Why Status Report?

Why Status Report

The quantity and quantity of drinking water the citizen get is an indicator of development of the people of the state. Perceptions about the drinking water scenario in Orissa have been a point of debate since quite some time. The media paints the drinking water scenario in the state as quite bleak. One will hardly find a community development block in the state from where the newspapers have not reported water scarcity or suffering of people not having access to potable water. But the claims by the government as well as the government documents give an altogether different picture. Government claims to have provided drinking water to all. At least that is what the statistics of tube wells and water supply schemes in Orissa say. These two different pictures of drinking water scenario in the state is so widely different that one fails to draw a conclusion about the real drinking water scenario in the State of Orissa.

While many of the villages are yet to be provided with safe drinking water, those villages having sources of water also have their share of problems. There are also a whole gamut of issues associated with drinking water like the issue of rights and entitlement, quality of water, operation and maintenance of water sources, both financial and technical sustainability of water supply systems, sustainability of water resources feeding drinking water sources and a range of social issues around it. Over the last few decades focus of the state has been creating water sources. But now it is the time to also concentrate on the other issues plaguing provision and sustainability of safe drinking water to all.

What is the real situation in the state? Are all the people in the state getting safe drinking water? Is the quality of water that the people of Orissa are able to access safe for their health? What is the plight of the people living in the reserve forest areas of the state? In the unauthorized habitations that has not been recognized by the State? What are the hindrances in providing safe drinking water to all on a sustained basis?

The purpose of the Status report is to draw a picture of the drinking water scenario in the state as close as possible to the reality. This report also intends to flag off different issues associated with drinking water in the state. This report is meant for the different players those are working for providing safe drinking water to the people of the state. This document is intended to be a handy tool for all the players to understand the state of drinking water in Orissa and different issues around it. The purpose of this document is not to find fault with the government and other players associated with drinking water provisioning, but develop clarity on the gamut of issues around drinking water and point our weak areas where we need to focus so that we can make judicious use of what ever resources we have.

The design of the report has been prepared based on the inputs of different government officials in charge of drinking water provisioning, NGOs working in this sector, geologists, retired officials and engineers of the state government etc. During the discussions it was decided to not only rely on the secondary information to put together this report. The State of Drinking Water in Orissa will be a mix of secondary information, outputs from focused group discussions and primary information collected directly from the field. To make this report as close to the reality as possible within the resources available it was decided to sample 5 villages each from all the districts of the state. Though sampling only five villages is not a representative sample, yet care was taken to select villages from a cluster of villages having identical problems in drinking water. These villages were identified after consulting government officials concerned with drinking water supply and different NGOs working in the district. For each district a profile of drinking water has been prepared to capture the district specific details of drinking water scenario. The draft district profiles were presented in the district consultations participated by the NGO representatives, government officials, media persons and interested individuals and finalized. With input from the participants issues around drinking water was identified and also the district profiles were finalized. The district profiles also constitute a part of the State of Drinking Water in Orissa. Apart from the district consultations, there also were State- level consultations on drinking water and discussion with different players. Apart from inputs from different individuals this report also relies heavily on the secondary information mostly documents by the state government departments, Central government documents, newspaper clippings or reports etc. to develop the skeleton of the report. After preparation of the draft report this has been vetted by two persons knowledgeable about the drinking water situation in the state. This also has been presented in a state level workshop and the inputs provided by the participants incorporated into the report.

One of the major limitations of this report has been our inability to assess the scale of the task and as a resultant of this the task had to be performed with a very small team. The number of villages from where the primary data was collected also is very small to be a representative sample. As the study also involved information collection directly from the villagers, some of the information regarding the quality and technical aspects is based on the inputs from the villagers. They may not be very accurate all the times.

We take this opportunity to express our sincere thanks to the NGOs, Government officials, individuals/Resource persons and media persons who have enriched our understanding on drinking water.

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CHAPTER - I

MANDATE ON DRINKING WATER

CHAPTER-I

MANDATE ON DRINKING WATER

INTERNATIONAL Declaration on "Water"

India is a member of the United Nations Organisation and signatory to many international conventions, treaties. This also bestows certain responsibilities on the State of India.

- Article 11 of the 1966 International Covenant on Economic, Social and Cultural Rights sets out that States signatory to the treaty 'recognize the right of everyone to an adequate standard of living for himself and his family, including adequate food, clothing and housing, and to the continuous improvement of living conditions." Common sense dictates that water must be considered one of the essential components of adequate living conditions.

- Article 14 of the Covenant on the Elimination of all Forms of Discrimination against Women (CEDAW) binds States parties to ensure rural women 'adequate living conditions, particularly in relation to housing, sanitation, electricity and water supply…"

- The International Convention on the Rights of the Child binds States parties to: "combat disease and malnutrition…through, inter alia, the provision of adequate nutritious foods and clean drinking water."

A number of declarations of political intent also influence statements of Indian policy on water:

- In 1977, at the UN Water Conference, the first major water conference held in 1977 at Mar del Plata, Argentina, UN member states recognised that "All peoples[….] have the right to have access to drinking water in quantities and of a quality equal to their basic needs." This may be regarded as the starting point for a global water policy. For the first time, the international community stressed on right to water as per the basic need. Chapter 18 of Agenda 21, the Plan of Action of the 1992 Rio Earth Summit formulated and underlined this call in concrete terms.

- In 1994, principle 2 of the International Conference on Population and Development in Cairo re-affirmed the right to water: "[Human beings] have the right to an adequate standard of living for themselves and their families, including adequate food, clothing, housing, water and sanitation. Chapter 18 of Agenda 21,the Plan of Action of the 1992 Rio Earth Summit formulated and underlined this call in concrete terms.

- The concept of meeting basic water needs was further strengthened during the 1992 Earth Summit in Rio de Janeiro and expanded to include ecological needs. In Agenda 21, governments agreed that "in developing and using water resources, priority has to be given to the satisfaction of basic needs and the safeguarding of ecosystems. Beyond these requirements, however, water users should be charged appropriately."

- Similarly, in the Plan of Implementation adopted at the 2002 Johannesburg Summit, governments pledged to "employ the full range of policy instruments, including regulation, monitoring … and cost recovery of water services, without cost recovery objectives becoming a barrier to access to safe water by poor people…."

- In November 2002, the United Nations Committee on Economic, Social and Cultural Rights affirmed that access to adequate amounts of clean water for personal and domestic uses is a fundamental human right of all people. In its General Comment No. 15 on the implementation of Articles 11 and 12 of the 1966 International Covenant on Economic, Social and Cultural Rights, the Committee noted that "the human right to water is indispensable for leading a life in human dignity. It is a prerequisite for the realization of other human rights." While the General Comment is not legally binding on the 146 States that have ratified the International Covenant, it aims to assist and promote the implementation of the Covenant and does carry the weight and influence of "soft law".

  The Comment also emphasizes that States parties to the International Covenant have the duty to progressively realize, without discrimination, the right to water, which entitles everyone to sufficient, affordable, physically accessible, safe and acceptable water for personal and domestic uses. Realization of the right should be feasible and practicable, according to the text, since all States parties exercise control over a broad range of resources, including water, technology, financial resources and international assistance, as with all other rights in the Covenant.

As per ECOSOC Committee on Economic, Social and Cultural Rights, the human right to water entitles everyone to sufficient,safe ,acceptable,physically accessible and affordable water for personal and domestic uses,"what does this means"?

Sufficient water means:
An adequate water amount of safe water is necessary to prevent death from dehydration,to reduce the risk of water related disease and to provide for consumption, cooking, personal and domestic hygienic requirements.[6] The quantity of water available for each person should correspond to WHO guidelines.[7]

Safe and Acceptable Water:
Safe acceptable water means it must not be a threat to a person's health and should be of an acceptable colour and odour.

Physical Accessibility:
Physical Accessibility means that water must be that water must be accessible for each household, educational institution and workplace, which generally means having mains water supply in these facilities.

Affordable Water:
Affordable water means that the direct and indirect cost must not be high enough to hinder the realization of other human rights. The Committee states with regard to affordability: "To ensure that water is affordable, States parties must adopt the necessary measures that may include, *inter alia*: (a) use of range of appropriate low-cost techniques and technologies; (b) appropriate pricing policies such as free or low-cost water; and (c) income supplements." [8]

The committee further emphasizes that water should be treated as a social and cultural good, and not primarily as an economic good. It speaks out clearly against the commercialization and commodification of water.

Millennium Development Goal:
It has been laid out in numerous UN documents over the past 30 years that access to clean drinking water is to be guaranteed. The Action Plans of the major UN conferences of the 1990s (inter alias Cairo, Copenhagen, Beijing, Rome), describe that water is a key factor in overcoming hunger and poverty, and the lack of water, in contrast, as one of the greatest obstacles to developments. The water decade that began in 1980 however yielded a sobering outcome. The number of people without sufficient water was reduced only marginally. Presently there is a renewed vigor to set targets to address the problem of drinking water. At the special session of the UN General Assembly in 2000 the international community has set itself a new and clear target, the so-called Millennium Goal to be achieved by 2015. The 7th Millennium Development Goal of Ensuring Environmental Sustainability goal of "Reducing by half the proportion of people without sustainable access to safe drinking water'. This goal was confirmed at the World Summit on Sustainable Development (Rio+10) in September 2002 in Johannesburg .At the same time it was supplemented with the call also to halve the number of people without sanitary facilities by 2015.
The 78th Plenary meeting also has proclaimed the the period from 2005 to 2015 the International Decade for Action, "Water for Life", to commence on World Water Day, 22nd Marh 2005' It has decided that the goal of the decade should be greater focus on water related issues at all levels and implementation of water related programs and projects for the realization of United Nations Millennium Declarations and Johannesburg Plan of Implementation.

Drinking water as a human right?
Many policy makers and advocates have called for the recognition of water as a human right as an essential step in ensuring that action is taken on behalf of those who are suffering from lack of access to clean water supplies. They feel that the legal obligation ensuing from such an acknowledgement of a right to water would motivate governments of both developing and donor countries to make effective changes in domestic and aid policies and resource allocation, and give citizen groups firmer ground on which to pressure governments. Furthermore, some critics of the increasing privatization of water supply services worldwide feel that recognition of a right to water would reinforce their arguments for a stronger role for the public sector rather than profit-motivated corporations in meeting such a crucial need (see backgrounder "Supplying Water — For a Price**").**

A recurring theme in the debate on water as a human right has been the recognition that water is a necessary precondition to all of our human rights. It has been argued that without equitable access to a minimum requirement of clean water, other established rights, such as the right to a standard of living adequate for health and well-being, as well as civil and political rights, are not attainable. It is widely thought that the language of the Universal Declaration of Human Rights, which has formed the building blocks of subsequent declarations, was not intended to be all-inclusive, but rather to reflect component elements of an adequate standard of living. The exclusion of water as an explicit right was due more to its nature; like air, it was considered so fundamental that its explicit inclusion was thought unnecessary.

To date, the only mention of a binding human right to water occurs in the Convention on the Elimination of all Forms of Discrimination against women, and this with a view to access without discrimination. In the Convention on the Rights of the child adequate clean drinking water is stipulated as a prerequisite for implementing the right to health. A right to water was also derived from the Universal Declaration of Human Rights of 1948,the "mother" of all human rights. Everyone has the right to a standard of living adequate for the health and well being of himself and of his family, including food, clothing, and housing. This formulation was interpreted to mean that clean drinking water comprised an element of the right to an adequate standard of living. Today a right to water is derived by and large from the binding norms of the International Covenant on Economics, Social Cultural Rights. The human right to water as a prerequisite for the realization of the right to life, the right to adequate food, clothing and housing is derived from it. This stance was reflected for example on World Food Day 2002 in the FAO motto" Water: Source of Food Security".

But, till date there is no explicit mention of right to water as a human right, ECOSOC Committee on Economic, Social and Cultural Rights report. In different forum and statements by world leaders have claimed that water is a fundamental human rights. As United Nations Secretary General Kofi Annan himself has said:

'Access to safe water is a fundamental human need, and therefore, a basic human right. Contaminated water jeopardizes both the physical and social health of all people. It is an affront to human dignity.' The persistent refusal questions the sincerity and commitment of international bodies regarding their commitment to human rights, as this refusal to recognize the right to water is undermining the international human rights system. Even the late UN Human Rights Commissioner, Sergio Vieira de Mello echoed this call at the Third World Water Forum in Kyoto last year, calling for a direct reference to the right to water in the Ministerial Declaration of the conference. Sadly, this call was not heeded.

Human Rights, MDGs and the WTO

Implementation of the major decisions taken by the UN bodies has been very slow or non-staters. This specifies the strength of such commitments by the UN as well as the member States. ECOSOC report puts Right to Water under General Comments those are not binding laws and at east could be termed as 'soft laws'. ECOSOC also raised its concern over the WTO negotiations. It emphasizes "Of capital importance s the – precisely in view of the ongoing WTO negotiations – the stated precedence of international human rights laws over national undertakings under international economic agreements. The committee has demanded for human rights law must take precedence over the trade law by mentioning "agreements concerning trade liberalization should not curtail of inhibit a country's capacity to ensure the full realization for the right to water."[1] With this kind of an environment how far the decisions and declarations by the UN and similar bodies is valid is to be pondered over. At the same time non-UN forums have started occupying the Centre stage and no doubt many of them are biased in favour of the water multinationals.

MANDATE OF GOVERNMENT OF INDIA AND STATE GOVERNMENT

Drinking water and Indian Constitution:

Constitution of India aims at securing Justice, liberty and equality to all citizens of India. Again Right to life is a fundamental right under the article 21 of the Constitution of India and it includes the right of enjoyment of pollution free water and air for full enjoyment of life. Article 47 of the Constitution is more specific about the role fo the state by mentioning that "the state shall endeavor to improve public health, viewing it as a primary duty". Article 47 says:

Duty of the state to raise the level of nutrition and the standard of living and to improve public health (DPSP): The state shall regard the raising of the level of nutrition and the standard of living of its people and the improvement of public health as among its primary duties and in particular, the state shall endeavor to

bring about prohibition of the consumption except for medical purposes of intoxicating drinks and of drugs which are injurious to health.

Interpretations of the Supreme Court of India is very clear on the status that drinking water should be provided. In the Narmada Bachao Andholan v Union of India, Supreme Court has indicated that right ot water is a fundamental right under article 21 of the constitution. It has said:

Water is the basic need for the survival of the human beings and is part of the right to life an human rights as enshrined in Article 21 of constitution of Indian, and can be served only by providing source of water where there is none.

India also is a signatory to the UN Water Conference resolution in 1997 and hence is under obligation to abide by this. The UN Water conference had resolved unanimously "All people what ever their state of development of their social, and economic conditions have the right to have access to drinking water in quantum and of a quantity equal to their basic needs."

The Supreme Court has ruled " under the constitution, the role of the State to provide every citizen with adequate clean drinking water and to protect water from getting polluted is not only an fundamental Directive Principle in the governance of the State, but is also a penumbral right under Article 21 of the Constitution of India."

Definition of Drinking water

While the constitution recognizes drinking water as a fundamental right, the government is yet to come out with a legal definition of drinking water. As drinking water is a health requirement, it is expected that in the acts administered by Ministry of Health and Family Welfare a proper definition of drinking water could be found. Food Adulteration Act, 1994 defines 'food' under clause 2(v) of the Act as

"Food' means any article used as food or drink for human consumption other that drugs and water and includes:

(a) any article which ordinarily enters into, or is used in the composition or preparation of, human food

(b) any flavoring matter or condiments, and

(c) any other article which the Central Government may having regard to its use, nature, substance or quality, declare by notification in the official Gazette, as foor for the purpose of the act."

Surprisingly the definition does not include drinking water under the category of food. Only packaged water has been declared as food vide notification 202 (E) dated 21 March 2001.

In 1994 the committee on Subordinate Legislation of the Parliament had recommended with regard to inclusion of water under the definition of food and even for normal drinking water, there has to be norms. [2] But even after more than a decade drinking water is yet to be brought under the definition of Food Adulteration Act.

Bureau of Indian Standards (BIS), an autonomous body under the administrative control of Department of Consumer Affairs has laid down the standards of drinking water as well as packaged drinking water since 1983. Similarly Central Health and Environmental Engineering Organization (CPHEEO) also has specific norm in its technical guidelines. But, both the norms are voluntary or recommendary in nature. It is upon the State government s to adopt them or not

Practically in the absence of a proper definition of drinking water, 'drinking water' being a fundamental right does not bear much of meaning as it is the quality or specificity that differentiates water from any water. Not only the quality, but also the non-specificity of quantity of drinking water is an hindrance for this fundamental rights.

Quantity not defined[3]

The fundamental right to water is primarily aimed at alleviation of suffering. But, in the absence of any proper quantification of water that is basic to human survival, this right to water fails to meet the litmus test of 'specificity'. Rajiv Gandhi Drinking Water Mission rate of 40 lpcd (liters per capita per day) could not be seen as a minimum requirement of water and understood as a fundamental right to drinking water as all the water is not meant for drinking. In the absence of a specified quantity of drinking water that is fundamental right, enforcing it and holding the State accountable has not been possible.

Drinking Water and the Water Policies

While the constitutional framework is hazy, the present policy framework is also not better. National Water Policy 2002 puts drinking water in the top of the 'Water allocation priorities'. It also mentions that provision of drinking water should be a primary consideration in planning and development of water resources projects. Similarly during the planning of projects in the hilly areas should take into considerations the need to provide assured drinking water. And 'drinking water' also finds a special mention in Para 8 of the policy as

i. i. Adequate safe drinking water facilities should be provided to the entire population both in the urban and in rural area. Irrigation and multipurpose projects should invariably include a drinking water component, wherever there is no alternative source of drinking water. Drinking water needs of human beings and animals should be the first charge on any available water. [4]

It could be seen all through the policy document where ever there is any mention of drinking water, it only pronounces that Drinking water should be the first charge. And the policy does not go beyond this. The over all orientation of the policy is irrigation centric and it does not have any serious thinking on the drinking water problem.

State Water Policy of Orissa 1994 in the objectives statement has mentions on drinking water as

iii. Judicious allocation of water resources to different sectors with drinking water occupying top priority in order to satisfy the basic need of the people'

v. Provision of adequate water for drinking water and industrial use.

The ultimate goal of the state policy as enunciates is developing a State Water Plan for the state that will be a blue print for all water resources development in the state. And the policy does not fail to mention drinking water as the top priority.

The draft State Water Policy of Orissa, 2003 which is a replica of the National policy more or less has the same concern for drinking water as in the National Water Policy 2002 with only one perceptible addition on the ultimate goal of state policy that again is the same as the State policy, 1994.

Neither the National Policy nor the State Policy has integrated drinking water into the whole framework of water management and the concerns with regards to drinking water have not been integrated into the policies. On the contrary the policies have created space for privatization of water under the grab of private sector participation. This rather creates a threat for privatization of drinking water provisioning. This effort needs to be looked at from the point of view of drinking water being a fundamental right and the State is to ensure it.

Spatial nature of right to dinking water

Thanks to the Forest Conservation Act, 1980 and other laws of the land, right to drinking water is regulated by the nature of land the habitation is situated.

[4] National water policy 2002, Ministry of Water Resources, Government of India

Forest Conservation Act, 1980 section 2 **restricts Dereservation of Forests or use of Forest Land for non-Forest Purposes.** Notwithstanding anything contained in any other law for the time being in force in a state, no State Government or other authority shall make, except with the prior approval of the Central Government, any order directing use of forest land for any non-forest purposes.' Non forest use' means use of the forest land for cultivation of tea, coffee, etc. crops or any purpose other than re-afforestation. But it does not include any work relating or ancillary to conservation, development and management of forests and wildlife, namely, the establishment of check-posts, fire lines, wireless communications and construction of fencing, bridges and culvert, dams, water-holes, trench marks, boundary marks, pipe lines or other like purposes.

The Forest Conservation Act debars or does not have any provision for drinking water to the villages situated within the Reserve Forests. In the hearing of the famous Godavarman case the honourable Supreme Court hasdefined the forest and the restrictions regarding felling of trees or diversion of forest land has been extended to all the forest whether reserve forest or otherwise. Hence the above restrictions hold good for all type of forest or forest land. The ground reality is that there are many settlements of indigenous communities within the reserve forests and also many settlements have come up by encroaching the forestland. So, water may be a fundamental right for the citizens of India, but for the villages in the reserve forest land or say nay forest land, the State is restricted by its own law to not to provide water to these villages as the settlement is not legal. The same principle also is adopted for the slums in the cities which are not recognized by the state. So water as a fundamental right is valid depending on his spatial positioning whether he/she is living on a legally accepted habitation or not.

However the recent decision by the Ministry of Environment and Forests are a welcome step towards recognition of this right even in the areas where Forest Conservation Act is in force. Recognising that development and conservation should go hand in hand and also the constitutional obligation of the State, it has issued letters and guidelines to the State Governments in this regard.

Ministry of Forest and Environment letter no **-1/2003 - FC dated 20.10.2003 has laid down the guidelines for general approval under Section 2 of Forest (Conservation) Act, 1980. Para iii of the guideline reads

"In the tribal areas, there shall be general approval under Section-2 of the Forest (Conservation) Act, 1980 for *underground laying of electricity cables and electric wires to individual households, drinking water supply/ water pipelines, telephone lines, which involve felling of trees not exceeding 50 numbers per project (should be bellow 60 cm. girth class) and are out side National Parks or Wildlife Sanctuary and are led along the roads and within the existing right of way*. This general approval shall be subject to the condition that the Nodal Officer shall certify compliance. Records of such works undertaken shall be maintained shall be send quarterly report to

concerned Chief Conservator of Forests (Regional Office) for monitoring purpose. In lieu of felling of trees, five times of the number of trees shall be planted by the User Agency at or near the site. Any deviation shall require permission from the Central Government under the Forest (Conservation) Act, 1980."

In another letter dated 03.01.2005 (F. No 11-9/98-PC) MoEF has provided a list of the activities for the general approval:

In addition to general approval already given for certain activities as stated above, the Central Government , hereby conveys its general approval under Section- 2 of the Forest Conservation Act, 1980 for diversion of forest land to Government Department for following activities:

1. Schools
2. Dispensary/hospital
3. Electric and telecommunication lines;
4. Drinking water;
5. Water/rain water harvesting structures;
6. Minor irrigation canal;

Some of the conditions imposed along with these provisions are

- The forest land to be diverted should be less that one hectare
- The clearance of such projects shall be subject to the condition that the same is need based
- The user agency shall do the compensatory afforestation at the project cost.
- The user agency shall pay the Net Present Value of the diverted land.

With such preconditions how far it will be possible for the User Agency (say the RWSS in the State of Orissa) to provide drinking water to the citizens is worth pondering.

CASESTUDY ON KARAMAHANDI

Sati has to get up early the next morning despite her ailing body for she knows that Sundari, her 8 year old daughter, would not fetch water for household needs. Unless she wakes up by 3 in the morning, she would have to be content with just one bucket of water from the dilapidated well. If she makes it to the well before daybreak, she would have the ultimate bonanza of having three buckets without raising an alarm. The alternative is daunting. She has to drag her ailing body for nearly 1.5 km to reach the streambed and then wait for an hour before water finally oozes out of the small dug well on the streambed. What follows next is the toughest part of the ordeal. She has to trek the long, uphill distance back home – water pot on head – in the scorching summer sun. In sheer

desperation, she asks Sundri if she would fetch water from the streambed just in case she fails to make it to the village well in time. It could be any woman's story in Karamahandi village, 17 km from Umarkote town in Orissa's Nabarangpur district. The village, coming under Sunabeda gram panchayat of Umarkote block, is situated deep inside a Reserve Forest. It has a population of 310 – most of them belonging to the Kondha tribe - living in 50 households.

Communication to Karamahandi is virtually nonexistent for the greater part of the year. In summer, the numerous streams and nallahs criss-crossing the area dry up making way for makeshift roads. The village remains completely cut off from the rest of the world during the four monsoon months. No wonder only two persons from the village have made it to the 10th level. Apart from their native dialect, the inhabitants can also speak Oriya – having picked up the language from their frequent interactions with government officials.

A thunder-hit open well, with concrete debris submerging the little water available, is the sole drinking water source in the village. The well – with a depth of 30 feet and a circumference of 8 feet – yields no more than 30 buckets of water a day, which falls well short of the drinking water requirement of the village. Worse still, the accumulated debris from three thunder-shattered cement circles at the bottom make it well nigh impossible for pots and pitchers to access whatever little water is available. When the water in the well reaches rock bottom in summer, the women of the village swarm to the nearest stream to fetch water.

The condition of the stream is no better, with only tiny puddles here and there serving animals. Women dig miniature wells (*chua*s in local parlance) and wait in the scorching heat until a sizeable amount of water oozes out. It generally takes four to five hours of tedious labour to get two pitchers of drinking water. The women, who would have otherwise earned Rs 40/50 per day working as labourers, have to spend half the day collecting water instead. Drinking water has a significant bearing on livelihoods in these parts as there is a substantial decline in household incomes during summer.

Located as it is in a Reserve Forest, Karamahandi is debarred by the law of the land from having basic amenities, including a proper source of potable water. Attempts by some organizations to install a tube well in the village have been repeatedly thwarted by Forest Department officials. The District Collector even threatened to seize the equipment and machinery requisitioned for installation of a tube well. "We have approached everybody - from the District Collector to MPs - but to no avail", says an exasperated Padia, a young man of the village.

Paradoxically, at a state level meeting on 'Mitigation of possible heat wave in summer-2005', it was decided to provide drinking water to habitations situated inside Reserve Forest through tankers, if needed. As per the decision taken at the meeting, efforts were to be made to construct/renovate water holes inside the forests by the Department of Forest and Environment to provide water to people and animals. But the Forest Department has done absolutely nothing to carry out this decision. Why, it has not even bothered to carry out an enumeration exercise to determine the number of people or households living in the village.

