

Central Water Commission  
WSE Dte.,  
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The News Clippings on Water Resources Development and allied subjects are enclosed for perusal of the Chairman, CWC, and Member (WP&P/D&R/RM), Central Water Commission. The soft copies of clippings will be uploaded on the CWC website.

*P. Maheshwari*  
11.2.2019

SPA (Publicity)

Encl: As stated above.

Deputy Director, WSE Dte.

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11/2/2019

Director, WSE Dte.

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Chairman CWC, New Delhi

Member (WP&P/D&R/R.M.), CWC and all concerned, uploaded at [www.cwc.nic.in](http://www.cwc.nic.in)

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# NE glaciers may vanish by 2100 if warming unchecked, finds study

Amit Bhattacharya  
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**New Delhi:** More than a third of the glaciers in the Hindu Kush Himalayan (HKH) mountain range, the "water tower" of Asia, will vanish by the end of this century even if global warming is contained at 1.5°Celsius in the best case scenario, warns a report compiled by 210 experts.

The findings are particularly dire for India's north-eastern region. The study says the eastern Himalayas could face a near-total loss of glaciers, around 95%, if global warming goes unchecked. Even in the best scenario (of 1.5°C warming), the region is likely to lose 64% of its glaciers by year 2100, it says.

The glaciers in the HKH region, spanning eight countries from Afghanistan to Myanmar, have the biggest store of ice outside the poles. The region, sometimes referred to as the "third pole", supplies water to nearly 2 billion people.

"This is the climate crisis you haven't heard of," said Philippus Wester of the International Centre for Integrated Mountain Development, who led the study that says even if carbon emissions are dramatically cut under the most ambitious goals of the Paris climate accord, 36% of the glaciers in the region will have gone by 2100.

For India, one of the most alarming finding is on the glaciers in east Himalayas that feed northeast India. "Based on a compilation of area change studies, eastern Himalaya glaciers have tended to shrink faster than glaciers in central or western Himalaya," it says.

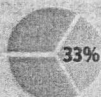
On the other hand, in a surprising finding, the study indicates that the western Himalayas — including J&K, Himachal Pradesh and Uttarakhand — may see an increase in glacier mass because the region, along with the Karakoram, has a higher probability of snowfall.

Full report on [www.toi.in](http://www.toi.in)

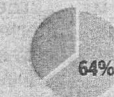


1.5°C temperature rise  
(best case scenario)

2.1°C rise across  
Hindu Kush-Himalayas



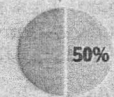
of glaciers  
lost



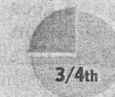
of glaciers gone  
in eastern Himalayas

2°C temp rise (more  
likely scenario)

2.7°C rise across  
Hindu Kush-Himalayas



reduction  
in glaciers



of glaciers lost  
in eastern Himalayas

## East Loss, West Gain

**SURPRISE FINDING:**  
Glaciers in western  
Himalayas (J&K,  
Himachal,  
Uttarakhand) may  
grow due to higher  
snowfall

## Impacts of melting glaciers

- River flows may rise and then fall, increase natural hazards
- High uncertainty over water availability, potentially impacting up to 2 billion people
- Greater risk of glacial lakes bursting, unleashing lethal floods

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# Brace for more rain, hailstorms this week

## Wet V-Day In City, Snow In The Hills

TIMES NEWS NETWORK

**New Delhi:** After heavy storms lashed north India last Thursday, turning streets white with hail and causing damage to crops in the region, the Met department has forecast another spell of wet weather and hailstorms this week, particularly on Valentine's Day.

The wet spell is likely to hit the region from Wednesday, with peak activity the following day, and last till Friday, the Met office said. It is likely to bring snow to higher Himalayas and rain in the northern plains right up

### CROPS HIT

- ▶ Last week's hailstorms caused heavy damage to mustard crops in Ganganagar (Raj) and Sirsa (Haryana) districts
- ▶ 4-5 southern districts of Haryana also reported 5-10% crop damage, mainly bajra and mustard
- ▶ Punjab govt launched special survey to assess extent of crop losses
- ▶ Wheat not impacted much, said reports

to western Uttar Pradesh.

"But the intensity and spread of the spell is expected to be less than the storms last week, which were unusually heavy and well distributed. While some areas, including

Delhi-NCR, could get hail, most places may just receive light rain," said B P Yadav, head of the IMD's regional meteorological centre here.

