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Technical Documentation Directorate  
Bhagirath(English)& Publicity Section  
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18/4/18

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## Fortnightly monsoon forecasts soon

JACOB KOSHY  
NEW DELHI

This year, the India Meteorological Department (IMD) is likely to issue fortnightly forecasts of the monsoon's arrival in States, once it begins its onset over Kerala. Typically, the IMD only forecasts the monsoon's arrival over Kerala – around mid-May – and then gives a three or five-day heads-up as it journeys northwards.

This year, it will tweak

one of its models to generate a 15-day lead time. "It's a difficult task but we hope to make a beginning this year," said Madhavan Rajeevan, Secretary, Ministry of Earth Sciences (MoES).

The IMD is an organisation under the MoES.

### Climate meet ahead

Mr. Rajeevan would be detailing plans later this week in Pune at the South Asian Climate Outlook Forum – an

annual conference of climate and monsoon experts from Afghanistan, Bangladesh, Bhutan, India, Maldives, Myanmar, Nepal, Pakistan and Sri Lanka.

While the IMD, on Monday, said that India would experience a 'normal' monsoon – or 97% of the 89-cm average – it hasn't indicated how this would distribute geographically.

CONTINUED ON PAGE 10

## Monsoon forecasts likely every two weeks

Farmers are interested in when the monsoon will arrive at their fields and a longer lead time means decisions, such as what seeds to sow, furrowing, etc. can be better planned.

IMD chief K.J. Ramesh told *The Hindu* that the organisation already issued weekly forecasts on the likelihood of significant rains in any region.

Historically, meteorologists have identified mile-markers: the monsoon system reaching Maharashtra within 10 days of landing in Kerala, and the whole of the country being covered by the 15th of July. However, these schedules are increasingly getting erratic.

Last year the monsoon arrived in Kerala on the

30th of May; precisely when the IMD said it would arrive. After that it stalled and didn't reach north Karnataka, Telangana and central Andhra Pradesh until 11th June, instead of the traditional 5th June.

Though every monsoon has its own quirks – regarding the pace of its progress – meteorologists say the last few years the monsoon has been moving along slowly and even stays on until mid-October instead of its traditional September-end exit.

The IMD's Monsoon Mission Climate Forecasting System (MMCFS), or the 'dynamical' model that simulates the weather on supercomputers, is being employed for these forecasts.



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## Chasing the monsoon

The forecast has enhanced the economic outlook, but India must conduct a water audit

The forecast of a normal monsoon has brought relief all around. For farmers, the India Meteorological Department's estimate that rainfall during the summer, between June and September, will be 97% of the 50-year average of 89 cm, is bound to raise fresh expectations. This is the third year in a row that they can look forward to a high output for a variety of crops, although fiscal realities have come in the way of realising higher farm incomes. The Centre has been supportive of higher returns through the Minimum Support Price mechanism and additional bonuses have been announced by States such as Madhya Pradesh for procurement, but these have helped mainly rice and wheat. From a water management perspective, though, this trend has led to a skew towards these crops, which are heavily dependent on groundwater. Now that another year of good cropping is expected, and unremunerative prices will depress public sentiment, it is vital for the Centre to arrive at a policy that gives constructive advice to farmers on the ideal cropping mix and help them get the cost-plus-50% margin that it has promised them. The IMD's decision to provide a more fine-grained forecast on the monsoon's progress, particularly in the central and northern regions, will meet a long-felt need and can potentially guide farmers better.

