address the urban water crisis. It needs to be seen whether these schemes manage to address the water problems of the urban poor.

# 3 Productive uses of water in urban areas: an explorative study[3]

## 3.1 The case study area

The case study areas were randomly sampled from All India Disaster Mitigation Institute's (AIDMI) AIDMI's project areas in the city of Bhuj. All areas are low-income areas on the periphery of Bhuj. None of the areas are part of the ongoing reconstruction program initiated by government. All areas are dominated by one single caste or community except for Ravalwadi, Ahsapuranagar, and Jantanagar where two castes (or Hindus an Muslims) form more or less equal parts of the population.

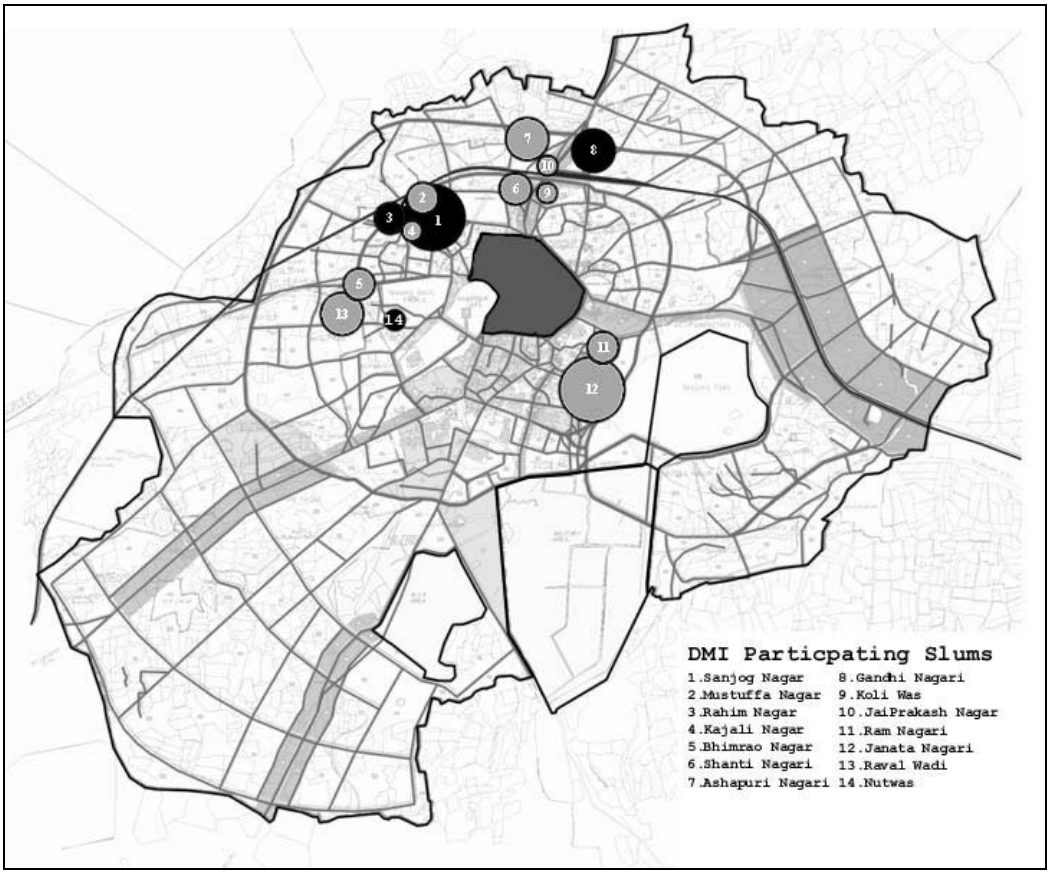


*Figure 4 : Map of Bhuj with AIDMI project area (circles) and research area (light grey circles). Historic centre dark grey in the centre. Source : AIDMI*

The basic characteristics of the 10 low-income study areas are presented in Table 4 (overleaf) presents. The data show that:

[3] For an explanation of the data collection methodologies used refer Annex A

*Table 4 : Basic characteristics of study areas (Source : AIDMI and PRA)*

| Area | Population | Distance from Centre (km.) | Density (persons/hec-tare) | Dominant community | Legal status | Average monthly income**** | Type of house | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Pakka* (%) | Kachcha** (%) | Tent*** (%) |
| Ramnagari | 5,000 | 1 | 1,250 | Vaghri | Illegal | 1,629 | 40 | 60 | 0 |
| Ashapuranagar | 1,635 | 4 | 1,022 | Rajgor | Illegal | 1,071 | 75 | 15 | 10 |
| Kajalinagar | 580 | 3 | 363 | Muslim | Illegal | 1,843 | 30 | 70 | 0 |
| Ravalwadi | 1,000 | 3 | 313 | no | Illegal | 1,414 | 30 | 70 | 0 |
| Shantinagar | 2,530 | 3 | 703 | Muslim | 60% Illegal, 40% Legal | 1,375 | 50 | 40 | 10 |
| Mustufanagar | 1,105 | 3 | 345 | Muslim | Illegal | 814 | 60 | 40 | 0 |
| Bhimravnagar | 800 | 3 | 400 | Vankar | Illegal | 600 | 20 | 80 | 0 |
| Jantanagari | 6,000 | 1 | 1,875 | Muslim | Illegal | 711 | 10 | 90 | 0 |
| JayPrakashnagar | 600 | 1.5 | 750 | Rajgor | 98% Illegal, 2% Legal | 1,000 | 85 | 15 | 0 |
| Kolivaas | 675 | 1.25 | 844 | Koli | Illegal | 750 | 65 | 30 | 5 |
| **Average/total** | **19,925** | 2.4 | 786 | | | **1,121** | **47** | **51** | **3** |

* pakka house is a house built with durable materials such as stone, bricks, concrete flooring, and tile roofing

** Kachcha house is a house built with non-durable materials such as clay, non-baked bricks, thatch roofs.

*** part of the population is still living in houses built with the material that was distributed during the after math of the earthquake such as tarpaulin sheets.

