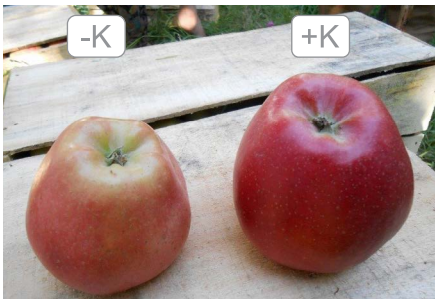
BALANCING USE OF FERTILIZERS WITH

POTASSIUM



INTERNATIONAL POTASH INSTITUTE

Food and Agriculture Organization of the United Nations

What Is Balanced Fertilization?

Although crops need at least 17 essential elements for optimum growth; however nitrogen (N), phosphorus (P), potassium (K) are required in large amounts and are also deficient in most soils of the world. Among others, most of the essential elements are either provided by soil or deficient elements are required in smaller amounts. While N, P and K have to be supplemented by fertilizers in optimum ratio as soil reserves are depleting and unable to support the plant growth. Application of adequate amounts of such fertilizers is called "Balanced Fertilization".

Why Balanced Fertilization with Potash?

Among three commonly deficient mineral essential elements N and P are generally used by farmers whereas less use of potassic fertilizers caused depletion of fertility, reduced crops yields, poor crop quality and low economic returns. Although soils have better K reserves comparing N and P, however not unlimited due to pronounced depletion from soils. Therefore potash fertilization is essential to maintain soil productivity. With adequate potash fertilization, it is possible to sustain high yields for generations and superior quality promotes easy marketing of produce. Thus more profit to the farmers.

Crops	Yield	Nutrients Removal (kg/ha)		
	Mt/ha	N	P_2O_5	K_2O
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

Source: IPI Publications

How does Potash Improve Crops Yield and Quality?

Potash promotes growth, increase yields and quality of produce. Potash regulates plants metabolism ensuring a healthy and strong crop which is more resistant to stresses such as drought, frost and pests. Potash increases the use efficiency of other nutrients by the plants, thus increasing the efficiency of applied nitrogenous and phosphatic fertilizer. Adequate potash application improves the quality aspects of the crops and its balanced use produce bold and shining grains with more protein, corbohydrates and vitamin C content. Potassium increases the size of fruits and tubers with better color, flavor and storage & shipping quality.

What is 4Rs Stewardship?

4R stewardship is a practical description of conventionally known term "Balanced Use of Fertilizers", which explains the use of Right source of fertilizers at Right rate applied at Right time and Right place.

Right Source

Just like urea and DAP used to supply nitrogen and phosphorus to the crops, various chemical fertilizers are applied to crops to supply potassium. Potassium Chloride (KCl) is also known as Muriate of Potash (MOP), the majority of potash fertilizer used by farmers is

MOP. The reserves of potash being mined are the deep residues of dried-out pre-historic seas. Potassium Sulphate, (K_2SO_4), also known as Sulphate of Potash (SOP) is preferred in areas with low rainfall to eliminate the possible accumulation of chloride in soils. This source of potash does not occur widely in nature and the majority is manufactured from KCl using sulphuric acid. It contains less potassium (50% K_2O) than that in KCl (60% K_2O). Potassium Nitrate, (KNO_3) known as Nitrate of Potash (NOP) produced by reacting potassium chloride and nitric acids, and is special sources of nutrients commonly used where these nutrients are supplied in irrigation water (fertigation). Mono-potassium phosphate (KH_2PO_4) is produced by processing KCl with phosphoric acid and is highly soluble and used for foliar application in fruits.