The government cannot shirk its constitutional responsibility of providing a basic need like drinking water to its citizens by merely pointing out that Karamahandi is a village situated inside Reserve Forest. While providing a drinking water source at the village would contravene legal provisions, it can surely relocate the people outside the Reserve Forest and provide them with all basic amenities. The administration's utter apathy and indifference towards the inhabitants of Karamahandi is in sharp contrast to its generosity towards Bangladeshi settlers in UV 1, barely 7 km from the village. The fact that the government has made available land and houses to the immigrants from Bangladesh, besides ensuring all basic amenities like roads, school, drinking water and healthcare facilities has inevitably caused a lot of heartburn among the people of Karamahandi.

But far from throwing up their hands in despair at such utter government apathy, the people of Karamahandi have devised their own way to meet their basic needs. They have made use of the water resources bestowed on the area by Mother Nature. The remarkable thing about the people of the village is the exemplary unity and integrity shown by them. It is something of a minor miracle that there has never been a conflict over sharing of natural resources. Situated on a tableland sloping down towards the west along a small ephemeral stream, Karamahandi is devoid of any organized agricultural land. Maize and ragi are grown in the little slope land that is available in the *kharif* season. But since their agriculture is entirely rain-fed, the onset of summer signals the start of a nightmarish ordeal for them. The luckier ones get some wage work and somehow manage to weather the difficult period. Others make do by collecting forest produces like timber, honey and *jhuna* and selling them in the local market. But for the vast majority of villagers, the four summer months constitute the toughest time of the year. The time is particularly tough for women since they are the ones who have to fetch water for household needs, which rules them out of any wage work even if it is available. Rather than bring an end to their misery, the advent of monsoon makes things even more difficult for the people of Karamahandi. Water borne diseases become the order of the day as the water of the stream and nallahs get polluted. Four out of every 10 people in the village fall victim to diseases like cholera, diarrhea, typhoid and jaundice. Since the

nearest hospital is five km away, the people resort to their traditional system of healing, which often leads to death.

The people of Karamahandi have a symbiotic relationship with the forests surrounding the village. They say they have been living in the area for centuries – much before the Forest Department came into being. But today, they have been branded encroachers on their own land and denied all basic amenities that the government is duty-bound to provide them. Sandwiched as they are between the draconian forest laws on the one hand and the rapacity of the timber mafia on the other, the villagers can do little more than run from pillar to post appealing for what they should have got as a matter of right in the first place. Come election time and hordes of politicians descend on the village and promise them the moon. But once the election is over, it is back to square one as the politicians forget all about the promise.

Karamahandi is symptomatic of governmental apathy towards the 200 villages scattered over the 535.57 sq km Reserve Forest area in Nabarangpur district and thousands of villages spread over the 26,329.12 Sq. Kms of Reserve Forest area in the state. The number of people living inside Reserve Forest area in Orissa is a matter of conjecture since the government has no record of the habitations within Reserve Forest areas. Ironically, the same government goes to great lengths to keep a tab on the number of wild animals in these forests.

The government takes away with the right hand what it gives these people with the left hand. The fact that they are allowed to vote means they are legitimate citizens of the country. But when it comes to providing them basic needs like water, they are treated as pariahs. The Supreme Court has interpreted the term 'right to life' enshrined in the Fundamental Rights of the Constitution to include the right to basic amenities that allow a man to live a life of dignity. Water being the most essential of these amenities, will it not be correct to say that the Fundamental Rights of lakhs of people are being flagrantly violated by the State itself? The situation throws up several important questions, which must be answered. What are the guidelines for demarcating a Reserve Forest? Can the government declare any part of the country as a Reserve Forest without taking into consideration the fate of thousands of people living there for centuries? What about human rights and the government's duty towards its citizen? The founding fathers of the Constitution intended the Fundamental Rights of citizens to take precedence over any other law of the land.

What makes the government's apathy utterly unacceptable is the fact that there is ample scope to provide drinking water to these 'encroachers' even within the existing framework of law. In an important judgment delivered a few years ago, the Supreme Court allowed state governments to provide water to forest

habitations of below two hectares size. The only requirement laid down by the apex court was a requisition by the district administration or the Rural Water Supply and Sanitation (RWSS) department. It is a measure of the state government's callousness that there has been no request made so far under this provision.

In another landmark judgment last month, the Supreme Court has allowed the Orissa government to provide land *patta*s to people living in forests before 1980. Importantly, the apex court has made this exception to the general rule only in the case of Orissa. Once land *patta*s are given to the people, they cannot be denied access to drinking water anymore. The Central government too has readied a Bill that would recognize the rights of hundreds of thousands of tribals living in forests for ages.

The state government should make use of such provisions to provide drinking water to forest dwellers rather than wash its hands off them as it has done so far. But this requires a complete change of mindset – from one of treating these people as the scum of the earth to one that recognises them as bona fide citizens of the earth. But given the attitude of successive governments, it is easier said than done.

Evolution of Dinking Water Provisioning in India

Drinking water provisioning started in India primarily with the health concerns for its citizens. During the Pre-Independence era, the govt. of India appointed the "Bhore Committee,. 1944" to review the general health problems including the availability of safe drinking water supply on a national scale. The Committee suggested that the target should be to provide safe water for drinking purpose to the entire population, within a period of 35 years (by 1979-80). After Independence, the govt appointed the "Environmental Hygiene Committee" in 1948-49 to look into the same problem. The Committee made specific proposal for providing safe drinking water and sanitation facilities for the 90% of the population within a period of 40 years (i.e. by 1990). For accomplishing this task, priority was given to places where the annual death rate due to cholera was more than 100 per 100,000 persons for the last ten years. It is 15 years past the time frame to provide drinking water to 90% of the population and still the whole country is grappling with the problem of providing safe drinking water to its citizens. But, this also could not be achieved.

Recently the target of providing drinking water to all has been rescheduled by the government of India. The 10th Five year Plan document accords highest priority to the coverage of Not Covered (NC) habitations followed by the Partially Covered (PC) one by 2004, while the remaining period of the Tenth Plan is to be utilized for the coverage of newly merged habitations and those that has slipped back to the PC or NC status. This implies that the Planning Commission

is contemplating only those habitations those have been identified. This will further leave a section of the population devoid of drinking water in the newly formed or not enumerated habitations.

Initiatives for drinking water provisioning in India

Drinking water supply is a state subject. Providing potable drinking water supply in rural areas is the responsibility of state governments. Funds have been provided in the budget of the states for the drinking water supply right from the commencement of the First Five Year Plan. A national water supply and sanitation program was introduced in the Social Welfare sector in the year 1954. The govt of India provided assistance to the states to establish special investigation divisions in the Fourth Five Year Plan to carry out identification of the problem villages. Taking into account the magnitude of the problem and to accelerate the pace of coverage of problem villages, the Central Govt introduced the ARWSP in 1972-73 to assist the states and the Union Territories with 100% grants-in-aid to implement the schemes in such villages. This program continued till 1973-74. But with the introduction of the MNP during the Fifth Five Year Planning (1974-75), it was withdrawn. The program was reintroduced in 1977-78, when the progress of supply of safe drinking water to the identified problem villages under the MNP program was not found to be satisfactory**.** The programme has been continuing since then parallel to MNP. Besides, to ensure maximum inflow of scientific and technical inputs into the rural water supply ARWSP continued to be implemented till 1998-99. However, the objective of the programme could not be attained as envisaged due to lack of sufficient funds and re-emergence of not covered habitations etc. and the programme continues to be implemented during the 9th Plan. The Mission included ARWSP, Sector Reform Programme, Sub-Missions, Human Resource Development (HRD), Research and Development (R&D), Information, Education and Communication (IEC) and Management Information System (MIS), Provision of water supply in rural schools and monitoring and Investigation Units, Purchase of Rigs, Water Quality Monitoring and evaluation Activity etc. w.e.f. April 1, 1999. During 1999 October Department of Drinking Water and Sanitation was created at the Central level to focus attention on the goal of safe drinking water to all the rural villages in he next five years i.e. 2004. (as contained in the National Agenda for Governance of the Government of India 1999).

Drinking Water Mission:

To ensure maximum inflow of scientific and technical input into the rural water supply sector to improve the performance, cost effectiveness of the on-going programmes and ensure adequate supply of safe drinking water, the entire programme was given a Mission approach. The Technology Mission on drinking water and related water management was launched in 1986. It was also called the National Drinking Water Mission (NDWM) and was one of the five Societal Missions launched by the Government of India. The NDWM was renamed Rajiv

Gandhi National Drinking Water Mission (RGNDWM) in 1991.The Sub-Missions were initiated with the objective of providing safe drinking water facilities in the water quality affected habitations. Sub-missions were initiated for Control of Brackishness, Eradication of Guinea worm, Removal of Excess Iron, Control of Fluorosis, and Control of Arsenic.

Reference-Annexure-1(Chapter-1)

Sector reforms

Government of India has reoriented its approach to drinking water provisioning after reexamining the water supply systems and programs in 1999. It has recognized that a transformation from a target based, supply-driven approach which pays little attention to the actual practices and/or preferences of the end users, to a demand-based approach, where users get the service they want and are willing to pay for, was urgently required. Implementation of a participatory, demand driven approach was expected to ensure that the public obtained the level of service they desired and could afford to pay part of the capital cost and full operation and maintenance cost. Further, full cost recovery of operations and maintenance and replacement costs is expected to generate a sense of ownership and ensure the financial viability and sustainability of the schemes. The conditions under which people would be willing to pay capital cost partially and operate and maintain water supply schemes are (a) if they own the assets, (b) if they have themselves planned and installed the systems and been actively involved throughout in the process, (c) if they have been trained to do simple repairs, (d) if they know the Government will not maintain the asset, (e) if they have sufficient funds for maintenance, and (f) if they have to pay for operation and maintenance of the systems. Hence, it was considered necessary to institutionalise community based rural drinking water supply programme with the Panchayati Raj Institutions and local communities to generate resources and equip them to plan, implement, use, maintain and replace water supply schemes themselves.

Building on this premise, Government of India launched the Sector Reforms Project on a pilot basis in the year 1999-2000 that was implemented in 67 Districts of 26 States. This was scaled up to the whole country from the Tenth Plan. The experience gathered during the past three years, have vindicated the reform principles. There have been demands to scale up the reform initiatives in the sector. According to the expectations and the needs to scale up reforms in the water sector through out the country, the Sector Reforms Project has been slightly improved and is launched as Swajaldhara on 25th December 2002.

Vision 2020[5]

India Vision 2020 report prepared by the committee headed by Dr. S.P. Gupta for the Planning Commission has identified access to drinking water as one of the

requirements for the achieving health for all. The vision for the Rural Infrastructure articulates vision for drinking water as "Our vision is to create a rural infrastructure which connects every village with paved roads and telecommunications facilities, provides electricity and an assured **supply of safe drinking water to all rural households** *(emphasis added)*, offers acess to quality primary and secondary education to all children and medical services to all citizens." While the vision document elaborates on the telecommunications and transport aspects, it does not have any elaborations as to how the vision of 'supply of safe drinking water to al rural households' will realized. However under 'Energy and the Environment' segment it has identified some of the fundamental problems plaguing drinking water sector. It mentions "However, water shortage has already become a serious and recurring source of concern for a large number of people in different part of the country and for a number of metropolitan areas. Only 70% of the people in urban areas have access to asic sanitation services. A large number of rural habitations remain without any identified source of safe drinking water. Ground Water tables are receding, rivers are silting up, and leaching of chemical fertilizers is polluting drinking water supplies." The documents has recommended that water resources can be enhanced substantially by wide spread of rainwater harvesting techniques adopted throughout the country, in both rural and urban areas. It also identifies serious degradation in quality of ground water as well as river water due to excessive and indiscriminate use of pesticides ad chemical fertilizers in agriculture as well as salinity resulting from overexploitation of ground water and lack of proper effluent treatment for domestic and industrial waste water. It has envisaged stricter enforcement of environmental regulation for stemming further degradation and enactment of ground water regulation to check overexploitation.

The Last Words

Despite all the international commitments, constitutional provisions, government mandates, and the Vision for 20202, the fact lies that the average citizen of India is yet to have potable drinking water six decades after independence. Mr. L. C.Jain has the last word on this in his report "…not a drop to drink - Pattern of Water Resources Development and Food Production: Distortions and Criminal Neglect (February 2002). He writes "Believe it or not, the Approach Paper to the Tenth Five Year Plan (2002-07) says that *'All villages to have access to potable drinking water by 2012'*. In other words, it is asking the thirsty to wait for the completion of the Eleventh Plan 2007-2012. It implies that it will be at least 65 years after Independence before all villages can expect to receive potable drinking water. Average life expectancy in India is currently 64 years. By the year 2012, a substantial number of village men, women and children born after Independence would have died without having tasted potable drinking water."

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CHAPTER – II

AREA AND EXTENT OF COVERAGE

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Rural Drinking Water Supply Programme:
A total number of 74,184 habitations were covered during the year 1999 - 2000. Thus, at the end of March 2000, the status of cumulative coverage is 83 per cent habitations as fully covered and 15 per cent as partially covered.

In the National Agenda for Governance, the Government made a commitment to provide safe drinking water to all habitations in the next five years i.e. by 2004,. To achieve this goal, in October 1999, a new Department i.e. Department of Drinking Water Supply was created in the Ministry of Rural Development.

Budget for the Rural Water Supply Programme has been enhanced from Rupees 1,800 crore in 1999-2000 to Rupees 1,960 crore in the year 2000-2001. A Comprehensive Action Plan for covering all rural habitations in the country with provision of potable drinking water has been prepared.
A new initiative in the form of Pradhan Mantri Gramodaya Yojana Rural Drinking Water has been launched in the year 2000-01. To further expedite the availability of potable drinking water in all habitations of the country, a minimum amount of Rupees 375 crore has been earmarked for the programme with a provision that States/UTs may allocate more funds as per their priority out of total allocation made under PMGY.

Dr. Manmohan says by 2009 all the habitations or 2012 or 2015

On 31st January,2006, addressing the Conference of Ministers in charge of Rurla Drinking Water Supply and Rural Sanitation the Prime Minister of India Dr. Manmohan Singh, has said that every single habitation in India will be provided with safe drinking water in next four years i.e. by the end of 2009. And this time it was under Bharat Nirman programme. He has declared that Drinking water would be the key component of the agenda to be delivered in the next four years. The Prime Minister pointed to five aspects which urgently needed to be addressed on a priority basis regarding the supply of drinking water and sanitation in rural areas. These include, elimination of backlog and provision of safe water to habitations which are either uncovered, or have slipped back from full coverage, addressing problems of water quality, entrusting the responsibility of water supply management to local institutions and build their capacity in the management of water supply, improving the comprehensive management of water supply by strengthening management of the environment and mobilising communities to spread awareness of the linkage between good health and safe water supply.

Dr. Singh has said "This year, our government has increased investments in this sector by about 40% over last year, raising it from Rs.2,900 crores last year to Rs.

4,050 crores in 2005-06. We are committed to sustaining this level of investment over the next few years. The agenda and the goals are simple. We must ensure that the 'uncovered' 55,067 habitations are indeed provided with water supply at the earliest. Second, we must effectively address the problem of the 2.8 lakh habitations which have slipped out of full coverage for a variety of reasons. Third, we have over 2 lakh habitations that are affected by a variety of problems flowing from poor quality of water that is in fact supplied. These include excess fluoride, excess salinity, excess iron and so on. Under Bharat Nirman, we have a programme for our nation, which will address all these issues comprehensively.

Contradictory views on the state of drinking water in the Country

The Planning Commission and the Ministry of Rural Development give contradictory pictures of drinking water situation in the country. Ministry of Rural Development claims 95% coverage for drinking water. Planning commission in its Approach Paper to the Tenth Plan has mentioned: "Despite good monsoons continuously for the last twelve years and high priority from the Government of India for the programme of augmenting the supply of drinking water by way of funds and attention, the problem of potable drinking water has remained unresolved and is, in fact, becoming more serious every year. Although, the Ministry of Rural Development claims more than 95 per cent coverage, independent reports show scarcity of drinking water in about half of the villages of India. What is even more distressing is the fact that this gap has been increasing over the years, despite heavy investment. Census of India provides an insight into the drinking water situation in the country as it enumerates all the families. **Reference-Annexure-1(Chapter-11)**

In the absence of information on quality/portability of water, it is really difficult to assess real coverage of drinking water in the country. One can assume that the tap and tube wells are safe sources of water, as wells does not necessarily mean sanitary wells. 25.4% of the population were covered by tap and tube wells in 1981. By 2001 the coverage under taps and tube wells increased to 86.1%. This is a substantial growth in 20 years. Only 70 million households out of ### have reported tap as their source of drinking water. This constitutes a mere 37 per cent of the total households.

At the national level, there has been an increase of just 14 percentage points in the use of tap as a source of drinking water in the past two decades. Moreover, the pace of growth is slowing — while the increase was more than nine percentage points during 1981-1991, it was only five percent points during the last decade. The trend in the rural areas indicates an upward swing of 11 percentage points in the decade 1981-91 but only three percent points in 1991-2001.

It is indeed a matter of concern that only six major States — Haryana, Gujarat, Maharashtra, Andhra Pradesh, Karnataka and Tamil Nadu — have reported a

figure above the national average in 2001. If the analysis is taken further, almost 20 per cent of the districts in India have less than 10 per cent of households served by tap.

Hand-pump, tube-wells
This source of drinking water is considered next to tap in terms of potability. It is heartening that there was a 26 percentage points increase in the usage of hand-pumps/tube-wells by households during 1981-2001 — from about 15 per cent in 1981 to 41 per cent in 2001.
Among the major States, access to drinking water from hand-pumps/tube-wells to the households was above the national average in Punjab, Uttar Pradesh, Bihar Assam, Orissa, Madhya Pradesh and West Bengal.

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 per cent of the households relied on well water in 2001 against 52 per cent in 1981 — a decline of about 34 percentage points during the two decades.

There has been a decline in the dependence of wells in all the States and Union Territories barring Lakshadweep, where *status quo* has been maintained. In Kerala (including the urban areas, surprisingly), the dependence is still very high, perhaps, due to traditional use of wells as also these being largely privately owned, thereby safe for drinking. In the newly created States of Jharkhand and Chhattisgarh well as a source of drinking water is high at around 1:2 and 1:4 households respectively. In 2001, one in four households in the less developed States of Madhya Pradesh, Orissa, Assam and Rajasthan are still dependent on `wells' for their daily requirement of drinking water.

Other sources While, on the one hand, it is reassuring that `other sources' of drinking water (considered unpotable) has been declining steadily, it is a stark fact that 4 per cent of the households in the country, or 8 million households, still depend on sources such as rivers, canals, ponds, lakes and the like.

This shows that a shift from blatantly unsafe sources such as `well' and `others' to the relatively more sophisticated sources of drinking water. While this is an improvement, particularly in view of the natural contaminants and the rising level of chemical pollutants such as pesticides and insecticides in groundwater, in the absence of any data on the quality of water from taps and below the surface, one cannot comment on the potability of the existing sources of supply.

Covering 100% of the villages has been a wild goose chase for the country. By the time the targeted villages have been covered, new habitations come up to be covered and at the same time some of the covered villages turn up ‘not covered’ or partially covered.

CHALLENGES FACED BY THE GOVT.

The Standing Committee on Urban and Rural Development (2002, 13th Lok Sabha) has observed that there are certain disturbing features with regard to the implementation of one of the top most priority programmes of the Government i.e. to provide potable drinking water to the rural population. The various shortcomings as noticed by the Committee are as below:

I. The Department is not getting the adequate allocation. The availability of funds is less than one-third of the estimated requirement in the Comprehensive Action Plan. In view of the inadequate allocation, the Committee express their doubt about the fulfillment of the set targets in the National Agenda for Governance of coverage of all rural habitations by 2004.
II. Not only there is inadequate allocation to the Department, but what is provided at BE stage is reduced at RE stage.
III. Whatever allocation is provided it is not being meaningfully utilised. There is huge underspending as regards the releases of funds by the Centre to State Governments. Besides, the position is alarming when the States' physical and financial progress is analysed.
IV. There are huge underspending with the State Governments.

The Committee feel that under-utilisation of resources is the main reason for getting the lesser allocation from Planning Commission/Ministry of Finance. Besides, they find that the Department is not serious in analysing the reasons for the dismal performance of such an important programme. Whenever asked about the reasons for slippage of targets, routine reply stating that NC and PC habitations are located in the difficult terrain etc., is furnished. The Committee have been receiving this type of reply for the last two to three years. This shows the casual approach of the Government.

Besides, the Committee find that the targets set during each of the year are somehow unrealistic. The Department has set the targets to cover 17,497 NC habitations, whereas they could cover 6,655 and 1,627 NC habitations during 2000-2001 and 2001-2002 respectively. [6]

The Planning Commission has set three objective for the Drinking Water Sector during the 10th Plan, (i) Coverage of habitations; (ii) Drinking Water quality problem mitigation; and (iii) Sustainable drinking water supply through Sector Reforms.

It is proposed to cover all the existing Not Covered and Partially Covered habitations in the rural areas by 2004 i.e. during the first two years of the 10th Plan. During the next three years the habitations, which have slipped from Fully

Covered to Not Covered or Partially Covered and from Partially Covered to Not Covered will be targeted for coverage. During the 10th Plan period the quality problems will be tackled, based on the number of habitations that emerge as quality affected as per the on-going survey. Strengthening of Sector Reforms initiatives in 63 districts and up-scaling to appropriate number will be aimed in 10th Plan. [7]

Unrestricted exploitation of groundwater has resulted in grave problems such as arsenic poisoning in West Bengal and increased salinity in Gujarat, Haryana, Karnataka, Punjab, Rajasthan and Tamil Nadu. High fluoride levels are also assuming threatening dimensions in peninsular India and the western parts.

Budgetary provisions and the thrust on drinking water in different plans in the country

Criteria for supply of drinking water nationally and at the state level/ what are the international criteria in terms of distance traveled, water quality and quantity etc.

DRINKING WATER SCENARIO IN ORISSA

The coverage norm followed by Orissa Rural Water Supply and Sanitation sector is as per the prescriptions of ARWSP in 1977-78. The norm follwed in Orissa is as follows[8]

- 40 liters per liters per day (lpcd) to meet the requirement of drinking (3 lpcd), cooking (5 lpcd), bathing (15 lpcd), washing utensils and house (7lpcd) and abdulation (10 lpcd)
- The drinking water source should be within 1.6 km of the habitation in plains or 100 meters elevations in the hilly areas.
- One hand pump or stand post with normal output of 12 liters per minute is estimated for every 250 population (150 persons in KBK districts). An independent habitation with permanently settled population of 100 may be taken as the unit of coverage, if there is no potable water source. However, SC/ST habitations with population less than 100 may also be taken as a unit of coverage. potable water source.
- A habitation is categorized as Not covered (NC), (a) if a safe drinking water source does not exist within 1.6 km of the habitation in plains or 100 meter elevation in hilly areas, (b) the drinking water source is affected with quality problem such as excess salinity, iron, fluoride or bacteriological contamination or (c) the availability of safe water from any source is insufficient to meet drinking water and cooking needs.

- A habitation is categorised as Partially Covered(PC) if availability of potable water is 10 lpcd or more but less than 40 lpcd; and Not Covered (NC), if the availability of potable water is less than 10 lpcd.

As per the 1977-78 ARWSP Guidelines after all the NC and PC habitations in the state have been covered as per the 40lpcd norm, the relaxed norm for providing 55lpcd water with a source within) 0.5 km in the plain and 50 mts elevation in the hills. Relaxed norm is being followed in the KBK districts by providing one spot source per 150 population in the blocks where total coverage has been achieved.

Coverage of Habitations in Orissa

Rural Development Department claims that by 31.03.2002 all the identified (survey done in 1995-96) habitations 1,14,064 have been fully covered[9] as per the coverage norm. Orissa, along with eight other major states in the country has achieved this status of full coverage of identified habitations. Other states are Bihar, Chhatishgarh, Haryana, Tamilnadu, Tripura, Uttar Pradesh and West Bengal. But, new habitations have been identified in the meantime. The Status Survey conducted during 2003-04 has identified a total of 1,41,368 habitations in the rural areas of the State. Out of this 1,00,669 were Fully Covered (FC), 12,528 were Partially Covered(PC) and 28,171 were Not Covered (NC) as on 1.4.2003. [10] A state that was claiming 100% coverage, by virtue of this Survey comes down to only 71.21% full coverage, 8.86 partial coverage and 19.92% of the habitations not at all covered. It is a different issue that the annual report after mentioning the total number of habitations adds that some of the identified NC villages are not eligible for coverage under ARWSP norms. Subsequent to the4 Status Survey and before the Habitation Survey, 22,300 habitations have been identified by the District Collectors including 9,418 having population of 100 or more or SC/ST population. It is not very clear as to what the RWSS intends to say by this. Whether the number of habitations is to be less than 1,41,638 or more than this needs to be ascertained .

