

# Phosphorus Status of Soils in India

By R. Hasan

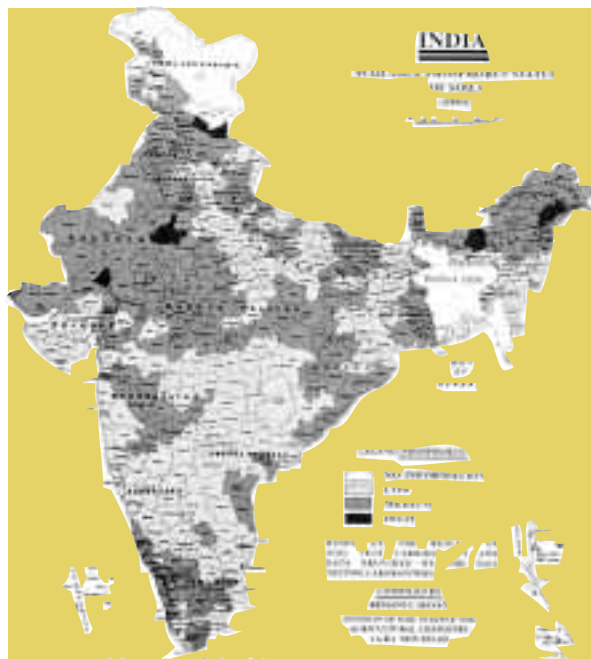
*Phosphorus (P) is one of the three major nutrients required in crop nutrition, the other two being nitrogen (N) and potassium (K). Phosphorus plays many vital roles in crop growth and is referred to by many as the “king-pin” in Indian agriculture.*

Information on P fertility status of soils is of great importance, since it helps determine the level of P fertilizer to be applied to crops. The information is equally useful for P fertilizer distribution and planning at both macro and micro levels.

The P fertility status of soils in India was first compiled in 1979. A new map based on about 9.6 million soil test summaries was published in 1993 and is shown in Figure 1.

For available P in Indian soils, 49.3 percent of the districts are in the low category, 48.8 percent are medium and 1.9 percent in the high P category. Compared to an earlier summary,

Figure 1. Available P status of soils in India.



the low fertility class has increased by 3 percent, while the medium and high categories have decreased by 2.7 and 0.3 percent, respectively. The distribution of districts into fertility classes based on available P status in soils is shown in Table 1.

An appraisal of available P status in relation to the major soil groups or associations indicates that generally the deep black, grey brown, desert and red loamy soils of semi-arid regions have medium fertility level. Similarly, foothill soils, alluvial strips of the northern region, and coastal alluvium that are not sandy in nature largely depict medium available P status. The few districts in which the soils are rich in this nutrient are usually comprised of arid tracts, foothills of high altitude, and cold and semi-dry regions where the intensity of cultivation has been low. The vast alluvial tracts of central, eastern and southern parts of the country, the latosols,

**Table 1.** Distribution of districts and Union territories into fertility classes according to the status of available P in soil.

| State/Union territory   | No. of districts for which soil tests obtained | Fertility classes |             |            |
|-------------------------|--|-------------------|-------------|------------|
|                         |  | Low               | Medium      | High       |
| Andhra Pradesh          | 21   | 17                | 4           | –          |
| Arunachal Pradesh       | 5  | –                 | 5           | –          |
| Assam                   | 9  | 1                 | 6           | 2          |
| Bihar                   | 26   | 12                | 14          | –          |
| Chandigarh              | 1  | 1                 | –           | –          |
| Dadar & Nagar Haveli    | 1  | –                 | 1           | –          |
| Delhi                   | 1  | 1                 | –           | –          |
| Goa                     | 1  | 1                 | –           | –          |
| Gujarat                 | 19   | 14                | 5           | –          |
| Haryana                 | 11   | 2                 | 9           | –          |
| Himachal Pradesh        | 11   | 2                 | 7           | 2          |
| Jammu & Kashmir         | 10   | 1                 | 9           | –          |
| Karnataka               | 19   | 16                | 3           | –          |
| Kerala                  | 10   | 3                 | 7           | –          |
| Madhya Pradesh          | 45   | 15                | 30          | –          |
| Maharashtra             | 25   | 17                | 8           | –          |
| Manipur                 | 1  | 1                 | –           | –          |
| Meghalaya               | 2  | 2                 | –           | –          |
| Mizoram                 | 1  | 1                 | –           | –          |
| Nagaland                | 6  | 6                 | –           | –          |
| Orissa                  | 13   | 5                 | 8           | –          |
| Pondicherry             | 1  | 1                 | –           | –          |
| Punjab                  | 12   | 2                 | 10          | –          |
| Rajasthan               | 26   | 2                 | 21          | 3          |
| Tamil Nadu              | 13   | 8                 | 5           | –          |
| Uttar Pradesh           | 55   | 41                | 14          | –          |
| West Bengal             | 15   | 4                 | 11          | –          |
| Tripura                 | 3  | 3                 | –           | –          |
| <b>Total</b>            | <b>363</b>                                     | <b>179</b>        | <b>177</b>  | <b>7</b>   |
| <b>Percent of total</b> | <b>–</b>                                       | <b>49.3</b>       | <b>48.8</b> | <b>1.9</b> |

medium black, mixed red and black soils, red (gravelly) loams of semi-humid or humid regions and sandy coastal alluvium are usually low in available P.

The information is of direct use for deciding application of P fertilizer. Phosphorus fertilizer is needed in soils testing both medium and low in P status. Accordingly, about 98 percent of the districts in India need fertilizer P application. Higher levels of fertilizer P are required in soils testing low. Likewise, fertilizer P to be applied can be reduced when soils test high in available P. About 50 percent of the districts in India need higher levels of P fertilizer than are currently being used. **BCI**

*Dr. Hasan is Principal Scientist at Division of Soil Science and Agricultural Chemistry, Indian Agricultural Research Institute, New Delhi-110 012, India.*