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JAL CHARCHA

जल चर्चा



जल शक्ति मंत्रालय  
जल संसाधन, नदी विकास और गंगा संरक्षण विभाग  
MINISTRY OF JAL SHAKTI  
DEPARTMENT OF WATER RESOURCES,  
RIVER DEVELOPMENT & GANGA REJUVENATION

# 2nd International Conference on Sustainable Water Management

under the aegis of

## **NATIONAL HYDROLOGY PROJECT**

**Ministry of Jal Shakti, Department of Water Resources,  
River Development & Ganga Rejuvenation,  
Government of India**

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## Introduction of Minister



**Shri Gajendra Singh Shekhawat**  
**Hon'ble Minister for Jal Shakti, Government of India.**

An active politician from Rajasthan, Shri Gajendra Singh Shekhawat was born on 3rd October 1967 in Jaisalmer . He holds M.A. and M. Phil. in philosophy from Jai Narain Vyas University (JNVU), Jodhpur, Rajasthan. He is married to Smt. Naunand Kanwar.

Shri Shekhawat started his career as 'President of Student Union' at Jai Narayan Vyas University in 1992. He has been co-convenor of Swadeshi Mela in Jodhpur under the aegis of Swadeshi Jagran Manch, from 2000-2006. The event had the highest footfall of 10 lakh visitors. Working with Seema Jan Kalyan Samiti, Shri Shekhawat established 40 schools & 4 hostels along the border covering 4 major districts of Rajasthan & almost 17 tehsils.

Shri Shekhawat was elected as Member of Parliament in 16th Lok Sabha in May 2014 from Jodhpur. He served as Union Minister of State, Ministry of Agriculture and Farmer Welfare since 3rd September 2017 onwards. He was Member of Standing Committee on Finance; Member of Consultative Committee, Ministry of Water Resources, River Development and Ganga Rejuvenation, and Member of Governing Council, All India Institute of Medical Sciences during 1st September 2014 to 4th September 2017.

He was also Member of Committee on Estimates; Member, Joint Committee on the Enforcement of Security Interest and Recovery of Debt Laws and Miscellaneous Provisions (Amendment) Bill 2016 from 11th May 2016 onwards. He also served as Member of All India Council of Sports, Ministry of Youth Affairs and Sports since 27th July 2016 onwards. He was chairperson, Fellowship Committee, Lok Sabha Secretariat, and Member, House Committee during 2016-17.

Re-elected in 2019 General elections from Jodhpur, Shri Shekhawat has taken the charge of Ministry of Jal Shakti as a cabinet minister. With a passion to create an intellectual India and an incisive decision making, all the water-related issues and developments in the nation would be dealt effectively under his guidance.

गजेन्द्र सिंह शेखावत  
Gajendra Singh Shekhawat



जल शक्ति मंत्री  
भारत सरकार  
Minister for Jal Shakti  
Government of India

### MESSAGE

As you all must be aware by now that a new Ministry of Jal Shakti has been formed by integrating the existing Ministries of Water Resources, River Development & Ganga Rejuvenation, and Drinking Water & Sanitation. This has been done with a view to address water related issues in an integrated and holistic manner. I am happy that our Prime Minister has shown confidence in me and given me the opportunity to work for this cause.

The per capita availability of water is decreasing with each passing day. Water scarcity has emerged as a major challenge. Water is also a common point of concern for all of us. I am of the view that a 'Jan Andolan' is required to effectively address the issue of water conservation. I also believe that there is an urgent need to revive the reverence for nature so that protection of environment becomes part of our consciousness.

The Government of India is fully committed to fulfil the vision of providing drinking water to all households by 2024, one of the important goals of the newly formed Jal Shakti Ministry. A lot has been achieved in the water sector since 2014, especially through Namami Gange Programme, and the Jal Shakti Ministry will take the work forward on war footing.

I am happy to know that this Ministry has been publishing a monthly magazine-*Jal Charcha*. It can be a very effective platform to establish dialogue on important issues related to water. Through *Jal Charcha*, the Ministry of Jal Shakti will continue to keep our readers informed about various activities. This magazine offers a window for new perspectives and directions in the area of water resources. I anticipate that a water consciousness, which is the need-of-the-hour, will take root in our country as we go ahead with our endeavour.

I wish the team all success!

(GAJENDRA SINGH SHEKHAWAT)

## Introduction of Minister of State



**Shri Rattan Lal Kataria**  
**Hon'ble Minister of State, Ministry of Jal Shakti, and**  
**Ministry of Social Justice and Empowerment, Government of India**

Three-time MP from Haryana, Shri Rattan Lal Kataria was born on 19th December 1951, in Yamunanagar district of Haryana. He received a Masters degree in Political Science and an LL.B. degree from S.D. College, Ambala and Kurukshetra University, Kurukshetra, Haryana respectively. He is a social worker and advocate by profession. He got married to Smt. Banto Kataria on 4th May 1984.

Shri Kataria started his political career as a youth leader in 1980. He became the State Minister of Haryana in 1984 and continued till 1988. In the year 1999, he got elected for the first time as a Member of Parliament in the 13th Lok Sabha. In 2014, he got re-elected to 16th Lok Sabha. He has served as a Member, Committee on Welfare of SC & ST (14th Aug 2014 – 25th May 2019); Member, Standing Committee on Finance (1st Sep 2014 onwards); Member, Committee on Private Members Bills & Resolutions; and Member, Consultative Committee in the Ministry of Urban Development, Housing and Poverty Alleviation (15th Sep 2014 – 25th May 2019).

Shri Kataria returned to 17th Lok Sabha retaining his seat with a margin of nearly 3.4 lakh votes in 2019 General elections. On 31st May 2019, he took oath as the Minister of State for Jal Shakti, and Minister of State for Social Justice & Empowerment. With so much of experience and knowledge, Shri Ratan Lal Kataria will be a great driving force for Ministry of Jal Shakti.

रतन लाल कटारिया  
RATTAN LAL KATARIA



जल शक्ति  
और सामाजिक न्याय एवं अधिकारिता राज्य मंत्री  
भारत सरकार  
नई दिल्ली-110001  
MINISTER OF STATE FOR  
JAL SHAKTI AND SOCIAL JUSTICE & EMPOWERMENT  
GOVERNMENT OF INDIA  
NEW DELHI - 110001

## Message

The demand for water has been increasing manifold in India due to various factors like increase in population, expanding agriculture, rapid urbanization and industrialization. As a result, per capita availability of water in the country is going down. The precious water resource is therefore under stress in the country.

The creation of Jal Shakti Ministry is a landmark step in the direction of dealing with water related issues in an integrated manner. It is expected to pave the way for effective water management to tackle the drought and water stressed situations in the country.

It is, however, essential that the activities of the Government are communicated to the people accurately. It is equally important to ensure people's participation in the noble cause of preserving this precious but scarce resource. I would like to congratulate the Ministry for bringing out the monthly magazine - Jal Charcha that facilitates a dialogue between the Government and the people, at large.

I wish them success.

(Rattan Lal Kataria)



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## मुख्य संपादक की कलम से



जल चर्चा का नया अंक आपको सुपुर्द करते हुए मुझे अपार प्रसन्नता का अनुभव हो रहा है।

पिछले कुछ दिनों से जल संकट पूरे देश में चर्चा का विषय रहा है। माननीय प्रधानमंत्री जी ने नई सरकार के गठन के बाद अपनी पहली “मन की बात“ में जल संरक्षण पर विस्तृत रूप से अपने विचार रखे। माननीय प्रधानमंत्री जी के आह्वान और उनके दिशा निर्देश पर हमारे मंत्रालय ने ‘जल शक्ति अभियान’ आरम्भ किया है। इस अभियान के माध्यम से हम जन-जन को जल से जोड़ना चाहते हैं। हमारी कोशिश है कि हम जल आंदोलन को जन आंदोलन में परिणत करें। हमारी आपसे गुजारिश है कि आप भी इस आंदोलन का हिस्सा बने। हम जल को बना तो नहीं सकते पर जल को बचा तो सकते हैं।

हमारे देश में बारिश करीब-करीब मानसून के तीन-चार महीने तक ही सीमित रहती है। पर पानी की आवश्यकता हमें पूरे साल रहती है। इसलिए यह जरूरी है कि हम इस वर्षा के जल को संचय करें। वर्षा का जल केवल बड़े-बड़े जलाशयों में ही नहीं अपितु छोटे-छोटे पोखरी, तालाब, कुओं में भी संचित किया जा सकता है।

हमारा नारा होना चाहिए - खेत का पानी खेत में, गाँव का पानी गाँव में।

बीते दिनों में जलवायु परिवर्तन का प्रभाव भी बारिश पर साफ दिखने लगा है। इस वर्ष प्री-मानसून की वर्षा काफी कम हुई। मानसून का आगमन भी देर से हुआ। मानसून की प्रगति भी सामान्य नहीं रही। आने वाले दिनों में जलवायु परिवर्तन के चलते अतिवृष्टि एवं अनावृष्टि की घटनायें बढ़ेगी और उनका प्रभाव भी ज्यादा होगा। जलवायु परिवर्तन से उत्पन्न समस्याओं से जूझने के लिए हमें सार्थक कदम उठाने होंगे।

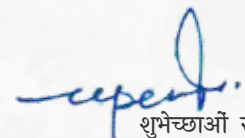
पानी के खर्च को कम करना भी पानी का संचय है। चाहें खेती हो या उद्योग हो या रोजमर्रा की जिन्दगी में पानी का प्रयोग हो, हर जगह पानी के बचाने की अपार संभावना है। कहते हैं- ‘Charity begins at home’। तो क्यों न हम पानी के बचाने की मुहिम को अपने घर से ही शुरू करें।

जल संरक्षण की दिशा में केन्द्र एवं राज्य सरकारों द्वारा कई प्रयास किये जा रहे हैं। गैर सरकारी संस्थायें एवं व्यक्ति विशेष द्वारा भी अनेक सराहनीय कार्य किये जा रहे हैं। मेरी आप सब लोगों से प्रार्थना है कि ऐसे कार्यों से हमें परिचित करायें ताकि हम उन कार्यों के बारे में इस पत्रिका में उल्लेख कर सकें।

पत्रिका को और उपयोगी बनाने के लिए आपके सुझावों एवं परामर्शों का स्वागत है। आपको यह अंक कैसा लगा, हमें बताना नहीं भूलियेगा।

