SUMMARY

Water has become the most commercial product of the 21st century. This may sound bizarre, but true. In fact, what water is to the 21st century, oil was to the 20th century. The stress on the multiple water resources is a result of a multitude of factors. On the one hand, the rapidly rising population and changing lifestyles have increased the need for fresh water. On the other hand, intense competitions among users-agriculture, industry and domestic sector is pushing the ground water table deeper.

To get a bucket of drinking water is a struggle for most women in the country. The virtually dry and dead water resources have lead to acute water scarcity, affecting the socio-economic condition of the society. **The drought conditions have pushed villagers to move to cities in search of jobs. Whereas women and girls are trudging still further. This time lost in fetching water can very well translate into financial gains,** leading to a better life for the family. If opportunity costs were taken into account, it would be clear that in most rural areas, households are paying far more for water supply than the often-normal rates charged in urban areas. Also if this cost of fetching water which is almost equivalent to 150 million women day each year, is covered into a loss for the national exchequer it translates into a whopping 10 billion rupees per year

The government has accorded the highest priority to rural drinking water for ensuring universal access as a part of policy framework to achieve the goal of reaching the unreached. Despite the installation of more than 3.5 million hand pumps and over 116 thousand piped water supply schemes, in many parts of the country, the people face water scarcity almost every year there by meaning that our water supply system are failing to sustain despite huge investments.

In India, there are many villages either with scarce water supply or without any source of water. If there is no source of potable water in 2.5 kilometres, then the village becomes no source water village or problem village. In many rural areas, women still have to walk a distance of about 2.5 kms to reach up to the source of water. She reaches home carrying heavy pots, not to rest but to do other household chores of cooking, washing, cleaning, caring of children and looking after livestock. Again in the evening she has to fetch water. Thus a rural woman's life is sheer drudgery.

Further variation in ground water levels are also causing changes in water quality resulting in an increase. The status of water quality in rural habitation is given in the following table.

Water is the biggest crisis facing India in terms of spread and severity, affecting one in every three persons. Even in Chennai, Bangalore, Shimla and Delhi, water is being rationed and India's food security is under threat. With the lives and livelihood of millions at risk, urban India is screaming for water. For instance, water is rationed twice a week in Bangalore, and for 30 minutes a day in Bhopal; 250 tankers make 2,250 trips to quench Chennai's thirst. Mumbai routinely lives through water cuts from January to June, when some areas get water once in three days in Hyderabad.

Harrowing midnight water for a precious bucket of drinking water is a regular feature for many families of Vypuri an island off the mainland of Kochi. Women have to queue up in front of the public water taps, being at the lag end of the pipeline system, they get water only after the users ahead in the pipeline finish collecting water. There are nights when water pressure dips so low that some women get it after midnight. They split their day between household chores and collecting water.

Apart from the water scarcity caused by Coca-cola in Plachimada, the other districts in the state are facing water crisis. For instance, in Kottayam district at some places, the water scarcity is so acute that people hesist to offer a glass of water to the visitor, which hitherto was a common custom. In the upper Kuttanadu area of the district during summer people collect from a distance of 3-4 kms. Water supply from public taps is erratic and very often even after standing for an hour in the queue; people are not able to get a bucket of water.

Most women and girl children in Rajasthan find themselves in for much of the year. They trudge bare foot in the hot sun for hours over wastelands, across thorny fields, or rough terrain in search of water, often the colour of mud and brackish, but still welcome for the parched throats back home. On an average, a rural woman walks more than 14000 km a year just to fetch water. Their urban sisters are only slightly better off- they do not walk such distances, but stand in the long warding queues for hours on end to collect water from the roadside taps on the water lorries.

In every household, in the rural areas in Rajasthan women and girl children bear the responsibility of collecting, transporting, storing, and managing water. In places, where there is no water for farming, men migrate to urban areas in search of work leaving women behind to fond for the old and the children. Women spend most of their time, collecting water with little time for other productive work. This impacts on the education of the girl child, if the girl is herself not collecting water, she is looking after the home and her siblings when her mother is away.

In brief :-

- Water source being open dug well, the quality of water is poor; dirty, saline and has turbidity.

- Women have to make at least three trips at 5 am, 11 am and 5 pm, sometimes the number of trips is more
- Total distance traveled is 9-10 km, even higher
- Total Time spent is 6-9 hours.
- Total number of pots/buckets is about 3 pots 30-45 litres (one pot of 10-15 litres per trip)
- Due to long distance, they have to take rest in the middle of the way. Dust storm aggravates their problem.
- At some villages water from tube well is too saline to drink. Even animals particularly cow gets indigested after drinking this water, so the villagers add water from the dug well.
- Entire life of women in rural like Jaisalmer is spent on water collection and cooking. Even the girls of 8-10 years cannot be spared. They cannot afford the luxury of school. For instance for Pappu a girl of hardly 10 years, water collection has become her main job. In the words of her grandmother "Water fetching is the schooling for Pappu:" There are so many Pappus in the villages and dhaanis of Jaisalmer.

In district such as Sriganganagar, canal is the main source for drinking water. However, during the crisis period (either being no water in the main canal/sub canal or due to the erratic power supply), the rich remain unaffected. In such crisis women from poorhouse hold draw water from the village diggis, which is totally unfit for any kind of human activity. They use this water not only for washing cloth and bathing but also for drinking. Due to the formation of algae, water becomes greenish and filthy. Women add alum to purify it.

In Orissa drinking water is being privatized. The government first insists on the formation of water associations and conveniently pass the responsibilities on to these association. When this proves inefficient, water distribution rights are given away to private contractors. For example, the Orissa government initially stressed on the formation of Pani Panchayats (water associations). Later using police the government suppressed these panchayats justifying this by claiming that the villages were not being responsible enough.

Titlagarh is the hottest town of India, but it has no water, causing great misery to the women. As the highest temperature, is recorded here 52 degree centigrade which is the highest temperature in India. People called "Titlagarh" as "Tatlagarh", in local language Tatla means Hot. In Titlagarh water problem is acute. People are buying water throughout the year for drinking and cooking purpose. In the month of May and June the rate of water increase three time, from Rs.2 per Dabba to Rs.8 per Dabba (container). This is the picture of urban areas, but in rural areas the problem is worse, well, tube well all are becoming dry but people have no money to buy water. Due to water problem some villagers are migrating to other places.

In Uttranchal women are suffering lot in every village where water problem is severe. Natural sources are drying up which adds the kilometers for women everyday to quench the thrist of their family as well as animals.

Women are the major workforces in whole Garhwal region. They work from early morning to late evening to serve the family. They do all household work from cooking to cleaning and washing clothes and soiled utensils as well as look after their children and animals. Women also collect the water required for cooking, cleaning, washing, bathing and drinking both for human beings and animals.

During the survey in Jaunsar area of district Tehri Garhwal, village Nagthat, Duena, Vishoi, Gadol, Jandoh, Chitar, Chichrad and Gangoa, it was observed that water in the region is mostly acidic in nature. Water problem in Chitar and Gangoa villages is very severe, where men and women carry water on mules from 8 – 10 Km far from the village. Because of the poor water quality, most of the villagers in the regions are suffering from many diseases related to skin and teeth. Natural resources of water in the area are very few and they are also disappearing very fast. During the survey, Smt. Nisha Devi of village explained that they are not getting enough water for their animals so they take their animals to the spring about 2-3 kms away.

In Bundelkhand women have no work but to collect drinking water on their heads from long distance. The grim situation of water may be best illustrated by one Bundelkhandi saying which roughly translated as “let the husband die but the earthen pot of water should not be broken”.

The scenario is worst in Patha in Chitrakut district where women have to travel a long distance to collect water for drinking. Half of the time of women is spent to collect water, which affects their health and the well being of their children. The paucity of time due to water crisis aggravates the domestic problem.

Instead of solving the water crisis, attempts are being made to create the disastrous situation in the region. Banda city entirely depends on Ken river. If Ken is linked with Betwa, then it will not affect only Banda, but would also jeopardize the survival of farmers who depends on Ken.

Even in Delhi the water scenario is no better being worst in Delhi slums, for example Sanjay colony slum of New Delhi has population about 15,000 – 20,000 with about 4500 households in the locality. Majority of the population is self-employed and are engaged in making dari, mate and other clothes for sale. In this area people collect water from different sources depending on the availability such as DJB tanker, MCD pipe water supply and from Sulabh International. DJB tanker comes daily but it has no fix time for water distribution. The water that comes from MCD pipe water has fix time for water supply but it only comes for 1-2 hr in the evening (around 4.30 p.m.). At MCD pipe line people made bore and fetch water from it. If

the people don't get water from the above sources they are forced to get it from Sulabh International near Kalka ji temple for which they have pay @ Rs. 2 for 20 liter or so.

Water crisis is same in West Bengal. In all the districts, the water commons have ceased to exist, and become open-access resources, with hardly anyone responsible to take care of the resource. In North Bengal, some women reported they had opinions regarding the use of the water body, but their importance in management decisions is cipher. The absence of the community from the management of the water resources is indeed a tragedy, because now the resources are at the mercy of either the market or government officials.

Punjab; the name stands for abundance of water, but the present situation of water resources in the state is highly critical. The ground water availability is drastically hampered. The village ponds are drying day by day. Women in the villages desperately need water. Near Talwandi Sabo, for some village the source for drinking water is about 8 km away. Near jajjal due to contaminated water, women are suffering from a number of diseases including cancer: There have been several deaths attributed to polluted water.

For Maharashtra, water is an abiding concern. In many villages women have to walk more than 3 kilometres everyday to fetch two huge vessels of water illegally from a government reservoir. They have to make at least three trips everyday. The state government do not send tankers to the villagers. At some places, women spend Rs 5 for two canes of water. Images of women carrying the pots of water, walking miles and miles for one single pot are common in the state of Maharashtra. Women in Maharashtra have carried the water burden both as a result of scarcity and abundance. Drought displacement due to dams and irrigation have contributed to increasing water burden of women. Women in Nandurbar district of North Maharashtra share their woes "forget about getting safe drinking water from wells, we spend most of time of our time locating streams and springs that quench our thrust". Many Women came as a bride, their hair have gone dry, but the search for water has not ended.

Karnatka is facing the worst kind of water crisis. In Banglore, only 35% of the city gets water on daily basis, the rest on alternative days. In addition to the scarcity, erratic water supply is another problem. In Samadhanagar area, water generally comes in the morning at 11 A.M or in the middle of the night. Both these timings make it very difficult for women to collect water as they leave early in the morning to go to work. In Doddanagar slums in the city, women and children who are also breadwinners of the family spend 3-4 hours filling water, losing their wages. In Hosapalya locality women get severe joint pain in their shoulders, hips and knees due to carrying water pits from water sources outside their colony. In Peenya industrial area, many street fight, occur among the women over water. Social conflict and tension is high due to water crisis.

In brief, at an estimate about 150 Million-Woman Days and Rs 10 Billion are lost in fetching water.

To mitigate the women water burden; the study suggests the following measures.

Recommendations and Suggestion:

1. Restore the conventional methods of water conservation like Baolis, Jhods, Ponds, Tankas.
2. Introduce rainwater harvesting.
3. Change the cropping pattern of agriculture. Instead of growing water intensive crop like paddy and sugarcane, introduce crops like millet, ragi, which consume less water.
4. In cities instead of Public Private Partnership (Privatisation of water) Public-Public partnership (Public and Government) is an alternative for water crisis.
5. Proper water conservation measures should be used. People should be made aware and trained on the techniques of water conservation.
6. Government schemes should be implemented properly.
7. Involve Public Raj Institutions (PRIs) and NGOs in the management of rural water supply.
8. Women should be trained as water manager for the better utilization of water.
9. Future programmes/projects should be designed, keeping in view the women as water users.

CHAPTER - 1

WOMEN, THE WATER PROVIDERS

Women are the water povidders in India. In villagers, they walk long miles and in cities they wait long hours to bring water for the drinking and cleaning needs of their families. The water crisis translates into an increasing burden for women as water providers. And with increasing water sacarcity and water pollution, water related diseases increase women as care givers also carry a disproportionate the burden of water borne diseases.

150 Million Woman Days and Rs. 10 Billion Loss Every year in Fetching water

To get a bucket of drinking water is a struggle for most women in the country. The virtually dry and dead water resources have lead to acute water scarcity, affecting the socio-economic condition of the society. **The drought conditions have pushed villagers to move to cities in search of jobs. Whereas women and girls are trudging still further. This time lost in fetching water can very well translate into financial gains,** leading to a better life for the family. If opportunity costs were taken into account, it would be clear that in most rural areas, households are paying far more for water supply than the often-normal rates charged in urban areas. Also if this cost of fetching water which is almost equivalent to 150 million women day each year, is covered into a loss for the national exchequer it translates into a whopping 10 billion rupees per year (Srivastava 2003)

In India, there are many villages either with scarce water supply or without any source of water. If there is no source of potable water in 2.5 kilometres, then the village becomes no source water village or problem village. In many rural areas, women still have to walk a distance of about 2.5 kms to reach up to the source of water. She reaches home carrying heavy pots, not to rest but to do other household chores of cooking, washing, cleaning, caring of children and looking after livestock. Again in the evening she has to fetch water. Thus a rural woman's life has become sheer drudgery for lack of water. (Pandya, 2002)

Further variations in ground water levels are also causing changes in water quality resulting in an increase in disease. The status of water quality in rural habitation is given in the following table (Chand, 2002)

Table 1.(1) : Status of Quality Problems Habitations

Nature of Quality Problems	No. of Affected Villages
Excess Fluoride	36988
Excess Arsenic	3553
Excess Salinity	32597
Excess Iron	138670
Excess Nitrate	4003
Other Reasons	1400

(Chand 2002)

Although the Ministry of Rural Development claims more than 95% coverage, independent reports show scarcity of shrinking water in about half of the villages of India. What is even more distressing is the fact that this group has been increasing over the years, despite heavy investments (Chandramouli, 2003). People died in India during the recent past, crying for water. And the problem is worsening day by day.

In cities the problem is gooing to be more acute, as the population growth is spurring a demographic change, especially as towns become cities and cities become mega cities. This can be seen from the fact that the 23 million-plus cities in India in 1990 grew to 42 in 2000 and are expected to grow to 63 by 2010. Also, there are serious concerns on the availability of fresh water, as India with 16 per cent of the world's population has only 2.45 per cent of the world's land resources and 4 per cent of the fresh water resources. The per capita availability of fresh water in the country has dropped from an acceptable 5,177 cubic metres in 1951 to 1,820 cubic metres in 2001. It is estimated that it would further decline to 1,341 cubic metres by 2025 and 1,140 cubic metres by 2050 (table 1.2). This is alarming as the threshold per capita value for water stress is 1,000 cubic metres. Total water availability is 1,122 billion cubic metres as shown in table 1. (3).

India ranks a poor 120 in a list of 122 countries ranked for their water quality as also their ability and commitments to improving its quality, in a World Water Development Report. In terms of water availability, India has not fared well. She is ranked a lowly 133 in a list of 180 countries. India's neighbours, Bangladesh, Sri Lanka, Nepal and Pakistan have fared better than India, occupying the 40^{th}, 64^{th}, 78^{th} and 80^{th} slots respectively (The Indian Express, New Delhi, 6 March 2003).

India's population, recording a current annual increase by 15.5 million, has to inevitably face the greatest challenge of conservation and equitable distribution of the limited fresh water resources. And its management is inextricably intertwined with future growth and poverty alleviation.

Table 1.(2) : Population Growth and Per Capita Water Availability

Year	Population (Million)	Per Capita Water Availability (Cubic metres)
1951	361	5,177
1955	395	4,732
1991	846	2,209
2001	1,027	1,820
2025	1,394	1,341
2050	1,640	1,140

Source: Ministry of Water Resources, Government of India

Table 1.(3) : National Water Resources Potential

Precipitation	4,000 BCM
Average Rim-off in rivers	1,869 BCM
Utilizable Surface Water	690 BCM
Replenishable ground water	432 BCM
Total Water Availability	1,122 BCM
Irrigation Potential	140 million hectares
Hydropower Potential (L)	84,000 MW @ 60 per cent

Source: Ministry of Water Resources, Government of India

Table 1.(4) : Need and Shortfall of Water in 12 Major Cities

City	Need (million litres/day)	Shortfall (million litres/day)
Delhi	3,830	880
Lucknow	560	120
Kolkata	2,258	690
Jaipur	349	313
Jabalpur	239	945
Bhopal	335	70
Indore	318	134
Visakhapatnam	305	146
Mumbai	4,000	1,030
Hyderabad	956	186

City	Need (million litres/day)	Shortfall (million litres/day)
Chennai	300	105
Bangalore	840	135

Source: Aiyar, India Today (New Delhi), 9 June 2003

As shown in table 1 (4), a study of 12 major cities reveals that while they require over 14,000 million litres of water a day, they get only 10,000 million litres. Due to water shortage, over 200 million people are vulnerable to water wars. In Neemuch (Madhya Pradesh), one person was killed and six injured in May 2003, when people fought for water with swords and knives. Such sporadic incidents could become routine.

Water is the biggest crisis facing India in terms of spread and severity, affecting one in every three persons. Even in Chennai, Bangalore, Shimla and Delhi, water is being rationed and India's food security is under threat. With the lives and livelihood of millions at risk, urban India is screaming for water. For instance, water is rationed twice a week in Bangalore, and for 30 minutes a day in Bhopal; 250 tankers make 2,250 trips to quench Chennai's thirst. Mumbai routinely lives through water cuts from January to June, when some areas get water once in three days in Hyderabad.

Urban water privatisation is divorced from reality. It is obvious that the privatisation protagonists forgot to take into consideration the myriad complexities of the India's Water Management System that are deeply embedded in the country's society, politics and economy.

According to Prof. A. V. Vaidyanathan, water expert with Madras Institute of Development Studies in Chennai: "It is not correct to describe water as a commodity. It is a public utility which can be priced, but within certain socio-economic parameters."

However, Municipal Corporations under the pressure of privatisation lobby have proposed a huge tariff hike (table 1. (5). For Delhi, the water cost will increase more than 10 times.

Table 1.(5) : Privatisation of Water to Spawn a Steep Tariff Hike

City	**Current Tariff (Rs/kl)**	**Likely Extra Burden (Rs/kl)**
Hyderabad	6.00	4.00
Kolkata	3.00	7.00
Surat	2.00	8.00
Tiruppur	5.00	5.00
New Delhi	0.35	9.65
Mumbai	4.00	6.00
Bangalore	6.50	3.50

Source: Down to Earth, New Delhi, 15 September 2002

Contrary to popular perception, water shortage is not just an urban problem but is, in fact, worse in rural India, And as basins and rivers dry up, it also threatens the country's food security. According to the data available with the Ministry of Water Resources, eight of the 20 river basins are water deficit, threatening the lives and livelihoods of over 200 million people.

Water precedes roti, kapada aur makan. The people of Antarnesh in Patan district of Gujarat still remember the pitiful sight of an eight-year old girl dying of thirst. Women had gone to collect gum from the trees. The child was thirsty but there was no water to give. The water source was 6 km away. She died crying for water (Saksena, 2003).

According to Shabana Azmi, the actress and nominated Member of Parliament, when the government social programme ran into a fierce opposition from the women, an NGO was called to break the impasse. When asked by the NGO, 'what was their biggest problem?' all the women in one voice said "water." It turned out that they had to walk miles for water because their hand pumps had broken down and the men of the villages could not repair it.

Indeed, judicious use is what is needed. Also in many areas, it is not how to save more water, but how not to waste water. In urban India, 12 to 15 litres of water is flushed per use. Experts believe it should not be more than 5 litres as practised in some western countries. Per household use of water should be brought down drastically. Also what is needed immediately is to find out new cropping patterns to save water. For instance, rice and sugarcane are high water intensive crops and we must look for alternatives.

Besides the management of water supply, there is also the need for technology to increase efficiency. It is time India should shift from the concept of yield per hectare to yield per cubic metre of water.

The National Water Policy passed in 2002 also addresses some of the concerns of the three main stakeholders (rural, urban and industrial) and identifies measures for developing and conserving the nation's water resources. In fact, to increase and optimise water availability in agriculture, it is important to use it optimally by adopting methods like water harvesting and recharging and recycling of water. Therefore, adopting modern techniques like deep and sprinkler irrigation would enable efficient utilization of the available water.

Water conservation programmes need to be initiated to generate awareness on conservation methodology by involving local communities. Industries also need to be encouraged to adopt the latest technologies available for effluent treatment. In urban areas, much water is lost due to technical losses by public water utilities.

About 70 per cent of the world's water is used for growing crops. The agricultural sector in India is the single largest user of water resources accounting for as much as 80 per cent of the total annual withdrawals. With India having the highest irrigated area in the world at 55.14

million hectare, out of total 255.46 million hectare, there is an urgent need for the efficient use of the available water resources. Also, as the population increases, there will be greater need for augmenting food production to achieve food security, and this in turn puts greater pressure on water supply for irrigation.

Looking 30 years into the future, FAO estimated that feeding the world's population would require 60 per cent more food. Most of this increase will have to come from intensified agriculture, supported by irrigation. But water is already scarce in many countries and competition for water from industrial and domestic users continues to grow.

In irrigation, it is estimated that more than 60 per cent of the water seeps from the distribution channels and is lost by evaporation. Moreover, seepage causes water logging and salinisation in irrigated lands, resulting in significant reduction of crop yield. And also, the rainfall shows great variation, unequal seasonal distribution as well as unequal geographical distribution and frequent departures from the normal. As much as 21 per cent of the area of the country receive less than 750 mm of rain annually while 15 per cent receive rainfall in excess of 1500 mm. Annual rainfall of less than 500 mm is experienced in Western Rajasthan and adjoining parts of Gujarat, Haryana and Punjab. This shows the need for undertaking the measures, which are water prudent.

Ground water today supplies as much as 80 per cent of the domestic water supply in rural areas and around 50 per cent of the urban and industrial needs. As per estimates, over 70 per cent of the value of irrigated products could depend on ground water resources. Ground water is said to contribute 51 per cent of the irrigation potential created in the country through more than four million dug wells, five million shallow tube wells and some nine thousand public tube wells. The over exploitation of ground water is leading to a drop in ground water levels in many parts of the country.

According to forecasts by the Ministry of Water Resources and presentations by the Ministry of Agriculture, 11 river basins including the Ganga will be water deficit by 2025, threatening 900 million lives. The symptoms are already visible. Tungabhadra river, fed by the high rainfall catchment area of the Sahayadri range, has already gone dry, but is not yet put on the list of deficit basins.

Instead of focusing on long-term solutions, every government has found it easier to allow exploitation of groundwater. While for the government it meant less investment, for the farmer it was free water to irrigate his land. True, India's food security was propelled by the "tube well revolution," but it led to long-term damage as the pump culture has wrought havoc on the hydrological cycle. Groundwater levels have plunged in 206 districts in the country. Nine States, including Rajasthan, Maharashtra, Gujarat, Haryana, Karnataka and Punjab, are facing major water deficits, where demand exceeds supply. With 3.5 million hand pumps and 56 lakh tube wells

in operations, pumping of underground water is now nearly double the rate of aquifer recharge from rainfall.

With in next two or three decades, water problem in India may constitute a greater crisis than does energy today. The major difference between the water and energy crisis is that there are no known substitutes for water in satisfying direct demands by people, but there are many known substitutes for petroleum in producing energy. Similarities between the present energy crisis and the expected water crisis emphasis on increasing scarcities and increasing costs. Thus increasing costs and scarcity of water is likely to bring profound effects upon economic progress, employment, income distribution, investment and debt. (Roy 2004)

The total quantity of water for example may be abundant, but we may not have available sufficient water of a particular use demand. The water may be too salty, too toxic for particular use, one answer was implied in the words of Coleridges', ancient mariner who while dying from the thirst lamented "water, water every where but not a drop to drink". This answer concerns water quality. The ancient mariner was served well by the transportation services of the ocean water that carried by ship, but the same water did not posses the quality to quench the thirst.

Global consumption of freshwater increased six fold during 1900-95, at a faster rate greater than twice the rate of population growth. And if present trend continues two out of every three people on earth will have to live in water stressed condition by the year 2025. A recent World Water Development Report corroborates this. About 20 per cent of the world's populations do not have access to safe drinking water and 40 per cent do not have sufficient water for adequate living and hygiene. The report expects that by 2050, water scarcity will affect 2 to 7 billion people out of total 9.3 billion, depending on factors like population growth and measures taken by political leaders to tackle the crisis. The report also found that more than 2.2 million people die each year from diseases related to contaminated drinking water and poor living conditions, faced with water scarcity. (Shiva and Jalees, 2003)

If we have to halve the number of people without access to safe water and sanitation by 2015, according to the Millenium Development Goals of the United Nations, the world will have to spend up to $180 billion annually, more than double that is spent today.

Water has become the most commercial product of the 21st century. This may sound bizarre, but true. In fact, what water is to the 21st century, oil was to the 20th century. The stress on the multiple water resources is a result of a multitude of factors. On the one hand, the rapidly rising population and changing lifestyles have increased the need for fresh water. On the other hand, intense competitions among users-agriculture, industry and domestic sector is pushing the ground water table deeper (Srivastava 2003)

The government has accorded the highest priority to rural drinking water for ensuring universal access as a part of policy framework to achieve the goal of reaching the unreached.

Despite the installation of more than 3.5 million hand pumps and over 116 thousand piped water supply schemes, in many parts of the country, the people face water scarcity almost every year there by meaning that our water supply system are failing to sustain despite huge investments (Chand 2003).

The situation is grave in 7% of the country's area where the ground depletion exceeds 85% of the annual replenishable recharge. Besides, it has reached the critical stage in 11% of the area where over 65% of the ground water is depleted. The major impact may be seen in Rajasthan, Gujarat, Andhra Pradesh, Tamil Nadu, Karnataka, Madhya Pradesh, Orissa and Haryana. In general, the demand for fresh water from different sectors has been growing against a finite available quantity, resulting in scarcity situation spread over 1203863 sq.kms in 1205 blocks of 223 desert and drought prone districts (Chand 2003)

Further a study shows that per capita availability of water, which was around 5177 cubic meters per year in 1951, has drastically fallen to 1869 cubic meter per year in 2001. It is likely to fall further to 1341 cubic meters in 2025 and in 2050 it will be 1140 cubic meters. It is generally presumed that if per capita level falls to 1000 cubic meters, it could seriously affect the health and economic activity of the entire country. At this level water crisis will be seen in 25% of India's geographical area, affecting 21% of the total population. Already 5.5% of the country's geographical area and 7.6% of the population are facing acute water shortages, with availability less than 500 cubic meters (Durga Prasad 2003).

Table 1.(6) : Water Requirements

Use	2000	2010	2025
Domestic	30	56	73
Irrigation	501	588	910

Source: Durga Prasad 2003

Table 1.(7) : Dependence on Ground Water (in percentage)

Based on ultimate Irrigation Potential, States Heavily Dependent on Ground water	
State	Percentage
Manipur	61.09
Uttar Pradesh	55.08
Madhya Pradesh	54.27
Jammu & Kashmir	52.13
Tamil Nadu	51.19
Punjab	48.80
All India	45.78

Source: Durga Prasad 2003

Table-1.(6) shows the details of the current water requirements for domestic and irrigation purpose, as also projects the demand for water in the years 2010 and 2025 and table –1.(7) shows the dependence of different states on ground water.

Norms for Safe Drinking Water for Rural Population

The following norms have been adopted for providing safe drinking water to rural population. (Durga Prasad 2003)

(a) 40 liters of safe drinking water per capita per day (lpcd) for human beings

(b) 30 lpcd additional for cattle in the desert development programme area.

(c) One hand pump or stand post for every 250 persons

(d) The water source should exist within the habitation or within 1.6 kms in the plains and within 100 meters elevation in the hilly areas.

A brief description of major sources of drinking water in the rural areas in given below:

Tap: The figure in the Census of India 2001 bear out the anguish expressed by the Planning Commission. Only 70 million households have reported tap as their source of drinking water. These constitute a more 37% of the total households. At the national level, there has been an increase of just 14% in the use of tap water as a source of drinking water in the past two decades. Moreover the pace of growth is slowing. The trend in rural areas indicates only three percent increase in the year 1991-2001. Large states such as Bihar, UP, Assam and Orissa registered a decline in the proportion of households having access to tap water during 1991-2001.

It is a matter of concern that only six major states – Haryana, Gujarat, Maharashtra, Andhra Pradesh, Karnataka and Tamil Nadu have reported the figure above national average. If the analyses are taken further almost 20% of the districts of India have less than 10% of households served by tal (Chandramouli, 2003).

Table 1.(8) : Households' Sources of drinking water

Households' Sources of drinking water												
	Tap			Hand pump/Tube well			Well			Others		
	1981	1991	2001	1981	1991	2001	1981	1991	2001	1981	1991	2001
Total	23.0	32.2	36.7	15.2	30.0	41.2	51.7	32.3	18.2	10.1	5.50	3.9
Rural	10.3	20.6	24.3	16.2	34.9	48.9	61.6	38.0	22.2	11.9	6.5	4.6
Urban	63.2	65.1	68.7	11.8	16.3	21.4	20.4	15.9	7.7	4.6	2.7	2.2

Census Data On Drinking Water Sources

32 million people are away from the source The Census data sheets. (Drinking Water Sources & Location and improvements in Sources of Drinking Water, 1981-2001, A Perspective) published by census of India says, " It is alarming that even at the commencement of twenty first century, about 32 million households at national level are dependent for drinking water on the sources away from the premises", i.e the source location is over 100 metre away from the premises in the case of urban areas and over 500 metre in the case of rural areas.(SANDRP 2003)

Hand Pump and Tube Well

This source of drinking water is considered next to tap in terms of potability. The usage of hand pumps/tube wells increased from about 15% in 1981 to 41% in 2001. In the North, there is preponderance of this source in Punjab, Uttar Pradesh and Bihar. In Haryana and Rajasthan, it rose from one in four households in 1991 to around one in three households, in 2001. In the South, Andhra Pradesh, Karnataka and Tamilnadu this dependency appears to have somewhat slowed down during 1991-2001 – a pointer to the depletion of grounder water sources.

It is important to note that even on the urban areas, two out of three households in Bihar, two out of five households in Uttar Pradesh and Assam and one out of three households in Punjab and West Bengal meet their requirements from these sources.

The dependency on Hand pumps/Tubewells as drinking water sources slowed down somewhat in the Nineties. Possibly in response to depletion of groundwater levels. As a matter of fact, the census figures clearly shows table 1 (9) that even though groundwater still remains dominant drinking water source at 59.5% in 2001. The dependency on groundwater has come down from 62.2% and 66.9% in 1991 and 1981 respectively. One lacuna with these figures is that some of the tap water comes from groundwater sources, but the Census figures not give division of figures in this respect. Still, even in urban areas, two out of three households in Bihar, two out of five households in UP and Assam and one out of three households in Punjab and West Bengal depend on this source of drinking water. (SANDRP 2003)

Wells

There has been a dramatic fall in the proportion of households depending on well as a source of drinking water. At the national level, around 18% of the household relied on well water in 2001 against 52% in 1981 –a decline of about 34% in two decades. There has been a decline in the dependence on wells in all the states and union territories, where status quo has been maintained.

The most remarkable shift from well is observed in Uttar Pradesh and Bihar where only one in nine households depend on this source as compared to one in three households in 1991. In states like, Madhya Pradesh, Rajasthan and Orissa, one in four households still depends on wells for their daily requirement of drinking water.

Table 1.(9) : Percentage Households dependent on Groundwater

State/UT	2001			Total	Total
	Rural	Urban	Total	1991	1981
Jammu & Kashmir	21.3	9.4	18.3	N.A	13.2
Himachal Pradesh	10.0	4.0	9.3	8.7	18.1
Punjab	82.3	32.3	64.8	69.0	70.4
Chandigarh	14.9	7.1	8.0	8.0	8.5
Uttaranchal	24.0	15.7	22.0	—	—
Haryana	59.8	26.4	49.6	49.3	63.8
Delhi	38.8	20.7	21.9	22.4	32.3
Rajasthan	68.9	17.5	57.0	59.6	66
Uttar Pradesh	88.0	44.5	75.7	68.5	80
Bihar	97.8	72.4	95.5	83.3	84.4
Sikkim	0.7	0.2	0.5	4	5.5
Arunachal Pradesh	15.3	11.5	14.5	12.2	9.9
Nagaland	36.9	53.7	39.4	37.4	37.7
Manipur	16.2	8.4	14.1	13.7	8.9
Mizoram	6.3	5.9	6.0	5.8	1.6
Tripura	71.7	42.4	66.3	65.6	66.2
Meghalya	36.7	14.0	31.9	40.9	40.8
Assam	78.4	63.5	76.3	71.4	N.A
West Bengal	91.3	42.1	77.1	76.6	73.9
Jharkhand	91.0	48.9	81.9	—	—
Orissa	89.2	51.7	84.	75.2	63.9
Chattishgarh	89.2	38.5	79.6	—	—
Madhya Pradesh	86.4	30.5	72.1	70.1	71.3
Gujrat	46.1	13.8	33.5	39.3	44.4
Daman & Diu	36.9	8.6	26.9	39.1	48.4

State/UT	2001			Total	Total
	Rural	Urban	Total	1991	1981
D. Nagar Haveli	70.1	62.7	68.1	71.2	58.5
Maharashtra	51.4	9.4	33.6	39.2	51.5
Andhra Pradesh	56.2	25.4	48.5	66.4	70.1
Karnatka	47.6	20.2	38.1	53.2	61.3
Goa	36.5	17.8	27.1	51.6	67.4
Lakshdweep	92.9	96.7	94.5	88.7	93.8
Kerala	80.1	59.0	74.9	77.4	77.5
Tamilnadu	36.1	30.1	33.6	50.7	56.6
Pondicherry	9.8	9.1	9.6	14.5	26.2
A & N Islands	23.4	1.9	16.5	22.4	29.1
India	**71.1**	**29.0**	**59.5**	**62.2**	**66.9**

Other Sources : It is a stark fact that 4% of the households in the country or 8 million households still depend on these sources, such as rivers, canals, ponds, lakes and the like which are considered unpotable.

Despite the high priority from the government, the problem of potable drinking water has remained unresolved and is in fact become more serious every year.

Women bear a disproportionate burden of water scarcity and water pollution. Even though women in the past have been the conservers and guardians of water resources along with land resources, today it is an imperative that women participate in water management, to ensure provisions for safe and adequate water. Policies must encourage women to participate in decision-making in matters regarding distribution, conservation and use of water in their region.

This is of prime importance in view of:

- Women's lack of time and energy affects selection of water sources and can limit availability of safe water at home and in the fields
- The high time and energy cost of fetching water govern women's perceptions of the importance of hygiene and disease prevention
- Control of water has class and gender dimensions affecting all aspects of women's lives
- The stigma attached to water-borne diseases such as urinary schistosomiasis in women affects their own health seeking behaviour and their access to health care

- Social factors such as these contribute to under-reporting or urinary schistosomiasis in women
- The disabling effects of diseases such as schistosomiasis and guinea-worm hamper women's performance of their multiple roles
- This threatens the nutrition and health status of the whole family
- Time and social pressures may lead to under –reporting of malaria in women and delays seeking treatment
- Lowered immunity to malaria during pregnancy has important health implications for women and their fetuses
- Exposure to cadmium may increase women's risk of ostoporosis and other bone diseases

Women and the Water Crisis:

"When there is water scarcity, women are the worst affected," says Santokben Lakhabhai Kamaria, a village woman from Gujarat. "When there is no water in the villages, no crops grow. Men migrate to the cities for work and women are left to fend for themselves, old people, children and cattle"

Sarabai, an old woman from kutch describes, "There is no income for women. In our region, income is from the sale of milk and ghee which goes to women directly the family gets nourishing food and financial security during other crisis. When there is no water, there is no fodder for cattle, there is no milk. Men go to far to cities and women have to go to far off and strange places to work, where they are often exploited and harassed,"

Seventy five year old Muttama from Tamil Nadu speaks of how the replacement of traditional water tanks with modern conservation systems disempowered women in her village, The traditional tanks gave women more time to do other things. Once the traditional tanks fell into disuse, women spend most of their time collecting water. "Today we have organized ourselves to revive these tanks. Twenty five per cent of labor for reviving these reservoirs comes from women, there is water underground and greenery over ground wherever we work."

Another water conservation enthusiast, Shantaben, from Dador, Gujrat, formed an organization of women and built check dams, revived old ponds and even procured a solar pump to pump water to other villages.

Ramom Magasaysay award winner Rajendra Singh says," To solve the country's water problem, we have to first recharge the earth's own resource, Women play an important part here."

Voicing opposition against male control over water management, women said," We are involved in bringing water from far off places, using it for cooking, cleaning, washing, feeding animals, looking after crops. But when it comes to taking decisions on water management, we are nowhere.'

Who Decides Water Use Management and Ownership?

While women carry the water burden as water provides, they are excluded from decisions about how water will be used, how it will be distributed, how it will be managed, how it will be owned. These decisions are being increasingly made by International Financial Institutions like World Bank and ADB, and Multinational Corporations like Suez, Vivendi, Coca Cola etc.

The World Bank, WTO And Corporate Control Over Water

Giant water projects, in most cases, benefits the powerful and dispossess the weak. Even when such projects are publicity funded, their beneficiaries are mainly construction companies, industries, and commercial farmers. While privatization is generally couched in rhetoric about the disappearing role of the state, what we actually see is increased state intervention in water policy, subverting community control over water resources. Policies imposed by the World Bank, and trade liberalization rules crafted by the World Trade Organization (WTO), are creating a sweeping culture of corporate-states all over the world.

The World Bank: An Instrument for Corporate Control Over Water

Not only has the World Bank played a major role in the creation of water scarcity and pollution, it is now transforming that scarcity into a market opportunity for water corporations. The World Bank currently has outstanding commitments of about $20 billion in water projects, $4.8 billion of which are for urban water and sanitation, $1.7 billion for rural water schemes, $5.4 billion for irrigation, $1.7 billion for hydropower, and $3 billion for water-related environmental projects. Sooth Asia receives 20 percent of World Bank water loans.

The World Bank estimates the potential water market at $1 trillion. After the collapse of the technology stocks, Fortune magazine identified the water business as the most profitable industry for investors. Large corporations, such as the biotech giant Monsanto, covert this lucrative market. Monsanto is currently plotting its entry into the water business and is anxiously eyeing the funding available from development agencies.

The erosion of water rights is now a global phenomenon. Since the early 1990s, ambitious, World Bank-driven privatization programs have emerged in Argentina, Chile, Mexico, Malaysia, and Nigeria. The Bank has also introduced privatization of water systems in India. In Chile, it has imposed a loan condition to guarantee a 33 percent profit margin to the French company Suez Lyonnaise des Eaux.

Not only does privatization affect people's democratic right to water, it also affects the livelihoods and employment rights of those who work in municipalities and local water and sanitation systems. Public systems worldwide employ five to ten employees per 1,000 water connections, while private companies employ two to three employees per 1,000 water connections. In most Indian cities, municipal employees have resisted privatization of water and sanitation services.

The WTO disregards and even subverts hard-won victories such as the Indian Constitution. GATS is a tool to reverse the democratic decentralization to which diverse societies have been aspiring. GATS can challenge measures taken by central, regional, or local governments as well as nongovernmental bodies. Its rules are shaped entirely by corporations without any input from NGOs, local governments, or national governments.

The Water Giants

Water has become big business for global corporations, which see limitless markets in growing water scarcity and demand. The two major players in the water industry are the French companies Vivendi Environment and Suez Lyonnaise des Eaux, whose empires extend to 120 countries. Vivendi is the water giant, with a turnover of $17.1 billion. Suez had a turnover of $5.1 billion in 1996. Vivendi Environment is the "environmental services" arm of Vivendi Universal, a global media and communications conglomerate involved in television, film, punlishing, music, the Internet, and telecommunication.

Vivendi Environment is engaged in water, waste management, energy, and transportation. In 2000, Vivendi Environment was awarded a 43-million-Euro contract for a wastewater treatment plan in Berne, Switzerland. Vivendi also has a 50-50 joint venture company called CTSE in the Czech Republic. Total net sales are expected to be 200 Euros. Vivendi's subsidiary, Onyx, owns Waste Management Inc. Vivendi operates in several countries, including Hong Kong and Brazil.

Other water giants include the Spanish company, Aguas de Barcelona, which dominates Latin America, and the British companies Thames Water, Biwater, and United Utilities. Biwater was established in 1968 and given its name to reflect the company's involvement in both the dirty-and clean-water businesses. Thames is owned by RWE, an electric company whose ventures include water.

Biwater and Thames have operations in Asia, South Africa, and the Americas. In the 1940s, Biwater entered Mexico and the Philippines. By the 1970s, it had contracts in Indonesia, Hong Kong, Iraq, Kenya, and Malawi. By 1992, the Biwater empire had expanded to Malaysia, Germany, and Poland. In 2000, the company. Cascal has contracts in the United Kingdom, Chile, the Philippines, Kazakhstan, Mexico, and South Africa. Another addition to the global water takeover is General Electric, which is working with the World Bank to crate an investment fund to privatize power and water worldwide.

Increasingly, the term “Water Providers” is being used not for the women who work to provide water, but for the water giants who take water from communities and sell it back to them at high cost for profit. The water traders, water profiteers are positioning themselves as “water providers” while increasing women’s burden in water provisioning.

CHAPTER - 2

WATER CRISIS IN KERALA

Every one is aware of the snake boat race on the Pamba River held every year at Aranmula during the Onam festival. This race draws a huge number of tourists both domestic and foreign. Sadly, this race could not take place last Onam in 2003, because of scarcity of sufficient water in the river. The Bharatapuzha or the Nila River, the longest of the 41 rain fed rivers of Kerala with a length of 209 kilometres, is now more or less dry. (Ghosh 2004)

And the most heart rendering sight one sees these days in Kerala is the hundreds of multi-coloured plastic buckets and pitchers lined up before one single tap in most parts of Kerala (Ghosh 2004)

There is no escape from the fact that in case of different rainfall from the south-west monsoon, the only source of water apart from some southern districts getting winter rainfall – kerala has to be provided with some water from somewhere in order to alleviate distress caused to the people. This source is still very apparent because the adjacent states of Karnataka are itself water-short. During 2003 monsoon as many as 16 districts of Karnataka had received deficient rainfall for the second year in succession. And Tamil Nadu itself is fast becoming a chronically water short area with procuring of even drinking water becoming an ordeal for Chennai residents (Ghosh 2004).

Harrowing midnight water for a precious bucket of drinking water is a regular feature for many families of Vypuri an island off the mainland of Kochi. Families have to queue up in front of the public water taps, being at the lag end of the pipeline system, they get water only after the users ahead in the pipeline finish collecting water. There are nights when water pressure dips so low that some women get it after midnight. They split their day between household chores and collecting water (Prathapan 2004).

Those who cannot stand in the queue buy water sold by private tanker operators. But women who depend on public taps are doomed. Most of the women in the rural area in the state cannot afford privately sold water.

Recently, the government has admitted that Kerala has ceased to be a water surplus state. According to Rajendra Singh, India's mascot of water literacy "Kerala is paying dearly for its lack

of water literacy. The state might have attained total literacy more than a decade ago, but it is still illiterate as far as water management is concerned".

Kerala, which is one of wettest place in the country, is behind arid Rajasthan in per capita availability of drinking water. Experts believe government policies over the years have worsened the situation. The characteristics of the state's topography, the steep slops of the Western Ghats take rainwater to the sea. (Prathapan 2004)

In districts after districts, drinking water has become another item in the monthly shopping list of people who could afford to buy water. But for the poor, getting water depends on the stopgap arrangements of the government and local administration bodies (Jayan 2004).

Kerala gets 2.8 times more rainfall than national average, but has about 2.5 times more people. Ground water recharge potential is lmuch less than all major cities.

Kerala is a water surplus state is a well-perpetuated myth 41 of its 44 rivers originating in the Western Ghats empty into the Arabian Sea in less than 48 hours after rain. Their combined water flow is 30% less than Godavari. Kerala has an estimated 77.35 billion cubic metres (BCM) of freshwater, but nearly 40% of water resources are lost as run off. This loss means that only 42 BCM for irrigation, domestic use, industries and other purposes annually. This shortage leads to people exploiting groundwater so severely that the water table in several districts has fallen to 200-250 metre (Jayan 2004).

Crores over decades have spent on irrigation projects, but when it comes to treat drinking water, only 59% of the rural population and 79% of urban population get it. In several rural areas, one tap caters to 250 people, this means that treated piped water reaches only 10 to 15% of the population. At least 80% o the people depend on the states 4.5 million wells one for every seven persons and 5% population depends on ponds. But as the groundwater is falling, it means more and more people would demand treated piped water.

At an estimate, Kerala would need 6,675 MLD of drinking water in 2010 and 8,772 in 2020 if supply were to be given to the entire population. There are 31 irrigation projects, but only two reservoirs for storing drinking water. The State has 1,655 schemes but it only supplies 1,700 – 1,800 MLD of drinking water all over the State.

Faced by growing demand, Kerala has signed several agreements with international organizations for water supply projects. The Government will implement a Japan Bank of International Cooperation Project (JBIC) in Thiruvananthapuram and Kozhikode and in three rural areas. The entire cost will be 1,787.45 crore

Jalnidhi Project

The 450 crore 'Jalnidhi' project, which is implemented by the Kerala Rural water Supply and Sanitation Agency, is also creating controversy. The World Bank has lent Rs. 300 crore for

Jalnidhi, which began in 2001 and will cover three million homes. Each micro-level water shed project under jalnidhi is expected to cost between Rs. 5-8 lakh. This means a capital expenditure of Rs. 2,250 on each beneficiary family. Jalnidhi water will be available to people at a rate of Rs. 6 kilo literes, three times that is charged by Kerala Water Authority (KWA). The argument is that KWA currently spends Rs. 8 on supplying one kilolitre of water. The project will slowly take the government out of water supply though it is the State's duly to provide water at a rate affordable to people (Jayan 2004)

Mining Sand, Choking Water

No water is safe in Kerala from mining, Bharathapuzha, Pampa, Periyar, Achankovil, Manimala, Muvattupuzha and Chalakkudi are important rivers that face the greatest threat. Sand mining became a lucrative business during the construction boom in the last decade. Mining fetches good revenue for village panchayats, who grant daily permits to contractors. It is these contractors who are over-extracting sand, causing riverbank cavines and destruction of riverine eco-system. The Kerala government had banned mining at Bharatapuzha and its six tributaries. However, the contractor, politicians and panchayat officials keep the mining going. The Karunakaran government in 1993 took away the right of granting permits from panchayats. On the High Court's order, the government enforced a law in 2001 and gave back permits rights to panchayats. According to the law, two Committees are supposed to monitor mining in a district (Jayan 2004)

All looks nice on paper, but it is rarely implemented. The permit is for single use, but it is used to extract sand several times. The sand extracted should be used locally, but it is often supplied to all over Kerala and in nehibouring states (Jayan 2004)

Except Periyar, other rivers become a trickle during summer, but they recharge wells and other surface bodies. Though the river turns shallow in summer, water still flows below their sand, which helps well and ponds, to retain water even in peak summer. It is this surface water that has been jeopardized over the years. The entire sand in the seven rivers in Kochi region will be mined in less than a decade. These rivers have an estimated 56 million cubic metres of sand, but about 6.63 million cubic metres is being extracted every year at 981 locations (Jayan 2004)

This mining is shocking because only 0.086 million cubic metre of sand is replenished each year. Apart from retaining water, sand regulates the flow in the rivers, particularly in lean months. Central Water Commission has already found that riverbeds are declining alarmingly at several places. In several places, sand has been completely extracted till the clay bottom of the river.

Building Water Democracy: People's victory against Coca-Cola in Plachimada

Two years ago, adivasi women in a small hamlet, Plachimada, in Palghat, Kerala started a movement against Coca-Cola. Today, the Coca-Cola plant in Plachimada has been shut down.

The victory of the Plachimada movement is major step in reversing corporate hijack of our precious water resources. It provides both inspiration and lessons for building water democracy in other parts of India and in the rest of the world.

The Coca-Cola plant in Plachimada was commissioned in March 2000 to produce 1,224,000 bottles of Coca-Cola, Fanta, Sprite, Limca, Thums up, Kinley Soda, Maaza. The Panchayat has issued a conditional license for installing a motor for drawing water. However the company started to illegally extract millions of liters of clean water from more than 6 bore wells installed by it using electric pumps in order to manufacture millions of bottles of soft drink. According to the local people, Coca-Cola was extracting 1.5 million litres per day.

The water level started to fall, going from 150 feet to 500 feet. Not only did Coca-Cola "Steal" the water of the local community, it also polluted what was left. The company is also pumping wastewater into dry bore wells within the company premises for disposing solid waste. Earlier it was depositing the waste material outside the company premises which during the rainy season spread into paddy fields, canals and wells, causing serious health hazards. As a result of this, 260 bore wells which were provided by public authorities for drinking water and agriculture facilities have become dry. Complaints were also being received from tribals and farmers that storage of water and sources of water were being adversely affected by indiscriminate installation of bore wells for tapping ground water leading to serious consequences for crop cultivation in the area on which residents of the panchayat depend on their living – e.g. maintenance of traditional drinking water sources, preservation of ponds and water tanks, maintenance of waterways and canals and shortage of drinking water. When the Panchayat asked for details, the company failed to comply.

The Panchayat therefore served a show cause notice and cancelled the license. Coca-Cola tried to bribe the Panchayat President A Krishnan with Rs. 300 million, but he refused to be corrupted and coopted. In 2003, the district medical officer informed the people of Plachimada their water was unfit for drinking. The women already know their water was toxic. Instead of drawing water from the wells in their homes they had to walk miles. Coca-Cola had created a water scarcity in a water abundant region. And the women of Plachimada were not going to allow this "hydropiracy". They started a "dharna" (sit-up) at the gates of Coca-Cola. On 21st September, 2003 a huge rally was organised to give an ultimatum to Coca-Cola. On 21st and 22nd of January, 2004 a World Water Conference brought global activists like Jose Bove and Maude Barlow to Plachimada to support the local activists.

The local panchayat used its constitutional rights to serve notice to Coca-Cola. The Perumatty Panchayat also filed a public interest litigation in the Kerala High Court against Coca-Cola.

The courts support the women's demands. In an order given on 16th December 2003, Justice Balakrishnana Nair ordered Coca-Cola to stop pirating Plachimada's water.

Apart from the water scarcity caused by Coca-cola in Plachimada, the other districts in the state are facing water crisis. For instance, in Kottayam district at some places, the water scarcity is so acute that people hesist to offer a glass of water to the visitor, which hitherto was a common custom. In the upper Kuttanadu area of the district during summer people collect from a distance of 3-4 kms. Water supply from public taps is erratic and very often even after standing for an hour in the queue; people are not able to get a bucket of water.

Earlier, private water selling was not known in Kerala, but today water selling by private parties has become common. For instance, in Thrissur district, there are private agencies selling water usually charging Rs. 300 for 500 litres, but the rate may increase according to the distance.

CHAPTER - 3

WATER CRISIS IN RAJASTHAN

"She sends me to fetch water
Very early in the morning
Oh! Grandfather it is very difficult for me
My pot never fills up fully
The water is so deep
That my rope hardly reaches it
The sun rises and also sets
By the time, I return
Unable to collect even one pot-full of water"

A folk song of Rajasthan

This is the situation most women and girl children in semi-avid Rajasthan find themselves in for much of the year. They trudge bare foot in the hot sun for hours over wastelands, across thorny fields, or rough terrain in search of water, often the colour of mud and brackish, but still welcome for the parched throats back home. On an average, a rural woman walks more than 14000 km a year just to fetch water. Their urban sisters are only slightly better off- they do not walk such distances, but stand in the long warding queues for hours on end to collect water from the roadside taps on the water lorries. (Krishan Kumar 2003).

In every household, particularly in the rural areas in Rajasthan women and girl children bear the responsibility of collecting transporting, storing, providing and managing water. In places, where there is no water for farming, men migrate to urban areas in search of work leaving women behind to fond for the old and the children. Women spend most of their time, collecting water with little time for other productive work. This impacts on the education of the girl child, for if the girl is herself not collecting water, she is looking after the home and her siblings when her mother is away.

The chore of water collection is a back breaking having adverse effects. Regular contacts with water also makes women prone to water borne diseases such as Schistosomiasis (bilharzia) and dracunculosis spread by guina worm (Krishna Kumar 2003)

Innovative Ways to Save Water

Determined to pull themselves out of their predicament, the women have formed 'water committees' and revived traditional methods of water harvesting. Women have brought up potable water to their doorstep using conventional techniques. Over the years, the women of Rajasthan, have devised ways of saving water (Saksena 2003)

Bathing on a string cot so that they can reuse the water falling through, wearing bone bangles wrist upwards to the armpit so that only the hands have to be washed delivering babies on sand to avoid soiling clothes and cleaning utensils with hot sand speak volumes about their harsh life style. With the monsoon-playing truant in the last few years, the miseries have increased manifold (Saksena 2003)

Agara Bai, who is 80 years old, in Sadavatin Village of Jodhpur district in Rajasthan has seen the revival of a pond in her village. A 40-year-old village pond, which was virtually useless, now holds water to last the 500 families for a year – thanks to one inch of rain they got.

Last year and the hard work of 70 women who desalted the pond, they increased the catchment area to 4 km and built a bund wall around it. The women's committee managing the pond has barred people from taking bath near the pond. Nor the animals are allowed to later around it. They went to keep water clean for drinking. They themselves decide how much water should be diverted for irrigation and how much to be saved for drinking and other purposes. Now, when they count their assets they also include the tanks (Saksena 2003)

To the women of Akhadhana Village go the credit for recharging the largest number of traditional beris in Rajasthan. Beri is a 40 foot deep well below the bed of pond, the mouth of which is covered by a stone lid. Raw water collected in the pond raises the groundwater table, which fills the beri to the ruin. When the pond dries up, the beri is opened to get filtered drinking water. The 100 beris desilted in Akhadhana are said to be 200 years old. (Saksena 2003)

"Water at hand is far more crucial for women than money" The revival of the system of johads in Arvari basin has had a visible impact on the socio-economic scenario of the region particularly women. In Rajasthan, the unhappy lot of fetching water has traditionally been the women. In times of scarcity, women would have to walk four to five kilometers for water. They also procure fodder and fuel wood, both of which are scarce in times of drought. The average time by women on these activities was 18 hours a day. But the johads have changed all this with water readily available to them; much time is now saved and utilized in productive work. The increased availability of water cooking, washing and bathing has definitely improved the standard and quality of life. (Kishore 2004).

