

BALANCED FERTILIZATION

Potash for Higher Crop Yields and Better Quality



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What is Balanced Fertilization?

Crops need many essential nutrients for optimum growth, yield and quality. Nitrogen (N), phosphorus (P), potassium (K), sulphur and zinc are some of the essential plant nutrients. Crops need N, P and K in large amounts, hence these are applied through fertilizers. Application of plant nutrients in optimum ratio and adequate amounts is called "*Balanced Fertilization*".



Effect of potassium on wheat. Experiment at farmers' fields. IPI project in Bhondsi, Haryana, India. Source: IPI Coordination India. 2001.

What Happens with Continuous Imbalanced Fertilization?

- Depletion in soil fertility
- Decrease in crop yields
- Poor crop quality
- Diminishing profits

What are the Advantages of Balanced Fertilization with Potash?

- With adequate potash fertilization, it is possible to sustain high yields.
- Superior quality, which means easy marketing of produce.
- Higher yields and better quality, thus more profit to the farmers.

How does Potash Benefit the Crops?

Potash promotes growth and increases yields. Potash regulates plant metabolism ensuring a healthy and sturdy crop which is more resistant to stresses. Potash increases the use of other nutrients in the plant, thus increasing the efficiency of applied urea and DAP. Potash fertilization increases root growth, drought tolerance and resistance to frost. It helps plants to resist attack of pests and diseases and stalk lodging.



Effect of 25 kg K_2O /ha on the number of soybean pods/3 plants. IPI-NCSR project in the 'soybean belt' of India, Sehore, Mādhyā Pradesh, India. Source: IPI Coordination India. 2002.

How does Potash Increase Quality of Crops?

Potash is referred to as the 'quality fertilizer' in crop production. Adequate potash application improves many quality aspects of the crops. With adequate potash fertilization:

- Grains are bolder and more shining.
- More protein, oil and vitamin C content in grains and fruits.
- Increased size of fruits and tubers.
- Enhanced fruit color and flavor.
- Improved storage and shipping quality of agricultural products.

Why Potash Fertilization is Essential for our Soils?

The soil does not have an unlimited supply of K. Therefore, potash fertilization is essential to maintain soil productivity and fertility. Successive harvests remove large quantities of potash from the soil, and if the level of potash in the soil is not regularly tested and sufficiently replaced by fertilization when the level is found to be inadequate, soils become deficient in K.

How much Potash do Crops Remove from the Soil?

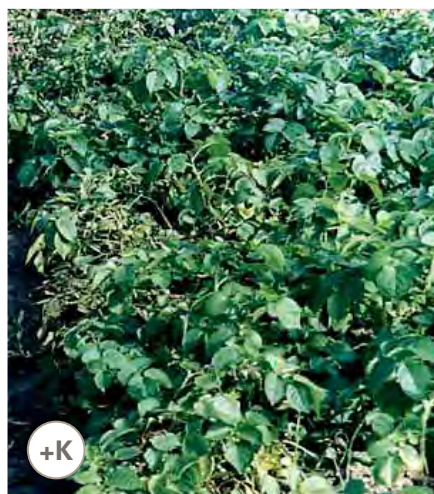
Every crop harvest removes nutrients from soil including potash. An average crop of rice yielding 5 t/ha removes 110 kg N/ha, 34 kg P_2O_5 /ha and 156 kg K_2O /ha. The higher the yield, the higher the removal of nutrients. Most crops remove more K than any other nutrient, indicating the necessity of applying an adequate quantity of potash fertilizer.

