Annex

Field management of rice

High-quality crop management is essential to derive maximum benefit from site-specific management.

Photo captions

(a) Proper leveling reduces water requirements and ensures even growth during early growth stages.

(b) Good-quality seeds with a high germination rate reduce seed requirements and result in strong, healthy seedlings.

(c) In transplanted rice, optimal seedling age is about 14–18 d with 1–2 seedlings per hill, whereas older seedlings of ≥21 days may require 2–3 seedlings per hill.

(d) Optimal canopy development is only reached with adequate planting density, with hills spaced 16–23 cm apart in transplanted rice, and 80–120 kg seeds per ha in broadcast wet-seeded rice.

(e) Weeds compete with rice plants for space, water, and nutrients and thus reduce yield.

(f) Observation of pests and diseases saves money, as pesticide application can be reduced with integrated pest management.

(g) Lodging can be avoided with well-timed N management using the leaf color chart to synchronize N supply with crop demand and balanced nutrient management, thus increasing plant strength and resistance to lodging.

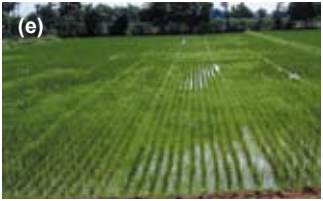
(h) The right harvesting time to achieve the highest yield is at full maturity, when grains are hard and fully filled.


(a)


(b)


(c)


(d)


(e)


(f)


(g)


(h)

Nutrient management tools: omission plots

Soil indigenous nutrient supply of N, P, and K can be measured from grain yield in 0 N, 0 P, and 0 K omission plots, respectively.

Photo captions

(a) Install omission plots (5 × 5-m size) at the long side of the field, not in a corner.

(b) Construct bunds of 25-cm height to avoid fertilizer contamination.

(c) Double bunds effectively reduce fertilizer contamination and bunds need to be well maintained throughout the season.

(d) Irrigation is ideally performed for individual plots, avoiding water running through all plots, which may cause fertilizer contamination.

(e) A well-established 0 N plot in a farmer's field at midseason.

(f) Sufficient and well-timed fertilizer N topdressing is important in 0 P and 0 K plots to make sure that N is not limiting growth.

(g) Excellent omission plot with a pronounced difference in growth when compared with the adjoining farmer's field.

(h) At full maturity, harvest all plants from a central 5-m^2 area and avoid plants from border rows. Carefully remove all grain from the spikelets, then dry and weigh the grain.


(a)


(b)


(c)


(d)


(e)


(f)


(g)


(h)

Nutrient management tools: leaf color chart (LCC)

The timing of fertilizer N application during the cropping season can be improved by assessing plant N status using the LCC.

Note: The panels of the new, standardized 4-panel LCC are numbered 2, 3, 4, and 5, so that the critical values correspond to those used with the older LCCs.

For the standardized IRRI LCC with most rice varieties, the leaf colors mentioned in Tables 7–9 correspond to LCC values as follows:

- Yellowish green = LCC value 3,
- Intermediate = LCC value 3.5 (intermediate between 3 and 4), and
- Green = LCC value 4.

Photo captions

(a) Plants look N-deficient in this field without fertilizer application.

