WATER CRISIS IN BIHAR AND ITS SOLUTIONS

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Abstract: Water crisis has been a huge problem in new millennium in Bihar. The average rainfall in the state for the last 15 years is getting slightly more than 800 mm. whereas the state used to get 1200 to 1500 mm of rain a decade and a half ago. The underground water level in Bihar has recorded a decline. The ground water reserves have also decrease in the state during last three decade. With this, Bihar stands in front of a big water crisis. The main reason for this is the lack of rainwater not reaching the ground water level due to heavy reduction in the amount of rain, damaged canal system, excess irrigation than boring method, lack of rainwater harvesting schemes. In this paper we briefly analysis the water resource situation and give measures solving to the problem of water crisis in Bihar.

Keywords : Water crisis, ground water, water resource, Bihar.

INTRODUCTION

According to known data, about 79.46 lakh hectares of land in the state of Bihar is cultivable, out of which only 56.03 lakh hectares of land is cultivated. That is, according to statistics, there is still 23.16 lakh hectares of arable land lying in Bihar. Irrigation facilities are available on a total of 43.86 lakh hectares of land by various means in the state.

About 33.51 lakh hectares of land is irrigated, that is, the benefit of these irrigation facilities does not reach about 13.35 lakh hectares of the targeted land. While 12.44 lakh hectares of agricultural land is completely deprived of irrigation facilities till now. Combining these two disadvantaged categories, about 26 lakh hectares of agricultural land in Bihar is still waiting for irrigation facilities. Agriculture accounts for 18.3 percent of Bihar's gross domestic product (GDP) and 76 percent of the state's population is dependent on agriculture. 21 percent of the state's total agricultural land is in the hands of 2 percent people. The rest is mostly with marginal and poor farmers.

At the global level, the effect of disturbing the balance of environment has started to appear in Bihar as well. In the last thirty years the water level situation has worsened in many districts of Bihar, ground water level has fallen by two to three meters in some districts. This situation has occurred here due to excessive emphasis on increasing agricultural production and no concern for groundwater management. The main reason for this decline in ground water is the rapid narrowing of shrubby vegetation areas and water body areas. Demand for ground water has also increased due to increase in population and expansion in agricultural sector.

According to the meteorological department data, the average rainfall in the state for the last 15 years is getting slightly more than 800 mm. whereas the state used to get 1200 to 1500 mm of rain a decade and a half ago. With this, Bihar stands in front of a big water crisis. The situation has become more serious in 19 districts of the state. Those districts are Jehanabad, Jamui, Gaya, Nawada, Arwal, Vaishali, Samastipur, Muzaffarpur, Bhagalpur, Katihar, Purnia, Begusarai, Khagaria, Bhojpur, Saran, Gopalganj, Sheikhpura and Munger. According to the researchers, the underground water level of districts like Begusarai, Bhagalpur, Samastipur, Katihar and Purnia has recorded a decline of 2-3 meters. Samastipur, Begusarai and Khagaria have been the worst affected due to the fall in ground water. The ground water reserves of these districts have shown a decrease of 57.7 million cubic meters, 39.5 million cubic meters and 38.5 million cubic meters respectively during the thirty years. A similar trend in ground water reserves has been observed in Samastipur, Katihar and Purnia districts in the months before and after the monsoon. The highest decline in groundwater reserves before the monsoon has been recorded at 63.6 million cubic meters and 63.1 million cubic meters. At the same time, the highest drop in ground water reserves after monsoon has been recorded at 289 million cubic meters and 216 million cubic meters. The main reason for this is the lack of rainwater not reaching the ground water level due to heavy reduction in the amount of rain, damaged canal system, excess irrigation than boring method, lack of rainwater harvesting schemes.