The fresh forecast comes close on the heels of the damage caused by last week's hailstorms. Experts said places such as Ganganagar district of Rajasthan and the adjoining Dabwali area of Haryana suffered heavy damage to standing mustard crops.

Elsewhere in Haryana, the damage was restricted to four-five districts in the south. "These districts (Bhiwani, Rewari, Mahendragarh, Dadri and parts of Mewat) reported 5% to 10% crop loss. It affected mainly bajra and mustard," said Suresh Gahlawat, additional director in the state agriculture department.

▶ Continued on P 4

# Chill to stay till today as city air turns poor again

▶ Continued from P1

**Y**adav said a number of factors made last week's hailstorm activity unusual — including a confluence of winds coming from opposite directions and jet stream winds in the upper levels, which lead to strong cloud formation. "The western disturbance was much stronger last time and we had winds from Bay of Bengal and Arabian Sea coming, and meeting on top of the northern plains, leading to such a phenomenon. While there is an active western disturbance this time around as well, the other factors are not present this time around," said Yadav.

There were reports of potato and other vegetables taking a hit in Punjab, where CM Amarinder Singh has ordered a spe-

cial survey to assess crop losses due to the storm. Most of the wheat crop may have escaped damage because the plants have not yet attained much height. The moisture could, in fact, be beneficial, some experts said.

Temperatures in the region had plummeted by almost eight degrees in some parts of NCR after the hailstorms, and

### WD WARNING

the chill is likely to continue till Monday. While Delhi's minimum temperature was recorded at 6° Celsius on Sunday, officials from the regional met department say it could rise to around 13° Celsius as the rain spell approaches.

The western disturbance (WD) scheduled to hit the region this week will be the third this month. In January, seven

WDs impacted north India, higher than the normal number of four to six, leading to rain and heavy snowfall across the western Himalayas. The high frequency of WDs hitting the region continues.

Meanwhile Delhi's air quality deteriorated to the "poor" category on Sunday with an overall Air Quality Index of 276 — an increase from Saturday's reading of 158 (moderate). Agencies say air quality is likely to deteriorate in the next few days before it improves after a spell of rain.

"Air quality in Delhi is in the "poor" category now and the clam night situation and strong surface inversion has led to almost doubling of the pollutant concentration. The air quality can further degrade in the next three days," said SAFAR's daily forecast on Sunday.



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# Pakistan's water crisis not India's fault T-811



LT GEN PRAMOD GROVER (RETD)

FORMER INFORMATION COMMISSIONER, PUNJAB

**T**HE Indus Waters Treaty, signed by India and Pakistan in 1960, mandates the commissions of both countries to inspect sites and works on both sides of the Indus basin in a block of five years. Honouring this obligation, a Pakistani delegation recently visited the Chenab river basin in Jammu and Kashmir for an inspection. Since the signing of the treaty, 118 such tours on both sides have been undertaken. The last tours of the commissions in Pakistan and India were conducted in July 2013 and September 2014, respectively. The current five-year block ends in March 2020.

During the bilateral talks on the treaty in Lahore in August last year, India, rejecting Pakistan's objections to the construction of the Pakal Dul and Lower Kalnai hydroelectric power projects (HEPs) on the Chenab river, had invited Pakistani experts to visit the sites to address their concerns regarding the impact on the flow of water into their country.

The Pakul Dul project (1,000 MW, ultimately 1,500 MW) is located on the Marusadar river, a major right-bank tributary of the Chenab Main, in Doda district. The confluence of the Marusadar and Chenab is 225 km upstream of the Marala headworks and 76 km from the Baglihar HEP. A concrete-faced rock fill dam with a height of 167