Each structure of johads is small-scale but the cumulative benefits of johads are most certainly large scale. Not a single family has been displaced to achieve these impressive benefits.

Unlike big dams, the johads have not destroyed any rivers or submerged huge areas of forests and farmland. Johads are cost-effective and viable options in any agro-climatic situations for conserving rainwater and recharging ground water. The structure may vary in terms of shape and size, but the technology remains the same and is easily adaptable to local conditions. The experience of Arvari catchment shows that communities are best qualified to conserve water by adopting their techniques and wisdom (Kishore 2004).

In a meeting, which was attended on Women's day by more than 3000 women in Tonk in Ajmer district, the issue of drinking water dominated the discussion. The situation is not better in Rajamond, Bhilwara or pali. The women are queuing at the hand pump from 4 a.m and as late as 11.30 p.m., one can find women still waiting for water. (Roy 2004)

Rajasthan is India's largest state with its area of 342,239 sq.km. It has an estimated population of 5,64,73,122 (2,93,81,657 male & 2,70,91,465 female) spread over its 41,538 villages. The economy of the state is primarily based on agriculture and animal husbandry. In Rajasthan 90% of the population is dependent on ground water for drinking and irrigation purposes. The ground water mining is continuously going on. The ground water table is going down at a rate of approximately one metre per year. The situation has reached alarming proportions in some parts of the state. As a result, the water supply systems of many towns, villages and habitations have been put under great strain due to reduction in yield from hand pumps, tube wells and open wells. The over exploitation of ground water and lack of dilution though recharge is resulting into degradation of ground water quality in many areas.

Unfortunately almost 25% of the villages in the state are suffering from presence of high level of fluoride in ground water. Nine districts of the state are having fluoride-affected water in more than 50% of the villages. More areas are reporting fluorosis problem every year because of scanty rainfall and indiscriminate exploitation of ground water. UNICEF has supported development of an integrated model for fluorosis mitigation by Government of Rajasthan involving creation of awareness about control and mitigation of fluorosis, changing dietary habits, rain water harvesting and domestic defluoridaiton through activated alumina filters. This model has been tested on the ground in the state and given noteworthy results.

Rajasthan is the most water deficient state in the country following short spell of monsoon coupled with erratic behavior and scanty rainfall. Drought is the most frequent disaster recurring in the state. The last successive four years of drought has largely eroded copping capacity and economic potential of people. All the 32 districts (41000 villages) of the state have been declared drought affected having a serious impact on the bare survival needs of people, including safe drinking water and adequate nutrition. Family food security is under threat due to considerable economic losses, and reduced agriculture output. Many poor and landless people are forced to migrate in search of livelihood leaving behind their old parents, women and children to increased risks and vulnerability of drought.

A study was undertaken to analyse the water burden on women in Jaisalmer and Sri Ganganagar districts of Rajasthan. The rural habitation in Jaisalmer and Sri Ganga Nagar could be categorised on the basis of settlement pattern into 'gaanvs' and dhaanis. The gaanvs being more concentrated with a high population density and the dhaanis being a location of low population density. Also it is found that the problem faced by the people living in dhaanis are quite different from those living in gaanvs. While there are tube wells in the gaanvs, the women in dhaanis collect water from open dry wells.

Almost all the villagers are engaged in agricultural activities. They are mainly land owner-labourer or landless labourers with very low income The increased reliance Jaisalmer on rainfall made them vulnerable to the vagaries of changing weather patterns which affected their income. In Sri Ganga Nagar, to the significant extent the agriculture depends on the network of canal/ sub canals.

Jaisalmer: The only source of water available in Jaisalmer is ground water at a depth of more than 200 ft. This water is tapped through dug open well, and the tube well installed under various government schemes in some "gaanvs" (village). Water from the tube well is also supplied to some other villages. The distance to water source is less incase of 'gaanvs' (about 100-200 metre) as compared to 'dhaanis 2-3 km, some area even more.

Water availability: In Jaisalmer the survey revealed that water is scare for all the uses. This includes water required for drinking, personal hygiene, households uses and other activities. Typically, time spent for water collection per trip is one hour to one and half hour. Women report that 3-5 trips are made every day.

Due to irregular power supply, the tube wells are not able to run properly. When water is not available from the tube well in the village, women fetch water from tube wells in the neighbouring villages. At such times, the distance traveled for water doubles or triples to cover 6-8 kms.

Reduced water availability has also affected consumption pattern and affected lifestyles with very less amount of water being consumed per person for drinking and other activities. The amount of water consumed per day varies from mere 7.5 litres per capita daily (lpcd) to 14 lpcd for drinking as well as household activities.

Discussion with the villagers indicate that women and children suffer with a number of health problems like diarrhoea, gastroenteritis, jaundice, being more rampant in summer and rainy season. Backaches are more common among women and this may be linked with the burden of collecting water. There is hardly any sanitation facilities in the villages. Personal hygiene is also found quite dismal. People reported as being forced to take a bath only once or twice in a month. Poor quality of water as well as poor availability of water aggravates malnutrition. One

distressing factor is that women do not perceive diarrhoea or jaundice as the water related problem. There are some factors, which aggravates the water related stress for instance.

With no alternative source of income in the villages, people have migrated either temporarily or permanently to other areas.

Demographic forces: Of the demographic forces, population density of settlements appeared to be an important factor; with high pressure affecting not only per capita water availability but also the quality of water at source.

Socio-economic factor: Poverty is evidently aggravator of water related stress, given the inability of poor households to invest in water collection, storage and purification. Additionally caste continues to play a role in determining access to water in some villages.

It is distressing that nearly two decades after the launch of the National Drinking Water Mission, women in our village, continue to reel under water related stress, aggravated by a gamut of natural, demographic, socio-economic and cultural factors. It is evident from the study that access to water has significant benefits for women.

In Sriganganagar district, the Public Health Engineering Department (PHED) has installed only 2132 hand pumps, which according to the report of PHED of 593 hand pumps were functioning. In fact, this number may be higher and there is no guarantee that after repairing functioned properly. Due to the less flow of water in main canal, the villages located at the extreme fail to receive the water.

The study was conducted in the following Villages and dhaanis of Fatehgarh Tehsil of Jaisalmer district.

District Jaiselmer, Tehsil Fatehgarh

1.	Uga	
2.	Aasled	
3.	Bhopa	Villages
4.	Jhandra	
5.	Shobh	

1.	Sangat Singh Ki Dhaani	
2.	Madhu Singhi ki Dhaani	
3.	Aamn Singh ki Dhaani	Dhaani - Main Panchayat “Uga’
4.	Loon Singh ki Dhaani	
5.	Govardhan singh ki Dhaani	

6. Anetra Ram ki Dhaani
7. Taj Sinh ki Dhaani
8. Sanwala Singh ki Dhaani
9. Umender Singh ki Dhaani - Main Panchayat Jhandra

Rani Sar: This is Kutcha inhabitation near Jaiselmer city with about 5000 populations but, there is only well at a distance of about 1 km, women make 4-5 trips to collect water. Water is available in the well at a lesser depth because the well is a near famous lake 'Garih Sal Lake'. When the lake gets dry, no water is available in the well and women face a lot of hardship they walk miles and miles to collect water. The names of the women who responded to the questions are;

Ghafoor Ka Bhatta: Similarly in 'Ghafoor Ka Bhatta' near city, there is only one tap for large number of people. Water comes on alternate days. When the supply is disrupted, women walk about 2km to fetch water. The following women told their problem

In brief, survey in Jaisalmer has revealed that:

- Water source being open dug well, the quality of water is poor; dirty, saline and has turbidity.
- Women have to make at least three trips at 5 am, 11 am and 5 pm, sometimes the number of trips is more
- Total distance traveled is 9-10 km, even higher
- Total Time spent is 6-9 hours.
- Total number of pots/buckets is about 3 pots 30-45 litres (one pot of 10-15 litres per trip)
- Due to long distance, they have to take rest in the middle of the way. Dust storm aggravates their problem.
- At some villages like 'Jhandhra' water from tube well is too saline to drink. Even animals particularly cow gets indigested after drinking this water, so the villagers add water from the dug well.
- Entire life of women in rural Jaisalmer is spent on water collection and cooking. Even the girls of 8-10 years cannot be spared. They cannot afford the luxury of school. For instance for Pappu a girl of hardly 10 years, water collection has become her main job. In the words of her grandmother "Water fetching is the schooling for Pappu:" There are so many Pappus in the villages and dhaanis of Jaisalmer.

Sri Ganga Nagar:

In Sri Ganga Nagar district due to Indira Gandhi Nehar Pariyojna (IGNP), there is a large network of canal sub canals and minor canals. There is a well-established system of water works, where the water of canal is treated and supplied to the surrounding villages. In every village there is one or two big 'Diggi ' (pond) to store the water during crisis period. In Sri Ganga Nagar Tehsil of the district almost every household is having its own diggi, whereas on other tehsil like Padampur, there is no diggi in the premises of the house. The size of the diggi of the rich is very large while the poor have very small diggi.

However, the most unfortunately, during water supply the rich and affluent peasants, draw the maximum water by using motor pumps, very little or sometime no water reach to the poor and needy. Some time, water is transferred to the agricultural land of the big farmers, which should have gone to the diggies of the poor. For this rich farmers bribe the village officials. Some time water flow is reduced to the poor by putting one plate in the pipe. During the crisis period, (either being no water in the main canal/sub canal or due to the erratic power supply), the rich remain unaffected. In such crisis women from poorhouse hold draw water from the village diggis, which is totally unfit for any kind of human activity. They use this water not only for washing cloth and bathing but also for drinking. Due to the formation of algae, water becomes greenish and filthy. Women add alum to purify it.

And when no water is left in the diggies the women have to draw water from the canal or from far-flung areas.

To find the hardship of women, the study was conducted in the following villages of Sri Ganga Nagar district.

1.	Jodhe wala	Sri Ganga Nagar Tehsil
2.	Chhoti 14 G	Sri Ganga Nagar Tehsil
3.	Kuddu Wala 37 G	Sri Ganga Nagar Tehsil
4.	40 GG	Sri Ganga Nagar Tehsil
5.	Sri Nagar	Sri Ganga Nagar Tehsil
6.	Janwai Wala	Sri Ganga Nagar Tehsil
7.	27 BB	Padampur Tehsil
8.	29 BB	Padampur Tehsil
9.	2 J.J	Padampur Tehsil
10.	32 BB	Padampur Tehsil

11.	33 BB	Padampur Tehsil
12.	Dev Nagar	Padampur Tehsil
13.	Kapda Mill Colony	Sri Ganga Nagar City
14.	Guru Nanak Basti	Sri Ganganagar City

Tanka- Conventional system for water conservation: Running water is pure water. In Rajasthan this proverb stands on shaky ground, for here the water in Kund, Kundi or Tanka (pond, small pond or reservoir) remains pure throughout the year and some times even more. The principle behind this is simple, to hold the drops of rains in a very clean space and stock it. Tankas can be seen in almost every village or dhaanes of Jaiselmer.

Wherever any space is available, people whitewash it and make a sloping angan (courtyard) there. The angan from where rainwater is collected for the Tanka is called agor. Throughout the year, the agor is kept spotlessly clean. The water slops down the agor to the circumference. At the mouth of the tanka clean slop is made. A device is also conceived to take care of the dust that comes into the water. Thus the water is cleaned before it reaches to the tanka. Tanka is properly covered on one corner the aperture is covered with a clean lid; which can be removed to fill the water in the bucket. Throughout the year the water of tanka is used for drinking and for kitchen work. Women also add one or two pots of water whenever they can.

The very first precaution, which is taken, is to ensure the thorough cleanliness of the tanka, from time to time, particularly before rain starts, the tanka is cleaned.

Tankas are even made in uninhabited places, far from localities, villages and hamlet. Those who undertake the construction of such tankas do not do it for themselves but for society. These tankas are meant for herdsmen and cowherds. In the morning cowherds and herdsmen set out carrying out a flat earthen water pots; the kupari, but by the midday itself the kupari becomes empty. However, they can always find a tanka nearby. At each tanka, one can find a bucket or at least an old tin box with a string attached to it (Mishra 2001).

In sandy regions, wherever a rocky terrain or gravelly soil is found, a tanka is built. However, the biggest tanka is to be considered, can contains about 2,00,000 gallon. It was built 350 years ago at the Jaigarh fort, which is near Jaipur. A tanka of such an immense capacity was built not only to fulfill the need in water of the whole fort, but by enemies, then there would be no shortage of water. The king has gone and with him his army too. Now tourists visiting a city like Jaipur come to the fort, when they reach the fort, after an arduous climb, their thirst is quenched by the cool water of this very tanka (Mishra 2001)

However at many places water pollution is causing problem. In Jodhpur surface water as well as ground water are the main source of drinking water. For instance, water in Jojhri river near Jodhpur has a reddish tinge that is due to presence of large amount of pollutants. The

effect is felt in the nearby wells that are downstream of the river. The villages have experienced that the wells have been contaminated as the pollutants have seeped into the ground water and have accumulated in the well water too.

Traditionally, people of the surveyed villages used to collect excess rainwater in tanka and ponds and subsequently used it for drinking and other purposes. Now these villages have drinking water supply system (through Indira Gandhi Canal) but facility for irrigation is negligible.

According to the respondents, the water quality in Jodhpur suffers due to:-

- The water table in this region is high but the water is very saline.
- Rainwater is the only source for irrigation.
- The ground water of this region generally contains large quantity of dissolved salts. The hydrological investigations of the villages have indicated that most of the areas have saline water.
- The principal constituents are sodium and chloride. Sulphate and bicarbonate are present in appreciable amount.
- Due to excess irrigation with saline water, the fertility of soils is deteriorated by adding salt to the soils.

Even in Jaipur the capital of Rajasthan the situation of water crisis is alarming. The town of Kaladera, 60 km outside of Jaipur, has experienced severe water shortage since a Coca-Cola factory was established in the town 6-7 years ago. Reports from the villagers estimate that the water table has dropped at least 80-100 feet in that time. Whereas the level 10 years ago was around 40 feet, it has now gone down to 120-130 feet depending on the area. In the village itself, the only source of water are provided by the government which pumps in water two times a day (morning and evening) for one hour at a time. Other than that, all the wells have gone dry and the only pumps in town have either been supplied by the government or by Coca Cola. While the government has been providing water to the town for an estimated 40-50 years, the duration per day of water services has shrunk in the last 5 years down form having 3 hour periods of water supply a day.

Inadequate Water for Irrigation: A Cause of Social Violence

Not to talk about drinking water, water is not available even for irrigation in sufficient quantity in Sriganganagar and adjacent districts, resulting in protests and violence.

On Oct 28,2004 agitating farmers set ablaze a police station and staged protests in Sriganganagar district where four persons were killed in police firing on 27th October, 2004 prompting authorities to extend curfew to more areas like Gharsana, Rawala, and Anoopgarh (Joshi 2004 c, Hindu 2004 (a) and Times of India 2004 c).

Demanding release of more water for irrigation and protesting against the police firing, farmers set on fire a police station 20 km near Rawala town, the scene of violence.

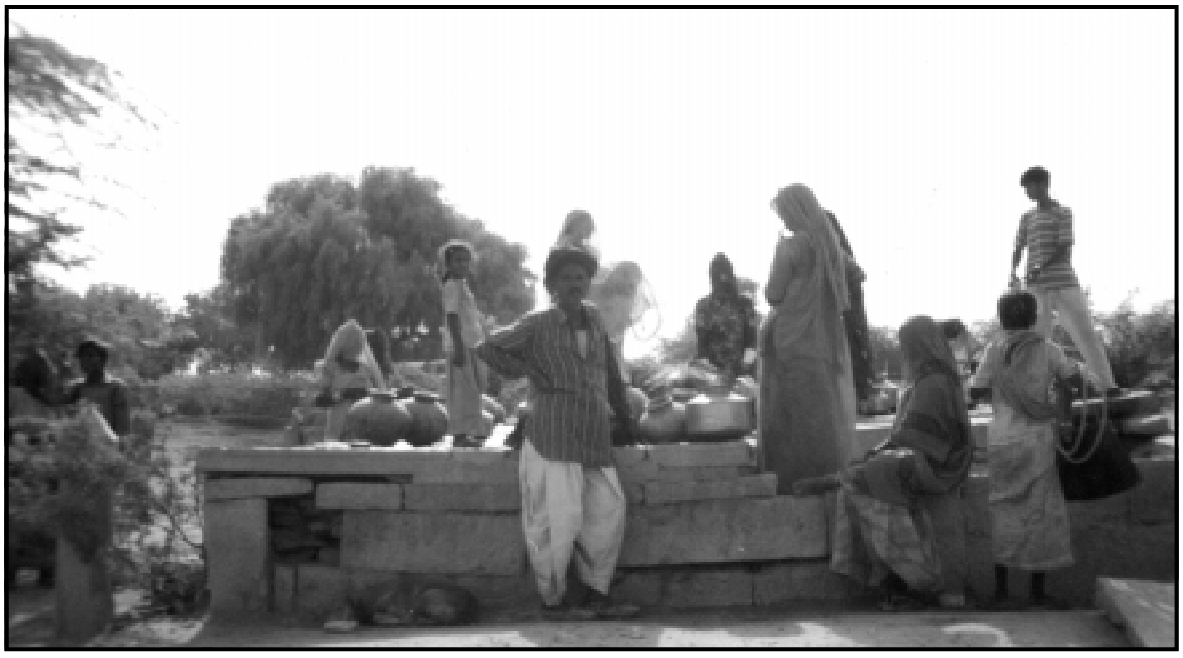
Situation could be controlleld when the Army held flag marches in trouble –torn areas. Curfew had been so strictly enforced that even mediapersons could not get passes to visit affected areas. No movement was allowed in Gharsana and Rawala villages and nearby areas.

Farmers in this interior part of the Rajasthan are an agitated lot. Those who were well-off some years ago, have virtually turned paupers. Villagers who owned more than 20 acres are forced to do menial jobs to make both ends meet. The border area is mainly dominated by the Punjabis who cultivate narma variety of cotton and wheat. Most of the villages are those who have settled down hereafter partition or sold their landholdings in Punjab to buy cheap land in this belt. The land that was once mainly barren or was having the wild growth was converted into fertile land by the hardwork of the new Settlers.

Farmer's agitation was not a political movement. They were demanding just to release the adequate supply of water. The government had taken the decision to reduce the water to farmers in the canal fed areas, from 5.23 to 3.5 cusec per 1000 acres (Hindu 2004b).

If river diversion or interlinking of rivers take place, inter-state as well as intra-state violence will be a common phenomenon beyond the control of police force or army.

Guddi a little girl is carrying water to a Dhani from a well in Jaisalmer, Rajasthan



Women assemble to collect water in Raniser near Jaisalmer, Rajasthan

CHAPTER - 4

WATER CRISIS IN ORISSA

In Oriya there is a common saying, “Jala bihune srusti nasha, jala bahule srusti nasha” which means water both in abundance and in scarcity pose a threat to the existence of life on earth. The summer season and scarcity of water are synonymous. Both the rural and the urban area go through a water stressed condition during these months. The rural women have to bear the brunt of water scarcity, as they have to go a distant place to fetch water, which has an adverse effect on their health. It’s a pity that rural women are not still aware of water conservation methods to fight the scarcity. Role of women in water resources management and conservation has been duly recognized. The National Water Policy 2002 while stressing on participatory approach in water resources management specifically provides for necessary legal and institutional changes to be made at various levels for the purpose of ensuring appropriate role for women. The Ministry of Water Resources, while issuing guidelines in April 1987, specifically emphasized the States to consider representation of women in Water Users Associations at all levels. As a consequence, many State Governments have amended their Irrigation Acts or have come out with specific Acts on the Participatory Programme in Irrigation. Some of the States have gone further and have made specific provisions for women. One can categories the women in relation to water as rural and urban.

The approach for water of a rural woman is different from her counterpart in an urban area. Though the state government is taking care of the water needs by providing tube wells, wells in rural area, the woman has to struggle hard to fulfill her water requirements. The women in these areas are still not well armed to fight both the abundance and scarcity of water. The urban woman is bit more comfortable as there is municipal supply water and people have the monetary capacity to have their own bore wells. But the poorer section of the urban establishments particularly the women in the slums have to face the hardship in procuring water. Availability of potable water both in the rural and urban Orissa is pathetic as is revealed from the census report 2001. Out of a total of 7870,127 families of the state only 687284 families receive water through municipal supply. This is about 9% only. About 3% of the state population still collects drinking water from rivers and canals. Those along the large rivers sometimes walk miles to fetch drinking water. 29% of the population collect potable water from dug wells and 27% from tube wells. Poor sanitary practices and non-availability of toilets is equally alarming. 92.29% families of the rural areas and 41% in the urban families do not own a toilet.

Six villages of Jagatsinghpur district and cuttack town was studied under this project to know the level of awareness among the rural and the urban women about safe drinking water and judicious use of this resource. Six Villages of Jagatsinghpur which are having river, canal, tube wells, community ponds and wells were studied under this project to find out the common problems that are being faced by the women regarding use of water for domestic purposes. Cuttack was studied as a sample urban establishment of Orissa to find out the problems of women in procuring water for domestic use both during the abundance and the scarcity of water. Besides, the study also tried to assess the level of awareness among treatment, recycling of used water, ground water recharge, storing and using safe drinking water, preservation of water bodies, prevention of water borne diseases and optimum use of water.

Table 4.(1) : Water Sources

Name of Village	Population (Approx.)	No. of Wells		No. of Tube Wells		Nearby river/Distance	Community Pond
		Govt	Private	Govt.	Private		
Andhari	460	4	46	2	6	Andhari/400mts	5
Badapala	600	-	44	3	17	Mahanadi/400mts	-
Balarampur	5800	-	40	6	-	Mahanadi/500mts	-
Jamukona	800	-	-	3	-	-	1
Nacchipura	1200	-	-	3	-	-	-
Ranitola	1100	-	2	2	40	Paikal/1 km	4

Table 4.(2) : Awareness About Water Conservation

Name of the Village	Aware about Ground water Conservation		Aware about Water pollution		Aware about water borne diseases		Aware about Safe drinking water/Purification	
	Yes	No	Yes	No	Yes	No	Yes	No
Andhari	0	50	3	47	21	29	20	30
Badapala	2	48	7	43	11	39	12	38
Balrampur	0	50	5	45	12	38	15	35
Jamukona	0	50	4	46	22	28	18	32
Nacchipura	1	49	6	44	13	37	26	24
Ranitola	0	50	4	46	28	22	22	28

50 women of different age group of different families and having different educational background were interviewed from each of the villages mentioned in table No. 4. (2) to know

the positive and the negative aspect of water in abundance and in scarcity. They were also asked about there awareness for different water related issues. Each woman has to collect about 10 to 20 pitcher full (about 200 to 250 litres) of water for their domestic use apart from bathing. For a family having 5 to 8 members. In villages like Nacchipura and Jamukona people have to depend on the government tube wells during the summer season. In fields people dig 'Chua' (small shallow wells having diameter of about 3 meters and depth of about 2 meters) where water gradually acculmulates. People use these 'Chua' for bathing and even drinking purposes. In these villages people do not venture to dig shallow tube wells because these become defunct during the summer season. The community ponds become dry in the summers, which make it difficult for the women to take bath and wash their clothes. Women also find it hard to pump bore wells for a long time as the water level goes down.

Rains bring some solace to the women who struggle hard to get during the summer months. The puddles made by the rainwater are used for bathing and washing clothes. Unknowingly the women invite many water borne diseases by using such temporary water bodies. Flood during the rainy season is common in many parts of Orissa, which adversely affect the people. It's a matter of great concern that a large chunk of womenfolk are not aware of safe drinking water, its collection, purification and storage. Level of awareness about safe drinking water is directly proportional to the level of literacy among women. Astonishingly more than 90 percent of rural women are not aware of ground water conservation, water shed management after so much discussion on this subject in the media. Awareness about water purification, water pollution, preservation of water bodies and storing and using safe drinking water is abysmally low among rural women.

Cuttack town

Cuttack Municipal Corporation (CMC) comprises an area of 91.94 Sqr km. Having a population of 533139 as per the provisional census of 2001. The total corporation area has been divided into 39 wards. The town is situated in-between river Mahanadi and the Kathajodi. Though many people afford to have their own tube wells and municipal supply connections, the poorer section of this urban establishment has to depend upon the rivers for bathing and public tube wells and the public stand posts for other domestic uses. In the rainy season the water in the river becomes dirty and polluted but the regular users of the river get water near the shore. However the water line recedes in the summer season and people have to walk about one kilo meter in the sand to reach the water mass (Plate-5). Level of ground water sinks in this town year after year. In the summer season people face a water stressed condition. Awareness about water conservation among the people of slum area is almost zero. The section of the society who is aware of this fact turned a blind eye towards wastage of this precious resource. It really hurts to see that about 90%

Of the public supply taps run aimlessly. Most of these points do not have a stopcock to regulate the flow. Neither the Municipal corporation nor the general public care to think about a solution for it. Community involvement in maintaining these stand posts and the public tube wells is the need to the hour of sustainability of these points. Water logging in many parts during rainy season makes the people vulnerable to many water borne diseases.

Table 4.(3) : Detail information on Tube wells in CMC Area (Data Collected from CMC)

Type of tube well	**Total No. of T/W**		**Defunct T/W**		**Running T/W**	
I.M-Tube well	1550		(-) 49		1501	
Shallow Tube Well	150 66		1655 88		(-) 17 1589	
Section	No. of Complain Received TW Pipeline		No. of Complain complied with TW Pipeline		Balance to be completed TW Pipeline	
Ward No. 1 to 12	44	05	33	11	11	-
Ward No. 13 to 27	27	08	15	08	12	-
Ward No. 28 to 39	23	08	11	05	12	03

Orissa, district Naupada, block Boden, Village Bhaisadani lying on the fringe of a forest reserve, the tribal settlement was shunned by parents looking for grooms till seven years ago. The reason; the women of the village had to walk through dense forest to mountain streams three kilometers away; three times a day to fetch water. The stream was the only source of water for them and the trek through the forest often entailed encounter with wild bears (Saksena 2003)

Their day began with the 5 a.m, trip to the stream. Which caused a bald patch on their heads where they rested the pitcher. Bhaisadani Village fell in the dark zone. However, the expertise in watershed management by some Voluntary Organization changed their lives. The women offered free labour to construct a 25-foot wide and 2-foot high check dams at the spot. From there a 3 km long cement canal was constructed to carry the water to a pond near the village. The water harvesting structure took four years in the making and became operational in 1998 (Saksena 2003)

Having water so close by has given the women not only plenty of spare time but also green vegetables. Earlier they did not know about vegetables. They ate rice with salt, when there was no water to boil the rice, they had to roast it.

At Maharajore Village, drinking water used to be a problem. A river flows close by but drawing water from it during the monsoon was a dangerous proposition. Many women had been swept away by the current. Now, near the village the Council has constructed a dam for Advancement of People's Action and Rural Technology (CAPART). Today, the dam irrigates 404 acres of land and quenches the thirst. The Women Committee maintains the dam and supervises the water distribution.

The Orissa Lift Irrigation Corporation

The Orissa Lift Irrigation (OLIC) provides a lifeline for approximately 50,000 farming households, the majority of whom are small and marginal farmers, enabling them to produce enough food and remain self reliant in meeting their basic food needs.

Created by the Government of India, OLIC is instrumental in supplying the agriculture water need to farmers in areas where canal irrigation is not available. However post cyclone the Orissa Lift Irrigation Corporation is just one of the many public sector corporations to face a privatization overhaul under the combined onslaught of the World Bank, and Department For Finance International Development, U.K (DFID) under the pretext that they are loss making operations.

With Orissa's debt burden amounting to Rs. 24000 crores, 60% of state revenue goes towards servicing this debt, leaving only 40% left to meet day to day expenditures on public service. The directives via the WB's puppet installation of DFID, whose role it has become to oversee the 'proper' utilization of WB's loans to the state, (i.e. the programme of privatization through it's conditional lending policy), for which DFID receives a concession of 18% of the loan.

As one of the main employers in the state, (9500 direct and indirect employees of OLIC range from engineers to agriculture labourers) government action has had a devastating effect on people livelihoods. The state government has conducted a moratorium on jobs, wages have not been paid to over 20,000 teachers, salaries have been cut, staff laid off, and millions of people are without the prospect of paid work, all part of the various fiscal and financial measures of the government in tackling the state's financial crisis.

Moreover the claims made by WB and DFID that OLIC is a loss maker does not show the wider picture. For example DFID chooses to interpret limited set of statistics ignoring the fact that OLIC has been providing as essential service to the most effected poor and marginalized farmers. It's role has been crucial in helping farmers to irrigate 435 lakh hectares for agricultural land which produces 16 lakh Million Tonnes of food grains (valued at 710 crore rupees). This in turn enters the food security system including the PDS (Public Distribution System), giving affordable food to people.

Therefore, the cost of water is more than compensated by the amount of food produced. The commodification and marketisation of water will mean that the 50,000 farmers will have no access to food as they will no longer be able to afford to produce food with the increased cost of water and will be turned from economic producers to an economic drain on the state. Millions of small and marginal farmers will become displaced migrating to cities in search of new livelihoods.

OLIC provides 70-80% crop success for farmers, who depend on OLIC for Rabi (winter) cultivation. The role of OLIC was set up to provide a public service and not to make a profit. This role is being undone in the name of fiscal reforms, which make a mockery of the state government anti-poverty policies, as laid out in 1998 WB report 'Reducing Poverty in India' and clearly goes against the interest of the poor.

WB reasoning is that water scarcity is a new situation and needs a new approach to water management. Under the heading of 'participatory development', the WB and DFID have abused the concept of local level participation through the setting up of Pani Panchayats. Farmers are anxious in the way that Pani Panchayats are being undemocratically installed, formed with those who have financial social and political clout. Often the groups do not represent the local community, yet take control over the community's water resources, operate and manage it in return for fees paid by the users. (98% of Water Committees have been formed where lift irrigation points are involved). Users have to repay the capital (fixed assets) costs over a period of time, and have to pay immediately in full for the operation and management. In Orissa, the price of lift irrigation water to users has increased almost 10 times since the creation of the Pani Panchayats. Water rates have increased from Rs. 750 to Rs. 5000 and from Rs. 1000 to Rs. 10,000.

The formation of Pani Panchayats only serves to undermine the activities of small and marginalized farmers to access water, resulting in a collapse in food production for thousands of farming households, as well as thousands of job losses for OLIC employees. Further problems are likely to arise through Pani Panchayats including access to drinking water of which the bulk of rural drinking water is provided meeting the basic water needs of the rural folk.

Co-opting Cooperative Governance Systems: The DIFD/WB Pani Panchayat

By usurping the word 'Panchayat' for creating user groups or 'stakeholders' who pay for water, DFID is following the lead of the World Bank, is undermining the concept of community control over this natural resource. The four million pound sterling project is being implemented by the Adam Smith Institute, U.K in the Jagatsinghpur and Puri districts of Orissa, the districts that are particularly vulnerable to cyclones. Particular efforts to privatize water are being made in villages that bore the brunt of the Orissa Super cyclone in 1999, where people and agriculture have yet to recover from the calamity. This region was also the recipient of genetically

contaminated food aid in the aftermath of the cyclone; the exposure of this added health threat by the Research Foundation for Science Technology and Ecology spearheaded the Indian Campaign against Genetically Engineered Food as Aid.

The OLIC/Pani Panchayat project of DIFD involves the cooption of NGOs, primarily Unnayan and SEEDS, who have been working in the areas for some time and have established their credibility with the people, is based on the privatization of the 6,600 Minor Lift Irrigation Projects (MLIP) of the Orissa Lift Irrigation Corporation (OLIC), a public sector enterprise. The water users' group in each village designated as "Pani Panchayat" or PP, does not represent the village community, but is actually a group of those who can pay Rs. 40/hour for water and is supposed to look after the day-to-day management and maintenance of the equipment. The project designers have ensured that the payment is made in advance through a coupon system so that no credit-sales are done.

The PP has to sign a legal document with UNNAYAN in regards to exceeding in project and managing the activities and maintaining the assets created under the project. The support provided to the PPs (both for fixed assets and revolving fund) is not considered as grant, rather considered as a returnable grant. In case of fixed assets the fund provided to the PPs will be returned back to UNNAYAN by the concerned PP in a period of 10 years without interest. But as far as revolving fund for each PP is concerned the repayment will start from harvesting of first crop since installing of the MLIP with interest, which will be mutually agreed upon by PPs and UNNAYAN. The amount of interest to be charged from individual member on loan from revolving fund is left to the PPs.

The scheme is being popularized through the Food-for-Work programme, with the government providing rice at a concessional price, distribution of blankets to those who become members of the PPs (euphemistically known as relief work)

Not only is water for irrigation but even drinking water is being privatized. The government first insists on the formation of water associations and conveniently pass the responsibilities on to these association. When this proves inefficient, water distribution rights are given away to private contractors. For example, the Orissa government initially stressed on the formation of Pani Panchayats (water associations). Later using police the government suppressed these panchayats justifying this by claiming that the villages were not being responsible enough.

In the village of Tikhiri block Muribohal there lived a number of thirty-two families of Gondo and Sikani tribe. Total population of the village is one hundred and fifty. The main problem of the village is scarcity of drinking water. There is pond called Dabara, which has was no water during summer causing a lot of hardship to the people. Even animals in the village are unable to get water. The village people are going to another near by village Badarband. To solve the problem villagers contributed their labour and dug mud well.

Titlagarh is the hottest town of India, but it has no water. As the highest temperature, is recorded here 52 degree. Which is the highest temperature in India. People called inspite of “Titlagarh” it “Tatlagarh”, in local language Tatla means Hot. In Titlagarh water problem is acute. People are buying water throughout the year for drinking and cooking purpose. In the month of May and June the rate of water increased three time, from Rs.2 per Dabba to Rs.8 per Dabba (container). This is the picture of urban areas, but in rural areas the problem is worse, well, tube well all are becoming dry but people have no money to buy water. Due to water problem some villagers are migrating to other places.

In Pialapatar, women’s are spending 3-4 hours in morning and around 5-6 hours in evening to fetch the water from 3 Kms away. In the month of May, there is a long queue, resulting in tensions and quarrel. People also suffer due to water borne diseases, like malaria, dysentery and diarrhea.

Any one who visits western Orissa can found the storage practice in almost all the villages in the plain parts. Digging of Chahala is unique system of water. Storage practice in Orissa. There are other traditional water management practice like, Munda, Kata, Chahala, Chua, and Bandhli.

CHAPTER - 5

WATER CRISIS IN UTTRANCHAL

The Himalayan Mountain system is dotted with 12 rivers, out of 18 major rivers of the country. Hundreds of small rivulets and thousands of streams make the Himalayas as "Water Bank of Asia". This constitutes 42% pf the total of the country. It is ironical that these rivers have not been of any use to the local resident, except for the minor utilities in the form of watermill, occasional irrigation, not exceeding 2% of the total potential use (Joshi 2004)

The government scheme of water supply has largely failed due to its appropriate nature, poor maintenance and distribution. This has plunged mountain residents to severe water shortage, so much so that women and girl have to walk kilometers for potable water. In Uttranchal, out of total 16000 villages 8800 villages have been placed as water scarce villages. The districts like Almora, Pauri, Tehri, Pithora Garh and Chamoli are facing drinking water crisis (Joshi 2004).

72% women and 14% children have to bear the responsibility of carrying potable water. The average 60% women have to walk ½ km while 10% of them walk 4 km for fetching water. The villagers are not satisfied with the government scheme.

In district Tehri, Smt Bachni Kaunthura has to climb 1.5 km, 5 times to collect water with a back load of 40 litres of jerry cane. Smt Shankara Devi of Village Nagri of district Tehri has to engage herself for water collection from 3 a.m in the morning. There is often quarrel among women on the issue of water. When the quantity being the priority is not met out, quality of water becomes the secondary need.

They believe that traditional methods of water harvesting were the best. By their own efforts, where government has failed, villagers are making at hilltops to charge spring, an age-old practice like in Maikoti (Rudraprayag).

Women are suffering lot in every village where water problem is severe. Natural sources are drying up which adds the kilometers for women everyday to quench the thrust of their family as well as animals.

Women are the major workforces in whole Garhwal region. They work from early morning to late evening to serve the family. They do all household work from cooking to cleaning and washing clothes and soiled utensils as well as look after their children and animals. Women also

collect the water required for cooking, cleaning, washing, bathing and drinking both for human beings and animals.

Smt. Kundana Devi of the village Kandakholi, in district Tehri, which is situated above 1800m M.S.L, told with tears in her eyes that there is pipeline from Govt, but water comes weekly or sometimes fortnightly only for one hour. There is no natural source nearby. The govt. water supply is through a pumping system, lifted from Bhilangana river a tributary to Bhagirathi which is at about 700m M.S.L Now they reduced the number of animals only because of water crisis. The only source close to the village is about 1.5 km. The discharge rate is only 1.0 liter per minute. A woman has to wait for minimum of 1 hour to fill a buntha (20 lt.) of water. They get up early in the morning to queue for water and go to bed late around 11.30 after storing enough water for next day work.

Smt. Shashi Devi of Kandakholi says that we take bath one by one and only once in a week because of the water problem. Or they go very early or very late to the spring to take a bath or wash the cloths. They also told us that water is also reducing every year. They are also afraid of drying of the only existence source.

Similar stories were told by the women in other villages also. 269 ladies of 32 villages in two districts of Garhwal Mandal in Uttaranchal were interviewed for water. It was observed that a glass of water is much more precious than Kerosene oil in the villages where people have to travel more than 8 km for one brass pot (Gagar) of water or have to pay to more than Rs. 50 for one 15 liter of tin. Most women walk on an average of 5-10 km per day just to fetch the water. In some villages condition is worse, where women walk between 20-24 kms per day spending 5-9 hrs per day just for water.

Villagers also blamed Govt. for their hand pump scheme everywhere. According to them natural water sources are drying wherever there are hand pumps.

During the survey in Jaunsar area of district Tehri Garhwal, village Nagthat, Duena, Vishoi, Gadol, Jandoh, Chitar, Chichrad and Gangoa were visited. It was observed that water in the region is mostly acidic in nature. Water problem in Chitar and Gangoa villages is very severe, where people carry water on mules from 8 – 10 Km far from the village. Because of the poor water quality, most of the villagers in the regions are suffering from many diseases related to skin and teeth. Natural resources of water in the area are very few and they are also disappearing very fast. During the survey, Smt. Nisha Devi of village explained that they are not getting enough water for their animals so they take their animals to the spring about 2-3 kms away.

In the villages where govt. pipeline is available, water quality is quite good but due to the carelessness of extension workers, they don't get water. Especially during the two months in the summer they face lot of problem. Another problem is of maintenance of the pipeline,

whenever it is damaged by one or other reason, repairing is always delayed. Women are not able to do their normal work due to the time spent to fetch the water. Most of the women in water scarce villages suffer from the joint and back pain. Girl child education also got affected in such villages because after mother they have to bring the water. Boys also spent their time for water collection as well as to take the animals to the water sources, which affects their studies. Water mills in most of the villages are either closed or are seasonal, because of reduction in the water in the streams.

Suggestions of women for improvement:

1. Proper water conservation measures should be used. People should be made aware and trained on the techniques of water conservation.
2. For the conservation of water in the fields, khals, chals (small ponds) should be made.
3. Natural water sources should be restored.
4. Watermills should be improved so that it can run in less water also.
5. Government schemes should be implemented properly

Tehri Dam Project

The Geological Survey of India conceived the Tehri project in 1949. The Tehri site was considered suitable, provided that sub-surface investigations did not reveal any adverse factors. However, it was only in 1963 that the detailed investigation was made. The site was finally confirmed, after the visit of the then Union Minister for Irrigation and Power, K. L. Rao in 1965. By 1967, several Indian and foreign experts visited the dam site and recorded their opinions (Paranjpye, 1988).

Apprehension was expressed with regard to the geological vulnerability of the area at and around the site – the unstable hill slopes that would constitute the reservoir run areas and the seismic danger at the site. The preliminary investigations by the Geological Survey of India had revealed a riverbed fault at the dam site and this strengthened the decision to opt for a concrete dam.

Tehri Dam is a gigantic multipurpose project being built on the Ganga at Tehri in the Garhwal Himalaya. The cost of 260.5 metre high dam project which was originally estimated at about Rs.197.29 crores in 1972 has now escalated to Rs.10,000 cores. The dam has been surrounded by controversy since its very inception. The main reasons why the citizens of Tehri Garhwal, several scientists and ecologists have opposed the Tehri dam are the following (Matu-People's Organisation, 2002):

i) The uprooting of more than one lakh people, directly and indirectly from their homes in Tehri town and surrounding villages.

ii) The high risk of dam failure, whether by an earthquake of higher intensity than what the dam design provides for, or by other factors; in the case of such event the acute threat to dense urban and rural habitations in the downstream area, including the culturally important towns of Dev Prayag, Rishikesh and Haridwar.

iii) The threat of RIS or reservoir induced seismicity, after the creation of the huge new artificial reservoir, to the people living around this reservoir, a threat that arises from the height of the dam and other factors favourable to RIS found at and around the dam site.

iv) The threat of rapid siltation of reservoirs due to the high erosion in the catchment areas. Some experts assess the present life of the reservoir at only 60 years.

v) The project has been steeped in financial waste and corruption. The Comptroller and Auditor General has raised disturbing questions about this project.

vi) Adverse impact on fisheries, other fauna and flora, and various other adverse effects.

The 260.5m high dam is more than two-thirds the height of the Empire State Building, and is on the river Bhagirathi, a tributary of the mighty Ganga, India's holiest river. The most worrying feature of this reservoir is that it is being constructed in the Himalayas, one of the most geologically unstable and earthquake prone regions on the earth, as the subcontinent of India continues to slip and grind its way northwards into central Asia. Indeed, it is well known in engineering circles that the massive artificial water bodies created by dams have a tendency to increase the frequency, and perhaps the intensity of earth quakes (Davies and Day, 1998).

The Tehri dam will impound 3.22 million cubic metre of water. The reservoir will extend up to 45 kms in the Bhagirathi valley and 25 kms in the Bhilangana valley with a water spread area of 42.5 sq. kms. The reservoir is expected to irrigate 270,000 hectares of land. The turbines in the powerhouse at Tehri have an installed capacity of 1,000 MW, so that they can operate essentially to satisfy the peaking power requirements of Uttar Pradesh Power Grid. (Shiva and Jalees 2003)

Besides, the Tehri dam is also expected to supply 500 cusec of drinking water to Delhi. While cost has increased from 200 crores in 1972 to about Rs.10,000 crores, the benefit component will not change in real terms because the height of the dam, and therefore the water available for irrigation will remain constant. Similarly, as there will be no change in the water-head, there can be no change/increase in power generation. This will make the cost benefit ratio even worse.

An important aspect of the Tehri Dam is its proximity to the Chinese border. We cannot ignore the fact that we had war with China and in future if there is war, Tehri dam might be an attractive target for Chinese bombers. It is a well-known fact that during the Second World War, the Allied forces and Nazi Germany busted each other's dams without any qualms. Since

then, it has been wisely decided by most countries not to build dams too close to unfriendly borders. A dam at Tehri, barely 100 kms from the border, is strategically vulnerable. (Shiva and Jalees 2003)

However, the main controversy surrounds the all-important feature of seismicity at the Tehri location. It is feared that if an earthquake of intensity equal to eight or more on the Richter scale were to occur, the dam would collapse, and the catastrophe would lead to consequences that would greatly outweigh the benefits from development.

Galileo (17th century) stated: "I had less difficulty in the discovery of motion of heavenly bodies in spite of their astonishing distances than in the investigation of movement of flowing water before our eyes." The significance of Galileo's statement acquires even greater relevance today when one is dealing with a river like the Bhagirathi, which originates at an attitude of 12,000 ft. from a glacier, which is 26 km long and is fed by some of the highest mountains in the world. The Bhagirathi has a catchment area of 7,511 sq. kms out of which almost one third, i.e., 2,328 sq. kms, is snow bound as it lies above an attitude of 16,000 feet above mean sea level. (Shiva and Jalees 2003)

In 1969, the project authorities had estimated the rate of sedimentation as 1.7 acre-feet per sq. mile of catchment area per year. At this rate, the life of the dam was estimated as 100 years. However, as empirical data started coming, the annual rate of sedimentation went up substantially, i.e., 2.8 acre-feet per sq. mile by 1980 or 13.5 hectares per 100 sq. kms per year. Subsequently, at this rate of siltation, the expected life of the dam reduced to 61.4 years.

In case the Tehri dam collapses, the impact would be as given in table 5 (1). As seen in the table, in less than an hour and a half the water would hit Rishikesh and Haridwar and wipe out these two cities. This is certain because the height of the water would be 260 metres and 232 metres respectively. This would result in horrific loss of life and property. In order to assess how this can be minimized and to what extent, a disaster management plan is essential. This plan would also prescribe the communications and personnel networks that would need to be in position and the costs involved in all this. These costs would have to be calculated as a part of the cost benefit analysis of the project (Singh and Banerjee, ed. 2002).

Table 5(1) : Impact on cities if the Tehri dam collapses

Place	Distance from Dam (kms)	Arrival Time for Surge (hrs.)	Depth of Surge (metres)
Dam	0	Approximate Time of Empting of Reservoir = 22 (minutes)	260.00
Rishikesh	80	0.63	260.00

Place	Distance from Dam (kms)	Arrival Time for Surge (hrs.)	Depth of Surge (metres)
Haridwar	104	0.80	232.00
Bijnor	179	4.45	17.72
Meerut	214	7.25	9.85
Hapur	246.5	9.50	8.78
Bulandshahar	286.5	12.00	8.50

Source: Shekhar Singh and Pranab Banerjee (ed., 2002): Large Dams in India: Environmental, Social and Economic Impacts, Indian Institute of Public Administration, New Delhi.

It needs to be noted that Tehri Dam Project is only one of the over 40 hydel multipurpose projects, which have been constructed, or being constructed/ investigated in the Garhwal region. These projects include big, medium and small projects (Paranjpye, 1988).

The cost benefit ratio

B/C ratio = Annual Benefits/Annual Costs = 21007.47/37539.31 = 0.56.

The annual benefit per cost rate is calculated as 56 per cent. In other words, for every rupee put on Tehri project, only 56 paise will be recovered (Paranjpye, 1988).

The project has also not made any provisions for rural electrification schemes in the surrounding areas, even though the dam will submerge about 100 villages in two districts of Tehri Garhwal and Uttarkashi. On the other hand, the project will supply enough to large industries and urban areas in the plains of Uttar Pradesh.

The locals are totally alienated from the project. Hence the authorities have foregone the advantage of having first hand knowledge from the people, say the types of trees most beneficial for water retention, their fuel requirements, etc.

Table 5(2) : The Tehri Project at a Glance

Location	Tehri, Uttaranchal
Catchment Area	7511 km^2
Snowbound area in the catchment	2328 km^2
Average annual rainfall	101.6 cm to 263 cm
Annual run-off on 90 per cent availability	5.59MAF
Maximum Recorded Flood	3800m^3/S

Adopted maximum flood for diversion during monsoon	8120 m^3/S
Type of the dam	Rock fill, clay core
Height of the dam from deepest foundation level	260.5 m
Height of the dam from river-bed level	239.5 m
Installed capacity	1000 MW
Firm Power	346 MW
Area Irrigated	2.7 lakh ha.
Dead-storage capacity	5 MAF-at 720 m above MSL
Outlet for releasing water for irrigation	At 730 m above MSL
Head-Race-Channels for leading water to the turbines	Four tunnels at 720 m above MSL

Source: Paranjpye, Vijay (1988): Evaluating the Tehri Dam: An Extended cost Benefit Appraisal, Studies in Ecology and Sustainable Development, Series No. 1, INTACH, New Delhi.

Another controversial aspect is the catchment area management by the Forest Department, which had been entrusted with the planting of trees to build the soil. Though the catchment area is around 7 lakh hectares, the forest department is entrusted with only 52,000 and odd hectares for greening.

There are 12 rare and endangered species of flora and fauna, which may be disturbed by inundation. They are: (Kumar 2001)

1. Cirrhopetalum hookeri
2. Eulephia hormusjie
3. Gastrodia orobunchoides
4. Herbenasia triflora
5. Listera microgolties
6. Saccolabium olistichum
7. Allium rubellun
8. Gagea preudoreticulsta
9. Tulipa clusians
10. Abgcuia tongleusis
11. Poa rhadiana
12. Preudoduntonia himalaica

The construction of the reservoir would push the fauna to the higher slopes in the area. The flora that was thriving on the facile conditions in the valley would face with a tougher life. The fauna already inhabiting the higher slopes would share scarcer resources and smaller habituating area of the land, which they are not accustomed to. In their fight to survive against new odds, we may find ourselves the losers with many species becoming rare.

Rehabilitation: Human Factor

Involuntary displacement of human population is always traumatic. Irrespective of the causes leading to migration the degree of suffering experienced by such people simply cannot be quantified in money values and even in words; it can be described only inadequately. In the case of natural calamities and wars one notices a sense of helplessness because the causes and consequences are so diverse and widespread that compensation and restoration become either intractable or apologetic. However, this need not be the case when the displacement is the consequences of pre-planned developmental projects undertaken by the government or other public authorities. But, unfortunately ousting of people likely to be submerged under irrigation or hydel power dam is a classic case where hardships are imposed on people, in spite of the 'pro-people' laws and policies proclaimed by the government.

The history of this phenomenon in India dates back to 1884 when the British Government passed the Land Acquisition Act, and legitimised the displacement of people whose lands were to be acquired for "public purposes." The Act was based on the general philosophy that the interest and well being of a few could be subsumed by the larger interest of the society, which, in practical terms amounts to the interest of the state.

The Act however was very clear on the point that such displacement does not indeed cause great sacrifice and therefore, such people should be fully compensated for all the losses, and that if such land acquisition is not voluntary, an extra 15 per cent of the total compensation be paid in addition.

Over the years, experience, however have shown that almost all the displaced persons become the refugees in their own country, and end up penniless, landless and homeless.

The Tehri Dam Project has affected around 125 villages including the old Tehri Township. Thirty-nine villages are going to be fully affected and another 86 villages (number may possibly increase) would be partially affected. Wherever less than 75 per cent of the families are in the displaced category and have to be rehabilitated, all those villages have been categorized as partially affected. That means that even where 74 families out of a total population of 100 families are eligible for rehabilitation, they have been classified as belonging to partially affected villages.

According to a new estimate made by the Rehabilitation Directorate, around 5,291 urban and 9,238 rural families would be affected due to construction of Tehri dam. 3,810 rural families

have been partially affected by the dam. In reality, however, the number of affected families is much higher. As of now, the number of urban families displaced by the dam has reached 5,500 and the number of rural displaced families is more than 12,000 (Matu-People's Organisation, 2002).

The State Government has deliberately submitted lower figures of the displaced families in the affidavits filed in the Supreme Court of India in 2002 ignoring the ground situation. The Government has not still compiled the aggregate statistics of the affected people. However, if it is assumed that each urban family has roughly five members and each rural family consists of seven members, the total number of affected persons, may in fact, be more than 1 lakh. Even 1,605 families of government employees have been categorized as displaced families (Matu-People's Organisation, 2002).

The report published by Peoples Union for Civil Liberties highlighted rampant corruption and other irregularities prevailing in the Tehri Dam Project. For instance:

- Out of a total outlay of Rs.582 crores for rehabilitation measures, only Rs.94 crores have been earmarked for the displaced people.
- Out of the budget for rehabilitation, residential premises for District Magistrate and the Superintendent of Police were earmarked at a cost of Rs.47 lakhs and Rs.43 lakhs respectively. A sum of Rs.2 crores was earmarked for a field hostel, though no amount was spared for building Dharamshalas.
- Sale of residential flats by the rehabilitation authorities like builders.
- Rehabilitation becomes the business of moneybags.
- Lack of clear rehabilitation policy and disregard for Government Orders.
- Significant recommendations of Dr. Hanumantha Rao Committee were not accepted.
- Flawed evaluation of socio-economic structure of the community.
- Exodus of people rather than meaningful rehabilitation is happening in Tehri.

In the rural areas, there are only two categories of displaced families, namely, landowners and landless agricultural labourers; and no estimate is done (table 5.3). Whereas, in the urban areas there are many other categories made for rehabilitation. Even government employees and organisations have been categorized as displaced families.

Table 5(3) : Categories of Displaced Families

	Townships			**Villages**
1	Landowners	1,766	1	Farmers with land
2	Tenants	442	2	Landless Agricultural Labourers
3	Benap	384		
4	Employee	1,605		
5	Organisation	653		
6	House on Fathers' Land	140		
7	Three villages displaced by New Tehri	269		
8	Others	32		

(Matu people's organisation 2002)

Partial Submergence: Unrealistic Demarcation,

Eighty-six villages would be partially submerged by the Tehri Dam Project. This includes those villages where 70-75 per cent of families and land are going to be affected. However, eligibility for the status of a fully affected village has been determined as affecting 75 per cent or more families and land. Even those villages, where 25-30 families would remain after submergence, have been affected. Although denomination of villages as partially affected has been done on a mathematical formula (wherever the land of 75 per cent of the families is involved), no estimates have been prepared to take into account the existence of link roads, gazing places, local markets, civic amenities, 'ghats' along the banks of the river drains, and the disintegration of social life. If the people were deprived of all the amenities in villages where only 25 to 30 per cent of the people would be left (in some villages the number is as less as 5-10 families), how are these people be expected to retain their existence and identity as part of the village society?

Cut off Area

Around 80,000 people are going to be indirectly affected by the construction of the dam. The area is in Pratapnagar tehsil. This area has been dependent on Tehri Township for various civic amenities. Due to the construction of the dam and the resultant reservoir, six bridges (two motorable and four pedestrian) on the Bhagirathi and Bhilangana river would be submerged, thereby completely disrupting the roads connecting the district, block, state and national capital and other areas. As a result, the distance to be traversed between these places would increase by 100 to 150 kms. A large part of the cut off area falls in the rim area of the dam and partially submerged area.