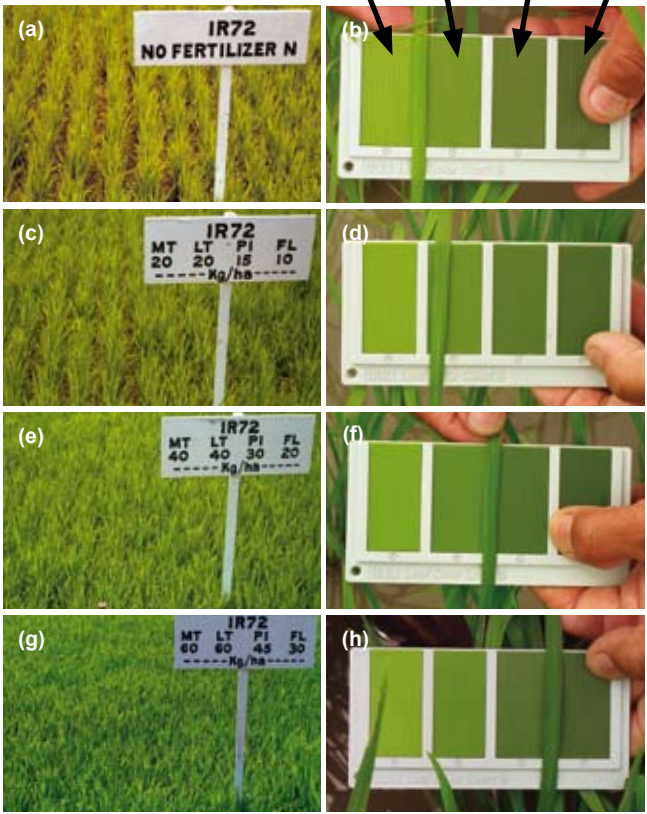
(b) This was confirmed through an LCC measurement, since leaves were yellowish with a color between panels 2 and 3.

(c), (d) At low fertilizer N rates, plant appearance is better, but the low LCC reading still indicates N deficiency.

(e), (f) Plants look well developed and the canopy is closed at the higher fertilizer N rates, while the LCC reading is between panels 3 and 4, which is in most cases the critical value for transplanted rice. With real-time N management, fertilizer N should typically be applied soon when leaf color drops below 3.5 for transplanted rice and 3 for wet-seeded rice. With fixed-time N management, a relatively higher rate of fertilizer N should be applied when leaf color drops near 3 for transplanted rice and below 3 for wet-seeded rice.

(g), (h) Plants look very dark at the very high N rate. Leaf color is very dark green and darker than LCC panel no. 4 indicating no N deficiency.

LCC panels: 2 3 4 5

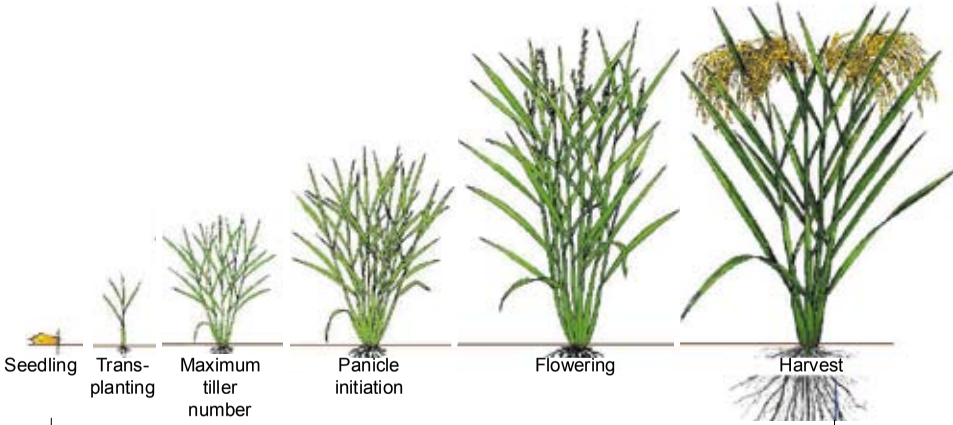


Growth stages

Extension workers and farmers should work together to identify the local names for the most important growth stages of rice to organize fertilizer application at the right time.

Photo captions

The duration of the vegetative phase differs with variety and may range from 30 to 80 d for modern high-yielding varieties. The duration of the reproductive and ripening phases is, at 30–35 d, about the same for most varieties. Using the leaf color chart, most fertilizer N should be applied in 2–4 split applications between early tillering and panicle initiation.
In high-yielding seasons or in hybrid rice, a late N application could be given at heading to first flowering. Flowering to harvest takes about 30 days. Thus, sowing to harvest may range from 90 to 160 days in irrigated rice, depending on variety.



Growth stage	Vegetative phase	Reproductive phase	Ripening phase
Duration	Variable	35 days	30 days