

# Alleviation of Water-Crisis in Jharkhand State of India

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## *Preface*

Jharkhand is a newly created State. It took its birth on 15<sup>th</sup> November, 2000 by separating southern part of Bihar State. Presently its population is 3.5 million. The average annual rainfall in this State is 1350 mm. As such it gets sufficient rain water which should have been conserved, be it on surface or underground by artificial means. The State having mostly rocky and hilly terrain provides fair scope for ground water recharging.

Over exploitation of ground water by the multiplied population and negligence in conserving rain water, have resulted into a serious water crisis in Jharkhand. Having mostly the rocky terrain with high relief about 80% of rain water flows out through run-off and gets wasted. Unplanned and unsustainable extraction of ground water has led to drastically fall of ground water level reducing the water-yield of tube-wells and dug-wells. Further over exploitation of ground water has resulted into concentration of impurities like fluoride, arsenic, iron etc. in the remaining ground water occurring in different aquifers causing health hazard to consumers.

**Keywords:** Jharkhand, Water, Crisis

With a view to replenish underground aquifers with bacteria free soft rain water effective and sustainable management of water resources is now a necessity for the state. This can be done in various ways like capturing run – off water from roof tops, capturing run - off water from nearby catchment areas, conserving rain water through watershed management, identifying potential zones like fractured and weathered zones and recharging them with rain water to raise the ground water level.

In India about 70% water is used for irrigation to produce food grain and thus for meeting the food grain requirement of the people. Availability of water is necessary even for animals & plants. Further, scarcity of water severely affects environment & disturbs ecological balance.

Urbanization, industrialization and mining in this State have also put adverse effects on the water-resources.

A favourable water policy for development and management of water resources of Jharkhand is still lacking

## ROCK FORMATION OF JHARKHAND AND THEIR HYDRO-GEOLOGICAL BEHAVIOUR

There are three types of rocks occurring in this State. The First one being compact formation like granite, basalt and dolerite with cracks having only secondary porosity. Secondly semi-compact formation like Gondwana sandstones having both primary and secondary porosity. The third type of formations are alluvial formations having primary porosity which yield maximum volume of water.

The depth limit of getting ground water is to the tune of 185 metre. The Central Ground Water Board (CGWB) on the basis of their bore hole data from different parts of the State have found the range of water-yield varying from 3.6 cu.m per hour in hard rock areas to 50 cu.m in the Gondwana formation. Alluvial formation with primary porosity in the valleys of big rivers like South Koel, Karo, Damodar, Swarnrekha and Sone have yielded water upto 80 cu.m. per hour. However, such alluvial areas are only 3% of total area of State.

## IMPACT OF URBANISATION, INDUSTRIALISATION & MINING ON THE WATER RESOURCES OF JHARKHAND

During the last few decades urbanisation has taken place very fast in the State. In course of population growth in various towns, a number of roads & buildings have been constructed. This led to shrinkage of open areas required for natural recharging of ground water. Secondly, thousands of trees were cut which play a major role in natural recharging of ground water. Thirdly, many river banks and ponds have been illegally encroached besides draining out dirty water to water-bodies & polluting them badly. Such dirty water should have been first treated and then allowed to go to water bodies .

Jharkhand is globally known for its rich mineral resources. About 40% of total Indian minerals are produced from Jharkhand. Based on easily available coal, a number of industries like coal-washeries, hard and soft coke-oven plants, thermal power plants, bricket-plants have been set up. For example, on the banks of Damodar river almost all the above plants have been located and they all discharge their industrial effluents into the river. The result of polluting this river water is to the extent that the river water is not left even worth bathing. The actions taken so far for eliminating the

above stated pollutions are insufficient. As regard other industries proper disposal of red mud discharged by Muri Aluminium Plant is yet to be done which is creating serious problem for local people. The caustic soda plant located in Garhwa Road of Palamu District is discharging chlorine in the South Koel river polluting the river-water. The effluents of Heavy Engineering Corporation (HEC) Ranchi, have been polluting the river water of Subarnrekha. Besides above the integrated steel plants, cement plants, fertiliser plant located in different parts of the State pollute the nearby water bodies along with cultivable lands. The suitable and sustainable actions to eliminate such pollutants are yet to be taken.