Benefits and costs, loss of output on submerged land, loss of output on the land for rehabilitation and comparison of revenue are given in tables respectively.

Table 5(4) : Benefits and Costs of the Tehri Dam

Item	Value calculated by the Tehri dam project authorities	Values arrived at after calculations made by us
Energy generated annually on 90 per cent availability	3,029 x 10^6 kwh	3,029 x 10^6 kwh
Energy available to the final consumer	Not calculated	
Cost of power	35 paise per unit	73 paise per unit
Revenue return (with sale-rate of 48 paise at the bus-bar)	11.52 per cent	6.89 per cent
Net benefits due to increase in agricultural production	Rs. 15,774 lakhs	Rs. 6,467 lakhs
B/C ratio for agriculture	3.49:1	1.28:1
B/C ratio for the whole project	Not calculated	0.56:1
Forest area lost due to the project	1,600 ha.	4,705 ha.
Number of displaced persons	46,000	85,600
Useful life of the dam	100 yrs.	62 yrs.

Source: Paranjpye, Vijay (1988): Evaluating the Tehri Dam: An Extended cost Benefit Appraisal, Studies in Ecology and Sustainable Development, Series No. 1, INTACH, New Delhi.

Table 5(5) : Loss of output on Land to be submerged

Crop	Area (ha)	Average yield (quintals/ha.)	Total Produce (Quintals)	Rate/qtl (Rs.)	Vale of output (lakh Rs.)
Rice	443	17.23	7,633	400	30.53
Wheat	603	12.82	7,730	201	15.54
Minor Millets	258	10.33	2,665	150	4.00
Barley	56	6.90	386	149	0.58
Other Kharif	240	8.67	2,081	200	4.16
Total	**1,600**		**20,495**		**54.81**
Total value of output					54.81
Less cost of inputs @ Rs. 1,250 per hectare (1,600 ha x Rs. 1,250/ha.)					- 20.00
Net Output					**34.81**

Source: Paranjpye, Vijay (1988): Evaluating the Tehri Dam: An Extended cost Benefit Appraisal, INTACH

Table 5(6) : Comparison of Revenue Estimation by TDPA & Experts Estimated in 1988

Item	TDPA Values	Our Values
Total Working Expenses per year	Rs. 2,143.00 lakhs	Rs. 2,418.19 lakhs
Total annual energy available for sale	3,029.18 $X10^6$ KWH	2,423.16 $X10^6$ KWH
Cost of the power component	Rs. 107,650 lakhs	Rs. 126,431.34 lakhs
Interest charges	Rs. 8,612 lakhs	Rs. 15,171.7 lakhs
Total charges per year (1+4)	Rs. 10,755.0 lakhs	Rs. 17,589.95 lakhs
Cost of generation per KWH	35 paise	73 paise
Gross annual revenue assuming sale rate of 48 paise (0.48 x 2)	Rs. 14,540 lakhs	Rs. 14,540 lakhs
Net Revenue (7-1)	Rs. 12,379.06 Lakhs	Rs. 12,121.81 Lakhs
Revenue Return (8/5)	11.52 per cent	6.89 per cent

Source: Paranjpye, Vijay (1988): Evaluating the Tehri Dam: An Extended cost Benefit Appraisal, INTACH

Table 5(7) : Loss of Output on Land Acquired for Rehabilitation

Crop	Area (ha)	Average yield/ha (in quintals)	Total produce (quintals)	Rate/qtl (Rs.)	Value of output (lakh Rs.)
Rice	349	17.23	6,013	400	24.05
Minor Millets	204	10.33	2,107	150	3.16
Wheat	476	12.82	6,102	201	12.27
Other Kharif	189	8.67	1,639	200	3.28
Barley	44	6.90	304	149	0.45
Total	**1,262**		**16,165**		**43.21**

Source: Paranjpye, Vijay (1988): Evaluating the Tehri Dam: An Extended cost Benefit Appraisal, INTACH

The Secret Reports of Geological Survey of India

The idea to construct a big Dam in the unstable and geologically sensitive mid-Himalayan region has been mired by innumerable controversies. The government, on the other hand, claims that the dam design has been prepared keeping in view the geological aspects. Yet many questions arise. What would be the impact of the reservoir on the mountain habitations?

The Geological Survey of India has identified as unstable large tracts above the rim area, which may face land slides in future due to the reservoir. Many villages are located in this area. Though the report has been classified as secret, many significant issues highlighted by the report have become public.

When subsurface explorations were carried out on advice of the Geological Survey of India in the 1960s, a major fault was found at the dam site that has been fully or partially proved. In the GSI report it has been stated: “in the area encompassing the rock fill dam, the rocks exposed are the massive phyllitic quartzites, the schistose and sheeted phyllites of grade III and IV quality and numerous, cross as well as foliation sheet-zones of grade V quality. These alternative bands of phyllites and quartzites are of the Chandpur series, and at some places up to 20 bands can be counted.” And finally, it said, “the riverbed sheet-zone has been proved by drill holes and the true thickness of this zone below the core of the rock fill dam has been established to be 11.6 metres.”

About the seismicity, the Geological Survey of India reports that the proposed project site falls between isoseimals VIII and IX of Kangra Earthquake (1905). In the vicinity of the Tehri dam, the following tectonic features exist:

1. The Srinagar Thrust is located about 4 kms from the dam-site, which brings the rocks of the Bharat Series against the Shimla and the Chandpur phyllites.
2. The Gadolia Tear Fault was traced from village Paukhal to village Nelda.
3. The Tehri Tear Fault has been traced near Nandgaon.
4. The Tehri Tear Fault has proved the existence of a fault running along the river course, and it represents the just older branch of the Tehri Tear Fault.
5. The Deul Tear Fault passes through terrace gravel and there is a scarp about 15 m high along its inferred trace.

The GSI Report further states: "The seismicity of the thrust and faults is not known as no seismographic data exists in this connection." And in the Tehri dam detailed project (1983), it is stated that epicentres of 77 earthquakes lay within a radial distance of 320 kms from the proposed dam site. The nearest epicentre was located 35-40 kms northeast from the site. Most of these quakes had a magnitude of 5-7 on the Richter scale. (Shiva and Jalees 2003)

Tehri (Historical Trihari)

The biggest township, which is going to be submerged in India, is perhaps Tehri. Instead of augmenting its own prosperity after independence, the Tehri township is being devastated in the name of oft-repeated national development. This is an ancient land, which is being submerged and devastated on the pretext of developmental projects.

The place where Tehri Dam is being constructed, finds a mention as 'Dhanushtirth' in the 'Skandha Puran.' The confluence of Bhagirathi and Bhilangana rivers is just 500 m from the main gate of the dam. This confluence is known as 'Ganesh Prayag,' also known as Trihari – the confluence of three rivers and later called Tehri. Swami Ramtirth, the founder of 'Practical Vedanta,' adopted Trihari as an abode of meditation and 'nirvana.'

The king of Garhwal, Sudarshan Shah belonging to Panwar dynasty, built Tehri township as the new capital of the state in 1815 AD. Prior to this, the capital was Srinagar Garhwal, which had been captured by the East India Company. The capital Tehri built by King Sudarshan Shah witnessed royal grandeur for almost 133 years.

The Garhwal state however witnessed decline after the reign of the sixth king. Till the state's decline, Tehri continued to be the capital. Being the capital, Tehri became the hub of education, literature, culture and politics. Even after independence, Tehri retained its importance. It was the centre of peoples' movements. Chipko, Prohibition and Uttarakhand movements reverberated in the streets and markets of Tehri and chronicle the grandeur of the township.

Shri Dev Sumar had undertaken a marathon 84-day old hunger strike, which is only second in duration in the world history. The fast had been undertaken to gain freedom from the royal rule. After 84 days, Shri Dev Suman passed away and became a martyr.

After visiting Yamunotri and Gangotri, most of the pilgrims heading for Kedarnath and Badrinath have to pass through Tehri. Even when there was no motorable road, Tehri was the traditional route of the pilgrims.

Unlike in other places, where construction of dams has taken place, the displaced belong to highly educated middle class families. According to the 1992 statistics of the National Literacy Mission, the literacy rate in Tehri had reached 98 per cent.

Besides education and literacy, the economic condition in the township was admirable. Only 5.54 per cent of the houses were thatched. Although Narendranagar was the district headquarters, more than 40 government offices were located there including the District Court. All civic amenities were available for the residents at a distance of 2-3 kms. Since Tehri was the central point and the nearest market for the adjoining 200 villages, there was lots of hustle bustle and the place used to be quite crowded.

The Historical and Cultural Heritage of Tehri Region

In Tehri, there are religious, cultural and archaeological places and monuments of importance, which require conservation efforts. However, there is no plan for conserving the heritage in the submergence area of the reservoir.

In fact, some Dharamshalas (places of residence for the pilgrims), rock scriptures, and unique craftsmanship on wood and stone still exist in the precincts of Badrinath Temple complex. Nearby, the staircases of ghats reaching the innermost depths of the confluence of Bhagirathi and Bhilangana rivers still exist.

The Badrinath complex consists of a large number of intricate high-domed mosque like temple structures having unique, expansive metal sculptures of presiding deities like 'Satteshwar Shivling,' 'Bhairav Panchmukhi Hanuman,' 'Raj Rajeshwari,' 'Laxmi Narayan,' 'Ranganath,' 'Ganga Dakshin Kali,' 'Shitala Mata' – all these still exist.

The 'Ashtavakra Rishi Shilas,' 'Gopeshwari Ling' and 'Raktavarna Ganesh Shila' on the confluence of Bhagirathi and Bhilangana rivers including the 'Shish Mahal' in Simalsu have already been submerged under the spate of water and sand.

In one of the Hindu Hymns, "Kedarkhand,' Tehri and the important adjoining places find mention, and these places are tragically in the submergence area of the Dam.

Legend has it that Aadi Sankaracharya had been responsible for building the ancient temple in Malidewal village of Bhagirathi valley.(Shiva and Jalees 2003)

July 29, 2004 was a black day for those residents of old Tehri town who had decided to remain back. At around 2 p.m, the water in the lake surrounding the empty town rose and entered their homes. The 20 or so families had to run for their lives, grabbing whatever they

could. The residents blame the **Tehri Hydro-Development Corporation** (THDC) which they say had closed the Tý tunnel in March 2004. This together with the monsoon rains raised the level of water in the reservoir up to 655 metres on the fateful day. The closing of the tunnel violated the supreme court's order of 2003. The apex court had ordered that no tunnel be closed, or reservoir filled any partner, till rehabilitation was completed (Yadav 2004.)

Disaster struck at the Tehri dam site at 10.15 on August 2, 2004. A huge landslide inside the vertical shaft of a tunnel claimed the lives of 29 workers and left about 12 injured. The victims were working at various levels of 240 metre shaft and in the two horizontal tunnels that it connects. The horizontal tunnel at the top is called the Intermediate level out let (ILO). The ILO and the vertical shaft are meant to drain excess water from the dam reservoir once it is filled to the tunnel, Tç at the bottom of shaft. Draining excess water is important because this dam is on earth and rockfill dam, which can be damaged if water passes over it. But such a dam can withstand seismic vibration to an extent. Since Tehri is an earth quake prone region, so the authorities had settled on an earth and rockfill dam and not on concrete dam.

At the time of the incident, concretes work was going on T3 to strengthen the tunnel. In the ILO, workers were involved in digging and excavating activities.

According to J.P Gaur of Jai Prakash Industries, the contractor is responsible for constructing the dam structure. The dam is strong, but inherently the mountains are weak. The comment begs the question: was such a tragedy foreseen? And if so, what steps had been taken to protect the lives of the workers from the 'inherent risk'? (Yadav 2004).

The dam authorities and successive governments have repeatedly said that the life span of the dam would be 100 years. But many disagree. Siltation will take place much faster than expected life. Says, " K.S. Valdiya, former director of the Walia Institute of Himalayan Geology." Sums up, " The ghost may not be there but the fear of the ghost makes your life miserable, referring to the earthquake and the possibility' of dam collapse. (Yadav 2004).

Meanwhile, the anti-dam movement spreaded by Shri lal Bahuguna fizzled out. Rehabilitation issues were somehow lost in all the noise against the project itself. And the protracted construction period meant that the rehabilitation could never be carried out satisfactory.

Lots of stories relating to messy rehabilitation float around Tehri and the surrounding villages. There are examples of people who have taken compensation multiple times, people who were not entitled and still got hefty compensation coupled with houses and shops in New Tehri. Endless tales of corruption do the rounds. But at the other end are those genuine claimants, who did not get anything and still are running from pillar to post. The situation is worse in the villages. For them it is not just relocation but an entirely new socio-cultural environment. (Yadav 2004).

New Tehri: In order to settle the residents of Tehri, the New Tehri Township is being developed. It is being built above Bauradi village, at 1950 metre above sea level. As compared to Tehri, there is marked difference in the geo-morphological make up, climate and weather conditions.

Table 5(8) : Population Figures – Tehri and New Tehri

Year	Tehri	New Tehri
1991	15,730	4,496
2001	14,954	10,471

Hydel and multipurpose projects in Ganga Yamuna Valleys, Garhwal

Following are the hydel and multipurpose projects being built and/or proposed in Garhwal region (Bharat Dogra, "Dams, Barrages and Future of Garhwal," in Friends of Chipko, undated, Ignoring Reason, Inviting Disaster: Threat to Ganga-Himalaya, New Delhi).

A. Bhagirathi river projects

1. Bhairon Ghati Hydel Scheme I
2. Bhairon Ghati Scheme II
3. Loharinag Hydel Scheme
4. Pala Maneri Scheme
5. Maneri Bhali Hydel Scheme I
6. Maneri Bhali Hydel Scheme II
7. Tehri Dam Project
8. Koteshwar Dam Project

B. Alaknanda River projects

9. Rishi Ganga Scheme
10. Lata Tapovan Scheme
11. Markur Lata Scheme
12. Tapovan Vishnu Gad Scheme
13. Vishnuprayag Scheme
14. Vishnu Gad Pipalkoti Scheme
15. Bovla Nandprayag Scheme
16. Karnaprayag Dam Project
17. Utyasu Dam Project
18. Srinagar Dam Project

19. Bhagoli Dam Project
20. Padli Dam Project

C. Ganga River Projects

21. Kotlibhel Dam Project
22. Rishikesh Chilla Scheme

D. Projects on Yamuna, Tons and Tributaries

23. Hanuman Chatti – Saina Chatti hydel scheme
24. Saina Chatti – Gangnani Scheme
25. Barkot – Kuwa Hydel Scheme
26. Kuwa Damta Hydel Scheme
27. Lakhwar Dam Project
28. Vyasi Dam Project
29. Kala Pathar Scheme
30. Karkot Tuni Hydel Scheme
31. Hanol Tuni Scheme
32. Tuni Palasu Scheme
33. Kishau Dam Project
34. Devara – Mori Hydel Scheme
35. Sidri Dewara Hydel
36. Taluka Sinkri Scheme
37. Jokhol Sikri Scheme
38. Ichari Dam Project or Yamuna Hydel Scheme II
39. Dakpathar Project or Yamuna Hydel Scheme I
40. Asan Scheme or Yamuna Hydel Scheme Part IV
41. Kahara Hydel Project

The Tehri Dam Project: A Chronology

Following are some of the important dates in the Tehri dam project (Matu-People's Organisation, 2002; Bharat Dogra, "Dams, Barrages and Future of Garhwal," in Friends of Chipko, undated, Ignoring Reason, Inviting Disaster: Threat to Ganga-Himalaya, New Delhi and Yadav 2004)

1972: Rs.197.29 crores dam at Tehri to generate 600 mega watts of power mooted. N. D. Tiwari, the then UP Chief Minister, pressurises the Planning Commission and gets the project cleared.

1978: People of Tehri go to the Petitions Committee of Parliament against the dam. Tehri Bandh Virodhi Sangharsh Samiti formed.

1980: Mrs. Gandhi asks the Department of Science and Technology to review the project. Mr. Sunil Roy appointed the Chairman.

1986: Mr. Roy submits report and says that seismic risk too great and Dam should not be constructed. The Environment and Forest Ministry refuses clearance. Yet, the government enlarges the project to Rs.3,000 cores scheme for generating 1,000 mega watts in phase one and another 1,400 mega watts in phase two. Construction continues without clearance. On his visit to India, Mr. Mikhail Gorbachev grants assistance to the fund starved Tehri project, but not before the Committee of Secretaries directs the Central Water Commission to convene a meeting of experts to report on the dam's safety.

Oct. 1986: Clearance granted. The report says a dam in this region could withstand an earthquake of magnitude 5.9 and peak ground acceleration of 0.25 g. Environmentalists do not give credence to the report, as it was not based on field studies by seismologists.

August 1989: Project submitted to Public Investment Board, Planning Commission. The Standing Environment Committee under Dr. D. R. Bhurmal rejects Tehri proposal on all counts. Says there is evidence of an earthquake of over 8 points on the Richter scale in the lifetime of the dam. Subverting this report, the committee of secretaries sets up a high-level panel, headed by Dr. D. Daundyal, to look into the seismicity. Another member, Dr. V. K. Gaur, Secretary, Department of Ocean Development asks for a review.

June 1990: The Committee defers decision on clearing the project, following objections raised by Dr. Gaur. At the same time, newspapers report the on-schedule completion of preliminary construction of the dam.

July 1990: The Ministry of Environment clears project while stipulating that the project authorities must get safety aspects approved by an expert committee. Leading environmentalists assail clearance.

Jan. 1991: The Central Government gives go-ahead signal and says it would not allow further delay in the project's completion.

July 1991: The Indian National Trust for Art and Cultural Heritage (INTACH) urges not signing the dam due to possible earthquake of 8.5 magnitude.

August 1991: The Union Ministry of Environment lays down stringent conditions while issuing clearance, following warning by an experts committee on the "environmental

appraisal" of the project that dam site is located in 'seismic gaps,' where a major earthquake could be imminent.

Oct. 1991: Disaster strikes, bringing the simmering controversy to a boil. 'Greater disaster in store,' say experts.

Sept. 1996: A twelve member Expert Committee under the Chairmanship of Dr. Hanumantha Rao was constituted to study the environmental and rehabilitation aspects of the project.

Nov. 1997: Dr. Hanumantha Rao Committee submits its report to the Central Government.

Dec. 1998: The Central Government takes decision on the Group of Experts Committee report. The Government accepted the recommendation regarding safety of the dam design, but it rejected two other recommendations.

2001: A Committee was constituted under the Chairmanship of Dr. Murli Manohar Joshi to study the safety of the dam and the importance of Ganga water in the aftermath of Bhuj earthquake.

Dec. 2001: Diversion Tunnels T3 and T4 of the dam closed down. Dr. Joshi Committee is yet to submit its report.

Nov.2002: M.M Joshi Committee submits its report. Says the dam is safe to withstand an Earthquake of high magnitude.

Sept 2003: In a divided verdict, the Supreme Court clears the legal hurdles for dam construction.

March 2004: Tunnel T_2 closed water level rises to 648 metres, submerging many parts of old Tehri town.

July 29, 2004: Water level rises to 655 metres submerging the remaining parts of the Tehri town. Residents flee for their lives.

August 3, 2004: Internal landslides at the dam site, 29 workers dead.

Dialogue with the sufferers

As mentioned earlier, Tehri dam has affected a large number of people, but women faced greater hardship than men. Few examples given below are suffice to illustrate their hardship and pain.

1. Mrs. Jamala Khatun Nisha Beg, a 58 year old lady W/O Md. Ishan Sidaqui with his 11 family members is now forced to live in a tin shed below Bauradi. She told us with unstopped tears that their forefathers came to Tehri more than 150 years ago when the

town was Kings Dynasty. They had their traditional business of bangles. Her husband who was in the Tehri dam office was recently retired. Her elder son Md. Irfan was looking after their family business at their home. Younger boy also had a shop on rent where he used to repair TV, radio etc. They had a good house with 6 rooms. They were living separately in the same house in Tehri. Now all of them are living in 2 rooms of a tin shed.

They told us that 9 years ago they got a plot of 60 square feet near Bauradi, but there is no road to reach the site. They were living in old Tehri town till 29th July when town was flooded and people were forced to leave their houses. According to them they not only lost their assets worth Rs. 80,000 but they are workless too.

Old lady demands job for either sons or shops for both of them or a piece of land or even access to the given plot.

2. Smt. Laxmi Devi, w/o Sri Jagdish Prasad a 54 year old lady Scheduled Caste community has 8 members in her family which includes 2 suns and 2 daughters. Elders son Mr. Chandra Mohan is married and has one son. Mr. Jagdish Prasad Had a workshop and his son was a painter. Laxmi told that about 150 years ago One of their relative Mr. Sundar Lal borrowed Rs. 2000 from her forefather Mr.Nand Lal, but he was not able to return it. Instead of money Nand lal gave a piece of land about 70 square metres. The ownership of the was not transferred to them on their understandings as well as because of close relations of both families. But 10 years ago Mr. Arjun Lal S/O Sundar Lal got the compensation of Rs. 3.5 lakh and plot shifted to Dehradun leaving them in the mercy of god. They were having double story building in the same land. They are categorized in the landless people, so got nothing in the name of compensation.

   One and half years back they were allotted a three room set in Bauradi for which they had to deposit Rs. 1,00,000.00. But because of lack of money they were not able to buy it. On 29th of July 2004 they left the old Tehri. Till 2nd August before shifting to the present one room tin shed their family lived in school. Now a day all 8 members are living in one room. According to Laxmi Devi, they also their belongings and tools of workshop worth Rs. 60,000.00.

   They want shop to reopen their workshop and painting work and piece of land and cmpensation for their loss.

3. Smt. Sateshwari Devi W/O late Sundar Lal another family of SC community has 13 family members. She has 2 son, both were barbers and had a house and a rented shop in old Tehri. In 1984 they received a compensation of Rs. 20,000 for their house. They got the shop in New Tehri but it is too far for people to come for hair cut. They lost their belongings worth Rs. 30,000.00. They were in Tehri town in hopeof roper compensation. Presently they have 2 tin shedsof one room each but are not sure how long they'll be allowed to stay in these sheds.

There are so many such families those who are still waiting for proper compensation; although there are hundreds of families those who received many fold compensation or even more than one time. People also believe and speak slowly about lot of corruption and manipulation of data was done by the officials to benefit their own people but nobody wants to come forward because of no support. Smt. Deepa Devi however told us that they lost their shop because she was not able to pay Rs. 30,000 to one of the official of allotment committee. Mrs. Rasidan W/o Rasidan however confirms the corruption involved in the whole process. She recalls that they had to deposit Rs. 2,50,000.00 for a double story house and a shop. But because of lack of money they were not able to deposit the money in time. However they were given a compensation for Rs. 1,50,000.00 after deducting Rs. 10,000.00 without giving any receipt for this amount.

Smt. Kaushalya Devi a widow with one son and one daughter told us that although she got the allotment letter to tin shed no. 213, but she is still waiting for possession. Till 15th of Sepetmeber she was living with one family and her belongings are lying outside. (Matu People's Organization 2004)

The Tehri Dam: Women, Water And Community Representation

From legislation to movement, is it possible to change development from a diverse woman view?

Displacement and Resettlement:

- 109 villages displaced
- Cash instead of land
- Shifting from subsistence agriculture to market economy
- Social changes in the community
- Nominal properties not for women in the Rehabilitation Plan
- The Panchayats of the Bhagirathi Valley were dissolved
- New Tehri drought

Background:

In 1978, the Tehri Hydro Development Corporation (THDC) began building the city of New Tehri. For the villagers of the Bhagirathi valley the displacement plan started in the 1979 after which in 1984 people began to settle in New Tehri. Both, the villagers of the Bhagirathi Valley and the city of New Tehri have been facing many problems after this rehabilitation project started. The villages are going to be destroyed and submerged by the water when the channels are closed and water fills the valley. The decision to destroy the natural and social environment

of an entire area has been justify by the central Government of India as a solution to create water supply for the cities, energy and agricultural benefits. Those who are going to benefit are not the people of the rural areas but urban elites and big landowners. Damming the Ganga at Tehri means privatize water and irrigation. To treat water, as a property will facilitate a shift to market products agriculture damaging self-subsistence agriculture and small scale crops production. The ecological and social costs of the project must be added to the economical costs, but the cost-benefit ratio was not able to look forward and only short-term benefits were calculated. The submergence of forest and fertile area, the ecological and relocational costs were not taken into account. Tehri Dam will submerge an area of 5200 hectares, mainly covered by forest. The destruction of forest (that should cover about 60% of the hilly areas) is bound to escalate mismnagment of water, leading to soil erosion and increased sediment flow. Teri Dam life is expected to be 62 years. Moreover, civil engineers did not take care of a possible second earthquake (last one was on 1992).

The focus

The Tehri Dam is being built for three purposes: to bring water to big farmers in western Uttar Pradesh; to create energy for New Delhi and to supply New Delhi with additional water. Many debates have already taken place regarding the environmental impact of big dams, as well as possible alternatives for irrigating agriculture and creating power.

This paper shall focus on the "**social costs of the Tehri Dam Project from a gendered perspective"**. Women, as the knowledge-keepers of a community's natural resource management, were the main source of information for this paper. As their living relationship with water sources is part of these women's every day life, it was from their different experiences that I got my vision. Because water management has always been the woman's duty, community management of its sources has been as well. As community rights on water resources are becoming an increasingly controversial issue in Indian society, thus it has become imperative to realize women's roles in local self-governance.

The main purpose of this work would be to search for self-empowerment strategies instead of delegating to the institutional representation.

Objective

This work is based on interviews conducted by me in the time period between august to October 2004 with a variety of individuals affected by the Dam Project. This information is based von the experiences shared by the women and men of the Garhwal area. People told me about how they are facing a lack of water on a daily basis for both domestic and agricultural purpose. Two different environments have been analyzed: the rural area of the Bhagirathi valley and the town of New Tehri.

Impounding living water

When I first came on the Dam site it was the beginning of august, right after 26 laborers were killed working in the Dam channels. I came on the Dam site in the morning time and I saw this huge man made mountain that is forcing the Ganga stopping her flowing. The River has now to stop its natural way to the sea of Bengal and it has to make an unnatural u turn on his body. The Ganga in this point is still keeping the name of Bhagirathi. The story of Bhagirath is narrated both in the Ramayana and the Mahabharata.

King Bhagirath did penance for his ancestors, Sagar's sons. They were burnt to ash when disturbed by a rishi namely Kapila. In order to release the sons of Sagar from eternal suffering Bhagirath left his kingdom in Ayodhya, traveled onwards in the Himalayas and meditated at Gangotri. His devotion succeded in releasing the Ganga from heavens, so that the River fell into the hair of Shiva. From Tehri, the River would follow its way throw Devprayang, Rishikesh, Haridwar. It is from Devprayag that the Ganga river takes is name. This is the reason that some people took to say that the Tehri Dam is not going to hurt the Holiest River, because it is called Ganga from Devprayag and before it is just the Bhagirathi, the main affluent. This is a debated point because, according to Hindu tradition, impounded water is dead water. The life of the Indian tradition and culture is made by the water of this River and its waters are the source and the nutrition for the life of many people in the country, not only in a physical, but also in a spiritual meaning. Many Hindu ceremonies cannot be done with impounded water and for that reason a Hindu priest in Haridwar, is now applying at the Court.

Few days before I came, Vimla Bahuguna had to leave her house in Tehri. She was the last woman living in the city. The level of the water increased quickly after the heavy rain of the beginning of august and when one of the channels was closed the city was under the water. She had to leave on a small sheep, bringing with her a few things.

As I came in New Tehri, I talked to the people. Everybody knows where Vimla and Sunderlal Bahuguna are living, they moved to a house that is right above the Dam. After the Chipko movement started, Sunderlal Bahuguna became a famous activist and thinker, although his actions are always linked and inspired by Vimla's experience with Vinoba Bhave, Radha Bhatt and Sarala Behn, as a Gandhian activist. She said:

"The Himalayas provide the rest of India with water and soil. If you dam the Ganga you not only destroy the lives and culture of the people who are displaced but you deprive those too, who live downstream of the resources they depend on".

After this first meeting with them, others followed. But that time I had the possibility to realize that the Tehri Dam as an answer to water demand represents a symbol of the malaise of the social, political and economical asset of our society. I asked about the political process that leaded to plan this big Dam on the Ganga with no care of the spiritual, cultural and vital

power of its water, and why the Government hadn't chosen more sustainable alternatives for the water supply. Sunderlal Bahuguna answered me:

"Economic is the new religion and in the religion of economics nature is a commodity. In the old religion, the nature was worship and divinity life was regarded not only in the human beings but it was present in everything, rivers, plants and animals, in the new religion, money is the God and the matter is how much money you can get".

When I ask about the water scarcity he tells what Chipko movement has been telling from the beginning of his protest against deforestation of Gahrwal.

"Wherever the cement roads go, cities grows up and forests disappear, deforestation is the main cause of water scarcity. The trees that you can see are not forest; those are a material for the industries".

The same Vimla told about the joint forest management, a joint venture between the World Bank and the Indian Government. They replanted pines, but pines are not able to preserve water, otherwise, they can grow very fast, a good point for the industrial purpose. In fact, what I saw in this area of Gahrwal, from Uttarkashi to Rishikesh are pines. In the forest the rain goes into the leaves and throw the roots water drops into the soil, and from the soil it is released again.

"Deforestation is the main cause of water scarcity in the Himalayan region itself. The glaciers are receding, the Gangotri Glacier, the source of the Ganga is receding and it is going to expire around the year 2005".

Water Equity

The damming of the Ganga at Tehri was planned for the increasing water demand, but water demand means demand of cash crops and an increase in the urban and industrial areas. Except the Ganga, water is a scarce resource for people of Gahrwal. Rural women have to walk long distances to bring water for domestic use and to feed animals and agriculture is mostly rain fed areas. However, instead of implementing the local economy, the Dam will feed intense water crops in the western Uttar Pradesh and will give water supply to Delhi, depriving this area from a fertile land. At the opposite of what the government blindness is planning, women the villages have developed a method from their own experience for governing and managing water scarcity. Food security and equity are two basic principles that the women here are following, governing the economy of the villages.

The unequal distribution of water is a part of the privatization process and so the shift from self-subsistence agriculture to water intensive crops. The big amount of water for this type of crops, as sugarcane and rice, is one of the reasons that are pushing for the use of dams, tube wells and drib irrigation. Moreover, those kinds of crops are not able to keep water into the soil. Those aspects of the water requirement are related to some of the main issues about the

water management and local community's survival. Shift to water intense crops means not only a change in terms of irrigation; it means to deprive communities from their own resources, to displace them in some unfertile area and to use rivers and waters as productive factors.

Unequal distribution of water is in proportion with social and political inequality. Changes in irrigation and agrarian relations are always improving centralization of water management in spite of communalization of the resources. The market has determined the choice of crops and so is the irrigation. What follows a commercialization of the agricultural production for overseas markets or for big cities? The pushing of private companies for highly irrigated crops is a strengthening of social and political inequalities in the distribution of water. The introductions of cash crops make the men the money managers and then follows the strengthening of **patriarchal relations** in water management. The introduction of intensive crops transforms the relation from the people and from the people and the soil. It deprives woman of their traditional role of natural resources gatekeepers, on which is based a self-subsistence agriculture. Moreover, highly irrigated crops, as rice and sugarcane, are centralizing the power in the hand of the man that control the irrigation system and are requesting more labor from women. Women's labor is cheap, and it is always in the form of unpaid domestic labor.

Sunderlal Bahuguna proposes to improve water conservation through his three "A" formula. Austerity: use less water; Alternatives: chose low- water- requiring crops and less industrial waste of water; A-forestation: trees conserve water and, as compared to rice, sugar cane and other crops they need very less water. The core of his thinking is **sarvodaya,** the Gandhian philosophy of self-sufficiency and self determination, the welfare of all or economic reconstruction with the self –sufficient village at the basic unit of society. Gandhi wrote: "Bit by bit, the villagers are being confined only to the hand-to-mouth business of scratching the earth. Few know today [1934] that agriculture in the small and irregular holdings of India is not a paying proposition…the extinction of village industries will complete the ruin of the village India"

A local based community with a self-determined organization is the only way to avoid the actual social and economical asset and to avoid dependence and economical slavery.

The democratic system, in the body of the Indian Parliament took the decision to build this Dam. But the word democracy (from demos-the people) it's not the right definition. The right word can only be dictator. It would be "democratic" but the districts of Tehri and Uttarkashi have a low representation in the Parliament Union, i.e. only one seat that is apparently highly undemocratic. But the Government and the contractors, in spite of the protest that is going on since thirty years by the local communities, by environmentalists, scientists, intellectuals and people from all over, the dam is undergoing completion. That easily shows how, in Tehri Gahrwal, the political representation in the Parliament needs to be reformulated. "There is a big difference between democratic system and humanitarian system. In the democratic system the majority decides, in the humanitarian system we care even for one individual".

So the Tehri Dam has been planned under a democratic decision, but the democratic system does not take care of the people who are at the base of the system. It is not so true that the majority is going to benefit always. Just a few are going to benefit and those who represent the majority have been displaced or still have to leave their houses.

Sunderlal Bahuguna talks about the society as a triangle where, today, even in democracy, a small number of people run the affair. Ask yourself why the government has to maintain the army and the police in a system that is really democratic more power will be at the base and when power is at the base the basic needs of the people are fulfilled from their surrounding. Revelation comes from the small unit, when a society becomes self subsistence and self sufficient, then, what is the need from the government?"

Case studies:

Kuttha, Tehri District

Kuttha is situated on the way from the Dam site and the city of New Tehri. They receive the same unclean water of New Tehri. At the beginning of the eighties, THDC asked them for land in order to lay down the pipelines. They gave their land to the government but they still do not have water. Thanks to the struggle of the local community, the village is not a part of the displacement plan. It is not going to be submerged by Dam, but it has to survive and to struggle to maintain boundaries on its own resources. The villagers had fought to save themselves from the dam and the people succeed. This village and the struggle of the people for their natural rights is an example of self-strengthening within the community. But it is also an example of how the centralization and privatization of natural resources is trying to deprive the rural areas from an equal distribution of water.

The community has been facing many problems since the Dam works began and, although irrigation does still not exist in the village, a big amount of money and energy has been taken by the Dam project. The social impact of the project on the local area is changing the economical environment. Since the dam site started working many people left the villages to work for THDC or for the JP Company, the main contractor. Many, between the younger generations are gone, looking for a job in the cities in order to make money. What is now happening is that self-subsistence agriculture is being replaced by market products.

Kumar is living here with the entire family. Her husband has to work outside, in the state of Haryana, as a truck driver. Here crops are rain fed. No self-subsistence economy is possible here. Not after the village had to give half of the agricultural land to the government to have the pipeline for water. But the water is still not coming and they lost half of their source of living. There are no hand pumps and water from the pipeline is running just for two hours a day.

“There is no source of living in Kuttha. The only crop that grows is Koda, but mostly we have to bring food from the market.”

I ask about how they are managing for water supply. She says: “The water from the pipe line is not pure, my child is getting sick with cough and fever. This is a very big village! Just two hours it is not enough but water does not come from the taps; we have to walk three km to get the water for drinking, for cooking and to feed the animals. For washing clothes we have to go to the spring source that is very far away. In the winter sometimes it is too dark and far to go to take the water. We have to collect water for many days, so we rarely have fresh water to drink. If a woman has small children and the husband is working outside it is a problem to leave the children alone.”

They told me that they asked for help to the Pradhan and he went to the Minister but nothing has changed. Nobody from the State Government has been to Kuttha for checking the problems. They just gave some thousand rupees. The Pradhan sad that we have to wait for one year or maybe more and he just built three taps for the entire village. And they don’t work”

Another lady says: “The problem is not going to the spring source to bring water, I have been carrying the bantha since I was a child, I’m addicted of that. The problem is that most of the young people from here are going outside to earn money because here we do not have any source of living. My sons moved to Delhi, searching for a job. We are living in the village from our ancestor but now the family has increased and jangoora, koda, daal and rajma are not enough for all.”

Pavita Devi and her husband Hari Singh Rawat: Twenty years ago they started surveying places in order to supply water to the village. It was the Jal Nigam office (Public Work Department). When the Dam project started they asked to have water supply. THDC ask for some land to lift water here from the Ganga. They gave the land but no pipeline was built.

At that point it started as a big conflict between the village and THDC. The entire community protested for the government criminal behavior. Many people from the village were beaten and put together in jail. Women did support the struggle, putting their efforts to keep the community together. After a while, the pipeline in Kuttha came. Kuttha was going to be displaced because of the Dam, but a delegation of represents from the village raised their voice to the Indian Parliament (at that time Indira Gandhi was Prime Minister) and they saved the village. It was only when women were supporting the struggle that it has been successfull. The Government has never proposed many schemes for development, even when however; the village needed water, hospitals, and schools. When they went to Public Work Department office to have water taps facilities in the houses, the govt. sad there was not enough money for the purpose. They had to bring electricity on payment in the village. It was thirty-two years back they had to pay 150 rupees for each member. Although they had to pay a big amount to bring electricity, power is climited to just a few hours a day.

When I asked rawat'wife if she finds no difference from the times when water was lifted to the village in comparison to the present situation she says that it did not change so much because they have water only two hours a day. Water for irrigation is not coming anyway, so crops are still rain fed.

Depki Rawat is seventeen; she is studying in New Tehri. Before leaving, in the morning, she goes to the spring source to collect water. This is her duty. First thing she will do after finishing school is to go outside, maybe to Delhi, to find a job. Why? "Because we are poor!" She and her mother are living in Kuttha in a typical rural house. Depki's feelings about her life are reflecting the social and economical impact of the Dam project. After the Dam site began and the city of New Tehri was built natural resources rights were exploited. The social relations are changing following the economical changing. Pushing people to leave the rural areas and the villages to settle dawn in a city and run a commercial activity has a social impact. The self-image of this girl as a "poor"may be related to the changes in the environment around her.

Information equity, does there exist a Panchayat control on natural resources?

In 1992, the 73rd Constitutional Amendment Act, passed by the Indian Parliament, puts natural resources management under the Panchayati Raj control. Periodical elections once in five years at village level, intermediate level and district level, reservations for scheduled castes and tribes and reservations for women (1/3rd of the total seats at each level) are some significant features of the new system. After it has been conferred constitutional and legal status, the Panchayati Raj would be widely accepted as Institutions to enact people participation in self - governance. The panchayats have now full authority to prepare plans for economic development and social justice and to implement those schemes. This includes ten fundamental items related to natural resources management that are listed in the well-known Eleventh Schedule.

Crucial resources like rural irrigation system, water bodies and unreserved forests are now under the Panchayats management. Anyway, in the villages affected by the Dam, where these common properties are vital daily resources, the Gram Panchayat was unable to play its role. As some researchers had shown, elected panchayats may not have a stake or interest in the common property and they can look at these resources as income generators. What happened to the villages in the Tehri Dam was that the Panchayats were unable to solve their mandate. At one point the THDC, representing the Government and private contractors, started a "cohoptation plan".

In order to make their work efficient and to take away the people from their houses, they started offering huge compensations in terms of money, commercial activities and flats in New Tehri. The local panchayats were slowly dissolved and the people of the villages had to manage the crisis by their own.

Misinformation is the major problem. People do not realize which are their rights on the environment they are living with. The communities of this area feel they do not have power on their lives. They do not realize that they have the power to preserve the water, the forest, the land as they have been doing until now. They do not realize it because no information process was developed to spread the power to the people. In the rural areas of Gahrwal, very few know about Panchayati Raj updates. People look at roles and duties of these institutions in different ways and it mostly depends on their own reality and history.

The Gram Sabha, the collective body of all the eligible voters, is supposed to be the soul of the panchayat institutions in order to further people's participation in a democratic way. But, from what I saw in the Tehri area, neither the Gram Panchayat nor the Gram Sabha are used as instruments of empowerment for the community. Not to mention the political representation for women that is still far to be assumed. No real empowerment followed the Amendment Act and the Government has spread no information. The empowerment plan made by the Government is the "Community Empowerment for Sustainable Development" joint with the United Nations Development Program. In Gahrwal this program is run by local NGOs. Anyway, a single organization can cover at least one Block. So, there is no equity in terms of awareness, at least in the same District.

In the Bhagirathi valley the Panchayats were unable to take the challenge and to fight for the life of the community. It happened with the British land reform and with the World Bank privatization that common lands where categorized as empty land Now, another time, common natural resources are turned into open access resources. The THDC is playing a key role in this robbery; depriving communities from their representation they are centralizing the power on water. With nobody asking for accountability and transparency, the government can easily manage natural resources as the colonial British administration. With no protection of the local stakeholders interest, no self-subsistence agriculture will survive.

For that reason, when the displacement started being operational the Panchayats simply dissolved. This is what happened in Sirain. More than 50% of the people are still living in the village and many of them still do not have a house to move to. The money they received as compensation has gone. In many cases nobody in the family has a job and it was fine until now. Irrigation is coming from a natural spring source; the crops fed by nahar were sufficient to feed the families. The Ganga is nearby, so no problems related with lack of water are affecting the village. In Pasuluk, Patri or Raiwala, where they received the land, there is no water to irrigate the fields. So this people are not only loosing their home, they are loosing an entire bio-system. At the beginning of September the Tehri Hydro Development Corporation told them they have to leave immediately. As an old woman told me: "Unless one member of my family will find a job we will not move and we will die in our home".

I asked her who is representing them and who is taking care of the interests of the people that are still living next to the River. Nobody is representing them anymore: “The Panchayat left it has been dissolved”. So, there seems to exist a big gap between the legal status of panchayats and the real one. Another time the political system is just a formality and the decisions are taken by economical elites, and often economical and political elites are very close one to each other.

First of all there is no information throw the people of the rural areas of Gahrwal about their political rights on natural resources. Still the majority, which is supposed to be represented by the democratic system, is not conscious about their rights in self-governance. Second, the Panchayat empowerment for facilitating communities in critical resources management is quite far to be truth.

The Tehri Dam is the evidence of the centralization of the power on natural resources and a step forward to deprive people from common benefits. What kind of benefits could be achieved by the majority through damming a River that they consider like a mother? Which kind of benefits can be achieved by the majority by submerging 5200 hectares of forest and fertile agricultural land, displacing 109 villages?

Representation for Women as the Tehri Dam project is testifying, centralization of power on natural resources is increasing and the Panchayats are just administrative bodies. When the elected people do not depend on the resources they are managing, there can be cases of corruption as it was for the panchayats under the rehabilitation program. People who are not directly involved in the resource management and outcome can defeat or not contribute to the management, behave as free rider. From an Act of Parliament, communities and women within the communities do have power to protect water and natural resources they depend on. A village republic self-reliant and self-sufficient can exist only if common natural resources will stop to be treated as income generators. The members of the community must have a role in making and modifying the rules to manage these resources. The stakeholders are the ones who must monitor the political functionaries action and they have also to coordinate natural resources access. A free access from outsiders can justify state intervention on natural resources management or large-scale privatization. Where there are weak boundaries on community resources access, they can easily become open access resources, leading to a tragedy of commons.

The matter is not the human rationality in the action for a collective good. Infact, local collective organizations where women are, are following a traditional knowledge and experience that is above the costs-benefit ratio. Those groups are spontaneous and they know better than civil engineers how to maintain sustainable conditions and functioning to use water resources in a futuristic way. A group of women that share the duties of running a village is a political body, although they are not recognized from the burocracy’s power. In the local communities

of Gahrwal, as in the villages around Tehri, women were already living in self-governance. They protect the life of the forest, of the water bodies, of the animals, of their crops, in total transparency and accountability, so that the interests of all the participants are protected. Participation and discussion are a basis of every day decision-making. Hierarchy can be present when organizational roles are required, as to manage with the money for common uses. The women of these villages know very well which are the boundaries for the use of natural resources. If there was a free flow of information and they would have open access the decision making stage, there could be better assurance about institutions responsibility and conflicts on water equity could be solved on a low costs arena. However, in the rural areas, where the community organizations are strong, restrictions are imposed for the protection of the participant's interest.

Although the 73rd Amendment Act stated that women would be represented as 1/3rd of the community, women reservation in the Panchayat is just on the paper. Because of their knowledge of the resources and their knowledge of the resources use, Indian women can be a determinant catalyst for enduring self - governing system. Self-determination about natural resources, community ownership on water and land and political representation for women in the Panchayat are some interlinked issued that has to be discussed for the awakening process.

Some of major issues emerged at the Interface meeting for the Elected Woman representatives of Uttaranchalorganized in Dehradun by the NGO Rural Litigation and Entitlement Kendra, on March 2003 had shown:

- Misinformation from the Government about the 11th schedule and about urban local self-governance bodies as specified in the 12th Schedule of the 74th Amendment.
- The Government has delayed the Panchayat elections in the State for nearly 2 years
- High handed approach and attitudinal differences in govt. functionaries
- In the 11th schedule agriculture, land consolidation and soil conservation, irrigation, drinking water and water bodies, fuel and fodder are among the departments transferred to the Panchayats. Ideally this would mean that the women elected to the panchayats would play a key role in water management and water resources conservation. However, instead of devolving the power to the Panchayats the government is creating parallel bodies like the Forest Management Committee to avoid people control on natural resources.

As it was sad by Jagdamba Devi, a member of the Zila Panchayat from Tehri: "the de-volution of powers to the local bodies, which is the backbone of the 73rd and 74th Amendments has not taken place at all. The funds, finances and functionaries are controlled by the government officials and we, the people's representatives are merely titular heads".

In many cases, to be elected for a woman means to have to begin a struggle. Prabha Ratouri, was elected in Tehri as Pradhan on 2001. She was raising her voice on the corruption of the government that is depriving people from their rights to have water (safe water). The Gram Panchayat, scared by what she could represent in terms of awareness, forced her to leave the charge.

The women I interviewed seemed to confirm the position of some researches on Panchayati Raj institutions. What emerged is that these bodies are not able to improve people's participation and control on natural resources.

Women as stakeholders in water and forest management are the best gatekeepers of the community interest. They know how to manage water resources following the principles of Equity and Security. Where political bodies do not have basis at a grassroots level, where the women are not represented, the community would not get benefits from their own common goods.

Awareness and information are still missed in the rural areas; in fact where no NGOs are working, women scarcely know about their right to be represented.

What happened to the Gram Panchayat of the villages under the rehabilitation plan it's a clear example of the big gap existing from the legal status of these institutions and what they really represent for the rural population. Those people, the forest and the water they have been living with are treated as nothing, the less information they have about their rights to be self sufficient, the easier for the political and economical power to cheat them. Unless the women will be facilitated to take decisions and making plans for the community's resources management, no village republic will come.

Athurwala, Haridwar District.

Rehabilitated people from fourteen different villages of Tehri came here in 1980, when the displacement process was at the beginning. The landscape here is totally different from the Himalayan hills. The area is flat and dry, no rivers and no forest. The resettlement is spread off in the valley, there are some field breaks intersections of cement roads.

Manju Chamuli is the Pradhan in Athurwala but she is from another village, Coty, now Coty Colony, in Tehri. She came here with her family in 1980, and with them came people from fourteen different villages. When they came here from Tehri they were represented from seven Gram Sabhas, now reduced to one. She is now around thirty-five but she's been elected among the rehabilitated people first time in 1996.

After the elections in 1996, there were no new elections until 2003, after six and a half years, although elections are supposed to be every five years. In 2003 she won a second time. When she left Tehri, Coty was a village; THDC moved the people from their houses, destroyed the village and built cement flats for the workers of the Dam site and for their families.

The compensation packet they have got was land, but agriculture was very difficult from the beginning because no irrigation were possible. As she says, it was very hard, because they didn't have any money and the environment was completely different from their home. In fact, Athurwala is in the flat area of Haridwar District. The landscape, the soil and the trees are completely different from the Gahrwal hills. However, the jungle that surrounds the village gave them the fodder, so that they could start with buffalos.

The Rehabilitation Plan rules provided the people with very different kind of land. The rules over the distribution of land were unequal. The quality and the quantity of land were distributed with no planning and without knowing the single-family situation.

"There were also two different kinds of compensations. One for people who had a father and one for the family without a patriarch."

Families with pater familias received ten bigas, families with pater familias received ten bigas for every son. So, this people, coming from the hills of the Bhagirathi had to face an adaptation process in terms of land and in terms of social organization. They were coming from a self-subsistence economy but here: The quality and the productivity of the land were also very different. For some people it was impossible to grow enough to live, for some other it was easy to convert they land in cash crops land."

Water supply is still depending on tube wells, but the women of the village are asking for nahar from a long time. Right now there are nine tube wells in the village. When I ask about the role of women in water resources management she says:

"Women are the only that can manage water, for both uses, domestic and irrigation. In Athurwala there has never been a scheme for water supply. Women are asking from many years to have open running channels (nahar) for domestic and agricultural use, instead of those tube wells. Tube wells can be out of order very easily. The water is safe but they can brake off very easily and it takes almost one month to repair a tube well".

When they came in 1980, the Rehabilitation Plan was supposed to provide them taps and pipe lines, but there is still non pipe line working here. When I asked her how she started working with the community she tells me that when she was elected she was ignorant about rights and responsibilities. It was an NGO (RLEK) that called her up and told her about her duties.

Displacing a Community

Legal and social representation for the people is nothing but a big hole in the political system. Displacing a community means to cut somebody's relationship with his native land and environment. In a feminine prospective it looks worst because no rights on land or properties compensation can be request from a woman. Any kind of compensation (money or land) has

to be assigned on a male member of the family. Although are the female members of the family that provide water and food from agriculture they are not represented in the rehabilitation plan. Moreover, in joint families landholdings are often registered in the name of one male individual, although those are collective goods.

We can say that rehabilitation plan in the Tehri Dam project is based on an individual prospective while this rural society is a community-based society. People here belong to a collective background of knowledge about nature, agriculture, and management of natural resources. Also the women's work in providing water is a collective work, they go together searching for water. As life subsistence providers, women are the owners of the most ancient tradition about natural resources management and their daily collective work to provide food, water and fuel from forest is the backbone of Gahrwal rural life.

Panchayats are supposed to represent the community's rights concerning natural resources, but those institutions simply dissolved when the displacement plan began. Many times the displaced people gets cash but no land so they have to change their entire livelihood. In reality, economic problems are only one face of the rehabilitation tragedy that is destroying these communities. 'Relocation' means to destroy a community and its link with the environment, while forcing people into new and more marginal livelihoods. Cultural alienation quickly follows as such persons are deprived of their cultural identity, not to mention the rivers, forests and land that they grew up on. Those people are forced to settle in a new environment, often-urban slums ore isolated areas and they will have no other choice than became cheap laborers for further industrial development

The production of surplus, requested by the commercialization of labor and the consumistic lifestyle. Most of the people are still living in soon-to-be- submerged villages such as Maldeval or Sirain. And although most villagers received some form of land compensation from the Government, there are some who still can not afford the costs involved with building a new house. There are others who will not leave because their lives are strictly connected with the water and the soil of their home villages.

The irrigation burocracy has a direct interest in undertaking large projects, they could benefit from commissions on a percentage basis paid by contractors in they effort to secure contracts. As in Tehri the contractor has his own link with the politician.

Maldeval and Sirain are two of the 109 villages that are going to be damaged by the Dam. These villages are supposed to be displaced in the immediate period. As told by the District Collector and THDC rehabilitation director, Punit Kamsal: "Compensations have been distributed following the Indian State low. Uttaranchal is just an executing agency of the Government of India. People of the villages went to the Supreme Court because they were not satisfied about the Rehabilitation Packet, but they lost. What they will tell you right now is just to reach more money as compensation"

Right now, the larger part of the villagers is still living in their houses. Theresettlements areas are spread in several districts as Haridwar, Dehradun, and Rishikesh. In two of those settlements I met the people from Tehri that already moved. I was trying to understand which are the reasons that are making people staying in old villages, facing the risk of the potential increase of the water level. In Athurwala people from 14 villages of the Bhagirathi valley moved in the 1980, when the rehabilitation plan started. In Banjarawala the displaced houses, called THD Colony are still under construction.

Maldeval, Tehri District

The village is right on the River and the view is the same it was before THDC started building the Dam. Although we are very close to the Dam site, the hills of the landscape that are banking the Ganga cover the Dam. If someone doesn't know about the Dam, from here he can still think that nothing happened. As always, the River is flowing rapidly, making a turn around the village.

The village has a constant water supply from the Ganga and when it is not too hot they can easily get water from the taps. Now almost 50% of the villagers had shifted to the rehabilitation sites, but daily activities are still going on. The Women are feeding the animals or they are going to the fields, some of them are still running the fire for cooking food.

One of the first people I met here is the old father of Vimla Bahuguna. In a short time many others from the houses around came. Although many of these people are members of the same family they received land as compensation in different villages. The village has to spread to different areas and so members of the same family, although they have been living in the same house for their entire life. Some got the land in Patri, some in Raiwala, some in Baniawala, some in Banjarawala. They have been to Court but they could get nothing. The answer was that there is not land enough to let them live together. The problem all over India is the scarcity of common land, after water. Most of the people in Maldeval still do not have a house to go. The Gram Panchayat has been protesting with them. They have been sitting-in closing the Site road for many times but nothing happened.

Vinod Nautiyal sad about rehabilitation: "It was told in the '80 that we have to leave, but we do not want to go to another place. Now we received a legal order from the government. I put the foundation of my house in Banjarawala only four months ago. Government is not following the rehabilitation law. Some are getting the entire compensation; some are getting nothing. Many times villagers have protested but the government took no reaction. The government is not speaking clearly about when to leave. They are not informing us and the water level can increase very quickly."

Rukma Pavar left four months ago to Banjarawala, where her family received the land, as compensation. I met her in her native land and this is not the firs time she came back in the

Bhagirathi valley. After she left to the new settlement she is coming back very often, she is facing problems with the community and the facilities. A village is like a small unit were people live in a collaborative way to solve problems. In Banjarawala people are strangers one to each other, the houses are spread on the land, there are no trees and the soil is quite unfertile. She does not like the place at all, that is why she was back in the village for some days.

About community problems she says that there are people around that she knows but the environment is completely different. It is flat and there is no forest. Drinking water is available two ours in the morning and two ours in the evening, although in Maldeval water is running from the taps whenever they need.