आप से विदा लेता हूँ, इस आशा एवं विश्वास के साथ कि आप इस बरसात के मौसम में पानी बचाने के लिए कुछ न कुछ अपना योगदान अवश्य देंगे।

**संचित जल, बेहतर कल।**

  
शुभेच्छाओं सहित  
(उपेन्द्र प्रताप सिंह)



## KNOW YOUR RIVER BASIN - GODAVARI

### Godavari Basin

- The Godavari basin is the 2nd largest basin in the country having total catchment area of 312812 sq.km which is nearly 10% of the total geographical area of the country.
- The basin is bounded on the north by the Mahadeo Hills, the Satmala Hills, on the north-west by the Ajanta Range, on the west by the Western Ghats, on the east and south-east by the Eastern Ghats and on the south by the Balaghat Range.
- It extends over states of Maharashtra (48.6%), Andhra Pradesh (23.4%), Madhya Pradesh 10%, Chhatisgarh 10.9%, Orissa (5.7%) and Karnataka (1.4%).
- The Godavari is the biggest among the east-flowing rivers of peninsular India, originating near Trimbakeshwar in Nashik, northeast of Mumbai in Maharashtra at an elevation of 1067 m and flows for a length of about 1465 km, in a generally south-east direction before joining the Bay of Bengal.
- The interior part of the basin lies in Maharashtra Plateau, the greater part of which is at an elevation of 300-600 m sloping eastward. The eastern part of the basin is majorly covered by the Dandakaranya Range with the Eastern Ghats forming the eastern boundary of the peninsula.
- The Godavari basin receives major part of its rainfall during the south-west monsoon season.
- The Godavari flows through the Eastern Ghats and emerges out of Polavaram into the plains. At Dhawaleswaram the river divides into two branches, the *Gautami* and the *Vasishta*. Between the two lies the Godavari Central delta.
- The *Pravara* and the *Manjra* are the main tributaries joining on the right bank of the river; and the *Purna*,



the *Pranhita*, the *Indravati*, the *Sabari* are the main tributaries joining on the left bank.

- The *Pranhita* is the largest tributary of Godavari. It carries the combined waters of the *Penganga*, the *Wardha* and the *Wainganga*; and at its confluence with the *Manjra* falls into Godavari.
- The *Pravara* rises in the Western Ghats with its drainage area falling entirely in Maharashtra. The *Purna* rises in the Ajanta Range of hills flowing in a south-easterly direction to join the Godavari. The *Manjra* rises in the Balaghat Range of hills and joins Godavari from east-south-east direction.
- The *Indravati* rises on the western slopes of Eastern Ghats in the Kalahandi district of Odisha, flows through the central part of the Dandakaranya region, with its catchment in Madhya Pradesh and Odisha and rises at an altitude of 915 m before joining Godavari.
- The *Kolab* rises at an altitude of 1372 m in the Sinkaram hill ranges of the Eastern Ghats, drains the southern uplands of the Dandakaranya region. The *Machkund* or *Sileru*, a major tributary of the *Sabari* rises at an altitude of 1220 m and joins the confluence of *Kolab* and *Godavari*. The *Kanger* and *Malengar* are the two other important tributaries of the *Sabari*. ■

S.No	Principal Tributary name	Length of river (km)
1	Godavari	1465
2	Purna	382.16
3	Penganga	634.36
4	Wardha	638
5	Wainganga	635.40
6	Pranhita	111.0
9	Indravati	586.98
10	Sabari	179.99
11	Kolab	240.05
12	Pravara	198.79
13	Manjra	724.51





## KNOW YOUR DAM-RIHAND DAM

### Rihand Dam, Uttar Pradesh

**R**ihand dam, around 91 meters high and 934 meters long, is constructed on Rihand river, a tributary of Sone river, near Pipri village in the Sonbhadra district of Uttar Pradesh. The dam is part of Rihand Hydro-electric Project intended for hydro-power generation as well as irrigation. The power house is located at the toe of the dam with 300 Mega Watt installed capacity (6 units of 50 MW each). The releases from Rihand Power House are utilized for irrigation in Bihar, through the Sone Barrage at Indrapuri. The construction of the dam was completed in 1962. The operation and maintenance of the Rihand Hydro-electric Project is carried out by Uttar Pradesh Jal Vidyut Nigam Limited.

Rihand dam is a concrete gravity dam having radial crest gates with designed spillway capacity of 13342.8 cumec. Rihand dam reservoir is also known as Govind Ballabh Pant Sagar which has a gross storage capacity of 10.6 Billion Cubic Metres (BCM) and effective storage capacity of 8.9 BCM. ■



*Rihand dam gates discharging flood water*



## THE WATER DOCTOR - AYYAPA MASAGI

**T**his month the man for our interview is Ayyapa Masagi, one of the Water Warriors of India. The 59-year-old from North Karnataka combines native intelligence with modern technology and ideas, to conserve and utilize every drop of water. He has helped create countless solutions to water scarcity problems of many communities, farms, towns, and states through his water conservation techniques.

### Conversation:

You were working as a project manager in Larsen and Toubro (L&T), a well-paid job, then how the idea of water conservation struck your mind?

Mr. Masagi: *"During my childhood days, I used to wake up at 3 am with my mother to go and fetch water from the stream bed, where people dug the sand from 8 feet to 20 feet. My mother would take me along as only a small boy could fit in to fetch water. Going through this struggle every day, water conservation and solving water problems of people was always in my mind."*

You have worked on thousands of conservation projects across 11 states, created over 900 lakes in the country, recharged over 2,50,143 borewells, implemented turnkey rainwater conservation projects and many more. Where did all the motivation and idea come from?

*"I bought 6-acre land in a drought-prone region. The crop yield was good for starting 3 years, but the crops soon dried up due to severe drought. One day heavy rain happened and washed away everything. I climbed a tree and spent the whole night there. Seeing huge water gushing in, I thought of conserving the rainwater otherwise wasted."*

Mr. Masagi shared the story when he went for a water

conservation survey in Aradeshanahalli village, 25 km away from Bangalore. *"I knocked on a door and asked for some drinking water. The lady on the door could offer me water for domestic use but not for drinking as she had to fetch drinking water from 3 km away."* he says. Mr. Masagi explained that the TDS (Total Dissolved Solids) of water in the Village was 4000 ppm (parts per million) that is not good for human consumption. So he took this as a challenge and made it potable in one season.

When we asked Mr. Masagi about the number of people who benefitted from his water conservation work, he said; *"More than 2 million-plus directly and another 3 million plus indirectly benefitted. 1 lakh acre of dry land is converted to the wetland in more than 100 villages. Our earthen dam benefitted 100 plus villages. Also, our methods of rainwater harvesting and greywater usage are being used in Bangalore. Indirectly, in more than 50 cities awareness is created."*

Mr. Masagi has also written a book - "Bhageeratha - War on Water Crisis". Talking about the book he says *"Bhageeratha is a replica of my struggle and works for water. I wanted to reach the people with my book. I believe, my struggle will motivate one among 100 and will remain an indelible document in history, motivating generations."*

He says *"Each and everyone should harvest rainwater, use grey water and adopt water conservation techniques. It is very important to strike a balance between water usage and water replenishment by transforming communities into Water Warriors which is only possible by bringing basic knowledge of water conservation practices that inspire and inculcate a culture of water efficiency."* ■



“

***Each and everyone should harvest rainwater, use grey water and adopt water conservation techniques***

”



## शिव गंगा

**ज**ल संरक्षण में सामुदायिक भागीदारी कितनी सशक्त होती है, इस बात का प्रमाण हम मध्य प्रदेश के एक आदिवासी जिले झाबुआ से देख सकते हैं। वर्ष, 2013 में, जब पानी की कमी और पेड़ों की कटाई के कारण वहां के लोग बड़ी संख्या में शहरों की ओर पलायन करने लगे, उस समय झाबुआ में शिव गंगा नामक एक जन-आंदोलन का उदय हुआ जो अब भी जारी है। इससे 175 गाँवों में नई उमंग का संचार हुआ तथा सैकड़ों लोगों का जीवन बदल गया। आई.आई.टी. और इन्फोसिस जैसे शैक्षणिक संस्थान और कॉर्पोरेट्स इस आंदोलन से जुड़े हैं। शिव गंगा आंदोलन में श्री महेश शर्मा जी की अहम भूमिका है, जिन्हें, सामाजिक कार्यों के लिए 2019 में पद्मश्री से भी सम्मानित किया गया है। शिव गंगा जनसंचार का एक सशक्त माध्यम बन गया है जिसकी सफलता के पीछे उन लोगों (भागीरथों) की अहम भूमिका है, जिन्हें सामाजिक उत्सवों के दौरान चुनकर लगभग एक सप्ताह का प्रशिक्षण दिया जाता है।

“भागीरथ” के लिए केवल ऐसे ही व्यक्तियों को चुना जाता है जिनमें उत्साह, जज्बा और समर्पण की भावना हो। ये “भागीरथ” समाज में लोगों से बातचीत और जरूरत मंद व्यक्ति/समुदाय का सहयोग करते हैं। मसलों को सुलझाने का यह तरीका, शिव गंगा आंदोलन की मूल शक्ति है। इस बातचीत को स्थानीय बोली में “हलमा” कहा जाता है। इसमें सुदूर गावों से हज़ारों आदिवासी पुरुष, महिलाएं और बच्चे, स्वेच्छा से अपने खर्च पर आकर पूरे दिन निःस्वार्थ भाव से एकजुट होकर काम करते हैं।

### ग्राम अभियंताओं की अवधारणा

शिव गंगा आंदोलन में ग्राम अभियंता बनाने की एक अनूठी अवधारणा है। इसमें प्रत्येक गाँव के दो स्वयं सेवकों को ग्राम अभियंता के रूप में चुना जाता है और उन्हें श्री जी.एस. प्रोद्योगिकी एवं विज्ञान संस्थान, इंदौर, के सिविल इंजीनियरिंग के विशेषज्ञों द्वारा प्रशिक्षण दिया जाता है। ग्राम अभियंता, ग्रामीणों से परामर्श करके गाँव में जल के संरक्षण तथा संचयन की योजना तैयार करते हैं। इसके लिए ग्रामीण अपने गाँव में जल