Chasing full coverage of all the habitations has been a wild goose chase for the Government of Orissa, primarily because the target for coverage is set basing on the number of habitations and by the time this target is met, survey has revealed new habitations. The story of Orissa is no different. 1981 Census identified 46,553 inhabitated revenue villages in Orissa out of which there were 42,221 problem villages. By the end of 7th Plan, 40,901 problem villages were fully or partially covered leaving a balance of 1320 no source problem villages by 1st April 1990. Out of these no source villages 761 hardcore problem villages were covered under 90-91 and 91-92 Annual plans that left 559 hard core no source problem villages and 1184 PC problem villages[11] on 1st April 1992. and by 1st April 1995

there were 74,322 habitations that included 14,395 no source villages, 9,372 partially covered villages 50,555 fully covered villages. On this date there were 1,32,724 functional TW and 2, 094 SW functional. On 31st March 1996, 7192 no source villages and 1213 partially covered villages were covered by 9361 sources. During 1995-96 the new habitations were revalidated and the number of habitations rose to 1,14,099 habitations as on 01.04.1998. Out of these 7136 NC and 6360 PC habitations were left out. It was planned to cover all NC and 1950 PC villages in the year 1998-99. But even after the finalcial year on 01.04.99 1978 NC habitations, 4660 PC habitations could not be covered. The number of functional TWs was 1,67,742, SWs was 4376. It was again planned to cover all the NC and PC villages by end of 1999-2000 financial year Relaxed norm for one TW for every 150 HHs to be provided in KBK districts. But this year too full coverage could not be achieved. On 01.04.2000 1,12,190 Habitations were fully covered, 1461 hab. Partially covered and 448 habitations NC. The number of TWs stood at 1,87,800 TW and SWs in the state. It was again decided to cover all the NC (178) and PC (474) by end o March, 2001. By 28.02.2002 the Department was able to cover 1,14,064 habitations fully and only 8 NC, and 27 PC habitations were left out. And the department announced that 99.97% of people in all identified habitations and all the habitations in in KBK have been provided with water, The state had a total of 2,02,364 TWs, SW 5554, Springbased source 88 and PWS 519 / No of defunct TWs in the state is 8155. By 31.03.2002 all the identified (survey done in 1995-96) habitations 1,14,064 have been fully covered[12] as per the coverage norm only to find the next year that 12,528 Partially Covered(PC) and 28,171 Not Covered (NC) (as on 1.4.2003) is to be provided with drinking water. And the latest figure available is by the end of the financial year 2004-05 (as on 1.04.05) the a total of 12,221 NC villages as per the Status Survey and 6832 Turned Nil villages totaling to 19,053 are yet to be covered.

While coverage information is provided in terms of the habitations, the population-covered figure is not available in the documents of the RWSS. At the same time in the nineties RWSS was providing figures on the coverage of NC and PC villages. But, later on it only provided information on the number of TWS and SWs and Pipe Water Supply Schemes.

Reference-Annexure-2 (Chapter-11)

Number of spot sources and indicator of water supply in Orissa

The statistics for coverage of drinking water in Orissa is very impressive, but the ground reality is not. If the number of tubewells are any indicator for drinking water supply in rural Orissa, then villages in Orissa have the luxury of getting water in a quantity that is more than the relaxed norm (one tubewell or spot source per 150 households) As on 01.04.2005 there were 2,17,256 functional tubewells, 5500 Sanitary wells and 927 commissioned water supply projects.

[12] Activity Report of Rural Developmetn Department, 2001-2002 Govt. of Orissa

Over and above this there are sanitary wells, spring based sources and pipe water supply schemes. But the ground situation is that leave alone the summer months, lack of drinking water is reported round the year from almost the entire state. This implies either the statistics provided for the drinking water infrastructures in misleading or there are other problems like distribution of the TWs in the habitations or the yield of the tube wells.

Analysis of the information provided by the Rural Development Department for the year 2003-04 and 2004 -05 provides an insight.

As on 31.03.04 there were 2,27,277 tubewells, 7079 sanitary wells, 121 spring based sources and 769 pipe water supply schemes. Apart from this there were 5589 TWs and 569pipe water supply projects in three sector reform districts (why this data has been kept separate from the total statistics of coverage? Let us keep it separate as well But on this date the total number of TWs adds up to 2,32,866, 7079 sanitary wells , 121 spring based sources and 1338 PWS) During the year 2004-05, 9379 TWs and 350 sanitary wells were installed. Apart from this 92 PWS were commissioned. So by 01.04.05 the total number TWs should stand at 2,36,656, 7429 sanitary wells and 861 PWS. But as per the information provided by RD Dept[13] on 01.04.05 there were 217256 tubewells, 5,500 sanitary wells, 144 spring based sources and 927 PWS. That means 19,400 tubewells and 1929 sanitary wells have vanished as there is no account for their disappearance from the statistics (no information on defunct TWS as well). At the same time, there is no explanation as to from where the 66 PWS came into existence in 2005.

Water yield of the sources a major influencing factor

Living on the Outlived Sources

The average life span of a hand pump tubewell is about ten years. (Source : Hand Book on Technology and Water Quality for Sustainability, Dept of Drinking Water Supply, Ministry of Rural Development, March 2004). As on 01.04.95 there were 1,32,724 TW in the state. All these tube wells have outlived their lifetime. One can assume that the hand pumps have been repaired as and when required. But the tube wells have not been. Hence in an ideal situation this number of tube wells should be deducted from the list of spot sources. Hence the state should consider that there are only 84,532 tube wells in good condition are there in the state to provide drinking water to the rural population. This may be one of the reasons for the scarcity of drinking water in the rural areas despite having more than required number of tube wells in the state as more than half of them have outlived their time span.

[13] Annual Report of Rural Development Department, 2004-05

PWS makes the TWs redundant

While pipe water supply schemes, that is picking up in the state after the introduction of Swajaldhara, are commissioned, they are basically serving the areas those which are served by the tube wells and sanitary wells. Hence the statistics of tube wells and wells need to be corrected. No doubt the tubewells and sanitary wells do continue to be the sole water provider while the PWS go non-operational. Similarly many tube wells in the urban areas also should not be considered as the sole provider of water. This is primarily because, as the urban areas are covered by pipe water system the tube wells are hardly of any use unless they are installed in the slums or the peri-urban areas where there are no proper pipe water supply systems. One can see many TWS in the urban areas those are not at all in use.

These two cases warrant a segregation of tube wells while being used as indicators of water supply / water infrastructures. This is primarily because all the TWs are not used as sole provider of water. Many of them are also used for once in a blue moon need. Hence one feels that there is a need to have saggregated data on the tube wells those are used on a day today basis and those which are set up as stand by infrastructures. It is the redundancy of such structures that does not make much of a difference if a set of tubewells sanctioned is dug or not.

Water Quality problem villages – to be considered as not covered as per the norm

As per the norm declared by the State Government "A habitation is categorized as Not covered (b) the drinking water source is affected with quality problem such as excess salinity, iron, fluoride or bacteriological contamination or xxx xxx xxx" This declaration of the government reduces the number of habitations covered substantially. Out of a total number of 114,099 habitations 19,519 were tested for Iron and 7,802 were found to be containing excessive iron. Similarly there are 233 fluoride contaminated habitations and 129 habitations have excess of fluoride from a smaller number of samples tested. In a situation when samples from all the water bodies are tested, these numbers will certainly increase many fold. While the state government declares the norm on one hand on the other hand it also claimed on 31st March 2003 that 100% coverage is achieved for the 1,14,064 habitations in the state. Hence the 100% coverage by the state is straightway reduced by 7%, that too at a discounted rate as all the water sources have not been tested for quality. Here one can see the contradictions.

Habitation Survey 2003

The latest habitation survey covered in the entire state brings out that out of the total population of 4,61,97,869 , only 2,70,32,078 have been covered, i.e. 58.51% population has safe drinking water in Orissa. Looking at the disadvantaged groups the coverage has been better in the state as per the habitation survey. 4416277 Scheduled caste population out of 5192793 i.e. 85.05% have been covered

. For the Scheduled Tribe population 6343212 out of 7259082 i.e. 87.38% have been covered. Out of 1,30,009 habitations 83,454 habitations have been fully covered that means only 64.19% of habitations have been completely covered. At the same time 12,251 habitations i..e. 9.42% of habitations are partially covered and 31,781 i.e. 24.5% habitations of the state not at all touched so far as drinking water provisioning is concerned. While the habitation survey recognizes 130009 habitations, the information provided by RWSS as on 31.03.2003 the total number of habitations in the state comes out to 1,41,368. One fails to understand the differences in the number of habitations and also the data provided by the RWSS and the DDWS as both the data has been generated by the RWSS only. However the data available till date on the Department of Drinking Water supply on Habitation survey mentions 303 blocks against 314 blocks. At the same time one also fails to understand how the State Government claims that all 1,14,064 habitations have been brought under full coverage while the total number of habitations covered has been claimed to be 83,454in habitation survey. This raises question regarding the verasity of the information provided both by the RWSS and the Habitation Survey. Which one is right and which one is wrong or whether both are away from the ground reality needs to be clarified. District wise details of drinking water coverage is provided in the previous table.

Drinking water provisioning in Orissa as per the Census of India

Census of India gives a different insight into drinking water provisioning in Orissa. As per 2001 Census, for 8.733% of households in Orissa tap is the source of drinking water. For 55.454% households' tubewells and hand pumps provide drinking water and still 28.554% of the households depend on wells for their drinking water. Three Census of 1981, 1991 and 2001 provide clues about the development of drinking water provisioning in the State. During the period 1981 to 2001, tap as a source of drinking water (considered to be the safest and most desirable) has not made impressive progress. During the decade 1981 - 1991 the percentage of households depending on tap as a source has increased from 6.599% to 8.964%. and by the end of the decade 1991-2001 it went down to 8.733, a decrease of 0.231 of the number of households despite a net addition of 1,50,504 new house holds provided with tap water. This certainly indicates that the population growth has offset the efforts of the state government to bring in more number of people under the fold of tap water. This population growth factor has all through impacted on the efforts of the government to achieve 100% coverage. Here one can have a look at the challenges that the government has been facing. In the year 1981 the total no of households to be provisioned with drinking water was 49,61, 645. But by 1991 the number of households went up to 59,88,090 an increase of 20.69%. By 2001 the number of households went up to 78, 70, 127 an increase of 31.43% over 1991 an increase of 58.62% as compared to 1981. **Ref-Annexure-3**

While population growth has been one of the deterring factors for providing drinking water to all, growth of pipe water supply also has suffered in terms of

net addition to the infrastructure. While the increase in the number of households depending on tap water has increased steadily albeit marginally, but, in terms of number of families brought under the coverage of tap water, progress during the decade 1991-2001 has been less that the progress in 1981-91. During 1981-91 2,09,385 new families were provided tap water, a growth of 63.995% over the 1981 figures. But, during the following decade this reduced to only 1,50,504 households were brought under the fold of tap water, a growth of only 28.038%.

Hand pump and tubewells have made substantial progress during the period 1981-2001. During 1981 the coverage of households under tubewells was only 7.977% that reached 30.102% in the year 1991 and 55.454% in 2001, thus accounting as the single largest source for drinking water supply. During 1981-91 decade 14,06,755 new households (an increase by 355.448) were brought under the fold of tubewells and the number of households brought under the coverage of tube wells in the decade of 1991-2001 was 25,61,805 (an increase of 142.123%).

It is worthwhile to mention here that the 1991 Census report puts the percentage of households having 'safe drinking water' as 39.1. This has been achieved by adding up the percentages of households covered by tap and tubewells and borewells. This report in a way does not consider water supplied from the wells, tanks, ponds, lakes, springs etc. as safe.

During these two decades the use of well as a drinking water source has undergone a constant decline. While the wells accounted for drinking water supply to 55.868% households in the year 1981, it reduced to 45.096% in 1991 and 28.554% in 2001. Around 55% is the coverage of households by the tubewells in 2001 that was the coverage by the wells. During the decade 1981 – 91 71,580 households shifted to safer sources like tap and tubewells. But during 1991-2001 4,53,165 households shifted to safer options. Similarly, use of tanks, pond and lake; and River. Canal and Spring also has been declining very fast. 2,92,705 households during the period 1981-91 and 1,68,989 households during the period 1991-2001 have shifted from tanks, pond and lake to safer sources. 1,56,930 households during 1981-91 and 68,052 families during 1991-2001 have waned away from River, Canal and Spring.

It can be said without doubt that the situation has improved during 1981 to 2001. While tube wells as a source of water is growing very fast, the growth in the area of providing tapped water has not been substantial. Coverage of number of new households during the decade 1981-91 under the safe sources has been substantial; the same growth could not be maintained in the subsequent years. And the same is true about weaning away of households from the use of relatively unsafe sources like wells, tanks, ponds, lake, springs, canal, river etc. As per the interpretation of the Census 1991, till date (2001 Census) only 64.187% of the households have access to safe drinking water. 33.813% of the households still use well (28.554%), tanks, ponds, lakes (1.859%) and River, canal and spring (7.508%).

Rural Urban divide in drinking water provisioning

Drinking water provisioning in the Rural Orissa also provides the same trend as that of the overall picture of the state. As per the 2001 Census only 62. 883% of the households have been provided with safe drinking water (tap and tubewells). But in the urban areas of the state, coverage of households under safe drinking water has been 72.827%. In the rural areas the taps account for water supply to only 2.774% of the households. This is a decline of 0.348% over the percentage coverage of rural households covered under tap water. Tubewells are the source for 60.109% households in the rural areas. And 29.089% still depend on the wells for their fill of potable water. In provisioning of water in the Rural Orissa too the growth has been slowed down in 1991-2001 decade as compared to 1981-1991. During 1981-91 95,740 new households were provided with tap water as against only 26,725 during 1991-2001. For the rural areas the maximum growth (379.8%) has taken place in case of the tubewells during 1981-1991 through an addition of 13,17,940 households under this category. During the subsequent decade another 24,12,147 households were added (accounting for a growth of 144.9%. Weaning away of the households from the traditional sources has been better during 1991-2001. **Annexure-4**

Urban Water Supply situation in Orissa

In case of the urban areas taps account for water supply to 46% of the households. During 1981 and 1991 the households covered by tap water was 43.267% and 45.976%. The percentage coverage of households more or less remained stagnant during the last two decades. Rather percentage coverage of households in the urban areas between 1991-2001 has declined by 0.07%. But, the number of households brought under the fold of tap water has been 1,13,645 and 1,23,779 households for 1981-91 and 1991-2001. In the urban area of the state too the rate of growth has been maximum for tubewells (181.17% during 1981-91 and 108.79 for 1991-2001). 26.42% of the households depend on tubewells for water supply as per 2001 census. But the net number of households brought under tubewells has been only 88,815% for 81-91. During 1991-2001 the highest number of households has been covered by the tubewells. Growth of the tubewells and tap water (in terms of the households covered) during the last two decades has remained almost same, contrary to the popular belief that tap water supply is growing faster in the urban areas. (***to be dealt later?***) Like the rural areas still more that one fourth of the households (25.22%) depend on wells for their drinking water. In case of the urban areas too the weaning of the population from the wells has been marginal during 1991-2001; while for the sources like the tanks, ponds, lake, river, canal, spring etc. the weaning away has been more or less same for both the decades. **Annexure-5**

CHALLENGES FACED BY THE GOVERNMENT

Challenges faced by the government in drinking water provisioning is both myriad in nature and mammoth by individual merit. Many of the challenges has already been discussed earlier.

The Wild goose chase of covering the Habitations in Orissa

Covergage of all the habitations in the state has remained a wild goose chase for the State Government. It identifies the habitations to be provided with drinking water supply, sets the target and by the time the target is realized, there are more number of habitations those which either have slipped back to not Covered or new ones.

- **1981 Census** identified 46,553 inhabitated revenue villages in Orissa. Out of this 42,221 were problem villages.
- **By the end of 7th Plan** 40,901 problem villages were fully or partially covered leaving a balance of 1320 no source problem villages by 1st April 1990
- **1st April 1990 –** There were 1320 no source problem villages out of which 761 hardcore problem villages were covered under 90-91 and 91-92 Annual plans
- **As on 1st April 1992** there were 559 hard core no source problem villages and 1184 PC problem villages[14]
- **By Jan 1993** 181 Not Covered and 644 Partially Covered villages were fully covered. Remaining NCs were to be covered by Mar 1993
- During 1992-93 there were 509 No Source problem villages, 1070 PC villages, 501 Turned No source villages and 1889 Turned Partial were covered
- **By 1st April 1995 the** total number of habitations was calculated to 74,322 villages. There were 14,395 no source villages, 9,372 partially covered villages 50,555 fully covered villages. On 1st of April 1995 the state had **1,32,724 TW and 2, 094 SW functional out of which 19,538 TW and 29 SW were defunct condition**
- **By 31st March 1996**, 7192 no source villages and 1213 partially covered villages were covered by 9361 sources leaving 7203 no source villages and 8159 partially covered villages. It seems that during this year seems the government had taken a giant leap in drinking water coverage.
- **By 01.04.1998** out of 1,14,099 habitations 7136 NC and 6360 PC habitations were left out. It was planned to cover all NC and 1950 PC villages in the year 1998-99
- **01.04.99 –** 1978 NC habitations, 4660 PC habitations and the number of functional TWs 1,67,742, SW 4376
- **30.06.99 –** 1,72,140 TW and 4376 SW were providing water in the state. It has been planned to provide water to all the NC PC villages in the

financial year 1999-2000. Relaxed norm for one TW for every 150 HHs to be provided in KBK districts.

- **01.04.2000**: 1,12,190 habitations were fully covered and 1461 habitations partially covered and 448 habitations were not covered. There were 1,87,800 TW/SWs in the state out of which 9274 TWs were completely defunct.
- **28.02.2001**: 113447 FC, 474 PC and 178NC The NC villages (178) were to be covered by the end of March 2001
- **28.02.2002 :** 1,14,064 Fully covered habitations, 8 NC, and 27 PC habitations were there, 99.97% of people in all identified habitations and all the habitations in KBK have been provided with water, The state had a total of 2,02,364 TWs, SW 5554, Spring-based source 88 and PWS 519. No of defunct TWs in the state was 8155.
- **On 31.03.2003** there were 1,14,099 habitations in the state and 1,14,099 were covered in the state completely. However there were 4612 defunct tubewells in the Turned Nil and Turned Partial villages. Here the RWSS adds that the district collectors have identified 22,300 habitations in the state out of which 9418 number of habitations had a population more than 100.
- **On 1.04.2003** as per the Status Survey 2003 by RWSS there were 1,41,368 habitations in the state and the out of these 1000669 were covered, 12,528 were partially covered and the rest 18,171 were not covered at all. [15]
- **On 1.04.2005** there were 12,221 Not Covered habitation s with 6832 slipped habitations that amounts to a total of 19, 035 habitations with no source at all. [16]

All the information provided above indicates the gaping holes in drinking water coverage or at least the stastistical representation of coverage. There are a lot of discripancies with respect to the number of habitations. The state has been declaring 100% coverage on a particular day (31.03.2003) and on the very next day (1.04.2003) it declares that there are more than 40,000 habitations that have not been completely covered. While in one year substantial ground has been covered, on another occasion the number of habitations not covered has increased despite digging of new tubewells (01.04.2005)

Information on the real status of coverage: The biggest challenge of the state is to have the authentic information on drinking water situation in the state. The information provided by the RWSS and the PHED does not really provide the real picture of drinking water situation in the state. Even for having up to date information on drinking water coverage is difficult due to dynamic nature of drinking water provisioning. Today a tube well is functioning and tomorrow it may not, hence getting information on 2 lakh odd tubewells from time to time it

has to gear up its whole human resources and the infrastructure. With the decentralization of drinking water management it may become more difficult.

Information gathering and target setting has to be responsive to the situation: New habitations are coming up in the different parts of the state at different points of time. Rather than waiting for the next survey there has to be an arrangement to have annual assessment of the new habitations. Presently the department conducts a survey of the habitations, sets the target and sets out to fulfil the target of providing water to those habitations. By the time the drinking water is provided to these villages in 5/6 or more years and the department savours that it is heading for a 100 % coverage, there are many more habitations left out. The effort of the state turns out to be the classic case of a monkey riding a slippery pole, in which by the time it climbs three feet, it slips own by two feet. Rather than living with such an false notion that they are approaching the ever alluding 100% coverage, it will be better approach to get yearly updates of the addition of habitations. And the effort certainly has to cover at least the number of habitations more than those which have come up and in this way really reducing the backlog.

Making the drinking water coverage Qualitative rather than quantitative:

At present the efforts of the government is mostly geared towards getting the statistics right. Hence the target is digging of the new tube wells and commissioning of Pipe Water Supply schemes. But, the numbers do not help in providing water to the uncovered. The sources should be able to meet the requirement of the water starved communities and be sustainable.

Causes of poor coverage:
Coverage of habitations is a dynamic concept and the reasons for fully covered habitations slipping back into NC/PC may be due to a number of factors like :

- sources going dry or lowering of the ground water table.
- sources becoming quality affected.
- systems outliving their lives.
- systems working below rated capacity due to poor operation and maintenance.
- increase in population resulting into lower per capita availability.
- emergence of new habitations.

Trend Of Drinking Water Supply In Orissa :

During the 1983-85 , 85.3% of the inhabited villages in the state had at least one source of drinking water through out the year Source?. The percentage differs from district to district. The percentage of villages in 9 out of the 13 districts in the state was higher than the state average . If plan fund for drinking water facility is to be allotted to districts with less than the state average like 85.3% of villages with year round drinking water source, then only the four districts of Kalahandi ,

Ganjam, Phulbani , and Koraput was entitled to plan funds for this purpose till they reach the state average level of 83.3% . The data were available with the block as a unit. The data were described below:

Districtwise Drinking Water Coverage during 1982-83

Districts	% of villages with drinking water facility
Sundergarh	97.5%
Mayurvanj	95.8
Dhenkanal	95.1
Bolangir	95.0
Cuttack	93.5
Keonjhar	90.7
Puri	90.6
Balasore	90.2
Sambalpur	89.4
Kalahandi	81.0
Ganjam	78.5
Phulbani	73.8
Koraput	68.0

Out of the 314 blocks in the state , 68 blocks had less than the state average percentage of village with year round drinking water facility.

State Strategy to meet the growing demand:
Therefore the plan funds for this purpose had been distributed among the 68 blocks upto achieve the state average i.e. 85.3% . Once these blocks achieved the State average, the state average was again recalculated , and the new average was located . The new average, which will now higher than earlier average ,would indicate new list of blocks and plan funds distributed once again adding to these 68 blocks. This will go on until all blocks have 100 % village provided with the facilities .

In Orissa , 87.57% of the people live in rural areas . Orissa govt committed to provide potable water to all by the end of 1990 seems to have been totally around 42,221 out of 46 , 533 of Orissa villages are problem village in relation to potable water . Women in rural and tribal areas traversing miles to collect water for their households. But what type of water is? Contaminated and not disinfected. An estimates put 15,000 waterless habitations in the State .

Urban water supply in 1991
22.82 lakh of urban people do not enjoy safe water supply. In the Monsoon months of 1991, following the tunnel disaster at Indravati , the epidemic Cholera situation in Koraput , Kalahandi , and Phulbani districts claimed around 1000 lives from which 99% were tribal . Around 3000 people were under attack.

Experts were of the opinion that contaminated water was the major cause. In 1990 , 49 towns were not able to get pipe connections .

Provision and Coverage of Drinking Water Supply, SC & ST

The State/UTs are required to earmark and utilize at least 25% of the ARWSP funds for drinking water supply to the SCs and another minimum 10% for the STs.Where the percentage of SC or ST population in a particular State is high warranting earmarking/utilization of more than stipulated provisions, additional funds can be utilized. As a measure of flexibility, States may utilize at least 36% of the ARWSP funds for the benefit of SCs/STs, particularly in those States where SC/ST coverage is less than the coverage of the general population. The funds, which are meant for lower cast is not permitted to shift to other sector. Those Sates which have achieved substantial coverage of SC/ST habitations and do not have sufficient SC/ST population left out so as to utilize 35% of the ARWSP and the MNP allocations, such States may be allowed by the RGNDWM to incur lower level of expenditure on the coverage of SC/ST habitations, on a case to case basis, in consultation with the Ministry of Social Justice and Empowerment and the National Commission for SC/ST. In such cases, States are required to submit separate proposals giving detail justification for availing of such relaxation. The State Governments may list out the SC/ST habitations.

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CHAPTER – III

Quality Matters

CHAPTER-III

Quality Matters

Water water everywhere not a drop to drink' this was the suffering of the ancient mariner. How thirsty one may be, but one can not drink just any water. Even the water that seems all right for drinking might not qualify to be drinking water. It is the purity of water that makes it drinkable and the quality is the measure for purity of water. It is the quality of water that differentiates drinking water from any water. Despite this Quality has been a grossly neglected area all these years
.
Drinking water is a fundamental right, derived from Right to Life under section 21 of the Constitution. Drinking water sustains life and any water is not drinking water. Water to become drinking water it has to confirm to certain quality norms. In fact it is the Quality that segregates drinking water from any other water. Non-compliance of Quality is not a failure in complying the quality norms but it is a gross violation of the fundamental right of the citizens as drinking water is a fundamental right and it is only the quality aspect that differentiates drinking water from any other water.

It is the quality concerns that have brought in the definition of Drinking water. The expressions related to drinking water are 'potable water', 'safe water', and 'drinking water'.

Definition of Drinking Water:

A water supply treated or untreated which is intended for human consumption and uses and which is considered to be free of toxins and pathogenic bacteria, cysts or viruses. It has to be treated additionally to enhance aesthetic quality and reduce mineral content plus other known or unknown, undesirable substances, that is called drinking, water.