'There water for drinking is not good as it was in Maldeval. But the biggest problem with water is irrigation because water for irrigation is not available." "Agriculture is our source of living in Maldeval". It was enough for her family and they could have a self subsistence economy. In Banjarawala they are growing crops but they have to buy products from the market. "We are buying mostly food from the market because there water is not enough for the crops. Now we are using the money from the compensation, but when the money will stop I do not know how we can manage. My husband does not have a job yet". The rehabilitation project speaks about irrigation facilities and drinking water from tanks but: "Facilities are not available as it was sad from the THDC office. Hospital, shops and schools are very far." She feels not safe; there is no security.

"Here I never lock the door, but in Banjarawala, many people is passing throw, I do not know my neighbors and thieves are a problem." "I have a high-tension poll in her plot. It is dangerous! I have two children and they can be hurt. I appealed to the office shift to another peace of land and THDC office ask her extra money to move to another plot."

Banjarawala, Dehradun District Banjarawala it's nothing like a village, it is like a suburb of Dehradun. Only three km are from here and the city, for this reason people that are moving here from Tehri received less land. People that are shifting to Banjarawala received 2,5 bigas plus some money to build the house. In the rehabilitation packet people were also supposed to get a job once shifted to the new settlements, but nobody of the people from Tehri has a job here. S. Saklani and her husband moved here from Sirain with a family of eight members. Her younger brother is working in Tehri for the J.P. Company. They have a house in the THDC Colony, an area of Banjarawala for the people from Their.

"We could choose from 10 bigas in Patri, in a very isolated area to 2,5 bigas in Banjarawala plus some money to built the house. When we came here, one year back, my husband was expecting to have a job from the government, but it didn't happened." I asked them which kind of accountability did they have from the Government and who was assuring on the rehabilitation project. But from what I hear no kind of accountability was given by the

government. “In 1982 THD started distributing compensations and pushing the people to move. In the meanwhile Panchayat dissolved, so nobody was taking care of the rehabilitation program, nobody was representing us.”

As all the displaced people they have to leave a subsistence economy to become part of the consumers: “Agricolture in Sirain was enough for the family, but here we do not have land. Water is coming from a tube well, but it is at least enough for drinking”. As all the people from Tehri she does not feel confident in this place: “It was very difficult for me at the beginning, I did not fell part of a community, I felt not safe and very isolated.” As most of the newly built suburbs Banjarawala is a place with no history and there is no relation between the people and the land. Here the land, the water, the soil are just goods, in order to satisfy needs. Land to build a house, water for drinking and washing. The living relationship between a traditional community of Gahrwal and the environment is based on sustainability. The principle is not the ownership; the principle is regeneration of nature. Within the human beings, the forest, the soil, the water and the animals are part of a cycle of creation and destruction.

Lack of Water in New Tehri (Naia Tehri)

From the beginning of human civilization big cities have been started on the rivers banks, in fertile areas. The old city of Tehri is lying on the confluence of the Bhagirathi and Bihlangana, the houses were demolished, so that nobody could live there anymore. Only temples are untouched and a huge pipal tree that is still standing in the center of the old city. Scarcity of water was not a problem for the people that lived in here since XVIII century.

The city of New Tehri has been built on an area with no water resources at an altitude of 2.000 meters. Natural water resources had been drayed out because of deforestation and the water supply for the entire city has to be lifted from the Ganga. As Sunderlal Bahuguna says: “it does not surprise that water is not coming there”. There is no center; no facilities and no development plan for the city. Water scarcity is a huge problem and the water supply plan is the same from 1978. The population, now around 30.000 is supposed to be 50.00 for the year 2020. Pipe lines are bringing water to the city but water is coming from the compound taps three times a week for a couple of ours. No water is running from the houses tap.

As in the villages of Gahrwal, women have to store water for days. Every day women of New Tehri are carrying bantha, (copper container for water) as in a mountain village. The water is impure, people is getting sick. Many cases of polluted-water-caused-disease are showing off at the Baurari Hospital of New Tehri. Doctors are recommending people to boil water for drinking and domestic purpose. **Dr Kamal Ranjan** in the **Government Combined Hospital, Baurari, New Tehri** confirms the feelings of the girls at school:

“Water is not pure because of the way it is coming from the River; water is coming from the Ganga in a channel process. They store water in a tank and in a second time the water is

dumped to the city. The purification process doesn't work because of the way the water is processed. The requirement of water is too much and the population of the city will increase. People that do not know about it are facing many problems. Eight to ten people are coming every day with gastric problems, diarrhea, skin problems and the cause is the water. I always say to use just boiled water."

Although the entire city is lacking safe water for drinking, no adjustments are taken by the government and the Panchayats is not solving his duty at all. Although political institutions in the body of the government and panchayats are just running their business, no local community action seems to take place:

"Only 50% of the people know a bout the quality of water, most of the people have migrated from other places. They are taking water directly from the taps or sometimes from the hand pumps. Ground water from some of the hand pumps is pure; it depends on ground source it is coming from. Anyway many of them are not working anymore."

"People are not complaining at all, there is not demand from the people to have pure water. Some days they are getting water, some days they are not. Water tanks are not coming because of the road and they have to go to bring their own water. But water is the main thing; people cannot live without water."

Twenty hand pumps have been installed because of the scarcity of water and every hand pump costs about 1 lack. But they did not work from the beginning. Right now, just a few of these hand pumps are still working. Because of the bad quality of water coming from many of those hand pumps people say the pumps are connected to the sewer lines. To protest the Government behavior women have started throwing junk on the pumps platforms. For building the city the forest that was covering this pick was cut. Now there are no more trees and pumps are flooding with the water when heavy rain comes. Although the bad quality of water is something very well known about this city, it costs 10 rupees per liter.

The city of New Tehri, is an urban settlement without history where people migrated after the beginning of the Dam project. The city is the physical and visible sign of the madness of the project. The top of a mountain has been destroyed, the trees cut, the natural role of the forest was forgotten and so was the relation between trees, soil and water. The Indian Government built this architectonical monster that more than a city seems to be the colonization of a mountain. People came from different places; many of them migrated to work for THDC. Many are laborers in the Jai Prakash Company, the main contractor of the project. They came here with their family to work in the Dam site and now there are feeling the same malaise their neighbors from the old city, now destroyed or from the villages "affected" are facing.

At the Girls Government College in Borari, one of the colonies in New Tehri, many of the girls are daughters of THDC employers. Those girls are all facing health problems since they

move here on 2000. These girls are around thirteen years old, but all of them agree on one point. The water is not safe and many times there is no water at all. Many of the students are living in Bhahgirathi Puram, a colony for THDC employers. From the year 2000, when they came, they started facing health problems, as fever and breathing problems. In Bhagirathi Puram, as in the whole New Tehri water comes at least three times a weak. THDC is poisoning its own workers, but it seems to be not a problem. As the teacher, Anjeli Chandola says, also the water in the school tank is polluted. Nobody is drinking water from that tank because they all where getting sick after using that water:

"Here we say to everybody not to drink the water from the tap they must bring water from home. We are in a school, but nobody from the state government is coming to check the purity of water! The problem here is awareness, ask to the students how many of them are boiling the water at home"

In a range of thirty students, only two of those girls are used to drink boiled water, the others are just filtering water for drinking or cooking. Public Works Department is sending water tanks in New Tehri to fill the drinking water demand but they are not able to cover people requirement.

"Administration is careless and the people are not complaining! The Panchayat? The Panchayat is corrupted and there are no ladies representative, when **Prapa Ratouri** did stand up, trying to make women aware, they shut her voice, that is how ladies are treated! She went to the magistrate but he didn't take interest on her."

The Collector and Rehabilitation Director **Punit Kamsal** is working here just from fifteen months and nobody in his office can give me a plan for the water supply in New Tehri. Actually the scheme for water supply is the same from 1978. A new scheme is going to be ready for the next year.

Anup Garula, Rehabilitation Director office: "water fom the natural sources is vey less and the population of the city of New Tehri is supposed to rise the number of 50.000 on 2020. (now 30.000)."

Sharda – Yamuna Link: A Project to Divide, Not to Unite India:

The Sharda-Yamuna link is part of the proposed Rs. 560,000 crores River Linking Project. The Himalayan Rivers Component envisages consltruction of storages on the principal tributaries of the Ganga and the Brahmaputra in India and Nepal. It calls for interlinking canal sustems to transfer surplus flows of the eastern tributaries of the Ganga to the West. It also proposes to link the main Brahmaputra and its tributaries with the Ganga, and the Ganga with Mahanadi. This component would provide additional irrigation of about 22 million ha and generation of about 30,000 MW of hydropower, besides providing flood control in the Ganga Brahmaputra

basin. It would also provide the necessary discharge for augmentation of flows at Farakka required interalia to flush Calcutta Port and the inland navigation facilities across the country.

Himalayan Rivers Development Component.

1. Kosi – Mechi Link
2. Kosi – Ghaghra Link
3. Gandak – Ganga Link
4. Ghaghra – Yamuna Link
5. Sharda – Yamuna Link
6. Yamuna – Rajasthan Link
7. Rajasthan – Sabarmati Link
8. Chunar – Sone Barrage Link
9. Sone Dam – Southern Tributaries of Ganga Link
10. Bhahmaputra – Ganga Link (Manas-Sankosh Tista-Ganga)
11. Brahmaputra – Ganga Link (Jogigghopa Tista – Farakka)
12. Farakka – Sunderbans Link
13. Ganga – Damodar – Sundernarekha Link
14. Subernarekha – Mahanadi Link

It is estimated by the government that the National Perspective Plan would give additional bebnefits of irrigating 25 million ha from surface waters, and 10 million ha by increased use of ground waters, raising the ultimate irrigation potential from 13 million ha to 148-150 million ha. It also predicts, the generation of 340000 MW of power, apart from the benefits of flood control, navigation, water supply, fisheries, salinity and pollution control etc. (Shiva and Jalees 2003)

Robbing Peter to Pay Paul

Sharada Yamuna link is in reality 5 links as mentioned below:

Gandak	Ganga
Ghaghara	Yamuna
Sharda	Yamuna
Yamuna	Rajasthan
Rajasthan	Sabarmati

The transfer of 11,680 MCM water from Sharda to Yamuna is further transfer of 11629 MCM water to the Rajasthan link canal and then to the Rajasthan –Sabarmati link. 3044 MCM

water to be diverted for urban-industrial use in the National Capital Region. Since 11,680 MCM water is not available as surplus in the Sharda, Ganga, Yamuna basins, thus diversion will leave the belt of the tarai and Doab without irrigation water. The deficit created by the diversion is to be made up by further transferring water from the Gandak to the Ganga and from the Ghaghra to the Ganga.

The people of the Ghaghra, Gandak, Sharada, Yamuna or Ganga Basin need to give their consent to this transfer if water wars are to be avoided.

(a) Water Transferred from Sharada-11680 MCM.

(b) Water Taken from Ganga in Lean season- 2349 MCM

(c) Water added to Ganga in Monsoon season- 101 MCM

(d) Ganga water used for industrial and urban consumption in National Capital region- 3054 MCM

(e) Water for Yamuna- Rajasthan Link -2733 MCM

(f) Water for Rajasthan- Sabarmati link – 5842 MCM

The project involves building large dams at Poornagiri and Pancheswar in Champawat and Pithrogarh districts of Uttranchal in the fragile Himalaya as well as additional dams for the diversion from Ghaghra. Recent land slides at Vishnuprayag caused by a dam, which is being built, and the collapse of the Tehri dam tunnel needs a reassessment of the safety. Viability of more dams in the Himalaya is a question mark on the dam safety. Because the dams will be built on a seismic fait makes the environmental risks more serious.

Displacement & Deforestation

The Sharda Yamuna link the chariot of development is crushing thousands of people under its heavy wheels, thousands of small farmers, landless labourers are growing becoming the victims of pauperiztion, this link will become the cause of cultural genocide uprooting the villagers, from their forest habitate of which their culture and livelihood is alien ably linked.

As per the detailed project report of Pancheswar Multipurpose Project about 15,000 persons in Nepal side will also be relocated. Thus approxiamately 45,000 persons are required to be relocated on implementation of the Pancheswar project whose submergence area is 123.82 sqkm. The number of persons affected by creating Poornagiri reservoir is about 23,625 persons which are required to be relocated for the 65 sqkm., submergence area on creation of Poornagiri reservoir.

Desertifying the Doab

The project will divert water from the irrigated areas of Sharda canal and Ganga canal leaving nearly a million acres of Doab and fertile Gangatic basin decertified. The transfer from Ghaghra and Gandak to make up for the deficit will neither be viable nor the cost effective.

The project crosses the drainage system at the foothills of the Himalaya. This will block the drainage of the heaviest precipitation zone in north India, leading to water logging and malaria on the one hand, and blockage of recharge of surface or ground water south of the canal.

The recent flood in Punjab due to a break in sutlej-Yamuna canal should be taken as warning for the kind of devastation that the Sharada-Yamuna canal could cause some problem. The link canals will cross 95 roads or railways through bridges as well as 15 major and Monor Rivers and hundreds of rivulets.

Water Wars

The Sharda-Yamuna canal is a ready-made recipe for conflict. The sharada Yamuna link canal will lead to conflict with Nepal and Bangladesh since the project will divert water from the Ganga system, which we share with the neighbouring states Rajasthan and Gujarat. It will also lead to conflict between Bihar and U.P., Bihar and Rajasthan, Bihar and Gujarat, Uttranchal and Delhi, U.P. and Haryana, Uttranchal and Rajasthan, Gujrat.

The Sutlej-Yamuna diversion has generated an irresolvable conflict. The Sharda – Yamuna canal will lead to unending water wars.

Reservoir and Earthquakes

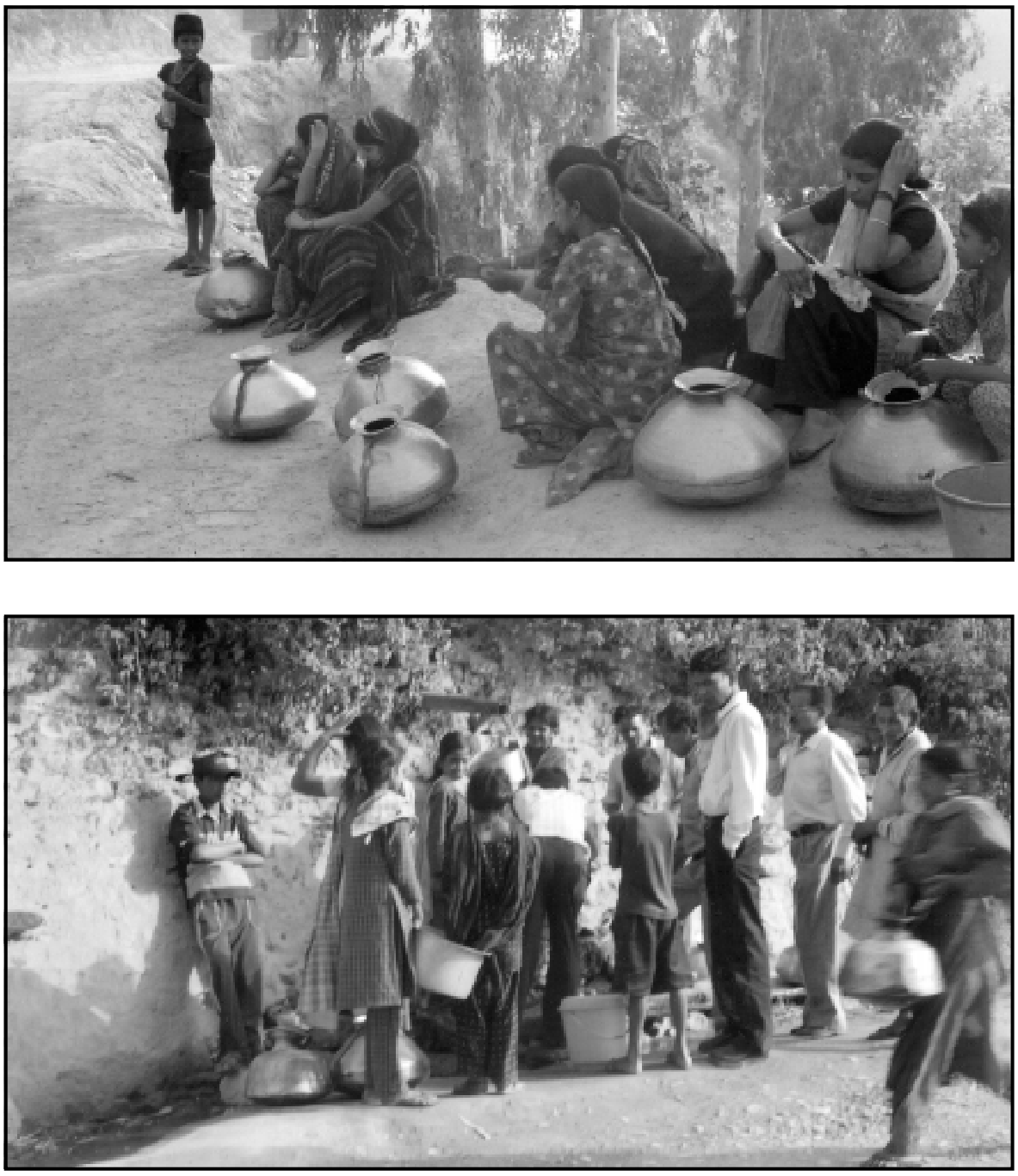
RFSTE calculated the mass of water at Poonagiri and Pancheswar dams would be 356 billion tonnes and approx. 400 billion tonnes at the gross storage capacity respectively. Such redistribution of mass occurs with extreme rapidity as a reservoir begins to fill behind a dam wall. The enormous mass, the rate at which the mass accumulates (during filling and re-filling) and the lubricating effects of water as it per-collates through the rock faults below the new reservoir, combine the earth groan and writhe. The weight of the reservoir, by itself or in conjunction with other reservoirs in the region, can create the sorts of pressures that result in an earthquake.

Cost of the Project

The total cost of the link canal based on 2002-2003 price level has been estimated to Rs. 19202.75 crore comprising Rs. 4666.7 crore for head works, Rs. 12,466.97 crore for canal and Rs. 2068.80 crore for power. Farmers will charge the cost of this project as an irrigation cess.

Alternatives – Reducing Water Demand Through Sustainable Farming

The diversion of water will create a number of problem as well as it is a fraud since the Sharda, Yamuna and Ganga donot have surplus water. Instead of depriving the breadbasket of India, the Doab. What is needed reduction of water use in agriculture. RFSTE/Navdanya's organic movement has successfully reduced water use by 60% while increasing output of food. The organic road to agriculture is a viable alternative to the waste and wars involved in the river linking projects.



Women are waiting for their turn to fetch water in Hilly areas of Uttaranchal

CHAPTER - 6

WATER CRISIS IN KARNATAKA

Karnataka is facing the worst kind of water crisis. A survey has revealed that as many as 50 percent of the respondent's felt that supply of drinking water is the major challenge that the government has to face (Deccan Herald 2004).

For the first time in the history of Belgaum district, the administration had started sending water through trains to several villages and towns of the district, which were reeling under severe water crisis. The train that carried six lakh litres of water halted at five-railway stations enroute to Shedbal from Ghatprabha daily. Later road tankers carried the water from railway tankers and supply it to the villages (Vijay Times, and Deccan Herald)

In Bangalore, only 35% of the city gets water on daily basis, the rest on alternative days. About 27 wards in Bangalore are not yet a part of the Bangalore Water Supply and Sewerage Board (BWSSB) network. Most of these lies on the periphery of the city in the newer colonies and left out. More over 40% of the city is not covered by the under ground drainage system, which implies that sewage goes untreated and this sewage percolates into the ground water (Manjunath 2004)

A Walk around Sanjay Nagar, a residential suburb shows that resident's gets water once in three days, with no fixed timings. Sometimes, it comes for three hours. In Murphy town a slum in the heart of bustling Ulsoor, where each street of 10-15 hutments shares one tap. Bangalore Ground Water has been severely depleted. Earlier bore wells hit water at 50 feet, now they have to go down to 300 feet. (Manjunath 2004)

Indeed, it is not just Bangalore but the whole of Karnataka that is reeling under severe water shortage. The state government payed to the government of Maharashtra an advance of Rs. 3.30 crore in order to seek the release of 2000 million cubic feet of water at the Rajapur Barrage of the River Krishna. This move had been made because three districts Bagalkot, Bijapur and Belgaum have absolutely no water.

In addition to the scarcity, Bangalore water woes have another dimension: chemical pollution. The findings of study are damning. Ground water is found unsuitable for drinking in as many as 370 out of the 735 samples. That means over 50% of the city's drinking water is not potable. In Bharthi Nagar, the level shut up to as high as 660 mg per litre while the permissible level is 50 mg (Radhika 2004)

Although there are no definite reports, doctors and environmental experts feel that there is possibility of increasing in the incidence of Blue Baby Syndrome because of high nitrates levels in drinking water. Most deaths among children, especially less than six months old, almost go unreported. With the consumption of excess nitrates, oxygen carrying capacity of blood decreases. It leads to the 'Blue Baby Syndrome' Nitrates increase the iron content in hemoglobin babies fed on processed foods are more vulnerable. (Radhika 2004)

In a discussion conducted by one **Voluntary Organization**, women made the shocking revelations about the water crisis in Bangalore in different localities and slum areas.

Sunalane and Samadhanagar Slums in Kadagoundanahalli

Suna Lane and Samadhanagar slums are located in kadagoundanahalli area, which has 2500 population. Most of the people earn their livelihood on daily wages. The worst affected being women and children, with hardly any source of maintenance or income. Sometimes whole families are compelled to work.

The housing condition of these people is miserable. A cluster of houses jammed in a small place is a common sight in these areas. The houses are one-room shelters with thatched roof. They are a cheaply constructed, walls generally not plastered and the floor not laid properly, these houses are over crowded with people. In such a situation they are unable to construct some structures for storing water, adding to their problem of scarcity of water, and this is why they should be provided with regular supply of water.

Sunalane:

Government had provided a hand pump, which has been under repair from past 10 years. They do not have any source of drinking water and have to purchase drinking water from private suppliers at Rs. 2 or 3 per pot.

The CMC, a year back has provided water connection at a location. This water is hard water (salty water), which is not fit for drinking, and they use it to only for washing and bathing purpose. They have to pay Rs. 5/-per week for this, for which no bill is issued. The water is supplied everyday in this tap, but only for an hour and it does not have any fixed timing, this being the only tap for 500 population, the residents have to spend hours together for filling water. Most of the ladies being daily wage labourers, housemaids. They have to forgo their bread for water. Children especially girl children will have to forgo with their studies, to maintain house and main job being quenching the thirst of the family.

Samadhanagar:

This situation in this area is much worse than the Sunalane; they do not have any source of water. Their only source is the private water supplier, who sells drinking water at Rs. 2/- per pot (how safe this water is also a question?)

Recently due to some action by the local pressure groups, Bangalore Water Supply and Sewerage Board (BWSSB), is providing two tanker of water, and each house gets only give pots of water for Rs. 1/-.

For getting water for other purpose's both Sunalane and Samdhanagar residents have to walk 2 kms to areas like Venkateshpura, PNT Colony, Tannery Road, amid high traffic.

Water Problem:

- For the first 30 years the slum did not have any source of water. 10 years ago BMP gave them one public tap, which has been constructed on the footpath of Netaji Road outside the slum.
- This tap is used by the slum dweller for their multiple uses of drinking, cooking, bathing and washing clothes.
- There is one common bathroom in this slum but only one water connection has been for both the public tap and the bathroom. This means that when the tap is used for collecting drinking water, no water comes in the bathroom.
- Water generally comes in the morning at 11 a.m. or in the middle of the night. The flow of water is also very thin and making collection of water takes a very long and tedious process in the scorching sun and zooming traffic.
- Other sources of water for the slum are the 2 public taps across Netaji Road. To get water from these, the women have to cross Netaji road, which has heavy vehicular traffic during the day. The chances of an accident occurring are high.
- Water is released either at 11 a.m or in the middle of the night both these timings make it very difficult for women to collect water as they leave early in the morning to go to work and have to stay up for most of the night if water comes in the middle of the night.
- They also find it very difficult to wash clothes or take a bath in the middle of the night.
- It is difficult for them it gives their children a bath and get them ready for school.
- They generally have a bath only twice in 8 days due to the scarcity of water and inconvenient times of water release.
- The sole publics tap in on the footpath and this is where the slum dwellers wash their cloths and take a bath. This means that the general public cannot use this section of the footpath, and have to taste the angry comments of the footpath users regularly.
- The sewerage pipe is very close to the water tap and there is a large pool of stagnant water with flies and other pollutants, very close to the tap. This increases the danger of contamination of drinking water source and the danger of infections to the slum dwellers.

Doddananagar slums in Kavalibairasandra

Doddananagar slum are located in Kavalbairasandra area which has about 20,000 population. It is supposed to be one of the Bangalore's oldest slum, but even after nearly 40 years of its existent people here have not been provided with basic necessities – drainage, sewage water etc., even today people here have to fill their sanitation and sewage water in drums manually and dumped into nearby gutters. Water here like other slums is really a blue gold, there is utter scarcity of water.

Water Supply Status:

- **Public Taps:** The government has been generous in providing one tap in each lane, but water trickles in these taps once in 10-12 days, and that too for few erratic hours. Mostly midnight or when everyone had gone for work. Moreover it is hard water, unfit for consumption.
- **Other Taps in the Vicinity:** The slum dwellers fetch drinking water from kavalbairasandra, which is nearly 1 km from their slum or from Tannery road (1.5 kms). They have to pay Rs. 25/- per month to fetch water from Kaval Bysandra tank. But even here they have to go either early in the morning or middle of the night.
- **Tanker:** Arranged by local MLA to supply drinking water only. However, only about 300 families are able to collect 4 pots in a week time and they have to pay Rs. 5/- per week, remaining 1500 households still suffer from safe drinking water.

  Few Private water suppliers sell water on bicycles at Rs. 2/- per pot.
- Women and children who are also breadwinners of the family spent 3-4 days filling water, losing their wages.
- Insufficient water for sanitation purposes has led to clogged drainage and bathrooms leading to more mosquitoes and polluted air.
- The public taps are located at strategic points! The rational behind laying water pipes on the gutter is beyond one's comprehensions.

Hosapalya and Bandipalya slums in Bammnahalli

Hosapalya and Bandipalya slums are located in Bammnahalli area, which has a population of approximately 3000 people. Hosapalya and Bandipalya have approximately 450 huts and come under the jurisdiction of Bommanahalli City Corporation. Most of them are being to backward communities.

Water Problem: There is water connection from Bommanahalli City Corporation and there are 9 public taps:

- Water comes from these taps only for 1 hour in the evening from 5.30 to 6.30 p.m. In that 1 hour each house gets only4 pots of water.
- Many complaints have been made to the local councilor but they have got no response.
- The colony has no other sources of water. In an emergency they have to walk 2 km to get water.
- Some of the women who work in the garment factory have to leave their homes at 8 a.m. They only arrive back at 7.30 p.m. This makes it very difficult for them to collect water as water only comes for 1 hour in the evening from 5.30 to 6.30 p.m.

How are they to go to work to earn their livelihood land yet gathering water for their family's daily needs?

- Some women make agarbattis in their houses. They can make 1000 agarbattis in 1 hour for which they get paid Rs. 10. Because here is such a severe water shortage they spend 4-5 hours every day that they cannot make agarbattis and as a result, they forfeit Rs. 40-50 every day.
- Some times the water coming from the taps is brown in colour. Due to this the children get many infections.
- Women also get sever joint pain in their shoulders, hips and knees due to carrying water pots from water sources outside their colony. To collect water from Garyabhavipalya takes 1 hour. This takes a toll on women of in the colony in terms of time spent collecting water, earning lost, and adverse effects on health.

Byappanahalli slum in Satyanagar.

Satyanagar slum are located in Byappanahalli area, which has approximately 6,000 populations. Satyanagar slum which shelter a population of 6,000 came under the Bangalore Mahanagar Palika in 1997, but even today is deprived of basic need for survival i.e. water. In the entire area there is not even a single tap bore well or any sort of water source.

There are no public taps and bore well. A big water pipeline connection between Marthisevaagar and Defence Colony runs through Satyanagar slum. Because there is absolutely no source of water for Satyanagar slum dwellers, they have loosened the joint in the water pipe with their engineering skills and the water that gushes from this point has been their only source.

This land belongs to the military. Sometimes ago military officials came to know about this leakage of water and appointed a watchman to see that no one fills water from the leakage, when this could not stop the slum dwellers from filling the water, the defence officials decide to repair the pipe. The elders in the slum requested them not to repair the pipe, as this is the

only source of water for 10,000 poor people. The defence people's generosity is quenching their thirst.

There is another slum, Byayappanahalli, 2 km away from Satyanahar slum. Those people, numbering approximately 4,000 also come to Satyanagar area to collect water. So this loose join in the water pipeline is the lifeline for people from both Satyanagar and Bayappanahali slums.

- The story does not end here; there is a huge open drainage/sewage gutter below the water pipe. The slim dwellers stand in the stinking gutter and fill their water and some times they also collect some amount of sewage water. Because of this women and children who are the primary water fillers are suffering from serious infections.
- Children wait to collect water instead of going to school. As a result of this their schooling suffers.

Rajeshwarinagar and Rajgopalnagar slums.

Rajgopalnagar and Rajeshwarinagar slums are located in Peenya. Dasarahalli City Municipal Corporation area, which has approximately 10,000 populations.

Source of Water:

This area comes sunder the jurisdiction of the City Municipal Corporation. The four CMC bore wells are the only source of water available to the residents of this area. Out of this four one bore well has not been functioning.

Most of the problems faced in this area are similar to the water problems faced in other areas.

- Insufficient & erratic distribution of water
- But the most significant and crucial problem faced in this area is the rapid contamination of water.
- All the bore wells pump out water containing some unwanted dangerous solvents.

Pale Green Water: One of the bore well, has been pumping out water that is of a pale green colour, from last 8 months. It is unfit for drinking, but since there is acute shortage of water, residents of this area are using this water for other domestic purposes, but for cooking and drinking.

Water with White Mask: Second bore well pumps out hard water. A white dusty like layer is formed on the surface of this water if it is stored, this water is not fit for cooking, washing and drinking due to hardness, but the locals have no other source of water and thus end up using this water of domestic purpose and also for drinking.

Water and Worms: The CMC drilled third bore well to provide for drinking water. In this bore well, people are allowed to fill only three pots per house when the water is supplied. This water if it is stored for more than one day gets infected with worms. But this water is being used for drinking.

Fourth bore well is under repair. The residents of this area being mainly daily labourers who leave their houses early morning and comes back late in the evening. They cannot afford to buy safe drinking water, or have their own source of water and hence are forced to use those contaminated water.

It is the women and children who are primary water fillers in the family, and since they use the contaminated water for cleaning, washing and other purposes, most of the children are suffering from severe skin problems like boils, rashes, itching sensation on their hands, legs etc. They are also experiencing sever joint pain in their hips, knees etc. after using water.

The doctors of CMC after seeing the water told the people that they should boil and use it, but this aggravated their problem. The situation in this area is a clear example of the absolute failure of the government machinery in protecting its people.

Peenya Industrial Area.

Peenya Industrial area is located in Peenya II Stage in Hagganahalli, which has 18,000 populations. This slum area comes under the jurisdiction of Peenya Industrial area. Many garment and other industries and factories are located here. Most of the dwellers in this area are migrated people from North Karnataka.

Source of Water. The area comes under the CMC jurisdiction and hence no BWSSB water supply. Ground water is the main source of water, there are 4 public bore wells out of which only two are functioning.

Issues and Problems of Water:

(i) Out of the 4 public bore wells; water comes only from 2 bore wells and even this water is being illegally sold by the CMC.

(ii) Only 10 out of 300 public taps are working. The other 290 taps are not working.

(iii) Out of the 35 small tanks, water comes from only 1 tank once in two days.

Due to the severe lack of water supply, the people of this slum are facing many problems.

- There is rampant sale of water. People have to pay Rs. 3-5 to get 1 pot of water from private sellers of water. There are 14 private bore wells that sell water. These private sellers are making huge profit through the sale of water.

Rates per Pot in each area:

Friends Colony	Rs. 3/-
Shivanandanagar	Rs. 2/-
Maruthinagar	Rs. 3/-
Mayurnagar	Rs. 1/-
Gulbarga Slum	Rs. 4/-
Raichur Slum	Rs. 3-4/-

Even after paying such exorbitant prices they are not able to get sufficient quantity of water. Most of the residents are daily labourers and casual labourers in factories; they have to shell out major share of their income to get water.

- Many street fights occur among the people over water. Social conflict and Social tension is high in this area.
- There is a steep increasing in the rate of social dropouts.
- People spend 4-5 hours in a day collecting water. They are not able to work for these 4-5 hours and this adversely affects their earning.

Most of the people who own houses have drilled bore wells and are selling water in their neighborhood. Apart from this farmers in the nearby villagers are getting bunkers and are selling water. One tanker of water costs around Rs. 250/-, one drum of water costs around Rs. 60/-. People queuing behind tankers for water are a common scene in these parts.

GowthamNagar Slum in Yeshwantpur.

Gowthamnagar slims are located in Yeshwantpur area which has approx. 3500 population. There are tow water tanks, two bore wells and three public taps in the locality.

Almost all the residents of this locality are construction workers and loaders in the nearby marketing yard of Yeshwantapur. The income varies from Rs. 50/- to Rs. 100/- per day. The children are discontinuing their education in primary education itself and go for coolie work to support their families.

Source of Water: Out of 350 houses in the locality,150 houses have got water pipe line connection. As per the Bangalore Mahannagare Palika (BMP) policy 18% of its budget should be spent for the slums to provide the basic amenities such as drinking water, toilets, drainage etc. The political leaders involved in this process of water pipe line connection and collected Rs. 4000/- to Rs. 6000/- from each individual and gave the connections.

Sealing of the Public Taps:

In the month of September 2002, the Junior Engineer of BWSSB came to the locality and sealed off all the three public taps, when people retaliated, he coolly answered that there is no more water to any slums in Bangalore. If at all you require water, you pay and get it. What is happening, the people have no water for drinking and imagine about the need for water for other need, such as bathing, washing etc. This is a classical example about the impact of privatization of water on poor. Though this slum is recognized by the Government, it has been struggling for water.

No Water But Pay the Bill

The people were happy that they would be getting water in their house itself, instead going to the public taps and stand in the queue for water. And also they thought that they need not waste their time for fetching water. It all went on for well till they got connections. But when it started functioning only the people those who residing at the back of the HIS Primary School and Higher Primary School are getting water and those who are in front of the school are not getting water since their houses are in not low lying area. The water won't reach to them since the water does not have that much of force to reach till end. Despite spending Rs. 4000/- to Rs. 6000/- for pipeline connection, and meter they could not get water.

At the end of the month who ever got pipe connections but were not getting water too got bill ranging between Rs. 100/- to Rs. 500/- for water supply from BWSSB. They have not paid the water bill since they have not get water. BWSSB authority stopped water supply for the whole area since they have not received water bill from this slum. The people went to the Junior Engineer of BWSSB and requested him for the water. Though water is being supplied to this slum, it is not guarantee. In a week once or twice they get water. The people those do not get water in the pipeline connections and those who do not have pipeline connections pay Rs. 20/- to Rs. 0/- for a month to the neighbors those who get water and get water for their needs. But the BWSSB has bben prompt in sending the bills.

Bharat Gold Mines Ltd (BGML), Township in Kolar Gold Fields.

BGML, Township slums are located in Kolar Gold Fields area, which has approximately 65,500 population. Kolar Gold Fields (KGF) well known for its rich deposits of gold and was a well-furnished, planned township. In the recent years it has declined, after the closure of the BGML, depriving the inhabitants of KGF of may of the basic amenities. The BGML miners through their hard work, excavated the royal yellow metal-Gold to the world, benefiting the nation but they remain poor and without proper amenities.

After the closure of BGML, basic amenities like water, sanitation, have worsened the life to the inhabitants especially regarding the poor water supplies. About 65,000 persons of the

township are badly hit. Requirement of water per person, per day including, domestic and public utility purpose. Required water for the present population is about 71,00,000 to 73,00,000 liters per day.

Source of Water:

1. **Underground Water Sources**: The township is divided into four divisions with pumping stations and the bore wells sources.

   Due to the closure of the mines, the abandoned mines have filled with water, and the submerged pipes have been rusting, and the entire system has failed, with about 20,00,000 liters of water have got contaminated and impossible to harness.

2. **Bethamangala lake Source:** Qualitative water was supplied in pre independence time to the BGML Township from the Bethamangala Lake. Three decades back, Karnataka Urban Water Supply and Drainage Board (KUWS&DB) took over the water source, and started charging for the water. Due to non payment of the bills, the board withdrew the water supply. Now against the earlier supply of 35,00,000 liters per day, the supply has drastically reduced.

3. **Borewell source:** To increase the water source, few bore wells have been dug, but the water is insufficient, with the bore wells yielding about 15,00,000 – 16,00,000 liters per day.

   Lack of water affects the health and hygiene of the public and creates several social problem.

   - According to one resident, “Guests avoid coming to our homes because they are aware of water problem.”
   - Another resident laments “neighbours look at each other as foes as we quarrel at community taps, a common sight witnesses”.

CHAPTER - 7

WATER CRISIS IN MAHARASHTRA

For Maharashtra drought hit belt, water is an abiding concern. For instance, Rukhmani, mother of three walks three kms every day to fetch two huge vessels of water illegally from a government reservoir. She handles the housework for an hour and once again readies herself for another three km walk. Rukhmani makes such three trips every day. Dilip Aniba Adsure, a small farmer from Manglur village in Latur district, cycles around balancing two big can and vessels on his cycle. Wherever, Adsure sights water, he fills up (Desh Pande 2004)

This is the tale in the 52 villages in the Marathwada belt of Maharashtra. Devasted by earthquake nearly a decade ago, these villages rehabilitated far away from their original site, are now affected by severe drought. In majority of these villages, angry villagers have destroyed taps or wanted it up with thorny bushes or barbed wire.

People have punched a hole in the pipeline and taken a connection. Even then water come after five or six days for less than hour. The state government is not even sending tankers to the villages.

For some people in Ashti taluk in Beed district of the state, food is not so important, they demand water. Some people spend Rs. 5 for two canes of water. The water often is dirty. People do not have any choice, but to drink dirty water. At some places in the morning, there is barely enough water to fill a small pot, large cans are placed in the queue at night (Menon 2004)

Drought has virtually come to stay for the fourth year in succession in Beed district, one of the three worst affected districts in Marathwada region. Traveling through the critically affected taluk, one can see bullock carts ferrying large plastic cans of water, tanker operation extract water from some bore wells and sell it. In the 177 villages of Ashti taluk, over 190 government tankers supply water daily, apart from 186 private tankers. Almost every water source including 25 to 30 large ponds and two minor irrigation projects have been dried up. Even the ground water level has dropped to 300 feet (Menon 2004)

Whatever water is left in the tanker, it is poured into a well, which is filthy and full of garbage. The women quickly drop buckets and other utensils into it. They use this water for washing and sometimes even drink it (Menon 2004)

Of the 353 talukas in the state, 71 talukas in 11 districts have the poor rain and have been declared as drought hit. 28 talukas consisting of 2789 villages are in Pune, Satara, Sangali and Solapur districts. The situation is so severe that for most of the farmers, the paisawari (average yield per acre) is less than 50%. (Jadhav 2004)

Keeping in view the gravity of the situation, the Ground Water Surveys and Development Agency (GSDA) has launched a 'Water Audit' project aimed at ensuring participatory water management in all the talukas in the state. The people in the selected village are being helped to set up a rain gauge. Observation wells to determine the ground water levels will be identified and the villagers will be asked to keep a daily record of the rainfall and the ground water levels (Kulkarni 2004)

The villagers will also be asked to study cropping patterns in the area and water requirement. They would be needed to note the number and capacity of water bodies. At the end of the monsoon, this data and details of the total rainfall and ground water levels will have to be put forth before the gram sabha. The villagers and the GSDA geologist will consider factors like the total rainfall, runoff and percolation and draw an approximate picture of the water regime in the area and plan their use accordingly. (Kulkarni 2004)

Maharashtra can be broadly divided into 5 regions – the high rainfall Konkan, the drought prone Marathawada, the sugar rich Western Maharashtra, the cotton growing black soils region Vidarbha and Northern Maharashtra.

The Konkan region has very high rainfall but the geological structure does not permit much storage. As a result of this there has been very little surface irrigation development in this region. This region is often referred to as the region of wet droughts. Rivers flow wildly during the monsoons but run totally dry in the post monsoon period. Several efforts have been made in the high rainfall Konkan region to harvest rainwater. However these efforts have been largely at an experimental level and have not really scaled up.

As opposed to Konkan are the low rainfall areas of Marathawada and parts of Northern Maharashtra and also the eastern belt of western Maharashtra where increasing pressure on the already scarce water and land resources is depriving a large section of the population in this region of livelihood security.

Another is the sugar rich belt of Western Maharashtra known for its 'successful' movement in the sugar co-operatives sector. Paradoxically it is this very powerful and successful force that has been the cause for the depletion of the states water resources. Only 3-4 % of the cultivated area is presently under sugarcane but it consumes almost 60% of the water available through irrigation In western Maharashtra and some parts of Marathawada we find that the area under sugarcane is increasing and so is the water consumption for this. The post 70's period saw the rapid spread of this water intensive crop alongside the rapid growth in sugar co-operatives.

Massive investments were made in irrigation and energy projects to support the powerful sugarcane lobby. What earlier relied on the canal water from large irrigation projects now expanded to minor irrigation projects and well irrigation all together contributing greatly to ground water depletion. Most of the benefits of this development project have been concentrated in small pockets leaving a large section of the population, water and food insecure.

The impacts are for all to see. At present Maharashtra is facing a severe water crisis, which has been deepened by the state policies or rather the lack of it on its water resources. The year 2004 is considered as the worst ever drought that Maharashtra has faced. The reason certainly is not low and erratic rainfall alone but the lowered water tables due to the unregulated withdrawal of ground water. Ground water crisis in Maharashtra has deepened and the worst affected are the poor-, women, landless and small and marginal farmers. In 1960 there were some 5.4 lakh wells with about 8445 pumps but by 2001 there were 13 lakh wells and 22 lakh pumps. Just points to the enormous rate at which extraction of groundwater has taken place. In some parts of Maharashtra extraction rate equals or exceeds the rate of replenishment.

As far as drinking water is concerned as per the Government of Maharashtra statistics, between 1978-80, 12,753 villages had inadequate drinking water. To resolve this crisis the government introduced 15,085 tube wells in the period between 1974-80. The government claimed then that almost 11,000 were successful. In 1986, the figure for number of villages with inadequate drinking water increased to 14,000. In 1999 there were 5163 villages and 3193 vadis that were being provided water through tankers. Between 1997-2002 the state government claimed that it had solved the problem for 30741 villages. However at the end of 2002 there were about 22870 villages with a severe drinking water crisis. This deep crisis has left the poor and the vulnerable sections in a deep crisis.

Images of women carrying pots of water, walking miles and miles for one single pot are not new for the state of Maharashtra or for that matter most parts of the country. Women in Maharashtra have carried the water burden both as a result of scarcity and abundance. Drought, displacement due to dams and irrigation have all contributed to increasing the water burden of women.

Impact of scarcity

The impact of repeated occurrence of drought is known to be the worst on women and other deprived sections that depend largely on natural resources for their livelihoods. The effect on women can be broadly seen on their incomes, health and nutrition, and social status. All these impacts have a combined effect on the capabilities of poor rural women to secure their livelihoods.

Even in normal times women have to spend a significant proportion of their time in meeting basic household needs like domestic water, fodder and fuel. With occurrence of drought

and with the degradation of the eco-system, women have to put in even more time and labour to collect less and less — both quantitatively and qualitatively — of water, fodder and fuel and have to hire out even more of their labour for a smaller than usual wage. This leaves women with very little time to engage themselves in any productive activity outside the house. It forces women to remain in subsistence.

Women from village Kalmadi, in Nandurbar district of North Maharashtra share their woes "forget about getting safe drinking water from wells, we spend most of our time locating streams and springs that could quench our thirst'' Almost half a day is spent in locating such sources of water. This crisis has deepened in the last 8 years."

Indutai Patil, ageD 60 years from the same village says "since I came to this village as a young bride I have been facing this problem of water scarcity. My hair has gone white but the search for water has not ended. As I am ageing the distance to the water source too is increasing.'

In Sindkheda taluka in Dhule district there are several dams like the Jamphal, Sulawade etc on the river Tapi, however all these are completely dry. Although this is a high rainfall area (1200-1500 mm) most of the rivers flow only in the monsoons and go dry 0immediately after. A common site in most of the villages here at any time of the day is that women are wandering in search of water with water pots on their heads. Although the government did take over two wells to resolve the drinking water problem an erratic power situation makes it difficult to pumping out water. Fetching water in this remote village is becoming an excruciating experience for the women.

For the women agricultural labourers this has meant a loss of incomes they say "We just cannot afford to spend our entire day looking for water, since we have to go for wage earning. But then we have to buy water for drinking. We earn about Rs.30 a day and spend about Rs. 15-20 on just getting some kind of water to quench our thirst- how do we live and what can we eat?"

In Mogarpada village in Sakri the story is no different. In this high rainfall area this is what women say 'It rains heavily but no one thinks of harvesting water then and now getting just one pot of water too is such a task. We wake up in the morning and leave the house to fetch water.' This is a small village with just 85 households. No bus goes to this village and there are no other amenities however the people of the village demand nothing except water.

Deterioration in health is caused by lack of nourishment and increase in workloads in drought years and in drought prone areas. Several studies have shown that increased incidence of anemia has been observed during drought years. Similarly instances of abortion and ailments related to reproductive organs have also been observed. Apart from the nutritional deficiencies,

health impact on women due to spread of water borne diseases, mortality and morbidity due to increased workloads has been observed across the region.

Permanent and seasonal migration of men to cities and irrigated areas leads to an apparent increase in the incidence of 'women-headed' households. The current crisis in different parts resulting from severe drought yet again demonstrate the extreme vulnerabilities of women and children, and the impact this slow on-set disaster is making on them. Incidents of sale of women and girl children, increase in female foeticide is much more in drought prone areas as per different studies and news reports.

Interesting developments have been observed in Jamner taluka where few people are willing to give their daughters in marriage to the boys from villages Vaghari and Saawargaon. Shantabai Sathe an old woman says ' I spent my entire life getting down into the river and fetching water. Now I am old and feeble and atleast at the end of my life I hope that I would be able to fetch water a little more easily. The Mental Hospitals in Sangli and Miraj have shown an increase in the cases of depression reported in the recent past and drought is cited as the main reason for this.

Impact of Water Crisis on Livelihood

Long term and widespread droughts have had long-standing impact on the status of the natural resources. This ecological degradation, contributing to drought, has led to the erosion of livelihoods. We see that degradation of forests, lands and lowering of water tables result in a similar impact on women, as would a single event of drought. But persistence of the situation creating drought prone areas has led to increased onus of subsistence on women. Added to this is the lack of opportunities in the non-farm sector thereby forcing migration to urban areas.

Canal irrigation has got its own set of problems for women. The case in question is the new irrigation schemes of the Minor Irrigation Department, Maharashtra. A few pilot projects are being launched in the state with financial support from the German organisation- KFW. These projects have an apparent air of being participatory from the very outset. The approach is thus referred to as Participatory Irrigation Development and Management (PIDM) thus claiming to be one step further to Participatory Irrigation Management (PIM). Here participation effectively means loading the infrastructure development costs on poor people.

Thus water is clearly treated as an economic good and costs incurred on developing the resource base have to be recovered. In this scheme the storage costs would be borne by the government but about 60% of the distribution costs (canal network) would be borne by the beneficiaries through a combination of contributions in the form of labour, cash and bank loans. How viable would such a scheme be is a much larger question, however what concerns us here is the women's participation in it. Village Varve, in Pune district is one of the villages where this pilot scheme has been launched. Here women labourers were working on the canal network

in large numbers. This labour was towards the labour contribution for the distribution network. The story is always the same on most irrigation sites. Women labour on the dams and build water storage structures but yet have to walk miles for drinking water. The same village was facing an acute water shortage. The women said that this was largely because of the increasing number of wells in the command area as well as in the village at large. The drinking water source had dried up and women are now forced to fetch water from longer distances. Some of those who have dug deep bore wells are in fact selling water in tankers to the near by companies.

If water is to be bought at such a high price, recovery in cash becomes an overriding concern in the choice of crops. This indicated the possibility of shifting over to more 'paying' crops to maximise monetary benefits from water. This would mean a shift from the low paying food crops to cash crops. This would encroach on the domain of women and other peasant households. The women said " Now we will have to stop cultivating jowar and bajra and move over to either sugarcane or tomatoes and onions which can be sold in the Pune market. We have to buy jowar to eat. Of course these days we cannot afford to eat jowar so we mostly eat wheat chappatis"

Although a transition to sustainable cultivation of high value crops for industrial use will be essential, there is need to see the impact it has on the irrigated area under food crops. In Maharashtra this area has been gradually reducing. A crop plan that ensures diversity in the choice of crops will therefore be necessary. The important policy issue that gets flagged here is the need to provide affordable water for livelihoods of all.

Policies In Water: Does Gender Matter?

Without going into a detailed analysis of the gender sensitivity of the water policies a quick overview shows that women have not been on the agenda of irrigation policies or watershed management. None of these policies and interventions until recently had equity and sustainability on their agenda. The policies have so far promoted private accumulation at public costs. In this kind of a scenario access to protective irrigation to the small and marginal farmers for cultivation of cereals and pulses itself has never been on the agenda leave alone the question of equitable access to the landless and women.

While scarcity of water resources has made the government sit up and think on reforms to improve performance and meeting the financial requirements of sustaining the irrigation systems, its translation in practice means that water is treated as an economic good and therefore users must pay for it. The portrayal of severe 'financial crisis' of the government now justifies its stance to invite private corporations to build operate and transfer water systems. This raises some serious questions in the light of gender equity and sustainability of the resource itself.

Policies in watershed management too have not addressed the specific concerns of resource poor and women. Most of the successful watersheds talk of enhanced producitvity but hardly look at the equity and sustainability aspects at all. Further on visualisation of women's participation in all such programmes does not extend beyond the formation of self-help groups. While the SHG has proved itself to be a robust agency in organising women it has not been able to connect itself to livelihood issues of women. This calls for a need for a serious review of all related policies through a gender lens. In this article we are merely flagging this as an issue needing further attention.

Emerging Alternatives

Any alternative will have to be based on restructuring of water sector on the principles of equity, sustainability and participation. Unless rational, equitable and sustainable use of water does not become a primary concern for the policy makers women and other resource poor will never be able to participate in the water governance. Here policy direction should be towards integrated management of water resources. This calls for pooling in of all local and exogenous, ground and surface water storages before planning for use and distribution is decided.

Any gender sensitive alternative in the water sector will have to ensure

1. Entitlements over water for women
2. Legal space for effective participation in decisions around water distribution and use
3. Need for understanding women's water needs beyond the drinking water domain

Women have responded to these crises in different ways. Often these responses are seen as mere coping mechanisms ignoring the subjective dimensions of poor women's lives. In adverse situations it is these 'coping mechanisms' that lead to very concrete alternatives. We would like to consider all such efforts of women as positive initiatives. It would be difficult to narrate all such initiatives where women have taken the lead and so here we would look at three initiatives in Maharashtra which focus on entitlements over water for agriculture

The Khudawadi Experience: Landless Women's Entitlement Over Canal Water:

Khudawadi village in the drought-prone Osmanabad district in Marathwada region is situated at the tail end of the Bori Medium Irrigation Project. It was only after the a water users' association (WUA) was formed in the village around 1995-96. that it received a share of water. SOPPECOM an NGO working in the land and water sector supported the local organisation in the formation of the water users society. Apart from pressing for equity within the command the Khudawadi WUA agreed to earmark 15% of the water the WUA would receive from the Irrigation Department for the landless and women in the village. Along with this was the question of what the landless and women would do with the water if they do not have access

to land. Here the role of the NGO was critical in building awareness around the need for use of water to develop wastelands and meet the specific needs of fuel and fodder primarily and then create a biomass base for enhancing income opportunities for women. Women's groups therefore took up the initiative to innovate on different low external input but sustainable practices on wastelands and small plots.

The Bhusawal Experience: Nutrition Per Drop of Water

In Survade village of Bhusawal taluka, an effort is on to develop norms for access to land and water for assuring livelihoods of women. The presumption here is that access to minimum land (5 cents), assured water for that plot and 100 day's wage cost in one year, could help a woman in 5 years time generate assets, which could give the household a permanent and consistent income for their sustenance.

The 100 days wages have been in the form of food for work as well as cash incomes. This wage support has essentially been used to develop the resource base, which in this case is soil fertility, and water resource. Water resource could be enhanced by building small bundharas on streams, deepening the existing wells and using the well water optimally. The idea is that this water would be shared equitably to meet the livelihoods of all the concerned households in the area. This has been planned with a women's group who would have access to small plots for cultivation of vegetables and energy crops and a patch of irrigated forest.

Women have managed to get substantial gains through cultivation of fruits and vegetables for their own consumption. The vegetables and pulses alone have yielded an income of Rs 1500 from 4 gunthas in a period of 3-4 months after meeting their domestic needs. There has been no recurrent investment except the Rs 1500/guntha that was made in the initial one year. The women are now convinced of the results and are keen on continuing this method. Some of them are also practicing similar methods on their own farms.

