

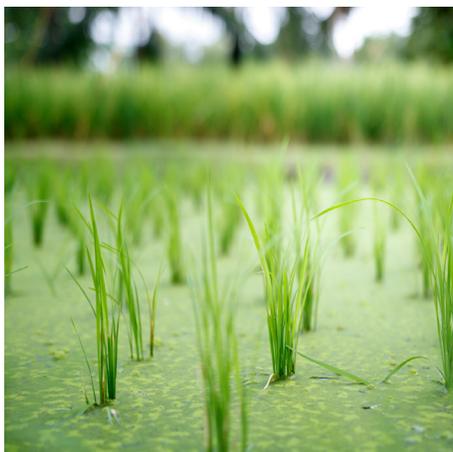


SoilCares 

Fertiliser Recommendation RICE

This SoilCares fertiliser leaflet gives a brief background on the recommendation module used by SoilCares. Calculation rules and product formulation are adapted to local conditions and differ for different countries and/or customers within a country.

Rice cultivation



Rice is the seed of the grass species *Oryza sativa* (Asian rice) or *Oryza glaberrima* (African rice) and is a common crop in humid, tropical areas. Rice is the most important crop for human consumption, providing one-fifth of the worldwide caloric consumption. Rice has small wind-pollinated flowers and is commonly grown as an annual crop, although it can survive as a perennial crop. Rice plants grow to 1–1.8 m. The top 3 rice producing countries are China, India and Indonesia.

Rice can be grown in different ways, based on water availability:

- lowland, rain-fed
- lowland, irrigated
- deep water or floating rice
- upland rice

System of rice intensification (SRI)

Since some time the system of rice intensification (SRI) has gained interest by various actors. In short, SRI is an agro-ecological methodology for increasing the productivity of irrigated rice by reducing plant population, improving soil conditions and irrigation methods for root and plant development, and improving plant establishment methods. SRI has reported some impressive results, but also has led to controversial responses.

The irrigated system, most often using flood irrigation, is most common. Worldwide there are about 40,000 varieties of rice, which can be categorised into their grain-size. Short grained varieties (e.g. Japonica) is sticky and is mostly grown in dry fields in temperate areas. Long grained varieties (e.g. Indica) is non-sticky and grows under submerged conditions throughout tropical Asia. Aromatic rice is medium grained and includes for example basmati rice. Global average rice yields are about 4 tonnes per hectare, but outliers up to 10 tonnes per hectare are possible. Rice production is jeopardised by various pests and diseases, the most obnoxious being the insects brown planthopper, several species of stemborers and the fungal disease rice blast.

Crop nutrient management

Rice has a relatively broad tolerance for soil pH and can flourish at pH levels between 5 and 7. Rice is susceptible to Zinc deficiency. Fertilisers are typically applied in three dressings: basal application, at active tillering and at panicle initiation. Even though rice requires substantial nitrogen inputs, excessively high soil nitrogen contents may result in increased susceptibility to diseases and lodging problems.

The SoilCares fertiliser recommendation system

The fertiliser recommendations developed by SoilCares are determined using the measured soil properties and the characteristics of the crop the farmer is growing. The SoilCares recommendation is built up of two parts: a soil correction plan to bring the soil to an adequate fertility level and the replacement of nutrients removed by the crop based on the expected yield. The recommendation is the sum of the soil correction and the nutrient uptake by the crop. The soil correction rates (the rate of nutrients to be applied to reach or maintain adequate soil fertility) may be different for different agro-ecological zones. This differentiation level and the corresponding soil correction rates are determined in collaboration with the customer. For paddy rice the use of nitrate based fertilisers is prohibited, because of losses caused by volatilisation (denitrification).



Nutrient deficiency symptoms in rice

Nitrogen: stunted, yellowish plants

Phosphorus: stunted, dark green plants

Potassium: dark green plants with yellowish brown leaf margins

Calcium: rolled tips on younger leaves

Magnesium: orange-yellow inter-veinal chlorosis on older leaves

Sulphur: pale green plants

Ranges for different soil fertility classes (mg/kg)			
Element	low	medium	high
N	1	1-2	>2
P	0.2	0.2-0.6	>0.6
K	2	2-30	>30
pH	5	5-7	>7

Table 1. Ranges for different soil fertility classes. These ranges are specified per country.

Nutrient uptake for rice (kg/tonne)	
N	15
P	3
K	16

Table 2. Crop nutrient uptake rates.

Used Literature

IFA, 1992, World Fertilizer Use Manual

Benton Jones J. (2002) Agronomic Handbook: Management of Crops, Soils and Their Fertility. Taylore & Francis

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