

**IMPACT OF TSUNAMI ON COASTAL AGRO-ECOSYSTEMS OF  
INDIA AND STRATEGIES FOR RESTORATION**

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**10.1 Introduction**

Tsunami waves hit Indian coast on 26<sup>th</sup> December 2004 wreaking havoc across the southern coastline. The waves are triggered by seismic disturbances on the ocean floor. The tsunami waves were caused by a massive earthquake on the Indian Ocean near Sumatra in Indonesia. The result is a deep wave, stretching from the sea's surface to the floor that travels horizontally at speeds of up to 500 miles per hour and reaches heights of 15 to 30m and weigh millions of tones. Though the bottom of the wave is slowed down by the sharp elevation of the ocean floor near the coast, its top part keeps moving at the original speed. As a result, vast quantity of water piles up and finally crashes over the shore with amazing force, thus causing massive destruction. The first sign of an approaching Tsunami is the sea tide receding from the shore, which leaves a large part of the sea floor exposed. The ocean water then flows towards the shore faster than before, resulting in high waves. This phenomenon is repeated several times before the Tsunami itself hits the land. Fisher folk in Indian coast were virtually caught unaware in the ocean fury as huge waves pounded. The Tsunami thickly hit the populated coastal areas of Tamil Nadu, Pondicherry, Kerala and Andaman and Nicobar islands of India, thickly populated fishing hamlets, resulting in death and destruction.

In Tamil Nadu, Chennai, Thiruvallur, Kancheepuram, Cuddalore, Nagapattanam, Tiruvarur, Thanjavur, Thoothukidi, Ramanathapuram, Tirunelveli and Kanniyakumari are the districts most affected, leading to loss of life of 8010 dead and rendered among 10 lakh people homeless. The giant waves have also affected the Pondicherry and Karaikal of the Union Territory of Pondicherry causing severe damage. In Kerala, Kollam, Alappuzha and Ernakulam are the major districts affected causing death of 173 human lives.

## **10.2 Impact of Tsunami in Kerala**

### **10.2.1 Soil and Water :**

Tsunami affected areas, in general, are a narrow strip of land between sea and back water. Soil along the affected areas of Kerala coast is littoral sand. This led to severe erosion of topsoil to a depth of about 30cm exposing roots of coconut palms in some areas, in certain other areas.

Exposed roots were showing symptoms of drying. Soil was not eroded in certain places and *ipomea biloba* was present in such areas. It was informed that water from sea was deep brown in colour with foul smell and stagnated for two hours to three days. Certain areas, the Tsunami sea water got mixed up with back water and intruded into the adjoining areas. Water collected from inundated area (both from open and bore well) showed very high salinity (up to 0.62 ppt) and electrical conductivity (upto 1247 microseimens/cm). The pH ranged from 6.55 to 8.82.

### **10.2.2 Plants and Animals**

Intrusion of seawater to a distance of about 500m caused severe damage to plants and animals. Arecanut (*Areca catechu*), Mango (*Mangifera indica*), Jack (*Artocarpus heterophyllus*), Breadfruit (*Artocarpus insisa*), Ficus (*Ficus* sp.), Anjili (*Artocarpus hirsute*), Tamarind (*Tamarindus India*), banan and papaya were completely dried. Coconut palms withstood the impact of gushing water and high salinity to survive the natural calamity. However, yellowing of outer whorls or leaves in older palms, button shedding, bunch buckling and uprooting of seedlings were observed in some places. Plants like *Poovarasu* (*Tespesia populnea*), *Punna* (*Caalophyllum inophyllum*), *Pongamia glabra*, wild badam (Indian almond) (*Terminalia catappa*), *Casuarina equisetifolia* etc. were tolerant to tsunami water and survived. Most of the poultry, duck and cows perished.

### **10.2.3 Socio-economic aspects**

In Kollam and Alappuzha districts, arecanut is one among the crops, which is severely affected due to salinity, causing an average damage of Rs.100/palm/year. The

Development Departments need to take corrective measures through appropriate schemes for saving the affected palms and to compensate the loss incurred to the farmers. Similarly, the State Department of Animal Husbandary may implement proper schemes for restoring the livestock based activities in the affected villages. Almost all the fisher folk lost their fishing boats, nets and other gadgets for fishing etc. putting them into great difficulties.

### **10.3 Strategies for management in Kerala**

#### **10.3.1 Short term :**

Restoration of topsoil – exposed coconut basin may be filled with the soil from surrounding areas and planting of ipomea as soil cover.

Application of soil amendments –

Improvement of drainage –

Soil moisture conservation – mulching with coconut leaf, coir pith etc.

Irrigating with fresh water/saline water.

Planting of arecanut, banana and other tuber crops

#### **10.3.2 Long term :**

Evolving a cropping system – identification of salt tolerant cultivars plantation

Establishment of green belts – casuarinas, mangroves, pandanus, *Thespeisia populnea* and *Pongamia glabra* on the coast

Augmenting animal husbandary and fodder grasses

Enhancing small scale industries – coir, marine products,

Promoting back water eco-tourism