संरक्षण हेतु स्वेच्छा से सहयोग करते हैं।

### ग्राम पुस्तकालय

झाबुआ में शिव गंगा आंदोलन के तहत 900 पुस्तकालय स्थापित किए गए हैं। प्रत्येक पुस्तकालय में विभिन्न विषयों पर लगभग 125 पुस्तकें हैं। प्रत्येक गांव में से एक परिवार को पुस्तकालय के रख-रखाव का प्रशिक्षण दिया जाता है। प्रशिक्षित परिवार को अपने घर में ही पुस्तकालय की व्यवस्था करनी होती है जहां गांव के दूसरे लोग पुस्तकों का अध्ययन करते हैं।

### ग्राम कायाकल्प

इस आंदोलन के तहत अबतक बहुत गाँवों में बदलाव की बयार प्रारंभ हो चुकी है। आंदोलन ने बयान गाँव में 2,000 लोगों के जीवन का कायाकल्प कर दिया है, जिनके पास अब साल भर आसानी से पानी उपलब्ध रहता है। निकटवर्ती जिले के गोपाल पुरा गाँव के लोगों की मानसिकता में तब बदलाव देखा गया, जब झाबुआ जिले के 16 गाँवों के हज़ारों लोगों ने गोपाल पुरा में

एकत्रित होकर जल के संरक्षण तथा संचयन की अघोसंरचनाएं तैयार करने के लिए एक होकर दिन-रात काम किया। आरंभ में अनिच्छुक होने के बावजूद भी, गोपाल पुरा के स्थानीय लोग बाद में इस आंदोलन में शामिल हुए और अब वे अपनी पानी की जरूरतों के लिए आत्म-निर्भर हैं। हाल ही में, 500 किलोमीटर की पदयात्रा आयोजित की गई, जिसमें 900 गावों के लोगों ने हिस्सा लिया।

### वृक्षारोपण

वृक्षारोपण, शिव गंगा आंदोलन का एक महत्वपूर्ण हिस्सा है। एक अनुमान के अनुसार, 2013 से लगभग 110 गाँवों में 70,000 से अधिक पौधे लगाए गए हैं। श्री महेश शर्मा, वृक्षारोपण के एक पुरजोर समर्थक हैं। उनकी राय है कि ग्लोबल वार्मिंग की गंभीर समस्या के निवारण में वृक्षारोपण सहायक सिद्ध हो सकता है।

संक्षेप में हम कह सकते हैं कि शिवगंगा जैसे आंदोलन जो कि ज़मीन से जुड़ी हुई परंपराओं को पुर्नजीवित कर सामान्य जीवन की आधुनिक चुनौतियों का सामना करने का सराहनीय प्रयास कर रहे हैं, आज की महती आवश्यकता है। ■





## KNOW YOUR AQUIFER

### AKOLA DISTRICT, MAHARASHTRA

Area (sq. km)	5428
Rainfall (mm)	750-1000
No. of Tehsil	7 (Akola, Balapur, Patur, Barshitakali, Murtizapur, Akot and Telhara)

#### Aquifer Disposition

**A**quifer is a porous and permeable geological formation from which water can be extracted economically. Sustainable ground water development and management in an area is planned based on the disposition & characteristics of the aquifer systems. Alluvium and Basalt form the principal aquifers in Akola district of Maharashtra. Two aquifer systems in Basalt and three in Alluvium are found to be prevailing in the area. Northern part of the district, covering about 2650 sq km is underlain by Purna Alluvium. Purna Alluvium has a proven thickness of more than 421 meters. Based on studies of the district, the entire thickness of Alluvium has been divided into younger Alluvium and older Alluvium. Ground water in Alluvium is found both under water table and semi-confined to confined conditions. Shallow Aquifer is found from 2 to 72 m below ground water level (BGL) depth with water levels ranging from 1.3 to 30.3 m bgl. The yield varies from 50-300 m<sup>3</sup>/day. The deeper aquifer is being tapped by borewells and it ranges from 11.3 to 421 m bgl, with the water level ranging from 8 to 55 m bgl.

#### Groundwater Management Issues:

- Declining Water Level trend is observed in 1454 sq. km. and covers 27 % area of the district.
- Inland salinity is observed in alluvium aquifer in 3002 sq. km. and covers 55 % of the total area of the district.

#### Groundwater Management Plan:

- The management plan has been proposed to manage the ground water resources and to arrest further decline in water levels. The management plan comprises two components namely supply-side management and demand-side management.
- As part of supply-side management, a total 174 percolation tanks, 185 check dams and 121 recharge shafts have been proposed, which will augment ground water resources to the tune of 35.70 Million Cubic Meter (MCM) (26.1 MCM by percolation tanks, 4.16 MCM by check dams and 5.44 MCM by recharge shafts).
- A total of 1167 farm ponds are proposed in saline patches of the district to reclaim the land for normal cultivation and reduce salinity.
- A total of 35.70 MCM ground water resources will be augmented after adopting artificial recharge measures and 18.89 MCM water harvesting potential through farm ponds can be created in saline zones which would improve the quality of ground water and soil moisture.
- For demand management, micro irrigation practice in selected areas is recommended.
- Besides, the ground water development plan has been proposed in view of the developing additional ground water resources available post supply side interventions to bring the stage of ground water development up to 60%. The additional 88.39 MCM volume of ground water generated can bring 135.97 sq km additional area under assured ground water irrigation by constructing 5304 dug wells and 589 borewells.■



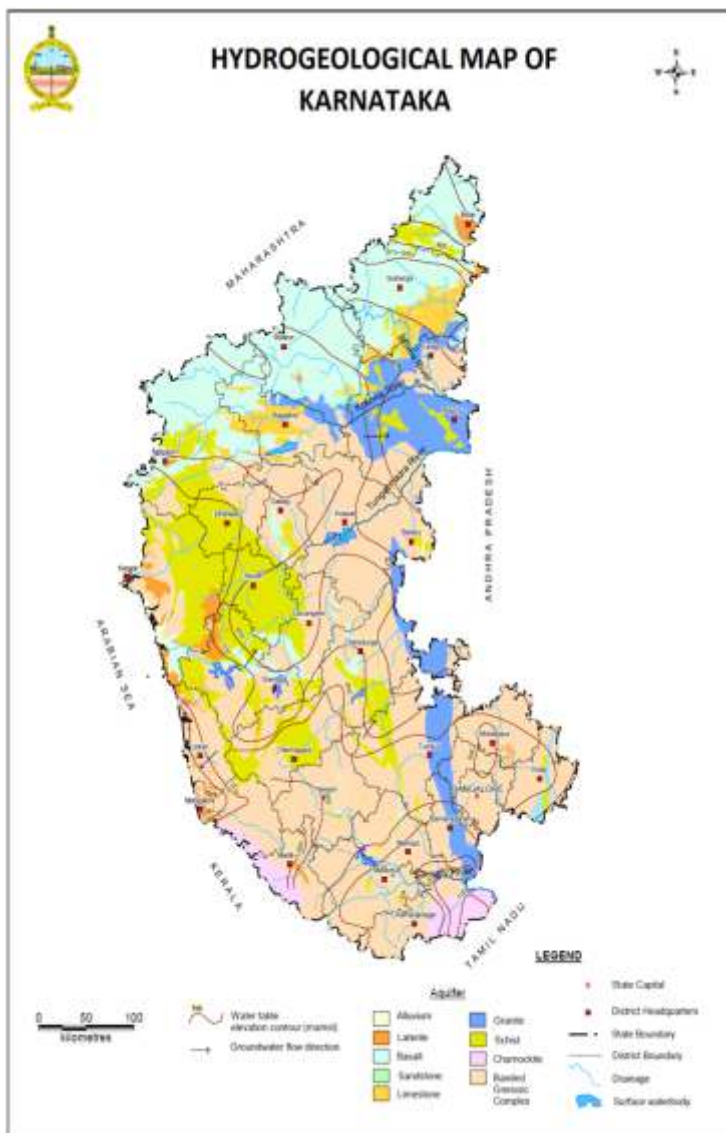
# GROUND WATER PROFILE OF KARNATAKA

With an area of 1, 91, 791 square kilometre, Karnataka State receives annual rainfall of 1779 mm across its 30 districts. The rock types in Karnataka range from Archaean to recent - major portion of the State is covered by Peninsular Gneisses, Granites and Dharwar Schists of Archaean age (Archean age is one of the four geologic eons of the

earth's history, occurring 4,000 to 2,500 million years ago). In the northern part, a substantial area is underlain by basalts, which form a continuation of the Deccan Traps occurring in Maharashtra. The recent alluvium is restricted to a narrow belt in the coastal area and along stream courses.

Aquifer is a porous and permeable geological formation from which water can be extracted economically. Sustainable ground water development and management in an area is planned based on the disposition & characteristics of the aquifer systems. The aquifer systems are classified into nine major groups depending upon their characteristics and distribution namely Banded Gneissic Complex (BGC), Basalt, Schists, Granites, Charnockites, Limestones, Laterites, Sandstones and Alluvium. The water bearing and yield characteristics in hard rock are primarily controlled by the extent of weathering and fracturing. The yield of tube wells tapping hard rocks is as high as 50 m<sup>3</sup>/hr. The tube wells in sedimentary areas can yield up to 15 m<sup>3</sup>/hr.

The summary of the dynamic ground water resources, ground water development, plan for artificial recharge to ground water reservoirs, ground water quality and ground water regulation in the State of Karnataka is given below:



Dynamic Ground Water Resources	
Ground Water Assessment Units	176 Talukas
Annual Replenishable Ground water Resource	17,00 BCM
Net Annual Ground Water Availability	14.83 BCM
Annual Ground Water Draft	9.76 BCM
Stage of Ground Water Development	66%
Ground Water Development & Management	
	Number of Assessment Units
Over Exploited	43
Critical	14
Semi-critical	21
Safe	98
Total	176
Artificial Recharge to Ground Water Reservoirs (AR)	
Area identified for AR:	74007 sq km
Volume of water to be harnessed:	11367 MCM
Feasible Numbers of AR structures:	
• Check dams	- 59853
• Percolation tank	- 10166
• Point Recharge Structure	- 2695
• Sub-surface Dyke	- 271
• Roof Top RWH (House)	- 663000
• RTRWH (Govt. & Inst. Buildings)	- 35000



## NATIONAL WATER MISSION - WATER TALK

**N**ational Water Mission (NWM) as part of their 'Water Talk' series to promote dialogue and information sharing among participants on variety of water related issues, organized the 2<sup>nd</sup> Water Talk on 1<sup>st</sup> May, 2019 on the theme "Ground Water Governance". The talk was delivered by Shri Shashi Shekhar, former Secretary, DoWR. RD & GR. Shri U. P. Singh, Secretary, DoWR. RD & GR; Shri Rajiv Ranjan Mishra, DG, NMCG; and officers from CWC, CGWB, NMCG and DoWR, RD & GR attended the programme.