As stated above, Jharkhand is a mineral rich State. Mining activities for different kind of minerals severely affect the water resources of adjoining areas. The impurities contained in the rejects of mines, which are dumped in adjoining areas, are dissolved in rain water and flow out into the adjacent water bodies polluting them significantly. In course of coal mining dewatering of deep quarries is done on the larger scale. The ground water level in adjoining area goes down leading to less water-discharge or stopping water yield from tube wells and dug-wells. The water stored in big open- cast coal mines pollute even the water of deep aquifers. In course of opening of mines & dumping its rejects numerous trees are cut leading to deforestation. The roots of trees and plants penetrate even through the hard rocks and make it porous for percolation of rain water and natural recharging of ground water. Therefore, after mining the affected areas should be reclaimed and converted into cultivable land. This is not being done in many mines of the State.

#### STATUS OF WATER-CRISIS IN THE STATE-CAPITAL, RANCHI.

Ranchi is the State-capital of newly created Jharkhand State. After being given status of State – capital its population has grown manifold. After achieving the status of State capital, a number of roads and buildings were constructed in course of which a large number of open areas were covered in the last two decades with cement and concrete barring the natural recharging of the ground water. Thousands of trees were cut in course of construction and widening of roads which play a very important role in percolation of rain water underground. As per the census of 1991 the population of Ranch was only about 0.6 million (5,99,306) and surface water reservoirs of Rukka, Hatia & Kanke dams were sufficient to meet the water requirement of the people. Presently its population has grown upto the tune of about 1.5 million. Unfortunately no additional water reservoir has been constructed to meet the requirements of multiplied population. As such the total load is on ground water which is mercilessly being exploited through deep tube wells. Even Ranchi Municipal Corporation (RMC) has set up a number of HYDT (High Yielding Deep Tube-wells) to meet the water requirements of the people. On the other hand no suitable & sustainable actions have been taken for recharging the ground water aquifers being emptied,

leading to fall off the ground water level and consequently several domestic tube wells and dug wells have dried up.

With a view to raise water storing capacity of already existing Rukka, Hatia and Kanke Dams action were proposed for their desilting long back but it could not be done till today. Particularly in summer season rationing in water supply from these water reservoirs is required to be done almost every year. The situation of rationing will be eliminated once the proposal of de-silting is executed and storing capacity of these dams are raised.

To reduce the load on ground water the construction of additional surface water reservoirs is a must. Three dams were proposed for construction on priority basis. Their location being downstream of the confluence of Jumar river & Potpoto river at Borea, the second one downstream of the confluence of Harmu river & Subarnrekha at Parsatoli and the third one on South Koel near Mandar where displacement of people will be nominal. Such surface reservoirs will not only meet water need of people directly but also recharge the ground water and raise the ground water level in adjoining areas.

#### WATER-CRISIS IN RURAL AREAS OF JHARKHAND

More than 70% people of the State live in the rural areas and are dependent on agriculture as their livelihood. Because of uncertain and untimely arrival of Monsoon and particularly in case of drought, they do not get sufficient water for their crop-irrigation. Water is an acute necessity for food-production. For want of water non-production of their food-grains compels the people to migrate to other States of India for their livelihood.

As stated above, Jharkhand gets sufficient rain water its rainfall being 1200-1400 mm per annum. Having hilly terrain with high relief about 80% of the rain water flows out through run - off & rivulets and get wasted. This leads to drying of dug-wells, ponds and small rivers and crisis starts even for drinking water. People have to fetch water for domestic use from distant places or even by digging deep pits in dry river beds.