**** the income refers to the personal income of the women participants of the PRA exercise and not to the entire household income.

- Most neighbourhoods are dominated by one particular community (caste). Hence, it is likely that most people have a strong local social network which strengthens their livelihoods.
- The daily individual income (of the participants of the PRA exercise) varies between € 0.33 and € 1.03. This puts most of them well below the poverty line of US$ 1 a day threshold as defined by the World Bank. The low economic status of the people living in the study area is corroborated by the high percentage of households living in non-permanent (=pakka houses).
- In line with expectations, population density shows a strong correlation with the distance to the centre of the city (Pearson correlation -0.60; σ = 0.063); population density decreases for neighbourhoods further away from the centre.
- All neighbourhoods, with the exception of one, have an illegal status. However, as most of the neighbourhoods have piped water supply most of them are *de facto* recognised by the municipal corporation.

## 3.2 AIDMI's Bhuj Reconstruction Program

**Impacts of the Earthquake on Urban Livelihoods**

The 2001-earthquake had a devastating and long lasting on the poor in urban and rural areas. Earlier reviews showed that the livelihoods of the poor were severely affected and that recovery is slow and tedious at best. In many cases, people are not able to restart their original occupation and become dependent on occupations that are less stable or financially less rewarding.

Secondly, the earthquake damaged the existing piped water supply systems; approximately 60% of the respondents noted that the quality of the water supply had deteriorated as a result of the earthquake. As mentioned before, in contrast to the inner city the piped water supply in the poor areas in the urban periphery has not been repaired yet.

**Livelihood Reconstruction Program and the Chamber of Commerce for Small Businesses**

AIDMI initiated the Bhuj reconstruction program with three objectives:

- To build and increase livelihood security.
- To improve and promote shelter security.
- To give poor victims a voice in the town planning process of Bhuj that was initiated as part of the reconstruction of Bhuj.

Through these three objectives, the program seeks to address four basic human securities: water security, livelihood security, shelter security, and food security. The program covers 14 of the 37 major slum areas in Bhuj.

**Box : AIDMI's rehabilitation and reconstruction activities in low-income areas of Bhuj**

Mitigating urban risk with livelihood support

The most vulnerable earthquake victims were provided with support to rebuild their livelihoods. Support is provided is by replacing livelihood assets that have been lost during the earthquake. Till now more than 1,500 beneficiaries belonging to the following categories have been provided with support:

- Small business men and women such as street vendors, shop keepers, and so on.
- Home based workers such as tailors, etc.
- Daily wage labourers such as plumbers, carpenters,

Safe Shelter Construction
Slum dwellers in Bhuj city have been left out from the reconstruction process for a long time. AIDMI initiated the Bhuj Reconstruction Program with the purpose to reach out to these specific groups. In total, AIDMI reconstructed the houses of around 200 families.

Capacity Building
AIDMI has built the capacity of the involved communities groups with the purpose to gradually develop them into partners, strengthen their livelihood related skills, and increase their capacity to cope with future disasters.

Right to information
Through a series of publications, AIDMI has informed slum dwellers about the ongoing reconstruction activities and re-planning of Bhuj, the water predicament, earthquake resistant building methods, and so on.

Chamber of Commerce and Industries for Small Business (CCISB)
The CCISB was established in February 2004 and has at present around 1,200 members, many of them of them have received livelihood support from AIDMI. The CCISB assist its members in the continuous development of their livelihoods by providing micro-credit and business development services. The CCISB is being recognised as key-initiative in the urban risk mitigation sector.

Alfa Vimo
This micro-insurance scheme makes its 632 participants less vulnerable against future disaster events. The scheme covers house and house contents, livelihood assets and stocks, personal accident, and death.

AIDMI's livelihood relief program was reviewed in 2004. The review concluded that:

- AIDMI managed to reach to people who had not received any prior assistance - 99% Bhuj of the beneficiaries in Bhuj received assistance for AIDMI only.
- Respondents indicated that livelihood is the most important need (99.1%) and recovery is not possible without AIDMI's intervention (93.2%).
- The factor that stopped the poor from rebuilding their livelihoods is lack of financial resources and poor access to formal credit facilities.
- The livelihood relief provided by AIDMI lead to a significant increase of income from Rs. 49 to Rs. 67 per day.

[Verhagen 2003]

## 3.3 Urban livelihoods

DFID has defined a sustainable livelihood as the set of capabilities, assets, and activities that are required to provide for a means of living. Sustainability is the capacity to cope and recover from shocks and stress without jeopardizing the livelihood of future generations. [DFID 2001].

The livelihood approach starts from the individual (household) and argues that everybody will develop a livelihood strategy[4] on the basis the access to the following five livelihood capitals;

- Human capital – skills, knowledge, capacity to work, etc
- Social capital – networks, membership of more or less formal groups (saving and credit groups)
- Natural capital – land, water, forest produce, etc.
- Physical capital – means of production, tools, infrastructure, energy
- Financial capital – savings, access to credit, jewellery

**Urban Livelihoods**

It is commonly presumed that urban livelihoods are distinctly different from rural livelihoods. but closer study reveals However, Farrington et al [2002] argues that differences are subtle, complex and hard to define because of:

- growing interdependence of urban and rural livelihood systems
- the blurred and unclear definitions of urban areas
- the widely varying and dynamic characteristics of urban areas

He identifies a number of broad patterns that between archetypical urban and rural livelihoods

*Table 5 : Differences between typical urban and rural livelihoods (source: Farrington et al 2002: 8)*

| Rural | Urban |
|---|---|
| Livelihoods drawn from crop cultivation, livestock, forestry or fishing (i.e. key for livelihood is access to natural capital) | Livelihoods drawn from labour markets within non-agricultural production or making/selling goods or services |
| Access to land for housing and building materials not generally a problem | Access to land for housing very difficult; housing and land markets highly commercialised |
| More distant from government as regulator and provider of services | More vulnerable to 'bad' governance |
| Access to infrastructure and services limited (largely because of distance, low density and limited capacity to pay?) | Access to infrastructure and services difficult for low-income groups because of high prices, illegal nature of their homes (for many) and poor governance |
| Fewer opportunities for earning cash; more for self-provisioning Greater reliance on favourable weather conditions | Greater reliance on cash for access to food, water, sanitation, employment, garbage disposal |
| Access to natural capital as the key asset and basis for livelihood | Greater reliance on house as an economic resource (space for production, access to income-earning opportunities; asset and income-earner for owners –including *de facto* owners) |
| Urban characteristics in rural locations (e.g. prosperous tourist areas, mining areas, areas with high value crops and many local multiplier links, rural areas with diverse non-agricultural production and strong links to cities...) | Rural characteristics in urban location (urban agriculture, 'village' enclaves, access to land for housing through non-monetary traditional forms...) |

[4] It needs to be noted that 'strategy' presents a too rosy picture as it suggest a certain degree of control and choice for the poorest of the poor. Survival, in their case, is a matter of day-to-day compulsion rather than choosing best available options.