CHAPTER - 8

WATER CRISIS IN PUNJAB

Punjab – the name itself is explanatory and stands for abundance of water. But it is ironic that the land, which is named after five rivers: Ravi, Chenab, Jhelam, Satluj and Beas is endangered to become the land without water that is "Be-Aab" which means without water

More over the present situation of water resources in Punjab is highly critical. Already by losing her three rivers due to partition of the country, the present Punjab is now the land of mainly two rivers namely Satluj and Beas. Water flow in these rivers is alarming low and is a cause of great worry. The Himalayan glaciers are melting down; the overall flow is decreasing and causing great ecological imbalance in the region. Loss of massive forest cover in Shivaliks is resulting in drying-up of several sub-rivers and natural stream. (Dutt 2004)

As a result, the ground water availability in Punjab is drastically hampered. At present Jayanti, Budki, Siswan the three major tributaries of river Satluj flowing through the district of Ropar have disappeared. They are no more revulates now. It is also the fate of "Patiala Ki Roh" and several other streams originating from shivaliks. "Kali Bein" river has also lost her character as a river (Dutt 2004)

Several major reservoirs such as Sitasar, Ajj Sarovar, Mullanpur Garib Das, Gharian, Pandusar, Raye Tal, Bopa Rai Kalan, Kahan garh Chmirai, Preet Nagar, Ramsar and Laxmansar are in condition of distress. Sangrur city once had four major reservoirs on all four corners of the town, which have vanished. Nabha also lost its famous 'Hati Khana Talab along with several other ponds in town and adjacent villages.

The village ponds are also dying up day by day. The dumping of garbage and the encroachments are the major threats to these water bodies. The nature is now giving death-bell as more than 80% of Punjab is either turned into 'Dark Zone' or Grey zone. Out of the seventeen districts of Punjab, the ground water balance is negative in seven districts. That means these districts are extracting more water than annual net recharge, thus causing deficit water budget. Jalandhar district is one of the worst affected zones in the state. The entire Jalandhar district is under dark zone. It is also the fate of Kapurthala, where all the five clocks are dark; in Sangrur all thirteen blocks are dark. All blocks of Fatehgarh Sahib are dark zone. In Amritsar district out of the seventeen blocks, fourteen are dark zone and other two are grey. The water

balance, in eight out of nine blocks in Patiala and in ten out of eleven blocks in Ludhiana is negative (Dutt 2004)

The ground water table in the past twenty years recorded a dangerous decline from 15–20 feet to 150–200 feet, in some parts of the state. The ruthless over exploitation of water had led to this situation or is it the gift of green revolution. In 1967, Punjab had around 55000 tube wells only, whereas today this figure crosses ten lakh. In the state, the extraction of water has increased by 200 times in the last three decades, whereas recharging ratio has been drastically decreased creating irreversible gap. The white zone areas of Bhatinda, Mansa, Mukatsar,Faridkot and some parts of Ferozpur have problems of salinity and chloride. Nawashahar and Hoshiarpur are reported to have problem of selenium. Several other parts of the state are affected with nitrates in ground water (Dutt 2004)

The gravity of water borne disease was narrated by women during public hearing. The fact was reconfirmed by the visit to Jajjal village in Talwandi Sabo, Bhatinda district. According to Jaspal Singh, there is problem of water logging resulting in the rise of water table and consequently affecting the water quality. In last five years, water table has risen from 80 feet to 300 feet. Doctors have advised the villagers to avoid the water from wells and boil it before use. Dangerous chemicals have mixed with underground water causing widespread incidence of cancer.

Smt Kartar Kaur said “out of the 60 people in Jajjal who have died of cancer, 30 are women, each person spent 4-5 lakh on treatment for which they had to visit Bikaner. Our problems, which are related to water, are acute pains in joints, especially knees, as well as pains in groins. Almost everyone in the village is suffering, we desperately need potable water.”

Another women Smt Balbir Kaur aged 50 years lost her husband, a cotton farmer to cancer a few months. She said for his treatment at Bikaner, the family spent 7 lakhs by selling land; still 12 lakhs of loan has to be paid. Her son has taken up a part time job to supplement his income to repay the loan. She takes painkillers all day long, as knee ache is acute.

Smt Kaur brings drinking water from the water works at Talwandi Sabo, 8 miles away in a bullock cart, which takes about 6 hours, which lasts 4-5 families for 3 days. She also uses water for drinking from the ‘nahar’, but put chlorine tablets in it. “When I came here as a bride 30 years ago, quality of water at 125-150 ft was very good. We used water from wells, but now the water has risen (water logging) and at present it is at 30 ft below surface level” she recalled.

Women of her village desperately need water, the sources of collecting water are too far away. The three sources are the water works at Talwandi Sabo, 8 miles away, ‘nahar’ one mile away hand pumps in peoples’ fields about 2 km away. There are 300 old women in the village and it is very difficult for them to collect water this way.

In villages, where pesticide use is high, health concerns are rising. Water in Bhatinda district is no longer fit for drinking, due to toxity of water. The water in Harkishanpura has been certified unfit for drinking by the government, but every one continues to drink it, as there is no alternative. The water was found to have high concentrates of chloride. Excessive use of pesticides has destroyed the topsoil in many areas, and has crept into the water table, endangering the health of villagers.

According to Ms. Usha Sharma- an advocate in Punjab and Haryana Court, "recently there have been several deaths from village Jajjal and the real figure of unreported deaths from neighboring villages could be much higher. A large number of people are suffering from cancer, kidney failure and ulcers". She demanded that compensation must be given to those who died due to pollution. Quoting villagers, she said that water has been proven to be the killer in the village. Even though the Panchayat of Jajjal village has been writing to the government to conduct an inquiry to the cause of deaths, the government has taken no action and only turned a deaf ear to the pleas. It is a matter of negligence on the part of the state government.

Taking suo motu notice that polluted drinking water in Jajjal village of Bhatinda district was causing serious "cancer like" disease in the villagers, the Punjab and Haryana High Court issued notice to the state of Punjab through the secretary (Public Health Department), Secretary (Department of Rural Development and Pancyayats), Bhatyinda Deputy Commissioner andf Gram Panchayat of the village, said the honourable judges, "we think that the constitutional safeguards provided in the Constitution prima facie stand breached by the stateof Punjab and its functionaries in relation to the residents of Jajjal village and accordingly issue notice.

One lady kamla spoke during the jansunwai narrated her problem. She said, "for a tanker, the contractor charges Rs. 400 which the poor cannot pay. Sometimes in her area sewage getsd mixed with the water supply. According to Ms. Rajendra Kaur Brar, the water alkaline in her region. Being a rich farmer, I am afford to pay the cost of 3 tankers per week, but the poor farmers cannot affort it. The poor women are buzy throughout the day for collecting water" said Mrs. Brar.

Sutlej Yamuna Link Canal

Of the 214 km Sutlej Yamuna Link (SYL) canal, 122 km lies in Punjab and 92 km in Haryana. Haryana has completed it in June 1980. The dispute over the construction of SYL canal is over two decades old, with Punjab refusing to comply with previous court judgments. On June 4, 2004 the Supreme Court directed Punjab to complete forth with the remaining section of the canal (Greval 2004)

Subsequently the passing of Punjab Termination of Agreements Bill 2004, has taken the federal structure of India by surprise. The Bill has created an unprecedented constitutional crisis,

annulling the very basis on which the Supreme Court had pressured the state to implement the river sharing agreement of 1981.

In a more subtle manner, however, Punjab has warned the protagonists against any move to interlink to country's rivers. The message is clear "Don't ask for more water, learn to manage water better" (Sharma 2004)

The Punjab move would deprive Haryana of water to be used for irrigation of 3.5 lakh acres of land. In Rajasthan, the Punjab stand on SYL agreement is likely to affect hundreds of villages for drinking water besides the seven districts including Sriganganagar, Bikaner, Hanumangarh, Jodhpur, Jaiselmer, Churu and Barmer. Around 19 lakh hectares of Rajasthan land in the western sector is irrigated by the Ravi-Beas water. Delhi will also suffer in terms of drinking water crisis. Facing shortage of water due to abrogation of the treaty by Punjab, the Haryana government might stop supply of water into the Yamuna, the main source of raw water for the one crore people in Delhi. (Parvatiyar 2004)

There is a need for new crop management policies. There should be a policy for both crop planning and management at micro level for each agro-climatic zone. This should be done keeping in mind the availability of water in the hydrological basins. Also the marketing strategy for produce of each crop should be planned so that farmers are assured of maximum returns from the produce – seeds should also be made available for the planned crops, again keeping in view the overall availability of water (Singh 2004).

Many actions would be required to be taken both within and among the basins. states to avert the crisis. Supply and demand management aspects have to be analyzed for an effective strategy and to provide a set of concrete solutions. These include adoption of techniques for augmenting water availability such as water conservation and pollution prevention, improving water use efficiency recycling and revise of drainage water. Adopting more intensive water saving technologies, changing crop patterns etc would reduce the demand on water (Menon 2004)

Dispute Over Sutlej – Yamuna Link Canal (SYL Canal)

Chronology of Events:

1976	Centre issues notice under Section 78 of the Punjab Reorganisation Act, 1966, dividing the river waters between Punjab and Haryana.
1978	Akali leader Parkash Singh Badal begins construction of canal in February, but losses steam. Haryana Chief Minister Bhajan Lal moves Supreme Court against go-slow. Punjab relaliates by challenging Section 78 of Reorganisation Act.
1981	Prime Minister Indira Gandhi forces Darbara Singh, Congress Chief Minister of Punjab, to withdraw case. Trilateral agreement gives 4.22 MAF to Punjab, 3.5 MAF to Haryana, 8.6 MAF to Rajasthan, 0.65 MAF to J & K and 0.2 MAF to Delhi.

1982	Indira Gandhi lays foundation stone of the canal at Kapoori village on April 8, 1982. The very next day, Prakash Singh Badal and Sant Harchand Singh Longowal launch Nahar Roko Morcha, later rechristened Dharam Yudh Morcha. Soon the movement snowballs into full-fledged militancy.
1985	Rajive-Longowal accord acknowledges Punjab's grouses and sets up tribunal to settle the waters issue.
1986	Tribunal rethinks two water shares: Punjab now gets 5 MAF, Haryana 3.83 MAF, The next year unhappy Punjab files review application.
1998	30 labourers shot dead allegedly by Babbar Khalsa militants. Work stops.
1990	Two irrigation department officers working on SYL are shot dead.
1999	Haryana files suit before Supreme Court seeking completion of the canal.
2004	(a) Supreme Court directed the Centre to take up the construction of 122 km Punjab portion of the Sutlej – Yamuna link which Punjab had been refusing to make. (b) Punjab assembly passed the Punjab Termination of Agreement Act 2004, Which annuls all previous agreements pertaining to the Ravi-Beas waters with Haryana and Rajasthan. (c) Government seeks the Supreme Court's advice under Article 143 of the constitution on the Punjab Termination Agreement Act.

(Grewal 2004)

CHAPTER - 9

WATER CRISIS IN BUNDELKHAND

Water is the biggest problem in almost every district of Bundelkhand whether it is Banda or Lalitpur: Despite the largest number of dams in Bundelkhand, the queue for water before tap and hand pump is a common sight during summer.

In Bundelkhand women have no work but to collect drinking water on their heads from long distance. The grim situation of water may be best illustrated by one Bundelkhandi saying which roughly translated as "let the husband die but the earthen pot of water should not be broken".

The scenario is worst in Patha in Chitrakut district where women have to travel a long distance to collect water for drinking. Half of the time of women is spent to collect water, which affects their health and the well being of their children. The paucity of time due to water crisis aggravates the domestic problem.

Patha Drinking Water Scheme was completed in 1973, which however failed to solve the problem, because 30% to 60% water does not reach to the people. Near Patha Jhalmal village, has always been in the news. There is only one hand pump, which is out of use. About 40 families in this village, which belong to 'Kol' tribal community drink water from the nallah. Worst crisis occur in summer when they use water after filtering. Likewise, in Sakroha village, there are only 3-hand pump out of 13, which are operating.

Instead of solving the water crisis, attempts are being made to create the disastrous situation in the region. Banda city entirely depends on Ken river. If Ken is linked with Betwa, then it will not affect only Banda, but would also jeopardize the survival of farmers who depends on Ken.

The livelihood of nearly 10,000 women who are growing vegetables on the bank of Ken river will be affected. Besides about 400 villages in Banda district will suffer because there will be no water in the river during summer.

Bundelkhand has sufficient rainfall, but the people have forgotten the conventional system of water conservation, causing the water crisis. For instance, the old tanks in the Tikam Garh are still operational providing water to the people.

In Bundlekhand organic and conventional agricultural is still alive, where agriculture is not considered a commercial activity like other places. Here one can find, Konda and Kutka, the nutritious rice. However the Government is promoting Genetically Modified (GM) crop, which needs more water and fertilizer.

In Bundelkhand, there are different kinds of lands available like Rakar, Padwa, Kabar and Mar. These kind of land has micro nutrients deficiency. Most of the people here depends on agriculture. Here main crops are wheat, gram, arhar, masur which have low productivity.

Best Practices in Bundelkhand

The name of conventional water structure in Bundelkhand are: -

Talab/Bandhis

Chandela tank

Bundela tank

Khadins

Baoli/Bavadi

Baoli/Bavadi : Traditional stepwells are called vav or vavadi in Gujarat, or baolis or bavadis in Rajasthan and Bundelkhand. Built by the nobility usually for strategic and philanthropical reasons, they were secular structures from which everyone could draw water. Most of them are defunct today.

The construction of stepwells date from four periods: Pre-Solanki period (8th to 11th century BC); Solanki period (11th to 12th century BC); Vaghela period (mid-13th to end-14th century BC); and the Sultanate period (mid-13th to end-15th century BC). Sculptures and inscriptions in stepwells demonstrate their importance to the traditional, social and cultural lives of people.

Stepwell locations often suggested the way in which they would be used. When a stepwell was located within or at the edge of a village, it was mainly used for utilitarian purposes and as a cool place for social gatherings. When stepwells were located outside the village, on trade routes, they were often frequented as resting places. Many important stepwells are located on the major military and trade routes from Patan in the north to the sea coast of Saurashtra. When stepwells were used exclusively for irrigation, a sluice was constructed at the rim to receive the lifted water and lead it to a trough or pond, from where it ran through a drainage system and was channelled into the fields.

A major reason for the breakdown of this traditional system is the pressure of centralisation and agricultural intensification.

Katas/Mundas/Bandhas: The katas, mundas and bandhas were the main irrigation sources in the ancient tribal kingdom of the Gonds (now in Orissa and Madhya Pradesh). Most of these katas were built by the village headmen known as gountias, who in turn, received the land from the Gond kings. Land here is classified into four groups on the basis of its topography: aat, (highland); mal (sloped land); berna (medium land); and bahal (low land). This classification helps to select.

A kata is constructed north to south, or east to west, of a village. A strong earthen embankment, curved at either end, is built across a drainage line to hold up an irregularly-shaped sheet of water. It commands a valley, the bottom of which is the bahal land and the sides are the mal terrace. As a rule, there is a cut high up on the slope near one end of the embankment from where water is led either by a small channel or tal, or from field to field along terraces, going lower down to the fields. In years of normal rainfall, irrigation was not needed because of moisture from percolation and, in that case, the surplus flow was passed into a nullah. In years of scanty rainfall, the centre of the tank was sometimes cut so that the lowest land could be irrigated

Check dam: A check dam is a barrier built across the direction of the flow of water in a stream or nallah to store a part of the excess flow, which takes place during the monsoon. The advantage of these structures is that they store surface water for use both during and after the monsoon and add in ground water recharge of the area. The cost of the developing assured irrigation for one hactare of land with a check dam is generally very less than Rs. 15,000/-per hectare, while in case of large dams and canal is about 2 lakhs per hactare. The check dams may be catgorised on the basis of the material used for their construction such as Earthen, Masonary and Reinforced cement concrete dams etc.

Sir Arthus Cotton, the founder of modern irrigation programmes during the British rule, acknowledged the strength of traditional irrigation works. He said “There are multitudes of old native works in various parts of India. These are noble works and show both boldness and engineering talent. They have stood for hundreds of years.”

The tanks of Bundelkhand region, impressed the Britishers also. The famous five tanks of Mahoba district (U.P.), inter-connected to each other, continued to provide a living testimony of ingenuity of their designers even in their state of neglected.

Talab/Bandhis: Talabs and Bandhis are reservoirs. They may be natural, such as the ponds (pokhariyan) at Tikamgarh in the Bundelkhand region. A reservoir area of less than five bighas is called a talai; a medium sized lake is called a bandhi or talab; bigger lakes are called sagar or samand. The pokhariyan serve irrigation and drinking purposes. When the water in these reserviors dries up the pond beds are cultivated with rice.

Chandela Tank: These tanks were constructed by stopping the flow of water in rivulets flowing between hills by erecting massive earthen embankments, having width of 60 metre or more. The earthen embankments were supported on both sides with walls of coarse stones, forming a series of stone steps. These tanks are made up of lime and mortar and this is the reason why these tanks survived even after thousand years but the only problem, which these tanks are facing, is siltation of tank beds. Chandela tanks usually had a convex curvature somewhere in the middle of the embankment; many older and smaller tanks were constructed near the human settlement or near the slopes of a cluster of hills. These tanks served to satisfy the drinking water needs of villagers and cattle.

Bundela Tank: These tanks are bigger in size as compared to Chandela tanks. These tanks had solidly constructed steps leading to water in the tank; These structures had chabootaras, pavillions and royal orchards designed to show off the glory of the king who built them. But these tanks are not as cost effective and simple as Chandela tanks. These tanks were constructed to meet the growing water demands in the area, maintenance of these tanks was done by the person employed by the king but in case of smaller tanks villagers collectively removed silt and repair embankment.

Ponds in Teekamgarh: According to the settlement records, there were 962 tanks constructed during the Chandela period. Most of which were small with low bunds. Several tanks were of considerable size, particularly those at Baldeogarh, Bamhauri Barana, Lidhoura, Jatara, and Bir Sagar. It is noticeable that none of these tanks with their massive dams, built by the Chandela and others were originally intended for irrigation. They were evidently constructed merely adjacent to temples, Palace and favourite resorts of the rulers. Their adaptation for irrigation is invariably a modern development.

The Ken-Betwa Link: The First Link In The River Linking Project:

In 2003, the Government announced a mega $ 200 billion (Rs. 560,000 Crores) diversion project called the River Linking Project. The core project involves the interlinking of Himalayan rivers and interlinking of rivers of Peninsular India. The project is being promoted for increasing irrigation potential and controlling floods by diverting water from rivers identified as “surplus” to rivers identified as “deficit”.

On 15th August 2003, in his independence day address from historic Red Fort the former Prime Minister Shri Atal Behari Vajpayee announced that the first link to be taken would be the Ken – Betwa link in Bundelkhand region of Madhya Pradesh & utter Pradesh

The idea of linking the rivers of India has its roots in the thoughts of Sir Arthur Cotton, the pioneer of canal system in India, Visveswarya, the stalwart engineer and architect of the modern Karnatka. The idea was further extended by K L Rao, the legendary irrigation minister of India and Captain Dastur, a pilot. Rao and Dastur thought of the Ganga-Cauvery Link Canal

and the Garland Canals respectively. Rao's ideas were based on his indentification of some river basins in the country as surplus and some others are as deficit, and seeking solution to the problem of water scarcity in many parts of the country by connecting them through a National Water Grid (National Commission for Integrated Water Resource Development Plan). Dastur proposed an impressionistic scheme, which became known as Garland Canal Scheme to feed Himalayan waters to the peninsular parts of the country by means of pipelines. The NCIWRDP found this scheme prima facie impractical. Both the proposals were examined and were not found worthy of being followed up.

On the basis of the National Perspective on water resource development, the interlinking project has two components the Himalayan and the Peninsular. The Himalayan component includes construction of storage dams on the main tributaries of Ganga and Brahmaputra to transfer surplus water to the west. The Peninsular component involves connecting rivers like Godavari and Mahanadi that have surplus water with rivers like Krishna and Cauvery. 30 link canals are envisaged, of which 14 will be in the Himalyan Component and 16 in the peninsular component. On the whole, the inter linking project is aimed at aimed at providing large scale human induced connectivity for water flows in almost all parts of India. This indeed, is the largest construction project thought of in the world as of now.

The project is claimed to be the answer to the country's problem of recurring floods and drought in different areas; the generation of hydroelectric power is also put forward as a justification. The need for hydroelectric power may lead to the formulation of particular projects in specific locations; it would not by itself take us to the idea of linking rivers.

Incidentally, the linking of rivers or inter-basin transfers would in generally of cases requires much energy normally in excess of what the project might generate but in this case we are told that the project will be net generator of large quantities of power: a figure of 30000 MW has been mentioned. That strains our credulity and will need careful examination with references to each link.

Similarly the problem of recurring floods in certain rivers or areas may lead (rightly or wrongly) to the formulation of specific projects with flood control as one of the objectives (or a primary objective)- for instance, the DVC projects, a high dam on the Kosi, and so on and will not by itself call for a linking of rivers. It must also be noted that opinion on flood control has changed over the years. It is now generally recognized that big dams play only a modest role in flood moderation. Even if all the river-linking proposals are implemented, the contribution that this will make to the mitigation of the flood problem will not be substantial. Dr. Bharat Singh, a doyen among engineers and the former Vice Chancellor of the Rourkee University, has observed "Any water resources engineer will immediately discard inter-linking of rivers as a flood control measure".

As regards drought, we have the answers already Rajendra Singh has shown in Alwar District in Rajasthan that rainwater harvesting can be practised successfully even in low-rainfall areas. Earlier, Anna Hazare had brought about a transformation through water harvesting (along with other measures) in Ralegan Siddhi (which is also a low-rainfall area). The Madhya Pradesh government has initiated large statewide programmes of water harvesting and conservation. The primary answer to drought has to be local. Besides, the river-linking project, if implemented will take water only to a small part of the target areas and drought prone areas; large parts of such areas will remain unserved.

The linking of river Ken with Betwa is proposed within the first phase of the Indian Government's project of interlinking of rivers. The interlinking of rivers is estimated to have an expense of Rs. 560,000 crores. This is when the Government of India is already facing a fiscal deficit and has abandoned 400 major and medium projects costing Rs. 156,500 crores. Under Ken-Betwa river linking project, constructions of a dam with a height of 73 metres in River Ken in Bundelkhand on the border of Chhattarpur and Panna districts and 231 km long canal are envisaged of which the latter will connect Ken and Betwa. Seventy-five per cent of the estimate of Rs. 1988.74 crores, supposed to be expended under this project, will be extracted from the local peasants out of various taxes to be imposed for around 25 years. That is why the government is proposing such crops, which are water intensive leadingto hike in water tax.

Ken River: Ken is an inter-State river flowing through the States of Uttar Pradesh and Madhya Pradesh. Its place of origin lies in district Jabalpur in MP. The length of river Ken is 427 kms till it meets Yamuna. Of this, 292 kms are covered in MP while UP holds 84 kms of its flow. Ken flows the rest of its length covering 51 kms through the border between these two States. Ken river joins with Yamuna near Chilla village in UP. The river Ken flows through the districts of Jabalpur, Sagar, Damoha, Panna, Satna, Chhattarpur and Raisen of MP and Hamirpur and Banda of UP. The tributaries emptying in Ken are the following:

1. Alona
2. Virna
3. Sonar
4. Mirhassan
5. Shyamri
6. Banne
7. Kutari
8. Urmil
9. Kail
10. Chandraval

Betwa River: Betwa river originates from the district of Raisen in M.P has a total length of 590 kms, covering 232 kms in MP and 358 kms in UP. The river Betwa flows through the districts of Tikamgarh, Sagar, Damoha, Raisen, Bhopal, Guna, Shivpuri and Chhattarpur of MP and Hamirpur and Jalaon of UP. The major ones among its tributaries are:

1. Bina
2. Jamni
3. Ghasan
4. Birma
5. Kaliasot
6. Halali
7. Bah
8. Narayan, etc.

Horrific Devastation: Research Foundation for Science, Technology and Ecology (RFSTE) has studied the possible negative fallout of Ken-Betwa interlinking. Which will lead to the following devastative impacts:

1. Negative impact on land, forests and bio-diversity
2. Displacement due to construction of dams and canals
3. Impact on conventional / traditional agriculture
4. Escalation of flood and drought
5. Impact on fisher man and water bodies
6. Deterioration in mutual relationship between communities
7. Hurt on social, cultural and religious feelings

Impact on Forests and Bio-diversity: Fifty sq. kms of land under Panna Tiger National Park will be submerged, once this interlinking project comes into effect. This national park through where the Ken flows is a natural homeland of aquatic fauna such as crocodiles and alligators. The Park has ten such species listed under Schedule - I of the Wildlife Protection Act 1972 that are endangered. This interlinking and transfer of water will affect not only these animal species but also the vegetation, as lakhs of trees would be cut. Even after losing all these, the government of India is considering that this step will enhance the environment and increase the revenue for both the Central and State governments, Which apparently is not true. And thousands of workers have to reside, eat and drink there. Further causing detrimental impacts on the flora and fauna. The way of development is exemplified as in the case of district Lalitpur that has the largest number of dams in Asia, which should have been in the world map of wealth and resources today, only 20% land is irrigated.

Displacement: Government of India has proposed altogether five dams under this project of interlinking, one on Ken river and four on Betwa river, which would displace around 18 villages. All these five dams are coming in protected and reserved forest area. The four dams to come in Betwa river would submerge 800 hectares of forest.

Inter-State Dispute: While Government of India wants to transfer 1020 million cubic metres of water to Betwa, the Irrigation Departments of UP and MP are of the opinion that the Ken does not have that much of water. While 342 million cubic metre of water is available in Ken according to Chief Engineer, Betwa, 373.13 million cubic metres water is available in Betwa. That means that the Government's aim of transferring water from the so-called surplus areas to water-short areas cannot be realised. Moreover, as Ken does not have surplus water and as Betwa has enough water, the river belts of Ken and Betwa will respectively get affected by drought and flood. Today, there are around a dozen of disputes between the governments of UP and MP on the issue of water. One such dispute will come up among these, which would create differences between the farmers residing in the border areas.

It should be noted that Ken-Betwa link canal would go through places where means of traditional irrigation had already been available since as back as 500 years. Tikamgarh is going to be one such district that will get the facility of irrigation through this new system of canal when Tikamgarh is already coming within the most irrigated agricultural area in the whole of Bundelkhand, through the ponds constructed by the kings of Chandel and Bundel dynasties.

Effects on Traditional Agriculture: Study reveals that this interlinking is worthless and meaningless. When the whole world is trying to conserve water on the one hand, the Government of India on the other is not only promoting high-water intensive crops but also destroying the existing old system brought in to preserve water. A glowing example of this kind of experience can be found in the case of Lalitpur and Tikamgarh districts. Here, government promoted the cultivation of soybeans. After cultivating it for few years, farmers left it as they incurred heavy loss. Then, they returned to the conventional ways of farming. Farmers not only incurred financial losses, but they had to face drought after losing the traditional means of water conservation.

Evaluation of Flood and Drought: The study by RFSTE shows that even after escalating drought in 40 villages affecting 75,000 hectares of land in the district of Banda and flood in 200 villages causes devastation in four lakh hectares of land in Hamirpur district, the link canal will remain without water for four months during summer. Species of fishes in many ponds and lakes, known throughout India by the name of various ponds and lakes will be lost. The fishermen whose livelihood is dependent on these fisheries will face severe famines. The number of such people will be 5,000 in Chhattarpur and 15,000 in Tikamgarh.

Water Sovereignty: RFSTE has taken up these issues and organised a Water Parliament under the Campaign for Water Sovereignty on 23 July 2003 at Satar located in Orchha,

Tikamgarh which falls on the birthday of Chandrashekhar Azad famous freedom fighter The place, located within the region of Satar, Orcha and Tikamgarh in MP, is purposefully selected because it was here that Azad took refuge to remain free from imprisonment. The Water Parliament was convened to dissiminate the information among the people about the Government proposal to interlink Ken and Betwa. Govt., wants to obstruct their independent flow. The Water Parliament vehementaly opposed the interlink of Ken-Betwa river the proposed interlinking can offer the farmers of Bundelkhand only trouble and nothing else.

The people's assessment of Ken-Betwa link raises and answers five basic questions

1. Is the Ken River "Surplus"?
2. Will the river link from Ken to Betwa contribute to increasing irrigation? Potential and food security?
3. Will the river link contribute to flood control?
4. What will be the impact of the river diversion on the ecology of Bundelkhand?
5. What will be the impact on potential conflicts between communities and States?

The assessment of the river link is negative for all five issues.

The project is based on diverting 1020 Mcum of water from the Ken river to the Betwa river, However, according to the government's own reports, Ken has a balance of 342 Mcum after taking into account existing irrigation and demands. There is therefore, no surplus water in the river Ken.

The project claims to create 4 lakh hact, of irrigation potential. However, the diversion will lead to 6 districts being deprived of irrigation. Further, the project involves the destruction of diversity of crops by proposing of 77% paddy in place of 7.74%, hence government is planning to create 69.26% more paddy, which is a water intensivecrop. 7.75% for Sugacane, 17% for Jowar & Maize in place of 36.96% for Pulses is 24.71% less than existing system. Therefore, govt. is going to reduce the water conserving crops, which are nutritious, and the backbone of the poor people health. Similarly in the case of proposed cropping pattern Wheat 127%, 20.50% Gram in enroute command. Besides the existing cropping pattern in all three commands are 101.38% Wheat, 25.84% Gram (in enroute command). In existing cropping pattern there is no Soyabean and Sugarcane, on which the project focuses. Hence, the traditional crops diversity will be destroyed.

The project is not creating new irrigation potential. It is taking water from living river Ken that is home for hundreds of Crocodile & Ghariyal, to proposed but dead dams. This was proved by the govt.'s river linking plan that will take Ken water to proposed four dams in upper Betwa basin i.e. Neemkheda dam, Richhan dam, Barari Barrage and Kesari dam. The area irrigated by

these four proposed projects is 1.02 lakh hact. If the Betwa water and these four dams had been sustainability managed these would not need to draw water from Ken 250 miles away. The non-sustainabile planning of the proposed dams in upper Betwa basin indicates that the diversion project itself could face a similar non-sustainable fate. The river linking merely reproduces and enlarges non-sustainable water use.

The project cannot contribute to flood control since both Ken & Betwa originate from the same catchment region with the same rainfall & topography. When one river is in flood the other will also be in flood. The project will increase flood impact by blocking the natural drainage of the river basins.

The dam for the river diversion is being constructed in the heart of Panna National Park. This will uproot and displace 900 families, 8550 persons & 10 nos. villages. It will also threaten the wildlife in the National Park. The diversion of Ken water will create conflicts between people in Ken-Betwa basins in Bundelkhand and between the states of M.P. & U.P.

The Jal Swaraj Abhiyan of the Research Foundation for Science, Technology & Ecology / Navdanya organized participatory research to assess the impact of the Ken Betwa link on the ecology, economy and culture of Bundelkhand among organisation working on water conservation in the region. A “Jal Sansad ” (Water parliament) was also organized to involve the people of Bundelkhand in decision making about their water systems, rivers and natural resources.

CHAPTER - 10

WATER CRISIS IN TAMIL NADU

In the state capital Chennai, water is scarce. Residents in many areas of the city keep vigil through the night, waiting for the water to arrive. When it does, quarrels break out to fill up the limited number of pots that each family can take. The sprawling red hills lake, and the Poondi reservoir, which feed the city, look like ponds now. (Subramanian 2004)

On February 22, 2004, the Central Interministrial team deputed to assess the drought in Tamil Nadu faced women carrying empty pots at several places in Namakkal district. "Give us at least one pot of water a day" the women told the team. In Pudukottai district, the team was shown huge tank at Eganivayal village, which had gone dry (Subramanian 2004)

Mention Chennai and the first thing people want to know about is the availability of water. This summer the scarcity was worst for the 55 lakh people in Chennai, not to speak of several lakh living in its suburbs. Due to poor rain, in 2003, the deficit is 54 percent in the city's reservoirs. Tamil Nadu government pinned its hope on the Telugu Ganga Project to combat the water problem in Chennai.

Residents of apartments complex who depends on water supplied by private tankers are worried a lot. Not only has the cost of this water escalated, but also there are no means of checking the quality of the product on which they spend a good amount. The average costs of private tanker of water are Rs. 450 (4000 litres), Rs. 650 (8000 litres) and Rs. 800 (12000 litres). The reasons why many residents opt for private water tanker supply in that their bore wells have gone dry or the water has become extremely brackish (Achutan 2004)

In a seminar held on 17th and 18th September 2004, Mr. Pradeep Kumar who is an advocate and the activist of Communist Party of India (Marxist) talked about the prevailing water crisis in Tamil Nadu.

Mr Pradeep Kumar mentioned that Mr Chidambaram is M.P from our area. It is a drought prone area. Vaigai river is known as the holy river. Technically it is divided into three parts : first Reach , Second Reach, Third Reach. Second reach is lying in the SivGanga district. Because it is drought prone area.

There are many water distributing scheme to distribute of schemes, supplying water to hundreds of villages, apart from supplying water to Siv-Ganga city.

Padamathur village 12 km from SivGanga is located near the bank of Vaigai river. One Sakhthi Sugar factory is operating here since 1989. The factory is owned by Mr Mahalingam who is associated with R.S.S., claims to be a Gandhian and a close friend of P. Chidambram. The Sugar Factory is an agreement with the state government to draw 30 lakh litres of water per day. Need of the factory is only 7to10 lakh litre per day. By new technologies only 3% of water is used and rest goes back into ground.

As the Sakhthi Sugar can not use its entire quota, the company made an agreement with Coca-Cola.

We considered this as a symbol of Liberalisation and Globalisation. This is a typical act of looting water. Our District Committee took the decision how to challenge the nefarious activities of Coca-Cola.

We chalked out two level strategy:-

I) First to bring together all the members of similar ideology.

II) Organise the necessity of local NGOs, Self help group (SHG) face-to-face discussion to create Mass Awareness. A special focus was concentrated in mobilizing the peasants and women dwellers around the plant.

In February 2003, we conducted "Padyatras" covering 300 villages. On March 8, 2003 Women's Day, our Women Group distributed pamplets, exposing the threats by Coca-Cola and Pepsi.

In the first week of April 2003, we organised street play on 16th April 2003, Coca-Cola made trial run. This has caused one incidence. The polluted water got mixed with the local ponds, 40 sheep and two cows died instantly. This matter was also raised in the assembly, where Minister of Industries accepted that no permissions have been granted however he kept silent over the possibility of issuing permission.

Both arrived at an agreement that bottling plant will be setup in the Sugar factory premises and the bottling to be carried out by Sakhthi Sugar and Coca-Cola would be the co-packer. Initially the company had designed to bottling of 800 bottles per minute. For this purpose, the company purchased the land on the bank of river and proposed to dig a borewell to the depth of 2000 feet. One Enquiry Committee was constituted. The concerned engineer tested the water from a borewell at 35 km away from the factory instead of selecting a borewell in the vicinity of Coca-Cola factory. We gheraeod the office of the engineer, and burnt the copy of the report.

A tripartite meeting was called by the Government. We boycotted the meeting and warned District Administration to call another meeting. In that meeting District Administration said while we have granted permission to draw 30 lakh litres, what is wrong if we allow 25 lakh litres

to Coca-Cola plant? This analogy is wrong. The logic applicable to sugar factory is not applicable to Coca-Cola plant.

We collected buffalo. We called them as George Bush. Some of our friends tried to put Coca-Cola in the mouth of the buffalo, which they refused to drink. This shows that Coca-Cola is so hazardous that even animals like buffaloes find difficult to drink

On 28th April 2003 we wanted to conduct the rally and tried to seek the permission of the District Administration. The administration kept on postponing the permission and in the last they refused to grant the permission to take out the rally. However, we took out the rally. Out of 8000 demonstrators, 6000 were women. Police made big bandobust. Police filed criminal cases against 1000 people.

Three attempts were made to inaugrate the factory but the demonstrators forced them to cancel. There is a basic difference between Plachimada & SivGanga. In Plachimada the factory was working, ours was a pre-emptive attempt. But still factory machines are lying there, they are very powerful people. There are two main reasons for our success. First is our independent activity, second is our Joint Action Committee. Some people have advised us to file a case in Tamil-Naidu High Court, but we believe in the strength of the people.

CHAPTER - 11

WATER CRISIS IN DELHI

To understand the grim water crisis we need to look no further than Delhi, where the water table has depleted by 13 metres since 1995 and the scarcity has often sparked off riots between otherwise friendly colonies. Delhi's water requirement is 3324 million litres per day (MLD). But it gets just about 2634 MLD. The average water consumption is estimated as 240 litres per day; the highest in the country (Halder and Kulshetra 2004)

Even though Delhi's Chief Minister Sheila Dikshit makes solemn public statements categorically denying that she is about to privatize the ownership, supply and distribution of Delhi's water. A French Multinational, Onedo Degremont, got the work on one of India's most ambitious water project. Rs. 200 crorre Water Treatment Plant coming up at Sonia Vihar in North Delhi. There is every indication that this privatization, whether you use World Bank Jargon (Public Private Partnership) or could it be with acronyan like BOT (Build, Operate and Transfer) or O & M (Operation and Maintenance). Degremont has been awarded an O & M contract for duration of 10 years on the completion of the machinery installation process. Mrs. Dikshit justifies this saying "Delhi Jal Board (DJB) will continue to own the water and enjoy full control over its supply. (Halder and Kulshetra 2004)

The most curious aspect about the contract is the counter guarantee clause. There are provisions in the contract, which assure Degremont payment even in the event of the Sonia Vihar lying idle. The matter assumes significance against some Third World ground realities. Multinationals doubt the ability of the poor consumers to meet their bills and extract promises of governments meeting the shortfall in revenue. No multinational would be willing to invest in the Third World water markets without counter guarantee to cover the risk (Halder and Kulshetra 2004)

Public-Private Partnership is a dangerous concept of the World Bank. South Asia receives 20% of the World Bank's water loans. As per various reports of the World Bank, by 2025, two thirds of the world population will suffer from drinking water shortage. Economic theory says that less availability with more demands ensures the highest profit. So water trade can be termed as oil of the 21st century.

Private water companies have failed to provide guaranteed quality water even though people continue to pay high prices. In the Indian conditions, Delhites will be compelled to pay

a monthly bill of Rs. 2000 instead of the present bill of Rs. 50. An additional tax on the sewage will also be charged which means; Delhites will have to pay Rs. 2,500 per month (Mohanty 2004)

Water privatization generates unemployment. In England, 10,000 employees were compelled to sit at home after privatization and in Philippines 40% employees were forced to leave the job. Experience shows that once water resources are privatized, the government hardly gets them back (Mohanty 2004)

Resident's thirst for adequate water supply is far from being quenched, scenario is worst in South Delhi. According to one resident in Saket, it is shame that even after 57 years of the country's independence, the government has not been able to fulfill one of our most fundamental requirements. At times, we have to contend ourselves with just half a bucket of water to finish our daily chores. Another resident in the same locality wakes up at about 2.30 a.m at night and with a torch in his hand does not go back to bed until he is seen that much sought after trickle (Times of India, 2004 a.)

Residents of Siddharth Extension in South Delhi have not got any water for the past two days. In east Delhi's Laxmi Nagar the situation is almost same. In Dwarka many people use bottled water to wash utensils (Sinha a. 2004)

While water wars are predicted in the next few decades, the city's inequitable supply – that ranges from 400 litres per person daily (LPCD) in NDMC and Cantonment areas to 30 LPCD in far flung south Delhi areas, may soon lead to a law and order situation (Sinha b. 2004)

The worst news is that things are not likely to change much till 2015 for revamping the city's distribution network, which means different section in Vasant Kunj will keep getting water between few minutes and two hours, while Civil Lines will retain its four hour supply. Similarly, the city's VVIP can continue washing their cars and garages as they enjoy the highest supply of in NDMC areas. (Sinha b. 2004)

Eighty per cent of Delhi's ground water is in extremely worrying categories of over exploited and dark; with drawl is well beyond what is recharged (Mago 2004)

In peak summer at an estimate about 15 million people in Delhi are facing crippling water shortage, and are looking for any one who can provide them even one bucket of water. In many localities, people are using treated water to take bath, which is used for gardening. People have to decide each day, what is their priority - desperation has driven some people to the unusual step of stocking mineral water not only for drinking, but also for taking bath (Pioneer 2004)

With water situation worsening by the day, Delhi Police have stepped its preparedness for the after affects of acute water shortage. Police have identified over 35 potential 'trouble areas'. These flash points include up-market areas like Defence Colony, Vasant Kunj, Greater Kailsah and

middle class localities like Patel Nagar, Malviya Nagar, Dwarka, Kalkaji, Tilak Nagar, Vikas Puri and Shahpurjat. As well as lower income group localities like Sangam Vihar, Narela, Najafgarh, Uttam Nagar and Dabri. To diffuse any potential situation the local police have been asked to liaise with the Resident Welfare Association (RWAs). District control rooms of the troubled areas too have been alerted to watch out signs of trouble. South district, which has the maximum number of trouble spots, stepped up beat patrolling in the identified areas. (Gulia 2004)

It is unfortunate that NDMC covers only about 2% of the city gets 30% of the water supply. It is very unfair distribution. A little water can be diverted to trouble areas to ease the situation.

Water tariff is set of soar in the capital to almost double the existing rates. The existing rate for 20 kilolitre of water is Rs 30 while the revised rate for the same quantity of potable water would be Rs 117. Similarly 30 kilolitre of water will be priced at Rs 192 as against the present slab of Rs 43, while 40 and 50 kilolitre of water will be available at Rs 267 and Rs 417 respectively. The impact of the tariff restructuring on the domestic bills will be felt most in the consumplry levels which exceed 25 kilolitres (Jha 2004).

Three categories of Consumers: -

CATEGORY I : Domestic consumers, ranging from pure residential premises to bulk connections for JJ colonies, orphanages and religious premises. (Total consumers : 13,89,273)

CATEGORY II : Non-domestic consumers, including commercial establishment like shops, offices, household industries, restaurants, public urinals, bank and professional traning institutes. (Total number of consumers : 91,596)

Table 13.(1) : Amount you'll have to cough up

Amount you'll have to cough up		
Monthly consumption (KL)	**Proposed Bill (Rs)**	**Current Bill (Rs)**
6	75.00	30.00
10	87.00	30.00
15	102.00	30.00
20	117.00	30.00
25	154.00	32.00
30	192.00	43.00
35	229.00	65.00
40	267.00	88.00

Amount you'll have to cough up		
Monthly consumption (KL)	**Proposed Bill (Rs)**	**Current Bill (Rs)**
45	342.00	110.00
50	417.00	133.00

(Jha 2004)

CATEGORY III : Commercial premises having large water consumption, like cinema halls, ice factories, private educational institutions, industrial units, photo labs, horticulture farms, power plants, hotels, banquet halls (Total number of consumers : 21,075)

Working out the Bill

The new tariff may be calculated like this: **B=F+1.5 X I X U**

B is the water bill amount in rupees

F is the fixed charge. In domestic category, it may very from Rs. 40 for LIG flats to Rs. 100 for houses built in 100 – 150 sq.m plots and Rs. 150 for bungalows.

Commercial and industrial rates may be between Rs. 250 and Rs. 600.

I is the incremental factor or rate per kilolitre. It may be zero for those consuming up to 6 kilolitres. Then from 6-20, 20-40 and above 40 KL, it could be 2.5 and 10.

U is number of units consumed in kilolitres.

The new tariff would have two parts. There will be a fixed charge that will vary depending on the size of the place where the connection is provided. Then there would be a slab-wise charge for using water. There may be a 50 percent surcharge on the consumption charge for sewerage collection and treatment. (Sinha 2004 c)

Suez-Degremont Water Plant at Sonia Vihar

This is the first contract of this size after Bombay for Degremont. Suez-Degremont has been awarded a Rs. Two billion contract for the design, building and operation of a 635 million litres/ day at Soniavihar. The contract is initially for 10 years. The profit of Sonia Vihar plant is guaranteed by the government during the period of 10 years.

Construction of the giant 3.25 meter-diameter pipe on a stretch of 30 kilometres from Muradnagar to Sonia Vihar is going on, and till date about 10 kilometres of the pipeline has been laid down.

The disastrous impact of this project on the farmers of Western UP is evident from the fact that this area is totally dependent upon the canal for irrigation. Even before being

operationalised to divert 630 million litres of water/day from irrigation, farmers are feeling the impact of corporate greed for profit. The Upper Ganga Canal is being lined to prevent seepage into the neighbouring fields (an important source of moisture for farming) and recharge of ground water, and farmers are being prevented from digging wells even as they are reeling under severe drought.

The lining of the canal to prevent recharging of groundwater has terrified the farmers of the whole region of Western UP. At a meeting organized by Navdanya on 21 July at Chhaprauli, the land of Choudhury Charan Singh, ex-Prime Minister, farmers stated, "we will not allow the Canal to be lined and supply water to Delhi. Instead the government should link the Upper Ganga Canal to the Yamuna Canal through this area to tackle the severe drought."

In an interview to a national magazine, a senior manager with Degremont said, "right now, we are happy with a profit of Rs. 10 crores per annum. Other companies may be content with managing and operating existing plants owned by individual civic bodies. But we don't want to dabble in that. We have very strict quality control and would like to maintain our image as quality providers to our clients"

The water scenario is worst in Delhi slums, for example Sanjay colony slum of New Delhi has population about 15,000 – 20,000 with about 4500 households in the locality. Majority of the population is self-employed and are engaged in making dari, mate and other clothes for sale.

In this area people collect water from different sources depending on the availability such as DJB tanker, MCD pipe water supply and from Sulabh International. DJB tanker comes daily but it has no fix time for water distribution. The water that comes from MCD pipe water has fix time for water supply but it only comes for 1-2 hr in the evening (around 4.30 p.m.). At MCD pipe line people made bore and fetch water from it. If the people don't get water from the above sources they are forced to get it from Sulabh International near Kalka ji temple for which they have pay @ Rs. 2 for 20 liter or so.

It is found that if women were not able to collect, from these sources 60% of them buy water from Sulabh international 40% also pay rickshaw charges.

Seventy per cent of the women said that water comes from different source is clean but 30% said that water sometimes come clean sometime not. People said that DJB water come clean but whenever tanker comes they put their pipe in tanker itself that makes water unfit for consumption.

On total time consumed for water collection 60% of women said that they have to spend 2-3 hr/day and 40% spend more than 3hr, sometime they have to wait for full day. Fifty per cent travel for 1 hr. 20% for 1/2hr. and 30% for 10 minutes to collect water.

On water consumption 50% family use 100 lit of water /day, 30% use more than 100 lit./ day and 10% use 60 lit of water daily.

Almost all the women said their household job suffer in collecting water as well as children get neglected during water collection. About 80% women store water in container for next day because its not certain that water will come on next day. A large number of people in the locality suffer from water borne diseases such as malaria, jaundices etc. Only 10% women use chlorine tablet to purify the water.

In Jeevan Jyoti Rajiv Camp slum locality, people collect water from different sources viz. tube well, DJB tanker and Sulabh International. MCD water pipeline though meant for industrial supply but due to non-availability of water people are forced to fetch water from this pipeline.

The water from MCD pipe though has fix time but it is supplied for -2 hr in the evening. At pipeline some innovative people made bore and fetch water from hand pump. If they fail to get water from these sources, they get it from Sulabh International near Kalkaji temple for which they have to pay @ Rs. 2 for 20 liter.

Half of the women have to spend 1 ½ - 3hr, 40% ½ - 1 hr and 20% for more than 3 hr per day to collect water. The distance travel by 80% women is 10-15 minutes and 20% take ½ hr. On water consumption 40% said that they use 100lit/day,10% said 80 litre, 30% use 60 litre/day and 20% use more than 100 litre/day.

For Eighty per cent of the women household job suffer in collecting water. All the women store water in container. Regarding the cleaning of water 80% strain water by cloth and 20% use chlorine tablet. Twenty per cent people in the area suffer from fever and diarrhoea.

Alternative for Quenching Delhi's Thirst

Sureshwar D. Sinha (2003) has suggested the ways to rejuvenating the Yamuna and reviving local water bodies, which would meet the water demand for Delhi.

At present the following sources are available for supplying water to Delhi for horticulture land domestic use.

(a)	Yamuna during lean season	144 MCM
(b)	Yamuna monsoon (Usable)	300 MCM
(c)	Bhakra during lean season	130 MCM
(d)	Ganga at 200 cuses (lean season)	120 MCM
(e)	Additional from Yamuna vide Court order compensated by return flow (sewage) during lean season	360 MCM
(f)	Ground Water	150 MCM
	Total	**1204 BCM**

Taking each of the above-mentioned 'Principles of Good Water Management' in turn, let us look at the measures that could ameliorate the deteriorating eco-systems around Delhi and provide its dwellers with adequate supplies of water.

The Yamuna has no flows between the barrage at Tajewala and Delhi's northern border, whilst waters allocated to this state from the Yamuna, as well the 0.2 MAF (Million Acre Feet) allocated from the Bhakra system, are conveyed to Delhi through canals. If Delhi's allocation of waters from the above systems are allowed to flow through the river, the wastage would be 25% less, and the river would rechare ground water en-route, and keep itself clean, with substantial flows, as follows: -

(a) **Exchange of Delhi's Bhakra and Haryana's Yamuna Allocations.** If the allocation to Delhi from Bhakra system is exchanged with Haryana's equivalent amount allocation from the Yamuna, the same would envisage a release of 371 cubic feet per second (cusecs) at Tajewala.

(b) **Delhi's own allocation be allowed to flow down the river** instead of through canals, the average additional flow in the river would be 242 cusecs.

(c) **The allocation in the inter-state agreement 'for ecological reason",** gives us an additional flow of 570 cusecs.

(d) The allocations for lower area canals, **is about 800 cusecs.**

Adding all the above flows, we would have a flow of 1983 cusecs or nearly two thousand cusecs, during the lean seasons. This would not only revive the river, it would have a salutay effect on the recharge and cleanliness of the ground water of the basin, including that of Delhi.

For storing monsoon waters of supplies to cities of the Yamuna basin in and around the state of Delhi, following measures are suggested.

(a) **Creation of Five Flood Plain Reservoirs within Delhi,** four of which could be quite large and one would be the expansion of an existing small lake. In addition every effort must be make to fill the old tanks, 'jheels' and 'hauzes' of this ancient city with clean monsoon waters.

(b) **Rain Water Harvesting** Apart from harnessing the flood waters of the Yamuna and Sahibi, as well as the Ganga as mentioned above, there is very good potential for rain water harvesting at the state colonies, and individual level. Delhi has an area of some 1485 sq. kms and average rainfall of 61 cms. Then the total precipitation is of the order of 906 MCM of water. At present most of these waters join the flood spills of the Yamuna, or are absorbed by plants and at upper soil levels.

The revival would greatly enhance natural groundwater recharge, improve the ecology and the bio-diversity of the areas drained by them and their surface flows could also be utilized if supplies became deficient.

High density of population has compelled most modern metropolis' to treat their sewage up to the tertiary stage, converting it to bathing quality water, and then to further treat these supplies as water for domestic use.

The alternatives suggested above are also those that would cost less and consequently would be a lesser drain on the exchequer due to the corrupt practices encountered in the execution of water projects.

CHAPTER - 12

WATER CRISIS IN WEST BENGAL

In the state of West Bengal, numerous water commons existed in all villages in the form of ponds, tanks, wells, springs and stretches of rivers that were maintained by village communities. Various stringent rules of use and taboos on over harvesting living and non-living resources from the water bodies prevailed. These customary rules of community management began to erode with the beginning of British colonial governance. Over the past two centuries, the agenda of colonial development systematically dismantled the old conditions of life in the colonies and created new conditions so as to supplant the old with new forms of life. However, even after 56 years of Independence the governmentality, pivoted on establishing the state authority on all common property resources prevails. Traditional water bodies still exist, and people continue to use these water resources, but they tend to lose their "common property" value, as the customary rules of management are now replaced by rules imposed by the state agencies. With the onset of the processes of globalisation, fostering a regime of market liberalization, the state is preparing to hand the management over to private capitalist interests. Moreover, as a result of the state-sponsored program of filling up the wetlands for the sake of industrial and real estate development, the water commons are now facing a deep crisis of existence.

To understand the condition of the water commons, a small survey was conducted in four districts of West Bengal – Howrah, North 24 Parganas, Coochbehar and Jalpaiguri in the northern part of State. Coochbehar and Jalpaiguri, the abundant rainfall abates the perception of water crisis. Moreover, the widespread traditional use of surface water for irrigation purpose has kept the pressure on the groundwater considerably low. Nevertheless, the use of tubewells and pumps is becoming popular in many places in North Bengal, and many households have reported scarcity of drinking water.

In the southern districts, where industrial and real estate development has been rampant over the past few decades, water scarcity is a common problem. With the spread of boro (summer rice) cultivation, the demand for water for irrigation has increased several-fold. Excessive groundwater withdrawal has resulted in arsenic contamination of groundwater in the southern districts. In addition, incidents of gastric and hepatic ailments have increased owing likely to pesticide contamination of water and crops. However, villagers are unable to report if their water

and foods are contaminated with any chemicals or heavy metals. There is an urgent need to conduct a statewide survey in this regard.

With a few exceptions, both the quantity of water and time spent for collecting the water from the source – mostly tube wells – has increased over the decade (1994-2004). Intensification of agriculture is the principal cause of the increased requirement of water everywhere. In the southern districts, the major reason for a longer time spent to collect the water is that a large number of wetlands (ponds and tanks) have been filled up. In North Bengal districts, privatization of many ponds for pisciculture has closed access of the neighbourhood to the water for drinking and washing.

In some cases, however, the quantity of water requirement has decreased, because the family size has become reduced after splitting. A comparative survey covering all the split families and the 'joint families' with regard to water use is necessary to examine whether any statistically significant change has occurred. Prima facie, while the absolute requirement of water for a nuclear family is smaller than that of a large joint family, the larger families are likely to use water more efficiently and require less proportion of water for different household uses than do a nuclear family.

What is most striking is that no women in the surveyed communities have any say in controlling access to, and management of, the water commons. In all the districts, the water commons have ceased to exist, and become open-access resources, with hardly anyone responsible to take care of the resource. In North Bengal, some women reported they had opinions regarding the use of the water body, but their importance in management decisions is cipher. The absence of the community from the management of the water resources is indeed a tragedy, because now the resources are at the mercy of either the market or government officials.

Whenever a commercial enterprise appears more profitable than community use, a water body will either disappear or be enclosed. On the other hand, the stroke of a bureaucratic pen may nullify the customary use of the ponds and utilize the water body to maximize revenue. Thus, the customary care and concern of the community toward the water commons have lost value. Earlier, a few selected ponds were strictly maintained for drinking water alone. In these ponds, no other use of the pond was permitted. Today, with the spread of tube wells, the need to protect the drinking water ponds has disappeared. However, when the same tube wells are pumped for withdrawing groundwater for irrigation, arsenic contamination and subsidence of the water table become an endemic community problem, which could have been avoided if the community had used surface water.

