

# Pollution turning country's rainfall acidic, says study

[Neha Madaan](#) / TNN / Mar 4, 2017, 11:01 IST



Representative image

PUNE: Pollution is causing “life-giving” rain to become increasingly acidic in many parts of the country, particularly in the last decade, research by India Meteorological Department and Indian Institute of Tropical Meteorology has revealed. Analysis of rainwater samples from Nagpur, Mohanbari (Assam), Allahabad, Vishakapatnam and Kodaikanal in the decade 2001-2012 showed a pH level varying from 4.77 to 5.32, indicating that these places have been receiving “acid rain.” Rainwater with pH below 5.65 is considered acidic.

Potential of hydrogen, or pH, is a scale to measure acidity or alkalinity of a solution, where 7 is 'neutral'. For lesser values, acidity increases with decreasing count.

Acid rain causes acidification of soils and lakes, said scientists who were part of the study. “It causes leaching of soil nutrients, which means that these nutrients are not available to plants and crops grown in the soil, affecting crop nutrition and productivity. Among other harmful effects, acid rain has had a corrosive effect on monuments in the country, like the Taj Mahal,” they said. Acid rain is a result of rain water in the atmosphere mixing with polluting gases like sulfur dioxide and nitrogen oxide emitted from power plants and automobiles.

This kind of rain is not only corrosive to buildings and structures including historical monuments, but can dissolve salts of heavy metals found in rocks and soil and other natural surfaces. These heavy metals then find their way into agriculture fields, natural water sources and, ultimately, the human, animal and plant physiologies.

According to the study undertaken by scientists V Vizaya Bhaskar and P S P Rao, which was published in the *Journal of Atmospheric Chemistry* (Springer) recently, almost all Global Atmosphere Watch GAW stations in the country showed a decreasing trend in pH levels with each passing decade during the period of analysis (1981 to 2012). The scientists analysed samples collected at 10 GAW stations - Srinagar, Mohanbari, Jodhpur, Allahabad, Nagpur, Pune, Vishakapatnam, Port Blair, Kodaikanal and Minicoy in Lakshadweep - spread across the length and breadth of the country.

Rainfall samples in these locations are collected throughout the year, as and when it rains during all the seasons. The decadal pH value of each station is the average pH value of all rainfall events observed here annually during the decade.

The pH scale is logarithmic, and so there is a ten-fold increase in acidity with change of each pH unit, such that rainfall with pH 5 is ten times more acidic than pH 6, rainfall with pH 4 is 100 times more acidic than pH 6 and rainfall with pH 3 is 1,000 times more acidic than pH 6. One of the scientists associated with the study said Mohanbari's rainwater pH has worsened 15 times over the three decades, while Allahabad's has fallen 28 times. Pune's pH has worsened 2.5 times and Nagpur's has deteriorated 10 times.

“The increase in sulfur dioxide and nitrogen oxides (NO<sub>x</sub>) emissions due to rise in coal and fuel consumptions as a result of growth in oil refineries, power plants in various ports and rapid increase in vehicles are mainly responsible for making rain acidic,” one of the scientists said.

The problem has aggravated due to decrease in acidneutralizing alkaline components like calcium in the atmosphere. “Calcium neutralizes the effect of acidic emissions mixing with rainwater in the atmosphere. However, the coverage of open land with buildings and mechanical ware due to urbanization has hindered the release of calcium from soil dust into the atmosphere. Calcium from soil dust is normally released into the atmosphere via winds,” the study said.

B Mukhopadhyay, IMD's former additional director general of meteorology, who has extensively studied the subject of acid rain, said, “There are some salts like the salts of heavy metals found in rocks and minerals that are not soluble in water unless they are acidic in nature. Acid rain can thus dissolve these salts of heavy metals, which eventually find their way into natural water sources. This is environmentally hazardous as this water ultimately enters the food chain.”

<https://timesofindia.indiatimes.com/city/pune/pollution-turning-countrys-rainfall-acidic-says-study/articleshow/57461536.cms>