## 3.4 Water supply in study area

In all ten research, people areas are using multiple sources to meet their water demands (refer Table 6). Moreover, the PRA exercises showed that 32% of the women need to go outside their own neighbourhood to fetch water.

*Table 6 : Type of water sources in research areas (source :*

| Type of Water Source / Name of Neighbourhood | Private Connection legal | Private Connection Illegal | Stand post | Well | Handpump | Water Vendor | Tanker | Other |
|---|---|---|---|---|---|---|---|---|
| Ramnagar | X | X | X | | | | | Tank at temple |
| Ashapuranagar | | X | X | X | | X | | |
| Kajalinagar | X | X | | | X | X | | |
| Ravalwadi | X | | | | | | Private | |
| Shantinagar | | | | X | | | | Private Bore well |
| Mustufanagar | | | | X | X | | Municipal | |
| Bhimravnagar | X | | | | | | | |
| Jantanagari | X | X | X | | X | | Municipal | Private Bore well |
| JayPrakashnagar | X | X | X | | | | | |
| Kolivaas | x | X | | | | | | |

Data collected regarding the quality of the piped water supply indicate that the use of multiple sources is a clear necessity born out of the poor quality of the piped water supply in the research area. Table 7 shows that water is only available 1.23 hours a day and that only during part of the year. Secondly, only in half of the neighbourhoods the water provided by the municipality is fit for human consumption.

*Table 7 : Quality of municipal piped water supply (source : PRA in 10 slums)*

| | Hours per day | Days per month | Months per |
|---|---|---|---|
| Reliability | | | |
| average | 1.23 | 19.9 | 7.9 |
| minimum and maximum values | 0.5 hrs - 2 hrs | 15 - 28 days | 6 - 11 months |
| Quality | | | |
| Fit for human consumption | 5 out of 10 neighbourhoods | | |
| Fit for livestock only | 3 out of 10 neighbourhoods | | |
| No piped water supply | 2 out of 10 neighbourhoods | | |

On average, participants in the PRA exercise consume 40 litre of drinking water[5]; they spent Rs. 176 per month on drinking water and Rs. 80/- on water for domestic purposes.

The water provided by the municipal water board through the public stand posts and private is the cheapest. When this supply fails poor households to end up spending more money to meet their daily water needs (refer Table 8). Secondly, the table shows that there are limited options to save scarce financial resources by spending more human energy. This in is contrast with many rural areas. It needs to be noted that drinking water is often fetched from different sources as water for domestic uses. For instance, handpumps that provide potable water are often private property and the owner charges Rs. 2/- for one matka of water (approximately 10 to 15 litres of water) whilst water from handpumps that is not fit for human consumption is common property and is available for free.

*Table 8 : Monthly costs of water for drinking and domestic purposes (source : PRA in 10 slums)*

| Connection | | Monthly Costs (INR) |
|---|---|---|
| **Drinking Water** | | |
| Piped Water Supply | Illegal connection | 0 |
| | Stand post | 0 |
| | Private connection (one-time installation costs) | 1,410 |
| | Private connection (monthly tax) | 30 |
| Other sources | private connection elsewhere | 64 |
| | private vendor | 738 |
| | well | 71 |
| | handpump | 371 |
| | private tanker | 61 |
| **Domestic water** | private connection elsewhere | 0 |
| | well | 58 |
| | handpump | 0 |
| | private connection | 65 |
| | government tanker | 0 |
| | private tanker | 650 |

[5] Many households store water for domestic purpose or order a private tanker during the PRA exercise a number of participants gave an estimate of their total storage capacity rather than the daily consumption. Secondly, for many households water of livestock is considered to be water for domestic purposes rather than water for livelihood.

Finally, many households have illegally obtained their private connection to the piped water supply network. It is likely that bribes need to be paid to obtain such connection but not surprisingly respondents were not willing to provide further detailed information on this.

## 3.5 The potential of a multiple uses approach in the slum areas of Bhuj

To estimate the costs of a substandard water supply and the benefits of an improved water supply—designed to meet drinking and domestic needs as well as needs for home-based economic activities—two approaches were followed:

- Costs of time spent on fetching water and estimated benefits of reducing this time to approximately half an hour a day. This approach mostly focuses on women as they are responsible for fetching water within the household. Data were collected through PRA exercises in low-income neighbourhoods.
- Water as a direct input into the livelihood of the poor. Many livelihoods need water. A substandard water supply will have a direct impact on these livelihoods. Data were collected through a structured survey amongst 100 micro entrepreneurs who use water in their livelihoods.

### 3.5.1 Time-activity profiles of women entrepreneurs

Many women across the world spend a considerable amount of their time and energy on fetching water. A study in Patan district (India) found that women spend up to 6 hours a day on fetching water [Verhagen 2004]. Hence, an improved water supply results has the potential to alleviate poverty as time savings could be allocated to economic activities. Visa versa, a substandard water supply comes at a considerable cost of the poor in urban and rural areas.