On the eve of water privatization, the community in all the study areas feels that water management must not be in the hands of MNCs. Women's unequivocal response to the question

"Who should water belong to" was "the community" (which of course would include themselves). To the questions, "Who should decide water use" and "Who should decide cost of water", some decided it is the government, while others thought the community would be the appropriate agency.

A majority of the women's answer to "Who should decide preservation of the commons" was "the government". This indicates the loss of the women's confidence in the capability of the community to preserve the commons. This in turn is a result of the erosion of the community's value and power to execute decisions on customary management of the commons. The 'community' in these areas consists of the Gram Panchayats, which function as appendages of the ruling party. The strengthening of the political elite and a concomitant debilitation of the traditional authority of the community has resulted in an ignorance of the community's role in conserving the commons. A few vanishing examples of the community conserving the water commons are given in the case studies.

Dum Dum Park Tanks, Kolkata.

Situated at Dum Dum Park, in the northeastern part of the city of Kolkota, there are five large tanks (ranging in size from 1 to 2 acres). All these tanks are managed and maintained by the Park's resident community.

Members of the community formed Krishnapur Cooperative Society in the year 1950. The society made a series of construction work to protect the tanks, namely, concretize the tank margins, erect fences around each tank, and build concrete benches around the tanks. The society also laid out a set of rules of using the tanks. These rules included :-

a) No Toxic waste to be disposed of in the tank water:

b) Fishing will be restricted.

   i) No fishing by outsiders is permitted:

   ii) People willing to pursue the hobby of angling must possess a card issued and endorsed by the Executive Committee of the Society. This card will cost Rs. 100 for every angling expedition.

   iii) Every two or three months, a fisherman will be called in to net the fish from one of the tanks; the fish will be sold only to the residents. Each resident family owning a house will be issued a membership card that will enable them to buy the fish.

   iv) Fish spawn will be released into the tanks for rearing and culturing every six months.

c) No washing of clothes, utensils, cars or cattle is permitted.

d) The tanks will be periodically cleaned.

The society put up notice boards by the side of each tank, displaying prohibitions on polluting the tank water.

All residents used the tank water for cooking; some also used the water for drinking. To prevent pollution of the water, Sri Sunil Mukherjee, the Secretary of the Cooperative Society keeps constant vigil over the tanks.

Violations of the rules to keep the tanks unpolluted began in the early 1980s. Three factors may be identified to have triggered such violations. (a) The municipal tap water supply cut down the importance of the tanks as the source of water for household needs, thereby reducing the significance of structures for maintaining the purity of the tank waters; (b) An influx of new resident families, who were unfamiliar and unrespectful of the community rules, eventually eroded the communitarian values. Earlier, most of the user community consisted of middle class and low-income families, including slum dwellers. In the early 1980s and afterwards, rich families arrived and bought lands and flats from real estate developers. The traditional community and its rules mattered little to this new group of the wealthy residents, who tend to justify their abuse of the tanks by the power of money: (c) After the death of Mrs. Jyotirmoyee Mukherjee in 1983, the constant watch over the tanks ceased. Furthermore, residents of an expanding bustee population in the neighbourhood use the tanks for bathing and washing, which the society finds difficult to stop.

Today, bathing and clothes washing are common. The tank water is cleaned annually by the application of lime. Plastic bags are sometimes seen floating on the tank waters. Even cars are kept on the tanks side and washed with the tank water. Nevertheless, the society continues to clean up the tanks periodically; fish spawn are released in the tanks two times a year; the fishing cards are still issued, land maintained; washing cattle and utensils are still prohibited; dumping of filth is still not allowed.

Women seem to oppose polluting the water of the tanks, and in general support the Society's rule to maintain the health of the tanks. A majority of residents feel content with, and even proud of, the tanks they maintain, and are eager to maintain them in the condition as they were a generation ago. In a regime where the city's wetlands are constantly endangered by real estate developers in collusion with politicians, the Dum Dum Park tanks are an exceptional example of how community involvement could conserve the commons in a metropolis.

Baneswar Temple Pond, Cooch behar.

In the town of Coochbehar in North Bengal, local people observe taboos against polluting a pond attached to the Nuileswar temple. The Siva (Baneswar) temple was built by the king of Coochbehar in the 16th century. The temple and the pond are maintained by a Trust body, which has in the year 2003 welded the pond margins with concrete.

A unique feature of the temple pond is that it houses a population of Indian soft shell turtle (Aspideretus ganeticus). Two of them are at least two centuries old, and come to the shore at the call of temple devotees who feed them with sweets. Tiny balls of sweets made of pulses and rice are sold at nearby shops. Devotees buy these balls and feed the turtles, as they believe the act is a virtue.

There is a strict taboo on killing anything in the sacred pond. The pond also contains a population of Indian major carps, which are also fed. During the ruining flood of 1994, the pond had overflowed, and a number of turtles and fish escaped with the floodwater. However, a few days later, when the flood subsided, people caught the turtles and brought them back to the pond. It was not possible to recognize the fish from the sacred pond, so they were not brought back.

Washing anything in the pond is forbidden. A small number of devotees, however, take bath standing on the bank of the pond on a few religious occasions. Otherwise, there is no scope of inflow of any pollutive matter into the pond.

The Scared Pond in Jainti Forest, Jalpaiguri.

Situated in the midst of a protected Terai forest, the Jainti sacred pond is a site of pilgrimage for Buddist and local Hindu villagers. There is no shrine, nor temple, nor any image of any deity at the pond.

Surrounded by ancient trees and lianas of the moist deciduous forest, the pond is consecrated to an abstract Pokhri Mai (pond goddess), and is religiously protected from any pollutive use of the water. People from forest-fringe villages visit the pond almost every day, but the big festival takes place only once a year – on the full moon day of Baisakh, the Buddha Day. Buddhists from distant villages surrounding the forest, and also from Bhutan and Sikkim gather around the pond. Local Hindu people also gather on the same day to observe some rituals by the pond. The two groups of pilgrims camp separately by the pond, and organize a fair. The fair runs for a couple of days, and pilgrims use the pond water for cooking.

The Sacred Pond of Belboni, Bankura.

Attached to an ancient sacred grove, a large sacred pond is devoutly maintained by villagers of Belboni in the district of Bankura. The pond lies on the side of Beliatore – Bankura highway. Both the grove and the pond are consecrated to the goddess Manasa. This pond is traditionally used as the only source of drinking water for people from three villages. Although there are numerous tube wells and ring wells in these villages, people collect only the pond water for drinking and cooking.

Villagers protect the pond from all types of pollution. Bathing and washing are strictly forbidden. A popular legend is that in the year 2000, a car driver had stopped by the pond

and tried to drive into the pond to wash it, but the car got stuck mid-way by the curse of the goddess. The driver was unable to get the car out of the pond until he apologized and worshipped the goddess. After that incident, every household in Belboni village contributed a sum to put a barbed-wire fence around the pond. They also put up a notice board which reads in Bengali “Drinking Water Pond, Don’t Pollute”.

According to the old people’s memory, the pond never was infested by weeds, nor was there any algal bloom. There is a periodic occurrence of lotus. The pond bottom is sandy and does not contain any macrobenthic animals. A two year long study on the pond revealed that the pond water houses a large number of phyto-and zoo-plankton, and a few predatory insects that destroy mosquito larva. Rare frogs like Limnonectes limnocherys and Euphlyctis cyanophlyctis, and a couple of otter live in the pond.

CHAPTER - 13

WATER CRISIS IN JHARKHAND

The Chhotanagapur plateau of south Jharkhand and the Santhal Parganas in the north and northeastern part of the state comprise some of the least irrigated districts of the country. Agriculture in Jharkhand has remained predominantly rain-fed, dependent on the vagaries of the monsoon and the annual distribution of rain. When normal patterns of rainfall are disrupted agricultural cycles can be severely affected. In most districts, less than 10 per cent of the cultivated area has irrigation facilities provided by the government. The most common traditional sources of irrigation have been bandhs, ahars and ponds, while farmers with-both large and smallholdings have also relied on homestead wells for irrigation in the dry season. In some districts, Persian wheels are used to lift water from wells and into field channels. The main problem remains in the hilly upland areas where the rocky terrain and lateritic or shaly soils make investment in water-retaining structures like ponds a costly proposition for the average small farmer.

Micro Lift Irrigation – PRADAN Model

The Lift Irrigation programme evolved for Jharkhand was based on a detailed analysis of local constrains and assets: small land holdings, scarce or non-existent electricity in rural areas, the presence of a large number of semi-perennial streams and rivers as well as relatively homogenous groups of traditional farming communities, specially in tribal areas, that provided a congenial social environment for collective effort. Financial aid from the government's ongoing Rural Development schemes was used to meet a large part of the capital cost of the Lift Irrigations.

The Women Managed Lift Irrigation Schemes

In Hazaribagh district, **PRADAN** an NGO introduced Lift Irrigation schemes with a difference– it inspired the women's savings groups to organize under its micro-credit programme to own and manage the schemes. Few women own agricultural land in Hazaribagh but they form the bulk of the agricultural labour as in any other rice producing area in eastern India. In the programme, the women members of the farming communities are first organized into self-help or savings groups (SHGs). The SHGs take a decision to set up LI schemes in consultation with their men folk. The NGO provides the technical inputs with its multi-disciplinary team of

engineers and other professionals. Working capital is taken by the women themselves, often from their own savings, with matching funds given as loans from banks. For large projects, women depend on government funds dispensed by the district rural development agencies (DRDAs).

One wonders how the Mahila Samiti manages to exercise its control over the irrigation scheme within a conservative social milieu. At the site of the intake well, the Mahila Sinchai Samiti appears to be in control of the earthwork being done there. Samiti representatives are busy supervising the work. Each beneficiary family has to contribute labour for the construction of the intake well. The proportion of labour contribution are decided by the Mahila Sinchai Sanchalan Samiti and decision is carried out by the men folk.

The women managed LI scheme at Purchara was installed in May 1995. Finance came from the District Rural Development Agency (DRDA). While the women of Purcha were ready to shoulder the responsibility of managing the LI scheme, the men of the village initially resented female encroachment in what was considered to be an exclusive male domain of agriculture and irrigation.

The Li scheme at Purchara, to all accounts, is doing well. The Samiti representative received payment for irrigation charges and issues a coupon to the landowner. The operator runs the pump to supply water only on receipt of the coupon. For the members of the Mahila Sinchai Samiti, the irrigation charges are Rs. 15.00 per hour plus the fuel cost. Out of it, Rs. 4.00 per hour goes to the operator appointed by the Samiti. The rest goes to the Samiti funds. Truly, the LI has changed the face of agriculture at Purchara. There was only one paddy crop earlier of local variety and its yield was poor even in best of times, reports Sohua Devi, a Samiti member. " Now , with irrigation facilities, we get not only wheat and potato but also a much better yield of paddy", she adds. At Lathia village in Barhi block, the men refused to accept women's control over the LI system and refused to buy coupons from them. It took a number of meetings there before the menfolk eventually recognized the women's ownership over the scheme. Right now, all-women Mahila Sinchai Samities run 50 LI Schemes in different blocks of Hazaribagh, Godda, Lohardaga, Kodarma and Dumka districts. It is not that women have already assumed full control over these schemes. Illiteracy, lack of technical training regarding the maintenance and operation of pump-sets as well as the patriarchal tradition remain obstacles on the way.

Traditional water harvesting structures are found all over Jharhkand. In the undulating hilly areas of the Chotanagpur plateau have relied on ponds that harvest rain run-off from higher locations. The water retained in such structures seeps into the layers of clay t the bottom from where it travels by gravity flow to irrigate fields situated at lower levels. Traditional wisdom had determined that a contiguous group of such ponds has a greater effect than the sum of many individual ponds in dispersed locations.

In Diuri village, Tamar block, Ranchi District. Dr.Ram Dayal Munda, former VC of Ranchi University, and his wife Anita told that the original pond was dug by his father over 50 years ago. His phua (paternal aunt) Sumitra remembers how exited everyone was when the scheme was undertaken. " I was that small when they dug the tank" she says showing her height as a 10-year-old girl. " It holds water throughout the dry summer months and irrigates fields way down there about half a mile away". The women of Diuri demanded from their men folk similar ponds in their adjacent plots. When the homestead wells run dry in summer women do their washing and bathing in these ponds.

Coal Mining leaves people landless and waterless

Even as the government of Jharkhand is initiating a Rajiv Gandhi National Drinking Water Programme to ensure drinking water in every village in Hazaribagh district, a village whose water supply has been destroyed by mining is threatened with police action for protesting about the same. Agaria Tola is a hamlet of 18 tribal and scheduled caste families, in the West Bokaro mining area of Mandu Block, where the Tata Iron & Steel Company (TISCO) has a captive coal mine. The village once had a natural spring of ever-fresh water, a permanent supply. Women from 110 families in 6 neghbouring hamlets would come to this spring, so precious to them that they called it"naihar", our mothers home. It was also a place for socializing, not only for the women as they collected water but also for nature. There were several water snakes in the spring, whom the women treated as their own. The spring was a place of fresh, pure water; it was a place of life.

In 2000, TISCO bulldozed that spring of water. The spring was at the edge of the coal bearing area of their West Bokaro colliery, and they waned the coal. Production figures had to be met, that area was in the mining plan.

Did the planners know about the spring? Did they include its value in the cost of their mining? If the spring were costed, its value would be many thousand times more than the value of the coal. But the point is, the company saw coal production figures, not the lives of ordinary people, or a spring of water whose cost could not be determined. The village people ask: If the people destroyed the Company colony water supply, there would be criminal charges. But if the Company can destroy the peoples' "nahar" how is it something different?

The people had proposed that a certain area be marked off for the preservation of the spring. The spring was on the edge of the mine lease, so it could easily have been done, even ensuring a suitable catchments area. During those summer months two years ago there were many angry exchanges between TISCO and the people. Blasting came close to the spring and next to a boundary wall of the village. Several times the women had gone into the mine and stood in front of the machines to stop them, and several times the company called in security and police when they protested.

The company then dug an alternative well, and in the meantime provided alternate supply of water through tankers. The people ask, can dependence on a mechanical tanker, to bring and pour water into cement troughs, be a substitute for a living spring? Even then, the tanker they used was a converted oil tanker, and the water tasted of kerosene!

Near Agaria village mine of Central Coal India has destroyed the water table and the well. Now the well has dirty, shallow and stagnant water. Appeals to the Company have gone unheeded. So the water collectors, the women, have protested, in the only language the company seem to understand. They stopped the mining during the summer of 2002. The woman went twice in large groups into the mine and stopped the working, pro-testing, "Are we too not citizens of this free country, to live in human dignity? Must we live like animals in our own village?"

High and dry between the Piparwaar and Ashoka mines

Benti village, situated in the southern tip of Tandawa block, Hazaribagh district, is the largest of the nine villages displaced by the Piparwar mine, India's biggest open-cast coal mine, started with Australian aid and expertise in the early days of liberalization, 1988-99 by the Central Coalfields Ltd (CCL). It was to be a 'model' mine, fully mechanized with in-pit crushing machines, conveyor belts, a modern washery, and a railway line to transport the coal to distant New Delhi for the capital's thermal power plants. Mine authorities promised strict environmental management and ecological restoration of the mined out pits, using Australian techniques of segregating topsoil and overburden and backfilling of the pit as the mining advances.

Piparwar is the first of the 23 mines planned in the North Karanpura valley which will displace hundreds of villages, devour prime cropland and forest and turn the upper basin of the Damodar river into a bleak, scarred, pitted and polluted moonscape. The very names of these mines – Ashoka, Ajatasatru, Chandragupta – suggest the new imperialism of India's mining industry, now supported by international finance.

The 700 odd people of the first village to be displaced, Piparwar-Mangardaha, live resentfully in two inhospitable, water-scarce resettlement sites, already proving too small for the growing population. The tube well provided by CCL yields reddish unpleasant tasting water, The village comprised of mainly agricultural households, both tribal and non-tribal, with a few landless and artisan families. When the lands were acquired through the Coal Bearing Areas Act and the Land Acquisition Act starting in the late 80s, people were not compensated on a land-for-land basis, because there was no land to be found for them to move. They got meagre cash compensations and some jobs on dubious criteria. The big landlords who first offered their lands to the company also cornered the most number of jobs for their sons, plus contracts for ancillary works like building of roads, culverts and drainage channels and fencing of the industrial area.

In Bhuiyan tola, the well, 10' wide and 50'feet deep, was made by the block office. As the Ashoka mine went deeper the well went dry. To date the entire Bhuiyan population lives without its own water source.

The only working hand pump is in the Sau tola, Karmi Devi Bhuiyan, grey-haired, about 60, says it takes her 2.5 hours to fill water from the handpump each day. Another lady Asha Devi says, " When we go there we get a number and wait in line." First the Sau fill their pots and buckets. If we happen to have come first we move away". Her husband Ganesh complains:" Sometimes the food gets burnt because it takes her so long to get the water", Santi Devi says, 5-6 large gharas of water will do for one household's daily needs. Each ghara takes 15-25 liters of water: the big ones take over three buckets of water each. The women carry 100-150 litres per day to their homes.

Some women prefer to go to the Barwatola pond 2 km away. Others take a hazardous trek down into the mine to collect the water that gets continuously pumped out of the lower levels from where it is directed towards the Damodar river. But isn't that full of coal dust? Ka kariti, says Rupni Devi, ha, kala to hai (What to do? Yes, its black). " Before the mines came we were surrounded by forests and had plenty of water from the stream flowing by", recalls Karmi Devi. " As soon as the Ashoka mine started our well went dry. Now there is a daily struggle for water, which we have to get from tolas in the village.

One lady Shanti says: " A lot of people have come to us with note books and pens like you. They went away and never did anything for us. Will you do the same?" What do you want us to do? we ask. We ask the men what they had done about the women's water problem. In 1994 when the well ran dry they agitated and stopped work at the mine. They damaged some of the vehicles and burnt their tyres. People were arrested. They lost many days of work and had to pay the police to let him go. Then CCL got the block to build a couple of cement tanks – all in the Sau tola – for commong use. These were filled by pumps, but after a year the pump broke and nothing has been done about it since.

The general water problem seems to have been relegated to the level of a women's problem because it is the women who must collect and carry over water each day back to their homes. They wash their clothes and utensils in other hamlets and bring home drinking, washing, cooking and bathing water for the family. Those who can't carry water or make the trek – the aged, the sick, pregnant women and children have to do with less. All the small children have eye infections and present an unwashed appearance.

CHAPTER - 14

WATER POLLUTION BY ARSENIC, FLOURIDE AND PESTICIDES.

(i) Arsenic Poisoning :

Though true, but shocking that the underground water may turn into poison and the drinking water from the hand pump or tube well becomes the source of crippling disease and death. This is deliberate poisoning created by successive governments and multinational agencies, which invested quickly in new technologies to dug water and deeper into the ground. Then the water table started to fall (Manisha 2003).

Studies in the arsenic affected zone have shown that the concentration increases with depth reaching at peak around 100-125 feet down and gets reduced as it reaches to 400 feet. Groundwater arsenic contamination by arsenic was first reported in 1983 in West Bengal when 63 people were reported suffering from arsenic poisoning. In May 2000, nine district in West Bengal had arsenic levels in ground water above the permissible unit of World Health Organization (WHO). The maximum permissible limit for arsenic in drinking water is 0.05 milligram per litre (mg/l). In 77 percent samples the arsenic level was found to be higher than the permissible limit, Arsenic crisis or arsenic toxicity develops after two to five years of exposure to arsenic contaminated drinking water, depending on the amount of water, consumption and arsenic concentration in water. Initially the skin begins darken known as diffuse melanosis. This happens first in the palms. Diffuse melanosis leads to spotted melanosis, when darkened spots begins to appear on the chest, back, and limbs.

Keratosis is the middle stage of arsenicosis. The skin in portions becomes hard and fibrous, as if body has broken out into the hard boils or ulcers. Diffuse or nodular keratosis on the palm of the hand or sole of the foot is a sign of moderately severe toxicity. Rough dry skin, after with palpable nodules on hands feet and leg mean, severe toxicity. This can lead to the formation of gangrene and cancer.

Arsenic poisoning brings with it other complications; liver and spleen enlargements and cirrhosis of liver, cardiac failure, neuropathy affecting primary, sensory function, diabetes, goitre and skin cancer.

Women appears to be more prone to arsenic poisoning, for instance Renu of Aripara, North 24 Paragana became blind due to arsenicosis. Her two sons have left the village in search of

safe water and livelihood. Another son and daughter- in- law live with her, because they suffer from arsenicosis. She has lost all hope. She is very cynical about any kind of arsenic mitrgation technology. Sumtaya in Gardmabi village in Murshidabad district has wound on her right tighs. The wounds bleed. Her problem worsens each passing day. Like her, Leaten is a widow in Nanda Block in Murshidabad. She has a cancerous wounds on her hand that is slowly spreading to the rest of her body. For her hospital is too far and too costly. She just waits for death. (Manisha 2003).

Due to arsenicosis women are considered as mad. In Fakir para locality in Chanalti block in North 24 Paragrana, women suffering from arsenicosis have been abandoned by loved one.

Contamination of water by arsenic has spread to U.P and Bihar. Dinanath of Ekwana Rajpur village in Balia district, UP suffers from skin cancer. Two fingers of his left hand had developed ulcers and had to be amputed. His two daughters died in last two years. (Gupta 2004).

The lesions are an is escapable social stigma, especially for girls. No body wants to marry girls, because of the spots. Everybody has to parade half naked in front of the prospective groom's family to prove that the entire village has the disease, we are not the only ones. People are finding difficult to find a match for their daughters. The economy of the arsenic affected village has stagnated. Arsenic has crippled the hands that could nurture the fertile land. (Gupta 2004)

Every new survey shows that the arsenic trail is far from being completely known. It certainly seems to be creeping along the basins of rivers of Ganga and Brahamputra. The extent of arsenic contamination now includes several states in India. The recent studies prove the presence of the contaminant in several states: West Bengal, Bihar, Assam, Uttar Pradesh, Chhatisgarh and Jharkhand. (Gupta 2004)

In Ekwana Rajpur village of Balia district, water is found to have 73 parts per billion (ppb) while the limit is only 10 ppb, more than 7 times of the prescribed limit. In Rajnandan gaon district in Chattisgarh, about 8% samples had arsenic above 50 ppb, 5 times higher than the standard limit. In Bhojpur district of Bihar more than 57% people in a village are drinking water which has arsenic concentration above 50 ppb, scenario is equally bad in Buxar . The menace has also spread to Jharkhand, where in Sahibganj district, 30% samples had arsenic above 10ppb, 19 % above 50ppb and 26% above 100 ppb. The studies show that the area near Ganga is prone to arsenic poisoning.

The arsenic crisis is the direct fall out of a public health imperatives. When policy makers found surface water bodies caused massive outbreaks of water borne diseases, instead of tackling contamination they pushed people towards ground water. Surface water bodies fell into greater neglect as hand pumps became the preferred option for drinking of water. Now, we have come

full cycle, hand pumps (India mark) are the problem and the solution lies in going back to surface water bodies.

But this poison is not as deadly as the callousness of the government, which neglects the disease. When the government denies the existence of the problem, the poison will spread. That is what we really need to worry about.

According to an environmentalist, arsenic poisoning is the biggest instance of toxicity. The magnitude and the extent of the problem is still unfolding. The problem gets more serious as there is no medicine The only medicine is safe drinking water and nutritious food. Skin lesions are mere manifestations, whereas arsenic poisoning actually devastates victims internally (Banerjee 2000).

Table 14.(1) : Level of Arsenic Contamination in Bihar.

BIHAR					
No.	**District**	**Year of Survey**	**Agency**	**Level of contamination (in parts per billion)**	
				Maximum	**Minimum**
1	Paschimi champaran	2003-2004	UNICEF	<25	<5
2	Purab Champaran	2003-2004	UNICEF	48	<5
3	Sitamarhi	2003-2004	UNICEF	48	<5
4	Madhubani	2003-2004	UNICEF	<25	<5
5	Supaul	2003-2004	UNICEF	<50	<5
6	Araria	2003-2004	UNICEF	<50	<5
7	Kishanganj	2003-2004	UNICEF	<10	<5
8	Purnia	2003-2004	UNICEF	<25	<5
9	Kathihar	2003-2004	UNICEF	<25	<5
10	Patna	2004	JU**	1466	<3
11	Bhojpur	2002	JU	1654	<3
		2003-2004	UNICEF	120	<5
12	Buxar	2003	JU	2182	<3
		2003-04	UNICEF	>50	<5
13	Saran (Chapra)	2004	JU	838	<3
14	Vaishali	2004	JU	288	<3

(Gupta 2004)

Table 14.(2) : Level of Arsenic Contamination in Uttar Pradesh.

UTTAR PRADESH					
No.	**District**	**Year of Survey**	**Agency**	**Level of contamination (in parts per billion)**	
				Maximum	**Minimum**
1	Pilibhit	2003-04	UNICEF	<25	<5
2	Lakhimpur	2003-04	UNICEF	<50	<5
3	Baharaich	2003-04	UNICEF	<50	<5
4	Shrvasti	2003-04	UNICEF	<50	<5
5	Balrampur	2003-04	UNICEF	<50	<5
6	Siddarthnagar	2003-04	UNICEF	<10	<5
7	Maharajganj	2003-04	UNICEF	<25	<5
8	Kusinagar	2003-04	UNICEF	<25	<5
9	Ballia	2003-04	UNICEF	3191	<5
10	Unnao	2003-04	UNICEF	<5	<5
11	Lucknow	2003-04	UNICEF	<10	<5

(Gupta 2004)

Table 14.(3) : Level of Arsenic Contamination in Assam

ASSAM					
No.	**District**	**Year of Survey**	**Agency**	**Level of contamination (in parts per billion)**	
				Maximum	**Minimum**
1	Dhemaji	2004	JU*	490	<3
2	Karimganj	2004	JU	303	<3

(Gupta) 2004

Table 14.(4) : Level of Arsenic Contamination in West Bengal

WEST BENGAL					
No.	**District**	**Year of Survey**	**Agency**	**Level of contamination (in parts per billion)**	
				Maximum	**Minimum**
1	Malda	Since 1988	JU*	1904	<3
2	Murshidabad	Since 1988	JU	3003	<3
3	Nadia	Since 1988	JU	3200	<3
4	North 24- Parganas	Since 1988	JU	4772	<3
5	South 24- Parganas	Since 1988	JU	3700	<3
6	Kolkata	Since 1988	JU	825	<3
7	Howrah	Since 1988	JU	622	<3
8	Hoogly	Since 1988	JU	600	<3
9	Bardhaman	Since 1988	JU	2230	<3

(Gupta) 2004

Table 14.(5) : Level of Arsenic Contamination in Jharkhand

JHARKHAND					
No.	**District**	**Year of Survey**	**Agency**	**Level of contamination (in parts per billion)**	
				Maximum	**Minimum**
1	Shahibganj	2003-04	JU*	1012	<3

Table 14.(6) : Level of Arsenic Contamination in Chattisgarh

CHATTISGARH					
No.	**District**	**Year of Survey**	**Agency**	**Level of contamination (in parts per billion)**	
				Maximum	**Minimum**
1	Rajnandgaon	1999	JU*	880	<3
		1999	UNICEF	49	<5
2	Durg	1999	UNICEF	>10	>10

* (JU) Jadavpur University

(ii) Fluoride Poisoning:

Fluorosis is another crippling and painful disease caused due to excess intake of fluoride through water. Fluorine and Fluoride compounds are listed by U.S. Agency for Toxic substance and disease registry as one of the top 20 among 275 substances that pose the most significant threat to the human health. There is no treatment for fluoride related human disorders. Safety lies only in the prevention (Sarkar 2004)

In India, Fluorosis has spread over 19 states. According to a study by **WHO** nearly 66 million i.e about 9.4% of the total rural population are in the grip of fluorosis. Though the prescribed limit of fluoride is 1.5 mgl, but fluoride level is as high as 48 mgl have been reported. The states where the ground water is contaminated include Andhra pradesh, Rajasthan, West Bengal, Uttar Pradesh, Maharashtra, Karnatka, Chandigarh, Punjab, Haryana, Delhi, Orissa, Tamil Naidu, Gujrat, Kerala, Madhya Pradesh, Jammu and Kashmir, Himachal Pradesh and North Eastern Region.

Table 14.(7) : Rural population consuming fluoride-contaminated water (1999)

Rural population consuming fluoride-contaminated water (1999) in the 17 endemic states				
State	**Total Population (million)**	**Rural Population (million)**	**Rural pop. at risk (million)**	**Percentage of total pop. At risk**
Andhra Pradesh	74.62	52.31	13.50	18.1%
Bihar	98.12	83.67	Na	Na
Delhi	13.42	1.23	0.16	1.1.4%
Gujrat	47.56	29.45	4.78	10.1%
Haryana	19.83	14.57	2.17	10.9%
Jammu & Kashmir	9.71	7.22	Na	Na
Karnatka	51.65	34.42	6.90	13.4%
Kerala	32.08	22.43	Na	Na
Madhya Pradesh	78.81	58.36	1.168	2.1%
Maharashtra	90.45	52.84	0.14	0.2%
Orissa	35.53	29.80	3.26	9.2%
Punjab	23.28	16.05	2.07	8.9%
Rajasthan	52.94	39.82	10.90	20.6%
Tamil Nadu	61.43	39.19	7.64	12.4%
Uttar Pradesh	167.66	130.83	11.77	7.0%

Rural population consuming fluoride-contaminated water (1999) in the 17 endemic states				
State	**Total Population (million)**	**Rural Population (million)**	**Rural pop. at risk (million)**	**Percentage of total pop. At risk**
West Bengal	78.32	56.21	1.65	2.1%
Assam	25.88	22.62	Na	Na
All India*	961.29	691.02	66.62	6.9%

(UNICEF 2001) * Total population of 17 endemic states
"na" indicates not assessed.

Hundreds of villages on the southern bank of Brahamputra in Assam are afflicted by the contamination. 70% of the Assamese population suffering from fluorosis are from Karbi Anaglong where in 1999, the fluoride level was reported as high as 5-23mgl.

Till recently, West Bengal was not in the list of affected of states by Fluorosis. Now ground water in large areas of Birbhum viz Nalhati, Suri, Rampurhat, Bhabhranandpuri, Dubragpur, Sainthi and Raj Nagar contain fluoride much beyond the prescribed limit. In some places at Nalhati, the fluoride concentration is found to be 15-19 mgl almost 15-20 times higher than the safe limit prescribed by W.H.O.(Sarkar 2004)

Fluorisis is a disease that neither allows a person to live nor to die. In Liliya block of Amreli district in Gujrat, people hang ropes from the ceiling of rooms and toilets to stand up. In Haripur village of the block, about 70% are suffering from fluorosis (known as "Wah" in Gujrati). In the morning, the knees are swelled and people have to wait for one hour before they can move. Such affliction brings life to a stand still. The daily routine becomes the bizarre experience. (Manisha 2003).

All the 32 districts of Rajasthan are affected with the problem of fluorosis, in which Nagaur, Bhilwara Ajmer, Pali, Jalore, Barmer and Charu are the worst affected districts. Nearly 56 percent of villages in the state are affected with the major health hazard and over 25 percent rural population is affected with deformities.

The problem has its socio-psychic effects too. Parents of girls are worried about their marriages as even if they manage to get their daughters married after hiding the shocking facts of the region, then there are chances that the girls are treated badly by the boy's family. There are instances of break up in marriage alliances between families where daughters or sons suffer from fluorosis (Srinivasan 2004)

Such affliction also sunders livelihood. In Bakhari village in Jharkhand's Daltongunj district, almost two thirds population has developed physical deformities due to fluoride contamination

of water. This is affecting the main occupation i.e agriculture, as there are fewer hands to till the soil. Fluoride rich water is bad for land and crops. A decade ago, in Gujarata's Amreli district, one hectare of land produced 100 kg , today it produces only 4 kg. Even the wheat grown with fluoride –laced water tastes bad. No one buys cattle from the fluoride affected villages (Manisha 2003).

The presence of fluoride in ground water and soil is human made. We have over extracted ground water and have tapped aquifers with high fluoride concentration. Over exploitation of ground water in last 20 years is the chief reason for the spread of fluorosis in the states like Gujrat and Punjab. With the coming up of diesel pumpsets, farmers started to dig deeper into the earth's crust and are extracting poison. Falling water table also increasing the fluoride content in the water. Income places water table is decreasing one and three metres per year.

Excessive fluoride can also damage a foetus, if the mother is exposed to high doses of fluoride during pregnancy or during breast-feeding. The infant may die due to calcification of blood vessels. Abortion, still births and deformities associated with fluorosis are also known. Male infertility associated with an abnormality in sperm morphology and development of early cataract has been blamed on fluoride toxicity. (Sarkar 2004).

(iii) Pesticides Worst Pollutant:

According to experts, pesticides are the most difficult to remove from water. Pesticides enter surface and groundwater as runoff from crops and they even pollute fresh water bodies lik rivers, lakes and estuaries. Incidentally, Delhi uses as much as 62 metric tonnes of pesticides while farmers in UP and Haryana use 7569 metric tonnes and 5025 metric tonnes annually. The rivers Yamuna and Ganga flowing through this region are already carrying huge amounts of pesticides when they enter Delhi. The DJB, infact, does not have the sophisticated equipment needed to remove pesticide residue from water. (Sharma and Patranobis 2003)

Cancer, liver and kidney damage, neurological and reproductive disorders are just a few of fatal and chronic health condition one can end up from prolonged consumption of such contaminated water. The most alarming fact about pesticide and effluent pollution of water is that young childeren are more sensitive to the effects of toxic chemicals because they eat and drink more per body weight and have faster metabolism than adults. Most people are said to receive up to 12 percent of their lifetime dose of toxic chemicals in the first year of their life (Sharma and Patranobis, 2003)

A huge proportion of the rural population suffers due to chloride, zinc, nitrate and sulphide pollution. The gravity of the problem can be understood from the fact that nitrate is present in 68 districts of 12 states, chloride in 17 districts of 5 states, sulphirde in 3 districts of one state, iron in 26 districts of seven states, zinc in six districts of 3 states and chromium in one district of one state (Patel 2003)

To add to the pesticide load in the water, there are industrial effluents being dumped into the river everyday. There are paper and sugar industries and distrillaries besides glass, nickel and chromium plants, along the river all-contributing to the pollution of the river.

Table 14.(8) : What Pesticides do to you

What Pesticides Do To You		
Pesticides	**Used for**	**Health Impact**
DDT	Used against wide variety of insects	Chronic liver damage, cirrhosis and hepatitis, reproductive disorders, immunosuppression, cancer.
Heptachlor	To control soil inhibiting pests	Reproductive disorders and blood dyscariasis.
Lindane	Used against sucking and biting pests, soil pests	Chronic liver damage and hepatitis, endocrine and reproductive disorders, breast cancer, polyneuritis, cirrhosis.
Malathion	Insecticide to control red spider mite, thrips etc.	Carcinogenic, ulcers, eye damage, immunosuppression, abnormal brain waves, behavioural effects, delayed neurotoxin.
Aldrin	Used against wireworme and termites	Cancer of the lung and liver diseases.
Dieldrin	Used against ticks, lice, moths etc.	Liver diseases, Parkinson's and Alzheimer's diseases.

CHAPTER - 15

STEALING WATER FROM WOMEN: THE COLA GIANTS AND THE VIOLATION OF WOMEN'S WATER RIGHTS

In a water-stressed India, two companies are able to extract nearly a combined billion litres of potable water per day to earn Rs. 4000 crore a year (two thirds of the Rs. 6000 crore industry) while communities living near the companies' operations are forced to do with depleted, contaminated, and unhealthy local supplies. With few government regulations to curb water over-extraction practices and inadequate environmental monitoring to catch and penalise polluting practices, villagers living near the 55 plants operating under the Coca-Cola Company and the 38 plants operating under PepsiCo India Holdings Pvt. Ltd. are forced to witness daily the decline in quantity and quality of their precious water resources.

The villagers-especially the women-of Plachimada in the state of kerala illustrate the extent of suffering that foreign multinationals inflict when their water extraction and pollution practices are not properly regulated. Living near one of Coca-Cola's largest bottling plants, commissioned in March 2000 to produce 1,224,000 bottles of Coca-Cola, Fanta, Sprite, Limca, Thums Up, Kinley bottled water, and Maaza fruit drinks, villagers watched as the company extracted some 1.5 million litres a day. The extraction of water by the company from 65 bore wells with electric pumps deplted the ground water supplies from 150 to 500 feet. Suddenly, communities that had previously enjoyed sufficient water supplies found themselves with an extreme water scarcity.[2] As a result of the depleted water resources; the livelihood of 2,000 farm families was destroyed.

ActionAid, a British NGO, the investigated the water situation in the village and determined that Plachimada was thriving agricultural community until the arrival of the bottling plant in 1998. Wate loss was not restricted to depleting ground water supplies. By dumping wastewater into dry bore wells and depositing waste material outside the company premises that leaked into paddy fields, canals, and wells, 260 bore wells were contaminated. Health problems increased. Women and children were the first to be affected. On 13 May 2003, the Chief Medical Officer of Palaghat declared that the water was unfit for drinking after having tested three wells surrounding the Coca-Cola Company's bottling plant and finding high chloride and hardness levels. With inadequate and contaminated water supplies, women had to walk as many as 4 to 6 kilometres in order to gather the water they needed to perform their daily duties.

Analyses of the sludge from Plachimada by the Centre for Science and Environment (CSE) in New Delhi and the University of Exeter in the United Kingdom found unsafe levels of the carcinogens cadmium and iron. The repeated exposure and accumulation of cadmium can cause kidney failure. Lead is particularly dangerous for pregnant women and children as it can cause mental retardation and severe anemia even at low levels.

Professor John Henry, a consultant at the St. Mary's Hospital in London, summarises the health concerns of overexposure to cadmium and Lead. " the results have devastating consequences for those living near the areas where this waste has been dumped and for the thousands who depend on crops produced in these fields.... What most worries me about the levels found is how this might be affecting pregnant women in the area. You would expect to see an increase in miscarriages, stillbirths, and premature deliveries. According to women in the area, they have seen just that. Women now avoid their contaminated water supplies, whispering that even surface contact with the water from bathing has caused miscarriges.

Outraged, the tribal women in Plachimada in Palaghat district began sitting in protest against the Coca-Cola Company and enlisting the support of community members and Panchayat leaders. In support of their cause, the Perumatty Panchayat filed a Public Interest Litigation (PIL) in the Kerala High Court against Coca-Cola. On 17 February 2004, the kerala Chief Minister ordered the closure of the plant. To date, the Perumatty Panchayat refuses to give the company permission to resume operations.

Although the women of Plachimada were successfully able to oppose the water over-extraction and pollution practices of Coca-Cola Company's plant, there are some 89 other factories across the India that daily threaten community access to safe and adequate supplies of water.

In the town of Mehdiganj, located 20km from the holy city of Varanasi in the state of Uttar Pradesh, villagers are protesting against the unjust practices of the plant near their home. The Bharat Coca-Cola Bottling North East Private Limited, operating under the Coca-Cola Company since 1999, is designed to produce 600 bottles per minute of Coca-Cola brand beverages.5 The company's extraction of millions of litres of water a day has contributed to a 40-foot drop in community water resources. While the loss of groundwater may not appear significant in contrast to the drop in groundwater levels in Plachimada, women in Mehdiganj see the loss of water as a sign of what is to come and they worry daily if there will be enough water to supply their family's needs. They are also aware that, like in Plachimada, Coca-Cola factories have contaminated water supplies after dumping wastewater into empty borewells that leaked toxins into local water resources.

The worst injustice by the Coca-Cola plant in Mehdiganj, however, was the dumping of wastewater that flooded 20-50 acres of agricultural land in the plant's vicinity in October of 2002. Since the water blocked the main road leading to the village, women and children became

exposed to the water taking the shortest route home. Village women testified that a mere five minutes of exposure to the wastewater caused painful rashes that lasted two to four months. Until May 2003, when the company was ordered to remove the water by the District Administration under Section 133, women were forced to walk extra distances to avoid the contaminated water.

The flooding of agricultural land with wastewater had other serious impacts. With the fields full of water, the mosquito population grew. Instances of malaria and other water-borne diseases rose, especially among children. A year after the waste water was removed, farmers are finding that their fields are no longer fruitful. Mango trees that before October 2002 were full of ripe fruit in the summers are now barren. Not a mango can be found. Farmers put their agricultural output of essential crops such as wheat, paddy, and chickpeas at 10-50% of their previous output. With less income-generation prospects, affected farmers are being forced to go out and look for work. Women now worry how they will feed their families and who will look after their children if they are forced to find employment outside of their village.6

In response to the water over-extraction and pollution of the plant in Mehdiganj, near Varanasi on 10 May 2003, 100 people held a demonstration outside the factory. They were met by 200 police along with 50 gun-toting security guards who tried to disperse the crowd with violence, beating the women as well as the men in front of the police lines. An elderly woman, Jagrupa Devi, was sent to the hospital with bleeding head injuries. She is now one of the main leaders against the company and a reminder to the entire community of the strength of their resistance.

In Kaladera, 60 km outside of Jaipur in the state of Rajasthan, villagers have been lucky in so far they have not experienced the widespread contamination of their local water supplies. They are, however, facing water scarcity. Due to the Coca-Cola plant's activities in the last five years, the groundwater level fell from 40 to 125 feet. Many wells and hand pumps have dried up. As a result, villagers must scramble to make ends meet with the small amount of daily water that the government delivers to them. Although the government and the Coca-Cola Company are pitching in to install new, deeper tubewells, villagers complain that they want water sovereignthy, not conscience-appeasing charity.

An interview with two women, who live on the outskirts of Kaladera, showed that outside the centre the situation is worse because there are no daily government water handouts. Instead of enjoying the clean water that filled their wells five years ago, the women now have to make do with the murky water at the bottom. When asked about health problems, the women confirmed that they got sick at first but they added: " Now we are used to it"

The massive extraction of water by the beverage industry in India is shocking when see in contrast to the inadequate and unsafe water supplies that women and families struggle to

meet the requirements of daily life. The reason for the discrepancy is that, in India, there are no Laws on groundwater extraction that distinguish between the secondary water use of industry (to facilitate the creation of non-potable products) and the primary use of water by the beverage industry for the sale of products that contain water as their main component. Unlike in Europe, where industry is not allowed to draw groundwater, in India beverage companies can deplete groundwater levels for a pittance. In Tamil Nadu, for instance, industry is charged around 2 to 4 paise per litre. According to P.C Chako, the Ground Water Authority's executive engineer, Palakkad division, Pepsico has been buying water at Rs. 10.60 for 1,000 litres when the market price for a litre of branded mineral water is Rs. 12. As States are in charge of managing their own water resources under Entry 17 of the State List, Entry 56 of the union List, and Article 262 of Indian Constitution, the fluctuation in prices varies regionally. The variation in water resource management is compounded by the liberty granted to Panchayats, local governing bodies at the village and city level, under the 73rd and the 74 Amendments. With the oversight over water resources, water development, and sanitation, Panchayats have a say in how water in their localities is used. Unfortunately, corrupt state and local government leaders have been more than willing to overlook soda beverage company abuses in return for money and over-inflated promises of local employment. The result, as the Joint Parliamentary Committee's report shows, is that in most cases water resources are given away at rock-bottom costs in most of the states where these companies operate.

The practice of giving away precious groundwater at minimal cost to the beverage industry must be curbed. States and Panchayats must price water at its actual cost to insure that women no longer have to do without when soda companies in their villages extract millions of litres a day. The practice of water pollution and the contamination of local water supplies by the Coca-Cola Company and Pepsico must also be put to an end. If women are to enjoy the right to clean, safe water resources, regulation and environmental monitoring of the soda beverage industry is mandatory.

Coke's Criminal Activities in Mehdiganj, Varanasi

A peaceful march of 1000 citizens was brutally attacked by the police near the Coca Cola plant in Mehediganj near the Holy city of Varanasi and hundreds have been arrested on 24th November 2004. While many of the arrested were women, there was only two women constable. Male police were manhandling women protestors who had reached the plant after one week march through affected villages and were 300 meters away from the gate, when they were lathi charged. They were kept in the open without food all night. A peaceful march of citizens defending their right to water and life is being defined as a "crime" because Coke, a criminal corporation is bribing and influencing the police to create a police state for continuing its crimes against people and nature.

As in every other coke plant, the company is extracting millions of litres of water per day, leading to a 40 m drop in water level, inspite of the plant being near the Ganga. In 2002, Coke has also dumped its toxic wastewater on the 50 acres of agricultural land. The wastewater was earlier being dumped untreated in the Ganga, but the World Bank's super highway blocked the flow into the river. Then the toxic water was allowed to flow in nearby fields till the company was ordered to remove the water by the District Administration under Section 133. Even after the draining of water, the fields yield only 10% compared to earlier corps due to toxic contamination. No mangoes bear fruit.

At every step Coca Cola has engaged in criminal activity. It has illegally occupied land of the village Panchayat, but the Court order, which called for the removeal of the plant, has not been implemented.

Coke cheated the government of 1 crore 75 lakh rupees in stamp duty, and was fined by a local court.

On 23rd of November, when the protestors including Sandeep Pandey, the Magassasy Award winner who returned his award, were meeting in Kashi Vidyapeeth, Coke sent goons to disrupt the University gathering. Four people were arrested and three vehicles with coke propaganda were confiscated.

Yet the criminal corporation bribed local police to arrest the innocent, peaceful villagers, who are already victims of Coke water theft, toxic pollution and land grab. On 10th May 2003, Jagurpa Devi had been inured during another protest; she is now a local leader.

Women protesting against water theft by
Coca Cola in Plachimada, Kerala

CHAPTER - 16

WATER PRIVATISATION

Water Privatisation has suddenly come to mean big bucks in India. With water resources in the country fast depleting and the government throwing up its hands, at least five global Corporates are ready to tap the over $ 2,000 million market. They have already set up shops in several States and are confident of seeing their projects approved, with the central government literally rolling the red carpet to welcome them. (Shiva and Jalees 2003)

To facilitate "private partnerships," the ministry of urban development in May 2003 released a set of guidelines to State governments for creating a "welcoming atmosphere" in the drinking water sector.

Neither the guidelines nor the National Water Policy, 2002, which advocates more private involvement in the water sector bother to see the result of such corporatization elsewhere in the world. As in Bolivia, where riots broke out in the city of Cochabamba after a 35 per cent increase in water bills, such experiment have been contentious almost everywhere. According to a study compiled by David Hall, director of the Public Services International Research Unit at the University of Greenwich, privatisation of water of the Philippines, Germany, Brazil, Nairobi and Argentina have led to a tremendous increase in water prices, triggering public outrage. Making profit on people's most basic needs is the dream of many corporate executives. (Shiva and Jalees 2003)

Global players are keenly watching the developments in India and are slowly seeping into the sector. Degremont, a subsidiary of France's Suez, has projects in six cities of India and has plans for further expansion. The company is dealing in treatment of water exclusively. Future expansion will depend on the kind of trade environment the government creates.

Degremont has a project in Delhi; the Sonia Vihar treatment plant is being developed by the company on a Build Operate and Transfer (BOT) contract for a fixed period of seven to ten years during which its profits are guaranteed by the government.

While private companies like Degremont have the government subsidizing their profits, other international agencies are looking forward to the civic bodies reforming their tariff structure to pay back loans.

It perceives water not as a fundamental right of the people, but as a commodity the government can no longer afford to make available to its people free of cost or at subsidised price. This approach, according to Himanshu Thakkar of the South Asia Network on Dams, River and People (SANDRP), is fundamentally flawed. "Water is a natural resource and the government owns it only because it promises to make it available to people. On what basis has the government made water a commercial product? On what basis are the private companies selling bottled water to people? Who has allowed them to make profit out of this natural resource (Joshi, 2003)

The answer to shrinking water resources and growing needs, according to Thakkar, does not lie in privatisation but in community participation and transparency on the part of the distributing agencies. Conservation efforts in India have been pioneered not by the government but by the community leaders like Anna Hazare and Rajender Singh. The irony, says Thakkar, is that while the government claims that it does not have any money to make infrastructure improvements in the existing maintenance and distribution system, it is willing to subsidise profits for the foreign trade companies in the water sector.

It is like privatising national assets and nationalizing private losses. The country is being sold and nobody has the courage to speak out. Why would a multinational invest in water without expecting you to pay back several timed the amount?

Nevertheless, Indian policy-makers justify privatisation as a necessary step for reforms in the water sector. "Everyone looks at it as a natural resource for which nobody should be asked to pay. The problem is that the water, which reaches your house has to be first taken to the treatment plants, has to be treated and then piped to homes. All this costs money. Where is that going to come from?" says Planning Commission (Joshi, 2003).

Access to a fair share of clean, healthy water is a basic human right and indeed the basis of our existence. According to the World Health Organization, 60 per cent (3.6 billion) of the world's population lacks access to essential sanitation facilities. It is estimated that in the next quarter of the century, the proportion of the world's population living in countries with significant water-stress could rise from 34 per cent (1995 figures) to 63 per cent. This would mean that water related conflicts would increase, as communities try to fulfil their basic needs.

Although, less than ten per cent of the world's water systems are currently under private control, at the present rate it is possible that the top three MNCs, i.e., Suez and Vivendi of France and RWE-AG of Germany, alone will control over seventy per cent of the water system in Europe and North America in a decade.

Vivendi that earned $ 5 billion a decade ago in its water related revenues had increased its profits to over $ 12 billion by 2002. RWE, which moved into the world market, with its acquisition of Britain's Thames Water, increased its water revenue by a whopping 9,786 per cent

in ten years. All three are among the top one hundred corporations in the world. Together, their annual revenue in 2001 was almost $ 160 billion, and is growing at ten per cent a year – outpacing the economies of many countries in which they operate. They also employ more staff than most of the governments (Barlow, 2003).

The state has a great duty vis-à-vis distribution of drinking water. Our rivers are sacred, so too our lakes and dams, which serve several social uses. Aqua robbery by corporates is becoming common. The core principle of the public law is that the state is a trustee of all natural resources and is under a legal duty to protect them. These are resources and are meant for public use and cannot be converted into private ownership (Iyer, 2003).

The ancient Roman Empire developed a legal theory known as the "Doctrine of Public Trust." The public trust doctrine primarily rests on the principle that certain resources like air, sea, water and the forest have such a great importance to the people as a whole that it would be wholly unjustified to make them a subject of private ownership. The said resources being a gift of nature, they should be made freely available to every one irrespective of the status of life. The doctrine enjoins upon the government to protect the resources for the enjoyment of the general public rather than to permit the use for private ownership or commercial purpose.

The Ganga or Narmada belongs to the people and the state cannot abandon its fiduciary obligation. It is unconstitutional, unethical and violative of human rights to sell or negotiate disposal of publicly owned water resources for mineral water rackets by industrial giants. Equally dangerous, mischievous and mala fide are permissions granted to macro corporates to dig dam to the bowels of earth, pump up waters in enormous quantities and leave the lakes and neighbouring wells deprived of the blessing of nature.

Serious questions are raised when the public properties are given to the corporations. Public funds bear the burden of public accountability (Dhawan, 2003).

Water and international financial institutions (IFIs) like the World Bank, Asian Development Bank and IMF have required developing countries to open up their water distribution to private sector investment and foreign companies as a condition of rescheduling debt. Bolivia, for example, had to accept comprehensive water privatisation as a condition of receiving new loans. And it doesn't start or end with just drinking water. Large dams are mostly built with the support (or pressure) of IFIs like Asian Development Bank, affecting not only drinking water but also the livelihoods and homes of hundreds of thousands of people.

The IMF and the World Bank, along with other financial institutions, support a 'full cost-recovery' principle. Financing criteria favour multi-utility service providers from many development providers, and this is also influencing the development of the water multinationals taking over other sectors.

As no one can survive without water, the multinational water companies have discovered a profitable market. The biggest multinational water companies come from Europe – Vivendi, Suez-Lyonnaise, Thames Water.

These companies have a record of corruption and bribery, pollution, and ignorance for the health and safety of both their employers and their customers. Extensive interlinks exist between executives from major water companies, the government and other sectors, mainly banking and international finance.

Vivendi is the world's largest water service provider through its subsidiary, Generale des Eux, and operates in 90 countries. Suez Lyonnaise des Eaux has operations in 120 countries, supplying water to 72 million people. The water industry is expanding rapidly the range of their activities and the geographic reach of their services. (Shiva and Jalees 2003)

Main strategies of entry

- Entering into public-private partnership or joint venture with an institution on the desired region. For example, Vivendi and RWE Group became major parties in 1999 in a consortium covering 49.9 per cent privatisation of Berliner Wasserbetriebe, resulting in the largest water sector privatisation company.
- Buying a share in an existing entity in desired region and eventually turning it into a wholly owned subsidiary. Vivendi has made it very clear that it wants to acquire other water companies' assets and operate them.
- Buying smaller operations that have established a presence in a geographic region or have developed new technologies.

Target areas within the water sector

The corporations are targeting four areas within the water sector. They are:

Water and waste,

Water services,

Water treatment, water-related construction and engineering,

Innovative technologies.

This can be targeted in several ways, such as developing internal capacity by acquiring subsidiaries with expertise; developing formal partnerships with other multinationals in other sectors; and entering joint ventures or one-contract partnerships with corporations in other sectors to work on individual projects.

Because of the management complications of big companies, many a times regional governments maintain ownership because of the corporation's lack of necessary regional

knowledge and wish to retain involvement in the former public sector projects. But more often, exclusive control is given to the corporation. Virtually, all successful international efforts to privatise water have focused on privatising the ownership of the existing infrastructure; a growing trend is to attain rights to water access.

WTO and Water

Water is treated as a service, under the General Agreement on Trade in Services (GATS) under WTO – water distribution and collection, waste water and so on. Under the WTO, water would be merely a tradable service. Among other problems arising, water is an essential part of agriculture, but not discussed within that framework. Instead of ministries and other bodies working with agriculture, rural development and so on, trade negotiators and multinational corporations formulate water regulations. MNCs are not interested in water availability for small farmers and communities but simply of making more profits, selling their services as the solution to the world's water problems.