Shri Shashi Shekhar

Speaking on "Ground Water Governance- Prospective Challenges and Suggested Interventions", Shri Shashi Shekhar discussed about the water availability at present in the country, diverse utilization and continuous increase in its demand, necessitating the urgent need of reforms in water sector. He highlighted the drastic decline in per capita water availability and called for a paradigm shift to address the

The 3<sup>rd</sup> Water Talk in this series was held on 24<sup>th</sup> May, 2019. Dr. Nayan Sharma (Emeritus Professor, IIT Roorkee), Shri Pradeep Gandhi (Ex. MP, Chhattisgarh) Shri S.C. Bardhan, IAS (Retd.) delivered the Water Talk. Shri U. P. Singh, Secretary, DoWR, RD & GR; Shri Rajiv Ranjan Mishra, DG, NMCG; Smt. T Rajeshwari, Addl Secretary and officers from CWC, CGWB, NMCG, CSMRS, NWDA and DoWR, RD & GR attended the



Dr. Nayan Sharma

programme. Dr. Nayan Sharma delivered his talk on 'Upgrading Technology in Irrigation, Hydro Power, Navigation and Flood Control for Optimal Water Conservation'. He highlighted the challenges, issues and flaws in irrigated agriculture, industrial sector, hydro power and river management approach.

Shri Pradeep Gandhi (Ex-Member of Parliament, Rajnandgaon, Chhattisgarh) gave a presentation on 'Water Conservation at Ground Level' and apprised that Prithvi Foundation has initiated water conservation

challenges in water sector.

Shri Shashi Shekhar discussed sustainability of Ground water backed up by scientific data citing geological, hydro-geological & terrain information. He discussed various factors impacting the ground water. He covered all aspects of water-related issues in his hour-long talk.

Shri U. P. Singh, Secretary, DoWR, RD & GR, while thanking Shri Shashi Shekhar for delivering the talk on Ground Water, stressed on the need for conservation, preservation and rejuvenation of river and water bodies in the country. He exhorted to focus on real situation and scientific studies rather than perceptions, and involve all stakeholders in water management. Participatory Ground Water Management is an efficient method to create awareness and address water management issues, he said. Earlier Shri G. Asok Kumar, Mission Director, NWM welcomed the guests. ■

work based on 6Ps (Public, Private, Panchayat, Profitable Progressive Partnership) model in villages of Chhattisgarh.



Shri Pradeep Gandhi

Shri S.C. Bardhan, IAS (Retd.), while delivering the Water Talk shared his experience and initiatives towards water conservation and management. He mentioned that huge amount of precious water is being wasted in household activities which can be easily avoided through implementing small initiatives like shaving without water and cooking our daily foods in solar cookers.



Shri S.C. Bardhan, IAS

Shri U. P. Singh, Secretary, DoWR, RD & GR extended gratitude to the speakers for delivering the talk. He felicitated Dr. D. D. Ozha who was selected by the Hindi Division of the Ministry for writing book titled 'Jal Prabandhan'. ■



## NAMAMI GANGE

### On International Biodiversity Day, Namami Gange organised workshop on Sustainable Agriscapes in Ganga Basin

On the occasion of the International Day of Biological Diversity (IDB), National Mission for Clean Ganga (NMCG) and International Union for Conservation of Nature (IUCN) organised a day-long workshop at India Habitat Center on 21<sup>st</sup> May 2019. The objective of the workshop was to understand the impact of agriculture on the Ganga basin through landscape approach and the larger ecosystem services that the



basin provides. The workshop saw participation from Ministry of Environment and Climate change, Ministry



of Agriculture and Farmer's Welfare, IIT Kanpur, BHU, Institute of Economic Growth, NEERI, FRI, WWF,

WWI, CGanga and representatives of state governments including UP, Bihar and Uttarakhand. Eminent dignitaries including Prof. RK Sinha, VC, Nalanda Open University, Mr. Amit Mohan Prasad, Principal Secretary, Agriculture, UP and participants from organisations like Welthungerhilfe, OISCA, WHO, FAO and Development Alternatives, also took part in the workshop. Shri U.P. Singh, Secretary, DoWR, RD & GR, Shri Rajiv Ranjan Mishra, DG, NMCG and Dr. Bharat Sharma, former Director International Water Management Institute (IWMI) Delhi were also present on the occasion. Two technical sessions were held on 'Biodiversity, Ecosystem Services & Sustainable Agriculture Challenges & Opportunities for India' and 'Sustainable Agriculture'; Ground Level Experiences'.

### Lecture to observe World Migratory Bird Day

To observe 'World Migratory Bird Day' (11<sup>th</sup> May 2019), NMCG organised a lecture by renowned ornithologist and wetlands conservation expert Dr. Fayiaz A Khudsar on impact of plastic on birds. Dr. Khudsar said that the river is a living system & restoring wetlands is the most efficient way of saving birds. The lecture was organised on 10<sup>th</sup> May 2019. This year's theme of the World Migratory Bird Day is 'Protect Birds: Be the solution to Plastic Pollution'. ■





## NAMAMI GANGE

### MoU signed between NMCG, HCL Foundation and INTACH for Rudraksh Plantation in Uttarakhand

A Memorandum of Understanding (MoU) was signed between National Mission for Clean Ganga, HCL Foundation and INTACH for taking up a project of 'Plantation of Rudraksh Trees in Uttarakhand' as part of CSR initiative under the 'Namami Gange' Programme. While the project aims at planting 10,000 Rudraksh trees in the catchment area of river Ganga in Uttarakhand in association with the local community and other stakeholders, it will also help in generating income for people residing in those areas. The tripartite MoU was signed by Ms. Nidhi Pundhir on behalf of the HCL Foundation, Shri Manu Bhatnagar from INTACH and Shri Rozy Agarwal, Executive Director (Finance) from NMCG on 14<sup>th</sup> May 2019 in the presence of Shri Rajiv Ranjan Mishra, Director General NMCG, Shri G. Ashok Kumar, Executive Director (Projects), NMCG and other officials from HCL Foundation, INTACH and NMCG.

### Lessons from Namami Gange to help clean



### Maharashtra Rivers

A MOU has been signed between NMCG and Maharashtra Water Resources Regulatory Authority for knowledge exchange and capacity building. This includes knowledge on the concept of e-flow, community engagement, and stakeholder mobilization among other areas of knowledge

sharing.

Shri Rajiv Kishor, ED Admin, NMCG and Shri Vinod Tiwari, Member (Law) Maharashtra Water Resources Regulatory Authority signed the MOU on behalf of their respective organizations. Shri Rajiv Ranjan Mishra, DG, NMCG and other senior officials of the Ministry of Jal Shakti were also present on the occasion.

### NMCG holds a Sensitization Programme on River Health Assessment at Kanpur

A Sensitization Programme on “River Health Assessment: Management at Kanpur” was organized at IIT Kanpur on 15<sup>th</sup> May 2019, in partnership with National Institute of Urban Affairs (NIUA) and Centre for Ganga River Basin Management and Studies (Cganga). Mr. Rajiv Ranjan Mishra, Director General, NMCG along with the sector experts of Urban River Management Plan, and Mr. Santosh Kumar Sharma, Municipal Commissioner, Kanpur; and Mr. Vijay Vishwas Pant, District Magistrate, Kanpur discussed policy plans related to river-health.

In the project “Addressing the urban drivers of human health in the Ganga River Basin”, being carried out by NIUA for NMCG, a key component is to support a pilot city in the Ganga River Basin for the development of an Urban River Management Plan (URMP). Kanpur has been selected as the pilot city for this project.

Director General, NMCG, Shri Rajiv Ranjan Mishra said, “We should treat our river as we treat our guests. When it leaves the city it should be healthy and in good spirits.” ■





## PMKSY



Secretary (DoWR, RD & GR) reviews 'Relining of Rajasthan Feeder & Sirhind Feeder'

Shri U.P. Singh, Secretary, Do WR, RD & GR reviewed the progress of works of "Relining of Sirhind Feeder" and "Relining of Rajasthan Feeder" on 10<sup>th</sup> May 2019. Discussions were held with the concerned Principal Secretary/Secretary from Water Resource Department of States of Punjab & Rajasthan regarding the future planning of works.



Commissioner (SPR) visits Patiala Feeder and Kotla Branch Canal



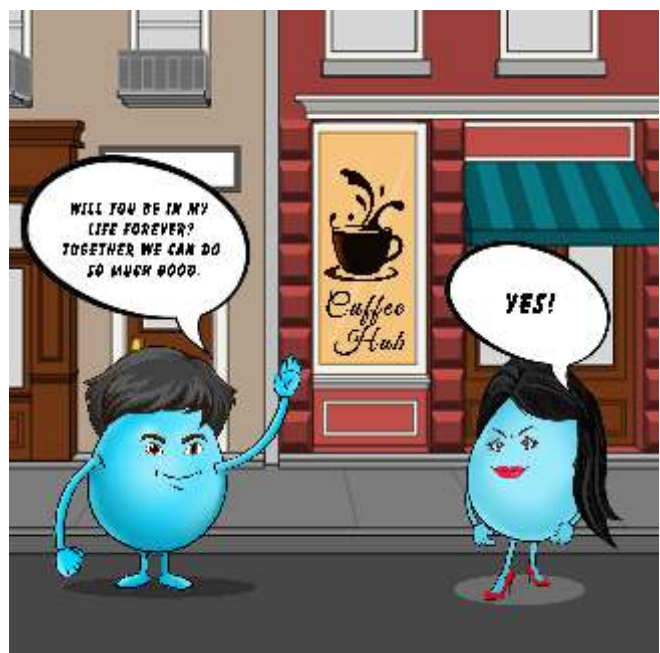
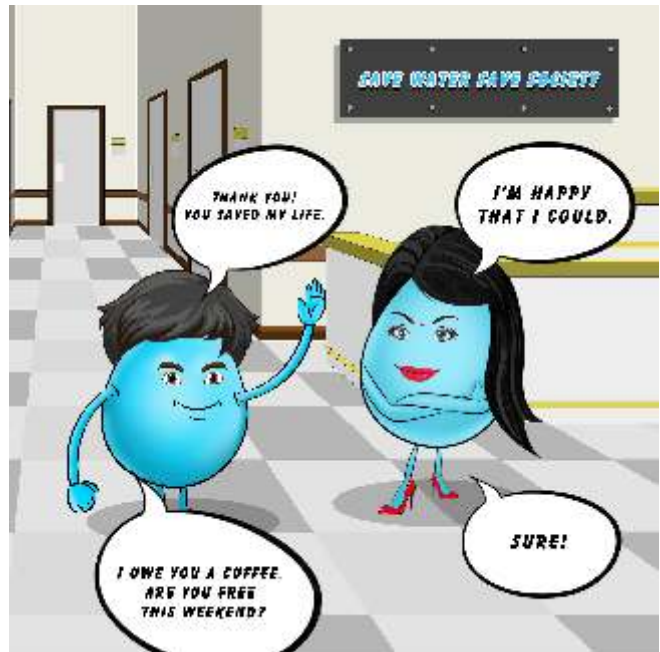
Shri Kushvinder Vohra, Commissioner, State Projects (SPR) visited the Patiala Feeder and Kotla Branch Canal, Punjab, one of the priority projects under PMKSY during 12<sup>th</sup> to 14<sup>th</sup> May 2019. He took stock of the status of works in the project and held discussions with the concerned officials from the State Government of Punjab.