Experts say that it is considered safe to remove up to 70 percent of the ground water of any place. Drawing more water than that is an invitation to crisis. Because much less water can get inside the ground than the water is extracted from that place. Today, per capita water availability is also declining annually in Bihar. This was 1594 cubic meters in 2001, which has come down to 1273 cubic meters in 2011. The situation remained the same and if we have not yet worked out the ways to overcome this crisis, then in the year 2025 this availability is expected to fall to 1006 cubic meters and by 2050 to 635 cubic meters.

According to a 2018 report, there were 10,242 government tubewells in the state. Out of these only 5077 tube wells were operational. The government was talking about handing them over to private hands, citing the shortage of pump drivers. This will lead to the government's move towards migration and its loot of farmers through its privatization of irrigation facilities in future.

The main sources of irrigation in the state are canals. Wells, tube wells and ponds are other major sources of irrigation. These canals are mainly in Bhojpur, Buxar, Rohtas, Gaya, Aurangabad, Patna, Munger, Saharsa, Madhepura, Darbhanga, Sitamadhi, Muzaffarpur and Champaran districts. The following canals are important in terms of irrigation.

(1) The total length of canals drawn from the Son River near the Dehri in the Son Canal is 1600 km and the irrigated area is 5,35,530 hectares. These canals irrigate Bhojpur, Buxar and Rohtas in the west and Patna Aurangabad, Jehanabad and most areas of Gaya district in the east.

(2) Triveni Canal 377 km long canal has been constructed by dam on the Gandak River which irrigates 85,980 hectares of East and West Champaran.

(3) The Gandak Canal is irrigated in Champaran, Chhapra, Muzaffarpur and Darbhanga districts of Bihar through canals drawn from Balmikinagar near Triveni Dam.

(4) Under the agreement reached with the Government of Nepal in 1954, the Western Kosi and East Kosi Canals have been constructed by constructing a dam on the Kosi river near Bhimnagar. The Kosi canal system irrigates about 9.96 lakh hectares of land in Supaul, Saharsa, Madhepura, Purnia and Araria districts.

(5) Kamla Canal is a canal drawn from the Kamala River flowing in the northern part of Darbhanga district. It mainly irrigates farming in Madhubani district.

(6) 37532 hectares of land in Bhagalpur and Munger are irrigated by the canal discharged from the Vadua reservoir.

The historic Son Canal System of Bihar was built by the British in the first freedom movement of 1857, fearing the militant participation of the farmers of this region. Similarly, the British built the Ganga Canal system in Meerut and western Uttar Pradesh, the major centers of that rebellion. Today, this historic Son canal system, which is the lifeline of the longest and most fertile land in Bihar, is dying due to lack of maintenance.

Canals are being broken in places, silt is filling in them, somewhere in the name of roads or other development works, they are being bridged and their boarder is being reduced. The same has happened to our other canal systems and dams. This has made these schemes unable to deliver water to their target areas. The result is that up to 13.35 lakh hectares of the irrigated area of Bihar recorded in government records, agricultural land connected to canal systems is facing drought in the absence of irrigation water.

Today, in many areas connected to these canals, farmers are being forced to enter the movement to get water to dry crops. But the state government does not see any blueprint for concrete plans for its solution. Reduced rainfall in the state, indiscriminate use of tube wells, lack of water to the last mile in these canal systems and their other use by bridging the already existing ponds and ponds have significantly affected the ground water level in Bihar. Handpumps and tube wells have started releasing water in many areas.

Two-thirds of Bihar's land, which has been exposed to continuous drought in one-third of its area, is also affected by floods. The flood of rivers coming mainly from Nepal brings a lot of destruction in the state every year. The 28 districts of the state are permanently flood affected. About 2.5 lakh hectares of agricultural land is waterlogged. Bihar alone accounts for about 17.2 percent of the total flood affected area of India. Bihar accounts for 12 percent of the total flood damage in the country. Similarly, Bihar accounts for 21 percent of the country's flood-affected population every year. The river Ganges flows almost through the state. The plain of North Bihar is the flow site of the rivers Ghaghra, Gandak, Budhi Gandak, Bagmati, Adhwara, Kamla, Kosi and Mahananda. At the same time, the seven rivers of Karmnasha, Son, Punpun, Kiul-Harohar, Vadua, Chandan and Cheer rivers are the rivers flowing through the Gangetic plains in Bihar.