In the research area, it was found that:

- During times when the water supply is 'normal' women spend 3.22 hrs per day on fetching water for their families. Given an average daily wage of Rs. 40, the maximum opportunity costs[6] of the substandard water supply are Rs. 16 per day per person (refer Table 9 overleaf).
- When the water supply breaks down, women spend more than twice as much time on this task (6.54 hrs per day). For this purpose, time is reallocated from economic activities (1.42 hrs) and personal activities (1.8 hrs). On basis of the average number of days the water supply breaks down, it is estimated that each women forgoes Rs. 17.75 of income per month (for more detailed information refer Table 9 overleaf)
- Finally, women were asked to estimate how they would allocate their time savings in case the water supply would improve to a level where they would have to spend 1 hour a day on fetching water. Women state that they would spend 2.92 hrs more on economic activities on average. However, this figure needs be seen as an indication only as it cannot be assumed that sufficient economic opportunities will be available (refer Table 9 overleaf).

[6] Realistically, actual opportunity costs are lower as (1) women are unlikely to allocate their entire time savings to economic activities and (2) economic opportunities might not be sufficiently available.

*Table 9 : Time activity profiles of women (N = 10 focus group discussions)*

| Main Category | | Normal situation | | Breakdown | | | Improved | | |
|---|---|---|---|---|---|---|---|---|---|
| | | **Hrs** | **%** | **Hrs** | **%** | **Difference** | **Hrs** | **%** | **Difference** |
| **Water related** | Drinking water | 1.18 | 4.9% | 2.54 | 10.6% | 1.37 | 0.33 | 1.3% | -0.85 |
| | Domestic water | 1.55 | 6.5% | 3.13 | 13.0% | 1.58 | 0.53 | 2.2% | -1.03 |
| | Water for livestock | 0.21 | 0.9% | 0.33 | 1.4% | 0.12 | 0.06 | 0.2% | -0.15 |
| | Water for economic activities | 0.28 | 1.2% | 0.55 | 2.3% | 0.27 | 0.10 | 0.4% | -0.18 |
| **Total water** | | **3.22** | **13.4%** | **6.54** | **27.3%** | **3.32** | **1.01** | **4.2%** | **-2.21** |
| **Household** | | **4.33** | **18.0%** | **4.23** | **17.6%** | -0.10 | **4.48** | **18.5%** | **0.15** |
| **Economic activities** | Economic activities | 4.58 | 19.1% | 3.40 | 14.2% | -1.18 | 6.93 | 28.6% | 2.36 |
| | Expenditure saving | 0.75 | 3.1% | 0.51 | 2.1% | -0.24 | 1.31 | 5.4% | 0.56 |
| **Total economic** | | **5.33** | **22.2%** | **3.91** | **16.3%** | **-1.42** | **8.24** | **34.0%** | **2.92** |
| **Personal activities** | Sleep | 8.28 | 34.5% | 7.76 | 32.3% | -0.52 | 8.31 | 34.3% | 0.03 |
| | Personal care | 1.03 | 4.3% | 1.03 | 4.3% | 0.00 | 1.03 | 4.3% | 0.00 |
| | Social activities | 1.82 | 7.6% | 0.59 | 2.5% | -1.22 | 1.17 | 4.8% | -0.65 |
| **Total personal** | | **11.13** | **46.4%** | **9.33** | **38.9%** | **-1.81** | **10.51** | **43.4%** | **-0.62** |
| **Total** | | **24.00** | | **24.00** | | | **24.23** | | |

Secondly, women were asked to estimate how much time they lost during the last week due to a bad water supply. This exercise was carried out to triangulate the findings of the time-activity profile, however it needs to be noted that the findings presented in Table 10 show the combined impact of a breakdown of the supply and the poor quality of this service in general.

*Table 10 : Income forgone due to sub-standard quality of the piped water supply*

| Neighbourhood | Weekly income | Time lost last week | Income lost last week |
|---|---|---|---|
| Ramnagari | 380 | 18.0 | 147 |
| Ashapuranagar | 250 | 14.0 | 67 |
| Kajilnagar | 430 | 10.8 | 121 |
| Ravalwadi | 330 | 10.1 | 94 |
| Shantinagar | 321 | 11.7 | 92 |
| Mustafanagar | 190 | 13.6 | 101 |
| Bhimravnagar | 140 | 5.8 | 40 |
| Jantanagar | 166 | 20.3 | 103 |
| JayPrakashnagar | 233 | 3.0 | 27 |
| Kolivaas | 175 | 9.0 | 53 |
| | **262** | **11.6** | **85** |

It was found that:

- On average, women forgo an income of Rs. 85 per week due to a substandard water supply. In other words, providing people with a reliable and easy accessible water supply has the potential of increasing the income of women with 32%.
- The findings of the time-activity profile do clearly point into the same direction as they both show large potential benefits of an improved water supply. However, different exact monetary benefits were found as the second exercise (loss of income due to bad water supply) asked women to estimate the actual losses during the week before the visit of the field team. In the time activity profile women were asked to estimate the potential benefits of an improved water supply.

### 3.5.2 Time and money spent on water for enterprise activities

With a few exceptions, investigated enterprises needed water. This water comes at a cost, even when not all economic activities require water suitable for human consumption. Excessive costs, production time or money, will hamper the profitability of the enterprise. To get a better understanding of the above issues, 100 selected micro-entrepreneurs[7], who all need water as an input for their enterprise, filled a questionnaire. This section discusses the outcomes of the questionnaire.

**Use of water in livelihoods**

The questionnaire that was carried out by the AIDMI in the research areas reveals a large range of livelihoods that use water (Table 11). Clearly, water is not only needed for human consumption but also to sustain many of the fragile livelihoods of the poor. Daily water consumption ranges from 20 litres for pan shops and vendors of animal fodder to 1,000 litres

[7] The micro-entrepreneurs were selected from the register of the Chamber of Commerce for Small Businesses which has been established by AIDMI for continued support to the beneficiaries of their livelihood relief program. From each of the research neighbourhoods, 10 micro-entrepreneurs have been randomly selected.

a day for masons. However, as the sample size for each of the individual livelihoods is very small, the data on average water consumption should be seen as an indication only. Finally, it needs to be noted that not all livelihoods will use local sources to meet their water demand. For instance, masons typically travel to a construction site and in case water is needed a water tanker is ordered.