By subjecting water access to market trends and WTO decision-making processes, an agreement like GATS is likely to exacerbate the world's water problems. Minority interests – mostly those of global corporations and foreign investors – would take precedence, with potentially devastating implications for fragile ecosystems and the poor communities.

Water as such is not a part of the current GATS agreement. The European Commission (EC) has now introduced a clause on "environmental service" with dead-end environmental services to whisk problems under the carpet instead of taking precautionary measures. The force behind this, are as described before, water MNCs lobbying behind the scenes in the European Commission and also USA. Key players are the likes of European Services Forum and US Coalitions of Service Industry that almost dictate the trade policy according to their needs.

European Commission

Leaked documents from the European Commission revealed an ambitious agenda for services liberation. EC is requesting WTO Members to open up a whole of sectors, including water as 'environmental service.'

Requests concerning the water sector made to SAARC countries including India, Indonesia, Malaysia, Pakistan, Philippines and Thailand all dealt with water collection, purification and distribution services through mains, except steam and hot water; wastewater services and treatment, remediation of contaminated/polluted water.

Most Favoured Nation Treatment

National treatment is one of the core principles in the World Trade Organization. It means that domestic and foreign companies should be given equal treatment, i.e., the same benefits.

Conditions of competition should not be in favour of Member's domestic services industry. Another core principle is the Most Favoured Nation (MFN) treatment,

which means that members must give other members' "treatment no less favourable than that accorded to like service and service suppliers of any other country." MFN treatment prohibits preferential arrangement among groups of Member States in certain sectors or of reciprocity provisions, which confine access benefits to trading partners granting similar treatment.

Thirsting for Profits

The Global Corporates are thirsty for profit as shown by the following examples (Shiva and Jalees 2003):

- The World Bank estimates the global market for water to be worth $ 800 billion.
- The price of one litre bottled water could deliver 3,000 litres of tap water to homes.
- Ten corporate giants are vying for control, including French based corporation Vivendi, Suez-Lyonnaise des Eaux and Bouygues (Saur); US based Enron (Azurix); German based RWE Group; and UK based companies Thames water, United Utilities, Severn Trent, Anglian Water, and the Kelda Group.
- Four of the top 10 water companies are ranked among the 100 largest corporations in the world by the Global Fortune 500: the RWE Group (no. 63), Vivendi (no. 69), Suez-Lyonnaise (no. 70) and Enron (no. 85).
- Vivendi and Suez-Lyonnaise are considered the General Motors and Ford Motor in the global water industry. Suez operates in 120 countries and Vivendi in 90 countries around. Together, US $ 10 billion out of their combined revenues of US $ 70 billion comes from water service alone.
- The global water industry is going through constant rapid changes. Between 1994 and 1998, there were no less than 139 water related mergers and acquisitions. In 1999, the rate of acquisitions and mergers reached record levels, including the acquisition by Vivendi of the US Filter Co., valued at over US $6 billion.

Externally Aided Projects in Urban Water Supply and Sanitation in India

So far, 15 projects have been implemented with World Bank/French assistance. The Ministry of Urban Development also supports external aided projects in the water supply and sanitation sector (Website of Ministry of Urban Development and Poverty Alleviation, Government of India, 26 December 2002). Currently, 19 projects are in different stages of Implementation. The details are in tables.

Table 16.(1) : Projects Implemented

Sl. No.	Name of Scheme	Cost (Rs. Crores)	External Assistance (US$M)	Agency	Year of Completion
1	Bombay Water Supply & Sanitation Project Phase-I	185.00	55.00	World Bank	1981
2	Maharashtra Water Supply & Sanitation Project	86.00	48.00	World Bank	1985
3.	Punjab Water Supply & Sanitation Project	67.00	38.00	World Bank	1988
4.	UP Water Supply & Sanitation Project	60.00	40.00	World Bank	1983
5.	II Bombay Water Supply & Sanitation Project	640.00	196.00	World Bank	1988
6.	Rajasthan Water Supply & Sanitation Project	137.76	80.00	World Bank	1988
7.	Gujarat Water Supply & Sanitation Project	207.33	72.00	World Bank	1991
8.	Tamil Nadu Water Supply & Sanitation Project	321.66	73.00	World Bank	1994
9.	Kerala Water Supply & Sanitation Project	127.88	30.11	World Bank	1994
10.	Madras Water Supply & Sanitation Project	255.95	69.00	World Bank	1996
11.	III Bombay WS & S Project	915.00	145.00	WB	1996
12.	Gujarat Urban Development WS Project	208.00	62.00	WB	1995
13.	U.P Urban Development	463.86	150.00	WB	1996
14.	Hyderabad WS & S Project	337.8	311.5	WB	1998
15.	Integrated Packed Water Treatment kiosk for high grade drinking water at Kangchup, Imphal, Manipur	4.75	FF 7.145	French Assistance	1998

Source: Website of Ministry of Urban Development and Poverty Alleviation, Government of India, 26 December 2002

Table 16.(2) : Projects under Implementation

Sl. No.	Project	Cost (Rs. crores)	External Assistance (Million/Agency)	Cumulative Expenditure (Rs. Crores)	Cumulative Disbursement (in Million)
1.	II Chennai WS & Sanitation	78.79	US $ 86.5 WB	623.50	US $ 66.66
2.	Functional Improvement to WS & Sewerage in Chennai	598.70	Yen 17,098 JBIC (Japan)		Yen 1,211.192
3.	Bombay Sewage Disposal	1,131.57	US $ 192 WB	759.82	US $ 127.75
4.	Bangalore WS & Sewage	1,100.00	Yen 28,452 JBIC		Yen 11,738
5.	WS & S of Bangalore city	98.76	FF 50 French		FF 8.969
6.	Preparation of WS & Environmental Sanitation	19.00	A $ 6.7 Aus aid		—
7.	WS Thiruvananthapuram, Kozikode, Pattuvam, Meenad, Cherthala and Adjoining areas	901.15	Yen 11,997 JBIC (Japan)		Nil
8.	Shimla Sewerage Project	54.80	US $ 10 OPEC	7.97	US $ 2.99
9.	Sewage Plant at Rithala	81.127	FF45 French		FF40.05
10.	Upgradation & Augmentation of Kangchup water	40.50	FF31.65 French	40.25	FF.32.66
11.	Study if evaluation of losses & leakages in the water distribution system of Jaipur	—	FF 13.686 French		FF.8.663
12.	Feasibility Study of water and sanitation of Jaipur	—	FF 11.8 French		FF.8.26
13.	Artificial groundwater recharge and wastewater reuse for Jaipur	—	FF 4.945 French		FF.0.88
14.	Improvement of WS Distr. Management in Calcutta	32.05	FF 36.00 French	8.5	FF 8.84
15.	Prep. of Kolkata WS & S	—	US $ 2.5 WB	—	US $ 0.58
16.	Preparation of Gangtok Urban Water Supply & Sanitation	—	USAID $ 23.43 (Stage I)		—
17.	Preparation of Shillong Urban Water Supply & Sanitation	—	AUSAID A$6.00 (Stage I)		—
18.	Integrated WS & Sewerage Scheme for Vishakhapatnam	65.70	FF 98 M French		

Some Myths and Reality

World Over, WTO and the World Bank have been pushing for privatisation of water, as in other sectors. In India too, there is a strong push in that direction. For example, in States like UP, Karnataka, Maharashtra and Rajasthan, various World Bank Projects are pushing in this direction. In States like Gujarat, Madhya Pradesh, and Chhattisgarh, Asian Development Bank is pushing in this direction.

Following are some examples (of course, there can be more such instances) to show the reality as against the myths propagated in support of water sector in WTO agenda (A dossier by South Asia Network on Dams, Rivers and People, Delhi 2003).

Myth 1: **New Policies (NP) would increase investments in the sector**.

Reality: The Portuguese government financed the building of a new water treatment plant in Matsulu, Nelspruit. The South African Government constructed it, and operated it for one year. After this it was given as a gift to the water multinational, Biwater as per the understanding. The MNC is currently increasing prices in Nelspruit, even through this company contributed nothing to the project.

Myth 2: **NP would lead to more efficient Water Sector**.

Reality: The people of Nairobi, Kenya, for example, were forced to fork out over R (Rands) 160 million when Nairobi's water was privatised to French multinational, Generales Des Eaux. Soon after the company, they decided to install a new (but not budgeted for) R 1.5 billion billing and revenue collection service. Although the Mayor complained, the company proceeded and put water prices up by 40 per cent in order to pay for the new system. During this time, 3,500 municipal workers were replaced by 45 foreign staff who earned massive salaries from a total R 13.6 million in the second year of the contract, rising to R 31.2 million per year by the end of the contract.

Privatisation of water was also found bad for the poor of Guinea. Before privatisation in 1989, fewer than 40 per cent of the urban population had access to piped water. The Government was short of funds and needed donor finance. Private participation was a condition of World Bank lending. The work force was cut almost in half form 504 employees to 290 and right after privatisation, water prices were increased. The connection rate rose only by 9 per cent by 7 years leaving over 30 per cent of Guineans still without water. The high price of water meant people could not afford to get connected; it was difficult for even wealthy people to pay.

Myth 3: **NP would provide clean water.**

Reality: The most recent example is the World Bank' role in creating the conditions that caused the current cholera epidemic in South Africa.

Myth 4: **NP would provide equitable access to water.**

Reality: The World Bank's insistence on full cost recovery service cut-offs to those unable to pay forced a number of communities to access unclean water sources in South Africa recently.

The World Bank has funded some rural water schemes in Ghana. These have failed because the Bank demanded that rural communities pay upfront cash amount towards constructing the water system. "The policy has resulted in excluding poor communities incapable of paying from enjoying their right to consume potable water," says the CAP-Ghana of Water.

Myth 5: **NP would provide sustainable water services.**

Reality: Biwater, which privatised Nelspruit's water, withdrew from a Zimbabwean water privatisation project when it became clear that citizens could not pay the tariffs that would be required for Biwater to make a profit.

Myth 6: **NP would mean less corruption.**

Reality: The World Bank's preference for massive projects led to the exceedingly and unnecessary expensive (and fatally corrupt) Lesotho Highlands dam project, which caused water price to jump, forcing even more communities to be a cut off. Twelve multinationals are being prosecuted for paying bribes in connection with huge water engineering contracts for the water supply scheme. [The trial began in Lesotho Government for what is expected to be a very complex and costly trial.]

In France, the home of 'delegated management' (the World Bank's favourite form of privatisation), the major multinationals have been convicted of bribery. In Milan, in neighbouring Italy, police are investigating politicians' alleged role to have received bribes from a private company for a concession to build a new sanitation plant.

In Indonesia (during the infamous Suharto's regime), Jakarta's water was privatised through a French and a British consortium: both were in partnership with companies owned by Suharto's relatives and cronies.

Some of the World Bank Researchers note: "Our empirical research provides clear evidence of the importance of public procurement corruption, defined as efforts to secure public contracts through payment of kickbacks to officials, as an oft-used channel of influence as well." "…the extent to which firms with foreign direct investment and transnationals are also involved in playing public procurement kickbacks and engaged in other forms of corruption." …"Conventional recommendations of economic and trade liberalization advocated to address administrative corruption will not suffice."

The two dominant water multinationals, Suez-Lyonnaise and Vivendi, are convicted in corruption cases.

Myth 7: **NP would make water sector economically viable.**

Reality: The World Bank's preference for massive projects led to the exceedingly and unnecessary expensive (and fatally corrupt) Lesotho Highlands dam projects, which caused water prices to jump, forcing even more communities to be cut off.

Myth 8: **NP will create competitive market, to the advantage of consumers.**

Reality: Water and Sanitation sectors by their very nature create monopolies in their respective service areas.

There are only four European multinationals that have the monopoly worldwide on water for profit. One of these, French Vivendi, has recently started raising water prices in the poorest countries of the world because they need extra cash to inject into a Hollywood studio they acquired recently.

Myth 8: **NP has been successful elsewhere.**

Reality: In Europe, water privatisation has been failing for decades, and in several towns water has been "re-municipalised" or taken back from whichever multinational messed up the service.

In Africa, recent research conducted by London-based Greenwich University's Public Service International Research Unit uncovered that where water was privatised, it was as disastrous as the European experience.

Elements of Water Supply Privatisation

Privatisation of water supply can involve any or all components from the source of water (say a dam), filtration and distribution, to the collection, treatment and disposal of wastewater and sewage. Hence the term normally used is Water Supply and Sanitation (WSS). The privatisation itself can be at various levels and of various types. A brief summary is given below (Dharmadhikary, 2002):

Service Contracts – Involves short-term contracts for provision of specific services. For example, metre reading and billing. No financial risks are involved, and also there is no direct legal relationship with the consumer.

Lease / Management Contract – As the name suggests, either the private company leases out of the facility from the civil authority, or the latter appoints the company for managing the facility. In either case, the ownership remains public; private company is normally not responsible for new investments or expansion. Some commercial risk is involved in so far as day-to-day operations are concerned.

BOOT Contracts – Build Own Operate Transfer Contract in which the private company builds some part of the infrastructure - say the treatment plant, or filtration plant – and runs it for a regular charge on the system. Normally, these would be long-term contract, with a purchase agreement that would guarantee a minimum demand (the equivalent of the "take-or-pay" clause of Power Purchase Agreement (PPAs) in the power sector).

Concessions – Long term contracts in which the private company takes full charge of the system, takes responsibility for the provision of the service and is also responsible for expansion, new investment, recover of bills, etc.

Divestures – Where the Government divests its equity in a utility that is then bought off by a private company. This may be full or part divesture.

In most cases, the establishment of an independent regulator, whose functions normally include setting the tariffs, is a part and parcel of privatisation.

While the private sector participation in water supply is just beginning in India, it has been extensive in Latin America and Southeast Asia. What are the implications of the privatisation of water supply? To understand this, we need to look also at the experience of water privatisation in other countries.

Bolivian Experience in Water Privatisation

It is unlikely that many would have heard of Cochabamba before 1999. Till this time, the city was probably best known for the El Cristo de la Concordia, an immense statute of Jesus Christ, higher than the Cristo del Corcovado in Rio de Janeiro in Brazil. The beautiful Andean city of Cochabamba in Bolivia lies in a fertile valley at 2,558 metres above sea level, surrounded by the Tunari hill, the Alalay lagoon and the San Sebastian hill (Dharmadhikary, 2002).

In 1999 began the story that was to bring a different sort of notoriety to Cochabamba. In 1999, the whole system of water supply for this city was handed over to a consortium of private companies called Aguas Del Tunari, led by the American corporation Bechtel. The water supply system in the city was in a mess, plagued by chronic shortages, and most of the poorest neighbourhoods did not have access to piped supply. Privatisation of water supply was projected as the only solution to solve its many problems. Brought in with the intention of improving the water supply in the city, Aguas Del Tunari was given extraordinary special considerations to attract it to invest in the city.

The Rs.12,500 crores concession (contract) was for 40 years, and assured the company a rate of return on investment of 15 per cent, linked to the consumer price index of the USA. It also gave the company full rights to all the water in the district. The immediate result was that the water charges doubled, and then trebled. On the outskirts of the city, some of the communities had built their own cooperative water supply systems based on common tube wells

and distribution networks about 5 years before the concession was signed. Aguas Del Tunari was given the right to install metres on the wells of these community systems, and not only that, charge the people for the metres too. The rapidly rising prices resulted in the average worker being charged about 25 per cent of his/her salary as the monthly water bill As the prices rose, the company declared – without any hesitation or remorse – that it would disconnect all those who could not pay for the water.

As the anger spread, the people took to the streets. The crowd captured the central plaza in the city. Instead of mediating between the people and the company, the Government brought in the army to suppress the people. The main leaders of the movement were arrested. The struggle became more intense – people started calling it la Guerra del aqua – the Water Wars. One day in April 2000, as the army confronted the people, a 17 year-old boy, Victor Hugo Daza was killed. This was the turning point in the struggle. There was no looking back after this, and the company finally had to leave the country.

A Jolt and a Wake Up Call

Cochabamba came as a huge shock to those advocating privatisation of water supply. Since about a decade and a half, the winds of privatisation and globalisation have been blowing all over the world. Around the globe, sectors that have traditionally been in the public domain are being privatised. These include power, transport, railways, insurance, and water.

The company has now filed an arbitration proceeding in the International Centre for the Resolution of Investment Disputes (ICSID), a dispute resolution mechanism created by and located in the World Bank. Aguas Del Tunari / Bechtel is suing Bolivia for 25 million US dollars (Rs.120 crores) for losses. The proceedings in this Centre are carried out in total secrecy and the common people, including people affected/to be affected by its decision have no say. Further, Bechtel has resorted to fudging to take its claims to this centre. It has claimed itself to be a Dutch Company to take advantage of a Bolivia-Dutch treaty, which invokes the ICSID in case of any trade dispute. Bechtel shifted its registration to Holland only after the Cochabamba concession was signed. In early September 2002, several hundred organisations from all over the world wrote to the World Bank to conduct the proceedings of this arbitration in public, and allow the people of Bolivia to become parties to the proceedings.

Structural adjustment programmes have forced country after country to adopt the programme of LPG – Liberalisation, Privatisation and Globalisation. It is being argued that LPG is the only path to economic development. The reasoning given for this is that the Governments no longer have the funds required for the huge investments necessary in these sectors. Further, Governments have proved to be inefficient, corrupt and must make way for the more efficient private sector.

Since water is such a vital part of the economy and infrastructure, it is not surprising that there has been an enormous push for the privatisation of water services. As a result, in many parts of the world, the water sector has seen large-scale privatisation. The events in Cochabamba came as hard reminder that the rosy picture of privatisation of water services also had plenty of thorns. And Cochabamba is not an isolated case. As it happened in Cochabamba, it also helped focus the world's attention on many similar, albeit not so dramatic, cases.

Past few years have seen growing push in India for bringing in private companies in a big way in the water sector. This privatisation of the sector raises a large number of issues. It is necessary that this be preceded by intense debates, discussions and in-depth examination. Otherwise, who knows how many Cochabambas may take place in India?

Failure of Water Privatisation in Manila

The privatisation six years ago of Manila's 120 years old Metropolitan Waterworks and Sewerage System (MWSS) was the world's first and largest such effort. International funding agencies have since upheld the Manila System as a success story urging other Asian countries to adopt the model.

But if the Philippine NGOs like Freedom from Debt Coalition and the Institute for Popular Democracy are to be believed, Manila is a basket case of privatisation's failure. While the water supply has improved for the city's wealthy, tariffs have skyrocketed 150 per cent. Many communities do not have water connection. The private companies are not concerned about water conservation and have reneged on their commitments (Chinai, 2002).

The privatisation of MWSS was carried out, notwithstanding opposition from civil society groups, among them the Freedom from Debt Coalition (FDC). Among the issues raised by FDC was the nature of water as a service, not a source of money. FDC views water as too important a resource to risk giving its provisioning to corporations whose primary motive is profit. This is further exacerbated by the Philippine government's lack of a credible regulatory capacity and its political system's malleability and being open to capture by vested interests.

The people's wariness against the turning over of water provisioning to private hands was drowned out when the results of the bid were announced. Maynilad submitted a bid of P 4.96/ cum while Manila Water submitted P 2.32. The pre-privatisation rate of MWSS is P 8.78 per cubic metre of water. Promoters of privatisation were blowing their trumpets, proclaiming to the world the merits of privatisation (Freedom from DEBT Coalition).

MWSS five years later

Did privatisation succeed in bringing water to the people of Manila? Less than five years after the privatisation of MWSS, the failure of privatisation was for all to see.

Not even five years has passed after MWSS was privatised, the only tangible gain brought about by privatisation, low water rates, went in tatters. Maynilad, from its P 4.96 bid, is now charging its customers P 15.46 per cubic metre. How was this possible? The Lopez-owned Maynilad was able to ally itself with the MWSS Regulatory Office's Chief Regulator himself to push for an amendment to the contract to allow them to increase tariff rates through an automatic currency exchange rate adjustment (auto-CERA) mechanism. This was despite the fact that the auto-CERA mechanism has no basis in the concession agreement.

Although the increases were not enough to cause riots, subsequent increases might. At an ongoing rate of raising process at MWSS, Maynilad is asking for a P 30.92 per cubic metre of water.

ADB and Maynilad

The Asian Development Bank (ADB), lender of almost half of the loans assumed by Maynilad when MWSS was privatised, pushed for the contract revision, which will allow Maynilad to increase water tariffs. It argued that the increases were necessary to make Maynilad viable. The contract was amended, tariffs increased, and people's lives became harder, but Maynilad still wants more rise in tariff rates.

Maynilad did not become viable. And ADB knows it. The Bank now wants Maynilad to secure a sovereign guarantee from the Philippine government before it will release a $ 350 million term loan to the ailing water firm. What in effect has happened is that the profits were privatised while the risks remained with government and ultimately, in taxpayers' hands.

Private is not always better than public sector

When government privatised MWSS, it was with the steadfast belief that the private sector can do wonders for the water sector because it will make the MWSS run efficiently.

In the view of Maynilad, the company should have registered profits starting 1999. Instead, Maynilad is losing, and losing big. In the year 2000, they were supposed to earn P 604 million but actually incurred P 2.4 billion in losses. In 2001, instead of earning P 477 million, they lost P 1.037 billion.

Why? Because of high non-revenue water (NRW). According to their targets, NRW should have been decreased to around 30 per cent by 2001 from 57 per cent in 1997. Instead, NRW ballooned to almost 66 per cent. Maynilad is also losing big bucks because of the firm's inability to efficiently collect water tariffs.

Worse, Maynilad is squandering its money not on capital expenditures such as laying pipes but on the salaries of its pampered executives, both foreign and local alike. It has also incurred very high advertising costs.

Indian Experience: Agitation in Sivaganga

People in Sivaganga in Tamil Nadu are agitating against a soft drink maker's plans to exploit large amount of water from the region, which is already facing water scarcity. On 28 April 2003, more than 7,000 people participated in a rally against Sakthi Sugar Mills at Padmathur. The sugar mill has entered into a contract with the soft drink maker to prepare and package some of its products, using its groundwater resources, 75,000 litres a day. Unlike at Plachimada in Kerala where the resentment among the local people manifested as an angry protest only three years after the bottling plant began operation, the agitation in Sivaganga is a pre-emptive one (Viswanathan, 2003).

The plant will have a production capacity of 600 bottles per minutes; the packaging units might resort to indiscriminate exploitation of groundwater, which would lead to scarcity of water for drinking and irrigation purposes. The unit had plans to dig bore wells up to a depths of 3000 ft. on the Vaigai river bed, besides using the unutilised part of the quantum of water permitted specifically for industrial use by sugar mill, which is 49 lakhs litres a day.

The plant would affect the water supply to Sivaganga, Manamudari, and Thiruppuvanam towns and about 80 villages. The effluents let into a canal during actual run of the unit caused the death of couple of cows and some sheep in a village close to the factory.

In the Thiruppuvanam panchayat union, where the wells of the Sugar mills are located, the groundwater reserves have fallen significantly from 13,351 hectares metre in 1985 to 7,463 hectares metre in 1992. The intensity of ground water extraction has increased rapidly. The quantum of water, drawn as a proportion of the water remaining underground, increased from three per cent in 1985 to six per cent in 1992.

Water Privatisation in Palakkad District of Kerala

Coca-Cola and Pepsi, arch-rival and thirst-busters for millions worldwide, have found common cause in Kerala against protest groups agitating against the way the bottling units of the two multinationals are depleting and polluting groundwater resources to the detriment of people in the drought-prone district in Palakkad (Kumar, 2003).

Within two years of its inauguration, and especially since April 2002, protests had become a regular feature in front of the Coca-Cola unit in Plachimada, as several places in Chittur taluk, including 10 colonies of Dalits and tribal people, began to experience a severe drinking water shortage. Despite the company's claims that the unit is a "greenfield soft-drink bottling factory," where a major share of the water not bottled, is recycled and used to recharge the groundwater, residents of surrounding villages continued to complain that indiscriminate extraction of groundwater had dried up many wells and polluted several others.

The company's initial attempts to provide water in truckloads to some of the affected villages was not appreciated, and the agitators continued to demand that it should take steps to restore groundwater aquifers and ensure continuous water supply in the affected villages, or face the prospect of closure.

Ironically, the bottling unit was established in 2000 on 38 acres (15.2 hectares) of mostly multi-cropped agricultural land, barely 2 kms away from the river Chitturpuzha and near a number of reservoirs and irrigation canals. Until recently, according to the protesters, every day the company drew nearly 1.5 million litres of groundwater and about 85 truckloads of products left the factory premises.

A study conducted by some well-known environmentalists, and members of the Kerala Sastra Sahitya Parishad (KSSP), too had warned that the extraction of groundwater by Coca-Cola at the current rate would stem the possibility of groundwater recharge and lead to deficient rainfall pattern of the region. The report also warned of deterioration in the quality of groundwater as a result of over-exploitation. The State government had refused to take note of the plight of the villagers or to ask the company to curtail the extraction of groundwater.

The Pudusseri Panchayat has cancelled the license of Pepsi unit, because the people of the village and surrounding areas had experienced one of the worst instances of water scarcity this year. There was a severe shortage of drinking water. While earlier there was enough water to operate the pumps for four to five hours a day, this year the pumping had to stop in less than an hour. The panchayat had examined these factors in detail and found that the Pepsi unit had been indulging in over-exploitation of groundwater sources, given the general drought situation prevailing in the area. (Shiva and Jalees 2003)

Privatisation of water: The Tiruppur case

Tiruppur has entered into the global map by virtue of the fact that the knitwear industries located in this town contribute to Rs.4,500 crores every year by way of foreign exchange. Tiruppur, the largest producer of knitwear products in India, is located in Coimbatore district in western Tamil Nadu. The population of this town is about 255,000. This town however starves due to inadequate water for both industries as well as for domestic uses. Agriculture is also badly affected and stressed due to lack of water. This region does not have any perennial water supply from surface sources. The groundwater is depleted with water dropping up to 1,200 feet in many parts of the district.

New Tiruppur Area Development Corporation Ltd. (NTADCL), a company is initiated to supply water to the industries of Tiruppur town and to the domestic users. This is a project in which many agents are participating. They are Tamil Nadu Government, Tiruppur Exporters' Association (TEA), Tiruppur Municipality, Infrastructure Leasing and Financial Services Ltd. (IL & FS), the Tamil Nadu Corporation for Industrial Infrastructure Development Ltd. (TACID), NTADCL

and Indo-US Financial Institutions Reform and Expansion (FIRE) Project. This project aims to supply 185 million litres of water per day from Bhavani river to cater to the needs of about 100 dyeing and bleaching units located in this area as well as to supply water to 1.6 million people located in the Tiruppur municipality and the adjacent Panchayats. The detailed project components are the following (Janakrajan, 2003):

- Treated piped water supply of 60 million litres per day (MLD) to Tiruppur municipality and 21 adjoining towns and village panchayats.
- Treated water supply of 100 MLD to over 700 dyeing and bleaching industries within the Tiruppur Planning Area.
- A sewerage system for Tiruppur.
- Onsite sanitation facilities for 88 designated slum areas within Tiruppur municipality.

NTADCL will be responsible for transmission, treatment of water supply, distribution of water outside municipal limits where most of the industry is located, treatment of the collected sewage and maintenance of the sewage treatment plants.

Resource mobilization of the project: Basically, TEA, TACID and IL & FS together are responsible to design and execute the project. Therefore, a public limited company called New Tiruppur Area Development Corporation (NTADCL) was formed in 1995 to see through the project. The NTADCL will contract out the construction and maintenance of the system to a Build, Operate and Transfer (BOT) consortium, which is the Mahindra Consortium (Mahindra & Mahindra, United International, North West Water, and Bechtel). USAID has provided long term (30 years) loan guarantees for US $ 25 million with IL & FS to help finance this project. Total estimated cost of the project is Rs.12 billion of which equity share of Rs.3.9 billion will be contributed by the Union Government, IL & FS, the Tamil Nadu Corporation for Industrial Infrastructure Development, the Tiruppur Exporters Association and the Mahindra-led consortium. The project has a debt component of Rs.6.98 billion and a subordinate debt of Rs.750 million.

The project is supposed to be in full operation within six years. It is boasted that this is the first public-private partnership project to access commercial funds for the water sector in India. The Tiruppur experiment is going to be the benchmark for private initiatives in the sector and it will build a strong case for private financing of water projects in India in the future.

Treatment of effluent generated by the industries is not taken care of by the company. One of the important processes in the making of knitwear products is dyeing and bleaching. This particular process not only consumes enormous quantity of water, but almost the same quantity of water is discharged as effluent. The major part of effluent is discharged into the Noyyal river and to a significant extent in other small streams such as Nallar and Jamunai rivers. The available evidence confirms that the effluents discharged by these units are quite hazardous

causing serious health problems. This is evident from the type and extent of chemicals used in the bleaching and dyeing processes. The estimated water requirements of the bleaching and dyeing units in Tiruppur is about 120 million litres per day (mid) of which about 60 per cent is met by groundwater as transported by the tanker-trucks from the rural neighbourhood. What is really disturbing is the fact that a comparable quantity of water is let out as effluent in the Noyyal river and other streams, which has already caused permanent damage to the river, top soil and most important of all, the groundwater.

Even 30 years earlier, the local textile operators have confirmed that groundwater is contaminated around the areas where dyeing and bleaching units discharge their effluents. In the absence of any perennial source of surface water, the villages around Tiruppur entirely depend upon groundwater for agriculture. As groundwater is contaminated, agriculture as the key occupation seems to have been abandoned in many villages.

The Government of Tamil Nadu has constructed a dam across this river (called Orathapalayam dam) in the year 1992, about 10 kms below the Tiruppur town, with a view to provide irrigation for 8,000 hectares. This dam's catchment area is 2,245 sq. kms, which includes most of the area in which the dyeing and bleaching units are located. The construction of this dam has turned out to be a mockery and has resulted in the wastage of public resources. This is simply because a large quantity of water (about 120 mld) consumed by the Tiruppur dyeing and bleaching units is conveniently led into the Noyyal river (in the form of untreated trade effluent), contributing thereby to the 'additional storage level' of the dam. Thus, the dam effectively performs the role of a storage reservoir for the contaminated water, contributing quite significantly to the pollution of environment, in particular, groundwater. Unless 20,000 cusecs of water is released into the river Cauvery, a major river into which Noyyal joins in the downstream. The release of water from the Orathapalayam dam would be extremely harmful to the crops, soil, animals and groundwater.

In February 1997 when there was no appreciable flow in the river Cauvery, the water from the Orathapalayam dam was released with a view to minimize the damage to the villages around the dam. Since the dam was opened without any prior public notice, it resulted in a great havoc to crops, animals, soil and groundwater. This polluted water of the Noyyal river joined Cauvery 32 kms down the Orathapalayam dam. It is reported that the water quality remains bad even at 300 feet depth, rendering it unfit even for irrigation.

If the new water company in Tiruppur brings additional water (185 million litres per day), the pollution threat is going to escalate further. The existing common effluent treatment plants (CETPs), a total of eight, hardly function but satisfy the Supreme Court order. Further, these CETPs are not designed to treat the TDS, which is the biggest pollutant. Since the treatment system is very expensive, no industry is willing to treat the effluent. Therefore, the new company will pose additional problem by bringing more water to the town.

The other problem related to Water Company is the fixing of the price of water for the domestic users. The rates are not decided so far but it goes without saying that the new rates for water is going to adversely affect the common man in the region. (Shiva and Jalees, 2003)

In brief privatisation of water will have devastating implications, some of them are listed below (Sharma and Naqvi 2004).

(i) Privatisation is an attack on the community rights over water.

(ii) Privatisation of water will result in the hike of water tariff.

(iii) Privatisation of water will reduce the availability of water.

(iv) Privatisation of water will affect the quality of water.

(v) Privatisation of water will result in the exploitation of consumers.

(vi) Privatisation of water will result in huge benefits to the Multinationals at the cost of survival of consumers.

(vii) Privatisation of water will lead to the corruption.

(viii) Privatisation of water will cause the retrenchment of the employees.

(xi) The water is privatized; it is difficult for the Government take control over the water again.

(x) Privatisation of water will result in number of diseases due to poor quality of water.

Privatization Of Ganga

In response to a request from the United States government for the purchase of land from indigenous people for colonists who were arriving thick and fast from Europe and further east, Chief Seattle in 1852 wrote a moving piece of prose, so poetic and metaphoric of rivers and worth quoting. Chief Seattle wrote:

The shining water that moves in the streams and rivers is not just water, but the blood of our ancestors. Each ghostly reflection in the clear waters of the lakes tells of events and memories in the life of my people. The water's murmur is the voice of my father's father. The rivers are our brothers. They quench our thirst. They carry our canoes and feed our children. So you must give to the rivers the kindness you would give any brother (Davies and Day, 1998).

The words of Chief Seattle are relevant for any river of India, be it Ganga or Brahmaputra. The words also convey the agony, anguish and the loss of livelihood, if the rivers are privatised or if their waters are diverted for sale for profit, at the behest of thirsty corporate houses and MNCs.

Suez: Privatising the Ganges to create water markets in Delhi

On 9 August 2002, on the eve of the Quit India Day, more than 5,000 farmers of Muradnagar and adjoining areas of Western Uttar Pradesh gathered in a rally at village Bhanera to protest the laying of a giant 3.25 metre-diameter pipeline to supply the water from the river Ganga to the Sonia Vihar water Plant in Delhi. The project, which has been contracted to Suez-Ondeo Degremont of France by the Government of Delhi, will deprive the richest farmlands of India of irrigation water.

The foundation stone of the Sonia Vihar water treatment plant was laid down on 21 June 2002 by the Chief Minister of Delhi, is designed for a capacity of 635 million litres a day on a 10 year BOT (Build, Operate and Transfer) basis, at a cost of 1.8 billion rupees (approximately 50 million dollars). The contract between Delhi Jal Board (the Water Supply Department of the Delhi Government) and the French company Ondeo Degremont (subsidiary of Suez Lyonnaise des Eaux Water Division – the water giant of the world) is supposed to provide safe drinking water for the city.

The water for the Suez-Degremont plant in Delhi will come from Tehri Dam through the Upper Ganga Canal up to Muradnagar in Western Utter Pradesh and then through the giant pipeline to Delhi. The Upper Ganga Canal, which starts at Haridwar and carries the holy water of Ganga up to Kanpur via Muradnagar, is the main source of irrigation for this region.

The rally at Bhanera village on 9 August 2002 was the culmination of the 300 kilometre-long mobilization drive along the Ganga by the farmers of Garhwal and inhabitants of the devastated city of Tehri to liberate the river from being privatised. The rally was launched from Haridwar – one of the oldest and holiest cities of India built on the banks of Ganga – where hundreds of farmers, together with priests, citizens and worshippers of Ganga announced that "Ganga is not for sale," and vowed to defend the freedom of this holy river. Thousands of farmers and others in villages along the route joined the rally to declare that they would never allow Suez to take over Ganga waters.

More than 300 people from across the country, representing over a hundred grassroots groups, intellectuals, writers and lawyers joined the rallyists, at the three-day Convention on Earth Democracy – People's Rights to Natural Resources, organized by Navdanya from 10 to 12 August 2002, at Indian Social Institute, New Delhi. The Convention sought to provide evidence of the state's violent appropriation of people's land, water and biodiversity, and evolve common action plans and strategies to defend collective community rights to resources.

"There is only one struggle left - the struggle for the right to life," said Magsaysay Award winning writer Maheshwata Devi. Eminent author Arundhati Roy and Dr. Vandana Shiva stressed the urgent need to take collective united action to defend people's rights to land, water and biodiversity.

(Shiva and Jalees 2003)

Mother Ganga Is Not For Sale
The Haridwar Declaration

Today, the 8th of August 2002, on the eve of the 60th Anniversary of the "Quit India Movement," we all have gathered here to pledge that:

We will never let the river Ganga to be sold to any Multinational Corporations. Ganga is revered as a mother (Ganga Maa) and prayed to and on its banks important ceremonies starting from birth till death are performed (according to Hindu religious practices). We will never allow our mother or its water to be sold to Suez-Degremont or any other corporations.

The sacred waters of the Ganga cannot be the property of any one individual or a company. Our mother Ganga is not for Sale.

We boycott the commodification and privatisation of the Ganga and any other water resources.

We pledge to conserve and judiciously use our regional water resources to save our environment and ecology, so that we would gift our coming generation a clean and beautiful environment as well as safeguard their right to water resources.

We pledge and declare that the local community will have the right over the local water resources. It is the duty of the local community to conserve and sensibly utilize their resources. Anyone from outside the community whether an individual, an organization or a corporation have to take permission of the Gram Sabha for utilizing these resources.

The river Ganga was brought upon the face of earth by Bhagirath through his yagna (prayers) to sustain the existence of life on Earth. The Ganga is now intrinsic to our culture and a part of our heritage and our civilization. Our life and progress over the millennia has been dependent upon the sacred waters of Ganga. We will fight any multinational company trying to take away our rights to life by privatising Ganga waters. The " Water Liberation Move ment" will continue till we liberate the sacred waters of Ganga from clutches of corporations, like Suez-Ondeo Degrement.

Shiva etal 2002

As discussed in chapter 13 "Water Crisis in Delhi", the Sonia Vihar plant is being developed on a basis of BOT contract for a fixed period of ten years, the profit of the Sonia Vihar Treatment Plant is guaranteed by the government during the period. In an interview to a national magazine, a senior manager with Degremont said, "right now, we are happy with a profit of Rs. 10 crores per annum. Other companies may be content with managing and operating existing plants owned by individual civic bodies. But we don't want to dabble in that. We have very strict quality control and would like to maintain our image as quality providers to our clients" (Joshi, 2003).

However, the Multinationals like Suez-Degremont are notorious to build poor infrastructure with no compliance to safety norms. On 25 June 2003, five people including one engineer died at the Rithala Sewage Treatment Plant (STP) in Delhi, which is managed by Suez-Degremont (Hindustan Times and Indian Express, New Delhi, 26 June 2003). According to Sanjay Sharma, union leader of Delhi Jal Board (DJB), this is the fourth incident in six months killing a total of eleven persons. Workers at the site are not provided with even the basic safety gear. There are no gloves, workers are never given gas masks or oxygen cylinders despite the air around the flotation units being foul; they have just rope.

The Rithala plant treats 80 million gallons per day (MGD) of sewage. DJB manages half of the sewage and the other half by Degremont. The Degremont, plant had been inaugurated by the Chief Minister Ms. Sheila Dikshit in October 2002.

With such a poor record of safety and maintenance, the Suez-Degremont Sonia Vihar Plant has no legitimacy or justification.(Shiva and Jalees 2003)

The pipeline of Suez Degremont to supply water from Upper Ganga Canal (near Muradnagar) to Delhi has been laid through the following villages in Ghaziabad district.

1. Kushalya
2. Masoori
3. Nahal
4. Kallu Garhi
5. Dasna
6. Qazipura
7. Mehrauli
8. Vijaynagar
9. Duraheda
10. Chhajarsi
11. Makanpur
12. Gazipur

After great agitation, the farmers whose land has been acquired are offered meagre amount of Rs.47,000 to Rs.61,000 per bigha, that too in several instalments.

Who is paying for Corporate Profit?

Privatisation of water has been justified on the ground that full cost must be paid when water giants get water markets, whereas with water privatisation they demand a full price from the people. As the case of the Delhi Water Plant shows, the corporate giants get the water for

free without paying for full social and environmental cost to those rural communities from whom the water is taken.

The country has got into huge debt for the loans taken from World Bank for the Ganga Canal. At the same time, the giant 3.25 meter-diameter pipe is being built through public finances. In effect, the public pays the price while transnational companies make the profit.

Delhi Jal Board claims that they have no intention of raising the water rates for the time being. However, as has been seen in the case of Enron with electricity, the Orissa Lift Irrigation Corporation in Orissa, and other cases, privatisation leads very quickly to a steep rise in the price of water and electricity. With regards to concession to the poor, DJB said there would be no such proposal. DJB will continue to deliver the water to Delhites and maintain infrastructure, i.e., burst water pipes, billing, etc. Thus, the people of Delhi will not just be paying Suez and the Jal Board for the water directly, they will be paying through taxes to maintain the infrastructure, thus freeing the corporation of any expenses, which might detract from their profits. (Shiva and Jalees 2003).

Water Requirement and Source of Water in Delhi

Delhi is experiencing increasing pressure to meet demand for its water resources. Growing urbanization, improvements in living standards, exploding population are just some of the contributing factors. The population of Delhi has crossed 15 million by the end of 2003. The city, at the moment, requires 3,324 million litres of water a day (MLD) while what it gets stands closer to 2,634 MLD. Average water consumption in Delhi is estimated at being 240 litres per capita per day (lpcd), the highest in the country. The large-scale extraction of ground water is a result of this widening gap between the demand and supply of water. And still worse, serious doubts are being raised about both the quality and quantity of groundwater, which has gone down by about eight metres in the last 20 years due to unsustainable demand and use.

Delhi's Water and Wastewater Management is controlled by the Delhi Jal Board, which has signed the contract with Suez Degremont. With the demand-supply gap projections for water set to increase in the next ten years, DJB has identified new raw water sources including Tehri, Renukal, and Kishau Lahawar dams. Plans also centre on the construction of new and existing sewage treatment plants (STPs), which will enable an increase in treatment capacity. Rainwater harvesting is another option that DJB is considering. (Shiva and Jalees 2003)

Corruption related to Delhi Jal Board's Suez Degremont Plant

The process for allotment of contract for the Sonia Vihar Plant to Ondeo Degremont has not been without controversy and objections by senior DJB members. Of the three companies that bid for the tender, Ondeo Degremont was chosen despite being higher in cost than the two other contenders, and allegedly an inferior technology. It was also known that Ondeo

Degremont had already experienced problems with previous contracts in Surat and Delhi (Okhla) where they were slow in the projects by two years.

Jagdish Anand, a member of the opposition party, has accused senior politicians of trying to bribe him into silence. He said: "Earlier also I had exposed the irregularities committed by the Jal Board and its officials with regard to the allotment of Sonia Vihar 140 MGD plant. They approached me on more than one occasion. They independently requested me not to expose the working of the Delhi Jal Board... They also tried to tempt me with suitable reward and my adjustment in lieu of my not exposing the irregularities being committed by Delhi Jal Board (Hindu 2002)

Yet another accusation against the politicians and senior DJB members was of pushing through a contract to Larsen and Toubro for laying of water pipeline in Sonia Vihar at a cost that was approximately more by Rs.30 crores than the justified amount. The clear water transmission mains will supply water from Sonia Vihar Water Treatment Plant to different parts of Trans-Yamuna Delhi.

Former Mayors of Delhi Yog Dhyan Ahuja and Shakuntala Arya (both members of DJB) said that though the appropriate amount for laying the 33.948 km long water pipeline within Delhi was about Rs.85 crores, the contract has been awarded for Rs.111.31 crores.

Out of the four firms that were short-listed, two did not even submit their tenders and the lowest tender bid was as high as Rs.148 crores. Though Larsen and Toubro made a final offer of Rs.111.31 crores only on 27 February 2001, the technical committee had already given its approval a month earlier. (Shiva and Jalees, 2003)

A Public Full Cost Recovery Campaign: The Debt Suez Owes The People Of India

Privatisation is based on the logic of full cost recovery. This means the introduction of fees for the service of the end-user, which the state can subsidise if it can afford to, and liberalization of markets, removing trade barriers and tariffs, and invariably resulting in increased privatisation (SNDRP 2003 a). This also means that they should recover full cost invested in the infrastructure, payment of the salaries to the staff, costs involved in the maintenance and the huge profits. These corporates are never tired of preaching the principle of "full cost recovery" over the investment. These corporates should search their conscience before preaching the poor customers to pay the full cost of their investment. (Shiva and Jalees 2003)

"The Ganga, which is our mother, has become our graveyard," laments the people. Privatisation of water denies local communities their water rights and access to water in two ways. Firstly, the scarce and limited water resources are diverted, from the poor to the rich, from the countryside to towns, from agriculture to industry leaving water famines where people have no purchasing power, and providing water to those who have destroyed their own water

resources through waste and pollution. Secondly, the state itself shifts from its function in providing welfare to the needy and most marginalized communities to the new function of providing public subsidies for private profits. Scarce and limited public finances are diverted to MNCs like Suez and corporations like JP, which is building the Tehri dam. Small-decentralized rural schemes are starved of both water resources and financial resources. (Shiva and Jalees 2003)

The citizens of India are paying Suez either through high prices or through government guarantees. Suez owes the people of India a financial debt and a social debt. The financial debt owed by Suez to the Indian people includes the public investment in the Tehri dam and the Upper Ganga Canal of which Suez will become the sole beneficiary if the privatisation of Ganga water takes place. Suez would also owe the compensation to the farmers for annual production losses they will suffer. (Shiva and Jalees 2003)

In addition, the privatisation will cost social and ecological destruction whose costs are impossible to quantify and hence the social and ecological debt is unpayable.

As said earlier, the 635 million litres per day (MLD) of Ganga water will be diverted from the Upper Ganga Canal to Delhi, which would affect the agriculture potential of the canal and the food security of the region where the canal had been irrigating since last 150 years.

Suez is not bringing in private foreign investment. It is appropriating public financial investment. Public-private partnerships are in effect private appropriation of public investment. But the financial costs are not the only cost; there are other social and ecological costs as well.(Shiva and Jalees 2003)

Suez-Degremont should pay Rs.158,149.31 crores non-recurring money (one time amount) and should pay about Rs.70,425 crores as non-recurring amount for the guaranteed period of ten years to the farmers and other affected persons, as illustrated below:

A. Non-recurring Cost

i. Cost of constructing Upper Ganga Canal in 2004 (as explained in chapter IV)
= Rs. 147,456 crores

ii. Suez Degremont is the direct beneficiary of Tehri dam. Therefore, Suez Degremont owes the responsibility to pay the full cost invested in the construction of Tehri dam as well as the rehabilitation cost of displaced persons. Suez Degremont should pay Rs.10,582 crores to the people of Tehri as explained below:

Cost of constructing Tehri Dam = Rs.10,000 crores
Rehabilitation Cost of the people displaced by Tehri Dam
= Rs.582 crores

TOTAL (ii) = Rs.10,582 crores

iii. The cost of laying pipelines from Muradnagar to Sonia Vihar (to be borne by the Public) = Rs.111.31 crores

Total non-recurring cost (A) = i + ii + iii =

i.e., Rs.147,456 + 10,582 + 111.31 = Rs.158,149.31 crores

B. Recurring Cost

i. Upper Ganga Canal irrigates 924,000 hectares in 13 districts in western UP. As one hectare is 12.5 bighas, it irrigates 924,000 x 12.5 = 11,550,000 bighas.
At an estimate the per bigha income per year = Rs.3,500
So the total agricultural income from Upper Ganga Canal
= 11,550,000 x 3500 = 40,425,000,000 = 4,042.5 crores per year

ii. In the rural areas the farmers, particularly marginal, small and medium farmers also do cattle rearing which is closely linked with the agriculture development. In all 13 districts where the land is irrigated by Upper Ganga Canal, the earning from the cattle rearing is around 2,000 crores per annum.

iii. Besides, there are a large number of people like Blacksmiths, Carpenters and others, whose survival depends upon agricultural activities. There is also large number of landless labourers employed or hired by the farmers. It can be safely assumed that the total earning of these people is around 1,000 crores per annum.

Total recurring cost, i.e., annual income from agriculture, cattle rearing, by artisans and landless labourers (i + ii + iii) =

i.e., 4,042.5 + 2,000 + 1,000 = 7,042.5 crores

For the guaranteed period of ten years the amount is Rs.7,042.5 crores x 10 =

= 70,425 crores

This is the basis of the full public cost recovery campaign by the people of India against the privatisation of Ganga by Suez. (Shiva and Jalees, 2003)

An Alternative to Privatization: Public-Public Partnership: A Dialogue Between Citizen and Government

Water crisis in Delhi has been increasing every year. The scenario in metropolitan cities like Delhi may assume threatening proportions if immediate steps are not taken to avert the situation.

To discuss the problem a seminar "Public Public Partnership". A dialogue between citizens and Government was held at India International Centre in New Delhi on 8th Sep, 2004, which was organized by Research Foundation for Science, Technology and Ecology (RFSTE). Water Workers Alliance, Pani Morcha, Resident Welfare Association (RWAs). The employees of Delhi Jal Board (DJB) also shared their experience.

Dr Vandana Shiva Chairperson of RFSTE cautioned the government if Tehri water is diverted to Sonia Vihar in Delhi through Upper Ganga Canal, it may cause great environmental and social implication, besides increasing the land slides in the fragile Himalayas. This will also cause political conflict between UP, Poorvanchal and Delhi. We have already witnessed similar conflict between Haryana and Punjab over SYL. Tehri is the highest dam in the world of 280 metre height, if unfortunately it burst, water may reach up to Calcutta, playing havoc with the lives, and properties of the people.

The Financial institutions, like World Bank and Asian Development Bank promote and support the privatization which they call as Public Private Partnership. But we have formed the alliance to promote Public Public partnership i.e how public and government can find the solution of the water crisis. There are various ways and alternatives to the privatization.

Mr Gautam Rao, an engineering student in Delhi College of Engineering and an intern for a short term with RFSTE, made the vivid presentation. In Delhi, unaccounted water i.e leakage on pipelines, illegal connection, non-metre connection, faulty metres is estimated to be around 40% i.e about 1200 Mega Litres Daily (MGD), which is almost twice the water which will be made available to Sonia Vihar through diversion of water from Tehri. Avidance of unaccounted water will lead to greater benefits to consumers as well as DJB in terms of revenue, postponement of large expenditure and other environmental benefits.

According to Mr Rao, Unaccounted water may also be termed as Non-Revenue Water, since it consists of water which though produced in treatment plants at significant cost to DJB, is not associated with any cost recovery through billing. It is thus a direct financial loss to the utility. Further an increase in delivery through reduction of leakages implies a postponement or even obviation of planned failure investment in large. projects to increase water supply.

Delhi has 9000 km of pipeline network, 13.47-lakh connection, lack of data, lack of sufficiently trained manpower and low profile of maintenance. Through Public Public Partnership DJB may control, the unaccounted water. Project should be implemented at colony level or group of colonies under the supervision of Resident Welfare Association (RWAs). DJB may appoint one technical advisor to RWAs.

Shri S.D Sinha of **Pani Morcha** suggested some conventional mean, which will have greater potential to conserve the water and therefore reduce the water crisis. We should maintain adequate flow in Yamuna, as river flow recharge the ground water. Delhi has the possibility of big reservoir, so we should build such reservoir near Najafgarh and Sainik Farm. Colony wise, rain water harvesting must be promoted. Small rain water harvesting may be done at home.

Smt Amarjeet Kaur, a well known trade union leader talked about the negligency of the government official, they do not work till the court intervene. Bureaucrats sit in the air condition room and never care for the poor like us. They are totally indifferent to our problems. Even the

water from the Sonia Vihar will be supplied to the residents in posh colony who can afford Bisleri.

To pressurize the government officials we should involve Trade Union & leaders of the area they are first to interact with people.

Mr S.A Naqvi of **DJB** highlighted the ever increasing level of pollution in Yamuna. When Yamuna enters Delhi, the water of Yamuna is reported of 'B' grade however when it leaves Delhi after traveling a strech of 48 km the quality of water deteriorates to "E" grade Municipal Corporation of Delhi (MCD) is responsible. for 85% of water pollution to Yamuna. Besides three power plants in Delhi, Badarpur, Indraprastha and Rajghat discharge about an estimated 302 tonnes of fly as a everyday, which contaminate the ground as well as surface water due to bleaching of heavy metals present in the ash.

Mr S.A Naqvi of DJB discussed about the potential for using 'grey water'. Water from clothes washers, bath tubs, shower or bathroom sink may be called grey water. As much as 235 MGD of water can be saved in Delhi, if all the residents start using recycled 'grey water' for non drinking purpose. Grey water is the most effective as supplemental irrigation source, and car washing.

"By using grey water, we reduce the need to pump ground water and reuse it as a resource and protect putable water for future. Grey water can also save money on water bill. A family of five generates about 70 gallon of grey water per day. That is a lot of water going down the drain that has already paid for and that can be reused" said Mr Naqvi.

Shri Sanjay Sharma of DJB discussed in detail about the financial sustainability of DJB through Public Public Partnerships. The only problem is the loan liablities of about Rs 4000 crores, which infact is the legacy of parent organization Delhi Water Supply & Sewerage Board. The initial amount was only Rs 1200 crores, which over the time has increased. It is an usual practice that whenever the government creates a new Department/Board/Organization, the loan liabilities are waived off.

According to Mr. Sanjay Sharma Delhi Jal Board was constituted by Delhi Jal Board Act 1998 (Delhi Act no 4 of 1998) to discharge the functions of water supply, sewerage and sewage disposal and drainage within the National Capital Territory region of Delhi Accordingly it is responsible for Supply of Water, sewage disposal and collection of revenue for the services provided within the jurisdiction of MCD area and also supply water in Bulk to the New Delhi Municipal Council (NDMC) and Delhi Cantonment Board (DCB) and respective agencies further distribute water in their corresponding areas. Similarly, Sewage generated from NDMC and DCB areas is collected by respective agency and taken up by DJB for its disposal.

Presently there are about 1.5 million water connections and around 2996 MLD (Million Liters per day) of water produced at its six water treatment plants is distributed among the 1.5

million consumers. Delhi Jal Board DJB collects and treats 2337 MLD of sewage at its 17-wastewater treatment plants.

DJB was able to recover only 249.77 crore revenue from its all sources in 2003-04. The scenario of revenue collection always remains more or less same. The main recovery of revenue comes from water charges that contributes 98% of the total recovery rest 2% comes from other sources like bio gas charges and bio fertilizer. During the year 2003-2004, when DJB recover its highest ever revenue 249.77 crores, only 35 lacs contributed from bio gas charges.

Delhi Jal board has following type of consumers:

1. New Delhi Municipal Council and Delhi Cantonment board
2. Bulk consumers
3. Domestic consumers categories
4. Commercial consumers categories
5. Industrial consumers categories

There are total number of around 14.98 million water consumers in Delhi utilizing DJB's water and allied services. Out of it 93% present of consumers are domestic, 6% are commercial and only 1% are industrial consumers.