- Fast Track Proforma Clearance (FTPC) accorded to 2 prioritized projects under PMKSY-AIBP during the month of May. The projects are Gadnadi Irrigation Project (Medium) with an estimated cost of Rs.950.37 crore and Nardave Irrigation Project (Medium) with an estimated cost of Rs. 1084.66 crore from Maharashtra.
- Central Assistance (CA) of Rs. 119.65 crore has been released to various Surface Minor Irrigation (SMI) schemes under Har Khet Ko Pani (HKKP) component of PMKSY during the month of May 2019.
- Rs. 100 crore has been released in May as Central Assistance for 3 MMI and 34 SMI projects under the Special Package for Completion of Irrigation Projects to address agrarian distress in Vidarbha and Marathwada districts and other chronically drought prone areas of Maharashtra. State Government has reported the completion of 9 SMI projects so far.

Shri Kushvinder Vohra, Commissioner (SPR) held meetings during 14<sup>th</sup> to 15<sup>th</sup> May 2019 to discuss the use of Drone Technology in the Monitoring & Surveying of Irrigation Projects. Invitees from Matrix Geo Solutions Pvt. Ltd. presented the scope of use of drone technology in the irrigation sector on 14<sup>th</sup> May. On 15<sup>th</sup> May, officials from the State Government of Maharashtra presented the pilot study carried out on the use of Drone Technology for monitoring of Bawanthadi Irrigation Project, one of the prioritized projects from the State of Maharashtra under PMKSY. Detailed discussions were held on the methodology to be used for monitoring of projects through Drone technology. ■



In the last story, **Mr. Neer Boond & Ms. Ambu Boond** tied the knot with seven 'Water Vows'. Let's see how they met and decided their future together.





## NEWS IN BRIEF



CWC-CPR (Centre for Policy Research) Dialogue Forum organized a talk on 'India's Water Wars – Causes, Consequences and Cures' by Dr. Scott Moore on 28<sup>th</sup> May 2019 at CWC Library Auditorium. Dr. Scott Moore is a political scientist at the University of Pennsylvania whose work focuses on water politics and policy, especially in China and South Asia. ■



A MoU was signed for the capacity building of Central Soil and Materials Research Station (CSMRS) in dam safety areas under the Dam Rehabilitation and Improvement Project (DRIP) on 15<sup>th</sup> May 2019 at CWC-HQ, New Delhi. ■



National Conference on Flood Early Warning for Disaster Risk Reduction was jointly organized by Central Water Commission and National Remote Sensing Centre (NRSC), ISRO during 30-31 May 2019 at Hyderabad under the aegis of National Hydrology Project (NHP). During the conference a **Manual on Rainfall Data Validation** was released. ■

### International Cooperation

The 23<sup>rd</sup> meeting of Technical Coordination Committee (TCC) on Punatsangchhu-1 Hydroelectric project, Bhutan was held on 3<sup>rd</sup> May, 2019 at New Delhi. The TCC is chaired by Member (Hydro), Central Electricity Authority and co-chaired by Member (D&R), CWC. ■



Water Resources Department

### Isarda Major Dam Project, Rajasthan

A MoU has been signed between CWC and WRD, Rajasthan for the vetting of design & drawings for construction of Isarda Major Dam Project. The dam is proposed to be constructed on the River Banas. It envisages to provide drinking water to 5 towns & 1065 villages of Dausa, 96 villages of Sawai Madhopur, 19 villages of Tonk, and 3 villages of Alwar districts. A team of officers of CWC visited the dam project site on 3<sup>rd</sup> May 2019. ■



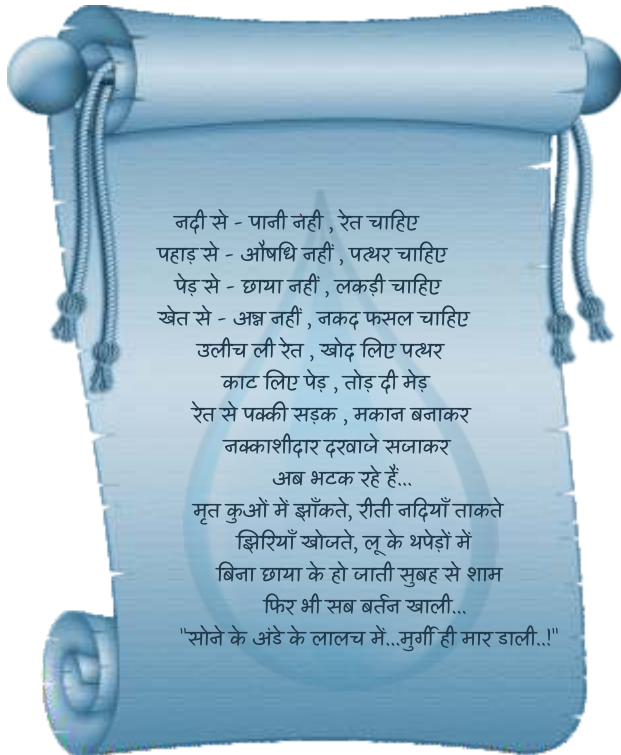
## NEWS IN BRIEF

### North Koel Reservoir Project

**R**egular monitoring of North Koel Reservoir Project is being held through Technical Evaluation Committee (TEC) under the chairmanship of Member, Water Planning and Projects (WP&P), Central Water Commission (CWC). The 20<sup>th</sup> meeting of TEC was held on 14<sup>th</sup> May 2019 at CWC headquarters in New Delhi. During this meeting, the issues regarding the tender of Right Main Canal (RMC), work for Jharkhand portion up to Bihar border, the status of Revised Cost Estimates (RCE) of North Koel Reservoir Project; the matter regarding readiness by WAPCOS to start the work at dam site immediately once the NOC from the State Forest Department is obtained, the process for handing over of all the required land by the State governments of Jharkhand and Bihar to WAPCOS for execution of works within stipulated time and status of balance works being executed by WAPCOS etc., were discussed. ■



CWC is closely monitoring the progress of 99 AIBP Projects under Pradhan Mantri Krishi Sinchayee Yojana. CWC officials visited 14 projects in 6 states during the month of May 2019 to ascertain progress, identify bottlenecks and fund requirements. These projects are Tadipudi LIS, Thotapally and Tarakaram Teerta Sagaram in Andhra Pradesh, Tral Lift in Jammu & Kashmir, Karanja in Karnataka, Arjuna, Morna and Kudali in Maharashtra, Sri Komaram Bheem, Gollavagu, Rallivagu, Peddavagu (Nilwal and Jagannathpur) projects in Telangana and Madhya Ganga Canal in Uttar Pradesh. ■





## FIELD INVESTIGATIONS BY CSMRS

### Isarda Dam, Rajasthan

**T**eam comprising experts from CSMRS, CWC and GSI led by Shri M. Lal, Chief Engineer, CWC visited Isarda Dam, Rajasthan for inspection and finalization of investigations required for the design of composite dam. The main objective of the Isarda Dam Project is to store the available water of Banas River.



### Kabrai Dam, Mahoba, UP

A field team of CSMRS visited the Kabrai Dam, Mahoba, Uttar Pradesh in connection with collection of disturbed and undisturbed soil samples for laboratory investigations at CSMRS to study the



strength and deformability characteristics.

### Pakal Dul HE Project, Kishtwar, J&K

A team of rockfill division visited Pakal Dul HE Project, Kishtwar, Jammu & Kashmir for carrying out field gradation analysis of prototype rockfill material and collection of modeled rockfill material from riverbed



materials.

### Vishnugad Pipalkoti H E Project (4×111 MW) Uttarakhand:

A team of concrete division of CSMRS visited Vishnugad Pipalkoti H E Project, Uttarakhand for inspection of the Quality Assurance/Quality Control works being carried out by the project authorities. CSMRS plays an advisory role for providing expert advice/technical solutions to the problems posed in the project as and when required by the project authorities.



### Swacchata Hi Sewa Abhiyan:

As part of Swacchata Hi Sewa Abhiyan, CSMRS officials cleaned the stretch of Yamuna River near Geeta Colony, Gandhi Nagar, New Delhi on 25th May 2019. ■





## NEWS IN BRIEF

Central Water & Power Research Station (CWPRS), Pune carried out extensive studies towards designing shotcrete mix design for arresting seepage. Scientists from CWPRS visited dam site for quality inspection & guidance during the shotcreting of upstream face of Temghar Dam in Pune, Maharashtra. ■



*Inspection of Shotcreted Surface*



*Shotcreting in process at Site*



Consultation Workshop under DST (Department of Science & Technology) sponsored Networking Project on “Revival of Village Ponds” was organized by Central India Hydrology Regional Centre (CIHRC) of National Institute of Hydrology (NIH), Bhopal at Sahawan Village, Banda Block, Sagar. During the workshop NIH scientists, water quality experts and livelihood experts interacted with the stakeholders. Field visits were also undertaken to village pond and ground wells for proposed research work in the study area. ■



## THE GREEN RAMESWARAM TRUST

The Green Rameswaram Trust, based out of Tamil Nadu, has been extensively involved in water conservation projects all over India. The trust has been primarily working on old water management systems called *Teerthams* which have now become spots of tourist attractions for pilgrimage and have lots of potential for replication.