The long-term challenge is to make the most of the rainfall that India gets, ranging from a few hundred millimetres or less in the northwest to more than a few thousand millimetres elsewhere. The Master Plan for Artificial Recharge to Ground Water drawn up by the Centre should be pursued scientifically, to help States with the most water-stressed blocks get adequate funds to build artificial recharge structures. Moreover, for those farmers who choose to continue with wheat and rice, transfer of expertise and provision of equipment that enables efficient utilisation of water is vital. An estimate of water used to grow rice and wheat, measured in cubic metres per tonne, shows that India uses more than what, say, China does. In the case of cotton, the figures present an even more staggering contrast: 8,264 cubic metres for India, against 1,419 for China. Combined with distortions in procurement subsidies, water stress due to such use is inevitable. On the monsoon as a whole, studies indicate a change in the pattern since 1950. There is an increase in daily average rainfall since 2002, barring some of the worst El Niño years, likely due to higher land temperatures and cooler oceans. What is well known is that a good monsoon raises agriculture's contribution to GDP growth, while a drought year depresses it. Clearly, governments need to invest consistently to harvest the monsoon, both on the surface and underground, with community participation.



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## Plea against landfills in Yamuna zone O

TIMES NEWS NETWORK

**New Delhi:** Yamuna Jiye Abhiyaan — an NGO working for the revival of the Yamuna — has written to Central Pollution Control Board (CPCB) and a number of officials in both the Delhi government and the Union environment ministry, asking them to change their decision over considering two landfill sites to come up in the Yamuna floodplain (zone O).

Terming the decision as outright illegal and dangerous, the letter which was sent on Monday night also said the move is untenable on several counts and will fall in the flooding area of the Yamuna, leaving both people and the landfill site at risk. The East Delhi Municipal Corpora-

tion (EDMC) had recently obtained the nod of the CPCB for two new landfill sites — one in Ghonda Gujran and the other in Sonia Vihar — both of which fall in the Yamuna river zone (zone O) where construction and commercial activity is prohibited.

"Sir, Sonia Vihar lies well within zone O (river zone) under MPD 2021 and is a low-lying area. A bund constructed towards the river on its west might give one an impression that the area is now safe from river flooding, but the fact remains that the entire area is low-lying and goes under deep waters during monsoon rains. The ground water table is also very high and it suffers from aquifer flooding during high floods in river Yamuna....," said the letter.



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# Why central India may see less rainfall over the next 50

ANJALI MARAR  
PUNE, APRIL 17

THE INDIA Meteorological Department predicted on Monday that the country would experience a normal monsoon for the third successive year, with rainfall at 97% of the long period average (LPA). The monsoon is considered normal if average rainfall is between 96% and 104% of the LPA. Anything less than 90% of the LPA is considered a deficient monsoon.

However, a recent study, conducted by Indian meteorologists, projects that about 50 years from now, the monsoon over the central Indian region is expected to drastically reduce owing to a declining trend observed in the number of Low Pressure Systems (LPS) that usually bring rain to this area.

The region, according to the study, will witness a 45% decline in the frequency of LPS activity, thereby resulting in lesser rainfall in this heavily rain-fed agrarian belt. This downward trend in rainfall is expected to be realised during the decades spanning between 2065-2095, that the researchers have defined as the end of the current century.