The Ministry of Health and family Welfare administers the "Food Adulteration Act, 1954 and "Food" means any article used as food or drink for human consumption other than water; surprisingly the definition does not include drinking water under the category of food. Only packaged water has been declared as food. But there is a big question, why this differences? Rich people have got the right to bye safe drinking water but those who are depended on municipality tap water; they don't have the right to have safe drinking water. But according to the Secretary Health, "The EU norms for water apply to all kinds of water including the water that comes from tap for drinking. Whereas our norm which we have notified and which would take effect from 1st January 2004, apply to bottle drinking water, it is not for other water. It is because under the PFA Act, water is still not covered as an item under food category. It is a very big lacuna in the Act.
(ref: JPC Report)

Safe drinking water is defined by WHO as being free from biological contamination like guinea worm, cholera, typhoid etc and it should free from

chemical contamination like excess iron, fluoride, arsenic, nitrate etc. Safe drinking water has special importance for keeping good health. For lack of safe drinking water people are bound to suffer from various kinds of stomach related diseases like diarrhea, cholera, dysentery, and jaundice etc.

Segregation of water from other water is a continuous challenge for the development planners, water managers and governments. Different expressions for drinking water at different times stand testimony to this effort.

(REF: V. Upadhyaya's article and Nalgonda Judgment)

The linkage between safe drinking water and health and productivity of human beings is well established. Hence the manner of utilization of water and its disposal have a close bearing on the morbidity and mortality of human beings.

Human health and economic development are threatened or restricted by multiple water quality issues that limit human welfare and water uses, including microbiological pollution, organic pollution, salinization, acidification, metal pollution, pollution by toxic organic compounds, nitrate pollution, radionuclide pollution, thermal pollution, and increases in total suspended solids. In addition to these issues, which are all related to human activities such as agriculture and related land uses, urbanization, industrialization, mining, land-use change, and climate change, there also are some natural water quality issues that may occur at specific sites and may cause severe limits to human development in the form of water-related diseases, such as cholera,
Malaria, and parasites, and excesses of harmful substances, such as fluoride, arsenic, metals, and salts.

Primary causes of water quality degradation by human activities can be grouped into six different categories according to the major factors controlling these issues: population density, changes in water balance, land-use indicators, long-range transboundary atmospheric transport of pollutants and concentrated pollutant sources and global climate change.

Attributes of Drinking Water

Following are the attributes that make water suitable for community's consumption;

- ·Free from pathogens, colorless and clear
- Palatable, free from odour and preferably cool
- · Reasonably soft (not hard)
- · Neither forming scales nor corrosive
- · Free from objectionable substances such as hydrogen sulfide, iron and manganese

- · Unpolluted by substances in quantities that are toxic or have adverse Physiological
- effects.

EVOLUTION OF QUALITY CONCERNS IN INDIA

Provisioning of safe drinking water supply has been receiving attention of the government from pre-independence era. During the Pre-Independence era, the Govt of India appointed the "Bhore Committee". 1944 to review the general health problems including the availability of safe drinking water supply on a national scale. The Committee suggested that the target should be to provide safe water for drinking purpose to the entire population, within a period of 35 years. After Independence, the Govt appointed the "Environmental Hygiene Committee" in 1948-49 to look into the same problem. The Committee made specific proposal for providing safe drinking water and sanitation facilities for the 90% of the population within a period of 40 years. For accomplishing this task, priorities given to places where the annual death rate due to cholera was more than 100 per 100,000 persons for the last ten years. The state govt on the advice of Govt of India, identified villages having acute scarcity of water and which were endemic to water borne diseases. Such villages are called "Problem Village". So the occurrence of the waterborne diseases were the primary consideration for provisioning of drinking water. To speedily cover these problem villages, the Govt of India introduced ARWSP (Accelerated Rural Water Supply) in 1972-73 and in Fifth Five Year Plan. MNP (Minimum Needs Programme) introduced specifically for water quality.

GOVERNMENT SCHEMES AND PROVISIONS FOR WATER QUALITY

Supply of drinking water forms part of the Minimum Needs Program (MNP) in the state plans. Under "Clean Drinking Water" of the current plan programme, known as TTP 1986. The important components are – Provide safe drinking water to all villages, to assist local communities to maintain the sources of safe drinking water supply in good condition and pay special attention to make supply of safe drinking water for Schedule Cast and Schedule Tribes. For the urgency of the providing safe and adequate drinking water in rural areas, the National Drinking Water Mission/ Rajib Gandhi Drinking Water Mission was launched in October 1986.The basic components are – Control of Fluorosis,eradication of guinea warm, removal of excess fluoride, arsenic , iron from drinking water etc.

In NDWM, 1991, the prime objective was to cover problem villages with **safe** drinking water and create awareness on the use of safe drinking water. The provision of safe drinking water is the responsibility of the govt. After investing lot of money still availability of potable drinking water in rural areas especially in summer month is not satisfactory. Even though about one lakh habitations are covered every year, the number of problem habitations has not declined proportionately. The revised guideline is envisaged to be a tool to energies the system towards the goal of providing safe and sustainable drinking water to all rural habitations of the country.

Under RGNDWM, April, 1999, there are nine programmes in which some programmes are specifically dealing with water quality. Like ARWSP, where govt should provide safe drinking water to all rural habitations of the country.

Under Sector Reforms Programmes, funds would be provided for water quality monitoring and Surveillance in identified pilot districts.

Under Sub-Mission Programme , basically under taken by the states for providing safe drinking water to the rural habitations facing water quality problems like fluorosis, arsenic, excess iron, brackishness etc.Upto 20 % of the ARWSP funds are to be utilized for the new projects under the Sub Mission activities designed to address water quality and sustainability issues.

Institutional arrangement for quality monitoring

Water quality in the country is being monitored by several different agencies like,

- Central Water Commission
- State Govt Agencies
- State Ground Water Board
- State Pollution Control Board
- Central Ground Water Board
- Central Pollution Control Board
- National River Conservation Directorate

The multiple agencies are involved in water quality monitoring and it has led to lot of confusions like it lacks the coherence of data. So it is difficult to generate and analyze data for formulation of policies and schemes to address issues of water quality. To remedy this problem, the Ministry of Environment & Forests constituted the "Water Quality Assessment Authority" with effect from 29th May 2001. The WQAA can standardize water quality monitoring methods, ensure proper treatment of waste water to restore the water quality of surface and ground waters, take up some activity related to water quality management and promote recycling and reuse of treated waste water.

Though drinking water supply is a" State subject", so the responsibility of the State Govts to provide safe drinking water to all by abstracting surface/ground water, treating and disinfecting before supply to the community. The Union Govt acts only as a facilitator in this regard. At Central level there are two agencies which are concerned with the supply of drinking water in the country.

Ministry of Rural development	**Ministry of urban dev & Povery alleviation**
Department of drinking water supply	CPHEO

Department of drinking water supply:

The Department of drinking Water Supply in the Ministry of Rural Development was created in October 1999 to focus attention on the goal of providing safe drinking water to all the rural villages in the next five years as contained in the "National Agenda for Governance".

The State Govts are to implement the rural water supply programmes as per the norms and standards for quality and quantity prescribed by the Dept of drinking water supply. The quality norms prescribed by the Dept of drinking water supply/CPHEO.BIS are to be adopted in the implementation of rural water supply schemes.

Central Public Health and Environmental Engineering Organization/CPHEO:

CPHEO acts as a facilitator and helps the Water Supply Agencies/ULBs by way of formulating and providing technical guidelines for planning, designing, execution and operation and maintenance of water supply and sanitation projects. In this regard, CPHEO brought out a manual "Water Supply and Treatment "and the physical, chemical, bacteriological parameters of drinking water that have been indicated in this manual, which all ULBs have been following since long back. But these guidelines are only recommendatory not mandatory on the part of the State Water Supply Department to follow since water is a State subject. CPHEO has no statutory power to set/fix up standards for drinking water.

Quality Standards of Public Water Supplies As Per CPHEO"s manual (Water Supply and Treatment):

The water supplied is free from pathogenic organisms, clear, palatable, and free from undesirable taste and odour, of reasonable temperature, neither corrosive nor scale forming and free from minerals which could produce undesirable physiological effects. The establishment of minimum standards of quality for public water supply is of fundamental importance and standards of quality form the yardstick within which the quality control of any public water supply has to be assessed.

The evolution of standards for the quality control of public water supplies has to take into account the limitations imposed by local factors in the several regions of the country. The Environmental Hygiene Committee, 1949 recommended that the objective of a public water supply should be to supply water "that is absolutely free from risks of transmitting deseases,is pleasing to the senses and is suitable for culinary and laundering purposes, and added that 'freedom from risks is comparatively more important than physical appearance or hardness" and that safety is an obligatory standard and physical and chemical qualities are optional within a range. The immediate need is for minimum standards, consistent with the safety of public water supplyies.Considering the standard prescribed … (Table of Manuals)

(Ref: JPC Report /CPHEO- Manual on Water Supply and Treatment)

Setting Standard for Safe Drinking Water:

There is no strict norm /standard for potable water. Generally we think that bottled water is safer than our tap water. But the most striking thing is that bottled water is no safer than any other. India Govt has invested huge money on it but people are dyeing every day for having poor quality of water. Almost a decade has crossed and the Ministry has still not taken any concrete steps in this regard. No legal standards for monitoring the quality of ordinary drinking water. According to some experts, for normal drinking water, there has to be norms and water should be added to the definition of "food", once it added there would be a need for a group of experts who have to sit and look at the norms that need to be fixed for the normal drinking water. The Ministry of Health and Family Welfare administers the Food Adulteration Act in 1954, but drinking water does not include under the category of food only bottled water includes in it. In 1994, A Committee on Subordinate Legislation of Parliament made a strong recommendation in this regard but somehow water has not been added to the definition of food in PFA Act all along.

There is an autonomous body under the administrative control of the Department of Consumer Affairs that is BIS (Bureau of Indian Standards) is the national standards body of the country, which was earlier called ISI (Indian Standards Institute) and came into existence on 6th Jan 1947. The Bureau of Indian Standard have been laying down the standards from time to time for the natural mineral water were prescribed for the first time in the year 1992 and these were revised subsequently in the year 1998 . The drinking water standards were laid down for the first time in 1983 and these were revised and updated in 1991 and presently these standards are again under revision. The standards for packaged drinking water were first formulated in January 1998. These are all for packaged or bottled water but no norms or standards for potable water for which basically Govt is the responsible for providing the safe water to all. Safe water means good quality of water, which does not lead any kind of deceases.

WHO guidelines for drinking water quality assess the health risk posed by contaminations in drinking water. The guideline values for biological and chemical pathogens in drinking water safety are not mandatory; these guidelines are only on pen and paper. The WHO's *primary health requirement* is a sufficient water supply, aside from quality, which the Govt of India takes to mean 40 lpcd. The *second requirement* is that the water be microbiologically safe especially for children less than 5 years of age are vulnerable to acute diarrhea. The WHO guidelines suggest that E.coli (the indicator organism for bacterial contamination) should not be detectable in a 100 ml sample of water. In practice with fewer than 10 coli forms in a 100 ml sample the water is considered to be of moderately good quality. **The Govt of India accepts these guidelines but not able to ensure this standards.** The *third requirement* is water be chemically safe, chemical contamination through agricultural runoff and unregulated industrial pollution is a rapid growing problem.

Standards of BIS/CPHEO/WHO:

Physical and Chemical Quality Standards Of Drinking Water /BIS

Quality	Highest Desirable	Maximum Permissible
Physical		
Turbidity (NTU units) Colour, Hazen-Units (On Platinum Cobalt Scale)	5	10
Taste	Agreeable	-
Odour	Unobjectionable	-
Chemical		
P^H	6.5-8.5	No relaxation
Total Dissolved Solids(mg/1)	500	2000
Total hardness as CaCO3 (mg/1)	300	600
Alkalinity as CaCO3 (mg/1)	200	600
Calcium(mg/1)	75	200
Magnesium(mg/1)	30	100
Iron(as Fe) (mg/1)	0.3	1.0
Manganese(as Mn) (mg/1)	0.1	0.3
Copper(as Cu) (mg/1)	0.05	1.5
Zinc (as Zn) (mg/1)	5.0	15.0
Aluminium(as A)	0.03	0.20
Chloride(mg/1)	250	1000
Sulphate(mg/1)	200	Upto 400 if Magnesium does not exceed 30 mg/1
Boron(mg/1)	1.0	5.0
Phenolic substances	0.001	0.002
Fluoride (mg/1)	0.6-1.2	1.5
Nitrates(mg/1)	45	100
Arsenic(mg/1)	0.05	No relaxation
Chromium(mg/1)	0.05	-do-
Lead(mg/1)	0.05	-do-
Mercury(mg/1)	0.001	-do-

Drinking water standard by CPHEO:

Characteristics	Acceptable	Cause for rejection
Turbidity(NTU)	1	10
Colour(units of Platinum Cobalt scale)	5	25
Taste and Odour	Unobjectionable	Objectionable
pH	7.0 to 8.5	Less than 6.5 or greater than 9.2
Total dissolved solids(mg/1)	500	2000
Total hardness(as $CaCO_3$) mg/1	200	600
Chlorides(as CI) (mg/1)	200	1000
Sulphate(as SO_4) mg/1	200	400
Fluorides (as F) mg/1	1.0	1.5
Nitrates(as NO_3) mg/1	45	45
Calcium (as Ca) mg/1	75	200
Magnesium(as Mg) mg/1	$\leq$ 30	150
Iron (as Fe) mg/1	0.1	1.0
Manganese (as Mn) (mg/1)	0.05	0.5
Copper (as Cu) mg/1	0.05	0.5
Aluminium(as AI) mg/1	0.03	0.2
Alkalinity mg/1	200	600
Residual Chlorine (mg/1)	0.2	>1.0
Zinc(as Zn) mg/1	5.0	15.0
Phenolic compounds(as phenol) mg/1	0.001	0.002
Anionic detergents (as MBAS) mg/1	0.2	1.0
Mineral Oil (mg/1)	0.01	0.03

Toxic Materials

Arsenic(as As) mg/1	0.01	0.05
Cadmium (as Cd) mg/1	0.01	0.01
Chromium	0.05	0.05
Cynides (as CN) mg/1	0.05	0.05
Lead (as Pb) mg/1	0.05	0.05
Selenium (as Se) mg/1	0.01	0.01
Mercury (total as Hg)	0.001	0.001

mg/1		
Polynuclear aromatic hydrocarbons (PAH) mg/1	0.2	0.2
Pesticides(total,mg/1)	Absent	Absent

Drinking Water standard by WHO

Naturally occurring chemicals for which guideline values have been established:

SL NO	**CHEMICALS**	**GUIDELINE VALUE (mg/liter)**	**REMARKS**
09	ARSENIC	0.01	
10	BARIUM	0.7	
11	BORON	0.5	
12	CHROMIUM	0.05	For Total chromium
13	FLUORIDE	1.5	
14	MANGANESE	0.4	
15	MOLYBDENUM	0.07	
16	SELENIUM	0.01	
17	URANIUM	0.009	Only Chemical Aspects of Uranium

Naturally occurring chemicals for which guideline values have not been established:

SL NO	CHEMICALS	GUIDELINE VALUE (mg/liter)	REMARKS
01	CHLORIDE	200 - 300 (250)	May affect acceptability of Drinking Water. Not of Health Concern.
02	HARDNESS	100 - 300	May affect acceptability of Drinking Water. Not of Health Concern.
03	Hydrogen Sulfide	0.05 - 0.1	May affect acceptability of Drinking Water. Not of Health Concern.
04	pH	1.5	May affect acceptability of Drinking Water. Not of Health Concern.
05	SODIUM	200	May affect acceptability of Drinking Water. Not of Health Concern.
06	SULPHATE	250	May affect acceptability of Drinking Water. Not of Health Concern.
07	Total Dissolved Solids (TDS)	600	May affect acceptability of Drinking Water. Not of Health Concern.
08	IRON	0.3 - 1	May affect acceptability of Drinking Water. Not of Health Concern.

The WHO has framed guidelines for levels of microbial contaminants and 128 chemicals that can be hazardous to human health. These guidelines are intended for use by national authorities as a basis for development of drinking water standards and regulations appropriate for their own socioeconomic and risk situations. The WHO Guidelines for Drinking-Water Quality is intended for use as a basis for the development of national standards in the context of local or national environmental, social, economic, and cultural conditions.

Some countries have gone beyond the WHO and set more rigorous national standards and regulations for all categories of microbiological, chemical and radiological

Table 8: Indian Standard Drinking Water – Specification

SL NO.	SUBSTANCE	DESIRABLE LIMIT	PERMISSIBLE LIMIT
1	Color, Hazen units	--	25
2	Odour	Unobjectionable	---
3	Taste	Agreeable	---
4	Turbidity, NTU, Max	5	10
5	pH Value	6.5 to 8.5	No relaxation
6	Total Hardness (as $CaCO_3$), mg/l	300	600
7	Iron (as Fe), mg/l	0.3	1.0
8	Chlorides (as Cl), mg/l	250	1000
9	Calcium (as Ca), mg/l	75	200
10	Sulphate (as SO_4), mg/l	200	400
11	Nitrate (as NO_3), mg/l	50	No relaxation
12	Fluoride (as F), mg/l	1.0	1.5

[Source: Department of Mines & Geology]

Major Parameters and Same Of the Problems That They Cause

Substances	**Impact on health**
Calcium and Magnesium	Major constituents that is present in water. Hardness are largely responsible for the formation of scales in heaters, pipes etc
Iron	One of the troublesome minerals and as low as 0.3ppm is potable-leaves brown stains on porcelains, clothes.
Fluoride	Dental fluorosis, Skeletal fluorosis.
Total Hardness	Temporary hardness and permanent hardness.
Nitrate	Methaemoglobinaemia and Carcinogenesis.
Pathogene	Hepatitis, cholera, typhoid, diarrhoel etc.
Cadmium	Cancer, harm kidney.
Chromium	Liver or kedney failure.
Copper	Severe renal damage, central

	nervous system irritation followed by depression.
Mercury	Neurological and renal effects
Lead	Anemia,tiredness,irritability.

Table 3.6:) Specifications for Drinking Water (RGNDWM

S.No.	Characteristics	Maximum permissible limits	Adverse effects beyond permissible limits	Alternative extended limits if no toxicity
1.	Colour (Hazen	10	Consumer acceptance decreases	50
2.	Odor	Unobjectionabl	-	-
3.	Taste	Agreeable	-	-
4.	Turbidity (NTU)	10	Consumer acceptance decreases	25
5.	T.D.S. (mg/1)	500	• Palatability decreases • May	3000 (WHO limits: 4500)
6.	PH value	6.5 to 8.5	Mucous membrane	9.2
7.	Total hardness as $CaCO_3$ (mg/1)	300	Encrustation and adverse effect on	600
8.	Calcium as Ca (mg/1)	75	Do	200
9.	Magnesium as Mg	30	Do	100
10.	Copper as Cu (mg/1)	0.05	• Astrigent taste • Discoloration & corrosion of metalc	1.5
11.	Iron as Fe (mg/1)	0.3	• Taste/appearamce affect • Promotes	1.0
12.	Manganese as Mn	0.1	Taste/appearance	0.5
13.	Chlorides as Cl (mg/1)	250	• Taste/palatability reduces • Corrosion	1000
14.	Sulphates as SO (mg/1)	150	Gastro-intestinal irritations when Mg	400 (provided Mg does not
15.	Nitrate as NO (mg/1)	45	Methnaemoglobin emia takes place	No relaxation
16.	Fluoride as F (mg/1)	0.6-1.2	• Low fluoride are linked with dental care • Above 1.5	1.5
17.	Phenolic compounds as C H OH (mg/1)	0.001	Objectionable taste and odour	0.002
18.	Mercury as Hg (mg/1)	0.001	Toxicity increases	No relaxation
19.	Cadmium as Cd (mg/1)	0.01	Do	Do
20.	Selenium as Se (mg/1)	0.01	Do	Do
21.	Arsenic as As (mg/1)	0.05	Do	Do
22.	Cyanide as CN (mg/1)	0.05	Water becomes toxic	Do
23.	Lead as Pb (mg/1)	0.1	Do	Do
24.	Zinc as Zn (mg/1)	5	• Astrigent taste •	15

25.	Anionic detergents as MBAS (mg/1)	0.2	Frothing in water	1
26.	Chromium as Cr^{6+}	0.05	Carcinogenic	No relexation
27.	Polynuclear aromatic hydrocarbons as PAH	-	Do	-
28.	Mineral oil (mg/1)	0.01	Undesirable taste and odour	0.03
29.	Residual free chlorine (mg/1)	0.2 (minimu	-	0.5 For protection

Source: Indian Standard Specifications for Drinking Water, IS: 10500, 1983

Role of different Agencies and the need:

Ministry of water resources, Ministry of Urban development and Poverty alleviation, Ministry of Rural Development, Ministry of Environment and Forest and Ministry of Health and Family Welfare; all have got a different roles to play to provide drinking water of adequate quantity and potable quality to meet the healthy needs of the community. All of them are involved and play their respective roles to provide quality water. Roles of different agencies:

- Ministry of Water Resources: The CGWB is monitoring both quantitative and qualitative data with regard to ground water. Apart from this, CGWB has developed ground water maps concerning various qualitative issues.
- Ministry of Urban development and Poverty Alleviation: Working through various Urban Bodies, the Ministry is involved in monitoring drinking water quality in the urban agglomerations. There are quite a few Water Boards especially in Metro Cities who are equipped to take up the job, but not all urban bodies keep watch of the quality of water being provided in regular basis.
- Ministry of Rural development: Department of Drinking Water in the Ministry is working through State Public Health Engineering Departments or Water Boards are monitoring the drinking water quality in the rural areas of the country. Almost all the districts do have WQ laboratory. Though WQ is generally tested during installation, follow up testing is not done on regular basis.
- Ministry of Environment and Forests: Working through Central Pollution Control Board, the Ministry is involved in monitoring water quality of main rivers and big water bodies. Most of these water sources are being used for drinking water purposes. So CPSB itself or through SPCB is having a watch on raw water quality.
- Ministry of Health: So far the Ministry had been playing a limited role with regard to drinking water surveillance in some selected areas. But with the inclusion of drinking water under food category, MoH played a significant role.

Special Committee for Drinking water Quality Monitoring by GOI

The Planning Commission had constituted a "Working Group" on Rural Drinking Water Supply and Sanitation under the Chairmanship of Secretary, Department of drinking Water Supply. In the First Meeting of the Working Group, eight Sub-groups, four each on Rural drinking water supply and rural sanitation were constituted to analyze and examine various issues involved, possible strategies and requirement of funds for the same. Reputed experts in the sector were included in the eight Sub-groups to give their considered recommendations.

A Steering Committee is also there to formulate the 10th Five Year Plan on drinking Water Supply and Sanitation (Rural & Urban) under the Chairmanship of Planning Commission, was constituted.

As per the information furnished by the State Govts, about 2.17 lakh rural habitations were affected with the quality problems of drinking water as on 1-4-1999. As this information

Mineral and Packaged Drinking Water Industries:

Day-to-day consumers worldwide are becoming more conscious of health. They do not want to fall prey to contaminated water. The mineral and packaged drinking water industries have, therefore, been flourishing globally to provide safe drinking water. For growing consumer anxiety and concern over the safety of packaged drinking water, the government has decided to enforce stringent BIS (Bureau of Indian Standards) norms for the manufacture and sale of bottled water by quantifying the maximum limit for pesticide residues.

The BIS standard for packaged drinking water was formulated and the other one for packaged natural mineral water was revised in 1998.There was a panel included a representative each from Ministry of Health and Family Welfare, a Scientist - Water Expert and a Consumer Organization, in addition to three representatives from industry. This panel prepared two draft standards for packaged drinking water and packaged natural mineral water.

The certification of packaged natural mineral water and packaged drinking water was brought under mandatory certification scheme of BIS, under PFA Act, 1954 through notifications No.GSR 759(E) and GSR 760(E) issued by the Ministry of Health & Family Welfare on 29.9.2000.

Ref: Report of Excutive Summary and Recommendations of the Committee on the Pesticides Residues in Packaged drinking Water and Packaged Natural Water.

India: Govt to enforce amended BIS norms:

Posted by News on 8:39:19 2/26/2003 from 134.121.87.141:

India: Govt to enforce amended BIS norms
Probe panel constituted to examine issues
Tribune News Service

http://www.tribuneindia.com/2003/20030226/main7.htm

New Delhi, February 25

Responding to growing consumer anxiety and concern over the safety of packaged drinking water, the government has decided to enforce stringent BIS (Bureau of Indian Standards) norms for the manufacture and sale of bottled water by quantifying the maximum limit for pesticide residues.

In a suo moto statement in the Rajya Sabha today, the Union Minister for Consumer Affairs, Food and Public Distribution, Mr Sharad Yadav, said that sectional committees concerned which met early this month to consider amendments in the BIS standards had unanimously decided in public/consumer interest to quantify the maximum limit for pesticides residues and made the necessary amendments to the two Indian standards.

Mr Yadav informed the House that these revised norms now formed an amendment to the two Indian standards, one for natural mineral water and another for packaged drinking water. The standards formulated in 1998 covered micro-biological, physical and chemical safety of water. He said that internationally established test methods capable of detecting the above limits would now be used for analysis.

The Minister said that the manufacturer would now be required to produce a No Objection Certificate from the Central/State Government Ground Water Authority before obtaining BIS certification. He said that the Ministry of Health and Family Welfare had initiated measures to amend the Prevention of Food Adulteration Rules.

Reassuring the House of proper monitoring, Mr Yadav said that inspections had been carried out across the country of all major manufacturing units and action taken under the BIS regulations against those found defying existing standards.

Mr Yadav said that experts, who attended a seminar convened by the BIS recently to determine whether the existing product was fit for human consumption, opined that the packaged drinking water now being produced according to BIS standards was fit for human consumption. The seminar was attended by eminent scientists representing government bodies, consumers, representatives of industry and other stakeholders.

