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## Probability of drought, excess rain now in April

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### The department will continue using the technique called the ensemble method for its predictions

NEW DELHI

**F**or the first time, the India Meteorological Department will give probability estimates of drought and excess rainfall for the country as part of its much-awaited April forecast of the south-west monsoon.

The department will continue to stick to a new technique it used last year for forecasting the monsoon though it led to predictions that turned out to be way off.

"Perhaps, putting a mere number on how the rain will distribute is not very useful. Agriculturists would like to know the chances of a drought or excess rainfall," said one official involved with the prediction process who didn't want to be identified.

The annual monsoon forecast is eagerly awaited by farmers across India as the June-September monsoon generates more than 80% of

the annual rainfall and is a lifeline for the country's rain-fed agriculture, which generates nearly one-fifth of the country's \$1 trillion (about Rs40.1 trillion) gross domestic product. The rains are also important for traders dealing in food and cash crops as bad rains can cause markets to go into a tizzy.

Because of key state elections as well as national elections likely within a year, the monsoon will also have a bearing on political campaigns and fortunes as it has a significant impact on the mood, if not the actual well-being, of India's rural voters.

Last April, India's apex weather forecasting body said India would receive an average of 829.53mm of rain, but ended up with 936.9mm. Significantly, the weather models last year predicted deficient (94% of the long-period average) rainfall over the southern peninsula, which actually posted an excess at 126%.

Concerned that its weather models were dipping in accuracy since 2003; the department, for the first time, had used a technique called the

ensemble method—essentially the weighted average of a host of weather models—to prepare its 2007 forecast.

"Different models have different strengths," said Madhavan Rajeevan, director of IMD's National Climate Centre in Pune. "So, a careful, weighted average of various models might help us with an accurate forecast. But, ultimately, no approach is absolutely fool-proof. No set of equations has been able to accurately and consistently predict the Indian monsoon, yet."

In the past five years, ever since it moved to newer weather-predicting models, the agency has got it wrong thrice.

The meteorological department (or Met department as it is popularly known) got it right in 2003 and 2005 and wrong in 2004, 2006, and 2007.

Another official, who didn't want to be identified, said the reason the department was sticking with its models was its relative accuracy over predicting the quantity of rain over north-west and north-east regions of India.

"Except for the south, pre-



**Annual feature:** A file photo of people wading through an inundated road in Kochi, Kerala. It is uncertain if the unusually heavy rains in Kerala this month will affect the south-west monsoon.

dictions on how the rains would pan out were within the margins of error," he said. "We are also testing models of other institutes such as the Indian Institute of Tropical Meteorology and the Centre for Mathematical Modelling and Computer Simulation. Let's see what they say."

Experts also say that given the paucity of reliable models to predict the monsoon, continuing with the department's ensemble approach makes sense.

"Relying on one single model no longer makes sense because each one has limited abilities," said Ravi Nanjundiah, meteorology professor at the Indian Institute of Science. "So, in the absence of such

choice, a weighted average is a sound approach."

Nanjundiah added that weather institutions across the country are only recently getting used to sophisticated instrumentation.

"While we understand the monsoon well, we were unable to effectively input that knowledge into our machines. Better instruments are coming in, and it will take a couple of years before we are comfortable with these systems," he added.

The south-west monsoon, essentially a moisture-laden cloud system, typically begins in June, from Kerala. Though there are nearly 16 atmospheric indicators of the south-west monsoon, ranging from wind

speeds over the Pacific to temperatures at fixed regions across the Atlantic, weather scientists say that no clear indicators have yet emerged to predict a drought or floods this year.

"There's been unusually heavy rains in Kerala (this month) and we don't yet know whether it will affect the monsoon," said Rajeevan.

"There are strong La Nina conditions that haven't yet moved away and that's one reason for the extremely heavy rainfall," he added.

La Nina is a weather jargon for a temperature dip across the equatorial eastern central Pacific Ocean and it traditionally points to good rains during the monsoon.