# Phosphorus Deficiency in Rice Production

Factsheets for Rice Production, East Africa

## Importance

- Phosphorus (P) is important for root formation, flowering, tillering and ripening
- Deficiency is widespread in both upland and irrigated rice and is a major growth-limiting factor in acid upland soils
- It may be as a result of low P uptake due to soil acidity (low pH), iron toxicity, zinc deficiency and soil salinity and/or low use of phosphorus fertilizer
- Carrying away of grains and straw lead to P mining resulting to its deficiency in the soil

## Prevalence

- Course-textured calcareous soils with low organic matter and small P-reserves in suc areas as Kilifi, Kwale and Vanga
- Highly weathered clayey acid upland soils with high P-fixation in areas such as Embu, Busia, Siaya, Homabay, Migori counties

## Deficiency Symptoms

Common indicators of P deficiency are:

- Stunted, retarded plants with reduced tillering
- Red-purple colouration on leaf margins moving towards the midrib
- Narrow, short, and erect older leaves
- Thin and spindly stems
- Poor grain filling and delayed maturity
- In severe phosphorus deficiency, plants fail to flower or husks remain empty


**Fig 1. Stunted growth (a), thin spindly stems (b), + and –P plants (c) (Dobermann and Fairhurst, (2000))S**


(https://www.google.com/search?q=P+deficiency+in+rice)

## Effects excessive application

- Application of excess P fertilizers may result in lowering of grain iron (Fe) content in rice (Binay *et al,* 2012)

## Management Strategies

- Analyze soils (at least in every three years) and plant tissue (whenever symptoms are noticed) to establish P status in soils
- Replenish P removed in crop products by applying P fertilizers based on soil test report.
- Apply optimum doses of N and K and correct micronutrient deficiencies that trigger Phosphorus immobilization
- Apply farm yard, compost manure or apply lime in acid upland soils
- On acid, low-fertility rainfed lowland and upland soils, correct soil fertility problems as per the soil test report for positive phosphorus response
- Judiciously apply P to prevent Fe- induced malnutrition
- Incorporate rice straw to help maintain a positive P balance

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