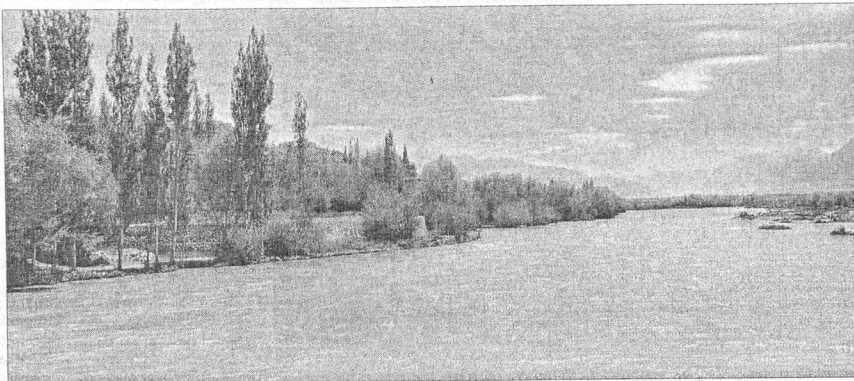
metres is being constructed at a cost of Rs 8,110 crore. Pakul Dul will not only be the largest hydroelectric power project in Jammu and Kashmir, but will also have the first storage unit. Also, subsequent to its commissioning, Jammu and Kashmir will get 12 per cent free power after 10 years.

The Lower Kalnai HEP is located on the left-bank tributary of the Chenab, about 19 km downstream of Dulhasti HEP and 180 km upstream of the boundary between Pakistan and India. A concrete gravity dam with a height of 34 metres is proposed to be constructed with an installed capacity of 48 MW.

Pakistan has raised technical issues, alleging that the design parameters constitute a violation of the restrictions imposed as per the treaty. Pakistan has objected to the designs of the projects — freeboard, pondage, spillway and intake crest elevation.

India, however, has rejected such assertions, stating that the projects were being built in adherence to the parameters laid down in the treaty. As against 3.6 MAF (million acre ft) which India can store on the western rivers, the total storage capacity created so far is a mere 0.5 MAF. Pakal Dul is a storage project with a capacity of 88,000 acre ft, but this is within the permissible limit of storage of 0.6 MAF on the tributaries of the Chenab. The gross storage capacity of Lower Kalnai (1,508 acre ft) is so small that it has negligible downstream impact on Pakistan. Other design differences are small and not of much significance with respect to downstream impacts.

Water is becoming an existential issue for Pakistan. The country is facing a grim situation regarding its fast-



**DISPUTE:** Pakistan has been accusing India of constructing hydroelectric power projects in violation of the Indus Waters Treaty.

Pakistan is facing a water crisis due to poor management and anticipated reduction in intake through the nine trans-border rivers from Afghanistan and in the Indus river from China. Pakistan's allegation that India is trying to usurp its share of water by constructing hydel power plants on the western rivers is not based on facts.

depleting fresh water resources. Pakistan has been attributing its problems of water scarcity to Indian action of constructing hydel projects on the western rivers. In Pakistan's perception, the construction of dams by India could lower the quantity of water in these rivers.

However, their water-related problems need to be attributed to Pakistan having drawn limited benefit of India's benevolence, despite the fact that it has been receiving more than its authorised share. Projects being undertaken by India are in tune with the provisions of the treaty. In 1950, the water available per capita annually was 5,500 cubic metres when the population of the erstwhile West Pakistan was 33 million; at present, it is down to 850 cubic metres annually, while the population has increased to 210 million. The overall quantity of water flowing in the western rivers to

Pakistan remains approximately the same. As per a recent report, Pakistan is receiving about 154 MAF of water annually against an authorisation of 136 MAF.

As far as India is concerned, the Kashmir dispute and the water dispute are inextricably intertwined. Pakistan's attempts over the years to annex Kashmir can be seen in the context of attempts to ensure water security. Despite India's generosity in the sharing of the Indus river waters, Pakistan has consistently adopted an obstructionist strategy since 1977, raising issues regarding run-of-river projects under construction on the western rivers by India.

Such an attitude has not only stressed the treaty itself, but also has had a considerable negative impact on the economic progress of Jammu and Kashmir. The state, even though being upper riparian, exploits merely

one-seventh of its hydel power potential. India, at present, irrigates 0.8 million acres area against the limitation imposed on the extent of area to be irrigated (1.32 million acres) with the waters of the western rivers. The annual energy loss suffered by Jammu and Kashmir is 60,000 million units; evaluated at the rate of Rs 2 per unit, it is approximately Rs 12,000 crore. These restrictions have, therefore, imposed a loss in terms of development of industry, power and agriculture equal to around Rs 40,000 crore annually.