### Revival of water bodies in Rameswaram

Many of Rameswaram's traditional water bodies have been seriously degraded which has led to water quality issues and an increased exposure to health risks. Green Rameswaram Trust in collaboration with IIT – Chennai, adopted low cost phyto remedial technologies to renovate and revive the traditional water bodies. The action is a blessing for the people of Rameswaram as it improved the ground water levels, water quality, tourism potential and human connectivity to the nature.

### Scope of Replicability

- There is a vast scope for replicating the methodologies used in renovating the traditional water bodies in other districts of Tamil Nadu as well as other States of India. Green Rameswaram has carried out renovation of 30 traditional water bodies. The scope for replication is large.

### Impact

- Spotting the locations in the Google maps along with the history of water bodies helps the tourists to understand the culture, spirit of *Teerthams*, and the work done for renovation.
- Degraded ponds and wells have been revived which has resulted in a surge in the water level in the surrounding areas.
- Publications on the renovation of *Teerthams* through social media and newsletters create a credible impact in the eyes of pilgrims and stake holders.

### Community Based Participatory Approach:

Kudimaramathu – an age old community management system to manage the common water bodies was replicated in this Green Rameswaram Project. *Teertha Mitras* identified from the locality ensure local management. These *Teertha Mitras* ensure that the *Teerthams* are clean and green. Green Rameswaram is acting as a facilitator to give the ownership back to the community through panchayats, island development committee, religious & charitable endowments. ■



Teertham #1



Teertham #2



## K V STEEL PLANT, VISAKHAPATNAM

**K**endriya Vidyalaya Steel Plant, Visakhapatnam has done some pioneering work in the field of water conservation and spreading awareness about the need to preserve and optimise the use of water.

The school has organized many competitions for students and staff members to increase awareness about water conservation. These include Painting Competition, Essay Competition, Elocution contest



*Poster making competition being organized.*

and Debate Competition.

To generate awareness about the topic, film-screening depicting the scarcity and need of water preservation was also organized. The film showed a world with very little water to generate necessary alarm about the gravity of the situation.

Brief description about the work done:

a) Posters and paintings have been displayed very prominently at many places and within the Vidyalaya premises.

b) Pits to conserve rainwater have been dug in the school ground to increase the awareness about rain water conservation. Students are taken to these areas to educate them about the need to conserve rain water and the methods of doing it.

c) A group of teachers handle the task of minimizing water wastage and capping water leaks (if any). Students are also included in the team (by rotation). This has ensured that the water wastage has become almost nil.

Students have been made the agents of water conservation drive. Every student is able to carry the awareness back to home to parents and his/her

residential area. The feedback has been very very positive. The various steps taken by the school have generated lots of awareness about the need to save water among students, teachers and parents.

These steps are taken continuously and there has been no let-off in the awareness programmes and competitions.

The water scarcity in Visakhapatnam town during the last few years has made students aware of the problem and the school's efforts have made big impression on the young minds of the students. ■



*Pits to conserve rainwater.*



*Water conservation posters made by students.*



## प्रमुख जल वैज्ञानिक की ग्रामवासियों से चर्चा

उदयपुर। पानी की कमी से निपटने के लिए पुरुष जहां एसीकर, नलकूप, कुँआ जगहा करवाना, दूर किसी स्त्रोत से पाइप लाइन बिछाने जैसे भौतिक कार्यों पर जोर देते हैं, वहीं महिलाएं मानती हैं कि पानी की बचत करना ही पानी की बढ़ोतरी है।

पुरुषों व महिलाओं के पानी के प्रति दृष्टिकोण की यह भिन्नता गुजरात को उदयपुर के हिल्सा, सुन्दरपुर, बडगांव, वरणी गांवों के कृषकों के साथ परिचर्चा में सामने आया। ग्रामवासियों के साथ इस संवाद का आयोजन वेस्टर्न रिजिनी विश्वविद्यालय, विद्या भवन, महाराणा प्रताप कृषि विश्वविद्यालय आदि के

तत्वावधान में किया गया। परिचर्चा में यह भी ज्ञात हुआ कि पानी की कमी परिवार में अशांति का एक प्रमुख कारण बन रहा है। घर की महिलाएं पानी की व्यवस्था करने के नाम पर वितायस्त रहती हैं तथा पुरुष इस तनाव में रहता है कि घर, खेत के लिए पानी का इंतजाम कैसे करे। ग्रामवासियों के साथ चर्चा में लाओस के डॉ. जोन वार्ड, ऑस्ट्रेलिया की मारिया वरुआ; ब्रेंडा, डॉ. वराल महेश्वरी, विद्याभवन के डॉ. अजित मेहता, डॉ. एएस जोषा, हसमुख गदलोत, सीटीएड के प्रो. पीके सिंह, शोधार्थी योगिता दशरो, प्रहलाद सोनी, पूर्व अजीबाण अभियंता मदन छाजेड़ ने चर्चा की।

# China shares Brahmaputra data

Following the Doklam stand-off, Beijing had stopped sharing the data on river in 2017

New Delhi: China has begun sharing hydrological data with India on the Brahmaputra river for this year's monsoon season, a senior Water Resources Ministry official said Monday.

The Brahmaputra originates in China's Tibet and flows into Arunachal Pradesh and Assam. It later drains into the Bay of Bengal through Bangladesh.

The data is necessary for flood management downstream when the rivers swell due to rains.

It is also expected to start sharing data on the Sutlej river from June 1, the start of monsoon season in the country, the



China provides data from three hydrological stations—File photo

official said. Sutlej, a tributary of the Indus, also originates in Tibet, and flows into India and then enters Pakistan.

China provides data from three hydrological stations Nagesha, Yangus and Natica located on the mainstream of the Brahmaputra, also known as Yarlung Zangbo Data for the

### FLOOD MANAGEMENT

■ Last year, China provided data even beyond October 15 after the river witnessed formation of a lake due to a landslide that increased the water levels

■ The data is necessary for flood management downstream when the rivers swell

The data is necessary for flood management downstream when the rivers swell due to rains.

Following the Doklam stand-off, China had stopped sharing the data on the Brahmaputra river in 2017, claiming that the hydrological data gathering sites were washed away due to floods.

However, with relations thawing, the two sides again resumed sharing of data in 2018. They also signed two Memorandum of Understanding for this. The Brahmaputra data is shared from May 15, while in case of Sutlej it starts from June 1 till October 15.

PTI

# Namami Gange holds 4th consultative meeting

By Mail Today Bureau in New Delhi

National Mission for Clean Ganges (NMCG), in collaboration with PTC Financial Services Limited, organised the 4th consultative meeting on 'Development of Sewage Treatment Plants through Hybrid Anamni Mode (HAM)' recently at India Habitat Centre, Delhi. There was wide participation of all the major players in the water-sewerage sector as well as other stakeholders, developers, consultants, financial institutions, bankers etc. including Adani Group, Larsen and Toubro, Suez India, UP Jal Nigam, Vistas, JICA Bank, World Bank, Union Bank of India, Federation of India Chambers of Commerce & Industry (FICCI), Aquanomics System Limited, Korfia Engineering Limited, International Finance Corporation (IFC), NRI, Mahindra, Gesellschaft für Internationale Zusammenarbeit (GIZ), KPJG, Priyadarshini Coopers (PwC), KPCPL etc.

Addressing the stakeholders, Upendra Prasad Singh, secretary, ministry of water resources, river development and Ganga rejuvenation, said that the Hybrid Anamni Mode (HAM) is proving to be a gamechanger and this innovation is adding value to projects in sewerage infrastructure. Besides taking a role model by players from different sectors, he believed that quality of overall delivery would also improve under HAM in the future.

Rajiv Mishra, director general, NMCG was pleased to see all the stakeholders on one platform and was confident that the discussions would help to build understanding of the concerns associated with qualification, financing, incentives and other terms of bid documents on development of sewage treatment plants (STPs) under HAM with public private partnership (PPP) and create readiness



in the mind of investors. Mishra looked forward to the suggestions, addressing the challenges and expediting the processes. At the interactive session, the secretary, along with the NMCG team, made sure that all the valued inputs and suggestions by stakeholders, prospective developers, contributors, and investors would be included in the policy framework of HAM projects. Before HAM projects, the focus was more on asset creation which led to under utilisation and inefficient operation of many STPs. Under the HAM with PPP projects, upto 40 per cent of the capital cost of the project is paid by the government during the construction phase of the project. The remaining capital investment on the project, the cost of operation

and maintenance of STP are paid over a period of 15 years as quarterly instalments. The payment of the project in the given period has been linked to performance standards of the project. Interest rate risk and inflation risk is also covered in the model. The pioneering projects in sewerage infrastructure under HAM with PPP have been prepared under this model, out of which six packages have already been awarded, bids have been received in two projects and nine are under the process of bidding. The HAM has been further improved through 'one city, one operator' model, wherein operations of new STPs, existing STPs, pumping stations and pipe lines are all given to one operator in advance. This

initiative is proving to be a paradigm shift in the waste water treatment sector giving one step addition to sewage treatment of an entire city. The single ownership and accountability for end-to-end operations assures consistent performance for both existing and new sewerage infrastructure. The innovation has been recognised at the international level. Varanasi waste water treatment project was recognised as the 'Water Deal of the Year' by International Infrastructure Journal and recently NMCG was awarded distinction as 'Public Water Agency of the Year' at Global Water Summit, London. Besides, various other subjects were also discussed during the consultative meeting, including the technical and financial criteria needed to bid in the project, experience in the sector, funding issues, concerns of banks and other financial institutions.

# Water Related Issues should Now Become Our Priority- U.P. Singh



New Delhi, U.P. Singh, Secretary, Ministry of Water Resources, River Development and Ganga Rejuvenation expressed concern that in spite of reports of water crisis in many parts of the country, water related issues have not got adequate space in our conversations and our concerns in society as a whole. New developments in the field of telecommunication and automobile sector easily get our attention and find space in centre stage but water which is the source of all life forms and essential for many of our needs is still not a subject of our concern in society as a whole. Addressing the inaugural session of 'Restoring Water, Restoring Nature-II' organized by Water Digest in New Delhi today, he said that the quality of water is worsening due to industrial pollutants and new technologies have to be devised to maintain the quality of water to fulfil all our needs.