Removal of Plant Nutrients by Crops

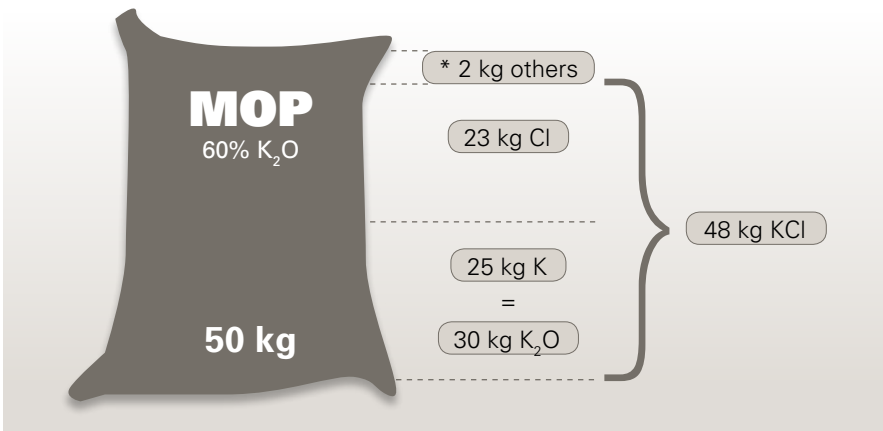
Crop	Yield Mt/ha	Nutrients removal (kg/ha)		
		N	P ₂ O ₅	K ₂ O
Maize	6	120	50	120
Wheat	6	170	75	175
Potato	40	175	80	310
Tomato	50	140	65	190
Citrus	30	270	60	350
Cotton (lint)	1	120	45	90
Sugarcane	100	130	90	340

What is Potash Fertilizer?

Just like urea and DAP fertilizers are used to supply nitrogen and phosphorus, potash fertilizers are applied to crops for supplying potassium.



Effect of potassium on occurrence of Late Blight disease (*Phytophthora infestans*) in potato crop. IPI-PRII-CPRI project, Jalandhar, Punjab, India. Source: IPI Coordination India. 1997



* Mainly CaCl₂, MgCl₂ and NaCl

What are the Common Potash Fertilizers?

Fertilizer	Formula	% K ₂ O	Common name
Potassium chloride	KCl	60	Muriate of potash - MOP
Potassium sulfate	K ₂ SO ₄	50	Sulfate of potash - SOP
Potassium nitrate	KNO ₃	46	Nitrate of potash - NOP
Blended or compound fertilizer	Various	Various	NPK's

Potash (MOP) fertilizer comes in different colors: red, pink and white. Red, pink and white potash have the same composition, K nutrient content and equal effectiveness when applied to soils. The color has no agronomic significance in terms of crop response as crops do not distinguish between red, pink and white potash.

Which is the Best Time to Apply Potash?

Application of potash is usually done at the time of sowing/planting (basal application). This ensures a good establishment of the crop and a subsequent supply of potash throughout the whole crop cycle. However, in sandy soils or heavy black soils, where potash can be lost by leaching or fixation, it is recommended to split the dose in two (half dose as basal application and half dose as top dressing) to ensure a continuous supply of K to the crop.

How much Potash should be Applied?

These are general fertilizer recommendations. Actual recommendations depend on crop yield, crop variety, irrigation and soil fertility. To check the status of nutrients in the soil, sample your field and have your soil periodically tested in the soil testing lab.

Crop	Recommended nutrients (kg/ha)		
	N	P ₂ O ₅	K ₂ O
Rice	120	60	60
Wheat	120	60	60
Sorghum	80	40	40
Maize	120	60	60
Groundnut	30	40	40
Potato	150	60	150

Remember: 1 Hectare = 2.5 Acres, 60 kg K₂O/ha = 40 kg MOP/acre

Can Organic Manures Supply Enough Potash to the Crops?

Organic manures contain low amounts of N, P and K nutrients. Farm yard manure (FYM) and compost contain only 0.5-0.6% K₂O, while potash fertilizer contains 60% K₂O. For example: to apply 60 kg K₂O/ha, you need to apply 10,000 kg of FYM as compared to only 100 kg of potash. Application of organic manure in balanced fertilization is very valuable due to micronutrients supply and improvement of the soil quality by enhancing microbiological activity and physical properties (structure, water holding, aeration). Best results are obtained when N, P and K fertilizers are applied in combination with organic manures. This is called Integrated Nutrient Management (INM).

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