



## Overview on Aerobic Rice Cultivation

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Aerobic rice system (ARS) is a new production system in which rice is grown under nonpuddled, nonflooded, and nonsaturated soil conditions. The expected yields in ARS are somewhat lower than those obtained under lowland flooded conditions, but double or treble of that obtained under upland conditions.



### Rice

- ▶ Bt. Name- *Oryza sativa*
- ▶ Chr. No- $2n = 24$
- ▶ Family – Poaceae
- ▶ Origin – Indo Burma
- ▶ Nature – Annual Plant
- ▶ Distribution – South East Asia, West Africa & Central and South America
- ▶ Staple food of more than 60% of the world population
- ▶ Good source of Carbohydrate

### History & Origin

The Aerobic Rice System (ARS) developed by the International Rice Research Institute (IRRI) is an innovative approach to rice cultivation aimed at increasing water productivity while reducing water use and greenhouse gas emissions. Today, the Aerobic Rice System stands as a testament to IRRI's commitment to developing innovative solutions for sustainable rice production, addressing the challenges of water scarcity and climate change faced by rice farmers worldwide.

### Aerobic Rice Cultivation in India

Aerobic rice cultivation has gained traction in India as a sustainable alternative to traditional flooded rice farming, particularly in regions facing water scarcity and erratic rainfall patterns. Aerobic rice cultivation was introduced in India primarily to address the water scarcity issues prevalent in many rice-growing regions, especially in states like Punjab, Haryana, Uttar Pradesh, Andhra Pradesh, and Tamil Nadu. The method aims to reduce water use while maintaining or even increasing rice yields.

### Advantages

- Cost effective and Eco-friendly.
- Direct Seeding.
- Efficient Utilization of Rainfall.
- Improve Soil Health.
- Puddling Not Required.
- Without Nursery rinsing.

- Save Water Upto 40-50%.
- Less Labour Requirement.
- Less Methane Produce.
- Mosquito production is Reduced.

### Disadvantages

- Not Recommended for High Rainfall Area.
- More Intensive Weed Control.
- Dark Soil is not Good Fit.
- Further Deficient in Micronutrients.
- Infestation of Root-Knot Nematode seen.
- Poor Crop Stands & Crop Lodging.
- More Panicle Sterility.

### Sowing Strategies

- Season: Summer (feb-mar), Kharif (jun-jul)
- Seed rate:- 5-6kg/ha.
- Spacing:- 25\*25cm or 30\*30cm.
- Sowing method:- Two seeds are scattered per hill using the dibbling method.
- Depth:- 5cm.



### Weed Management In Aerobic Rice System

More than 90 weed species infect Aerobic Rice System.

Weed cause 23-80% reduction in grain yield of rice under aerobic system.

Integrated Weed Management help to improve the aerobic rice productivity.

Grain yield significantly (15-30%), If weeds are controlled in this system.

### Aerobic Rice Vs Upland Rice

Upland rice is grown in rainfed, naturally well-drained soil fields without surface water accumulation. Whereas, the aerobic rice system is targeted at more favourable environments where farmers can afford to buy external inputs such as fertilizers and have access to supplementary irrigation if rainfall is not sufficient.

### Challenges

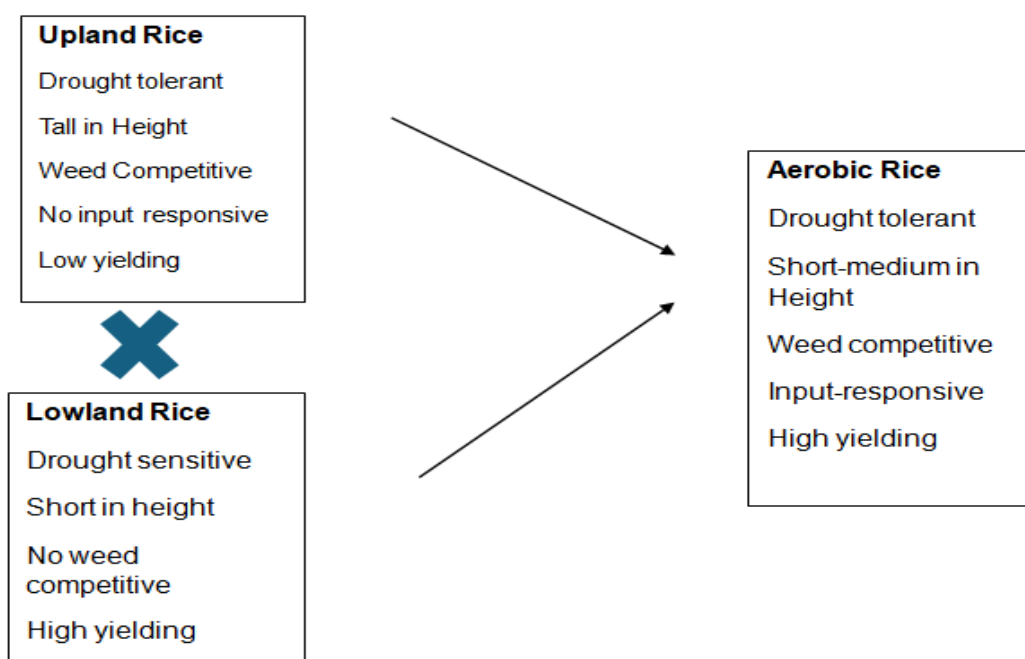
- Soil Compatibility
- Sudden Climate Change
- Lack of Scientific Knowledge
- Facing micronutrient deficiency
- Higher Prevalence of Pathogens
- Crop Lodging.

### Case Study

**Africa's Sahel Region:** This region experiences the severe droughts and limited water resources. Aerobic rice could indeed be a game changer for farmers struggling to grow rice in these harse conditions in the sahel region. Unlike traditional flooded rice cultivation, aerobic rice can thrive in drier conditions with less water, making it well-suited for areas prone to droughts and water scarcity. This could significantly improve food security and livelihoods for farmers in the region.

(References- Steve Burton, September 1998,339,Geofile)

## Development of Aerobic Rice



## Conclusion

Aerobic rice is a new concept to decrease water requirements in rice production and is highly suitable for irrigated lowland rice with insufficient rainfall and favourable uplands with access to Experiments on aerobic rice have shown that water requirement in aerobic rice were more than 50 per cent lower (only 470-650 mm) and water productivities were 64-88 per cent higher than the lowland rice. Rapid degradation of rice ecologies due to imbalanced use of fertilizers and unscientific water management has put tremendous pressure on the rice growers to make rice farming economically viable and ecologically sustainable. The concept of aerobic rice holds promise for farmers in watershort irrigated rice environments where water availability at the farm level is too low or where water is too expensive to grow flooded lowland rice.

## References

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