Rive	River basin runoff area (sq km)	River length (km)	Flood affected area (sq km)
Ganga	19322	445	12920
Kosi	1141	260	10150
Burhi Gandak	9601	320	8210
Kiul Harohar	17225	-	6340
Punpun	9026	235	6130
Mahananda	6150	376	5150
Son	15820	202	3700
Bagmati	6500	394	4440
Kamala Balan	4488	120	3700
Gandak	4188	260	3350
Ghaghra	2995	83	2530
Chandan	4093	118	1130
Vadua	2215	130	1050
Total			68800

In the state of Bihar, which has suffered so much of the drought on one side and flood on the other, there has been no plan for the scientific storage of this additional water of flood. If this were to happen, on the one hand we could have reduced the devastation of floods and on the other hand we could have dealt with the drought by storing that flood water. Farmers' organizations will have to keep an eye on what practical measures and long-term plans are being brought by the government to increase the ground water level. The law also provides for the replenishment of ground water used by large-scale underground water cans and bottled water, cold drink industry, liquor, food processing, paper, real estate, single air condition plants, hotels, railways etc. Provision should be made. If this is not done, then the entire gazette will be falling on the farmers and the poor.

Under the Pradhan Mantri Krishi Sinchayee Yojana (micro irrigation), now farmers are getting 75 percent grant instead of 50 percent. Micro irrigation systems such as drip irrigation and sprinkler irrigation systems are being made available to farmers at 75 percent subsidy. But for this farmers have been conditioned to register on the DBT portal. Only farmers registered on this portal can avail this scheme. Farmers' organizations should raise the demand of registering the list of all farmers and share croppers in the block by the Agriculture Department at the block level, making it an issue of movement.

With the help of NABARD for irrigation system in 29 lakh hectare new area of Bihar, three thousand crores are to be spent during the next five years. The government has planned to irrigate the entire area of all 17 districts of South Bihar. According to the estimation of the department, Rs 2487 crore will be required for the new 326 water harvesting projects, while the old 123 schemes are expected to cost Rs 550 crore. The area of each project will be about five thousand hectares. According to the State Agriculture Minister, work is going on in 123 water harvesting projects in 14 districts of the state in collaboration with the center. All these have to be completed in five to seven years. According to the state government, 15 hundred ahars will be restored, 775 beer dams and sluice gates will be constructed for irrigation in 8.3 lakh hectares in 17 districts of South Bihar. On this also, the state government will have to take a reply on how much progress has been made and what has been done. Whether or not this benefits the farmers will have to be closely monitored.

The Central Government has approved the schemes for Bihar to raise resources in them. 1 Punpun Barrage Project- This project located in Aurangabad district has a provision to construct headworks and canal system in an area of 13680 hectares. 2 Durgavati reservoir project - Durgavati reservoir project spread in Kaimur and Rohtas districts will cater to the requirements of 9190 hectare drought affected area and 23277 hectare non-drought affected area. Minor Irrigation Projects - 221 minor irrigation projects with an estimated cost of about Rs 340.6732 crore have been included for funding under AIBP.

Repairs, Restoration and Renovation (RRR) Scheme - In December 2014, the State Government had sent proposals to the Central Water Commission Patna for 35 reservoirs worth Rs 76.0315 crore, which are being reviewed. Command Area Development and

Water Management Program - Under this program Central assistance is given as a grant to the State Government. Central assistance of Rs 38.81527 crore was provided to Bihar during the year 2014-2015. Flood Management Program (FMP) - An amount of 167.96 crore rupees has been released to the state of Bihar under the FMP during the 12th Five Year Plan. Farmers' organizations should keep an eye on how well these funds are being utilized.

