

# GANGA

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*Water Condition in Central India*

In this summer's scorching heat 'water' has become an important topic from the poor villagers' mud house to the most sophisticated drawing rooms of the modern cities in India. With less rain in last two years and with rising temperature, water crisis was obvious. Still we had to wait till summer. Large part of the rural India from Bundelkhand to Telengana and from Marathawada to Puruliya are suffering from drought; but that really does not impact much to the people of urban India living in Delhi, Mumbai, Kolkata or other cities. Of

course, it impacted Mega Entertainment event likes IPL.

Soon the monsoon will come and with the first rain, people and Media will forget the crisis. Can they? Or collectively we shall wait for the next year water crisis and we shall wait for IPL. From the poor farmer to the highest level officials of the Govt. know that this is not a sudden problem, neither it will go away suddenly. But every one waits for summer water crisis.

In 2014 itself scientists from Stanford University in the United States had shown



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there has been a consistent drop in the average seasonal rainfall in India during the monsoon months of July-August. The study also warns of extreme weather patterns in future. The study found a significant decreasing trend in the mean rainfall during the monsoon period. It also shows that changes in atmospheric conditions have led to higher frequency of extreme weather events which are increasing the risk of drought and flood in central India.

In 2014 new Government has come to Centre. The name of the Ministry also changed to Ministry of Water Resources, River Development & Ganga Rejuvenation but water crisis **has** not changed yet, rather it is on the increasing trend simultaneously with the increase in population.

#### **NEWS:-**

##### **End of Kolkata Waterbodies**

A survey conducted by South Asian Forum for Environment (SAFE) revealed that Kolkata had lost 46% of its waterbodies since 2006, which is faster than any other metro in India. From 3874 ponds, lakes and canals 10 years

ago, the numbers has become 1670, which also warned that all the remaining would be wiped out in next 10 years, if the filling rate is same. It has been shown that 45-52% of the present day metropolitan area was covered with big waterbodies, marshland, creeks and canals, according to the Kolkata maps of 1893. These water bodies have disappeared with faster urbanisation. Two main causes of this filling up of water bodies are; 1) urbanization in main Kolkata Municipal area and 2) filling up of waterbodies in the fringes has been converted into farmlands. Kolkata has already suffered a drop in its underground watertable. Perhaps more importantly, the loss of waterbodies has left very few outlets for storm water drainage and waterbodies are crucial for Kolkata to accommodate excess rainfall. These waterbodies are helpful for underground recharge and disappearance of waterbodies is also affecting the bio-diversity. Birds and aquatic creatures' loss their ecological niches due to filling up of waterbodies.

*(Source: TOI-03.02.2016)*



### **New polymer to purify water in seconds**

Researchers from Cornell University in USA have developed a porous form of cyclodextrin filter that has displayed uptake of pollutants through adsorption at rates vastly superior to traditional activated urban filters- 200 times greater in some cases. Activated carbons have the advantage of larger surface area than previous polymers made from cyclodextrin-but they do not bind pollutants as strongly as cyclodextrin. Whereas activated carbon filters must undergo intense heat- treatment for regeneration, cyclodextrin filters could be washed at room temperature with methanol or ethanol.

*(Source:PTI Dec.26, 2015)*

### **Water Conservation can reduce pollution in India**

The recently released urban water Blueprint study by The Nature Conservancy (TNC), the largest environmental organization in the world provides an in-depth analysis of more than 2000 watersheds, serving 530 cities including Indian cities like

Kolkata, Mumbai, Gurgaon, Rajkot and several others that suffer from water pollution at the source by 10% through practice like water conservation and river bank restoration. The report also says that improving water quality at the source would mean that less than 1000 hectare of conservation action would be needed to achieve a 10% reduction in sediment or unwanted nutrient pollution.

*(Source: PTI Dec.26, 2015)*

### **Melting glaciers, rising sea level slow down Earth's rotation**

A new study by NASA confirms that the melting of glaciers near the Earth's poles, and the resulting rise in sea level is slowing down the Earth's rotation, and making each day longer. Glaciers contain a huge amount of mass near the poles, close to the Earth's axis of rotation, which runs from pole to pole. When glaciers melt, the meltwater ends up in the oceans, which have most of their volume near the equator, further away from the Earth's axis. As a result, moving mass away from the axis of rotation- would slow the Earth down.



Researchers predict that a century from now, Earth's slower rotation will make each day 1.7 milliseconds longer.

*(Source: Emily Chung, CBS News, Dec 11, 2015)*

### **Water ice found on comet's surface**

Ice was detected by the European Space Agency, on the bottom part of the main lobe of the dumbbell-shaped comet 67 P. called Imhotep. It appeared as noticeably bright patches in visible light and was located on cliff walls and debris falls. The surface of comet 67 P Churyumov-Gerasimenko, like most comets, is mainly covered by materials so dark that they appear almost black. "LA Times" reported that this is because as comets fly towards the sun, they are exposed to warm temperature that cause surface ice to sublimate or transform directly from solid to gas. Data collected by Rosetta's visible and Thermal imaging spectrometer showed that the water ice grains in the Imhoep region came in two different sizes.