The World Economic Forum rates the water crisis as the biggest risk in Pakistan, with terrorist attacks third on the list. Pakistan is facing the crisis due to poor management and anticipated reduction in intake through the nine trans-border rivers from Afghanistan and in the Indus river from China. The reduction in discharge is the result of construction of hydel power projects with storage facilities by Afghanistan and China. Shortage of water in Pakistan, thus, has very little to do with the non-adherence of the provisions of the treaty by India. As such, its allegation that India is trying to usurp its share of water by constructing hydel power plants on the western rivers is not based on facts.

A recent report of the World Bank puts into perspective the massive wastage of water in Pakistan. Water worth \$25 billion flows into the sea annually. As per the report, agriculture, which consumes more than 80 per cent of water, contributes less than 5 per cent of the GDP. Pakistan needs to initiate necessary action on its own to improve the water availability to overcome the crisis.



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## How to save the fragile Hindu-Kush belt

Policymakers must start looking at  
economic valuation of ecosystems

A comprehensive assessment of the Hindu-Kush Himalaya (HKH) region has said that a 1.5°C rise in global temperature over pre-industrial levels will spell doom for the fragile ecology of the region. The report, which deals with climate change, biodiversity, energy, cryosphere (frozen water), water, food security, air pollution, disaster and resilience, poverty, adaptation, and gender and migration, is significant because the HKH region covers 4.2 million square km across Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan. The region is home to 10 major river basins and four of 36 global biodiversity hot spots. The report is alarming and calls for serious introspection by the eight countries because this transboundary problem must have transboundary solutions. The region is undergoing rapid changes driven by stressors such as climate change and human conflicts, and factors like globalisation, infrastructure development, migration, tourism, and urbanisation. The outcome of the interplay of these complex drivers of change is challenging to predict but will have major consequences, not just in the region but across the world.

Such excessive demands on fragile ecosystems will also diminish their capacity and so there is a need to promote their sustainable development and also attach an economic value to the services they provide to people who depend on them. But that doesn't happen because such services are intangible and do not have an explicit market value. Fortunately, economists are looking at the ecosystems as capital assets and working on their valuation methods. This is an evolving science, but policymakers must start looking at such valuation of ecosystems seriously.

News item/letter/article/editorial Published on 10.02.2019 in the

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# Civic bodies, agencies told to keep Yamuna pollution-free

10-57  
**TRIBUNE NEWS SERVICE**

NEW DELHI, FEBRUARY 9

The Chief Secretary of Delhi Government, Vijay Dev, directed agencies concerned, including the Delhi Jal Board (DJB) and the Delhi State Industries and Infrastructure Development Corporation (DSIIDS) to check pollutants that polluted the Yamuna.

He issued the order following a meeting with monitoring committee members of the National Green Tribunal (NGT). The monitoring committee members are Shailja Chandra, ex-Chief Secretary of Delhi and BS Sajwan, ex-member of the NGT.

The Chief Secretary asked the DJB to ensure that its sewage treatment plants were operated properly to meet the prescribed standards, meet deadlines for its various projects and see that there was no leakage of waste water from the sewerage system to the drains. It should expedite the matter regarding registering



of the vendors for collection, transportation and disposal of septic tank effluent into sewage pumping stations. It should also look into the matter regarding charging for sewage generated from the households which are not connected to sewerage system keeping in view the directions of the NGT.

The Industries Department and the DSIIDS should ensure that common effluent treatment plant (CETPs) function properly and take necessary action against the Industries and units which are not connected to CETPs.

He asked the Delhi Development Authority to take necessary action and issue orders in respect of its drains for the

prevention of dumping of solid waste, sewage and industrial waste into the drains.

All municipal corporations, Irrigation and Flood Control Department, DJB, PWD and DSIIDS, should take necessary action to prevent dumping of solid waste and sewage into the drains and impose spot fine of Rs 50,000 on the violators and send such information in the prescribed format to the monitoring committee on the Yamuna constituted by the NGT by 10th of each month.

He also asked the Delhi Pollution Control Committee to act on the polluters and impose environmental compensation on violating industries.

Hindustan Times

Statesman

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# Heavy showers lash south interior Karnataka

**BENGALURU/MYSURU:** Parts of south interior Karnataka, including Bengaluru, Kolar, Chikkaballapur, Mysuru and Ramanagara, received heavy rain on Saturday evening coupled with thunder and lightning, giving a much-needed respite from the scorching heat.

The weather experts attributed the rain ranging from moderate to heavy rainfall to formation of a trough over the Peninsular region. According to meteorologists, the cloudy weather conditions with light to a moderate spell of rains likely to continue till Monday.