Namami Gange National Ganga River Basin Authority (NGRBA) has approved 14 projects in Bihar at an estimated cost of Rs 2155.63 crore. Which includes 13 sewage network and treatment plants in Buxar, Begusarai, Munger, Hajipur and Patna districts with an approval of Rs 1912.36 crore. Also, 26 projects to stop and change the direction of STP with an estimated cost of Rs 1968 crores and 4 river front development projects with an estimated cost of Rs 200 crores are in the works.

NDWA-The following five Inter Basin Water Transfer (IBWT) links are related to Bihar. (A) Manas-Sankosh-Teesta-Ganga Link, (b) Kosi-Mechi Link, (c) Kosi-Ghaghra Link, (d) Chunar-Son Barrage Link, (e) Son Dame-Ganga's southern tributaries. Pre-feasibility report of all these five links has been prepared. Their feasibility report is in progress. 9 inter-state link proposals were received from Bihar, out of which 6 feasibility reports of 6 links have been prepared and reported to Bihar. NDWA has made two inter-state link proposals of Budhi Gandak-Noon-Baya-Ganga and Kosi-Mechi links and has given it to the state of Bihar. What progress has been made on all these schemes so far and what has been the benefit of the people of Bihar? It should be checked.

Measures solving to the problem

System of wells instead of tube wells - 16 wells are being excavated in the only organic village Kaidiya in Jamui district of Bihar. The villagers have acquired these wells by fighting the government. The government wanted to give them two state boring facilities, but they said that we need wells. The level of ground water will fall due to boring, some people will get immediate benefit from it, the remaining people will be deprived. The Bihar government had to bow to the insistence of the villagers and had to approve the excavation of sixteen wells in this village. This decision is also excellent. If there is water available at 17 to 22 feet, then obviously we need to rethink and adopt the wells. If the slope of the land is towards those wells, then these wells will play a big role in increasing the ground water level in the rainy season. In the drought-prone areas of Madhya Pradesh, such wells and trenches have been constructed in every farmer's farm, where the rainy water fills up slowly and then its moisture and irrigation work goes on till April.

Construction of large reservoirs and lakes - In every block of Bihar, the state government should construct large reservoirs and lakes. These lakes and reservoirs should be connected to the river canal system, so that during the rainy season additional water of the floods can be released through them. Use of this water in times of water crisis. This will also help in increasing the ground water level. Fish farming can also be done in these reservoirs. For this, farmers' land can also be taken on lease if needed.

Laws should be made to replenish it from industries that use ground water - canned and bottled water, alcohol, food processing, paper, real estate, single air condition plants, hotels, rail, etc. Laws should be made and this amount to be recovered from them should be spent on the construction and maintenance of new reservoirs and lakes.

Legislation should be made for the creation of lakes / reservoirs and green areas in the expansion of cities - Laws for guaranteeing lakes, reservoirs and green areas should be made for the expansion of cities and laws for guaranteeing water harvesting system in old cities also.

Old reservoirs should be revived - The population settled in old reservoirs should be rehabilitated and revived again. Where this is not possible, the state government should construct water reservoirs elsewhere. Revival of old dams, old canal systems, and restoration of old dams and old canal systems should be guaranteed to bring water to the end. This will be helpful in increasing the ground water level along with irrigation.

Increase in forest area - There are about 6,764.14 sq km of forest area in Bihar, which is 7.1 percent of the total area of the state. This is much lower than the standards. Therefore, the percentage of forests should be increased by planting dense forests on the entire land unfit for agriculture.

Massive wastage of water from Aro - Indiscriminate operation of Aro systems in urban areas has led to the start of drinking water waste up to 70 percent. It will have to bring water waste to 10 percent by bringing major technological changes. The central government should work for the development of this technology.

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