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## Pokkali: Kerala's Ancient Rice That Grows Where the Sea Breathes

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In the coastal wetlands of Kerala, where the Arabian Sea breathes life into the land twice a day, stands one of India's most remarkable examples of traditional ecological wisdom, which is Pokkali rice cultivation. The word *Pokkali* itself evokes the image of tall, swaying rice plants thriving in fields flooded by saline tides. For centuries, farmers have mastered this art of growing rice in soils where saltwater and freshwater mingle, creating a natural balance between land, water, and life. Today, when climate change and soil salinity threaten modern agriculture, the Pokkali system offers valuable lessons in resilience and sustainability. It is more than just a crop, it is a way of life that integrates rice cultivation and prawn farming into a single, harmonious cycle.

### The Need to Revisit Tradition

Kerala consumes between 3.5 and 4 million tonnes of rice every year, yet produces only a small fraction of this requirement. Paddy lands have steadily declined as farmers shifted to more profitable crops or converted their fields for non-agricultural purposes. To ensure food security and preserve its agricultural heritage, Kerala must look back to its time tested indigenous systems and Pokkali stands out as a shining example by providing biodiversity conservation, carbon sequestration, and coastal protection.

### A Unique Ecosystem of Land and Water

The Pokkali farming belt stretches along the coastal regions of Ernakulam, Alappuzha, and Thrissur districts, where the land lies barely a metre above sea level. These regions are influenced by tidal flows that alternate between saline and freshwater conditions. Pokkali cultivation takes full advantage of this rhythm.

The system follows two distinct phases:

- Low-salinity phase (June–October): Farmers cultivate Pokkali rice.
- High-salinity phase (November–April): The same fields are used for prawn culture, locally called *chemmeen kettu*.

This integration of agriculture and aquaculture is both economical and ecological. It utilizes natural resources efficiently and avoids the environmental degradation often caused by chemical inputs or intensive mono-cropping.

### How the System Works

The Pokkali method begins in May, with the preparation of earthen mounds about one metre square and half a metre high. These mounds are raised to ensure proper seed germination even under flooded conditions. Germinated seeds are wrapped in coconut or banana leaves and placed on the mounds for sprouting. After about a month, the seedlings are spread evenly across the field once the mounds are levelled.

As the rice grows, it adapts to the rising water levels. The Pokkali variety can grow up to 1.5 metres tall, making it ideal for waterlogged and saline environments. No synthetic

fertilizers or pesticides are used; instead, natural processes sustain soil fertility and pest control. The crop is harvested in October, and the remaining plant residues are left to decompose in the field.

When saline water enters with the tides in November, farmers open sluice gates that allow baby prawns from the estuaries to enter the fields. These prawns feed on the decomposed rice stubble, while their excreta enriches the soil, which is a perfect example of nature's recycling system. The prawns, mainly Tiger prawn (*Penaeus monodon*) and White prawn (*Penaeus indicus*), are harvested around April, just before the full-moon tides, fetching a good market price.

### Varieties and Research Support

The traditional Pokkali rice is renowned for its ability to tolerate salinity, acidity, and submergence. However, its yield is roughly 2000 kg per hectare, which is lower than that of modern high-yielding varieties. To address this, the Vyttila Rice Research Station (VRRS) under the Kerala Agricultural University (KAU) has developed several improved lines, including Vyttila 1 to 5 (VTL 1–VTL 5). Among them, VTL 5 is particularly promising medium duration, semi-tall variety with high yield potential, white kernels, and tolerance to multiple stresses such as salinity and waterlogging. These varieties are being promoted to revive Pokkali cultivation in a commercially viable manner while preserving its ecological integrity.

### A Model of Organic and Climate-Smart Farming

Pokkali cultivation is organically grown with zero chemical fertilizers, pesticides, or mechanized equipment being used. The system relies on natural nutrient cycling and biological pest control. The regular tidal flushing enhances soil aeration and microbial activity, making the fields exceptionally fertile. From a climate perspective, Pokkali fields act as natural carbon sinks and buffers against sea-level rise. As global temperatures increase, saltwater intrusion is becoming a major concern in coastal agriculture. Pokkali's salt tolerance makes it an ideal climate resilient crop, capable of thriving where other varieties fail. Researchers have even identified beneficial endophytes from Pokkali rice that can transfer salt tolerance to other varieties, making it a promising frontier for future breeding programmes.

### Challenges on the Horizon

The area under Pokkali has declined from about 25 000 hectares a few decades ago to less than 8500 hectares, and only around 5500 hectares are actively cultivated. The rest are either fallow or fully converted to prawn farms. The key constraints include labour shortages, especially during harvesting, low profitability due to limited yields and longer crop duration, lack of price incentives for traditional red-grained varieties and market disconnect, as consumers outside Kerala often prefer polished white rice. To keep this heritage alive, farmers need assured markets, better branding, and government incentives that recognize the ecosystem services.

### Geographical Indication and Global Recognition

Recognizing its uniqueness, Pokkali rice has been granted a Geographical Indication (GI) tag, highlighting its identity as a product deeply linked to Kerala's coastal ecosystem. The Pokkali system has also drawn attention from environmentalists and researchers worldwide as a globally important agricultural heritage system (GIAHS) that aligns perfectly with the goals of sustainable and climate-smart agriculture.

### Future Prospects

With increasing salinity and changing climate patterns, Pokkali's relevance extends far beyond Kerala. Its principles like crop diversification, water-use efficiency, and integration of farming systems could inspire sustainable models in other coastal regions of India.

**To ensure its revival and continuity, the following steps are crucial:**

1. Strengthen research on high-yield, short duration, salt-tolerant Pokkali varieties.
2. Promote participatory farming groups and cooperatives to manage shared Pokkali fields efficiently.
3. Develop market linkages and value addition, branding Pokkali rice as a premium organic product.
4. Encourage eco-tourism and heritage branding to generate additional income for local communities.
5. Provide financial incentives under climate-resilient agriculture or carbon-credit programmes.

**Conclusion: Reviving a Living Tradition**

Pokkali rice cultivation is a living symbol of Kerala's harmony with nature. Its tall, green stalks standing against the saline tides remind us that sustainability is not a modern invention but an inherited wisdom. By combining traditional knowledge with modern research, Kerala can transform Pokkali cultivation from a fading legacy into a model for climate resilient farming across coastal India. As the world seeks sustainable ways to feed a growing population without harming the planet, Pokkali stands as a beacon of hope, proving that when farming respects nature's rhythm, both farmers and ecosystems can flourish together.