



## Available Phosphorus and Potassium of Beach Sediments in Nagapattinam District, Tamil Nadu After Tsunami

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### **Key Words:**

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### **ABSTRACT**

Phosphorus and potassium are essential macronutrients required by all terrestrial plants for proper growth and function. Accordingly, P and K are often included in fertiliser regimes used to maintain vigorous and aesthetic residential landscapes. Present paper deals with the available phosphorus (P) and available potassium (K) of Tsunami affected and non-affected areas in Nagapattinam district.

### **INTRODUCTION**

On 26<sup>th</sup> December 2004, a major earthquake of magnitude 9 on the Richter scale occurred in Indian Ocean on northern tip of Sumatra island. This led to fast moving giant Tsunami waves that lashed the coastal line of Tamil Nadu and Pondicherry, and caused severe damage. The Nagapattinam district was the worst affected in relation to agriculture and livestock (Thamizoly et al. 2006). Nagapattinam is a coastal district, covering a total area of 2,71,583 hectares. Out of the total area, around 1,26,149 hectares is classified as wetland, 61,880 hectares as dry-land, and the remaining 83,548 hectares as ‘poramboke’ or Government land. Around 74% of the cultivators have less than one hectare of land and another 15% hold between one to two hectares. The remaining 11% of the households own above two hectares of land. Though, the area receives an average of 1337mm of rainfall annually, nearly 76% of it occurs during the northeast monsoon, followed by 17.3% during the southwest monsoon.

The soil is predominantly sandy in texture and clayey in certain pockets with slight salinity/alkalinity. The area lying between Nagapattinam and Vedaranniam, dominated by sand dunes and cultivated soils, is mostly sandy in texture. The cultivation depends primarily on rainfall, supplemented by groundwater. The area lying between north Nagapattinam to the border of Cuddalore district is covered under the delta irrigation system. The present paper deals with the analysis of available phosphorus and potassium in Tsunami affected and non-affected beach sediments of Nagapattinam district of Tamil Nadu.

### **MATERIALS AND METHODS**

Beach sediment samples were collected at varying distances at ten different sites. Twenty samples of beach sediment (Tsunami affected and non-affected) were collected in the location of Pazhiyar, Thirumullaivasal, Poompuhar, Tharangambadi, Karaikal, Nagore, Nagapattinam, Velankanni, Vedaranniam and Kodiakarai of Nagapattinam district.

Representative composite beach sediment samples were taken from seashore, two samples each viz., Tsunami affected and non-affected from ten different sites spacing 5 km from Pazhiyar to

Kodiakarai. The samples were collected using standard procedure of IARI (Indian Agriculture Research Institute), New Delhi. The locations of sample sites were randomized to avoid biasing in results. The collected samples after sieving were used for various analyses. The soil parameters like available phosphorus (P) and available potassium (K) were determined by standard methods (Page 1982).

## RESULTS AND DISCUSSION

The results of available phosphorus (P) and available potassium (K) values of Tsunami affected and non-affected beach sediment samples are given in Table 1.

**Available phosphorus (P):** Phosphorus has been called “key of life” because it is directly involved in most biological process. It is a component of every living cell and tends to concentrate in water and soils in both inorganic and organic forms (Randall et al. 1997).

In the present investigation phosphorus of Tsunami non-affected beach sediment samples varies from 5.0-8.0 kg/ha. The lowest value of 5.0 kg/ha is at Pazhiyar and the highest value of 8.0 kg/ha is at Velankanni, Vedanniam and also Kodiakarai. Tsunami affected samples vary from 8.5-14.5 kg/ha. The lowest value of 8.5 kg/ha is at Pazhiyar, and the highest value of 14.5 kg/ha at Kodiakarai.

Phosphorus of Tsunami non-affected samples are very much lower than Tsunami affected sample values. Similar results have been reported by many workers (Olsen et al. 1954).

**Available potassium (K):** The Three forms of soil potassium are unavailable, slowly available or fixed and readily available or exchangeable potassium.

Unavailable soil potassium is contained within the crystalline structure of micas, feldspar and clay minerals. Plants cannot use potassium in these insoluble forms. Slowly available potassium is trapped between the layers or plates of certain kinds of clay minerals. This is, sometimes, called fixed potassium. Plants cannot use much of the slowly available potassium during a single growing season (Arnold et al. 1970).

Readily available potassium is that which is dissolved in soil water or held on the surface of clay particles. Dissolved potassium levels in the soil water are usually 5-10 ppm. Plants absorb dissolved potassium readily and as soon as the concentration of potassium in the soil solution drops, more is released into the solution from the exchangeable forms. Plants absorb large amount of potassium in the form of  $K^+$ . The positive charge of the potassium ions help to maintain electrical neutrality in the

Table 1: Available phosphorus and potassium values of Tsunami affected and non-affected beach sediment samples.

Sl. No.	Location	Available P(kg/ha)		Available K(kg/ha)	
		Non-affected	Affected	Non-affected	Affected
1	Pazhiyar	5.0	8.5	45	106
2	Thirumullaivasal	6.5	11.0	48	118
3	Poompuhar	6.5	11.0	50	118
4	Tharangambadi	6.5	11.0	75	125
5	Karaikal	6.5	11.0	80	133
6	Nagore	6.5	11.0	85	134
7	Nagapattinam	6.5	12.25	105	185
8	Velanganni	8.0	13.0	91	135
9	Vedanniam	8.0	13.5	89	160
10	Kodiakarai	8.0	14.5	87	150

soils (Olaniya 1998). Most soil tests for available potassium measure the readily available forms but not the unavailable and slowly available forms. In the present study, potassium of Tsunami non-affected beach sediment samples varies from 45-105 kg/ha. The lowest value of 45 kg/ha is at Pazhiyar, and the highest value of 105 kg/ha at Nagapattinam. Tsunami affected sample values also vary from 106-185 kg/ha. The lowest value of 106 kg/ha is at Pazhiyar, and the highest value of 185 kg/ha at Nagapattinam.

Potassium of Tsunami affected beach sediment samples is high as compared to Tsunami non-affected sample values. It is in close agreement with the results of Hanway & Heidal (1969). The present investigation concludes that the available phosphorus (P) and available potassium (K) values of Tsunami affected beach sediment samples are high as compared to Tsunami non-affected sample values.

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