The collaborative study, by R S Ajayamohan and a team of scientists from the



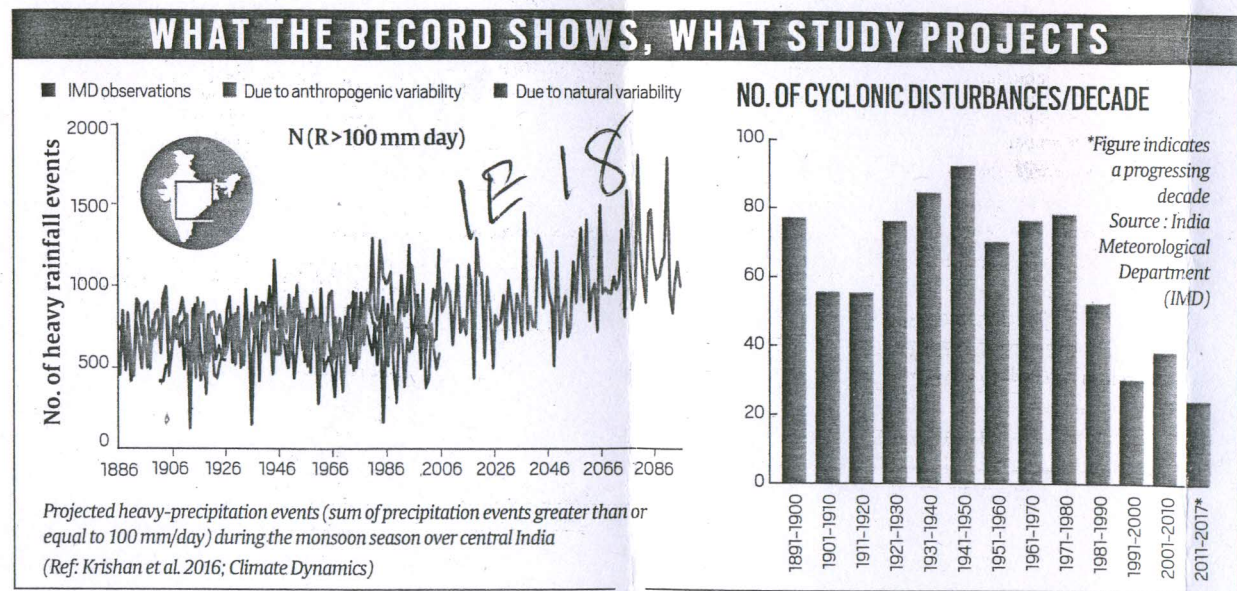
FLAGGING INTERESTING  
RESEARCH

## WEATHER AND ENVIRONMENT DEFICIENT RAINFALL

Published in PNAS, on February 26, 2018

**AUTHORS:** S Sandeep, R S  
Ajayamohan, William R Boos, Sabin T P  
and V Praveen

Indian Institute of Tropical Meteorology (IITM), IIT Delhi, New York University and University of California, which was recently published in PNAS, also highlights a 10% increase in the instances of LPS forming over



land, which will eventually lead to extreme rainfall over the North Indian plains.

LPSes originate in the Bay of Bengal, and travel landwards in a southeast-northwest direction crossing Odisha, Andhra Pradesh,

Telangana, Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra and Uttar Pradesh. This region is known as the core monsoon zone.

Speaking to *The Indian Express*, Sabin T P,

one of the authors and senior scientist from IITM, said, "One of the main reasons for this decrease in rainfall, particularly during the monsoon, could be the largescale decrease in the moist westerly winds travelling from the

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Arabian Sea, called monsoon circulations, along India's west coast onto the mainland. In addition, these winds have been observed to have shifted northwards from their normal track during their forward propagation."

On the importance of studying the core monsoon zone, Ravi Nanjundiah, director of IITM, said, "In order to have a better understanding about the monsoon, this is a very crucial region as most LPS pass by this region during the monsoon season, that is from June to September. A new test-bed facility by the institution is being set up on the outskirts of Bhopal, in order to study these key rain-bearing systems."

According to R S Ajayamohan, global warming is getting more pronounced with each passing year, when all previously known record temperatures have been surpassed. Additionally, its effect even on the monsoon, especially over this zone, is seen as inevitable.

He said, "With the rise in global temperature, the atmosphere would have a much higher moisture holding capacity. But, at a certain juncture, this capacity would collapse leading to extreme rainfall events, which are anyway found to be increasing in recent years."



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# फलासिया के मंगल कोठारी ने साथियों के साथ तैयार किया मॉडल गंगा को मैली होने से बचाएगा बतख जैसा रोबोट