Sources in Karnataka State Natural Disaster Monitoring Centre (KSNDMC) revealed to *DH* that various taluks of Kolar and Chikkaballapur, including Bangarpet, Malur and Mulbagal, Bengaluru Urban and Rural, Ramanagara, Mysuru and Chamarajanagar districts received moderate to heavy rainfall on Saturday evening. Data from the KSNDMC revealed that the several taluks of Kolar



**SUDDEN SHOWERS:** Vehicles navigate through the flooded road following heavy showers, near railway overbridge in Malur of Kolar district. The town received 64 mm of rain on Saturday evening. *DH PHOTO*

district received heavy rain with Malur alone accounting for 64 mm followed by Marikuppam 26 mm, Kysamballi 20.5 mm, Mulbagal 19 mm until Saturday evening.

Similarly, Chintamani in Chikkaballapur also received 26.5 mm rainfall while Gundlupet in Chamarajanagar received 10 mm of rainfall.

Parts of Mysuru district and Sakleshpur and Halebid taluks in Hassan district also registered spells of moderate rain since Friday night.

In Mysuru taluk, Varuna, Varakodu, Pillahalli, Mellahalli, Vajamangala, Chikahalli and MB Halli received rains during the wee hours of Saturday.

"The sudden rain is due to the

formation of a trough extending from Tamil Nadu to Telangana including parts of South interior Karnataka districts. This has resulted in thundershowers along with squally winds in certain pockets of the region. The situation is likely to continue till Monday. While it is common to witness hot and humid day, it is likely to cause downpour towards evening," explained Dr G S Sreenivasa Reddy, Director of KSNDMC.

The prevailing situation has resulted in bringing down the day temperature by a couple of degrees Celsius in the last two days. "What was used to be 32 and 33-degrees centigrade has come down to 29 and 30 degrees Centigrade," Dr Reddy briefed.

The sudden showers, while bringing down temperatures, have also triggered worries among farming communities in the region. The mango crop which had begun to bloom is reportedly hit severely by the rains. Several trees in some of these taluks were uprooted due to heavy winds and downpour.

**DH News Service**



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# Hosakerehalli Lake set to be a rainwater reservoir

To witness green glory after three decades

Sandesh MS

**BENGALURU:** Nearly after three decades, the historic Hosakerehalli Lake in South Bengaluru is all set to return to its former green glory.

The Bangalore Development Authority (BDA) has taken up the task of giving the lake the much-needed facelift. This includes the fencing of the area, building a walkway, diverting the sewage away from the lake and the maintenance of the park.

Though the lake was rejuvenated two years ago, sheer negligence from the civic body ruined it within months. Now, the lake has become a dumping yard for garbage and demolition debris. A nasty stink engulfs the area. The water level in the lake was expected to cross the danger level during the rainy season. However,

the BDA took up the rejuvenation work last month, which now is in full swing, and things are looking up.

## Trash dumping stopped

"We have taken up the fencing work and have checked the dumping of garbage and debris. The work is expected to

be completed by July. The waterbody will be transformed into a natural rainwater reservoir. Bangalore Water Supply and Sewage Board (BWSSB) has also completed the pipe laying work to divert the sewage. The lake will be developed similar to the Kempambudhi Lake," a senior BDA

official on the spot told DH.

According to Gopalkrishna, Executive Engineer, BDA, Rs 9.40 crore was sanctioned for the rejuvenation project. "Encroachments around the lake have been cleared and marking of the lake area is done to further avoid it. For now, the construction of the walkway

around the lake is in progress. The channel bringing sewage has been diverted and the outlet that takes excess water has also been cleared. We are aiming to finish the work by the coming rainy season so that the lake can store rainwater," he said.

**DH News Service**



The construction of a walking path at Hoskerahalli Lake in Banashankari 3rd Stage is going on at a brisk pace.



News item/letter/article/editorial Published on 10.02.2019 in the

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# In TN's rice bowl, a crisis of cultivation

**GAJA AFTERMATH** Production may decline by 2.7mn metric tonnes

M Manikandan

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**CHENNAI:** Cyclone Gaja, which destroyed standing crops in vast tracts in the Cauvery delta, the rice bowl of Tamil Nadu, and the ongoing agrarian crisis in this part of the country (caused, in part, and ironically, by shortage of water) might push rice production in the state down by 2.7 million metric tonnes for the current season (2018-19), according to farmers in the area and data released by Union Agriculture Ministry.