*(Source LA Times)*

### **Bundelkhand is in the grip of Severe Water crisis**

Bundelkhand region is facing severest drought in last forty years. 13 districts – seven in UP and six in Madhya Pradesh – make up the Bundelkhand region. The rivers are dry, the farm land is dry food is scarce. It falls under MP as well as UP states and both the State Govt. are clueless to counter this crises. Everyone knows it cannot be sorted in short term measures still in 5 years election cycle that is the only hope.

The Jamuniya River which flows from Uttar Pradesh and merges in the Kain River in Madhya Pradesh separates the two states. In Madhya Pradesh's Tikamgarh, a city in Bundelkhand region, men with guns guard precious water of the Bari Ghat Dam of Jamuniya river. The Jamuniya is the only source of drinking water for the over one lakh people of Tikamgarh. The armed security guards have been hired by the city's municipal body to stop farmers from neighbouring Uttar Pradesh, from "stealing" the river's waters. The drought has started battle of sorts over water. As per an agreement between the two states, Madhya Pradesh receives 17



per cent, or 2.5 crore liters, of water stored in the Jamuniya Dam in Uttar Pradesh. The state stores its share in five dams, including the Bari Ghat. As the drought this year has worsened, water in the four other dams – Harpura, Charpuva, Madiya and Sudan dams – has dried up.

### **SPECIAL NEWS:-**

#### **Urban groundwater problem**

*(Continued from Newsletter from 50)*

#### **London:**

Since 19<sup>th</sup> century London expanded rapidly and the industrial, commercial and public demand for water increased. Groundwater became increasingly important as a water source. The geology of the central London shows London clay and the silts, sands and clays of the Lambeth Group; for water drilling into the confined Sand/Chalk aquifer that initially had artesian groundwater levels that became prevalent. Progressive increases in water withdrawal from the confined Chalk in the late 19th century and early 20th century eventually became unsustainable, resulting in steady groundwater level decline till mid-

1960s. By this time, G.W. levels in the central London had fallen by about 65 m. b.g.l. in 1845 to almost 100 m. b.g.l. in 1967. In 1965, it is estimated that about 480 ml/d were being withdrawn from the chalk of the London basin. Slowly this withdrawal declined steadily to about 380 ml/d in early 1980s and remain relatively stable until around 1990. As withdrawal from this layer decreased further, G.W. levels in the confined aquifers began to recover; rates of G.W. level rise, reached upto 3 m. per year in the center of the basin. In late 1980s the constituting G.W level rise was recognized as a risk with potential consequences of

- a. Flooding of subsurface infrastructure, including deep tunnels and the basements of tall buildings;
- b. Changes in geotechnical prospects that could affect the deeply founded structures such as tall building.

Although there was a clear risk from rising G.W. levels, there was little support from Govt. to address the issue. However, in 1998 some of the stakeholders launched a 5-phase



strategy, known as GARDIT (General Aquifer Research Development and Investigation Team) strategy that aimed to deliver an increase in withdrawal of 70 million lit/ day, using this water for public and private supply, and to bring G.W. levels under control. There has been a more rapid decline in G.W. levels in the central and southeast London than expected, caused restriction of withdrawal Govt.

***Chennai:***

The Ground water problem in Chennai is opposite. Chennai is underlain by various geological formations from ancient Archaean to the Recent Alluvium. Ground water in Chennai district occurs in all the geological formations viz., the Archaean crystalline, Gondwanas, Tertiaries and alluvium. The crystalline rocks are weathered and jointed/fractured. The degree and depth of weathering varies from place to place and the thickness of weathered mantle varies from less than a meter to about 12 m in this district. The successful bore wells drilled tapping the deeper fractured aquifers in Saidapet, Adyar, Kasturba nagar, Gandhi nagar

and Ashok nagar revealed the existence of fracturing down to depth of 60 m below ground level. The granular zones below the Kankar layer in the depth range of 20-28 m bgl in Poes Garden probably represent Tertiary sandstones and tube wells tapping these granular zones yield 2 to 3 lps. The C.P.R Environmental Educational Centre made a survey in and around Chennai city, and the results show that crisis in both water availability and pollution is worsening gradually with each day. On one hand, the quality of water is getting worse, and on the other hand, the level of water level is going down rapidly. Water samples from different locations were collected from wells and boreholes and analyzed for their portability. Total dissolved Solid (TDS) exceeded 500 mg/l (desired limit in drinking water) in 83% of samples ,and 72% of samples contained more than 1000mg/l. About 38% of samples contained more than 2000 mg/l of TDS, and 22% of samples contained high level of iron content. Proper water resource management and rainwater harvesting may reduce the problem.



### ***Kolkata:***

Kolkata also faced the same problem like Chennai but with different consequences. The nature of the aquifer is semi confined to confined. Kolkata is underlain by 762m thick unconsolidated alluvium, which overlies a huge pile of unconsolidated to semi-consolidated sediments deposited on the basement. The structure and lithology of the sediments indicates number of pulses of sedimentation, marine transgression and regression and tectonic uplift from Cretaceous to Pleistocene times.

