



Rice Farming on Bali

Steve Lansing and John Miller

February 11, 2025

The Balinese have farmed rice in flooded paddies for over a millennium. Prior to the Green Revolution in the 1970s, slow-maturing native varieties of rice were grown in the nutrient-rich volcanic soils. Rainfall leaches potassium and phosphate from the volcanic soil and flows to the fields via the irrigation system. The flooded fields and traditional farming methods allow naturally occurring cyanobacteria to fix the needed nitrogen used by the plants. The Green Revolution introduced new, rapidly maturing, high-yielding rice varieties that required commercial fertilizers in lieu of microbial nitrogen fixation.

Stages of Paddy Rice Farming on Bali

The various stages of rice farming are sequenced based on when the rice is planted in the field. In a remarkable example of system-wide cooperation, the subaks coordinate planting dates with one another to avoid water shortages and uncoordinated fallow periods that would otherwise result in excess crop losses to agricultural diseases and pests.

1. Pre-Planting Stage (2–3 weeks prior to planting)

A. Land preparation (1–2 weeks prior to planting)

- Weeds, stubble, and debris from the previous harvest are cleared and the field is flooded with water.
- The flooded field is plowed and harrowed to further breakup and level the soil.

B. Nursery preparation and seedling production (2–3 weeks prior to planting)

- Seeds from the chosen variety are soaked in water for 24 hours to accelerate germination and then sowed in a small, separate, well-irrigated nursery plot.
- Seedlings are grown for 2–3 weeks before transplanting.

2. Planting Stage

A. Transplanting

- Seedlings from the nursery are pulled up and bundled for transplanting.
- 2–3 seedlings are transplanted together into holes that are precisely spaced across the field (about 20 cm apart) to ensure proper root establishment.

3. Growth and maintenance stage (~8 weeks, depending on rice variety and growth conditions)

During this stage, the seedlings continue to grow, eventually forming a full canopy over the field.

A. Flooded water management and weed control (8 weeks)

- Water levels are maintained at a depth of 5–15 cm depending on the growth stage.
- Hand-weeding or organic herbicides prevent competition from weeds.

Alternatively:

A. Alternate Wetting and Drying (AWD) water management and weed control (8 weeks)

- After the field is planted, it is immediately drained.
- Triggered by the presence of hairline cracks in the soil (judged by the farmers), water is channeled into the field to remoisten the soil and then drained.
- Hand- or machine-weeding or organic herbicides prevent competition from weeds

B. Fertilization and disease/pest management

- Fields are fertilized when the rice is transplanted and a couple of times during the initial phases of growth. Commercial fertilizer (NPK, consisting of nitrogen, potassium and phosphorus) is used for the fast-growing rice varieties. Under AWD, this fertilizer tends to stay in place, resulting in higher crop yields per unit of fertilizer.
- Diseases and pests are monitored and are addressed using natural predators, biopesticides, and pesticides.

4. Harvesting Stage (2 weeks)

A. Draining of the fields (2 weeks)

- Two weeks prior to the rice maturing, the fields are drained.

B. Harvesting

- Rice is harvested either manually (small fields) or mechanically (large fields), and dried.
- Rice is then threshed, winnowed, milled, and stored.

6. Fallow and Soil Regeneration Stage (1–2 months)

- Field is allowed to lay fallow before replanting for at least 1–2 months. Fields may be replanted with crops other than rice.

Given the above timing, rice is farmed twice per year on the island.

For further information or inquiries, contact wxc.bali@gmail.com