The cyclone struck the delta districts on November 15, during the so-called milk or dough stage of development of the rice crop (a stage at which the maturation of the crop starts). The result: yield in 2 lakh hectares has halved to an average of 2.5 metric tonnes per hectare instead of the previous 5 metric tonnes. It has been affected, although not to the same extent, on other fields. All told, conservative estimates put the hit on account of Gaja at around 1 million metric tonnes.

In the five delta districts of Thanjavur, Tiruvarur, Nagapattinam, and Pudukottai, rice was grown on 1 million hectares.

Compare this to the previous season (2017-18), when rice production stood at 6.6 million metric tonnes from 1.17 million hectares. Buoyed by this, the state government set a target of 1.2 million hectares for Samba (the August-January crop) cultivation for the current season with a projected production of 7 million metric tonnes.

This was to push the total cultivable area of food grains to 1.8 million hectares and production to 11 million metric tonnes.

But data released by the Union Agriculture Ministry as well as ground reality paints a different picture. A report released by the ministry on January 24 says Samba cultivation in Tamil Nadu had come down to 860,000 hectares, a 27% slide from last year.

"This time, Samba is being raised in only 860,000 hectares and Kuruvai (a short term rice crop) in 80,000 acres — under the Chief



Cyclone Gaja struck the delta districts on November 15, during the so-called milk or dough stage of development of the rice crop. HT FILE

Minister's Kuruvai special package scheme. As such, we can expect a harvest of 5.7 million metric tonnes," S Ramadoss, Secretary, Tamizhaga Cauvery Farmers Association, told HT.

"If we take the Union Agriculture Ministry's report into account, there will be a drop of 1.77 million metric tonnes this year since it indicates a drastic reduction of 31,700 hectares in Samba cultivation. So, due to the cyclone and shrinkage of cultivable area, in rice production we are expecting that a total loss of 2.7 million metric tonnes when compared to the previous year," he explained. Gaja may well have exacerbated existing problems.

S Cauvery Dhanapalan, general secretary, Delta Farmers Protection Association, says most farmers who raised samba in October are in distress and many are opting out of farming altogether. The reasons according to him: the prolonged water dispute with Karnataka which meant farmers got no water from the river he is named after; an inconsistent North East monsoon for the past few years; and severe drought in 2016-17. "Further, the cost of cultivation has gone up manifold," he explained.

That agriculture is not a viable option anymore is also forcing many to give it up, says PR Pandian, Co-ordinator, Tamil Nadu All Farmers Organizing Committee. "Besides skyrocketing input

costs, market fluctuation denies good returns even during a good harvest. After globalization, import of agri products has emerged as a major challenge for farmers in Tamil Nadu," he added. Actually, this is a nationwide problem — one reason why farmers across the country are in distress. "Currently, ₹1,750 is the Minimum Support Price (MSP) per quintal of paddy. Since we are spending around ₹30 for producing a kg of paddy, MSP should be enhanced to a minimum of ₹3000 per quintal," Pandian said.

Gagandeep Singh Bedi, Principal Secretary and Commissioner, Agriculture Production, Tamil Nadu, agreed that there is a loss in yield due to the cyclone.

"Of course, there was a huge loss as crop in the milk stage was battered by cyclone Gaja. We don't want to disregard what the farmers say. While assessing the loss, farmers who have incurred 33% of crop damage will definitely get their crop insurance in the upcoming season," Singh said.

He doesn't think there has been a reduction in the area under rice cultivation and says the Union government may have used September data for its report, while sowing for the Samba season started in some parts in October. "Tamil Nadu will achieve its cultivation target this season by the end of February," he headed.



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## No one taking ownership in Yamuna clean-up: NGT

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**New Delhi:** No ownership is being taken at departmental levels to clean up Delhi's drains and, in turn, the heavily polluted Yamuna, an NGT-appointed monitoring committee for the river clean-up has said.

In a recent report to National Green Tribunal (NGT) that has been accessed by TOI, the committee said there was no coordination between the irrigation and flood control department and Delhi Jal Board (DJB). The department "seems to believe that the water quality is not their mandate and should be done by DJB. DJB says they don't have jurisdiction over drains," the committee said. The NGT judgment and the committee's action plan talk about aeration and ozonation to improve water quality but "there is apparently no ownership at the department level", it added.