A typical hydrochemical situation exists in KMC area. In the major part of KMC area fresh ground water overlies the brackish ground water except in the western part starting from Fort William in the central part on the bank of river Hugli and Kalighat in the south and in a localized body around Kasipur, west of Dumdum in the north, where brackish ground water overlies the fresh ground water. In the levee deposit on the bank of Hugli river thin lens of shallow aquifer occur within 12m bgl, where ground water occurs under water table condition. Ground water also occurs

under unconfined condition within 17m below ground level in the marshy/swampy lands around Ballyganj, Tollyganj, Tiljola, Dhakuria, Kasba, Santoshpur, Garia, Behala, Barish and Thakurpur.

The Gross Annual Ground water draft for domestic & industrial use in Kolkata is 305.20 Million litres per day. With such withdrawal Groundwater level has been lowered to a large extent over the years. Saline groundwater in shallow aquifer within 120 m. bgl in the western part of the city, and the deeper aquifer below 120 m. b.g.l. in eastern part. KMC has reported sporadic occurrence of Arsenic beyond permissible limit (0.05mg/l) in groundwater in a few places. Groundwater tapped by open wells in the marshy/swampy lands is hydraulically connected to the surface water bodies, and is biogenetically polluted.

### **Ministry level coordination to clean up Ganga**

The union Water Resource Ministries GOI has signed a joint MOU with seven Ministries to carry forward multi-sectoral activities for a minimum of



three years to rejuvenate the river Ganga. The collaboration is just to use different arms of the Govt. in pursuing the gigantic task of Ganga cleaning. The project has some specific issues like

1. Taking up comprehensive measures to determine and maintain environmental flow of Ganga round the year.
2. Rehabilitation and upgradation of existing sewage treatment facilities and taking up new projects of sewage infrastructure.
3. Treatment of sewage and other effluents flowing directly into the river through various drains by adoption of suitable technology and financial models.
4. Tackling industrial pollution.
5. Promoting sanitation in rural areas on the banks of the river Ganga and development of select village panchayats as model Panchayats to be christened as “Ganga grams”.
6. Tackling pollution coming from use of chemical fertilizer and pesticides.
7. Tackling religious refuse entering into the river, including cleaning of river surface and ghats.
8. River- front development and ghats at selected seven places and also at other places of cultural significance.
9. Development of public amenities in Char Dham Yatra and at Ganga Sagar.
10. Engagement of Ganga Task Force.
11. Providing support to states for preparation of Detailed Project Reports.
12. Coordination between various Ministers of the Central Govt. and concerned State Ghats; capacity building of State Govt. urban local bodies and Panchayat Raj Institutions.
13. GIS and special mapping of Ganga basin.
14. Research project including Ganga River Basin Management Plan.
15. Establishment of “ National Ganga Monitoring Centre”.





16. Establishment of “Ganga Institute of River Sciences” at a suitable location along Ganga.
17. Afforestation Drive for medicinal plants and tree species.
18. Conserving diversity of Gangetic aquatic life.
19. Creation of “Ganga Bahini”.
20. Communication and public outreach activities.

### **RIVERS OF INDIA**

#### **Narmada the daughter of Lord Shiva**

##### Part-5

The sources of the Son, Narmada, and the Mahanadi lie around the trap plateau of Amarkantak. A number of small detached outcrops occur along the Narmada valley, extending along an E-W line from the town of Bagh in the Gwalior region to beyond Baroda, stretching as far west as Wadhwan in Saurashtra.

Some fissure dykes occur in the Narmada valley near the Satpura range among the Gondwana rocks. It is an evidence of the igneous activities along its course.

In the west coast of India, even the large river like Narmada, there is absence of

any deltaic deposits at the mouth of the river. This peculiarity arises from the fact that the force of the currents, generated by the monsoon gales and the tides is too great to allow alluvial spits and bars- the skeletons of the deltas-to accumulate. On the other hand, the debouchers of these streams are broad deep estuaries, daily swept by recurring tides.

Since ancient times the Narmada Valley has divided India in two parts North and South. The valley itself shows a continuation of human settlement from the beginning of Stone Age upto present Day. The earliest hominid skull remains of subcontinent found in Narmada valley dates back to about 150000 years. This was unearthed in 1984 on the bank of the river at Hatmora. The isolation of the valley and the relative inaccessibility of the terrain has limited settlement of great number of people, and for a long time extensive stretches of the river bank have been home to aboriginal people. All these circumstances account for the fact that the culture of the river valley shows many distinctly regional features.



From pre-history upto present times, settlement in the valley has been continuously unabated and the valley has at all times produced cultural traditions and heritage of a distinct character. Together with her neighbour rivers Tapi (south) and Mahi (north), the Narmada, the fifth largest Indian river, is one of only three east-west flowing rivers of peninsula India with a total length of 1312 km. (contd.)

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*(Cover Picture from Patrika)*



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