The conference was organized to raise awareness and encourage action around water and related issues. The main purpose was to create a platform to discuss and showcase the best concepts of water conservation and management in synchrony with the UN's sustainable development goals (SDG). Masood Husain, Chairman, Central Water Commission stressed the need of water management to fulfil our needs of drinking water, irrigation and industrial sector for

entire population. He said that 80 percent of water is being used for agriculture and practices of micro irrigation, drip irrigation should be encouraged for efficient use of water. Civil society still do not understand all aspects of water crisis and mass awareness movement is required to educate masses. He further said that to check over exploitation of ground water, inter basin transfer of river water, micro irrigation techniques and recycle and reuse of water is the need of the hour. Rajiv Ranjan Mishra, DG, NMCG said that we do not really care about our rivers in spite of the fact that rivers are essential for our existence. We need to create awareness about aquatic life in rivers, biodiversity and flora and fauna in rivers so that these could become a subject of conversation in our households and we could adopt a more caring attitude towards our rivers. The conference was attended by around 150 participants from the industry, government bodies, development agencies and institutions. Three sessions along with panel discussion was organised on 'Water for all: A platform to discuss available water resources, and the efforts needed to achieve SDG 6'; 'Irrigation-Strategies to balance available resources and adapt technological innovativeness'; and 'water tributary care about the rivers'.





**नया मंत्रालय बना 'जल शक्ति', कमान शेखावत को नई दिल्ली (भाषा)। जल संसाधन और पेयजल एवं स्वच्छता मंत्रालयों को मिलाकर बनाए गए नए 'जल शक्ति' मंत्रालय का कार्यभार गजेन्द्र सिंह शेखावत को सौंपा गया है। शेखावत ने शुक्रवार को मंत्रालय का कार्यभार संभाल लिया। उन्होंने कल मंत्री पद की शपथ ली थी। चुनाव प्रचार के दौरान मोदी**



ने जल संबंधी मुद्दों से निपटने के लिए एकीकृत मंत्रालय के गठन का वादा किया था। प्रभार संभालने के बाद शेखावत ने कहा, जल संबंधी सभी कार्य एक ही मंत्रालय में निहित होंगे। मंत्रालय का दायरा बढ़ाते हुए इसमें अंतरराष्ट्रीय से लेकर अंतरराज्यीय जल विवाद, पेयजल उपलब्ध कराने, बेहद जटिल नमामि गंगे परियोजना, गंगा नदी और उसकी सहायक एवं उप सहायक नदियों को स्वच्छ करने की महत्वाकांक्षी पहल को शामिल किया जाएगा। मोदी सरकार ने पहली बार गंगा को स्वच्छ बनाने की परियोजना शुरू की थी जिसका जिम्मा पर्यावरण एवं वन मंत्रालय से जल संसाधन मंत्रालय को सौंपा गया था और भारी भरकम आवंटन के साथ नमामि गंगे परियोजना शुरू की गई।

मंत्री ने कहा कि पार्टी के घोषणापत्र में किए गए वादे के तहत हर किसी को स्वच्छ पेयजल उपलब्ध कराना हमारी प्राथमिकता होगी। रतन लाल कटारिया को नवगठित मंत्रालय में राज्य मंत्री बनाया गया है।

**वर्षा के जल को संरक्षित कर जलसंकट से निपट सकते हैं: महेंद्र मोदी वर्षा जल संरक्षण के लिए कार्यशाला आयोजित**

हरिद्वीप, उत्तरांचल, उत्तराखण्ड

देश के महानदी में नवनियुक्त बहुसंख्यक इमारती से पहले खले जल को संरक्षित किया जाये, जो देश में कानूने हर एक जल संकट से उबरने का सकारण है। उत्तर प्रदेश सरकार के जल विशेषज्ञ अधिवाहक सहायक महेंद्र मोदी ने खनिवार को यशोवर्धन विकास प्राधिकरण (जीटीए) जलवाहक कक्ष में अर्द्धसंरक्षित जल संरक्षण कार्यशाला में खोलते हुए यह बात कही। उन्होंने बताया कि महानदी के अर्द्धसंरक्षित इमारती से वर्षा का जो जल गिरता है वह सीधे नाली और सीवर लाइन में जाक है। जिससे कोई उपयोग नहीं होता। यदि इन वर्षा जल को वैधानिक रूप से संरक्षित कर पब्लिक के लिए स्टोरेज किया जाये तो खेतों के पानी को समानता लाभ समानता को बढ़ाती। उन्होंने बताया कि लखनऊ को पुलिस बलियों और इन्वेंटरी में वर्षा जल को



पुलिस महानिदेशक नौदर मोदी पुलिस बलियों के अलावा वर्षा जल संरक्षण के लिए भी प्रोत्साहन बढ़ाएंगे। कार्यशाला में मौजूद जीटीए के अधिकारियों, उदात्त अधिकारियों व निदेशकों को संबोधित करते हुए

मोदी ने कहा कि जिस सकारण जल को हर सप्ताह नैने जा रहा है उसमें अपने खाली नाली को पानी जलसंकट से जमाक कर लिया है। उन्होंने अधिवाहक के अधिवाहक से आवाह किया कि वे यशोवर्धन शहर में जल संरक्षण परकें तैयार करें। जोकि खेतों में जलसंरक्षण के प्रति जागरूकता बढ़ाए।

कार्यशाला में उन्होंने कहा कि देश उन्मुख राशियों में जिलानी वर्षा होती है वह जो हमें जलसंरक्षण को प्रोत्साहन देना चाहिए। जल से जो वर्षा अर्द्धसंरक्षित इमारती में जल संकट से उबरने में मदद मिल सकती है।

कार्यशाला में जीटीए उपाध्यक्ष नंदन चर्मा, अधिवाहक सुपर गांव, यशोवर्धन शहर के निधि, मुख्य अधिवाहक निधि व अर्द्धी प्रमुख अमरेंद्र कुमार शर्मा को बड़ी संख्या में निदेशक व अधिवाहक विभागों के अधिवाहक मौजूद थे।

**Yamuna cleaner this April than it was previous year, finds study**

Ritam Halder@timesgroup.com

**Now Delhi:** Yamuna water quality has improved substantially in the past one year, a recent report submitted to the NGT-appointed monitoring committee has revealed.

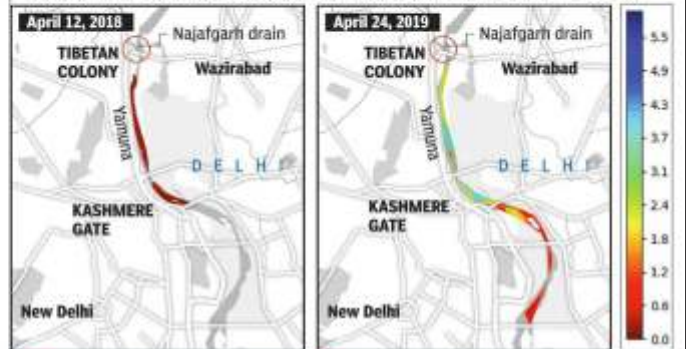
According to the water quality analysis, submitted by the researchers of the University of Chicago as part of the Water to Cloud project, the amount of oxygen dissolved in water which should be a minimum 4, was almost 0 in April 2018. "The river was also observed to be sludgy and stinky. However, there seems to be quite an improvement in dissolved oxygen (DO) levels in April, 2019. While there are some pockets along the river where the DO levels are 1 mg/l or near 0, in many other pockets the DO levels were seen to be above 5 mg/l. A possible reason is the better flow observed in the river," the report, a copy of which is with TOI, stated.

Himank Sharma, team leader, Water to Cloud project, said the improvement in water quality in April 2019 compared with April 2018 can be attributed to a better flow observed in the river by the field team. "However, we do not know if this better flow is due to upstream rains or frequent opening of barrages or some other intervention by the authorities," he said.

The report also points out that a similar improvement was observed in biological oxygen demand (BOD), chemical oxygen demand (COD), and T.Coli values when the lab sampling data was compared between April 2018 and February 2019.

**A TALE OF TWO APRILS**

Najafgarh drain starts discharging actively into the Yamuna around 10am every day



- ▶ Dissolved oxygen (DO) was almost 0 in April 2018 (note the heavy concentration of the river where the DO levels were 1mg/l or closer to 0, in many others, these were found to be above 5 mg/l a reflection of better water quality than before
- ▶ Clear improvement seen in April 2019
- ▶ While there were some pockets along the river where the DO levels were 1mg/l or closer to 0, in many others, these were found to be above 5 mg/l a reflection of better water quality than before

**WHOI | Researchers say this could be because of an improved water flow in the river**  
Source: Water-to-cloud project, an initiative of the Institute for Molecular Engineering at University of Chicago

The Water to Cloud project, supported by the Tata Centre for Development (TCD), has been monitoring Yamuna in Delhi, among other rivers, through its innovative technique using sensors mounted on a boat and was able to map the river temporally and spatially for various parameters.

"We started monitoring Yamuna in Delhi in July 2017. Since then we've conducted 36 boat ride experiments and collected 60,078 data points from the river. Additionally, we've also conducted multiple lab samplings along the river to capture ex-situ parameters (which cannot be measured using sensors) such as BOD, COD, FColi, etc," Sharma said.

Activists, however, are sceptic of the observation. "Need specific site-wise data to get a clearer picture. Such a remarkable improvement is hard to believe. Timing of the data taken also needs to be seen," said Manoj Misra, co-venturer of Yamuna Jyoti Abhiyan.

Earlier, Central Pollution Control Board's data of 2017 and 2018 showed that in one year, the 23-odd drains of the city dumping waste water into the Yamuna have reduced the flow and BOD load. While 178 millions of litres per day (MLD) has been reduced in terms of waste water volume, 56 tons per day has been reduced in terms of BOD load, a CPCB report stated.

According to the monitoring committee for Yamuna cleaning, this (the CPCB report) is a substantial improvement. "Things are now looking up. Next year, there should be a further reduction," a government official, who wished not to be named, told TOI, adding that one year's data can also give misleading result and there is a need to look for a trend.