Consultants have been appointed to work on groundwater recharge component in 10 canals or irrigation minors where water quality improvement work is to be undertaken, but it does not include aeration and ozonation. The committee also pointed out, "An action plan for in-situ treatment of waste water flowing into the



File photo

### FROTHING AT THE MOUTH

drains needs to be prepared for at least the four major drains flowing into the Yamuna in a time-bound manner." After a preliminary assessment is submitted, the committee will call a meeting to review the plan.

The Yamuna receives maximum pollutant load through the four major drains, Najafgarh, Supplementary, Shahdara and Barapullah. Various schemes are working in parallel to trap the untreated sewage and take it to sewage treatment plants (STPs).

However, it needs a coordinated approach, the committee said. For example, it stressed, the Rs 2,000-crore interceptor project — being constructed for capturing untreated sewage — can't be fully utilised till the linked STPs are functional to treat the added volume. Similarly, new drains emerging from

unauthorised colonies need to be brought into a proper sewerage network system in a time-bound manner.

"Experts had informed NGT that technical interventions are needed in parallel to reduce the pollutant load in the drain, which would have direct impact on the quality of river water," the report stated. These interventions are necessary because even after completion of the current schemes, the water quality of Yamuna will not "reach bathing standards of BOD (biological oxygen demand) <3mg/L and DO (dissolved oxygen) 5mg/L as design standards of the latest STPs are set at BOD <10mg/L".

NGT chairperson A K Goel had formed the monitoring committee in July and asked it to submit an action plan and a detailed report on cleaning the river by December 31, 2018.



Hindustan Times  
Statesman  
The Time of India (New Delhi)  
Indian Express ✓  
Tribune

Hindustan (Hindi)  
Nav Bharat Times (Hindi)  
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The Hindu (New Delhi)  
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Deccan Chronicle  
Deccan Herald  
The Times of India (A)  
Business standard  
The Economic Times

and documented at Bhagirath (English) & Publicity Section, CWC

## Decoding Vangchhia's ancient art of holding water in Mizoram's hill rocks

**Holes in hill slopes were to channel water into rock fissures, researchers surmise**

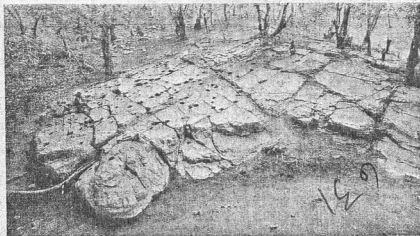
RAHUL KARMAKAR  
GUWAHATI

As climate change and extreme weather events push the world towards growing conflicts over water, a lost civilisation in Mizoram that turned rocks into hidden reservoirs, could hold the key to water conservation in extreme conditions.

In January 2016, the Archaeological Survey of India (ASI) announced the discovery of a "living history museum" at Vangchhia, a village in Mizoram's

Champhai district bordering Myanmar.

The site, measuring about 45 sq km and located 260 km from Aizawl, has yielded pictographs etched on large stone slabs, menhirs – large standing stones – and a necropolis – and a large cemetery – among other artefacts. The area is part of the Lower Himalayas, and has rows of steep hills largely made up of various kinds of sandstone shading from light grey to blackish. The ancient people of Vangchhia carved terraces



**Ingenious effort:** Rainwater was trapped in holes to be stored in the fissures and veins of the rocks. • SPECIAL ARRANGEMENT

on these rocks for their settlement – the main excavated site consists of 15 such terraces.

But what fascinated the archaeologists the most was

a water pavilion and strategically drilled holes – between one foot and one metre across – spread over several sandstone slopes. The grey sandstone is softer

and home to the holes while the harder black rock is used for menhirs, ASI researchers said.

In two years of study since the discovery of the Vangchhia site, researchers have arrived at some theories behind the "seemingly simple science" of water harvesting, perfected several centuries ago, which could sustain local populations for at least a year.

"It is remarkable how they trapped rainwater flowing down the slopes by making holes to let the water flow in and be stored in the fissures and veins of the rocks. When we began

excavating in 2015-2016, we wondered why the people who lived in and around Vangchhia did not make water tanks which they appeared capable of," Sujet Nayan, who heads ASI's Aizawl Circle, told *The Hindu*.