Taking cognisance of news reports quoting findings of the Centre for Science and Environment, a Delhi-based non-government organization ,that pesticide residues were in excess in samples of BIS-certified packaged drinking and mineral water, the government constituted an inquiry committee. Mr Yadav said that the committee chaired by the Additional Secretary in the Department of Consumer Affairs, was examining various issues related to BIS standards for packaged drinking water/natural mineral water.

On International Level:

One silent feature of international standards is that they have only one standard for drinking water, which would apply to drinking water from a distribution system as well as in bottles or in other containers.For mineral water, however, different standards have been prescribed. The Indian Standard (first revision) for drinking water specifications derived assistance from the WHO guidelines 1984.The standard also derived assistance from the Manual of Standards for Quality of Drinking Water Supply, Indian Council of Medical research, 1971 and a similar Manual of Ministry of Urban development, 1989.The subsequent standards for packaged natural mineral water and packaged drinking water, formulated in 1998.

Major water quality concerns in Orissa:

State government has the responsibility to provide safe drinking water in rural areas. Govt of India supports and supplements efforts of the state govt. The programme for drinking water supply and sanitation have been under implementation ever since inception of First five-year plan. The problem is severe particularly in rural areas. Government has already invested a large amount for safe drinking water, but not able to provide safe and sufficient water to all. Several factors like rapid growth of urbanization, giving less importance of traditional water bodies, over exploitation of ground water, lack of judicious distribution system, lack of coordination of departments are basically responsible for poor management and low quality of water. The maximum effects are felt in some specific patches like in Coastal areas- Berhampur, Gajapati, Khurda, Puri and some in western areas like Kalahandi, Phulbani, Boudh etc. In coastal areas, basically surface level of quality problem has been found but in Western areas, the ground water quality problem has been occurred. There are number of villages in Orissa where high fluoride content has led to serious problem. Singbhum, Balasing in Nayagarh and Karlakata in Nuapada are most affected areas.

The contamination of drinking water is more possible where Govt supplies water from river, spring, nallah, but where ground water is concerned contamination is

less possible. Orissa has got major six rivers; source of supply is more possible from rivers, so contamination is more. Degradation in water quality has been observed due to industrial pollution, contamination of ground water source due to disposal of industrial effluents (Anugul, Talcher, Keonjhar, Badbil etc) without treatment, excessive use of chemical fertilizer in agricultural fields, exploitation of ground water for industries and Mines. To have the good quality of drinking water women have to walk a long to collect a pot of drinking water, they have spent more energy for collecting the water.

One of the greatest challenge government is going to face is drinking water quality. Supply of safe drinking water in adequate quantities to all communities has become impossible. In every year Orissa is taking major burden of health risk due to poor quality of drinking water. Most of the diseases such as gastroenteritis, diarrhea, dysentery, cholera etc prevail every year because of unsafe drinking water. The state is also increasingly facing the problem of excess chemicals like fluoride, arsenic, nitrate, salinity and iron in ground water sources.

In our State water policy, which is replica of National water policy, has also given the first priorities to safe drinking water to all. So many programme and schemes have been implemented for providing safe water but Govt is lagging behind. As per the Govt, safe drinking water to be provided as per stipulated norms on a sustainable basis to all habitations by March 2004.

In Orissa, the coverage of households having safe drinking water was 92.7% comprising 97.5% of urban and 92% of rural households.

Steps taken by Orissa Govt:

Sub-Mission projects are undertaken for providing safe drinking water to rural habitations facing water quality problem such as excess iron, salinity, fluoride etc. Initially, Govt of India was sanctioning Sub-Mission projects recommended by the states. Prior to 1.04.1998, seven Sub-Mission projects were sanctioned for Orissa. As on date, 5 projects have been completed. The remaining two will be completed within 2006. After 1998, India Govt has once again sanctioned 8 more Sub-Mission projects for Orissa , out of these 8 Sub-Mission projects , 3 have been commissioned and 2 have been partly commissioned. The three remaining projects are in different stages of execution.

Subsequently, power has been delegated to the State Govt to sanction Sub-Mission projects. But no separate fund is allocated for implementing such projects. Under the delegated powers, the State Govt has sanctioned 109 Sub-Mission projects during 2002-03. Up to 2003-04, six projects have been complited.

The remaining 103 projects are ongoing. Rs 1611.89 lakhs has been provided in the budget for the year 2004-05 for this purpose.

The programme for 2004-05, in the CSP sector, envisages that installation of 10,564 tube wells, 200 sanitary wells, and completion of 274 rural piped water supply projects including 98 Sub-Mission projects for providing safe drinking water facility in water scarce rural habitations. The programme for 2004-05, in the State plan sector, envisages that installation of 4330 tube wells, 200 sanitary wells and completion of 143 rural piped water supply projects for providing safe drinking water facility in water scarce rural habitations with focus on no safe source habitations. The programme also envisages artificial ground water recharge of drinking water sources in Boden block in Nuapada district and Narla block of Kalahandi district. Since 1977-78, 13,797 habitations out of 1, 14,099 problem habitations identified in the State had not been provided with safe drinking water as of March 2001. Rs 2.34 crores spent on 12 piped water supply schemes for providing safe drinking water to 0.29 populations in 19 villages could not be commissioned due to failure of production wells arising from improper investigation and lack of coordination of between the implementing agency and the power supply authorities

In Orissa, there are many areas which are severely affected by Fluoride, iron and chloride. The lists of these districts are given below-

In Orissa, there are many areas which are severely affected by Fluoride, iron and chloride. The lists of these districts are given below-

Status of Iron Problems in Orissa:

District	No of habitation	No of habitation tested	No of habitation affected	Remarks
Anugul	3264	586	496	
Balasore	6841	527	110	
Baragad	2744	1653	1024	
Bhadrak	5088	461	82	
Bolangir	3621	2580	523	
Boudh	1723	50	03	
Cuttack	4359	255	34	
Deogarh	1427	149	71	
Dhenkanal	2650	462	400	
Gajapati	2115	132	90	
Ganjam	5354	356	212	
Jagatsingpur	3487	90	13	

Jajpur	2960	172	78	
Jharsuguda	1231	303	150	
Kalahandi	3819	533	109	
Kendrapada	4728	141	02	
Keonjhar	6250	1601	457	
Khurda	3949	639	304	
Koraput	4605	550	373	
Malkangir	2319	183	114	
Mayurbhanj	5771	913	640	
Nawarangpur	2704	927	427	
Nayagarh	3301	449	173	
Nuapada	2267	115	30	
Phulbani	4457	553	161	
Puri	5518	505	172	
Rayagada	4081	516	238	
Sambalpur	2809	1522	733	
Sonepur	1500	901	123	
Sundergarh	9157	1695	460	
Total	114,099	19519	7802	

Status of Fluoride Problems in Orissa:

Districts	No of habitations	No of habitation tested	No of habitation affected
Baragarh	2744	1487	47
Bolangir	3621	2423	49
Deogarh	1427	77	01
Jharsuguda	1231	263	04
Khurda	3949	367	14
Mayurbhanj	5771	348	16
Nayagarh	3301	270	45
Phulbani	4457	204	04
Puri	5518	368	24
Sambalpur	2809	1305	25
Sonepur	1500	414	04
Total	36328	7526	233

Status of Chloride Problems of Orissa:

Name Of District	Total No Of Habitation	No Of Habitation Tested	No Of Habitation Affected
Balasore	6841	74	02

Bhadrak	5088	205	08
Bolangir	3621	501	04
Cuttack	4359	196	34
Ganjam	5354	193	12
Kalahandi	3819	33	01
Khurda	3949	152	03
Nayagarh	3301	210	02
Puri	5518	436	63
Total	41850	2000	129

Drinking water standard of Orissa Govt:

Since 1960s, Orissa Govt has been following the guideline of "Manual on water supply and treatment"by CPHEO.

Characteristics	**Acceptable**	**Cause for rejection**
Turbidity(NTU)	1	10
Colour(units of Platinum Cobalt scale)	5	25
Taste and Odour	Unobjectionable	Objectionable
pH	7.0 to 8.5	Less than 6.5 or greater than 9.2
Total dissolved solids(mg/1)	500	2000
Total hardness(as $CaCO_3$) mg/1	200	600
Chlorides(as CI) (mg/1)	200	1000
Sulphate(as SO_4) mg/1	200	400
Fluorides (as F) mg/1	1.0	1.5
Nitrates(as NO_3) mg/1	45	45
Calcium (as Ca) mg/1	75	200
Magnesium(as Mg) mg/1	$\leq$ 30	150
Iron (as Fe) mg/1	0.1	1.0
Manganese (as Mn) (mg/1)	0.05	0.5
Copper (as Cu) mg/1	0.05	0.5
Aluminium(as AI) mg/1	0.03	0.2
Alkalinity mg/1	200	600
Residual Chlorine (mg/1)	0.2	>1.0
Zinc(as Zn) mg/1	5.0	15.0
Phenolic compounds(as	0.001	0.002

phenol) mg/1		
Anionic detergents (as MBAS) mg/1	0.2	1.0
Mineral Oil (mg/1)	0.01	0.03

Toxic Materials

Arsenic(as As) mg/1	0.01	0.05
Cadmium (as Cd) mg/1	0.01	0.01
Chromium	0.05	0.05
Cynides (as CN) mg/1	0.05	0.05
Lead (as Pb) mg/1	0.05	0.05
Selenium (as Se) mg/1	0.01	0.01
Mercury (total as Hg) mg/1	0.001	0.001
Polynuclear aromatic hydrocarbons (PAH) mg/1	0.2	0.2
Pesticides(total,mg/1)	Absent	Absent

WATER QUALITY TESTING LABORATORIES:

The List of stationary laboratories to be set up in the States are given below:

S. No.	State	Regional Centre	Stationary	Mobile
AIIH & PH, CALCUTTA				
1.	Orissa		6	1

2. IMPACT OF WATER QUALITY ON LIVES:

About 80% of all deaths in developing countries are caused by water related diseases. The largest incidence of diseases in the country arises out of deteriorating water quality and ingestion of polluted water. It has been estimated that out of the 37 most prevalent diseases, 21 are because of poor quality of water.

Problem of safe drinking water is one of the most pressing environmental issues for almost all countries of the world and protecting the drinking water sources

became more challengeable for every national govt. The WHO has estimated that more than five million people die every year only because of unsafe drinking water.

Nearly 1.5 billion people lack ready access to drinking water. And also contamination denies some 3.3 billion people access to clean water and 2.5 billion people have no water sanitation services. On the basis of some Govt reports, there are about 250 million cases of water – related diseases with some 5 to 10 million deaths. The continuous degradation of water quality leads to many diseases for human beings and animals also.

Water - borne deases:

Firstly, there is the direct impact of consuming contaminated water - this is known as '**waterborne disease**' and includes diarrhea, typhoid, viral hepatitis A, cholera, dysentery.

Secondly, there is the effect of inadequate quantities of water being available for personal hygiene or the of un-hygienic practices which contaminate water and cause diseases. Without enough water, skin and eye infections (including trachoma) are easily spread, as are the faucal–oral diseases. These diseases are known as '**water-washed diseases**'.

Thirdly, there are '**water based diseases**' and "**water-related vector-borne diseases**" in which the aquatic environment provides an essential habitat for the mosquito vectors and intermediate snail hosts of parasites that cause human diseases. Malaria, schistosomiasis, lymphatic filariasis, onchocerciasis and Japanese encephalitis are examples of these diseases.

Fourthly, there is **chemically contaminated water** such as water containing excessive amounts of arsenic or fluoride. Some contaminants are added to drinking water as a result of natural processes and some due to human activities such as industry and mining. Poor communities, especially in urban fringe areas, are particularly susceptible to dangers from polluted water from a variety of sources due to lack of or poorly enforced regulation of water pollution.

(Provide tables and info on Arsenic, fluoride, iron, salinity, gunea worm etc. Ref-DTE and DW Census 2003).

Table 3.1: Water based disease transmission and preventive strategies

Classification	Transmission	Examples	Preventive strategies
Water-borne	Disease is	▪ Diarrhoeas (e.g.	▪ Improve

(water-borne diseases can also be waterwashed	transmitted by ingestion	cholera) ▪ Enteric fevers (e.g. typhoid) ▪ Hepatitis A	quality of drinking water ▪ Prevent casual use of other unimproved sources ▪ Improve sanitation
Water-washed (water scarce)	Transmission is reduced with an increase in water quantity: ▪ Infections of the intestinal tract ▪ Skin or eye infections ▪ Infections caused by lice or mites	▪ Diarrhoeas (e.g. amoebic dysentery) ▪ Trachoma ▪ Scabies	▪ Increase water quantity ▪ Improve accessibility and reliability of domestic water supply ▪ Improve hygiene ▪ Improve sanitation
Water-based	The pathogen spends part of its life cycle in an animal which is water-based. The pathogen is transmitted by ingestion or by penetration of the skin.	▪ Guinea worm ▪ Schistosomiasis	▪ Decrease need for contact with infected water ▪ Control vector host populations ▪ Improve quality of the water (for some types) ▪ Improve sanitation (for some types)
Insect-vector	Spread by insects that breed or bite near water	▪ Malaria ▪ River blindness	▪ Improve surface-water management ▪ Destroy

			insects' breeding sites ▪ Decrease need to visit breeding sites of insects ▪ Use mosquito netting ▪ Use insecticides

Ref.: Waterlines. "Technical Brief No. 52: Water: Quality or quantity", Vol. 15, No. 4, April 1997

4. WHY AND HOW THE QUALITY DETERIORATES

Quality deterioration can be divided into two types – bacteriological contamination, chemical contamination Bacteriological contamination is mostly from anthropogenic reasons – poor water and sanitation situation, improper disposal of municipal water etc. The focus of govt. and UN agencies is mostly on this. (TSC here or in a later part) Hospital wastes are also one of the areas of concern Open pit latrine as a solution to bacteriological contamination needs to question.

Chemical contamination is an neglected area till date as the impact in most of the cases is felt much much later – not easy to detect – the reasons for this are non-anthropogenic (like endemic fluoride and chloride etc in the ground – new occurrence due to over exploitation or digging deeper) and anthropogenic like industrial pollution, agricultural pollution – pesticides pollution is emerging as a new threat

Even if when rain is falling, it accumulates small amounts of gases, ions and dust particles from the atmosphere. Human add a lot of impurities to surface and ground water like industrial and commercial solvents, metal and acid salts, sediments and pesticides, fertilizers and faucal matters.

The Central Pollution Control Board through its network of about 500 water quality monitoring stations on Indian rivers and their tributaries has identified 39 polluted river stretches requiring action programme for upgrading water quality. Moreover, minor surface water drainage channels, receive untreated domestic sewage and industrial wastes and have virtually turned into open sewers. Indiscriminate disposal of municipal solid wastes and hazardous industrial silage on land severely contaminates ground water reserves. Pumping of industrial wastewater into ground water to get rid of wastes is also being reported. Pollution of ground water is very difficult to be checked.

The fact that groundwater is commonly available and easily procurable has made it vulnerable to over-exploitation. Indiscriminate boring and extraction and over-exploitation of ground water in some areas have caused a disturbance of the state of equilibrium of the reservoir. This has resulted in lowering of water table, decreased pressure in aquifers and changes in the speed and direction of flow of water, which could disturb the hydrological cycle in the region, triggering several negative environmental impacts. Because of domestic and industrial pollution, many areas have been affected, from natural pollutants like - high nitrate, high fluoride, high arsenic, high iron which are highly toxic.

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CHAPTER – IV

WATER CRISIS AREAS OF THE STATE

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WATER CRISIS AREAS OF THE STATE

Bolangir district is a well known district in western Orissa and it is widely known for its magnificent heritage like Harisankar and the adjacent Gandhamardan hills which attract thousands of tourists from all parts of the country. At the same time, it also suffers from natural calamities like drought, scarcity of rain almost every alternate year affecting the economical conditions of the people. This has occurred due to heavy biotic interference in forests and implementation of development projects, industries and mining operations in the locality resulting in depleting forest cover and adversely affecting the environment. The official record reveals that the temperature in this area during summer goes up to 45°C to 46°C. But, during the year 2003-04, the temperature in summer went too high almost breaking the past records and touched 50.60°C in Titlagarh Township and threatening the lives of local habitations. Such an alarming situation drew attention of conscious mass in and around the country and the state of Orissa. So, the matter was taken up at the state level and a high level expert team was formed consisting of senior officers from Department of Forest, Agriculture, Horticulture, Soil conservation and scientists under the leadership of Hon'able Minister Forest and Environment to make a preliminary study to combat the excessive heat wave. The expert team visited the township and its adjacent areas from 29.6.2003 to 30.3.2003 and suggested for taking up massive tree plantations in the area coming within 20km radius of Titlagarh along with other soil moisture conservation measures to bring down the temperature in summer days.

Titlagarh of Bolangir district is in limelight also due to non-availability of drinking water in the state. The situation of its adjacent blocks like Muribahal, Tureikela and Bangamunda area are also heat wave and water scarce areas. The situation became alarming from the year 1997 and it went on rising year after year. Officially it is reported that the death toll due to sunstroke rises up to 65 during the year 1999 as the people and the administration was not aware about sunstroke menace and no preventive measures were taken prior to the summer. According to Subhransu das, the NAC Chairman Titlagarh, the crematory ground was flooded with corpses during the year 1999 and the non-official death figure was above 300 within one weak. This was happened due to lack of awareness and prevention. Water supply through the Railway was taken up to the parched area to quench the thirst of the people in 2000. A team of two/three scientists visited the area on 7th Dec 2004 to conduct a study on the vegetation and geomorphologic reasons behind the climatic change in and around Titlagarh. The vital point is that all on a sudden what amounts to the rising of heat though the previous years experienced relatively less temperature. Geographically, Titlagarh is situated in the central table land. The solitary river

the Tel is flowing through the subdivision. The Tel remains dry for most of the times in a year.

Titlagarh became NAC in the year 1954 and there is a sub-collector, a B.D.O and other developmental wings of the state government operating to do away with the heat wave and the drinking water scarcity.

Titlagarh block has 18 GPs and the total population is 1, 03,971 and out of the total, 32,500 are urban population. There are 15 wards in the urban area. Due to urbanization, industrialization and fuel wood needs forests are cut down at a rapid pace. The bald hills and hillocks, stone quarries, hard rocks within low-reach of the soil and blasting of hills are some of the major factors that contributes towards the heat wave effects as well as non availability of drinking water. This is also one of the major factors responsible for ground water depletion.

Natural resources are interlinked and any deviation in one has its negative impact on the other. Land, water and forest are now in a dwindling stage. If it went unchecked it may fraught with dangerous consequences. Due to human action, these natural resources are unable to restore a balance and therefore, the heat absorbing capacity of the soil, water and forest are diminishing and it enhances the temperature.

There are more than 30 big water harvesting structures in and around Titlagarh. Twelve Micro-watershed projects are located in near by 20 villages. The Maharaja Sagar is situated at the heart of the town and its area is about 4 acres. The renovation work was partially done and it is not properly taken care of. It is in the ownership of NAC and during the scorching summer it provides life to the cattle, other animals as well as to the people residing near by. Similarly, the Deybandha of Kumuda is a huge bandha of an area 18 acres. About 8 thousand people are depending upon the Bandha. The other water harvesting structures are Sinhini Pond, Udayapur Pond, Jamunajora, Kankadajora, Sabajora, Gandharkela, Mathanpalla project of Bijepur GP. According to a survey conducted by the irrigation department, there are 6847 numbers of Bandhas and Katas located in Bolangir district. But, without proper care and negligence, most of them are not in good condition to solve people's water need for agriculture, pisciculture, bathing and drinking etc.

People's sufferings: Huge gatherings around tube wells and stand posts, dried ponds and wells, quarrel to fetch water early, waiting for long time near the source, employing the Nariyans to collect water, young children are engaged in water collection with their cycles and plastic buckets, defunct tube wells, less number of sweet water tube wells are some of the most common sights in

Titlagarh. Suffering is resulted due to non-availability of water. Water demand is more particularly in town area. In rural area, the people have their own wells and Bandhas to meet their needs. But, the provisions are not sufficient. Government coverage is though 100% in pen and paper, but most of the sources are not giving good quality water and the defunct tube wells are timely attended by neither the SEMs nor the crews. Some patches near to Muribahal and Bangamunda block, Kulipalli village, Haridakhola area, the adjacent area near to Kalahandi district have acute drinking water problem. Women have to travel at least three to four kilometers to wash there clothes during night time. For household activities they spend about four to six hours in water collection. Each cattle owner free their animals and the animals get their water needs fulfilled in some Bandha or watershed. Lack of safe drinking water, thirsty people, thirsty cattle and trees, defunct tube wells and temperate atmosphere all blame the administration. The actions taken by the district administration is very negligible and hence people are blaming the water supply departments. People are using muddy water of the ponds as the pigs and buffalos are making the water turbid. Bathing for women is the biggest problem. They have to rise much early to finish their daily work as the male persons use the same source.

According to the Meteorological data, the rainfall is decreasing and erratic particularly in the Titlagarh subdivision during the last ten years. The evaporation rate is increased by 10% and Kumuda hills radiation is the principal cause of the intensification of heat. The RWSS department has agreed that the ground water level is depleting and the reason may be the loss of forest cover. The presence of hard rocks also has made the tube wells unsuccessful.

The major causes of heat wave are as follows:

- Location factor
- Presence of bald mountains
- Presence of industries
- Urbanization
- Loss of forest coverage
- Lack of people's sensitivity.
- Brick layers and Potters.

Location factor: Titlagarh is located at a higher altitude, on a hilly terrain and is situated far from the sea. Besides, the presence of continuous hard rock at a depth of 4-5 feet below the surface retards the heat absorbing capacity of the soil. Atmospheric temperature rises suddenly after twelve o' clock because the surface emits its temperature. There is no such wetland, sea to provide the cooling effect. River Tel remains dry for 8 months in a year. There is no perennial stream or Nallah to recede the temperature effect. Due to the presence of hard rock, the rain water storage is not possible in underground. Only water

harvesting structures are feasible here to provide water and cooling effect. Looking back, people and the Maharaja of Balangir dug huge Sagars, ponds, Jholas and wells for water facility. The tube wells are not successful due to the presence of hard rocks. There is also no ground water level as there is no proper water recharging.

Presence of bald mountains: Kumuda hills are the central focus and it is responsible for the climatic change and heat impact as per the report of the scientists. The hill is full of Granite stone. The sunshine reflection as well as the heat emission increases the atmospheric temperature. Titlagarh has a good number of bald hills and hillocks around it. Ten or twelve years back, these mountains have tree cover and soil cover. Sheet erosion, loss of forest cover has made them bald. Now, we can see only rock pieces standing here and there and Titlagarh is surrounded by these hills. Bald mountains can not absorb heat. On the other hand, it assists in increasing heat. Bald mountains emit heat to the atmosphere and it acts as a reflector. Quarry works is responsible for depletion of ground water and promotes the atmospheric temperature.

Presence of Industries: There are a number of industries in Titlagarh that came up in 1990s. The big ones are Ordnance Factory of Badmal, Powmex Steel etc. Three sponge Iron plants like Pabansuta, Bhagabata and SPS are coming up shortly. Ordnance factory at Badmal cleared the forest coverage from 1500 acres area. The smokes emitted by the industries increase the atmospheric temperature. The factory has developed its project at Demerbahal to fulfill its water need. In order to develop infrastructural facility, the factory authorities blasted a number of hills to collect road building materials. All these activities are contributing to increase the atmospheric temperature. In case of Powmex Steel, the company has its deep boring to cater to the water needs. The companies are not interested to provide water to the public in case of necessity or for their peripheral development programme.

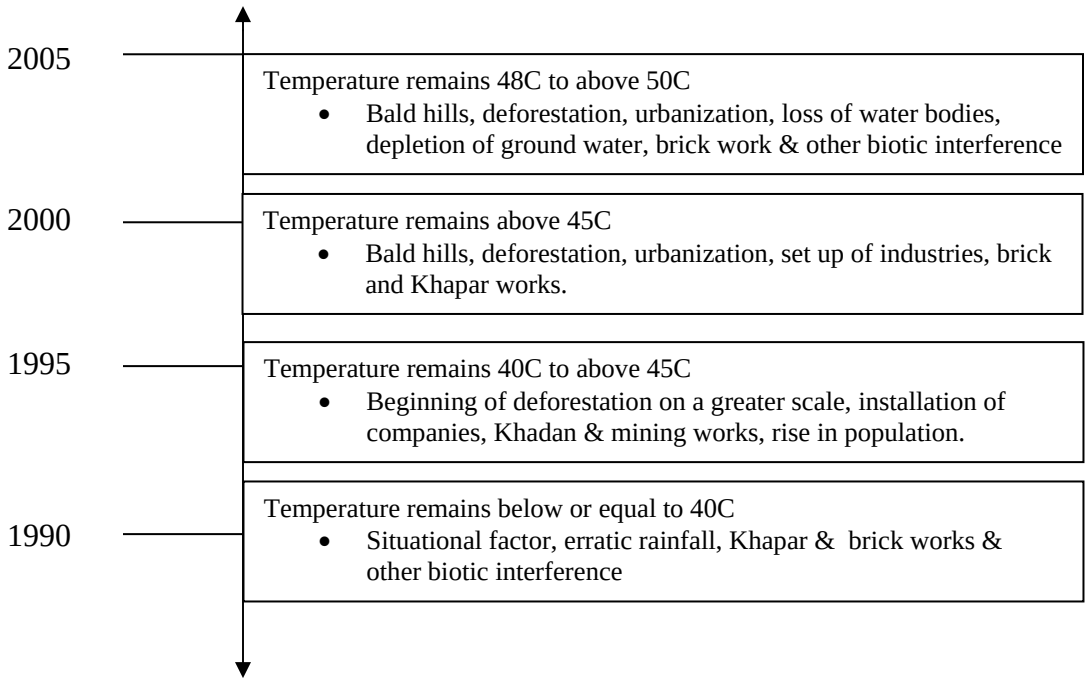
Urbanisation: The urban areas are constantly increasing in Titlagarh. Currently, the NAC area is about 10.36 sq km. The population is also rising. For their fuel wood need and water need, trees are cut down and new borings are coming up. These things are neither recorded nor are seen in accordance with the area feasibility. The rich people have their borings and this work have a constant pressure on the ground water. In urban areas, the Bharuas/Nariyans supply water to the hotels and restaurants from the tube wells. Private households are also taking water directly or by Bharuas/Nariyans. There are long queues near the tube wells and stand posts. People are waiting long hours to collect water. Women are not seen around the tube wells or stand posts as the cultural prohibitions exist. The unauthorized connections are the maximum in the town area according to the Asst. Engineer PHED.

