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Enhancing Potassium Consumption: Need of Policy Support

exacerbated the problem. As a result, Indian soils are being continuously mined of their available K reserves because its removal by crops is much higher compared to replenishment through fertilisers. At present, Indian agriculture operates with an annual net negative balance of 8.6 million tonnes of K which is getting compounded year after year. Areas which were high in available potassium 3-4 decades ago have become deficient. It is high time that due attention is paid to enhance the consumption of potassium to sustain soil health and crop productivity.

Potassium (K) is one of the primary nutrients essential for plant growth and development. Its essentiality in plant nutrition is due to myriads of functions such as enzyme activator, stalk strengthener, water regulator, sugar and starch transporter, disease retarder and crop quality improver. Its role in human nutrition is also being increasingly realized. Potassium is the 3rd most limiting nutrient in Indian agriculture, only after nitrogen (N) and phosphorus (P). Fifty per cent of soil samples are deficient (13% low & 37% medium) in available potassium. Potassium removal by different agricultural production systems is either similar to that of nitrogen or is even higher; it is nearly 4-5 times higher than that of phosphorus, sulphur and magnesium. However, its application rates are much lower than both for N and P. On All India basis, the per hectare consumption for N, P and K was 84.4, 33.8 and 12.4 kg, respectively in 2016-17. Potassium is contrastingly different from nitrogen. Unlike N, it is immobile in soil and most of the applied K, which is not utilized by plants, accumulates in the soil and is not lost to environment under normal conditions. Potassium content in straw is normally 2-3 times higher than that in the grain/seed and reverse is the case for N.

Potassium deficiencies have been on rise in the post-Green Revolution era. General perception that *the majority of Indian soils, dominated by K-bearing micaceous minerals, are rich in available potassium and may not require its external application* led to the omission or application of miniscule quantities of potassium. Complete dependence on import of potassic fertilisers to meet the country's K crop requirements further

Use of potassic fertilisers started after nitrogen and phosphorus. Use of potassium, which was almost negligible (0.5 kg K₂O/ha) till mid-1960s, started increasing after the introduction of high yielding varieties (HYVs) of rice and wheat in late 1960s. Consumption of K increased from mere 77,000 tonnes in 1965-66 to 3.63 million tonnes in 2009-10. Per hectare K use increased from 0.5 kg to 19.2 kg during the period. The country became 4th largest consumer of K fertilisers in the world. Favorable fertiliser policies implemented during 1970s and 1980s encouraged fertiliser use in balanced manner. To ensure availability of K fertilisers at the fertiliser sale points, Government of India, in early 1970s, made it mandatory for fertiliser dealers to stock certain amount of K fertilisers along with N and P fertilisers. Government fixed the maximum retail price (MRP) of fertilisers in a manner to make the fertilisers affordable to farmers and encourage the balanced use of nutrients including potassium.

Upward rising trend of K consumption was reversed by two policy decisions namely, decontrol of P and K fertilisers in August, 1992 and introduction of Nutrient Based Subsidy (NBS) scheme with effect from 1st April, 2010. Consequent upon implementation of both the policy decisions, there was steep increase in price of MOP. After the decontrol of P&K fertilisers on August 25, 1992, the price of MOP increased from Rs.1700 to Rs. 4500 per tonne over night. Sudden increase in price affected the K consumption adversely, which dropped from 1.36 Mt in 1991-92 (pre-decontrol) to 0.88 Mt in 1992-93 (post-decontrol).

With a view to partially compensate the increased cost of decontrol fertilisers, an *ad hoc concession* (later termed as concession) of Rs. 1000/- per tonne each for DAP and MOP was announced which became effective from *rabi* 1992-93. The rate of concession was revised from time to time in later years. The K use started increasing slowly and the country took 5 years to reach the pre-decontrol level of K consumption. After slow growth in K consumption during 1990s, there was a significant increase in K consumption in the 10 years starting in year 2000 when consumption of K increased from 1.68 Mt in 1999-2000 to 3.63 Mt in 2009-10. However, K consumption suffered again after selective introduction of nutrient based subsidy (NBS) scheme in 2010. The K consumption declined from 3.6 Mt in 2009-10 (pre-NBS) to 2.1 Mt in 2012-13 (post-NBS). This happened again due to steep increase in price of MOP. The price of MOP for farmers increased from Rs.4455 per tonne in 2009-10 to Rs. 17000 per tonne in 2012-13. The drop in K consumption distorted the NPK use ratio from 4.3:2.0:1 in 2009-10 to 8.2:3.2:1 in 2012-13.

The prevailing fertiliser pricing policy under which there is a huge distortion in urea *vis-à-vis* P&K fertiliser prices goes against the concept of balanced fertilisation. It is affecting the crop productivity, soil health and farm profits. Government is spending huge amounts on fertiliser subsidy. The instrument of fertiliser subsidy should promote balanced and efficient use of plant nutrients. Products and practices which improve fertiliser use efficiency

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need encouragement under the policies for the sector.

The Hon'ble Prime Minister's Mission of providing soil health cards to all 138 million farmers by March 2018 is a step in right direction. It would help the farmers to know their soil fertility status and follow the prescription-based fertiliser recommendations for crops. Merely providing soil health cards is not enough. Based on the latest soil analysis data available on soil health card portal, state governments should revise and incorporate the K recommendations in package and practices. Even more important is that pricing policy should bring parity in price of different nutrients to enable the farmers to buy and use all the limiting nutrients in balanced proportion.

In addition to direct use of MOP, the production and sale of K containing fertilisers particularly crop- and area- specific customised fertilisers, water soluble mixture of fertilisers and NPK complex fertilisers need to be encouraged to increase K use and improve NPK use ratio. Policy should also encourage the use of organic manures and city compost to build up soil organic carbon and supplement potassium needs.

In view of the fact that India is entirely dependent on imports to meet its potassium demand, alternate sources of potash such as low-grade potash-bearing minerals, glauconite, mica wastes coupled with potash-solubilizing bacteria need to be explored for partial import substitution of muriate of potash. Integrated potassium management, involving optimized use of mineral, organic and biological K sources, coupled with best management practices like 4R principle-driven site-specific nutrient management is a future sustainable strategy.

Right from the beginning, FAI has been promoting the balanced use of fertilisers. The problem of soil nutrient mining, particularly soil K mining, is being highlighted at various fora. All important issues related to potassium management were deliberated at length in International Conference on "Advances in Potassium Research for Efficient Soil and Crop Management" held during August 28-29, 2017 in New Delhi.

This special issue on potassium is an initiative to highlight the importance and need of enhancing potassium use in Indian agriculture. The issue includes eight papers covering important aspects like soil K status, potassium mining, improving K recommendations, re-cycling of potassium, and potassium nutrition and human-health. We hope that all those concerned with development of Indian agriculture including scientists, policy makers, extension workers and farmers will find the contents of the special issue useful.

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