Denying enemies easy access to water storage areas is believed to have been one of the reasons behind the holes. "Most of the ethnic groups that inhabited these areas were at war, and the possibility of raiders poisoning water reservoirs or stealing water could have made locals devise this strategy to dissuade those not familiar with the

topography," Mr. Nayan said. Water harvesting, however, seems to be at the heart of the activity with the nearest river, the Tlau, 12 km away as the crow flies beyond several hills.

But the archaeologists have not been able to accurately date the Vangchhia settlement. "When we excavated the place three years ago, we thought the ruins were of the 15th century. However, the Birbal Sahni Institute later said the place dates back to the 6th century," Mr. Nayan said.

Adding to the unanswered questions, less than a week ago, an ASI

team discovered neolithic caves near Vangchhia, indicating that the lost civilisation could be much older.

"These archaeological relics are not confined to Vangchhia and are found all over Champhai district. There are at least four more major sites – Farkawn, Dungtlang, Lianpui and Lunghunlian – that are yet to be excavated extensively with hundreds of menhirs and pictographs that tell stories of a forgotten past," P. Rohmingthanga, convener of the Mizoram Chapter of Indian National Trust for Art and Cultural Heritage (INTACH), said.

News item/letter/article/editorial Published on 09.02.2019 in the

Hindustan Times  
Statesman  
The Time of India (New Delhi)  
Indian Express  
Tribune

Hindustan (Hindi) ✓  
Nav Bharat Times (Hindi)  
Punjab Keshari (Hindi)  
The Hindu (New Delhi)  
Rajasthan Patrika (Hindi)

Deccan Chronicle  
Deccan Herald  
The Times of India (A)  
Business standard  
The Economic Times

and documented at Bhagirath (English) & Publicity Section, CWC

## गंगा एक साल में सौ फीसदी शुद्ध होगी : नितिन गडकरी

प्रयागराज | हिन्दुस्तान संवाद

केन्द्रीय सड़क परिवहन एवं राजमार्ग, पोत परिवहन, जल संसाधन, नदी विकास और गंगा संरक्षण मंत्री नितिन गडकरी ने शुक्रवार को दावा किया कि अगले मार्च माह तक गंगा सौ फीसदी निर्मल और अविरल हो जाएगी। शुद्धता इतनी होगी कि गिलास में लेकर गंगाजल को पिया भी जा सकेगा।

साथ ही ऐलान किया कि प्रयागराज से वाराणसी के बीच एयरबोट सेवा अगले साल मार्च से शुरू होगी। इसके साथ ही प्रयागराज से वाराणसी, बांग्लादेश के रास्ते म्यांमार तक जल्द ही जलमार्ग बनाया जाएगा। केन्द्रीय मंत्री ने कुम्भ मेला क्षेत्र में गंगा स्नान और गंगा पूजन किया। इसके बाद किला घाट के पास अंतर्देशीय जलमार्ग प्राधिकरण के कार्यक्रम पहुंचे।

गडकरी ने प्रयागराज में बनने वाले चार रीवर फोर्ट का उन्होंने उद्घाटन किया। उन्होंने उम्मीद जताई कि माह

### 5500 करोड़ के काम होंगे

केन्द्रीय मंत्री ने कहा कि फरक्का से पटना तक रीवर ट्राफिक कंट्रोल सिस्टम है। इस सिस्टम के जरिए जलमार्ग पर चलने वाली बोट की मानीटरिंग भी की जा सकेगी। उन्होंने कहा कि अन्तर्देशीय जल मार्ग प्राधिकरण की तरफ से 5500 करोड़ की परियोजना के कार्य कराये जाएंगे। उन्होंने बताया कि जलमार्ग विकसित होने से अब उत्तर प्रदेश का आम और आलू, गुड़, चीनी आदि वस्तुएं दूर-दूर जाइला तक निर्यात किया जा सकेगा।

फरवरी के अंत या माह मार्च के प्रथम सप्ताह में एयर बोट से वाराणसी से प्रयागराज आवागमन शुभारम्भ किया जाएगा। उन्होंने बताया कि इस एयर बोट में अधिकतम 14 लोग बैठ सकेंगे। इसकी गति 80 किलोमीटर प्रति घंटा होगी। उन्होंने कहा कि जल मार्ग से सामान भिजवाने में लागत भी कम हो जाएगी।