*Table 11 : urban livelihoods in Bhuj that need water (source: questionnaire)*

| Type of livelihood | Description/remarks | Water inputs | Indicated water consumption[8] | N | Quality of water needed |
|---|---|---|---|---|---|
| Animal husbandry | Livestock rearing is only done by certain communities – Muslims and Rabaris | Water for livestock, bathing of livestock, preparation of fodder, washing of milk cans, preparation of butter milk, thinning of milk | High | 17 | Drinkable |
| Auto rickshaw | | Cleaning auto-rickshaw | Low | 1 | clean and non-saline |
| Blacksmith | | Cooling of iron, extinguish fire | Low | 2 | clean and non-saline |
| Block and screen printing | | Printing process | High | 1 | Drinkable |
| Broom vendor | | Wetting of brooms | Medium | 1 | clean and non-saline |
| Cobbler | | Cleaning of leather, cleaning of workplace and tools | Medium | 1 | clean and non-saline |
| Cold drinks vendor | | Making cold drinks, washing of utensils | Medium | 3 | Drinkable |
| Cycle repairing | | Repair of punctures, cleaning of clothes | Low | 2 | clean and non-saline |
| Dairy products vendor | | Preparation of butter milk | Low | 1 | Drinkable |
| Dobhi | Wash(wo)man | Washing of clothes | Medium | 9 | Drinkable |
| Fishery | | Wash fish, keep fish wet, wash bags in which fish is kept | Medium | 3 | clean and non-saline |
| Flour mill | | running of flour mill | High | 1 | clean and non-saline |
| Fodder vendor | For the preparation of additional fodder for livestock water is needed | Preparation of fodder | Low | 1 | clean and non-saline |

[8] Levels of water consumption: low – less than 50 litres daily; medium – between 50 and 200; high – more than 200.

| Type of livelihood | Description/remarks | Water inputs | Indicated water consumption[8] | N | Quality of water needed |
|---|---|---|---|---|---|
| Mason | | Preparation of concrete and cement, wetting of walls | High | 1 | clean and non-saline |
| Matka vendor | Matkas are traditional earthen pots used to store water | Wetting of clay | Medium | 1 | Drinkable |
| Pan shop | Pan shops sell chewing tobacco, betel nuts, cigarettes | Washing of utensils | Medium | 1 | Drinkable |
| Snack vendor | | Preparation of snacks, washing of clients, washing of utensils | Medium | 31 | Drinkable |
| Tea cabin | | Preparation of snacks, drinking water clients, preparation of tea, washing of utensils | Medium | 10 | Drinkable |
| Vegetables vendor | | Washing of vegetables, vegetable garden | High | 3 | clean and non-saline |
| Water vendor | | Water for vending | Low | 1 | clean and non-saline |

**Buying water for enterprise activities**

The daily water consumption of the investigated enterprises varies between 20 and 1,000 litres. Most of the entrepreneurs buy water. On average, they spend INR 6 per day on fetching water or INR 180 per month or approximately 8% of their total income.

**Time spent on fetching water for enterprise**

The interviews revealed that on average entrepreneurs spend 1 hour and 51 minutes per day on fetching water. Figure 5 shows that a considerable portion of the entrepreneurs even spend more than 3 hours daily on fetching water.

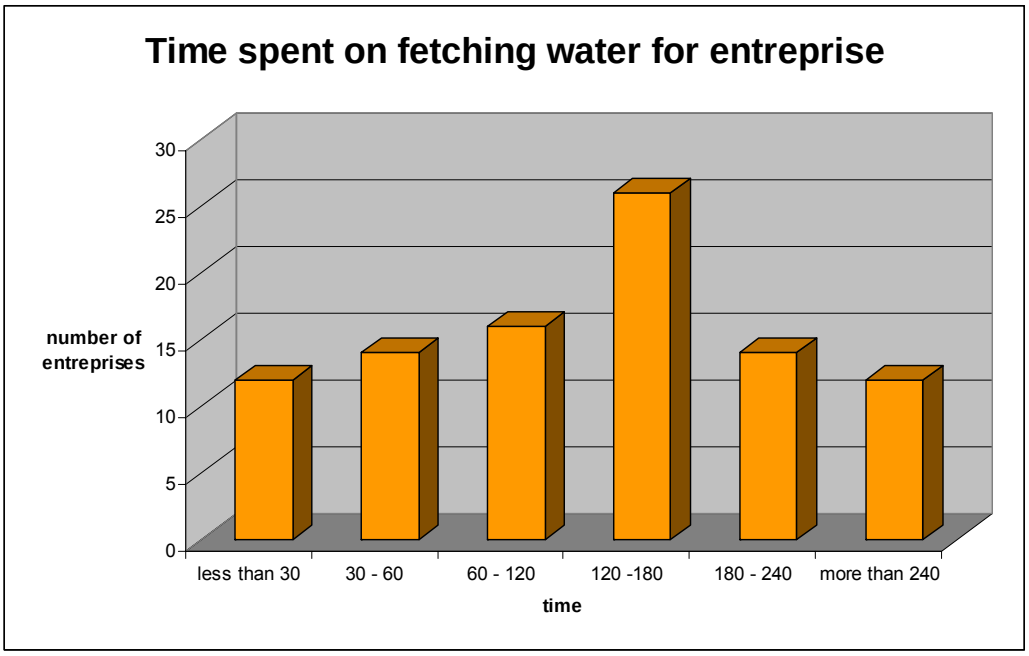


*Figure 5 : Time spent on fetching water for enterprise (N = 94)*

When the entrepreneurs were asked to describe their problems regarding the water supply, many of the answers were directly or indirectly related to the one or more of the production factors: in particular, raw material (availability of water) and human labour (time and energy).