Fertilizers	Formula	% K_2O	Common Name
Potassium chloride	KCl	60	Muriate of potash – MOP
Potassium sulfate	K_2SO_4	50	Sulfate of potash – SOP
Potassium nitrate	KNO_3	46	Nitrate of potash - NOP
Mono-potassium phosphate	KH_2PO_4	34	Mono-potassium phosphate
Blended or compound fertilizer		6-30	NPK's

Right Rate

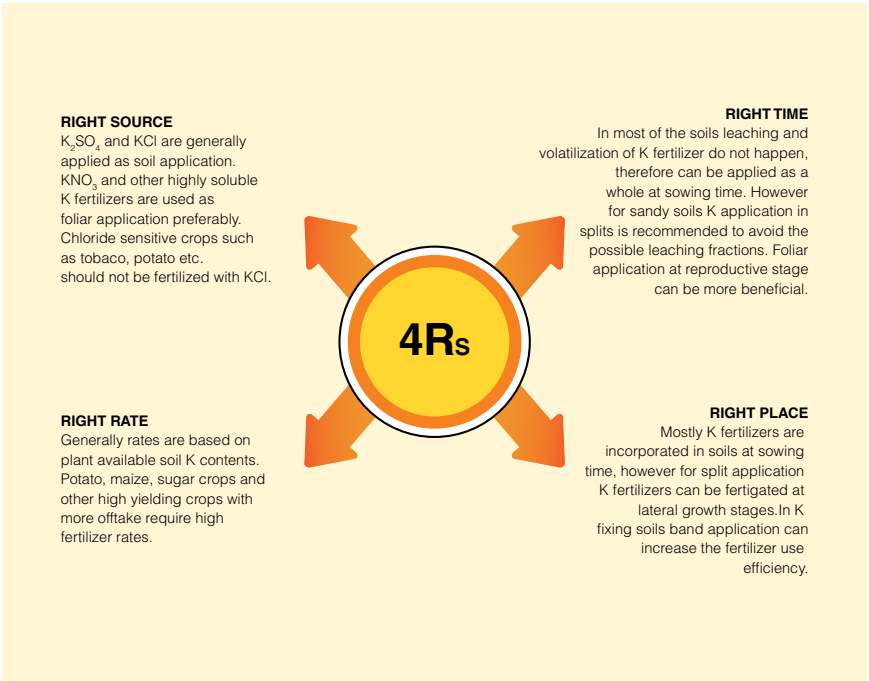
These are fertilizer recommendations based on plant available K in the soil. For recommendations crop species, crop variety and irrigation water are also considered. To check the status of nutrients in the soil, sample your field and have your soil periodically tested in the soil testing lab. In the following table general recommendations of N, P and K fertilizers is presented for different crops.

Crops	Recommended Nutrients (kg/ha)		
	N	P_2O_5	K_2O
Rice	120	60	60
Wheat	120	60	60
Sorghum	80	40	40
Maize	120	60	60
Groundnut	30	40	40
Potato	150	60	150

Source: IPI Publications

Right Time and Right Place

As potassium is very safe element in the soil because of no volatilization and very little chances of leaching (only in sandy soils), therefore all amount of K fertilizer can be applied at sowing time. If NOP source is used then better to apply after sowing at different growth stages as fertigation. Highly soluble sources of potash can also be used as foliar application as a supplement to soil application, nevertheless only foliar application does not substitute soil application of potash.



Four Benefits (4Bs) of Potash Use

Potash regulates plants metabolism ensuring a healthy and strong crops which have;

- Increased growth and yield of crops
- Enhanced quality of produce in the form of bold and shining grains with more protein, oil and vitamin C content in cereals, whereas in fruits and tubers, potassium increases the size with better color, flavor and storage & shipping quality
- Improved resistance against drought, salinity, frost and pests
- Efficient use of other fertilizers such as urea and DAP, thus increased economic returns

Pakistan agriculture is facing the problems of salinity, drought and low fertilizer use efficiency causing high input cost and low produce quality, thus deceasing farmers' profitability. Use of potassic fertilizers can play role to decrease the extent of such issues. For good and profiltable crop production, farmers are advised to apply potassic fertilizers after analyzing their soil, and water in irrigated areas.

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