## IN NEWSPAPER

## 1000 लोगों की प्यास बुझा रही है 500 साल पुरानी यह बावड़ी



दिल्ली | दमोह किले के खमोरेवकी गांव की 500 साल पुरानी बावड़ी करीब एक हजार लोगों को प्यास बुझा रही है। यहीं में गांव के सभी हैंडपंप और कुर सूख गए हैं। यह बावड़ी आज तक नहीं सूखी। असमय के गांव वाले भी यहां पानी लेने आते हैं। गुटखा खाकर बावड़ी में जाने, नहाने और धोने धोने पर 51 रु. जुमाने तक किया गया है। निम्न तोड़ने को सूचना देने वाले को 51 रु. का फुसकरा दिया जात है। ये निम्न बावड़ी की दीवारों पर भी लिखे हैं। गांववाले इसको देखेगा करते हैं। यह बावड़ी चट्टानखालीन गडकों ने बनवाई थी।

## Against the odds, Centre forging ahead with ambitious river-interlinking project

RADHESHYAM JADHAV  
Photo: May 1

Will the interlinking of rivers mitigate drought and the effects of floods? Yes, says the Centre. Notwithstanding the debates on the merits and demerits of the plan, the Ministry of Water Resources wants to take forward the interlinking of rivers.

"Interlinking of rivers can play a major role in water management in the country," the Ministry of Water Resources, River Development and Ganga Rejuvenation told the Rajya Sabha in February. "The National Perspective Plan (NPP) for transferring water from water-surplus basins to water-deficit basins was prepared in August 1980."

The Ministry added that the link projects under the NPP are designed to minimise wa-

ter going to sea unutilised, and to mitigate the "effects of floods and droughts to some extent".

## Long-term plan

Many regions face severe drought routinely, and the States and the Centre try to tackle the situation with emergency plans. It seems that the only concrete long-term plan in place is that of interlinking of rivers.

The NPP is envisaged to give the benefits of 25 million ha of irrigation from surface waters and 10 million ha by increased use of ground waters, raising the ultimate irrigation potential from 140 million ha to 175 million ha. It is also seen to lead to the generation of 34 million KW of power, apart from the incidental benefits of flood con-

trol, drought mitigation, etc. Under the NPP, the National Water Development Agency has identified 30 links (16 under the Peninsular Component and 14 under the Himalayan Component) for the preparation of feasibility reports (FRs). The government has identified four priority links for the preparation of detailed project reports (DPR) under the Peninsular Component: the Ken-Betwa link project (UP and MP), the Damanganga-Pinjal link project (Maharashtra and Gujarat), the Par-Tape-Narmada link project (Maharashtra and Gujarat) and the Godavari-Conary link project (AP and TN). Ministry data show that DPRs are ready for the first three projects, while FRs are ready for 13 links.

Under the Himalayan Com-

ponent of the NPP, the Yamuna-Rajasthan link has been proposed; it is an extension of the Sarda-Yamuna link canal proposed to originate from Nepal. The link is planned to take off from a barrage across the Yamuna.

## Serious crisis

The Mihir Shah Committee report titled 'A 21st Century Institutional Architecture for India's Water Reforms' observes that many of India's peninsular rivers are facing a serious crisis of post-monsoon flows.

"The single most important factor explaining the drying up of India's peninsular rivers is the over-extraction of groundwater. The drying up of base-flows of groundwater has converted so many of our 'gaining' rivers into 'losing' rivers," the report adds.

## Noida all set to 'top-up' its depleting ground water tables

VANDANA KEELOR @ Noida

IN an effort to make the city self-sustainable and eco-friendly, the Noida Authority has decided to recharge its depleting ground water tables. It will install nearly 200 rainwater harvesting pits by June end.

As per recent data from the Central Ground Water Board, the ground water level in Noida has been dropping at an estimated average of 1.5 metres annually for the past five years. Taking note of this, the official said recharging of water table is the need of the hour and must be executed at all levels.

According to the officials, rainwater harvesting pits will be restored and dug afresh across the city's parks and green belts. "We have three horticulture divisions," noted Rajeev Tyagi, General Manager, Projects, Noida Authority.



## NATURAL WETLAND

The Noida Authority has said it has roped in Ramveer Tanwar, a local water environmentalist, to restore a natural wetland in the city. This pond, which covers approximate area of 1.8 hectare, is located opposite to Sector 137 Metro station in Noida. It was lying neglected for a long time

"While the first division will tackle 25 harvesting pits, the second and third will handle 94 and 353 pits respectively. We have already started the work to ensure the pits are ready by June end," the official said.

Tyagi further said all new parks in the city will have zero water discharge policy. "All the waste water will be treated inside the parks itself. Then it will be used for irrigation of plants and general maintenance of the parks," he added.

## Go for drip irrigation

Punjab lures farmers, needs long-term perspective

IN a push to averting agriculture distress as aridity stares at Punjab following over-exploitation of groundwater, the state government is persuading farmers to go in for the drip irrigation technology. The 80 per cent subsidy offered on the cost of the project to the cotton farmers of the Malwa belt should attract the water-stressed peasants to the scheme. The demonstration plots will educate the farmers on how micro-irrigation works. The crop is irrigated by dripping, or sprinkling water on the surface, or subsurface. It is pumped through a network of pipes emanating from a canal or harvested water. To some extent, this meets the challenge of unreliable monsoons.

Micro-irrigation also holds the potential of providing more efficient use of water as its loss is minimised in comparison to the conventional flooding method of irrigation and also raising crop productivity. The neighbouring Haryana showcases a dramatic turnaround. In the last decade, the centres for vegetables in Karnal set up with technical know-how and assistance from Israel that also rely on drip irrigation have been a success. The cultivators have registered a manifold increase in the vegetable yield and at the same time registered an almost 50 per cent decrease in water use and a significant reduction in fertiliser/pesticide input.

As Punjab goes in for this corrective measure, it would do well to learn from the southern and western states which have experimented with micro-irrigation. Since erratic electricity supply is a problem, the solar-powered lift micro-irrigation project would be a more reliable option. The government's scheme would be myopic if it did not take into consideration the cost and recurring maintenance of drip irrigation, especially by the small farmer. It must factor in the funds required to take care of wear and tear of components such as filters, pipes etc. Only then would it be beneficial to the farmer in the long term. Coupled with weaning farmers away from water-intensive crops and monitoring of the use of this depleting resource, it is crucial that the government implements its water management policies strictly, lest the fertile land turns barren.



## IOCL INTERVENTION IN WATER SAVING TECHNOLOGIES



400 farmers directly and provide capacity building to more than 3000 farmers for adopting these technologies over a span of 3 years at a total project cost of Rs. 54 Lakh.

**Location:** 50 villages, along oil pipeline RoW in Villupuram District, Tamil Nadu were chosen for this project. Villupuram is among the top rice producing districts, and is one of the most backward districts of Tamil Nadu.

### Impact:

- Noticeable increase in grain yield with the same water availability.
- The size of the plant has grown to be bigger than the conventional cropping method.
- All these methods are set to reduce water consumption by 30% and increase yield by 20%.
- Hundreds of farmers have been trained in these water saving technologies to have big impact on water saving as well enhanced yield. Direct Seeded Rice method has also been adopted by few farmers and drum seeders are provided to the farmers. CSR scheme includes providing capacity building of neighbouring farmers, as well as to enable them to reap the benefits of these methods.

**'Oil major, Indian Oil Corporation Limited, Southern Region Pipelines partnered with Tamil Nadu Agriculture University, Coimbatore in bringing SRI, AWDI & DSR methods in paddy cultivation to reduce water usage & improve rice productivity'**

In Tamil Nadu, the water crisis is severe as Tamil Nadu has 7% of India's population & 2% of water availability. This water stress is affecting the rice productivity & farmers income as cultivation of paddy crop consumes a lot of water which is about 70% of the total water used in agriculture in India.

In order to reach out to this problem, Indian Oil Corporation Limited (IOCL), Chennai in partnership with Tamil Nadu Agriculture University (TNAU), Coimbatore introduced water saving technologies to the farmers for improvement in Water Use Efficiency (WUE) & increase in productivity of rice.

- SRIMethod - System of Rice Intensification
- AWDI Method - Alternate Wetting & Drying Irrigation
- DSRMethod - Direct Seeded Rice

In October 2018, IOCL & TNAU entered into a formal MoU for disseminating these technologies to more than

### UNIQUENESS OF THE CSR PROJECT:

- Futuristic as ground water levels are depleting.
- Resilient to climate changes and highly sustainable.
- Benefits small & marginalized farmers with increased yield.
- These agricultural activities are farmer centric.
- High scalability across India.
- Environment friendly as there is reduced generation of GHG (Greenhouse Gases). ■



Ministry of Jal Shakti  
Department of Water Resources,  
River Development & Ganga Rejuvenation  
Government of India

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Director General  
National Water Development Agency

# यजुर्वेद में जल के महत्व का वर्णन



अवभृथ निचुम्पुण निचेरुरसि निचुम्पुणः।

अव देवैर्देवकृतमेनोयासिषमव मर्यैर्मर्त्यकृतं पुरुराव्णो देव रिषस्पाहि॥४८॥

नीचे प्रवाहित होने वाले (अवभृथ यज्ञरूप) हे जल प्रवाह ! यद्यपि आप अति वेगवान हैं; तथापि अत्यधिक मंथर गति से प्रवाहित हो। चैतन्य इंद्रियों द्वारा देवताओं के प्रति किए गए पाप को, इस जल में धोने के लिए आए हैं। हे अवभृथ नामक यज्ञ देव! दुःखदायी शत्रुओं से आप हमारी रक्षा करें।

आपो अस्मान्मातरः शुंधयंतु घृतेन नो घृतप्वः पुनंतु। विश्वं हि रिप्रं प्रवहंति

देवीरुदिदाभ्यः शुचिरा पूत एमि॥२॥

जल हमारी मां है। जल हमें शुद्ध करने की कृपा करे। घी से जो जल झरता है, वह हमें पवित्र करने की कृपा करे। प्रवाहित होता हुआ जल सभी पापों को धो दे। जल से हम शुद्ध और पवित्र होते हैं।

श्रवात्राः पीता भवत यूयमापो अस्माकमंतरुदरे सुशेवाः।

ता ऽअस्मभ्यमयक्ष्मा ऽअनमीवाऽ अनागसः स्वदंतु देवीरमृताऽ ऋतावृधः ॥१२॥

हे देव! आप जल रूप हैं। हम आप का सेवन करते हैं। आप हमारे पेट के अंदर पुष्टिकारक हो कर सुख दीजिए। हमारे लिए जल क्षयरोगकारी न हों। जल हमारी सामान्य बाधाओं को दूर करने वाले, दिव्य, अमृत स्वरूप एवं स्वादिष्ट हो यज्ञ में सत्य की बढ़ोतरी करने वाले हों।

Share your suggestions & feedback at [media-mowr@nic.in](mailto:media-mowr@nic.in)