*Table 12 : Most important water supply related problems experienced by micro-entrepreneurs (N = 94)*

| Problem related to water | % of entrepreneurs experiencing this problem[9] |
|---|---|
| irregular supply | 46.8% |
| no private connection | 8.5% |
| quality of water | 16.0% |
| access denied to water | 7.4% |
| Distance | 21.3% |
| physical strain | 37.2% |
| waste of time | 52.1% |
| Expensive | 41.5% |
| no problem | 2.1% |

Table 12 shows three major groups of interrelated problems that are experienced by micro-entrepreneurs:

- Poor quality of the water supply in terms of reliability, quality, and access.
- Entrepreneurs need to travel of large distances to fetch water. This results in a loss of time and energy that have been used for more productive activities.
- Enterprises profits are reduced because entrepreneurs need to pay for water.

[9] The total sum exceeds 100% as entrepreneurs were allowed to mention more than one problem

**Impacts of a deteriorated water supply on enterprise performance**

Sixty per cent of the respondents confirmed that even today the quality of the water supply is inferior as compared to the situation before the earthquake. This, very unfortunate situation, creates the opportunity to further investigate the impacts of a substandard water supply on the performance of micro-enterprises.

The questionnaire findings show that 85% of the entrepreneurs, who mentioned that the quality of the water supply is not back to pre-earthquake conditions, confirm that the income from their enterprise has decreased due to a bad water supply. On average, their monthly income decreased by around INR 500[10].

Figure 6 shows which factors were indicated by the entrepreneurs that experienced a decrease of income:

- More than 80% of the entrepreneurs had to spend more time on fetching water for their enterprise.
- Almost 60% of the entrepreneurs had to spend more money on water.
- In more than 60% of the cases this resulted in a decrease of production.
- Notably, very few entrepreneurs decided to change their livelihood. This might be a confirmation of the vulnerability of the livelihoods of the urban poor.

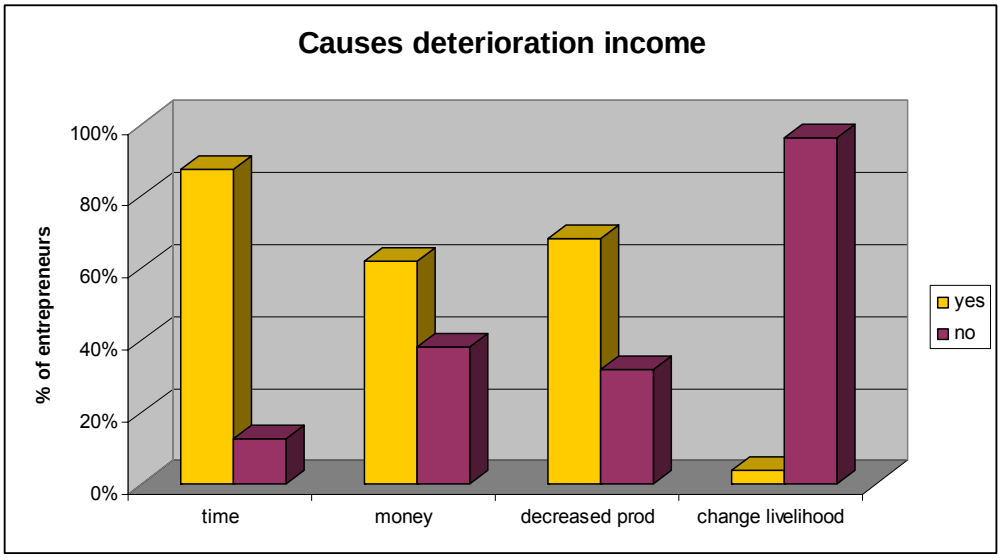


*Figure 6: Causes of decrease income of micro entrepreneurs (N = 50)*

**Potential of an improved water supply**

Finally, the entrepreneurs were asked whether an improved water supply would lead to an improvement of their income. For this purpose, the entrepreneur were asked how much their income would increase in case they would spend a maximum of 1 hour daily on fetching water for their enterprise.

[10] This figure should be considered to be an indication only as the impact of a deteriorated water supply is hard to separate from other factors.

Not surprisingly, almost all—that is 93%—entrepreneurs expect that their income will increase. This would be an estimated average of almost INR 500 per month. Besides earlier mentioned factor such as saving of time and costs, 63% of the interviewed entrepreneurs that an improved water supply will lead to an improved of the quality of their products.

# 4 Conclusions

The study investigated two possible links between the quality of the water supply and poverty:

- A substandard water supply may lead to a loss of time which women could use for other, and in particular economic, activities.
- A substandard water supply may force micro-entrepreneurs to spend more time and money on acquiring water needed for production and hence, reduces profitability of their micro-enterprise.

The findings of the case study confirmed both hypotheses. Poor women in urban low-income areas, just like their sisters in rural areas, spend large amounts of time on fetching water for their families. In case, the piped water supply breaks down this time almost doubles and reduces the time women spend on economic activities.

Many of the livelihoods of the poor require water to prepare snack, lemonade, wash vegetables, drench livestock, and so on. The daily water consumption of investigated micro-enterprises varied from 20 to 1,000 litres daily. Micro-entrepreneurs identified the time, energy, and money that they need to spend on fetching water for their enterprise as factors hampering the profitability of their enterprises. Moreover, they indicated that an improved water supply would increase the income of their enterprises.

Though many households and entrepreneurs pay for water from private vendors, they often expect to get water for free (or for a nominal flat rate) from the government. It is clear that this situation is not sustainable in the long-run. Though water needs to be considered an economic good in urban areas, it needs to remain affordable for the urban poor.

It can be concluded that the pre-dominantly rural, multiple-use concept[11] is applicable in urban situations as well and that improving urban water supply, and in particular beyond domestic needs only, has the potential to contribute to the alleviation of urban poverty. Hence, in light of the rapidly growing global urban population and the complexity of urban poverty, it is strongly recommended that work on the multiple and productive use of water is expanded to include urban and rural areas in equal measure.

The downside of the story is that the poor have no access to adequate water supply for the very reason that they are poor. In other words, drought does not automatically mean an overall shortage of safe water for everybody. Water is often available to better-off groups whilst disadvantaged sections of society are denied easy access to safe water.