Loss of Forest coverage: The Forest coverage area during the year 1990 was about 185 sq kms. But within the last 15 years it has been reduced to 135 sq kms. Therefore we can say that the forest coverage is dwindling very fast. According to the forest department, cutting of forests by local people, thieves, fire in the forest, industries requirements, special projects etc are the reasons of forest depletion. The forest dwellers are Kondh, Domba, Sabar tribes. Forest agricultural activities are their main occupation. But, the tribes in desperate situation and in need collect fuel wood. But, the loss of forest coverage due to industrialization, urbanization, infrastructural development activities etc are responsible in a bigger way for the increase in atmospheric temperature.

Lack of people's sensitivity: Peoples are not sensitive to heat wave issue. There is a citizen's committee but it is not functioning properly. The committee had got a sum of Rupees two crore thirteen lakh to utilize for the prevention of heat wave and to facilitate drinking water provisions. But, its utilization has not yet done due to lack of coordination among the members. People's role seems passive because no work is done on behalf of the communities.

Brick layers and Potters: By an observation, one can see a lot of bricks construction works are going on the periphery of Titlagarh town. These works are intensely done during the summer season. Heavy dependency on fuel wood and less on coal is operationalised as the coal is dearer to wood. Similarly, the potters are preparing "Khapara" at a massive scale to provide pre-monsoon market need. The heat and smokes emitted by the *"bhatis"* are adding to the heat wave situation and it is adversely affecting the environment.

We can represent the climatic change event through a **time line** showing the events responsible for heat wave as well as drinking water scarcity.



District Administration's steps to combat drinking water scarcity and heat wave:

The state Government and the district administration are taking up a number of steps to combat the heat wave menace. These are as follows:

- Everyday the temperature is recorded and reported to the emergency section of the district administration.
- The collector convenes the SDCC meeting prior to the summer and directs the RWSS, PHED, NAC and OWSSB to look after the drinking water supply facilities and to repair the defunct tube wells from the CRF. Renovation of wells, water supply through tanker to the scarcity areas are facilitated on a regular basis by the appropriate authorities.
- The WESCO authorities are requested to provide power supply with appropriate voltage so that no problem will be confronted with regard to water supply.
- Afforestation will be done around 20km radius of Titlagarh within 2006 A.D through the utilization of RLTAP Fund. The implementing agencies are forest department, Government of Orissa.

The Principal Chief Conservator of Forests is going to launch a pilot scheme for raising plantations in Titlagarh sub-division to control heat wave vide his letter no. /7F (misc) AQ.303/2004. The project period is Ten years but the first phase approval time frame is for three years. After an assessment, the project may be extended for another four years. The major work will be to make the Kumuda hills and the near by area green.

The basic objectives of the project are as follows:

- Checking forest degradation and loss of bio-diversity.
- Ecological restoration and environment conservation and ecological development.
- Fulfillment of Broader objectives of productivity, sustainability for general people.

The immediate objectives of the project are to increase vegetative cover all around Titlagarh and to improve the climatic condition through better distribution and moderation of temperature. Besides, the project shall strive to achieve employment and awareness generation among the people.

The scheme area covers 287.58 ha area under plantation and 148 kms under avenue plantation. The total cost of the project is 200.83 lakh. Western Orissa Development Council has provided the fund to take up massive plantation in the bald Kumuda hills and the surroundings. The plantation will be carried out in reserve forest, protected forest, demarcated protected forest, dunguri, pahad, pather chattans, gocher land, river banks, roadside areas, and revenue lands like anabadi, abadajogya anabadi etc, and any other suitable land.

The major activities within the project are as follows:

- High density plantation over 200 ha.
- Barren hill & Chattan plantation in 37.85 acres
- Avenue plantation in 148 kms(222ha)
- Institutional plantation over 2 ha.
- Farm forestry (distribution of 4 lakh seedlings)

PHED Role: The subdivision office started functioning at Titlagarh during August 2000 being separated from RWSS. The Asst.Engineer said that every year water supply through tanker is a regular event in the sub-division during April and June. But, from 2006 on wards, there will be no such tanker water supply because a new water supply project is now going on. The project is undertaken keeping the water demand of 2016 in mind. The project construction work is undertaken by OWSSB and the project cost is Rs 3, 60, 000, 00/-.

- Titlagarh current population --- 32,500
- Water demand ---- 2.27 mld
- Water Supplied ---- 0.6 mld
- House connections ---- NIL (Govt connection-5)
- Stand posts ---- 87
- Current water cess ---- Rs 64/-(in Kantabanji NAC)

- Duration of water supply ---- 1½ hours in day time and 45 minutes in evening time.
- Tube wells ---- 168
- Tankers ---- 2 numbers of 10,000 litres, seven numbers of 5000 litres.
- Source ---- 5 Open wells and 4 Production wells

According to the Asst.Engineer, the water demand will be 6mld by 2016. Hence, the department, as per plan, shall have 2 MLD water reserve. The tank which is under construction has the capacity of 2, 50,000 liter. The sump at Desil has the capacity to store I7, 00,000 liter. Therefore, the reserve comes around 1.95mld. Now the project is operationalised from 23rd April 2005 and the Chief Minister inaugurated the project. But, the project is not working with its full capacity now. The pipe laying and other small works are yet to be completed. Through the existing pipe lines the water supply was not possible and therefore, another 2 crore rupees will be provided within one year to take up pipe line laying activity. Pipe line connections to the three *Padas* are going on. Now, the department has advertised for new household connection. The minimum requirements for the connections are as follows:

- Xerox copy of latest holding tax paid to Municipality
- Plan of existing house (3 copies)
- Road cutting permission from Municipality, PWD, N.H. etc.
- No objection certificate from NAC.
- Feasibility report from JE.

Answering to the question, the engineer said that the tankers get water from the wells that are located in the paddy fields. The individuals are requested and the tankers are filled up. The water is supplied to the NAC people. The train water supply is not fit for drinking as it gives kerosene or diesel smell. Most of the people depend upon the small dug wells situated in the paddy fields and it is effective to this condition. The traditional system of water supply is conducive to the water crisis situation.

The operational problems exist. Currently, NAC is giving Rs 5,800/- per annum and the revenue collection from Kantabanji area is very negligible. But, the WESCO is charging at commercial rate to the PHED. The unauthorized connections are more and the department has no staff to monitor and take action against the culprits.

SN	**Year**	**Temperature**	**Rainfall**
1	2000	48.8˚C	1123mm
2	2001	49.6˚C	921mm(drought year)

3	2002	49.6˚C	1200mm
4	2003	50.1˚C	987mm(drought year)
5	2004	44.6˚C	1221mm

Source: Office of the Sub-Collector, Titlagarh.

NAC Role: There are 15 wards in the NAC. There are three wards which are water scarce in nature. The Blockpada, Silvatapada, Hatapada wards need door delivery of water during the summer. NAC has one tanker of 5000liter capacity. Drinking water supply at various public places is done by NAC during the summer. According to the NAC Chairman, the NAC has no such funds for water provisioning. The amount of 8% of the total holding tax is given to the PHED and it is looking after the water needs of the urban people.

NGO Role: Watershed activities, community forestry and awareness generation Programmes are undertaken. Water delivery works at various *chhacks* are done by some organizations. There are 12 watershed projects in Titlagarh and these are implemented by NGOs through assistance from watershed mission and other agencies. Un-fortunately, all the watersheds dried up during the summer as the proper technology is not maintained.

RWSS Role: According to the Asst. Engineer RWSS, there are 131 inhabited villages in the block. The villages are all covered with sources. As per the norm, they have supplied 645 tube wells to 90,000 populations. There is no such NC village as per the report.

But, according to the people and our observation, people are using open well water. The farmers dug wells in the paddy fields and it fulfils the drinking water need as well as the vegetative need. Bijepur, Jagua, Singhala, Sagadghati, Khunti, Malguntha, Lutarbandha are not covered villages and people are using river water or Chua water for their drinking purposes.

- Tube wells are not successful due to hard rock.
- No ground water level and this leads to dysfunction of the tube wells.
- SEM system seems to be not working. The operation and maintenance system is not working properly.
- Iron problem in water exists in most of the cases.
- Maximum dependency on specific tube wells make it busy and breaking prone.
- Staff shortage and spare parts availability problem exists.
- Lack of cooperation from the public.

Gender in water: Gender stereotypes in water are not seen in collecting water. Generally males collect water through plastic containers and tin containers. Since the sources are little distant from the houses and one has to stand in queue the

females will be in a difficult situation in collecting water. Social restrictions on women are more. The town is dominated by *Maruadies* and *Gujuraties*. Even the Oriya households also do not allow women to go outside for water. Lower income group women are seen in collecting water as they have no alternative. Here the labour is cheap. People engage Nariyans for water. For household supply one Nariyan gets two rupees for one pair of water bucket. But for shop delivery, they are getting four rupees. Thus, the Nariyans are able to earn 50/- to 100/- per day. Caste feeling is more. Every one can not be a Nariyan. He/she must be of such caste group who can be allowed to provide water as per the social law.

Lack of Political force: According to Mr. Sachikanta Das of Hatapadapada, there is a lack of leadership in Bolangir. The development process is neglected. There is no lack of funds but there is lack of willpower. All most all the blocks are dominated by 2nd cadre leaders those who have no developmental thinking. They need guidance and understandings. In this context he sighted many instances of Titlagarh, Muribahal and Kantabanji etc.

Conclusion: Summer can not seem to wait for its scheduled arrival if the weather in Balangir is any indication. With mercury already touching 40˚C in Titlagarh, the residents are in for a long drawn period of scorching heat. Adding to the woes is the acute water scarcity in the region, out of 645, nearly 245 tube wells in the Block has either gone dry or become defunct. The concerned department neither has the resources nor the required spare parts to repair these tube wells, which are the prime source of drinking water in the block. More tube wells are likely to go dry as the heat intensifies. According to the R.W.S.S of Titlagarh sub section; there are 645 tube wells in the block. Out of 645 tube wells, 250 tube wells were found defunct in the last summer. Though 40% of these tube wells were repaired under the R.W.S.S last year, still the water crisis was acute and tanker water supply was in operation for a period of two months. According to Exe-Eng. of Bolangir (R.W.S.S Division) 428 tube wells were sunk during the year 2004-05 fiscal years in the district. According to executive engineer of Bolangir all tube wells would be provided with hand pumps very soon. What the department, however is want of resources and spare parts. Nearly 5000 tube wells had to be repaired last summer in the district. The department gets the required spare parts from the chief engineer's office in Bhubaneswar every year. But this year, the department is yet to get the spare parts and if it is not provided soon, then repair works of the defunct tube wells cannot be taken up. Under the Koraput-Bolangir-Kalahandi (KBK) Long Term Action plan (LTAP), a project was initiated to provide one tube well for every 250 people. This was followed by another scheme last year which provides one tube well for every 150 population. By this calculation, the district needs another 1337 tube wells to meet the demands of the people. Apart from the tube wells, 41 projects under the rural

pipe water supply scheme have also been taken up, which would benefit the inhabitants of 49 villages. About 13 more such projects are also underway.

Water Crisis of Berhampore township:

Supply of drinking water to about 4 lakh people of Brahmapur town, has been a subject of debate, for the last one decade. To be clear and latest on the issue, there is no denying that any think worth the name has been attempted, not to say done. The water supply to Brahmapur town started in 1905, for a population of 30,000 at the rate of 20 gallons per capita per day. Use of water is an yard stick of how developed a society is. The population of the town stands at 4 lakhs today. Although the norm of water supply still stands at 100 litres per-capita per day after one hundred years as claimed by the authorities, that much water is no where within the reach of the citizens. The present position of water availability is as follows.

Source	Capacity of Source	Present supply	Daily delivered
Rushikulya Project (1983)	9 MGD	2.4 MGD (12 MLD)	13 MGD
Dakhinapur		3.3 MGD (15 MLD)	
Bore Wells 27 nos.		1.32 MGD (5 MLD)	
Total		7.02 MGD (32 MLD)	

Apart from one above there are about 859 hand pump tube-wells supplying about 0.5 MGD of drinking water. The supplied water through the distribution system reaches to 13500 households as house connections and public supply through 1705 stand posts. Many a times, the unavailability of water is attributed to the drying up of the major drainages like Rushikulya river; which is of no mean importance to Ganjam district in general and Brahmapur town in particular.

Some important facts and figures given by the Water Resurces Deptt. (The Samaj 1/12/1997) on the Rushikulya basin, are worth considering.

- Area of watershed : 8900 sq. kms.
- Lenghth of the river : 120 kms.
- Rainfall : 1056 mm.
- Utilisation : 350 mm.
- Surface flow : 3,11,500 Hect Metre (1.6%)
- For Irrigation : 1,11,030 Hect. Metre (35.7%)
- Excess flow to sea : 1,95,470 Hect. Metre (62.7%)

N.B. : The present requirement of water for Brahmapur town is 33 MLD or 3.3 Hect. Metre (1 Hect. Metre = 10,000,000 litres)

The excess flow of water to sea in the Rushikulya river is far in excess to that needed for Brahmapur town. Literally speaking it a fraction of it is trapped near to the mouth of the river, that would be far more in excess to the need of Brahmapur town for coming decades, without any adverse impact on the ecology and environment.

Urban-water crisis:

Urban development department in India is presently going a very dynamic stage. At present India have 285 million urban populations in 5161 towns (as per 2001 census). Of the urban population in many in many cities, some citizens alone reside in the slums and squatter settlements, but in the capital city of Orissa 30% of the population stay in slums. Slums are as real as urban communities. They are constructed as by products of cities. The slums as universal phenomena are characterized by poverty, mal-nutrition, illiteracy, unemployment, unhygienic living, low income and such other maladies that account for sub human living. In slums, huts are enacted in a haphazard manner without proper access. In Indian context, slums have various names such as jhuggi, Jhompari, patis, bastee etc. Industrialization and consequent migration of rural masses to urban area is the major causes of slum. Minimum basic services are lacking in these areas. In some slums protected water supply and drainage management do not exist in these area

Pot ability of water in slums is an identified need of the country. Creation of Rajiv Gandhi National Drinking Water Mission reflects the resolve of the Union Govt. to effectively deal with the current situation with a view to provide potable water to Indian population. As well known, drinking water in most of the slum areas is drawn from different diverse sources like wells, municipal taps, and at some places from India Mark II hand pumps. Obviously, the maintenance of water quality in slums is the most challenging task. As such, the slum population constitutes the most vulnerable section to the water borne infections and diseases due to inherent pollutants. The repeated out break of cholera & other gastro epidemics, especially in the spring may be solely attributed to the wide spread contamination of the water bodies. The stupendous task of mobilizing huge financial resources to mitigate the cost involved in reorganizing the haphazard, unplanned population growth & the resultant development of the shelter devoid of basic human necessity further compound the civic problems..

Due to faulty planning and rapid growth of town with multifarious urban activities the city of Bhubaneswarhas had undergone a lot of problems like slums and squatters. It is observed in a survey in 1982 that there were only 15 major

slums in the city having 4,182 households with a population of 18,961. But at present there are more than 190 slums with a population of 190710. The slums are along the railway line and low laying area of the city. These slums are mainly occupying Govt vacant land. There are various types of slums in Bhubaneswar – authorized, unauthorized, old and new, settled and resettlement colonies. Bhubaneswar Municipal Corporation is working in all 190 slums of Bhubaneswar consisting of 59 authorized and 131 unauthorized slums. The Swarna Jayanti Shahani Rozgar Yojana is operating in the slums since 1997-98 where all the urban poverty all aviation programmes have been dovetailed. **Annexure-1**

SHANIPALLI BASTI:

Sahantipalli is a registered Basti, which is situated by the side of Saheed Nagar level crossing. The Basti is twenty years old and about 750 households reside there. The Basti is coming under 20 number council and Ms.Urmila Dash is the present councillor. Almost every category of people there. But a community feeling exist among them. About 5000 people live in four different wards.

During 1985, there was only one ward. About 150 households were settled. They collected Rs10/- each and dug a well. The area is a low land. Even now during the month of May people use only four feet rope to draw water from the well. The water quality is good. At the beginning, the entire ward use water from that well. Now, there ar about twenty individual wells in the Basti. Well water was used for all purposes. But now, people are using the well water for some specific purposes.

During 1995, RWSS dug four tube wells to provide drinking water to the Basti. By this time, the Basti size was bigger and it was divided into two wards. The water was good and tasty. But, now people are no more using the tube well water. The tube well surrounding sanitation is very bad. Water is deposited at the root of the tube well. The base is dirty and muddy. Due to rough use, two tube wells are defunct. Other two tube wells are working. But, if we keep the tube well water for one night, the next day, the watercolour turns slight red and the container also have some reddish colour. So, people are no more using it for drinking purposes and hence, they are not taking care of the existing tube wells. In this Basti the tube well water is loaded with high percentage of iron. Using water for drinking purposes will be inviting trouble.

According to the area people, just after Super cyclone of 1999, the PHED supplied Pipe water to the Basti. So, tube wells are subjected to limited use and people are not looking after them properly. Its maintenance was not done and hence now for a bucket of water, one has to pump 30 times. The tube wells need oiling and rust clearance. Cracking sounds are coming out while pumping them.

The PHED has sanctioned only two stand posts which was not sufficient for the community whose size was about 750 households. So, constant demand was for extra stand posts given to the concerned department. Besides, people used to bathe, wash motorcycles, cycles, wash the dresses& dishes etc near the stand post. During the peak hours of use (8am to10am) people are in line to take water. This leads to quarrel, tension and criminal cases. So, the community leaders decided to leave the decision to women. There is a women organisation, which is named as 'Shantipalli Mahila Sang than'. About 25 women are its members. they strictly prohibited the use of water for bathing, washing, and vehicle cleaning etc. They have decided to fine up to Rs 501/- in case of violation of the above decision. Male members respect the decision and a written board is hung there with the declaration. In case of the second stand post; there is still chaotic situation in water collection. Very often quarrels are taking place.

Recently, during the 14th parliamentary and state legislative election, one stand post was created. Construction work was not yet completed. But, people are taking water from the same. Twenty-four hours water supply was made to the Basti. People are using pipe water for drinking and cooking.

In case of disruption of pipe water supply people again resort to tube well water. But, they confront problem because they have not kept it in useable condition. So, the Sang than women said that if Govt provide more facility, people start misusing them. We have seen everything in connection to water. From dug well to pipe water use is very comfortable but people should realise the things in proper way.

The community people demanded one more stand post. They intimated the thing to the councillor and MLA. But according to the norm, no stand post is required because they have to travel only 300 metres distance to fetch water. During the interaction they expressed that the only vital issue is non-availability of land pata.. They have the voting right, ration card, and all the assurance from the political people and Govt officials. But in spite of 20 years of settlement, they do not have the land ownership.

NILADRI VIHAR BASTI:

It is a Authorised Basti. The residents of Sahid Nagar and few people of Sastri nagar , satya nagar have been rehabilitated in Niladri Vihar. It is a authorized or a registered basti, which is situated at the end of the Niladri vihar area. The Basti is 5-6 years old. And it is divided into different names like—Panda park, (KA), Panda park (KHA), omfed colony, Hare Krishna colony, Science Park, Sitanath nagar. This basti is coming under Niladri vihar ward no 2. And Mrs. Nirupama

Jena is the present councilor. Almost every category like Rickshaw puller, Mechanics, Mate servant, Electrician are reside there. These people are from different caste but community feelings exist among them.

Safe and potable drinking water supply is the basic need in any area. The source of drinking water in this basti is Bore wells. During 1998, Municipality dug 2 borewells to provide drinking water to the basti.

(a) Panda park basti (KA) In panda park basti the household no is 300. And the total population is 1800. One tube well is present in this area. But it is in defunct condition. There is no P.H.D connection in this area. All most all people depend upon the bore wells. The Municipality has sanctioned 12 stands posts in this Panda park basti. People used to bath, wash etc near the stand post. The duration of water supply is 4 hours. During this time women are in line to take water. Some times they quarrel for water .In a day 2 times water supply is available which is not sufficient. In this Basti 2 stand post is available in each line. But water quality is good. During rainy season , few particles are present in water. Water born diseases are not found. The diseases are mainly for sanitation. Sewerage facility is not present in this area.

(b) Panda park (KHA): The household no is 150. The population is 700 or more. Water problem is acute. The duration of water supply is 1 and ½ hours. In a day one time water supply is available. So it is not possible for women to collect water in a few time span. The stand post no is 9. In this basti one un-authorized connection is present. One of the major problems in this basti is the geographical location. It is a up and down area. So the pressure of water is very low.

(c) Harekrushna basti: The household no is 200. The population is 800. This basti is neareaer to the municipality bore well. So water problem is not acute. Total no of stand post is 18. In each line 3 stand posts is available. The duration of water supply is 4 hours. The water quality is same as Panda park (Ka).

(d) Omfed colony: The household no is 45. The population is 200. It is the most water crisis colony in this basti. The stand post no is 1. The duration of water supply is 1hour in a day. so it is not possible for the people of the basti to collect sufficient water . Some times they walk to another basti to collect few backet of water for drinking water purposes. Same situation in Sitanath Basti, because the area is up and down.

In all these basti the stand post surrounding sanitation is very bad. The operator Mr Gurucharan dhal said these two bore wells are 380 feet and 140 feet deep. He also said that some time the basti people forced him to operate 3-4 times a day, which is

not possible. As regards the sanitation a facility is concerned, sanitary latrines facilities are not available for these 5 basti. The resident of households without latrines uses the surrounding open fields for the purpose of defection and as a result the entire area becomes unhealthy.

During summer, when the water is a acute problem, Bhubaneswar Municipality does not provide any water tanker facility to these basti.

TRINATH BASTI: it is a registered basti, which is situated nearer to O.U.A.T farm. The basti is 25 years old. The household no is 540 and the total population is 2500. The basti is situated in ward no-34 and the councilor name is Mr. Dhira Behera. In these basti most of the people engaged in self employed category as domestic servants, rickshaw puller, tempo driver, plumber, fitters. In this basti one municipality boring is available. Besides this four wells and three tube wells are also there. Out of those three tube wells, two are defunct. The only running tube well is not able to suffice the water to the entire basti. Even for bucket full water, one has to pump 30 times. In the other side, the municipality boring is time bound. So naturally people are dependent upon the open wells. Though the taste of the water of those sources are quite good, but due to extremely poor sanitation condition water quality is in a dangerous condition, which causing the water born diseases like jaundice, gastro endemic diseases, malaria, dysentery ets. The slum has no latrines and so every morning the slum dwellers troop-off into the dense green bushes of aerodrum areas to relief themselves. This is not a pleasant experience. In summer, water level went down. During the month of may people use thirty feet rope to draw water from the well. Well water was used for all purposes.

PAIKANAGAR BASTI: it is a unregistered basti, which is nearer to Fire station. The basti is 15 years old. The household no is 60 and the total population is 500. The councilor name is Mr Gudre swain. In these Basti most of the people are Laborers, carpenters, Painter etc. In this basti six wells are there. Besides this one-municipality tube wells is available. They used tube well water for bathing, washing,etc. A serious lack of rainwater drainage makes the conditions of the localities filthy, muddy and hazardous in terms of health. The basti is located at lower slopes. So it is water logged for long time and this leads to high incidence of mosquito breeding. The well water is good and tasty. In this basti the tube well water is loaded with high percentage of iron. Using tube well water for drinking purposes will be inviting trouble.

So at last the important thing is that the basic infrastructure facilities should be provided in these basti. Water supply system should be important. Potable water should be provided through P.H.D pipelines. A community pond should be in a basti with active participation of the slum dwellers. Along with water supply, sanitary system is also imp.

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CHAPTER – V

DRINKING WATER GOVERNANCE

Role of Panchaytiraj Institutions

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DRINKING WATER GOVERNANCE

Role of Panchaytiraj Institutions

Different schemes, different roles for the Panchayat

Water is a state subject. Adequate amount of safe drinking water provisioning should be done by the state as water is coming under basic necessity for life. Article 21 of the Indian Constitution has categorically stated that safe drinking water is a fundamental right of all the citizens. Keeping the scarcity of drinking water in mind, the 2003 water policy speaks about water conservation at the individual and community level. On the other hand, the 73rd constitutional amendment empowers the GP to deal with drinking water and sanitation in effective manner. Water supply and sanitation schemes form an important part of the civic responsibilities of the Grama Panchayat. The maintenance of health and hygiene is also the responsibility of the Grama Panchayat as can be evidenced from several sections of the law. Under these circumstances, water supply and sanitation should be as far as possible, the responsibility of the Grama Panchayat.