Conserving rain water on the ground surface or underground is the only way out to alleviate the water crisis. There are many streams emerging from hilly areas which are perennial but their water flows out through rivulets and gets wasted. If such water resources are conserved by constructing a series of check dams right from the areas of their origin, such actions will go a long way to recharge the ground water and to make available irrigational water from surface reservoirs located in the downstream areas. Diverting water from hilly areas like Bisunpur, District Gumla by Vikash Bharti; Namkum, District Ranchi by R.K. Mission and Palkot area of Gumla District by CAPART to cultivable lands are good examples. After availing this facility farmers have started getting three crops in one year instead of one and are happy. Because of favourable geomorphic topography there is plenty of scope in Jharkhand for diverting such stream water to agricultural fields and getting substantial quantity of irrigational water.

Construction of contour trenches on the sloping lands and collection of rain water in already existing or proposed reservoir in down-stream areas will provide lot of relief to farmers starving for water in their cultivable lands. Such water bodies will not only be useful for direct use in down slopes side but also recharge the ground water. The practice of step farming as is done in Nepal will be another useful action by the farmers.

Creation of a large number of water bodies in form of medium, small and micro check-dams located in rural areas together with excavation of tanks at suitable sites must be done. These water bodies will not only be source of surface water for irrigation and domestic use but will also keep on recharging ground water storage. The similar work in Rajasthan under the guidelines of Magsaysay Awardee Rajendra Singh has given the rebirth of dry river Arwari which has become the life line of 75 villages situated on its banks.

In the villages where dug-wells dry and people face acute water crisis in summer season, the roof top rain water harvesting is the assured solution. In rural areas the houses have mostly slopping roofs, either thatched or covered with earthen roofing tiles. From such roofs rain water may be collected using gutter system and putting it into recharge-pits. Such roof water from several adjoining houses may also be collected and stored in large sumps to consume directly after necessary filtration through sand filter and chlorination. The excess water stored in sumps may also be diverted to adjoining dug-wells which become dry even before the onset of summer. The hand-pumps also become dry in summer. If surface rain water from surrounding area is diverted to surface water harvesting structure located near the hand-pumps, they will never dry.

For alleviation of water crisis protection of ephemeral rivers flowing on the rocky terrain of Jharkhand is equally important. They are gradually losing their existence because of over exploitation of ground water, pollution and encroachment by people. The glaring example is Harmu River which used to be the life line of Ranchi. Such rivers flowing either through urban or rural areas must be protected for multipurpose use. Rivers are the main source of surface water. If they are made perennial the areas adjoining their both banks get recharged, as a result the dug-wells & hand pumps located in those areas will never get dry rather they will keep on supplying drinking water as well as water for irrigation.

#### QUALITY OF AVAILABLE WATER IN JHARKHAND

In the ground water of ten districts of this State the quantity of arsenic and fluoride have gone up to a dangerous level. This has been established by tests carried out by the National Metallurgical Laboratory, Jamshedpur as well as the Department of Drinking Water and Sanitation, Govt. of Jharkhand. The acceptable limit of arsenic has to be 0.01 mg per litre and that of fluoride 1 mg per litre. In arsenic rich districts like Sahibganj, Dumka, Hazaribagh & Ranchi

arsenic has been found upto 0.5 mg per litre whereas in Fluoride rich districts like Ranchi, Palamau, Jamshedpur, Dhanbad & Chaibasa fluoride content varies from 2 to 8 mg per litre. Excess of arsenic in drinking water causes heart diseases, gangrene, kidney, urinary track and cancer. In almost all towns particularly in Ranchi iron is in excess which affects digestive system.

Due to over exploitation of ground water the impurities are concentrated in some areas of the state. Remaining sub surface water as such they have gone to dangerous level which can be brought back to acceptable level by recharging the ground water with bacteria free soft rain water from roof tops.

The main ingredients used to purify water available in the surface reservoirs from which potable water is supplied to the users are lime, alum, bleaching powder and chlorine. All the reservoirs in Jharkhand do not have water treatment plants. As such the total population of the state does not get purified water. This fact has to be taken up very seriously by Drinking Water and Sanitation Department to save the people from facing health hazards.

