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RICE - PRAWN
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FOR FUTURE



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AN EXQUISITE CLIMATE RESILIENT AND ORGANIC RICE-PRAWN PRODUCTION SYSTEM FOR FUTURE

Sumi Jacob¹
Shinoj Subramannian²

¹BSc (Agriculture) Graduate,
Dr. Balasaheb Sawant Konkan
Krishi Vidyapeeth, Dapoli,

²Principal Scientist &
Head, Krishi Vigyan Kendra
(KVK)-Ernakulam, Central
Marine Fisheries Research Institute.

The globe is facing faster climatic changes in the 21st century than in the past. The world's average temperature is rising and is accompanied by flooding, drought, and erratic rainfalls. The change in soil and water salinity is a peripheral impact of this utmost weather conditions. These climatic changes have a significant effect on agricultural production, making



climate-adaptive crops extremely valuable at this time. Pokkali is the oldest indigenous rice variety that has 3000 years of organic cultivation and climate resilience history. The journey of Pokkali rice began from a flood, where earlier Pokkali was wild rice that was seen in the western ghats of India and was carried by the flood to low-lying coastal saline areas. All the climatic stress was overcome in this great journey and it developed resistance to flood and salinity. It is grown in the water-logged, coastal regions of Ernakulam, Thrissur, and Alappuzha districts in Kerala and is well known for its flood, saline tolerance, and high nutritional value. The rice got its name Pokkali, because of its notable height, which can grow up to 6 feet. In Malayalam, Pokkali is a term used to describe someone who dominates in height over others. Pokkali rice cultivation alternated with extensive aquaculture is known as Pokkali farming.

In Kerala, when the southwest monsoons wash the salinity of the tiny soil mounds made in the fields, is the ideal time to start Pokkali paddy cultivation, it is carried out over 4 months which begins in June and ends in September, which is the 1st season. In the second season, which runs from November to May, prawns/fish are produced in the same field. During harvest, panicles are cut, and the remaining parts are left in the field, where they eventually serve as feed for



Avifauna of pokkali fields 2

Photo: Netto Peter

prawns in the next season. The entire farming is organic, since no fertilizers and pesticides are used, and the soil is well fertile with prawns, fish excrement, and other remnants.

SIGNIFICANCE OF POKKALI RICE

In 2018 Kerala experienced a severe flood that destroyed much agriculture and bought up losses for the farmers, while majority of the Pokkali fields were able to withstand the heavy

wind, soil erosion, and flooded water that entered the fields. The rapid climatic changes and the rising sea levels across the world have encouraged the search for saline-resistant varieties, hence Pokkali which can also grow in saline water will have a great future. Some of the major salt tolerant rice varieties in the world are listed in Table 1.

The traditional way of Pokkali transplantation enables the plant to survive underwater

for more than a week. It is widely used as a donor for developing new breeds and in salt tolerant crop research.

Pokkali rice got its Geographical Identification tag (GI Tag) in 2008-2009, by the Geographical Indications Registry Office, Chennai, also making it the first product in Kerala to receive the tag. Most importantly, this farming is eco-friendly without exploiting natural resources and biodiversity.

Table 1. Major salt-tolerant varieties in the world

India	Cheruviruppu, Nona Bokra, Getu, Damodar, SR26B, Vikas, Kuthiru, Korgut, Karekagga, Sathi, Bhurarata, Picha neelu, Kalundai samba
Bangladesh	BRI, BR203-26-2, Sail
Russia	VNIIR8207 and Fontan
South Korea	Dongjinbyeo, Seomjimbyeo, Ganchukbyeo, Gyehwabyeo, Nonganbyeo Ilpumbyeo, and
Thailand	FL530
Japan	Mantaro rice, Lansheng, Kanto 51, Chikushiqing, Hama Minoru
United States	American rice





Avifauna of pokkali fields 1

Photo: Netto Peter

NUTRITIONAL AND MEDICINAL VALUES

The Pokkali rice varieties are abundant in protein, fiber, and antioxidants. The grain contains tocopherol, oryzanol, and tocotrienol antioxidants that are essential for immunity. Pokkali rice has the lowest concentration of carbohydrates making it suitable for diabetic patients and is also enriched with micronutrients such as iron, boron, sulphur, and vitamin E. However, polishing of grain can result in the loss of nutritional and health benefits. Polished rice is deficient in minerals such as manganese, sulphur, potassium, and phosphorus.