In terms of consumption of water, 93% domestic consumers consume 86% of water, commercial consumers those are just 6% consume 10% of water and 1% industrial consume 4% of water i.e 660 MGD or 2996 MLD.

Delhi Jal Board is in debt trap, the organization which total revenue recovery has yet to cross Rs 250 crores and spent 370 crore per year to provide water and sanitation services to the citizens will one day will certainly sink if the situation is not addressed and taken care of. Its accumulated debt will cross Rs. 4000 crore in next few months.

There are some options available to the problem in which Government has to play a role.

Option A: Government may waive off the loan on Delhi Jal Board in one stretch as a social liability of it.

Option B: Government may waive off the loan on Delhi Jal Board in one stretch with the condition that Jal Board has to raise it's own financial resources in future and will not opt for loans. An assistant package may be considered for DJB.

Option C: Government may waive off interest on Delhi Jal Board and take liability of interest on it. And may consider yearly financial assistant package for DJB as a social liability of it.

Option D: If Government decline to take responsibility of fiscal deficit, than public funding may be answer.

According to Mr. Sanjay Sharma, the steps need to be taken with Public-Public Partnership are the following: -

- ❖ Reducing leakage or non-revenue water.
- ❖ DJB's Bottled Water, 'Jal'.
- ❖ Utilization of sewage by products.
- ❖ Installation of Water connection by DJB (presently license plumbers do the work).
- ❖ Horticulture work (DJB has large vacant land)
- ❖ Water consultancy to other organization.
- ❖ Deputing DJB staff on Tubewells/ Waterwells (Presently run by contractors)
- ❖ Saving from optium dose of Alum, Poly Aluminium Chloride and Chlorine.
- ❖ Water assurence Programme.
- ❖ Recycling of Water.
- ❖ Saving on Energy.
- ❖ Internal reforms.

The reform is not daytime schedule. It takes time to achieve the targets and studies are required to check the results. The above scheme and alternative for the financial sustainability is summarized as: -

1. Development charges from uregulairsed/ unauthorized water connection = Rs 2131 Crore (in phase manner)
2. Increasing revenue = Rs 499 Crore.
3. Alternate source of income = 75 Crore.
4. Internal Financial reforms = 47 Crore.

Total: 621 Crore extras + 2131 crore (onetime)

"The suggestion are based mainly on the experience gained from **Public Public Partnership** of ground one globe" concluded Mr Sharma".

Thus according to Mr Sanjay Sharma through **Public Public Partnership** DJB cannot only sustain but it can also earn the profits of Rs 621 crores per year without any staff retrenchment, no water privatization and no need to enhance the tariff.

Shri Radhey Shayam Sharma, General Secretary of Yamuna Vihar Resident Welfare Association made some suggestion to improve the water availability in Delhi. According to Mr

Radhey Shayam Sharma. We should not divert drinking water for irrigation. We should immediately inform about the leakage of water to DJB. We must conserve water by using it prudently. Inter linking of rivers will need astronomical amount of money and very long gestation period, however reservoir can be made with little amount and in very less time.

Mr Radhey Shayam Sharma added, “We should also not create panic. In the public by creating an alarm. There is a need to think positively to avert the crisis”.

In November 2004, the government of Delhi announced a steep tariff increase. It put out aggressive advertisement campaign on the need for citizens to pay more for water.

On 22nd November, women activists had a major protest against waater privatization and increase in water tariff. Women are committed to keeping control over water in women’s hands.

Women protesting against water Privatization and Hike in water Tariff in Delhi

CHAPTER - 17

WATER RIGHTS ARE HUMAN RIGHTS

Water Rights As Natural Rights

More than any other resource, water needs to remain a common good and requires community management. Infact, most societies private ownership of water has been prohibited. However, the emergence of modern water extraction technologies has increased the role of the state in water management. With globalization and privatization of water resources, efforts are under way to rode people's rights over water. Following paragraphs briefly explain about water rights, riparian rights and community rights.

Throughout history and across the world, water rights have been shaped both by the limits of ecosystems and by the needs of people. In fact, the root of the Urdu word abadi, or human settlement, is ab, or water, reflecting the formation of human settlements and civilization along water sources. The doctrine of riparian rights – the natural rights of dwellers supported by a water system, especially a river system, to use water-also arose from this concept of ab. Water has traditionally been treated as a natural right – arising out of human nature, historic conditions, basic needs, or notions of justice. Water rights as natural rights do not originate with the state; they evolve out of a given ecological context of human existence. (Shiva 2001)

As natural rights, water rights are usufructuary rights; water can be used but not owned. People have a right to life and the resources that sustain it, such as water. The necessity of water to life is why, under customary laws, the right to water has been accepted as a natural, social fact:

Riparian Rights

Riparian rights, based on concepts of usufructuary rights, common property, and reasonable use, have guided human settlement all over the world. In India, riparian systems have long existed along the Himalaya. The famous grand Anicut(canal) on the Kaveri at the Ullar River dates back a thousand years and is believed to be the oldest hydraulic structure to control the flow of rivers in India. It is still functioning. In the northeast, old riparian systems known as dongs guide the use of water. In Maharashtra conservation structures were know as bandharas.

The ahar and pyne systems of Bihar, where an unlined inundation canal (pyne) transfers water from a stream into a catchment basin (ahar), also evolved from a riparian doctrine. Unlike

modern Sone canals built by the British, which have failed to meet the needs of the people, the ahars and pynes still provide water to peasants. In the United States, riparian systems were introduced by the Spanish, who had brought them from, the Iberian Peniesula.[4] These systems were adopted in Colorado, New Mexico, and Arizona, as well as the eastern settlements.

Water as a Commons

Water is commons because it is the ecological basis of all life and because its sustainability and equitable allocation depend on cooperation among community members. Although water has been managed as a commons throughout human history and across diverse cultures, and although most communities manage water resources as common property or have access to water as a commonly shared public good even today, privatization of water resources is gaining momentum.

Prior to the arrival of the British in south India, communities managed water systems collectively through a system called kudimaramath (Self-repair). Before the advent of corporate rule by the East India Company in the 18th century, a peasant paid 300 out of 1,000 units of grain he or she earned to a public fund, and 250 of those units stayed in the village for maintenance of commons and public works. By 1830, peasant payment rose to 650 units, out of which 590 units went straight to the East India Company. As a result of increased payments and lost maintenance revenue, the peasants and commons were destroyed. Some 300,000 water tanks built over centuries in pre-British India were destroyed, affecting agricultural productivity and earnings.

The East India Company was driven out by the first movement for independence in 1857. In 1858, the British passed the Madras Compulsory Labor Act of 1858, popularly known as the Kudimaramath Act, mandating peasants to provide labor for the maintenance of the water and irrigation systems[11]. Because kudimaramath was based on self-management and not coercion, the act failed to mobilize community participation and to rebuild the commons.

Water Exclusion and Caste Exploitation

Untouchability, the worst crime of caste system is expressed in various ways but one of the expressions is connected with water. Usually a higher caste Sabarna was not supposed to drink water touched by Abarnas. Therefore Abarnas; lower caste were not allowed to draw water from village wells or pond or river bank. They were supposed to bring water from far-flung places. During crisis period Abarnas suffer the most as most of the water sources dry up. Obviously it was difficult for Abarnas to get irrigation for their land hence they had to remain economically backward. Thus for sustenance with meagre remuneration they were exploited.(Ghosh 2002).

Untouchability became a crime as per law after independence. But psychological untouchability continued. Due to fear of punishment direct untouchability eradicated up to certain extent but indirect untouchability remained while new forms of untouchability emerged.

Latest expression of untouchability in rural India is depriving Dalits of irrigation water. It is fairly common in Uttar Pradesh, Bihar, Madhya Pradesh, Rajasthan and other states. It is also fairly common in Tamil Naidu and certain areas of Andhra Pradesh. Even when canal irrigation available, the castes belonging to Sabrana group block irrigation water diverting it towards their fields with the help of their private army. This led to a situation when Dalits can get only one crop a year thus remain poor where in the process Sabarna has opportunity to exploit them economically, physically and mentally.

Exploitation becomes worst during the period of crisis. A report from Gujrat during drought of 2000 AD describes the horror of Dalit women who are exploited in several ways. Drought is driving Dalit women into the arms of landlords and contractors. As most of of their men migrate in search of a livelihood or been forced into bonded labour, the Dalit women fall back on Thakurs, Chowdharys-Patels, and Rabari-Desais in these trying times.

For the Dalit women, the exploitation starts at the water taps. In Taranagar, there are three taps supplying potable water but the Dalits are forced to take brackish water from another one. The Rabari-Desais will allow them to fill a few pitchers only if a young woman goes begging to them. (Ghosh 2002)

Traditionally in most of the states in every village, the Dalits were allowed to stay in seprate areas identified by them. Village politics are usually dominated by persons from higher castes therefore elections are won by them except for those seats reserved for scheduled Castes or Scheduled Tribes. But decision-making bodies have majority of persons from higher castes. When modern system of water supply or sewerage are planned the priority goes to those areas within village where people from higher castes live. When budget run off, the Dalit areas are left out even in those states where caste clashes are not very pungent even negligible. Therefore water remains tool of caste exploitation and mirror of caste neglects almost all over India including in those states known to be progressive. This is unfortunately a situation even after India remained an independent country for over 57 years.

Community Rights and Water Democracies

In India, farmer's associations for the construction and maintenance of water systems were once widespread. In Karnataka and Maharashtra the associations were known as panchayats. In Tamil Nadu, they were called nattamai, kavai maniyam, nir maniyam, oppidi sangam, or eri variyam (tank committee). Tanks and ponds of ten served more than one village, and in such cases representatives from each village or farmers' association ensured democratic control. These committees could also tank dues and taxes from users. Lands were also donated, especially for

financing capital expenditures on waterworks. Water managements was given to Dalits to ensure equity in distribution and guarantee access for all. However, caste exclusion has become association with water exclusion.

There are nine principles underpinning water democracy:

1. **Water is nature's gift**

   We receive water freely from nature. We owe it to nature to use this gift in accordance with our sustenance needs, to keep it clean and in adequate quantity. Diversions that create and or waterlogged regions violate the principels of ecological democracy.

2. **Water is essential to life**

   Water is the source of life for all species. All species and ecosystems have a right to their share of water on the planet.

3. **Life is Interconnected through water**

   Water connects all beings and all parts of the planets through the water cycle. We all have a duty to ensure that our actions do not cause harm to other species and other people.

4. **Water must be free for sustenance needs**

   Since nature gives water to us free of cost, buying and selling it for profit violates our inherent right to nature's gift and denies the poor of their human rights.

5. **Water is limited and can be exhausted**

   Water is limited and exhaustible if used nonsustainably. Non-sustainable use includes extracting more water from ecosystems than nature can recharge (ecological non-sustainability) and consuming more than one's legitimate share, given the rights of others to a fair share (social non-sustainability).

6. **Water must be conserved**

   Everyone has a duty to conserve water and use water sustainably, within ecological and just limits.

7. **Water is a commons**

   Water is not a human invention. It cannot be bound and has not boundaries. It is by nature a commons. It cannot be owned as private property and sold as a commodity.

8. **No one holds a right to destroy**

   No one has a right to overuse, abuse, waste, or pollute water systems. Tradable- Pollution permits violate the principle of sustainable and just use.

9. Water cannot be substituted

Water is intrinsically different from other resources and products. It cannot be treated as a commodity.

Right to Water as a Human Right

Water has found its way into international law at the most varied of places. The action plans of the major UN Conferences of the 1990s (inter alia Cairo, Copenhagen, Beijing, Rome) and numerous declarations focus on the various aspects of the water. In most cases, however, it is a matter of so-called "soft law". In contrast to agreements under international law, soft law is not binding on individual States.

In the framework of United Nations activities, the international community is agreed that water is a human right. Yet to date, no binding agreement under international law includes express mention of the human right to water. Rather, it is derived from the right to food or the right to health for example, which are enshrined in various UN agreements (see below). Logically, at the first major UN Water Conference in 1977 in Mar del Plata, Argentina, the international community underscored the following:

All people have the right to have access to drinking water in quantities and of a quality equal to their basic needs." (Extracted from: Why we need an international water convention, by Rosmarie Bar, Swiss Coalition of Development Organisations)

We declare that:

- The formal recognition of the Right to Water is a major step towards the implementation of the right to life for all;
- The effective implementation of the Right to Water for all is a necessary condition in the fight against poverty and its eradication;
- The Right to Water for all (and not only for the half of those people who have not access to water) by 2015, is a realistic economic target. In 1977, UN (namely the UNDP) showed that access to water for all within a period of 15 years was economically feasible. It still is absolutely clear that the main obstacle to its implementation is not the absence or the inadequacy of financial resources, not of competencies of technology rather, what is lacking is a political will and all related economic and social policy choices.

Therefore we consider that:

- The exclusion of water, 55 years ago, form being explicitly mentioned as a human right in the Universal Declaration of Human Rights, has hampered citizens' ability to put effective pressure on governments to affirm it. To the contrary, it has contributed, in an international context increasingly influenced by neo-liberal market economy, to the success of those

approaches and management choices at national level that consider water an economic good. Hence the growing process of water privatization and commodification.

- It is urgent and necessary to recognize water and the ecosystems as a common public good and to manage to exclude them out from the category of "market goods and services", not only with regard its domestic uses. Being also an essential and unsubstitutable element for other economic activities (agricultural, energetic, industrial) of fundamental importance for the right to life and living together, water must be considered as a public good under these circumstances as well.
- Water and water services cannot be the subject of trade talks or of World Trade Organisation negotiations, but have to become the object of world rules and institutions that support and promote a use of water as a common good and a human right.

To this end, we re-state our adhesion to the following principles:

- Water is a common public good belonging to humankind and all living species
- The access to water is a human and social right, individual and collective right
- Financing the costs for guaranteeing access to water for all by the quantity and quality required for life is the responsibility for the public authorities.

(Extracted from: Rome Declaration of 10 December 2003 making the right to water a reality)

Women's water rights are human rights

The water crisis embodies a gender equality dimension that should not be underestimated. In developing countries, fetching water is the job of women and children. Women are the world's water carriers. Walking for hours on foot, they carry home as much as 60 liters of water day after day for their family. Thus, a 65-year-old women in Brazil's parched northeast has spend roughly a third of her life fetching water. Chronic health problems result from carrying this heavy load. After such an expenditure of energy and time, there is no place left for school and education and, by extension, for development and economic independence. Whereas women are fetchers of water, men are policy makers. It is the men who make up the water authorities and decide about pumps, the location of wells and the distribution of water. Water privatization is further exacerbating social discrimination against women.

Women are not only the world's carriers of water; they are also its breadwinners. Water and food go together; this has always been so. Women produce more that half the world's total food supply – 80 per cent in Africa. Their role as the ones responsible for the entire food chain contrasts starkly with their lack of rights when it comes to land acquisition and ownership as well as the provision of loans, seeds and technical assistance. Numerous action plans form UN conferences (e.g. Cairo, Beijing, Copenhagen, Rome) ascribe capital importance to the principle

that “women’s rights are human rights”. Besides, gender equality is amongst the international community’s Millennium Goals.

Equal access for women to water and land are key factors in the fight against poverty and hunger. Equal rights for women means a secure nutritional base. An international water convention would give women of all countries a binding powerful instrument with which to enforce and demand fulfillment of their rights – even vis-à-vis their own (passive) government.

(Extracted from: Why we need an international water convention, by Rosmarie Bar, Swiss Coalition of Development Organisations)

The women’s water struggle in Plachimada has gone a long way in establishing water rights as human right as was ruled by Kerala High Court’s Judgement:

> “The courts support the women’s demands. In an order given on 16th December 2003, Justice Balakrishnana Nair ordered Coca Cola to stop pirating Plachimada’s water. As the Honorable Justice stated:
>
> “The Public Trust Doctrine primarily rests on the principle that certain resources like air, sea waters and the forests have such a great importance to the people as a whole that it would be wholly unjustified to make them a subject of private ownership. The said resources being a gift of nature, they should be made freely available to everyone irrespective of the status in life. The doctrine enjoins upon the government to protect the resources for the enjoyment of the general public rather than to permit their use for private ownership or commercial purpose.
>
> Our legal system – based on English common law – includes the public trust doctrine as part of its jurisprudence. The State is the trustee of all natural resources, which are by nature meant for public use and enjoyment. Public at large is the beneficiary of the seashore, running waters, airs, forests and ecologically fragile lands. The State as a trustee is under a legal duty to protect the natural resources. These resources meant for public use cannot be converted into private ownership…”
>
> In view of the above authoritative statement of the Honourable Supreme court, it can be safely concluded that underground water belongs to the public. The State and its instrumentalities should act as trustees of this great wealth. The State has got a duty to protect ground water against excessive exploitation and the inaction of the State in this regard will tantamount to infringement of the right to life of the people guaranteed under Article 21 of the Constitution of India. The Apex Court has repeatedly held that the right to clean air and unpolluted water forms part of the right to life under Article 21 of the Constitution. So, even in the absence of any law governing ground water, I am of the view that the Panchayat and the State are

bound to protect ground water from excessive exploitation. In other words, I am of the view that the Panchayat and the State are bound to protect ground water from excessive exploitation. In other words, the ground water, under the land of the 2nd respondent, does not belong to it.

Even assuming the experts opine that the present level of consumption by the 2nd respondent is harmless; the same should not be permitted for the following reasons:

The underground water belongs to the general public and the 2nd respondent has no right to claim a huge share of it and the Government have no power to allow a private party to extract such a huge quantity of ground water, which is a property, held by it in trust.

If the 2nd respondent is permitted to draw such a huge quantity of ground water, then similar claims of the other landowners will also have to be allowed. The same will result in drying up of the underground aqua-reservoirs.

Accordingly, the following directions are issued:

The 2nd respondent shall stop ground water for its use after one monthfrom today.

The Panchayat and the State shall ensure that the 2nd respondent does not extract any ground water after the said time limit. This time is granted to enable the 2nd respondent to find out alternative sources of water.

(Extracted from: K. Balakrishnan Nair, J. W.P.(C) No. 34292 of 2003-G, Judgment)

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APPENDIX

I. SWAJALDHARA

In order to give momentum to the drinking water supply programme, Government of India created a separate Department of Drinking Water Supply in 1999. In this context, the Ministry of Rural Development launched Sector Reform initiatives.

The "Swajaldhara" programme is an extension of these reform initiatives. According to the government, it is a very powerful step forward to provide drinking water to all water scarce villages in the shortest possible time and at least cost.

The key elements of this Scheme are that the rural people should feel the ownership and, therefore, contribute at least 10% of the capital expenditure of the Scheme upfront; and the communities and their Gram Panchayats must shoulder the Operation and Maintenance (O&M) responsibility of the Schemes.

Process for Implementation

The following processes, must be observed for effective implementation of the Scheme:- **(Website, Ministry of Rural Development)**

(i) The Gram Panchayat shall convene a Gram Sabha Meeting, where the Water Supply Scheme of People's choice including design, cost etc., must be finalized.

(ii) A resolution must be passed in the Gram Panchayat meeting calling for users/beneficiaries to contribute 10% of the capital expenditure. The Gram Panchayat shall maintain the record of the Community contribution and issue necessary receipts to the contributor/user. The Gram Panchayat must also agree undertake the Operation & Maintenance (O&M) responsibility after the scheme is completed and taken over by them. The Executing Agency for the scheme should also be decided in the Gram Panchayat meeting i.e. whether the Panchayat wants to execute the scheme on its own or wants a State Government Agency to undertake the execution.

(iii) The Panchayat must also decide on the user charges to be collected from the community so that adequate funds are available with the Panchayat to undertake O&M.

(iv) The users' contribution of 10% must be obtained from the maximum users/beneficiaries of the Scheme. At least 30% of the users/beneficiaries of the Scheme must contribute for the Scheme to be considered for sanction by the Department. Those Schemes will be sanctioned on priority, where the percentage of contributors is more.

(v) In case of a Beneficiary Group (BG), all members of the BG shall meet, consider the proposal including design and costs and pass resolutions before submission of the proposal to the Gram Panchayat.

Elements of Swajaldhara :- This will have the following elements: (i) demand-driven and community participation approach; (ii) Panchayats / communities to plan, implement, operate, maintain and manage all drinking water schemes; (iii) partial capital cost sharing by the communities upfront in cash; (iv) full ownership of drinking water assets with Gram Panchayats; and (v) full Operation and Maintenance (O&M) by the users / Panchayats.

Swajaldhara Principles

States can **implement Swajaldhara in Blocks / Gram Panchayats / Beneficiary Groups** following all the fundamental reforms principles. This need not be taken up in the entire district at the initial stage, but may be extended subsequently. (BG) should be a **registered Society** and would submit proposal through Gram Panchayat or Block Panchayat as the case may be.

The Swajaldhara projects will be **sanctioned** by the Department of Drinking Water Supply for Ministry of Rural Development, Govt of India. **If the proposals are found to have** (a) the commitment of the concerned District Implementing Agency and the State Government for compliance of reform principles; (b) **10%** of the estimated capital cost of the Schemes **(5%** in case of SC and ST Gram Panchayats / villages where 50% of the population is SC / and ST as per 2001 Census) is paid by the community, in cash, as their contribution to the Implementing Agency. The cost of the Project, excluding community contribution, will be **fully met by Government of India**.

Responsibilities of Swajaldhara Applicant

Block Panchayat / Gram Panchayat / Applicant / BG will be responsible for

- **Execution** of the sanctioned schemes;
- Place the progress of scheme implementation in each **Gram Sabha** meeting;
- Ensure **community participation** in scheme activities;
- Arrange community **contribution** towards capital cost, in cash;
- Open and **manage** bank accounts for management of **project funds**;
- **Procure** construction materials/goods and select contractors for construction activities;

- Supervise construction activities;
- Commission **and takeover completed water supply works**; and
- Collect funds, and **manage O&M** of water supply works.

Norms for Safe Drinking Water

The following norms are being adopted for providing safe drinking water to rural population in the habitations:

(a) 40 litres of safe drinking water per capita per day (lpcd) for human beings.

(b) 30 lpcd additional for cattle in the Desert Development Programme Areas.

(c) One hand-pump or stand post for every 250 persons.

(d) The water source should exist within the habitation or within 1.6 km in the plains and within 100 mtrs elevation in the hilly areas.

The norms may, however, be relaxed to provide for 55 ltrs per capita per day with a source within 0.5 km in the plains and 50 metres elevation in the hills after the coverage of all NC/PC rural habitations in that State is achieved, as per the existing norms of 40 litres per capita per day. This relaxation is subject to the condition that beneficiaries of the relaxed norms share a part of the capital cost (which should not be less than 10%) and shoulder full responsibilities for subsequent Operation and Maintenance.

- The text of Swajaldhara is taken from the Website, Ministry of Rural Development, Government of India.

(II) STATISTICS ON WATER

Table (II)(1) : Utilisable Water - Requirement and Return Flow

Sl. No.	Particulars	Year	Year 2010		Year 2025		Year 2050	
		1997-98	Low Demand	High Demand	Low Demand	High Demand	Low Demand	High Demand
1	Utilisable Water							
a)	Utilisable surface water	690	690	690	690	690	690	690
b)	Utilisable Ground Water	396	396	396	396	396	396	396
c)	Existing Augmentation from Canal Irrigation	90	90	90	90	90	90	90
	Total (a+b)	1086	1086	1086	1086	1086	1086	1086
2	Total Water Requirement							
	Surface Water	399	447	458	497	545	641	752
	Ground Water	230	247	252	287	298	332	428
	Total	629	694	710	784	843	973	1180
3	Return Flow							
	Surface Water	43	52	52	70	74	91	104
	Ground Water	143	144	148	127	141	122	155
	Total	186	196	200	197	215	213	259
4	Residual Utilisable Water (4=1-1(c)-2+3) Balance							
	Surface Water	33443	295	284	263	219	140	42
	Ground Water	219	203	202	146	149	96	33
	Total	553	498	486	409	368	236	75

Source: Background Paper, National Conference on Water Management: Public-Private Partnership, 27 May 2003, CII and Ministry of Water Resource, New Delhi.

Table (II)(2) : Water Requirement for Different Users

Sl. No.	Particulars	Year	Year 2010			Year 2025			Year 2050		
		1997-98	Low	High	%	Low	High	%	Low	High	%
	Surface Water										
1	Irrigation	318	330	339	48	325	366	43	375	463	39
2	Domestic	17	23	24	3	30	36	5	48	65	6
3	Industries	21	26	26	4	47	47	6	57	57	5
4	Power	7	14	15	2	25	26	3	50	56	5
5	Inland Navigation		7	7	1	10	10	1	15	15	1
6	Flood Control		-	-	0	-	-	0	-	-	0
7.	Env. (1) Afforestation		-	-	0	-	-	0	-	-	0
8.	Env. (2) Ecology		5	5	1	10	10	1	20	20	2
9.	Evaporation Losses	36	42	42	6	50	50	6	76	76	6
	Total	**399**	**447**	**458**	**65**	**497**	**545**	**65**	**641**	**752**	**64**
	Ground Water										
1	Irrigation	206	213	218	31	236	245	29	253	344	29
2	Domestic & Municipal	13	19	19	2	25	26	3	42	46	4
3	Industries	9	11	11	1	20	20	2	24	24	2
4	Power	2	4	4	1	6	7	1	13	14	1
	Total	**230**	**247**	**252**	**35**	**287**	**298**	**35**	**332**	**428**	**36**
	Grand Total	**629**	**694**	**710**	**100**	**784**	**843**	**100**	**973**	**1180**	**100**
	Total Water Use										
1	Irrigation	524	543	557	78	561	611	72	628	817	68
2	Domestic	30	42	43	6	55	62	7	90	111	9
3	Industries	30	37	37	5	67	67	8	81	81	7
4	Power	9	18	19	3	31	33	4	63	70	6
5	Inland Navigation	0	7	7	1	10	10	1	15	15	1
6	Flood Control	0	0	0	0	0	0	0	0	0	0
7.	Env. (1) Afforestation	0	0	0	0	0	0	0	0	0	0
8	Env. (2) Ecology	0	5	5	1	10	10	1	20	20	2
9	Evaporation Losses	36	42	42	6	50	50	6	76	76	7
	Total	**629**	**694**	**710**	**100**	**784**	**843**	**100**	**973**	**1180**	**100**

Source: Background Paper, CII and Ministry of Water Resources

Table (II)(3) : Future Drinking Demand

Year	Total Water Demand*		BCM/Year		BCM/Year
	Based on Past Census	Based on UN Projection	Based on Past Census	Based on UN Projection	Total water requirement for domestic use for urban and rural
1991	31465		11.48		
2001	43065	49935	15.72	16.03	
2011	54810	63555	20.00	23.20	42
2021	66555	83375	24.29	30.43	NA
2025	71340	91350	26.04	33.34	55
2050	100755	140650	36.77	51.33	90

* The water demand has been worked out @ 170 lpcd for 65% of the urban Population presumed to be living in class 1 cities and @ 100 lpcd for balance 35% of the urban population living in class 1 cities. (Report of the National Commission for Integrated Water Resource Development Plan.)

Table (II)(4) : Share of water Management in States' Total Expenditure Declines from 8.21% in 1995-96 to 5.55% in 2002-03

State	Expenditure on Irrigation, flood control and soil and water conservation(Revenue + capital expenditure) (Rs. Crore)								Change over the previous year (%)						
	2002-03	2001-02	2000-01	1999-00	1998-99	1997-98	1996-97	1995-96	02-03	01-02	00-01	99-00	98-99	97-98	96-97
Andhra Pradesh	3547.12	2966.87	2612.05	2298.64	2053.61	1852.40	1586.14	1491.22	19.6	13.6	13.6	11.9	10.9	16.8	6.4
Arunachal Pradesh	42.32	83.28	62.87	33.44	33.18	35.84	33.59	32.04	49.2	32.5	88.0	0.8	-7.4	6.7	4.8
Assam	342.22	379.47	311.07	303.76	235.73	237.11	178.40	157.16	-9.8	22.0	2.4	28.9	-0.6	32.9	13.5
Bihar	1023.90	803.16	878.85	1335.59	525.66	321.86	55.30	460.20	27.5	-8.6	-34.2	154.1	63.3	-41.5	19.6
Chhattisgarh	481.47	282.75	109.67	0.00	0.00	0.00	0.00	0.00	70.3	157.8	—	—	—	—	—
Goa	103.48	99.98	71.66	42.90	41.44	39.60	42.41	42.47	3.5	39.5	67.0	3.5	4.6	-6.6	-0.1
Gujarat	2776.96	2476.22	3195.99	3287.79	2966.25	2460.90	2016.37	1654.74	12.1	-22.5	-2.8	10.8	20.5	22.0	21.9
Haryana	817.09	774.04	680.53	648.12	628.27	580.09	513.06	427.51	5.6	13.7	5.0	3.2	8.3	13.1	20.0
Himachal Pradesh	157.02	128.01	124.85	122.33	114.65	100.02	80.25	65.22	22.7	2.5	2.1	6.7	14.6	24.6	23.0
Jammu & Kashmir	359.25	323.44	224.52	187.11	187.62	154.23	137.02	133.12	11.1	44.1	20.0	-0.3	21.6	12.6	2.9
Jharkhand	454.07	432.34	0.00	0.00	0.00	0.00	0.00	0.00	5.0	—	—	—	—	—	—
Karnataka	2472.60	1439.98	2058.56	1876.32	1655.73	1479.53	1479.39	1267.51	71.7	-30.0	9.7	13.3	11.9	0.0	16.7
Kerala	325.89	373.43	319.44	350.81	343.71	313.72	320.35	305.51	-12.7	16.9	-8.9	2.1	9.6	-2.1	4.9
Madhya Pradesh	1102.76	1037.45	880.88	788.59	819.82	749.34	718.62	671.11	6.3	17.8	11.7	-3.8	9.4	4.3	7.1
Maharashtra	2317.61	2407.63	3040.33	3666.18	3207.35	3687.02	2998.58	3132.96	-3.7	-20.8	-17.1	14.3	-13.0	23.0	-4.3
Manipur	103.14	137.13	49.82	85.08	60.30	71.35	70.43	63.22	-24.8	175.3	-41.4	41.1	-15.5	1.3	11.4
Meghalaya	49.51	52.98	38.42	33.43	34.74	31.61	28.01	33.23	-6.5	27.9	14.9	-3.8	9.9	12.9	-15.7
Mizoram	12.93	15.25	11.75	16.69	7.10	7.71	11.71	7.85	-15.2	29.8	-29.6	135.1	-7.9	-34.2	49.2
Nagaland	27.72	26.13	25.00	24.47	23.90	21.79	23.25	14.64	6.1	4.5	2.2	2.4	9.7	-6.3	58.8

State	Expenditure on Irrigation, flood control and soil and water conservation(Revenue + capital expenditure) (Rs. Crore)								Change over the previous year (%)						
Orissa	740.55	714.40	679.54	743.83	825.10	779.41	619.03	423.68	3.7	5.1	-8.6	-9.8	5.9	25.9	46.1
Punjab	994.12	927.06	783.84	683.30	925.83	846.24	352.00	681.38	7.2	18.3	14.7	-26.2	9.4	140.4	-48.3
Rajasthan	1390.16	1257.37	1172.20	1254.39	1340.25	118.79	1066.41	1039.77	10.6	7.3	-6.6	-6.4	19.8	4.9	2.6
Sikkim	18.71	26.35	22.81	10.23	10.67	7.24	10.56	6.66	-29.0	15.5	123.0	-4.1	47.4	-31.4	58.6
Tamil Nadu	778.65	782.14	775.89	811.68	675.89	428.78	313.87	314.51	-0.4	0.8	-4.4	20.1	57.6	36.6	-0.2
Tirupura	80.62	85.74	56.79	48.04	39.24	34.76	26.06	18.71	-6.0	51.0	18.2	22.4	12.9	33.4	39.3
Uttaranchal	196.43	198.61	35.52	0.00	0.00	0.00	0.00	0.00	-1.1	459.1	—	—	—	—	—
Uttar Pradesh	2169.34	227.43	2421.28	2146.76	2028.11	1957.43	2122.30	1694.91	-2.6	-8.0	12.8	5.9	3.6	-7.8	25.2
West Bengal	985.26	1002.50	962.41	766.79	625.87	499.45	513.97	422.05	-1.7	4.2	25.5	22.5	25.3	-2.8	21.8
New Delhi	66.27	65.33	56.75	51.15	44.53	38.11	32.14	15.45	1.4	15.1	10.9	14.9	16.8	18.6	108.0
All States	**23937.17**	**21526.47**	**21663.29**	**21617.42**	**19454.55**	**17854.33**	**15844.22**	**14576.83**	**11.2**	**-0.6**	**0.2**	**11.1**	**9.0**	**12.7**	**8.7**

Source: Tushar K. Mohanti (2003):"Water Crisis ...", Economic Times New Delhi, 9 June 2003

Table (II)(5) : Percentage Share of Expenditure on Irrigation, Flood Control and Soil and Water Conservation in State's total Budgetary Outlay

State	(Revenue + Capital) Percentage share in Rs. crore							
	2002-03	2001-02	2000-01	1999-00	1998-99	1997-98	1996-97	1995-96
Andhra Pradesh	10.01	9.48	9.29	10.10	9.35	10.44	9.75	10.43
Arunachal Pradesh	3.09	5.47	5.21	3.05	3.31	3.69	3.77	3.99
Assam	3.26	3.66	4.08	4.29	4.53	4.72	4.18	3.58
Bihar	6.25	5.40	5.19	6.83	4.32	3.15	5.85	4.89
Chhattisgarh	6.82	4.71	5.72	—	—	—	—	—
Goa	3.65	3.91	3.65	2.66	2.84	3.12	4.48	4.50
Gujarat	9.50	8.20	11.76	15.32	15.47	16.54	16.03	15.31
Haryana	6.83	7.05	7.43	7.75	7.32	7.43	6.55	6.97
Himachal Pradesh	2.61	2.35	2.35	2.60	2.75	2.90	3.05	2.78
Jammu & Kashmir	4.22	4.02	2.87	2.63	3.21	3.15	3.41	3.73
Jharkhand	4.83	5.45	—	—	—	—	—	—
Karnataka	9.62	6.56	10.47	10.53	11.12	11.74	12.35	12.18
Kerala	2.12	2.74	2.43	2.72	3.24	3.20	4.03	4.41
Madhya Pradesh	6.08	5.26	5.20	4.39	5.13	5.27	5.49	6.34
Maharashtra	5.10	5.49	7.20	9.59	10.58	13.32	11.99	14.66
Manipur	5.13	6.27	3.61	4.78	5.40	6.30	6.95	7.80
Meghalaya	2.69	3.03	2.70	2.80	3.45	3.72	3.57	4.27
Mizoram	1.06	1.09	0.91	1.44	0.79	0.89	1.45	1.10
Nagaland	1.41	1.29	1.36	1.64	1.60	1.77	2.12	1.41
Orissa	5.23	5.68	6.15	7.35	9.55	11.37	9.81	7.62
Punjab	5.18	5.52	5.55	5.70	8.45	8.93	4.66	9.73
Rajasthan	6.20	6.44	6.70	7.72	9.36	8.82	9.73	9.53
Sikkim	0.94	2.33	2.41	0.63	0.66	0.52	0.85	0.67
Tamil Nadu	2.53	3.01	3.18	3.59	3.40	2.47	2.04	2.51
Tirupura	2.95	3.21	2.66	2.71	2.56	2.57	2.21	1.89
Uttaranchal	3.68	4.15	3.20	—	—	—	—	—
Uttar Pradesh	4.93	5.21	6.60	6.20	6.45	7.35	9.22	8.15
West Bengal	3.17	3.32	3.60	3.38	3.65	3.68	3.94	4.02
New Delhi	0.75	0.70	0.77	0.87	0.90	0.91	0.91	0.52
All States	**5.55**	**5.36**	**6.24**	**6.89**	**7.30**	**7.83**	**7.81**	**8.21**

Source: Tushar K. Mohanti (2003):"Water Crisis ...", Economic Times New Delhi, 9 June 2003

III. CATEGORISATION OF BLOCKS/MANDALS/TALUKS/ IN DIFFERENT STATES

Table (III)(1) : Categorisation Of Blocks/Mandals/Taluks/Watersheds As Over Exploited And Dark On All India Basis.

(Central Ground Water Board 2004)

S. No	STATE/UTS	Number of Districts	Number of Blocks/Mandals/ Taluks/Watersheds	NO. OF BLOCKS/TALUKS/ MANDALS/WATERSHEDS			
				Over Exploited		Dark	
				NO	%	NO	%
1	Andhra Pradesh	23	1104	6	0.54	24	2.17
2	Arunachal Pradesh	—	—	—	—	—	—
3	Assam	23	134	—	—	—	—
4	Bihar	42	585	—	—	—	—
5	Goa	3	12	—	—	—	—
6	Gujrat	19	184	12	6.52	14	7.61
7	Haryana	16	108	45	41.67	6	5.56
8	Himachal Pradesh	12	69	—	—	—	—
9	Jammu & Kashmir	14	123	—	—	—	—
10	Karnatka	19	175	6	3.43	12	6.86
11	Kerala	14	154	—	—	1	0.65
12	Madhya Pradesh	45	459	—	—	3	0.65
13	Maharashtra	30	1503	—	—	34	2.26
14	Manipur	6	26	—	—	—	—
15	Meghalya	5	29	—	—	—	—
16	Mizoram	3	20	—	—	—	—
17	Nagaland	7	21	—	—	—	—
18	Orissa	27	314	—	—	—	—
19	Punjab	12	118	62	52.54	8	6.78
20	Rajasthan	30	236	45	19.07	11	4.66

S. No	STATE/UTS	Number of Districts	Number of Blocks/Mandals/ Taluks/Watersheds	NO. OF BLOCKS/TALUKS/ MANDALS/WATERSHEDS			
				Over Exploited		Dark	
				NO	%	NO	%
21	Sikkim	4	4	—	—	—	—
22	Tamil Nadu	21	384	54	14.06	43	11.20
23	Tripura	3	17	—	—	—	—
24	Uttar Pradesh	63	895	19	2.12	22	2.46
25	West Bengal	16	341	—	—	—	—
	TOTAL STATES	465					
No. of Blocks (Except A.P. A.P, Gujrat & Maharashtra)		4272	231		107		
No. of Mandals (A.P)		1104	6		24		
No. of Taluks(Gujrat)		184	12		14		
No. of Watersheds (Maharashtra)		1503	—		34		
Andhra Pradesh-1104 Mandals/309 Blocks. Gujrat-184 Taluks/218 Blocks. Maharashtra- 1503 Watersheds/231 Taluks/366 Blocks.							

Table (III)(2) : Statewise Categorisation Of Over-Exploited And Dark Blocks/Taluks/ Mandals/Watersheds

ANDHRA PRADESH

S. No.	District	Over Exploited Mandals	Dark Mandals (100 to 85%)
1	Anantpur	—	
			1. Rolla 2. Parigi 3. Yadiki
2	Chittoor	1. Tirupati (R)	1. Chandragiri 2. Somala 3. Kammapalle
3	Cuddapah	1. Vempalli	1. Proddatur
4	Guntur	—	1. Thullar
5	Karimnagar	—	1. Bejjanki 2. Ramadugu 3. Veenavanka 4. Elkkathurthy
6	Mehaboobnagar	1. Midjal	—
7	Medak	—	—
8	Nalgonda	—	1. Chityal 2. Marguda 3. Nutankal
9	Nizamabad	—	1. Armoor 2. Sirikonda 3. Kammarapally
10	Rangareddy	—	1. Moinabad
11	Warangal	1. Duggondi	1. Bachchannapet
12	West Godavari	1. Undrajavaram	—

BIHAR

S. No.	District	Over Exploited Mandals (> 100%)	Dark Mandals (100 to 85%)
1	Samastipur	—	1. Pusa

GUJRAT

S. No.	District	Over Exploited Mandals (> 100%)	Dark Mandals (100 to 85%)
1.	Ahmedabad	1. Dahegaon	1. City & Daskroi
2.	Amreli	1. Kodinar	—
3.	Banaskantha	1. Tharad	1. Deodar
4.	Baroda	—	1. Sinor 2. Baroda
5.	Jamnagar	—	1. Jodia
6.	Junagarh	1. Maliya	1. Veraval
7.	Kutch	—	1. Bhachu
8.	Kheda	—	1. Kapadganj 2. Nehemadabad
9.	Mehsana	1. Chansma 2. Hariji 3. Kadi 4. Kheralu 5. Mehsana 6. Patan 7. Sidhpur	1. Kalol 2. Vijapur 3. Visnagar

KARNATKA

S. No.	District	Over Exploited Mandals (> 100%)	Dark Mandals (100 to 85%)
1.	Banglore	1. Anekal 2. Banglore (North) 3. Devanahally 4. Hoskote	1. Banglore (South) 2. Channapatna
2.	Belgaum		1. Hukkeri 2. Rayabag
3.	Bijapur	—	1. Indi
4.	Kolar	1. Kolar 2. Malur	1. Chikballapur 2. Gauribidanur 3. Mulbagal 4. Sidlaghatta
5.	Mysore	—	1. Kollegal
6.	Tumkur	—	1. Tiptur 2. Tumkur

HARYANA

S. No.	District	Over Exploited Mandals (> 100%)	Dark Mandals (100 to 85%)
1.	Ambala	1. Bavana	
2.	Bhiwani	1. Dadri-II	
3.	Faridabad	1. Ballabgarh 2. Faridabad	1. Hodal 2. Palwal
4.	Gurgaon	1. Farukhnagar 2. Gurgaon 3. Patudi 4. Sohana	
5.	Hisar	1. Bas 2. Bhuna 3. Hissar-I 4. Hissar-II	
6.	Jind	1. Alewa 2. Jind 3. Narwana	
7.	Kaithal	1. Gulha 2. Kaithal 3. Pundri	
8.	Karnal	1. Gharaunda 2. Indri 3. Karnal 4. Nilokheri 5. Nissang	
9.	Kurukshetra	1. Ladwa 2. Pehowa 3. Shahbad 4. Thanesar	
10.	Mahendragarh	1. Ateli Nangal 2. Kanina 3. Mahendragarh 4. Narnaul	

S. No.	District	Over Exploited Mandals (> 100%)	Dark Mandals (100 to 85%)
11.	Panipat	1. Assandh 2. Israna 3. Panipat 4. Samlakha	1. Mandlanda
12.	Rewari	1. Jatusana 2. Khol 3. Nahar 4. Rewari	1. Bawal
13.	Rohtak	1. Salawas	1. Jhajjar
14.	Sirsa	1. Odhan	—
15.	Sonipat	1. Rai	—
16.	Yamunanagar	1. Jagadhari 2. Radaur	1. Bilaspur

KERALA

S. No.	District	Over Exploited Mandals (> 100%)	Dark Mandals (100 to 85%)
1.	Trivandrum	—	1. Chirayinki

MAHARASHTRA

S. No.	District	Over Exploited Watersheds (> 100%)	Dark Watersheds (100 to 85%)
1.	Nasik	—	1. GV- 7 2. GV- 15 3. GV- 21 4. TE-96 5. TE-109
2.	Jalgaon	—	1. TE-1 2. TE-2 3. TE-35 4. TE-37A 5. TE-50A 6. TE- 51A 7. TE- 60A
3.	Ahmednagar	—	1. GV-38B 2. GV-107 3. GV-109 4. GV-110 5. GV-117 6. GV-123
4.	Pune	—	1. BM-5 2. BM-7 3. BM-12 4. BM-58 5. BM-59 6. BM-75
5.	Solapur	—	1. SA-27 2. SA-29
6.	Kolhapur	—	1. KR-84
7.	Sangli		1. KR-38 2. KR-39 3. WGKCC-1
8.	Nagpur	—	1. WRJ-1
9.	Usmanabad		1. MR-36A
10.	Warda		1. WRK-2
11.	Amravati		1. WB-2

PUNJAB

S. No.	District	Over Exploited Mandals (> 100%)	Dark Mandals (100 to 85%)
1.	Amritsar	1. Patti 2. Gandiwind 3. Raya 4. Ajnala 5. Verka 6. Taran Taran 7. Khadoor Saheb 8. Valtoha 9. Tarsikka 10. Jandisla 11. Bhikhiwind	1. Naushera Panu
2.	Jalundhar	1. Nurmahal 2. Jullandhar East 3. Banga 4. Jullandhar West 5. Shahkot 6. Bhogpur 7. Adampur 8. Nakodar 9. Nawan Shehar 10. Phillaur 11. Goraya 12. Aur	
3.	Kapurthala	1. Phagwara 2. Kapurthala 3. Nadala 4. Sultanpur	1. Sidhwan Bet 2. Machhwara
4.	Ludhiana	1. Pakhowal 2. Jagraon 3. Mangat 4. Sudhar 5. Samrala 6. Doraha 7. Ludhiana	—

S. No.	District	Over Exploited Mandals (> 100%)	Dark Mandals (100 to 85%)
5.	Rupnagar	1. Chamkaur Saheb	
6.	Patiala	1. Patiala 2. Bhjunerheri 3. Nabha 4. Samana 5. Ghanaur 6. Bassi Pathana 7. Rajpura 8. Sirhind	
7.	Hoshiarpur	1. Tanda	—
8.	Bhatinda	1. Phul(East)	—
9.	Ferozepur	—	1. Ghalkhurd 2. Zira 3. Ferozepur
10.	Faridkot	1. Nihal singh Wala 2. Moga-I 3. Bagh Purana 4. Moga-II	—
11.	Sangrur	1. Sangrur 2. Mahikalan 3. Sunam 4. Lehardaga 5. Dhuri 6. Barnala 7. Ahmedgarh 8. Malerkotla 9. Bhawanigarh	1. Sehna
12	Gurdaspur	1. Dara baba Nanak 2. Kalanaur 3. Batala 4. Hargobindpur	1. Dhariwal

RAJASTHAN

S. No.	District	Over Exploited Mandals (> 100%)	Dark Mandals (100 to 85%)
1.	Ajmer	1. Jawaja 2. Pisangan	1. Srinagar
2.	Alwar	1. Behror 2. Kathumar 3. Kishengarh 4. Kotkasim 5. Laxmangarh 6. Mandwar 7. Neemrana 8. Rajgarh 9. Reni 10. Tijara	1. Ramgarh
3.	Barmer	—	1. Dhorimanna
4.	Bharatpur	1. Deeg 2. Kumher 3. Nadbai	
5.	Chittorgarh	—	1. Chhoti Sadri
6.	Dholpur	1. Dholpur	—
		2. Rajakhera	
7.	Jaipur	1. Ajmer 2. Bairath 3. Bandikui 4. Govindgarh 5. Jhotwara 6. Lalsot 7. Sambhar 8. Sanganer	
8.	Jalore	1. Ahore 2. Bhinmal 3. Jalore 4. Raniwara 5. Sanchore 6. Sayala	

S. No.	District	Over Exploited Mandals (> 100%)	Dark Mandals (100 to 85%)
9.	Jhalawar	1. Pirawa	
10.	Jhunjhunu	1. bohana 2. Chirawa 3. Surajgarh	1. Khetri 2. Udaipurwati
11.	Jodhpur	1. Balesar 2. Bilhara 3. Osian	—
12.	Sawai Madhopur	1. Gangapur 2. Hindon 3. Mahua 4. Toda Bhim	1. Bamanwas
13.	Sikar	1. Khandela 2. Neem ka Thana 3. Srimadhopur	1. Danta Ramgarh
14.	Sirohi		1. Reodar

TAMIL NAIDU

S. No.	District	Over Exploited Mandals (> 100%)	Dark Mandals (100 to 85%)
1.	Chenganpet-MGR	1. R.K.Pet 2. Poondi 3. Minjur 4. Thiruvalangadu 5. Thiruvallur 6. Madhavaram	1. Sholavaram
2.	North Arcot- Ambedkar	1. Kanniyampadi 2. K.V.Kuppam 3. Madanpur 4. Thirupattur 5. Villore	1. Anaicut
3.	Thiruvannamalal Sambuvarayar	—	1. Chengam
4.	South Arcot	1. Koliyanur 2. Thiruvennainallur 3. Kandamangalam 4. Nellikuppam 5. Vikravandi 6. Keerapalayam 7. Ulundurpet 8. Thiurnavalur	1. Gingee 2. Vallam
5.	Salem	1. Konganapuram 2. Mallasamudram 3. Attur 4. Rasipuram 5. Vennandur 6. Paramathi Velur 7. P.W.Palayam 8. Erumaipatti 9. Namagiripettai 10. Mohanur	
6.	Periyar	1. Modakurichi 2. T.N.Palayam 3. Nambiyur 4. Andhiyur 5. Bhavani Sagar 6. Kodumudi	1. Erode 2. Uthukuli 3. Chennimalai

S. No.	District	Over Exploited Mandals (> 100%)	Dark Mandals (100 to 85%)
7.	Coimbatore	1. Palladam 2. Sulur 3. Annur 4. Tiruppur 5. Avinashi 6. Madhukkarai 7. Sultanpet 8. Poongalur	1. Pollachi (N) 2. Thondamuthur 3. Gudimangalam
8.	Dharamapuri	1. Palacode 2. Bargur 3. Mathur 4. Krishangiri 5. Harur	1. Dharmapuri 2. Pappireddipatti
9.	Tiruchirapalli	—	1. Kulithalai
10.	Thanjavur	1. Papanassam 2. Kumbakonam 3. Thiruvidaimarudur 4. Thiruppanandal	1. Thiruvaiyar
11.	Nagapattinam	1. Mayiladudrai 2. Kuttalam 3. Kollidam 4. Sirkali 5. Sembanarkoil 6. Neeedamangalam	1. Nannilam 2. Koradachery
12.	Madurai	1. Theni 2. Chinnamanur	1. Usilampatti 2. T.Kallipatti
13.	Dindigul-Anna	1. Reddiyachatram 2. Vadipatti 3. Alanganallur	1. Vattalagundu
14.	Kamarajar	—	1. Rajapalayam
15.	Tirunelvelikattabomman	—	1. Alangulam 2. Melaneelithanallur
16.	V.O.Chidambaranar	—	1. Vilathikulam 2. Udangudi 3. Sathankulam

UTTAR PRADESH

S. No.	District	Over Exploited Mandals (> 100%)	Dark Mandals (100 to 85%)
1.	Agra	—	1. Barauli Ahir
2.	Badaun	1. Wazirganj	1. Junnawai 2. Islamnagar 3. Binawar(Salarpur) 4. Ambiapur
3.	Bijnor	1. Aku	1. Noorpur 2. Jalilpur 3. Kiratpur 4. Burhanpur
4.	Bulandsahar	1. B.B. Nagar	1. Unchagaon 2. Danpur 3. Jehangirabad 4. Lakhaoti 5. Shikarpur
5.	Farrukabad	—	1. Karnalganj
6.	Firozabad	—	1. Khairganj
7.	Gaziabad	1. Hapur	—
8.	Lakhimpur-Kheri	—	1. Behjam
9.	Mathura	—	1. Sahpau 2. Sadabad
10.	Meerut	1. Binauli	1. Pilana 2. Kharkhauda 3. Rajpura
11.	Moradabad	1. Bahjoi	1. Dingerpur 2. Bilari 3. Baniakhera 4. Asmoli 5. Pawansa
12.	Muzaffar Nagar	—	1. Shahpur
13.	Sahranpur	1. Gangoh	1. Nangal 2. Sarsawa
14.	Varanasi	—	1. Gyanpur

MADHYA PRADESH

S. No.	District	Over Exploited Mandals (> 100%)	Dark Mandals (100 to 85%)
1.	Indore	—	1. Sanwer
2.	Mandsaur	—	1. Mandsaur 2. Neemuch

REPORT ON
WOMEN AND WATER

By
Research Foundation for Science - Technology and ecology

NATIONAL COMMISSION FOR WOMEN
NEW DELHI

WATER IN WOMEN'S HAND

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FOREWORD

In the land of sacred rivers, and generous monsoons the water crisis has become the most serious crises facing society.

The National Commission for Women's report on Women and Water, prepared by Diverse Women for Diversity, the gender programme of the Research Foundation for Science, Technology and Ecology is based on a nation wide study on the water crisis, its particular impact on women, and women's perceptions and responses.

Women as water providers bear the worst burden of the deepening water crisis - through longer walks in search for water in rural areas, longer wait or less water in urban areas.

The crisis has been aggravated by a number of factors. Industrial pollution has created an artificial scarcity by destroying safe, accessibel sources of water. The scarcity in Delhi is a result of the pollution of the Yamuna. Most rivers treated in India as a divine mother, is now a toxic drain and sewer. Rivers that nourished people are now spreading hazards and pollution.

River diversions and mega projects are also causing a water crisis. The case of Tehri dam shows how local women bear the highest costs of displacement, and the water crisis. New diversion projects like the Ken-Betwa link, and the Sharda - Yamuna link could well create water wars like those generated by the Sutlej - Yamuna link canal.

A new challenge for poor women is the privatization and commodification of water. In most cities, women's protests have forced the cancellation of contracts for handling over urban supply to private corporations for whom it is a for-profit undertaking, not the supply of a common good and a public service. Delhi's water tariffs have been increased ten fold and women are already on the streets, defending their water rights.

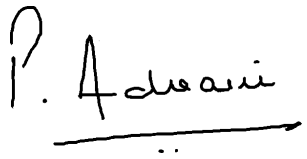
This report on Women and Water is brought out at a critical juncture, when perceptions and policies related to water are changing. Is water for social good or commercial gain? Is water a common property or a private asset? Is

water a human right of all or a commodity to be bought in the market place reaching those with purchasing power?

Water is life. The right to water is at the heart of the right to life guaranteed in Article 21 of the Constitution. That-is why when advasi women in Plachimada, Kerala started their protest two years ago against Coca Cola mining 1.5 million litres / day and leaving toxic pollution behind, the Court came in their support and ruled that water is a public good, the right to water is a fundamental rights, and water depletion and pollution is a violation of the Constitution Rights of Communities.

Women through their actions are creating a new water order based on sustainability, justice and peace in the face of non-sustainability, injustice and water wars.

This report brings you the story of the water crisis and women's responses to it.



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Chairperson
National Commission for Women

Place : New Delhi
Dated : January, 2005