

Good agricultural practice for rice

Improving rice productivity in Senegal



Introduction

- ▶ Rice good agricultural practices (GAP) is an integration of management practices encompassing land preparation (bunding, puddling and leveling), crop establishment method, variety choice, and weed and nutrient management along with crop calendar and record-keeping. Farmers can use GAP to increase their rice productivity.
- ▶ The GAP detailed in this brief is designed specifically for irrigated lowlands in the Senegal River valley and can be used for demonstration plots and farmers' training.
- ▶ Farmers who received GAP training and applied GAP improved their yields by 0.5 t/ha (10%), nitrogen use efficiency by 39 kg/kg (80%) and phosphorus use efficiency by 16 kg/kg (11%) compared to those who did not receive training.

How to use GAP

- ▶ GAP components shown in this leaflet have been identified based on previous research findings in this region.
- ▶ Additional GAP components can be identified using the Sustainable Rice Platform (SRP) Standard and Performance Indicators for sustainable rice cultivation and its digital data collection and diagnostic tool 'GAPfinder'.



Land preparation in terms of bunding and leveling makes the crop much easier to manage

Crop calendar

- ▶ A crop calendar is a timetable for the rice growing season, beginning with the fallow period and land preparation, and progressing through crop establishment and maintenance, harvest and storage.
- ▶ Using a crop calendar allows for better planning of farm activities and reduces production costs.
- ▶ The following crop calendar could be used for the irrigated lowland in the delta of the Senegal River valley:

Activities	Timing DAS = days after sowing	Expected date
Season: Dry		
Variety selection		15 Jan
Planning of field preparation		15 Jan
Puddling and harrowing		15 Jan
Field leveling and canal maintenance	0–20 days <i>before sowing</i>	10 Feb
Sowing		15 Feb to 15 March
Basal fertilizer	0–14 DAS	15–28 Feb or 15–28 March for late sowing
Herbicide application		Treat 2 days before fertilizer application
Water management	0 DAS to 10–14 DAS before harvest	
Nitrogen: First topdressing	Tillering	31–35 DAS
Weed control	2 days before the first topdressing	
Nitrogen: Second topdressing	Panicle initiation	43–47 DAS
Weed control	2 days before the second topdressing	
Field drainage	10–14 days before harvest	
Harvest	At 18–23% of grain moisture	103–107 DAS
Drying	Post-harvest	2 days after harvest
Season: Wet		
Variety selection		15 June
Planning of field preparation		15 June
Puddling and harrowing		15 June
Field leveling and canal maintenance	0–20 days <i>before sowing</i>	10 July
Sowing		15 July to 15 Aug
Basal fertilizer	0–14 DAS	From 15–28 July or from 15–28 Aug for late sowing
Herbicide application		Treat 2 days before fertilizer application
Water management	0 DAS to 10–14 DAS before harvest	
Nitrogen: First topdressing	Tillering	23–27 DAS
Weed control	2 days before the first topdressing	
Nitrogen: Second topdressing	Panicle initiation	33–37 DAS
Weed control	2 days before the second topdressing	
Field drainage	10–14 days before harvest	
Harvest	At 18–23% of grain moisture	93–97 DAS
Drying	Post-harvest	2 days after harvest

Step 1: Use of high-quality seed of improved variety

- ▶ Use seeds of improved varieties from seed producers or by picking good panicles from the weed-free rice field and drying and threshing them to obtain the seeds.
- ▶ Use varieties that are well adapted to irrigated rice areas in the Senegal River valley such as:
 - Sahel varieties** (Sahel 108, Sahel 177, Sahel 134, Sahel 202, Sahel 305)
 - ISRIZ aromatic varieties** (ISRIZ 1, ISRIZ 2, ISRIZ 3, ISRIZ 8 and ISRIZ 9)
 - ISRIZ with good quality grain for transformation and cooking** (ISRIZ 4, ISRIZ 5, ISRIZ 6, ISRIZ 7, ISRIZ 12 and ISRIZ 15)
 - Salt-tolerant** (ISRIZ 10 and ISRIZ 11)
 - Cold-tolerant** (ISRIZ 13 and ISRIZ 14).

Step 2: Land preparation

- ▶ Land preparation should begin 3 to 4 weeks before planting.
- ▶ For retaining water in the seedbed, field bunding is of high importance in both seasons of irrigated lowland rice.
- ▶ Field bunds can be constructed as follows:
 1. Mark the field boundaries using a tape measure, pegs and sisal ropes.
 2. Collect the topsoil round the field using a hand-hoe or a rake.
 3. Excavate the subsoil and use it to build the bunds.
 4. Compact the bunds and level the plot.
 5. Spread the topsoil evenly and gradually until the entire leveled area is covered.
- ▶ The dimensions of bunds must be max. 50 cm wide and 30 cm high around the field.
- ▶ Field leveling is critical to ensure uniform distribution of water and fertilizer in the field. Leveling is accomplished by using hand levelers or wooden leveling planks to remove crests and depressions in the seedbed and filling in low spots.
- ▶ Irrigation canals should be cleaned.

Step 3: Sowing

- ▶ Direct seeding is generally the most common practice in the delta of the Senegal River valley.
- ▶ Use pre-germinated seeds (80–120 kg/ha).
- ▶ Broadcast the pre-germinated seeds uniformly throughout the slightly flooded seedbeds (2–3 cm water level).



Broadcasting seed in a few centimeters of water in the Sahel

Step 4: Application of fertilizer

- ▶ Use the RiceAdvice app for appropriate fertilizer application: www.riceadvice.info. RiceAdvice is an Android app for optimal fertilizer management (types, amounts, timings) based on farmer questionnaires.
- ▶ Apply appropriate fertilizer according to the location, variety, season, crop management, fertilizer price and paddy price.
- ▶ **Don't apply fertilizer** at high water level and when water stress is severe.



Step 5: Weed management

- ▶ Weed control during land preparation is critical for reducing weed pressure in the field. Land preparation should begin 3 to 4 weeks before planting. Ploughing kills weeds and removes stubble from the field.
- ▶ Field leveling helps to maintain a uniform water level, which controls weeds.
- ▶ Conduct manual weeding by pulling weeds by hand. However, hand hoes or sickles can also be used.
- ▶ Mechanical weeding can be done using implements such as push- or rotary-weeders.
- ▶ Use herbicides only if other curative methods are not effective. A mixture of propanil 3.8 kg active ingredient per ha plus 2,4-dichlorophenoxyacetic acid 0.72 kg active ingredient per ha can be applied a few days before the first urea application (at 2–3 leaf stage of the weeds). The field should be drained 24 hours before application and reflooded 1–4 days after treatment.
- ▶ Consider using RiceAdvice-WeedManager: www.riceadvice.info/en/weedmanager/



Sowing in rows makes weeding by hoe (or machine) easier



Step 6: Water management

- ▶ Continuous flooding is generally practised in irrigated rice environments.
- ▶ For direct wet-seeded rice, the field should be flooded only once the plants are large enough to withstand shallow flooding (3–4 leaf stage).
- ▶ Keep the water level in the fields at a minimum of 5 cm from heading to the end of flowering.
- ▶ When applying herbicides, the field must be completely drained and the water level in the field reduced to 3 cm for approximately 4–5 days after each fertilizer application.
- ▶ Two weeks before harvest, the rice field must be completely drained.

Step 7: Harvesting

- ▶ Harvest the paddy when 80–90% of grains turn straw yellow color.
- ▶ Rice drying on-farm starts within 24 hours after harvest.

Contact information

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