



NUTRIENT REQUIREMENTS FOR POTATO PRODUCTION





Introduction

- Potato crop requires sufficient soil nutrients to grow well and give many tubers which are of high quality.
- Before planting potatoes, it is advisable to do soil testing to establish soil nutrient levels. Low soil fertility is caused by continuous growing of crops on your land without adding manure or fertilizers.
- Other causes of low soil fertility is soil erosion where top soil is washed away by surface runoff or by wind.
- These challenges call for an Integrated Soil Fertility Management (ISFM) approach that combines appropriate interventions on soil management including fertilizer use and crop agronomy.
- The set of soil fertility management practices (ISFM) that include the use of inorganic fertilizers, locally available organic inputs, improved seed combined to adapt practices to local conditions.
- It aims to optimize proper use of nutrients the from applied fertilizer materials and water by plants for improved crop productivity.
- Among others, ISFM uses techniques such as:
 - fertilizer banding (field application of fertilizer directly in area of root-zone).
 - micro dosing (applying small quantities of fertilizer with the seed at planting time and later a few weeks after emergence in top dressing).

Soil requirements for potato production

- Potato can be grown in a wide range of soils
- Well-drained clay loams to sandy loams texture is best



- Soil pH should be a range between 5.8 and 7
- Soil nutrients testing must be conducted before planting

Potato nutrient requirements include macronutrients (N, P, K) and micronutrients (Cu, Zn, Bo and Mo).

The general recommendation is to apply enough fertilizer to furnish 40-120 kg each of nitrogen (N), 24-40 kg phosphorus (P_2O_5), and 80-120 kg potassium (K_2O) per acre

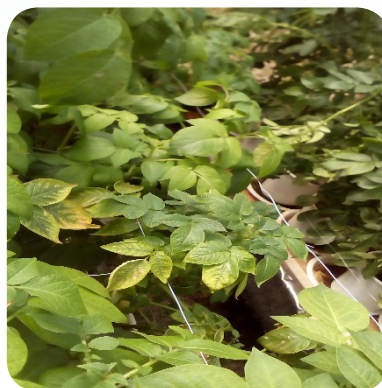
Micronutrients are normally applied in small quantities as foliar feed

Nitrogen (N)

- Application of N has the greatest impact on increasing tuber weight
- Too much N (based on the soil test results) can stimulate excessive vegetative growth, and suppress or delay tuber formation



Potato crop with good vegetative growth



Yellowing of foliage due to N deficiency

Phosphorus (P)

- Potatoes need a good supply of available P in soil for increased tuber numbers and uniformity in size and keeping quality.
- Due to unavailability of P in acid soils (P fixation), P fertilizer applications need to be considerably higher than the 12 to 20 kg P_2O_5 /acre removed by the crop
- Phosphorus fertilizer recommendation for potato is 92 kg of P_2O_5 /acre for most areas in Kenya

Deficiency symptoms

- Where P is deficient, plants may first develop leaves that are smaller and lighter green than normal.



- Over time, the lower leaves darken, have less shine, start to curl, and develop small grey patches along the edges
- Plants are stunted with shortened internodes and poor root systems, which can be observed at the early growth stages



Grey patches on leaf margins

Potassium (K)

Potato requires large quantities of Potassium (K) for increased yield, tuber quality and disease resistance

Deficiency symptoms

- Leaves appear dull and are often blue-green between the veins
- Leaves also develop small, dark brown spots on the undersides and a bronzed appearance on the upper surfaces.
- Yellow leaf margins eventually develop.



Yellowing of leaf margins

Sulphur (S)

Sulphur (S) is important for good crop development, improved yield, stress and pest resistance

Deficiency symptoms

- Young and maturing leaves on the upper plant become yellow while the lower leaves remain green
- Leaves show overall yellowing and curving upward



Curving and yellowing of leaves



Calcium (Ca)

- Calcium (Ca) is a key nutrient for improving potato keeping quality .
- Adequate Ca reduces the severity of many plant and tuber diseases in the field and during storage

Deficiency symptoms

- Young leaves are smaller, distorted, cupped, and darker green than normal



Leaf distortion

Magnesium (Mg)

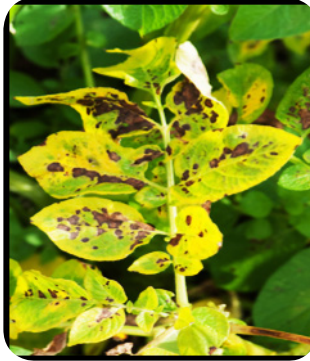
Magnesium (Mg) increases yield, improves disease resistance and enhances keeping quality

Deficiency symptoms

- Mature leaves are first to show yellowing (chlorosis) near the veins, which spreads out to the leaf edges.



- Leaves remain green on the margins and veins but are yellow in between the veins.

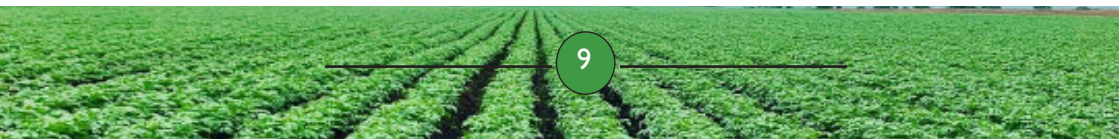


Yellowing of mature leaves near veins

4R Nutrient stewardship for potato production

The 4R nutrient stewardship concept helps to identify the “Right” way to meet the needs of the potato crop by considering:

- Right source
- Right rate
- Right time
- Right place





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