It will not be out of place to describe here a case history of Ranchi itself. In Pathalkudwa area in Ranchi, due to abnormal increase in fluoride content in ground water government had to ban the use of ground water in that area be it from hand pumps or from tube wells and arrangement was made to supply surface water to the dwellers of that area.

As already stated urbanization and mining activities here have put substantial impact on water resources of Jharkhand including the quality deterioration of both surface and sub surface water. After urbanization the dirty and polluted water of the drains is allowed to be discharged without treatment into nearby water body like ponds and rivers. Even in course of mining impurities from mine waste pollute the river water.

#### STATE WATER POLICY

Water is a precious natural gift to mankind which is becoming scarce to meet the demand of increasing population. Therefore development, conservation and sustainable management of water resources must be done which needs a suitable water policy. The availability of fresh water is the basic need of mankind. On the other hand it plays great role in maintaining ecological balance in nature which too is necessary for us.

Water policy should take care of financial and physical sustainability, quality of service provider including relief given to the downtrodden and poor people in respect of realising water tax. Issues like conservation of both surface and ground water, its distribution for domestic use, irrigation, hydropower generation, ecology and finally quality of the water being supplied to users. These all should be managed by promulgating suitable rules and administrative orders. Other factors like flood control, development of draught prone areas and water distribution among users. For construction of water reservoirs, dams, ponds etc. a team of

respective expertise should be constituted which will monitor the activities on regular basis.

Presently different government departments of Jharkhand, Board and Agencies are working for development of water resources in their own ways. They are Department of Water Resources, Drinking Water and Sanitation Department, Forest Department, Agriculture Department, State Watershed Development Agency and State Pollution Control Board etc. The fragmented approach for planning development and management of water resources is deteriorating the water quality. Therefore all the above departments, boards and agencies should sit together and plan the work for a sustainable result. After proper planning the area wise responsibilities should be given to them for completing their jobs under a time bound program.

The first and foremost action should be the construction of roof top rain water (RTRW) harvesting structure in every old and new houses as done in Tamilnadu. Government should promulgate rules for making it mandatory. Sizes of such structures will be proportionate to the sizes of roof area and accordingly the expenditure to be incurred on construction of the structure. If this proposal is executed most of the water scarcity for domestic use including drinking water will be solved. This action will conserve the rain water underground and raise the ground water level resulting into elimination of problem like failing of hand pumps and tube wells. Further this will also improve the quality of ground water. To encourage people for construction of RTRW harvesting structures the practice adopted by the neighbouring state Orrisa should be followed by Jharkhand. The water resources department of Orrisa pays 50% of the cost of RTRW harvesting structure as subsidy to the people after due inspection. In Jharkhand presently the prevailing practice is to realize 1.5 times holding tax from those who have not constructed the said structure. This is not an encouraging practice which is prevailing.

For the sake of awareness and training to the people establishment of a Rain Centre by Centre for Science and Environment (CSE) is necessary. In the said rain centre the whole process of rain water harvesting is nicely exhibited to educate the people. Further they provide all the necessary materials for construction of structure and welcome the leadership of rain water conservation movement. In such centre one can see ground water recharging system, storage system for drinking water, water for washing cloth, use of testing kit for quality determination of water etc.

As regard conservation of rain water in reservoirs ponds tanks etc as surface water, the details have already been discussed on previous pages. If excess of rain water is conserved on surface or sub surface and not allowed to flow out and get wasted this will go a long way in alleviating water crisis in Jharkhand which mostly had rocky terrain with high relief. This is necessary to reduce the load on ground water and to raise the ground water level. This action will also alleviate flooding of the areas.

There are few districts like Garhwa, Palamu, Latehar etc which are drought prone. With a view to reduce water crisis in such areas and thereby for promoting growth reduction in

poverty and to minimize regional imbalance the water act, rules and administrative orders must be enforced strictly.

Most of the inter-state water sharing agreements were made by combined Bihar State. With the creation of Jharkhand state which was earlier a part of Bihar the whole development scenario for Jharkhand has changed. It has therefore become necessary to undertake performance evaluation of all inter-state water sharing arrangements and initiate necessary action to protect the interest of Jharkhand.

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