FIELD PREPARATION

Rice cultivation is done during low salinity, while aquaculture is carried out during high salinity. By mid-April the soil mounds are dried and after April 14, sluices (water gates) are installed in the field to regulate water flow during tidal changes. Water channels and dikes are made followed by ploughing. The field is suitable for sowing once the monsoon has removed salt from the soil.

SEED PREPARATION

For sowing, sprouted seeds are used. Baskets made

of Teak, arrow roots, or coconut, leaves that can hold 10 kg seeds are used to submerge seeds in water for 12 to 18 hours without sun exposure. Within 6-8 days the seed germinates. When the weather is favorable, sowing is done. Before sowing; the seed baskets are again soaked in water for 6 hours. If the monsoon gets delayed, sowing is postponed. But two times water dipped seeds should be sown within 2-3 days.

FARMING PRACTICES

On the fifth day after sowing, shoots of saplings are visible, which is known as Panchakanam in Malayalam. Later on, on the 28th day weeds are removed from the paddy before transplantation, in Malayalam, this process is termed as Valaymatheerna divasam by the ancestors. After 100 days, rice spikes will be visible and in the next 20 days, the grain ripens to a golden color and is ready for harvest. Harvesting is done in the Malayalam month of Thulam.

CURRENT SCENARIO AND CHALLENGES

According to the Pokkali Land Development Agency (PLDA), a few decades ago 25,000 ha of land was there under Pokkali farming. It got reduced

to 8,500 ha, in which only 5,500 ha are cultivating paddy, the remaining is unused or under prawn farming. According to the latest data, Pokkali cultivation is done in only 967 ha in Kerala. Although Pokkali production requires no fertilizer or pesticides, farmers are not keen on it. They tend to switch to monoculture of Prawns due to the poor market price of Pokkali rice. Quality and taste of the pokkali paddy are its attractions, whereas there is no premium market for the Pokkali paddy products. The loss in paddy is generally compensated by Shrimp farming, whereas due to the widespread attack of White spot syndrome (WSS) viral infection, Shrimp farming also turned un-profitable. Lack of farm hands and excessive labor costs are the other problems faced by farmers in this sector. Large amount of labour is required for Pokkali land preparation, bund forming, planting, harvesting, transportation, whereas no specialized equipment or machinery is available for the marshy Pokkali fields to replace human labour. Since Pokkali farming is climate dependent, constant attention is required at each phase of the paddy/ shrimp cultivation. Even then,



Pokkali paddy harvesting. Photo: Dr.Vikas P.A

the production is unpredictable. Industries in the nearby area are a threat to this cultivation, as the toxic substances emitted by them contaminate the backwaters. Major Pokkali fields are being utilized for large-scale industrial projects, bridges, residential, and road construction, these have disturbed the tidal flow of backwaters to the Pokkali fields. The current social and economic practices are making it difficult for this traditional farming to survive and the rate of Pokkali farming is alarmingly declining.

THE NEED FOR POKKALI FARMING

For wetland conservation:

Kerala is well known for wetlands and one-fifth of the state's total landmass is wetlands. Thousands of people rely on wetlands for their livelihood, well-being and poverty mitigation.

Wetlands can act like a sponge to hold water during flooding, storms, or whenever the water levels are high, which helps in maintaining normal river levels and filtration and purification of surface water. When the water levels are low, it releases water. Wetlands are the home for many plants, fishes, and wildlife. It also avails in the migration and reproduction of animals that live in other habitats. But urbanization, and development activities are demolishing wetlands and their vegetation. Industrial pollution and improper sewage management have resulted in a decrement in biota, fish mortality, and ammonia accretion in water.

To Save avifauna habitat:

The wetland ecosystem is an Important Bird Area (IBA) that serves as a habitat for

avifauna and a stopover area for migratory birds. They utilize wetland ecosystems for breeding, feeding, roosting, nesting, and rearing chicks. Water birds are salient indicators of ecological wellness, productivity, and contamination of wetlands. The depletion in Pokkali farming has induced the diminishing of avian fauna.

To Escalate Rice production:

Rice is the staple meal of Kerala, still, there is not enough Pokkali rice being produced to meet demand. In this current era where organic farming acquiring social, political, and scientific acceptance for its contribution to sustainable agriculture, promoting rice production for stress-prone areas in a purely organic system like Pokkali, is vital to attain an evergreen revolution in rice.