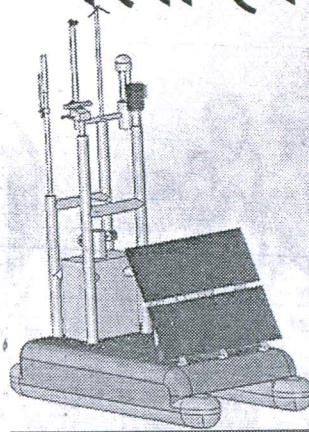
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**फलासिया** . कस्बे के एक युवा वैज्ञानिक ने आइआइटी के एयरोस्पेस इंजीनियरिंग विभाग में अपने साथियों के सहयोग से बतख जैसा एक रोबोट तैयार किया है, जो न सिर्फ गंगा नदी के पानी का पूरा डाटा एकत्र करेगा बल्कि पानी की गुणवत्ता रिपोर्ट भी सेटेलाइट के माध्यम से कंट्रोल रूम को भेजेगा। पूर्णतया सौर ऊर्जा से संचालित इस रोबोट की कीमत लगभग बीस लाख रुपए है और केन्द्र सरकार देश के सत्रह स्थानों पर इन रोबोट को प्लांट करने का आदेश जारी कर चुकी है।

आइआइटी कानपुर के एयरोस्पेस इंजीनियरिंग विभाग में असिस्टेंट प्रोफेसर पद पर कार्यरत



फलासिया निवासी मंगल कोठारी ने प्रो. बिशाख भट्टाचार्य, प्रो. इन्द्रशेखर सेन व प्रो. केतन राजावत के साथ मिलकर बतख जैसा रोबोट तैयार किया है। मंगल कोठारी ने प्रारंभिक शिक्षा फलासिया के स्कूल में ही ली।



उन्होंने इंग्लैण्ड में डॉक्टरेट करने के बाद अमरीका में भी अध्ययन किया। पिछले पांच वर्षों से मंगल आइआइटी कानपुर में सेवारत हैं। **सत्रह रोबोट ले रही सरकार:** वैज्ञानिकों द्वारा विकसित एक रोबोट की कीमत करीब बीस लाख रुपए

## पानी की गुणवत्ता का भी पता चल सकेगा

प्रो. मंगल ने बताया कि पर्यावरण परिवर्तन का नदी के पारिस्थितिकी तंत्र पर लगातार प्रभाव पड़ने के मद्देनजर नदी प्रणाली पर नजर रखना आवश्यक होता है। पानी की गुणवत्ता गंभीर चिंता का विषय है क्योंकि करोड़ों लोगों के लिए पीने के काम में आता है। भारतीय उपमहाद्वीप में गंगा नदी समस्त नदी

प्रबंधन का केन्द्र बिंदु होने से इसकी सफाई, कार्याकल्प व स्वास्थ्य संबंधी स्थिति को सरकार गंभीरता से ले रही है। वैज्ञानिक समुदाय को अपर्याप्त कुशल मानव शक्ति के लिए जल नमूना संग्रहण और विश्लेषण, समयबद्धता, एकीकृत डाटा संकलन, पानी का ऑटो नमूनाकरण करने जैसी चुनौतियों का सामना करना पड़ रहा है। इसके मद्देनजर नदी निगरानी वेधशाला स्थापना

की आवश्यकता महसूस हुई जिसमें न केवल उच्च आवृत्ति वाले डाटा का उपयोग किया जाता है बल्कि आपदाओं को लेकर पूर्व चेतावनी प्रणाली भी विकसित की जाती है। इन वेधशालाओं में रियल टाइम डाटा पहुंचाने के लिए अत्याधुनिक उपकरणों की आवश्यकता होने से आइआइटी कानपुर के वैज्ञानिकों ने बतख जैसा रोबोट बनाया है।

## ये भी हैं विशेषताएं

1. इन हाउस वेधशाला में पानी की गुणवत्ता वाले सेंसर व ऑटो सैंपलर सारिणी विकसित करेंगे।
2. मंच से दस किमी तक दायरा बढ़ने पर मोबाइल संवेदी रोबोट के माध्यम से डाटा संग्रहण

3. रोबोट, प्लेटफार्म एवं स्थानीय वर्क स्टेशन के बीच वायरलेस ट्रांसमिशन सिस्टम।
4. पानी के कंपन व सौर ऊर्जा के रूप में बहुमुखी मॉड्युलर स्थापित करने का कार्य