The complex and unclear picture of Indian urban administrative landscape with a particular focus on urban supply services that emerged from this case study further compounds the situation. Responsibilities of Central, State, and Local Government are not well-defined, interwoven, overlapping, and often conflicting responsibilities of actors emerged. Addressing

[11] "[that] refers to water used for small-scale, often informal activities whose primary purpose is improved nutrition and/or income generation. And we use the term 'household level' to indicate both the relatively small scale of the activities (and quantities of water) involved, and the primary social unit at which the use of this water takes place. Enabling productive use means providing a quantity of water over and above that needed for purely basic needs." [Moriarty et al 2004a: 21]

urban water supply for the poor outside this administrative reality or in isolation of other urban water sectors seems doomed to fail. More inclusive approaches, such as the Learning Alliance approach advocated by IRC, are more likely to lead to solutions that can be scaled-up and replicated. However, the main challenge for such type of approaches is to get the semi-legal and illegal land brokers—the hidden driving force behind urban expansion—around the table and their connections to urban administrators and politicians above the table.

Finally, an issue that needs more attention is the situation in the urban periphery where rural areas often rapidly transform to more urban settings. Some degree of planning of public amenities in the urban fringe has the potential of averting many future problems. However, present urban experiences bode not well for this low-cost and high-impact approach. Collating good practices is the way forward.

## Glossary

| | |
|---|---|
| AIDMI | All India Disaster Mitigation Institute |
| AMC | Ahmedabad Municipal Corporation |
| BHADA | Bhuj Area Development Authority |
| Crore | Ten million |
| CSE | Centre for Science and Environment |
| GDP | Gross Domestic Product |
| GIDB | Gujarat Infrastructure Development Board |
| GWSSB | Gujarat Water Supply and Sewerage Board |
| IAS | Indian Administrative Service |
| Lakh | Hundred Thousand |
| MoUD&PA | Ministry of Urban Development and Poverty Alleviation |
| RWSS | Rural Water and Sanitation |
| UBL | Urban Local Body |
| UDA | Urban Development Authority |
| UWSS | Urban Water and Sanitation |

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# Annex A Methodological Notes

The sustainable livelihood concept is used tool to link the quality of the water supply with livelihoods and subsequently alleviation of poverty. This case study investigates the link between the quality of the urban water supply and urban livelihoods through the following links:

- Human capital: women across the world spend large amounts of time on fetching water. This time cannot be spent on other (productive) uses [Verhagen et al, 2004]. This case study investigates how much time women spent of fetching water and how time savings of an improved water supply would be allocated.

- Natural capital: water is also being used as a direct input into people's livelihood for instance water for livestock, water to wash vegetables, prepare snack and so on. The case study documents the water needs of different types of urban livelihoods in Bhuj and investigates the impacts of a sub-standard water supply.

Data have been collected through:

- A series of focus group discussions with a group of self-selected women in 10 out the 14 slums where AIDMI is working. The slums were identified through a random sample. The following data have been collected in these focus group discussions:
    - Time-activity profiles
    - Quality of water supply
    - Loss of income as a result of a sub-standard water supply

- A questionnaire was used to collect data from 100 micro-entrepreneurs who need as an input for their production process. The interviewees were selected from a membership list of the Chamber of Commerce for Small Businesses that has been set up by AIDMI. The questionnaire was used to collect data on:
    - Use of water for economic activities
    - Impact of sub-standard water supply on enterprise activities
    - Potential impacts of improved water supply on enterprise activities.

# Annex B State of Gujarat:

## Gujarat – An Overview

**Location and Geography**

Gujarat state came into existence as a separate State on May 1, 1960. The State is situated on the west coast of India between 20-6' N to 24-42' N north latitude and 68-10'E to 74-28'E east longitude. It is bounded by the Arabian Sea in the West, by the States of Rajasthan in the North and North-East, by Madhya Pradesh in the East and by Maharashtra in the South and South East.

The State has an international boundary with Pakistan at the north-western fringe. The two deserts, one north of Kutch and the other between Kutch and the mainland Gujarat are saline wastes.

The State has a long coastline of about 1,600 kilometres: the longest among all States of country. For the purpose of administration, Gujarat State at present comprises 25 districts, sub-divided into 226 talukas (blocks), with 18,618 villages and 242 towns. Gujarat has a geographical area of 196,000 square kilometres and accounts for 6.19 % of the total area of the country.