Drinking water and sanitation (Swajaldhara, ARWSP, Piped water supply, mini water supply, bore wells, CRSP, Watershed / Hariyalli, MIP)

Subject to the provisions of the constitution, the legislature of a state may, by law, endow the Panchayats with such powers and authority as may be necessary to enable them to function as institutions of self government and such law may contain provisions for the devolution of powers and responsibilities on Panchayats at the appropriate level, subject to such conditions as may be specified there in, with respect to-

The preparation of plans for economic development and social justice;

The implementation of schemes for economic development and social justice as may be entrusted to them including those in relation to the matters listed in the eleventh schedule. (Article-243G)

Besides **drinking water and sanitation**, the Panchayat has the obligatory role with regard to **Minor irrigation, water management and watershed development.**

This logical separation of water supply schemes has been on the basis of piped water supply; mini-water supply and individual bore wells. A convergence of this nature would help in better management and greater flexibility in operation of at the local level of specific purpose grants for drinking water supply. In the

case of sanitation schemes too, there is a case for re-organisation of schemes. A glaring example of decentralization not being adhered to by the Rural Development Department is the Nirmal Gram/Panchayat Yojana, which is still part of the State Sector Plan. This ought to be transferred to the District sector and implemented wholly at the Grama Panchayat level.

ACCELERATED RURAL WATER SUPPLY PROGRAMME (ARWSP)

Under ARWSP, the Central Government is to supplement the efforts of the State Governments in providing access to safe drinking water to all rural habitations of the country.

The role of PRIs in Orissa:

Panchayati Raj Institutions should be involved in the implementation of schemes particularly in selecting the location of stand post, spot sources, operation and maintenance, fixing of cess/water tariff, etc.

The implementation of the Sector Reform Projects in the identified pilot districts, are also to be carried out either by the District Panchayats or through the District Water and Sanitation Missions (DWSM), which are to be registered societies under the supervision, control and guidance of District Panchayat.

Wherever PRIs are themselves firmly in place and willing to take up the responsibility and are strong enough to do so, they implement the projects themselves instead of DWSM.

At the village level, the individual Rural Water Supply Schemes are to be implemented through Village Water and Sanitation Committees, which should be committees of Gram Panchayats.

Drinking water supply assets are transferred to the appropriate level of Panchayats and such Panchayats are to be empowered to undertake operation and maintenance of drinking water systems.

So far as two tier maintenance system and the role of the Panchayat in it is concerned, the Sarapancha has to select and appoint such number of persons as Self Employed Mechanics basing upon the number of tube wells, operational area and type of terrain. She/he is a community member and has been assigned the duty to look after a fixed number of tube wells within the GP. The Sarapancha appoints the SEM and the training is imparted by RWSS. Two rounds of training (both on-the-job & off-the-job) extends to 15 days of duration are given to each SEM before induction programme starts. The SEM is attached to the Sarapancha, RWSS, and even to the community for facilitating the water supply system in the assigned area. The job of a SEM is as follows:

- To visit the tube wells twice a month.
- To see the functionality of the tube wells, tighten the nuts & bolts, grease the chains etc.

- To collect the tube well related information from GP office, maintain the complain register; repair the tube well, collection of signature from the user group.
- To attain the monthly meeting in RWSS office.
- To encourage people to form the Watsan committees in every village and have close liasioning with the local people.
- To look after sanitation near the tube well and aware the people regarding the tube well use.
- To mobilise local assistance for quick operation & maintenance of the tube wells.
- To disseminate the scheme related information received from the RWSS and GP office.

RWSS is providing 15 rupees towards each tube well and for cycle repairing. Sometimes the SEM is assisted by co-SEM, crewmembers, JE in case of high skilled work involvements. So, the overall duty of a SEM is to mobilise the local support and initiative on the one hand and the support of RWSS and GP on the other.

After Sector Reform in RWSS, the recent developments with respect to operation and maintenance is that the operation and maintenance cost will be borne by the community or the user group. In the NC villages, the department will install tube wells free of cost. But, in fully/partial-covered villages, if the community demands for additional tube well, the community has to pay 10% of the total cost or Rs5000/- whichever is less. Again the community has to bear all the operation and maintenance cost and this will be collected from the users.

The Implementing Agencies for the ARWSP are RWSS, RD, PR Department, WATSAN Board, Corporation etc. The PRIs should also be involved in the implementation of schemes, particularly in selecting the location of stand post, spot sources, operation and maintenance, fixing of cess or water tariff etc.

The ARWSP was launched in 1972-73 and continued up to 73-74 with 100% grant-in-aid from Government of India. During 5th Five-year plan Government introduced another Programme called MNP and stopped ARWSP. But, things went wrong and it was not satisfying as per the Programme objective. Hence ARWSP was reintroduced in 1977-78.

Govt. of India set up 'Sudersan Committee' to investigate the management problems in RNDWM. The committee has recommended 'community participation' to streamline the management problems in it and come out with 'sector reform projects'. The approaches are:-

1. Demand driven approach instead of supply driven
2. Participatory approach
3. Maximum empowerment of villagers in decision making

4. Sustainability of investment
5. Coordination between project components
6. Autonomy
7. Qualified staff and good incentive structure
8. Gender balance
9. Good mix of private sector professionals, NGOs etc.

There is an apex committee at the state level and an executive committee at the district level. In order to demonstrate implementation of community based rural water supply Programme in the pilot districts with a view to encourage PRI to take up similar initiatives in other districts in conformity with the principles envisaged in the 73rd amendment of the constitution, the state Govt has developed the institutions at various levels.

Village Water & Sanitation Committes (VWSC)

Sector Reform Projects has attributed importance to village level participation in the following manner.

1. To be set up after the demand for any particular water supply scheme is generated as per the sector reforms concept explained above.
2. To be set up in each GP for implementation of water supply scheme of their own choice with active participation of the villagers. In case the scheme covers more than one GP, involving representatives from all concerned Panchayats may constitute such committee.
3. The membership of a VWSC may consist of 6 to 12 persons, comprising members of Panchayat. Women, SC/STs and poor sections of the village may be given due representation in VWSC.
4. The committee shall function as a committee on water and sanitation of the Gram Panchayat. In case a scheme encompasses more than one GP, a similar committee may be constituted under the Block level. These Committees should be an integral part of the village Panchayat/ block for which, if necessary, appropriate amendments in the state PR Act / Rules /By-laws may be made.
5. The composition and functions of the VWSCs can be regulated by a set of by-laws under the state Panchayatiraj acts.
6. Till such time as states make suitable amendments in accordance with the above for composition and functions of VWSCs, suitable Govt. orders to that effect may be issued.

Role of VWSC.

VWSC may take up following roles:

- Ensuring community participation (cash and kind)
- Community decision making (Grama sabha meeting)
- Management of bank accounts.
- Planning water and sanitation activities
- Procuring construction materials
- Supervision and signing off on all completed works
- Hygiene awareness and O&M of WATSAN works.
- Empowerment of women
- Participation in HRD and IEC activities.

CENTRAL RURAL SANITATION PROGRAMME (CRSP)

This Programme aims at improving the general quality of life in rural areas; accelerating coverage in rural areas; generating demand through awareness creation and health education; and controlling incidence of water sanitation related diseases.

The role of PRIs in implementation if this scheme is: -

Total Sanitation Campaign (TSC) is a community based Programme where Panchayati Raj Institutions are in the forefront.

As per TSC Guidelines, the implementation at the district level is to be done by the District Panchayats. Panchayats at block and village level are to be fully involved for implementation of the Programme.

Where District Panchayat is not in a position to implement the Programme, it is being implemented by District Water & Sanitation Mission, which is chaired by Chairperson of District Panchayat, and the Village Committees are chaired by the Chairpersons of Gram Panchayats. In the later case, the Village Water & Sanitation committee is part of the GP.

SWAJALDHARA

This Programme aims at providing Community-based Rural Drinking Water Supply. The key elements of these Programmes are namely, (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 by the users/ Panchayats.

The role of PRI in implementation of Swajaldhara scheme is: -

Gramapanchayat is the lowest unit for implementation of Swajaladhara. In some cases more than one GP can be combined together to prepare a plan for Swajaldhara.

Gramapanchayat is the implementing agency of the Swajaldhara programme at the village level. For successful implementation of the programme, it should get the responsibility, funds and personnel.

In case of drinking water problematic GPs, the GP can play the role of sensitizing the people for generating a demand to have Swajaldhara project in their GP for the solution of drinking water problem.

Gram Panchayat shall convene a Gram Sabha Meeting where the Drinking Water Supply Scheme of People's choice including design and cost etc. must be finalized. Gram Panchayats are to undertake procurement of materials/services for execution of schemes and supervise the scheme execution. GP or the VWSC will monitor the Swajaldhara programme during the implementation period.

A resolution must be passed in the Gram Panchayat meeting calling for users/beneficiaries to contribute 10% of the capital expenditure. However, GP can remit towards community contribution from its tax revenue (Not from Government Grants) with the approval of Gram Sabha.

Gram Panchayat will decide whether the Panchayat wants to execute Scheme on its own or wants the State Government Agency to undertake the execution.

After completion of such schemes, the Gram Panchayat will take over the schemes for operationalisation and sustainable use.

Panchayat must decide on the user charges from the community so that adequate funds available with Panchayat to undertake O&M.

Pradhanmantri Gramodaya Yojana:

In the year 2000-01, the Government of India launched PMGY with the objective of achieving sustainable human development at the village level. It ENVISAGED Additional Central Assistance to complement the resources of the state to further focus on six selected basic services including safe drinking water.

With respect to drinking water supply sector, the selected activities for investment funds were: water conservation, water harvesting, water recharge, tackling water quality and coverage of NC and PC habitations. It was implemented up to 2004-05 but in 2005-06, no provisions have been made under PMGY.

Out of total Government outlay, 25% will be spent on water conservation, water harvesting, water recharging and for maintenance of the existing water sources in DDP and DPAP areas. The other 75% will be spent on the solution of water quality issues as well as to cover the NC and PC villages with safe drinking water.

The projects under PMGY, Rural Drinking Water should be implemented by involving Panchayats / local communities.

Water Management: It is the role of the GP to maintain water systems, facilities and assets. This is for the consumption purposes as well as for the other purposes. The need here is that there should be a prior assessment of the water requirement of the GP. In order to meet the same, there should be structures to keep that amount of water. This requires that the GP should maintain water harvesting structures and recharge structures both new and traditional.

Others: Jalachhatra provision was an old system. But, this was again re-introduced from the year 1999 by the district administration following heat wave effect and deaths. Now, this programme is going on for a period of three months starting from 1st April every year. After DLCC meeting every year, the district collectors asked all the departments and the GPs to check the water provisioning properly. This is a temporary arrangement but the GP should look after the permanent solution of the issue.

Linkages among the GPs, Blocks and RWSS, Water Resources Department:
The GP and Block are coming under PRI department and RWSS is under R.D. Department. There is practically no linkage among the three departments. Each department has its own vision, mission, objectives and way of working. But at the grass root level, each department is linking its programme with the GP or with a GP level committee. For example, water and sanitation committee, watershed development committee, farmers committee, water users association etc.

The Junior Engineers of each department have to interact with the GP functionaries prior to initiate any work in the village. Before grounding any developmental work in the village level, the concern departments interact with each other.

The Block Development Officer is the correlating officer among all the departments work. So, there is no overlapping of the work and wastage of Government resources.

ROLE OF URBAN LOCAL BODIES (ULB) IN WATER SUPPLY

'Right to life under article 21 includes the right to enjoyment of pollution free water.'

Who are urban local bodies?
Urban Local Bodies are the Corporations, Municipalities and Notified Area Councils. These divisions are done in accordance with the population capacity of the units. These urban local bodies are institutions of self-government

constituted under article 243Q. They collect holding taxes from their area of jurisdiction and in return they provide services. Prior to the 74th constitutional amendment, the roles of ULBs are full of ambiguity and uncertainty. But, 74th constitutional amendment in 1992 has provided the constitutional status to the ULBs. The 12th schedule of the Indian Constitution has clearly stated that ULBs have authority over 16 development subjects. Water and sanitation is included within it. The ULBs are responsible to supply water for domestic, industrial and commercial purposes. Besides, the ULBs also have to look after the public health and sanitation, conservancy and solid waste management.

Constitutional mandate:

Article 243W of Indian constitution deals with powers, authority and responsibilities of ULBs. According to this article, the legislature of a state may, by law, endow—

a) The ULBs with such powers and authority as may be necessary to enable them to function as institutions of self government and such law may contain provisions for the devolution of powers and responsibilities upon municipalities, subject to such conditions as may be specified therein, with respect to—
    (i) The preparation of plans for economic development and social justice.
    (ii) The performance of functions and the implementation of schemes as may be entrusted to them including those in relation to the matters listed in the twelfth schedule;
b) The committees with such powers and authority as may be necessary to enable them to carry out the responsibilities conferred upon them including those in relation to the matters listed in the twelfth schedule.

Section 196 of the Orissa Municipal Act states that Municipality shall provide water supply, drainage and lighting. Municipality shall provide a sufficient supply of water for the domestic use of the inhabitants; provide and maintain a sufficient system of drainage and conservancy.

Section197 of O.M Act deals with vesting of works in Municipality. According to this section the municipality has control over all public water courses and springs, all public reservoirs, tanks, cisterns, fountains, wells, standpipes and other water works. The state government may by notification, limit or define such control, or may assume the administration of any public source of water supply and public land, adjacent and appertaining thereto, after consulting the municipality and giving due regard to its objections.

Section 198 of the said act deals with construction and maintenance of water works. The municipality may, with the sanction of the state government, direct the construction of such works, as it deems fit, without the limits of the

municipality for supplying it with water and may provide channels, tanks, reservoirs, cisterns, engines, mains, wells, fountains, stand-pipes and other works as it may deem fit, within the said limits for the use of the inhabitants.

Section 199 deals with trespass on premises connected with water supply and section 200 empowers municipality to prohibit building construction over any water mains. If any building, wall or other structure be so erected, or any road be so constructed, the municipality may cause the same to be removed, or otherwise dealt with, as shall appear to fit it, and the expenses there by incurred shall be paid by the persons offending. According to Section 201, the municipality shall, so far as the funds at its disposal may admit, provide a sufficient supply of water fit for the domestic use of the inhabitants. Section 202 deals with the control over house connections. All house connections, whether within or without the premises to which they belong, with any water supply mains which may have been constructed by a municipality, shall be under the control of the municipality but shall be altered, repaired and kept in proper order at the expense of the owner of the premises to which they belong, or for the use of which they were constructed and in conformity with bye-laws and regulations framed by the municipality in this behalf. Section 203 speaks about private water supply for consumption and domestic use and powers of executive officer to enforce provision of water supply. Private water supply for non-domestic purpose and the power of executive officer regarding it is dealt with section 204. Similarly the municipality has the power to cut off water supply in certain cases, which is specified in section 206.

Section 210 of the Orissa Municipal Act deals with maintenance system of drainage by Municipality. The Municipality shall, so far as the funds at its disposal may admit, provide and maintain a system of public drains.

Different players in Urban Water Supply:

- State Public Health Engineering Department
- Orissa Water Supply & Sewerage Board.
- Urban Local Bodies
- Other agencies like industries, railways, ports etc.

Schemes implemented (1992-2004)

- Accelerated Urban Water Supply Project.

This is a centrally sponsored project with a funding pattern of 50-50 between the centre and the state. Under this programme twenty towns have been technically approved by Government of India and administratively approved by state government. Out of the six schemes have been completed and the rest are under progress. In the 10th five-year plan, an outlay of Rs2155/- lakhs has been

proposed as state share against the central share of Rs2155/- lakhs. The norm of this scheme is 70 lpcd and the schemes will be applicable to the ULBs having 20,000 populations as per 1991 census.

- Urban Pipe Water Supply Schemes.

Improvement and augmentation to the existing and ongoing programmes in urban water supply projects are coming under these schemes.

- Hand Pump Wells

Hand pump wells are sunk where there is no pipe water supply facility.

- Open wells

In case of necessity and in the absence of any other water supply facility the ULB shall dug open well to provide water.

- Urban Sewerage

It is an obligation of the ULBs to take up sewerage works for disposal of the wastes and the sewerage board is also looking in to these activities.

- Urban Pipe Water Supply Schemes. PMGY (New)

To augment water supply sources, system development and construction of treatment plants in different scarcity zones of 23 ULBs coming under KBK districts an outlay of Rs2000/- lakh has been proposed in the 10th plan.

ULB & its role in water provisioning:

a) Pipe Line Water Supply:

Presently ULBs are providing water on demand. In other words, growing urbanisation requires more water for domestic consumption as well as industrial purpose. Orissa water supply and sewerage board is the institution, which creates the project and infrastructure, Construction and technical plan and water supply to the urban areas. After completion of the work the project is handed over to the PHED for operation and maintenance. The basic objective of Orissa Water Supply and Sewerage Board is to construct water storage tanks, to lay pipe lines, create sewerage facilities etc. for each project, Govt of India and Govt of Orissa are providing assistance at the rate of 70:30. In most cases the work could not proceed as per the plan because of funds non-availability in time.

In case of **pipeline water supply**, the No-Objection-Certificate should be obtained on behalf of the ULBs. Secondly, in case of stand post, house connection; industrial connection etc one has to apply the ULB authorities in a prescribed format. The JE in charge shall inspect the sight and calculate the amount for the road cutting and rent etc. and the concerned person is asked to deposit the amount in municipality fund. In case of public stand post, the necessity is assessed by the JE as soon as they received the application from the public through the councilor. Then the JE shall approve it and the estimated amount is deposited by the ULBs in PHED office and the construction work is done by the ULBs. The operation and maintenance work is looked after by the ULB.

b) Sinking of Tube well by PHED through Municipality.

Where there are no pipe water supply arrangements and there is necessity for water supply, the ULB shall convey the matter to the PHED to sink required number of **tube wells**. The PHED shall estimate the total expense and asked the ULB to deposit that amount. The construction work is done by PHED through the ULB. The operation and maintenance work is looked after by the ULB.

c) Open well construction:

The area within the jurisdiction of municipality if not covered by the above kind of facilities shall be covered through the provision of **open well**. The municipal engineer shall estimate the expense and facilitate the entire operation through the municipality. The operation and maintenance work is looked after by the ULB.

d) Water supply through tanker:

The ULBs have **tankers** to provide water in a limited scale during emergency, ceremonies and special functions. In order to provide water the ULBs purchase it from PHED. So, the ULBs demand certain amount to the persons who made a requisition to avail the tanker facility. Presently a tanker full water costs about Rs250/-.

e) Special programmes for emergency:

During 2001-2002 **floods**, 54 ULBs were affected and to restore the damages caused due to flood, it was estimated that Rs1160 lakh needed. Due to fund constraint Rs508.88 was sanctioned and on priority basis the proposals were selected. Most of the works sanctioned proposals have been completed. Rs 308.85 lakh has been released so far taking up the works.

During 2001-02 against **drought**, NCCF grant, 300 numbers of hand pump tube wells were proposed in 32 droughts affected ULBs and 58 heat wave affected ULBs. All the 300 hand pump tube wells are sunk. Under NCCF an amount of Rs 105 lakh has been sanctioned & released.

To explore ground water source in mitigating water scarcity of drought affected ULBs 125 numbers of exploratory bore wells were profised in affected ULBs to be sunk by CGWB and the production wells will be energised and connected to the existing water supply pipe line through PHED being funded against PMNRF grant.

Execution & Coverage:

Execution of water supply systems in the urban sector is done under two programmes. These are State plan & Central plan.

State Plan:

- In case of state plan, the state government bears the full cost of the schemes.
- For ULBs with populations up to 30,000 under Non-tribal sub-plan
- For ULBs with populations up to 60,000 under Tribal sub-plan

- In case of schemes in other ULBs, the state government bears one-third of the cost and the ULBs bear the remaining two-third. Practically none of the ULBs are willing to bear the costs.

Central Plan:

- The government of India has introduced a programme named Accelerated Urban Water Supply Programme (AUWSP) in 1994 for implementation of water supply scheme ULBs with populations up to 20,000 as per 1991 census. The cost of which is shared as 50% grant from the Govt of India and 50% as grant from the state Government including 5% contribution from beneficiary ULB.

Operation& Maintenance:

- The O&M of all water supply and sanitation schemes in the state is done by the PHED and for which the State Government provides funds through the budget. Only part of the cost of operation & maintenance is recovered from the consumers through water tax.

Status of water supply systems:

There are 103 ULBs in the state and all these ULBs are provided with piped drinking water. Some of the ULBs are fully covered, some are partially covered. The summary of the present status is as below:

- Total ULBs in Orissa : 103
- Total population (2001 census) : 51 lakh
- Total stand post required : 20,400
- Total no. of stand post exists : 16,564
- Total quantity of water supplied : 628 MLD
- Average rate of supply : 124Lpcd
- Total no. of house connections : 177247
- Total no. of hand pump tube wells : 13,538
- Planned expenditure for full coverage : 1000 crore

An analysis of the status indicates that out of 103 ULBs, 71 are not fulfilling the norms fixed by the govt of India i.e., 70Lpcd. Out of the 71ULBs, 34 are providing only 40Lpcd or less. 79% of the urban households have access to pipe water supply.

Financial issues:

Water supply in urban areas has its multiplier effect on the state economy. Safe drinking Water has its direct impact on nutrition, health and well being of the people. There is tardy progress of water supply coverage by the government institutions because of the following reasons:

- Obsolete water infrastructure
- Expansion of service due to rapid urbanisation

- High operation & maintenance cost
- Load on public expenditure
- Lack of funds
- Inefficient working of public agencies
- The government public expenditure is going on increasing every year and water supply schemes do not achieve its goal. The water cess is not increasing because politicians do not want it. Hence, the water provisioning is not cost effective. On the other hand govt mobilises public borrowings to meet the high public expenditure. This leads to internal resource mobilisation.

However, the aim is to relieve the pressure on constrained public budgets and to improve efficiency in service delivery. In this context, there is a debate that should we opt for privatisation or a participatory water supply system?

Major issues confronted:

- Shortage of funds
- Lack of coordination among the departments
- Lack of manpower
- Procedural delay
- Political interference
- Lack of public cooperation
- Water loss and theft
- Lack of proper maintenance of the existing infrastructure.

Drinking water Administration

Lack of a proper definition of "drinking water" or say the 'Quality' and the Quantity of the basic need are not the only limiting factors to shake 'drinking water' in a legal framework. Drinking water administration also has added much chaos to the whole scene. Schedule VII of Constitution on India has placed water for drinking and irrigation at the disposal of the state as per Entry 17 of List II. Hence the responsibility of providing clean drinking water and help realize the right to healthy water and prevent health hazards has been vested with the State Governments. It is primarily the responsibility of the respective States to provide drinking water to the people. The Central Government acts only as a facilitator in this regard. At the Central level it is the Department for Drinking Water Supply (DDWS) under the Ministry of Agriculture and CPHEEO under the ministry of Urban Develop and Poverty Alleviation are the two departments that is concerned with the supply of drinking water. They lay norms those are mandatory in nature, provide technical guidance and fund water supply. At the state level in Orissa water supply in administered by Rural Water Supply and Sanitation wing for the rural areas and Public Health Department undertakes the same for the urban areas. The over all planning for water resources is done by the Ministry and Department of Water Resources at the Central and State level respectively. Apart from these there a

hoard of different autonomous or departmental bodies looking into different aspects of drinking water.