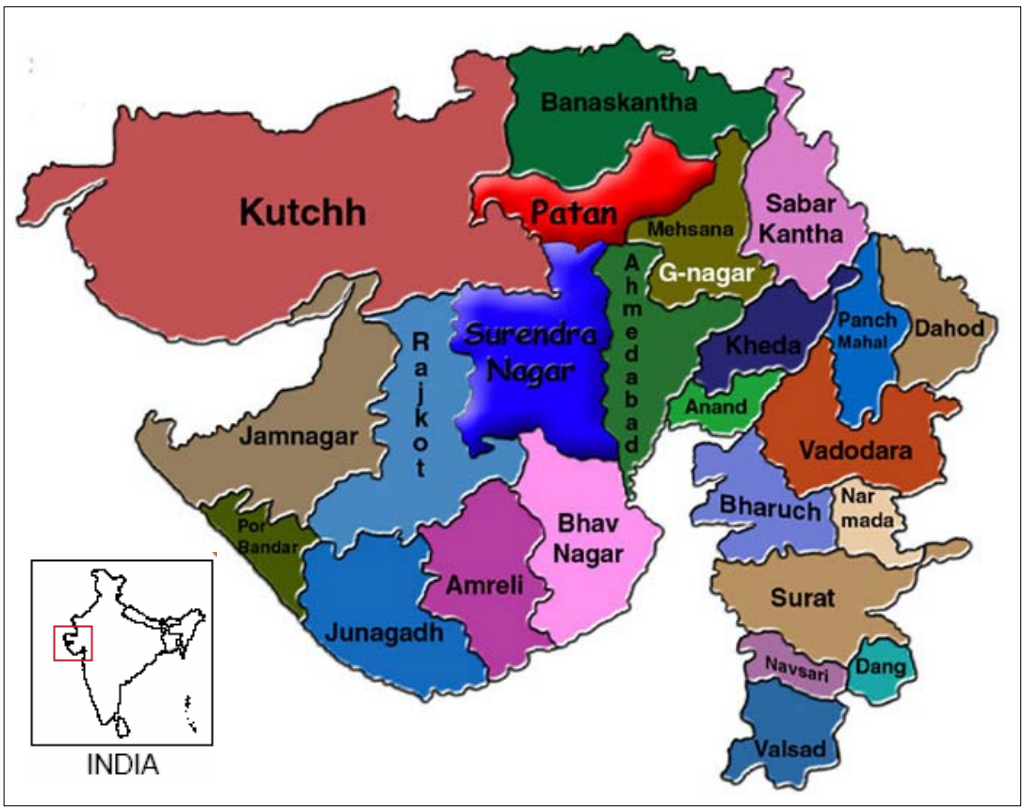


*Figure 7 : Map of Gujarat*

**Population and Literacy**

According to the provisional results of Population Census, the population of Gujarat stood at 50.6 million in 2001, with a density of 258 persons per square kilometre. This is below the national average of 324 persons per square kilometre. The decadal growth rate (1991 – 2001) was 22.48 % compared to 21.19 % in the previous decade. This is slightly above the national average growth rate of 21.3% over the 1990s.

The literacy rate in the State (excluding children in the age group 0-6 years) is 57.8% and 79.7% for women and men respectively. This is slightly above the national literacy rates which are 53.7% and 79.1% for women and men respectively (Census 2001).

**Climate**

Gujarat is located on the tropic of Cancer and the state falls in the sub-tropical climatic zone. But it has a varied climate and can be divided into five climatic regions.

*Table 13 : Climatic Zones of Gujarat*

| Specification | Region |
|---|---|
| Sub-humid | South Gujarat (South of Narmada) |
| Moderately humid | Central Gujarat (between Narmada and Sabarmati |
| Humid and sultry | South facing coastal region on Saurashtra |
| Dry | Region of Central Gujarat |
| Arid and semi-arid | North Gujarat and Kutch |

The various seasons of the year are the monsoon (June to September), winter (November to February) and summer (March to June). Gujarat receives its rainfall from the south-west monsoon (June to September), its maximum intensity being in the month of July and August. The annual average rainfall is only about 300 mm in the north and northwest, but increasing to 2500 mm in the south. The relative humidity in all parts of the state is low. Winds are generally light to moderate, increasing in intensity during the late summer and monsoon.

**Economy**

One of the most industrialized states in India, Gujarat attracts a lot of domestic and multinational investment. The important minerals produced into the state are agate, bauxite, dolomite, fireclay, fluorite, fuller's earth, kaolin, lignite, limestone, chalk, calcareous sea sand, petroleum and natural gas, and silica sand. The state is the main producer of tobacco, cotton, and groundnut in the country. Gujarat also contributes inputs to industries like textiles, oil and soap manufacture.

Gujarat has been the front-runner in the overall economic development of the country, as is evident from the fact that with a mere 6% of geographical area and 5% of the population of India, the state contributes 21% of the country's exports and 30% of stock market capitalization. In 2001, the per capita income in Gujarat was INR 22,065 (approximately € 408[12]), this is well above the national per capita income that stood at INR 17,974 (approximately € 332).

[12] At an exchange rate of € 1 = INR 54.

However, economic development is concentrated in certain parts of the state and there still exist pockets of underdevelopment such as the district of Patan where literacy rates are 55% and 23% for men and women respectively. The economy in these poverty stricken areas is dominated by rain fed agriculture. Here the erratic monsoon keeps the local population trapped in a vicious cycle of poverty and frequent droughts [Verhagen 2004].

## Political Situation

### National and State Government

India has a three-tiered federal democracy, with central, state and district governments. The President is the Head of State and is elected by the elected members of the *Lok Sabha* (the lower house) and the nominated members of the *Rajya Sabha* (the upper house). The President oversees the administrative system. The Prime Minister is the head of the elected government and the council of ministers.

The country is divided administratively into 29 States. The Governor is the head of the State and is appointed by the President. However, in the States the real power lies with the State Council of Ministers which is headed by the Chief Minister. Each of the ministers heads a state government department—the central level equivalent of a department is a ministry. Ministers are assisted by high ranking career bureaucrats from the Indian Administrative Service (IAS), who in turn are assisted by Commissioners, Joint Commissioners, Additional Commissioners, and so on.

In Gujarat, the right wing nationalistic party, the BJP, came to power in the 1998 state assembly polls and has won most of the subsequent polls. In 2001, Keshubhai Patel resigned and handed over power to Narendra Modi. The BJP retained a majority in the 2002 election, and Narendra Modi has since served as Chief Minister of the state. The Gujarat Legislative Assembly consists of 182 members (MLAs).

State Governments are mostly responsible for the delivery of services and policy implementation. However, ground reality often is more complex showing unclear and complex relationships and responsibilities between the Central and State Governments.

### District Administration

Gujarat is divided into 25 districts which are each headed by a District Collectors, the administrative head of a district. The President of the elected Zilla Parishad? (District Council) is the elected head of the district. Each of the Line Departments of the State has a district-level head and staff to carry out implementation activities.

Districts are further subdivided into Talukas (blocks) and Revenue Villages. Most Revenue Villages consist of a number of habitations and are headed by an elected Sarpanch (village head). There are 226 Talukas and around 18,000 Revenue Villages and 242 towns in Gujarat.

## Synthesis on background information State of Gujarat

The State of Gujarat is a well developed State with per capita incomes and literacy rates above the national averages. However, there exist pockets of intense poverty in the state especially in the climatically unfavourable area such as the Patan and Western Kutch.

Gujarat's population of 55 million lives in 25 districts that count a total of 18,000 revenue villages. The State Government is headed by the nationalistic Chief Minister Modi of the Bharatiya Janta Party (BJP). In principle, the State or Line Departments are responsible for the delivery of services and implementation of policies. However, in reality the situation is more complex as the Central Government extends its influence to States.