#

Annexures

Chapter-1

Annexure-1

Year - Wise Programme Implementation:

Year	**Programme**
1954	Water Supply And Sanitation
1972-73	Accelerated Rural Water Supply Programme
1974-75	Minimum Needs Programme
1977-78	ARWSP reintroduced
1986	National Drinking Water Mission
1991	Rajiv Gandhi DWM, (Renamed)
1999	Sector Reforms Programme
2002	Swajaldhara

Chapter-11

Take to the Annexure-2

Territory	**Percentage of HH having safe drinking water**		Total
	Urban	Rural	
India	81.38	55.54	62.3
Andhra Pradesh	73.82	48.98	55.08
Arunachal Pradesh	88.2	66.87	70.02
Assam	64.07	43.28	45.86
Bihar	73.39	56.55	58.76
Goa	61.71	30.54	43.41
Gujurat	87.23	60.04	69.78
Haryana	93.18	67.14	74.32
Himachal Pradesh	91.93	75.51	77.34
Karnataka	81.38	67.31	71.68
Kerala	38.68	12.22	18.89
Madhya Pradesh	79.45	45.56	53.41
Maharastra	90.5	54.02	68.49
Manipur	52.1	33.72	38.72
Meghalaya	75.42	26.82	36.16
Mizoram	19.88	12.89	16.21
Nagaland	45.47	55.6	53.37
Orissa	62.83	35.32	39.07
Panjab	94.24	92.09	92.74
Rajsthan	86.51	50.62	58.96

Sikkim	92.85	70.84	73.05
Tamil Nadu	74.17	64.28	67.42
Tripura	71.12	30.6	37.18
Uttar Pradesh	85.78	56.62	62.24
West Bengal	86.23	80.26	81.98
Andaman and Nicober	90.91	59.43	67.87
Chandigarh	97.68	98.11	97.73
Dadra and Nagar Haveli	90.97	41.17	45.57
Daman and Diu	86.76	56.87	71.42
Delhi	96.24	91.01	95.78
Lakshadeep	18.79	3.41	11.9
Pondicherry	86.05	92.86	88.75

Drinking Water Coverage in India

	Tap			Hand pump/Tubewell			Well			Others		
	1981	1991	2001	1981	1991	2001	1981	1991	2001	1981	1991	2001
Rural	10.3	20.6	24.3	15.2	34.9	48.9	61.8	35.0	22.2	11.9	6.5	4.6
Urban	63.2	65.1	66.7	11.5	16.3	21.4	20.4	15.9	7.7	4.5	2.7	2.2
Total	23.0	32.3	36.3	15.2	30.0	41.2	51.7	32.2	18.2	10.1	5.5	3.9

Source: Census of India 1981,1991 and 2001

CH II – Annexure

Annexure 2

Status of drinking water supply as on 31.3.2003

Sl No	District	No. of blocks	Total Nos. of habitation	FC habitation	PC Habitation	NC habitation	Total nos. of sources existing as on 1.4.03			No. of defunct TWS in TN & TP habitation as on 1.4.02			No. of defunct TWS in TN & TP habitation as on 1.4.03			No. of Commissioned PWS	
							TWs	SWs	SB	TN	TP	Total	TN	TP	Total	(1.4.02)	(1.4.03)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	Balasore	12	6841	6841			9616	3		225	362	587	225	362	587	18	21
2	Bhadrak	7	5088	5088			6714			94	161	255		85	85	15	15
3	Mayurbhanj	26	5771	5771			12052	122		267	359	626		356	356	16	17
4	Jajpur	10	2960	2960			8502	1		107	677	784		349	349	15	20
5	Kendrapara	9	4728	4728			7680			559	282	841		261	261	14	15
6	Cuttack	14	4359	4359			9982			150	224	374		129	129	23	30
7	Jagatsinghpur	8	3487	3487			6559			119	212	331		211	211	31	36

8	Dhenkanal	8	2650	2650			5556	43		62	172	234		169	169	12	17
9	Angul	8	3264	3264			6332	57		68	118	186		116	116	13	15
10	Puri	11	5518	5518			8968	262		325	381	706		381	381	15	18
11	Khurda	10	3949	3949			7674	79		252	194	446		101	101	15	20
12	Nayagarh	8	3301	3301			5851	263		108	135	243		73	73	20	26
13	Gajapati	7	2115	2115			2750	962		126	107	233		103	103	6	6
14	Ganjam	22	5354	5354			14038	321		73	544	820	73	544	617	46	67
15	Boudh	3	1723	1723			2904	53		120	31	151		31	31	5	7
16	Phulbani	12	4457	4457			6627	667		169	36	205		35	35	9	9
17	Koraput	14	4605	4605			7960	845	125	237	173	410	17	173	190	12	17
18	Rayagada	11	4081	4081			7126	454		145	107	252		107	107	16	20
19	Malkanagiri	7	2319	2319			4598	498	5	81	51	132		51	51	5	8
20	Nawarangpur	10	2704	2704			7365	172		30	41	71		41	41	17	17
21	Kalahandi	13	3819	3819			10707	159		59	46	105		40	40	16	19
22	Nuapada	5	2267	2267			5263	27		15	25	40		20	20	16	17
23	Bolangir	14	3621	3621			10456	3		8	49	57		7	7	36	45
24	Sonepur	6	1500	1500			4360			5	41	46			0	6	9
25	Bargarh	12	2744	2744			7608	27		28	150	178		149	149	55	57
26	Deogarh	3	1427	1427			2497	122		42	13	55		10	10	2	4
27	Jharsuguda	5	1231	1231			3202			10	4	14		4	4	3	6
28	Sambalpur	9	2809	2809			5475	174		104	101	205		100	100	18	20
29	Keonjhar	13	6250	6250			7414	563		332	222	554		219	219	24	26
30	Sundergarh	17	9157	9157			10508	427		30	40	70	30	40	70	22	22
Total		314	114099	114099			216344	6304	130	3950	5058	9008	345	4267	4612	521	626

Note : Apart from the 114099 habitations identified in the survey of 1996-97 as indicated above another 22300 new habitations have been subsequently identified by the District Collectors of which 9418 habitations are having population of 100 or more.

Annexure II

HABITATION SURVEY 2003

DISTRICT-WISE RURAL POPULATION COVERAGE DETAILS

DISTRICT	No. of Blocks	No. of Panchayats	No. of Villages	No. of Habitations				Population			Covered Population		
				Total	FC	PC	NC	Total	SC	ST	Total	SC	ST
ANUGUL *	8	208	1595	5720	3115	277	1807	963901	150048	116227	806475	125446	96620
BALANGIR	14	290	1677	2584	1682	555	341	991183	158610	213219	921928	150926	195814
BALESHWAR	12	283	2495	2637	2081	504	44	2793208	326774	183395	1648535	303479	167495
BARGARH *	12	244	1169	2539	2076	348	111	1257094	233301	258813	1190977	221246	246970
BHADRAK *	7	192	1208	1425	1036	237	150	15232254	265170	21817	1050602	230053	18716
BOUDH *	3	59	1104	2942	1815	75	1052	355938	72654	49978	302365	49356	36292
CUTTACK	14	315	1793	6760	3023	1080	2652	1747896	352360	70782	1509205	273207	59611
DEOGARH *	3	61	697	1845	1278	6	559	254066	36403	82286	212939	32202	66931
DHENKANAL	8	199	1058	4813	2153	352	673	1024762	160568	137719	928077	147833	122388
GAJAPATI *	6	110	1349	2924	1787	89	1039	395941	26273	262795	328867	21306	209885
GANJAM	22	429	2550	5173	3939	829	394	2530164	486843	93990	2095314	410421	76095
JAGATSINGHAPUR *	8	200	1235	4517	2535	473	1506	1023177	218799	2738	816640	163934	1822
JAJAPUR *	10	275	1540	4998	1670	691	2628	1570487	363783	119876	1227878	271255	106777
JHARSUGUDA *	5	81	356	1359	924	126	308	355994	62273	139387	312419	54536	124645
KALAHANDI	13	250	1998	4130	3753	146	225	1246044	217351	365842	1227200	214194	355323
KANDHAMAL	12	152	2309	6656	4998	111	1533	607188	112051	326049	505789	92529	266245
KENDRAPARA *	9	232	1361	6788	3653	179	2949	1224834	243724	4016	851672	173552	2744
KENDUJHAR	13	286	2044	7138	4630	562	1941	1381462	184720	591441	1183500	160096	498889
KHORDHA *	10	170	1380	4746	3305	441	885	1301168	183706	74924	1184546	161531	69043
KORAPUT	4	40	455	861	760	34	47	168174	20567	99862	159977	19867	95203
MALKANGIRI	7	96	902	2378	2003	243	132	455764	85776	289811	437013	84363	275361
MAYURBHANJ	26	383	3694	8637	5117	982	2500	2104871	161725	1253041	1754013	134867	1026859
NABARANGAPUR *	10	161	860	3132	1666	1236	230	958199	159334	548940	789903	132362	457950
NAYAGARH *	8	176	1517	4373	3028	261	1058	972536	119161	60394	933640	114207	57569

NUAPADA *	5	105	633	2346	1916	82	341	515719	68351	190393	511478	66096	180275
PURI	11	223	1542	9728	5085	716	3908	1636073	297219	3750	1346611	239852	2728
RAYAGADA *	11	172	2411	4204	2830	945	415	809455	111061	521862	696199	92680	454933
SAMBALPUR	9	147	1219	4205	2529	135	1536	716369	123894	296222	603036	101796	244028
SONEPUR	6	73	646	1517	1071	211	231	301155	81114	28851	263041	68961	25361
SUNDARGARH	17	263	1677	8934	7996	325	586	1302793	109180	850662	1232239	104124	800640
TOTAL	303	5875	44474	130009	83454	12251	31781	46197869	5192793	7259082	27032078	4416277	6343212

Annexure III

Year-wise and district-wise status of Swajaldhara projects

District-wise status of projects under Swajaldhara 2002-03

Sl. No.	District	Funds received	No. of Schemes taken up	No. of Schemes in Progress	No. of Schemes Completed	Expenditure (Rs. In lakh)
1	Angul	3.16	4	3	1	1.04
2	Bargarh	0.95	1	1	0	1.04
3	Bhadrak	28.52	43	43	0	21.735
4	Bolangir	33.99	32	25	7	34.122
5	Boudh	9.37	4	4	0	10.32
6	Cuttack	52.63	38	38	0	50.24
7	Deogarh	7.89	2	2	0	7.75
8	Dhenkanal	22.53	5	5	0	25.57
9	Gajapati	0.00	0	0	0	0
10	Jagatsinghpur	0.00	0	0	0	0
11	Jajpur	16.63	3	3	0	0
12	Jharsuguda	0.00	0	0	0	0
13	Kalahandi	1.27	1	1	0	0.99
14	Kandhamal	0.95	4	4	0	1.05
15	Kendrapara	4.47	1	0	1	0
16	Keonjhar	0.24	1	0	1	0.24
17	Khurda	0.00	0	0	0	0
18	Koraput	0.57	3	3	0	0
19	Malkangiri	122.10	137	78	59	108.69
20	Mayurbhanj	0.00	0	0	0	0
21	Nawarangpur	7.60	2	2	0	4.25
22	Nayagarh	0.00	0	0	0	0
23	Nuapada	0.00	0	0	0	0
24	Puri	3.15	1	1	0	3.15
25	Rayagada	0.00	0	0	0	0
26	Sambalpur	19.83	5	5	0	19.83
27	Sonepur	0.00	0	0	0	0
28	Balasore	0.00	0	0	0	0
29	Sundergarh	0.00	0	0	0	0
30	Ganjam	0.00	0	0	0	0
	Total	**335.85**	**287**	**21 8**	**69**	**290.017**

District-wise status of project under Swajaldhara 2003-04

Sl. No.	District	Funds received	No. of Schemes taken up	No. of Schemes Completed	No. of Schemes in Progress	Expenditure (Rs. In lakh)
1	Angul	18.23	31	6	25	18.46
2	Bargarh	17.31	6	0	6	10.273
3	Bhadrak	2.79	9	0	9	4.04
4	Bolangir	35.26	21	1	20	37.794
5	Boudh	18.865	20	0	20	7.71
6	Cuttack	24.69	51	0	51	16.62
7	Deogarh	4.41	2	0	2	0
8	Dhenkanal	8.64	2	0	2	10.55
9	Gajapati	11.53	9	0	9	12.71
10	Jagatsinghpur	1.89	2	0	2	0
11	Jajpur	25.54	13	0	13	0
12	Jharsuguda	7.675	10	10	0	7.47
13	Kalahandi	6.12	3	0	3	4.47
14	Kandhamal	5.04	9	3	6	1.36
15	Kendrapara	37.71	5	1	4	26.72
16	Keonjhar	14.895	13	0	13	0.11
17	Khurda	12.78	7	0	7	5.85
18	Koraput	11.16	24	0	24	11.88
19	Malkangiri	11.7	12	0	12	0
20	Mayurbhanj	20.35	8	0	8	23.45
21	Nawarangpur	16.83	3	0	3	15.29
22	Nayagarh	18.54	10	0	10	0
23	Nuapada	8.1	11	0	11	5.84
24	Puri	4.14	7	0	7	4.14
25	Rayagada	9.45	4	1	3	9.45
26	Sambalpur	11.725	24	18	6	11.73
27	Sonepur	22.08	11	0	11	15.90
28	Balasore	0	0	0	0	0
29	Sundergarh	0	0	0	0	0
30	Ganjam	0	0	0	0	0
	Total	**387.45**	**327**	**40**	**287**	**261.817**

District wise status of projects under Swajaldhara 2004-05

Sl. No.	District	Funds received	No. of Schemes taken up	No. of Schemes Completed	No. of Schemes in progress	Expenditure (Rs. in lakh)
1	Angul	5.02	18	0	18	0
2	Bargarh	10.02	3	0	3	0
3	Bhadrak	60.00	34	0	34	0
4	Bolangir	26.09	26	0	26	12.484
5	Boudh	7.26	9	0	9	2.847
6	Cuttack	57.98	19	0	19	0
7	Deogarh	0	0	0	0	0
8	Dhenkanal	14.73	3	0	3	0
9	Gajapati	13.20	3	0	3	0
10	Jagatsinghpur	0	0	0	0	0
11	Jajpur	42.52	6	0	6	0
12	Jharsuguda	2.67	4	0	4	0
13	Kalahandi	9.30	2	0	2	0
14	Kandhamal	0.68	2	0	2	0
15	Kendrapara	14.11	2	0	2	2.80
16	Keonjhar	5.16	5	0	5	5.16
17	Khurda	25.88	9	0	9	0
18	Koraput	7.83	5	0	5	0
19	Malkangiri	16.74	34	0	34	0
20	Mayurbhanj	65.68	12	0	12	0
21	Nawarangpur	22.61	3	0	3	0
22	Nayagarh	16.79	3	0	3	0
23	Nuapada	0.00	0	0	0	0
24	Puri	6.80	3	0	3	2.16
25	Rayagada	40.89	13	0	13	26.8
26	Sambalpur	17.06	2	0	2	5.07
27	Sonepur	5.77	2	0	2	0
28	Balasore	52.68	20	0	20	0
29	Sundergarh	11.58	4	0	4	10.15
30	Ganjam	89.87	17	0	17	57.00
	Total	**648.92**	**263**	**0**	**263**	**124.471**

Annexure IV
LIST OF SLUMS OF BHUBANESWAR CITY (AUTHORISED)

Ward No	Sl No	Name of the Slum	No of Household	Population	Watersupply Position
01	01	Sikharachandi	975	4875	
	02	Niladri vihar	850	4250	
	03	Patia Hadi Sahi	104	520	
	04	Patia Bhoi Sahi	103	515	
02	05	Radhakrishna Lane C.S pur	118	590	
	06	Talarangamgamatia Bhoi sahi	50	250	
	07	Talarangamatia	200	10000	
03	08	Rasulgarh Bhoi sahi	65	325	
	09	Rasulgarh Sabarasahi	85	425	
	10	Palasuni Bhoisahi	53	265	
	11	Sanogadia,Chakeisiani, Tangisahi	255	1275	
	12	Pandara	395	1975	
	13	Bhotapada	175	875	
04	14	Jharpada	550	2750	
	15	Bomikhal	250	1250	
08	16	Nuapalli Sabarsahi	125	625	
13	17	Nuapalli Bhoisahi	207	1035	
16	18	Baramunda sabarsahi	500	2500	
17	19	Bharatpur Jokalandi(part-1)	800	4000	
18	20	Bhratpur jokalandi(part-2)	900	4500	
	21	Behera sahi	31	155	
	22	Bijunagar, Bharatpur	200	1000	
	23	Banadurga,Bharatpur	400	2000	
	24	Ghatikia,Gadasahi	50	250	
	25	Ghatikia,Sethisahi	50	250	
	26	Ghatikia,Ralasahi	50	250	
	27	Ghatikia,Baramanasahi	50	250	
	28	Ghatikia,Bhoisahi	25	125	
	29	Sampur Bhoisahi	65	325	
19	30	Pokhariput	100	500	
	31	Dumuduma ‘A’(Panasahi)	45	225	
	32	Dumuduma ‘A’(Bhoisahi	50	250	
	33	Jadupur ‘A’	200	1000	
	34	Jadupur ‘B’	350	1750	
	35	Jadupur (Begunia)	100	500	
	36	Jadupur (Purunasahi)	100	500	
	37	Jadupur (Odiyasahi)	100	500	
	38	Aiginia	100	500	

	39	Dumuduma Raghunath Nagar	939	4945	
	40	Dumuduma Bhoisahi	50	250	
	41	Jagamara Bhoisahi	50	250	
20	42	Siripur Sabarsahi	100	500	
24	43	Laxmisagar uper Boisahi	150	750	
	44	Laxmisagar Talabhoisahi	220	1100	
25	45	Badagada Bhoisahi	130	650	
26	46	Paschim Badagada Sabarsahi	75	375	
27	47	Kancha Bhoisahi	50	250	
	48	Huda Bhoisahi	100	500	
	49	Nalamunhasahi	50	250	
	50	Dhoba sahi	30	150	
	51	Jayadev nagar	85	425	
	52	Brahmeswarpatna	65	325	
28	53	MatinBhoisahi	50	250	
	54	Jambeswarapatna Beherasahi	80	400	
29	55	Kapilaprasad Bhoisahi	130	650	
30	56	Nuagaon khorudasahi	147	735	
30	57	Nuagaon Jenasahi	80	400	
	58	Nuagaon uparsahi	115	575	
	59	Kapalaswara Bhoisahi	175	875	
		TOTAL	11,697	58,485	

Annexure IV

LIST OF SLUMS OF BHUBANESWAR CITY (UNAUTHORISED):

Ward No	Sl No	Name of the Slum	No of Household	Population
1	1	Patia jadisahi,Bauri sahi	96	480
	2	Munda sahi,C.S pur	103	515
	3	BDA Colony, C.S Pur	85	425
2	4	Damana Chhaka, Nilapadia	125	600
	5	Mancheswara patrasahi	80	400
	6	Mancheswara Dhirighutusahi	168	840
	7	MancheswaraDasharajasahi	75	375
	8	Mancheswara Munda sahi	135	675
3	9	Trinatha basti Press colony	49	245
	10	Jaganath Leprosy colony	65	325
	11	Tuhigutusahi Mancheswara(I.B)	252	760
	12	Gobabandhu colony	151	755

	13	Jharanasahi mancheswar	260	1300
	14	Rasulgarh canalsahi	253	1265
	15	Purosottam Basti	95	475
4	16	Jharpada canal area	450	2250
5	17	Sahidnagar Telenga basti	300	1500
	18	Sahidnagar Santi palli	475	2375
	19	Sahid nagarBirsamunda	150	750
6	20	Patharbandha(S)	650	3250
	21	Patharabandha(N)	731	3655
	22	2nd Gents Hostels vani vihar	250	1250
	23	Behera sahi V.S.S nagar	25	125
	24	Talapadiswri Vani vihar	45	225
7	25	Saliasahi Nilachkra nagar	950	4750
	26	Saliasahi janatanagar	425	2125
	27	Saliasahi Ekamra Nagar	358	1790
	28	Saliasahi Nirankari Nagar	725	3625
	29	Saliasahi mahabir nagar	575	2875
	30	Saliasahi Adibasigaon	775	3875
	31	Saliasahi	458	2290
	32	Saranapalli	191	955
8	33	Regional Science center basti	522	2610
	34	Nantini palli Mundasahi	135	675
	35	Unit-9 Bhoingar	475	2375
9	36	Sudhanidhiswar Labor colony	135	675
	37	Bayaba Colony,unit-9	215	1075
	38	Unit-9 Flat area	185	925
10	39	Unit-3 Harizanasahi Near ICDS office	95	475
	40	Ashok Nagar	146	730
	41	Santi nagar F.C.I	268	1340
	42	Ramakrishna Colony	135	675
	43	Malisahi	85	425
11	44	Unit-3 Labor Colony	65	325
	45	Near Mali colony	100	500
12	46	Rampur Unit-4	128	640
	47	Unit-4 Area	131	655
13	48	Nuapalli,jagannath sahi	95	475
	49	Nuapali sitapur Basti	515	2575
	50	Kalyani Krushna Nagar	188	940
14	51	ISKON Matha basti	120	600
	52	Behera sahi	80	400
15	53	CBI Front unit-8	53	265
	54	Nilapanitanki unit-8	315	1575
	55	Nehru Slum unit-8	171	855
	56	Bachelor Barrock,unit-8	191	955

	57	OCC front Basti unit-8	69	345
16	58	Sweeper Colony, Baramunda	75	375
	59	Mahabir Basti, Baramunda H.B	150	750
	60	Jaganatth Vihar,Adibasi basti	135	675
	61	Nilakantha nagar	225	1125
	62	Jalaeswar Colony	247	1235
	63	Jadumanivihar, Aramunda	131	655
19	64	Refugee Colony, Raghunath nagar	93	465
	65	Raghunath Nagar, Barabari	111	555
	66	Housing Board Near	102	510
	67	Kolathia	36	180
	68	Kelasahi,aiginia	60	300
	69	Khandagiri Basti, Trinath nagar	35	135
	70	Tabana Basti Jagamara	133	615
20	71	Parmpada	53	265
	72	Bhimpur	35	175
	73	Agriculture Colony Near	49	245
	74	PWD office front	37	185
	75	Bhaktamadhu Nagar	210	1050
	76	Laxmi bazaar Basti	425	2325
	77	Ganga nagar	148	740
	78	Delta Paika nagar	125	625
	79	Kandha sahi ,Siripur	71	305
	80	Tulasi Basti	75	375
	81	Jadi sahi	35	175
	82	Ganganagar palli	356	1780
	83	Krushi vihar	87	435
21	84	Sweeper colony, unit-6	97	485
	85	Sub-Station,unit-6	275	1375
	86	Maa Mangala Basti ,unit-7	101	503
	87	Durga mandap Basti, Surya nagar	171	855
22	88	Bapuji Nagar	365	1825
	89	Kalinga basti,Janapatha	67	335
	90	Kedarapalli Nuasahi	297	1485
	91	Jharanasahi	475	2375
23	92	Budheswari Labour Colony	280	1400
	93	Mochisahi	210	1000
	94	Gopabandhu labor Colony	61	300
	95	Behera sahi,old station Bazaar	83	425
	96	Pradhan sahi,old station Bazar	105	525
	97	Reddy Basti,old station Bazar	295	1475
	98	Budhanagar Bhoi sahi	175	875
	99	Laxmisagar refugee colony	385	1925
	100	Budhanagar	385	1925
	101	Gautam nagar	475	2375

24	102	Laxmisagar Haladipadia	375	1875
	103	Chintamaniswara mandir area	125	600
25	104	Kalinga basti,Bragarh Brit	265	1325
	105	Badagada Badisahi	45	225
26	106	Champapokhari	140	700
	107	Kalpana labor colony	375	1875
	108	Kalpana panitanki	150	750
	109	Kalpana medical side	69	345
	110	Kalpana flat Area	150	750
	111	Chintamaniswar area	50	250
	112	Aurovido colony	235	1175
	113	BJB Nagar Mahisiakhal	510	2550
	114	Bijaya laxmi colony	91	455
	115	Adeikhal	152	760
	116	Huda sahi	89	445
27	117	Chillipokhari	135	675
	118	Kusapadia	49	245
	119	Bishnumanir Basti	135	675
28	120	Punamagate Bhoisahi	68	340
	121	Bhimpur Bhoisahi	205	1025
	122	Lingaraj Leprosory Colony	50	250
	123	Rameswarapatna	215	1075
29	124	Maa Mangala basti,Bhimatangi	90	450
	125	Khandualsahi, Bhimatangi	99	495
	126	Bhimatangi,Phase-1	129	645
	127	Gokhibada Leprosory colony	95	475
	128	Noliasahi Jogeswarpatna	211	1055
	129	Noliasahi Muslim Basti	164	820
	130	Sunderapada Area	59	295
30	131	Samantarapur	185	925
		TOTAL	26,445	1,32,225

DISTRIBUTION OF HOUSEHOLDS BY SOURCE OF DRINKING WATER
AND ITS LOCATION
TOTAL ABSTRACT

Source	1981	1991	2001	% of 1981	% of 1991	% of 2001	Decaded growth			
							1981-91		1991-2001	
							Nos	%	Nos	%
Tap	327395	536780	687284	6.599	8.964	8.733	209385	63.955	150504	28.038
Handpump & Tubewell	395770	1802525	4364330	7.977	30.102	55.454	1406755	355.448	2561805	142.123
Well	2771975	2700395	2247230	55.868	45.096	28.554	-71580	-2.582	-453165	-16.781
Tanks, Pond, Lake	607965	315260	146271	12.253	5.265	1.859	-292705	-48.145	-168989	-53.603
River, Canal, Spring	606535	449605	381553	12.224	7.508	4.848	-156930	-25.873	-68052	-15.136
Any other	252005	183525	43459	5.079	3.065	0.552	-68480	-27.174	-140066	-76.320
Total No. of Households	**4961645**	**5988090**	**7870127**							

Source : Census of India, 1981, 1991, and 2001

DISTRIBUTION OF HOUSEHOLDS BY SOURCE OF DRINKING WATER AND ITS LOCATION
RURAL ABSTRACT

Source	1981	1991	2001	% of 1981	% of 1991	% of 2001	Decadel growth			
							1981-91		1991-2001	
							Nos	%	Nos	%
Tap	65705	161445	188170	1.508	3.122	2.774	95740	145.712	26725	16.554
Handpump and Tubewell	347015	1664955	4077102	7.965	32.193	60.109	1317940	379.793	2412147	144.878
Well	2535025	2431565	1973084	58.185	47.017	29.089	-103460	-4.081	-458481	-18.855
Tanks, Pond, Lake	590090	305820	141038	13.544	5.913	2.079	-284270	-48.174	-164782	-53.882
River, Canal, Spring	582115	431460	367737	13.361	8.343	5.422	-150655	-25.881	-63723	-14.769
Any other	236875	176470	35748	5.437	3.412	0.527	-60405	-25.501	-140722	-79.743
Total No. of Households	**4356825**	**5171715**	**6782879**							

DISTRIBUTION OF HOUSEHOLDS BY SOURCE OF DRINKING WATER AND ITS LOCATION

URBAN ABSTRACT

Source	1981	1991	2001	% of 1981	% of 1991	% of 2001	Decadel growth			
							1981-91		1991-2001	
							Nos	%	Nos	%
Tap	261690	375335	499114	43.267	45.976	45.906	113645	43.427	123779	32.978
Handpump and Tubewell	48755	137570	287228	8.061	16.851	26.418	88815	182.166	149658	108.787
Well	236950	268830	274146	39.177	32.930	25.215	31880	13.454	5316	1.977
Tanks, Pond, Lake	17875	9440	5233	2.955	1.156	0.481	-8435	-47.189	-4207	-44.566
River, Canal, Spring	24420	18145	13816	4.038	2.223	1.271	-6275	-25.696	-4329	-23.858
Any other	15130	7055	7711	2.502	0.864	0.709	-8075	-53.371	656	9.298
Total No. of Households	**604820**	**816375**	**1087248**							

Source-Census of India