

**Performance of existing tree species after Tsunami in selected areas of Hambantota District**

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**Abstract**

*Tsunami was the worst natural disaster that occurred in the coastal region of Sri Lanka. Due to tsunami, most of the existing vegetation in the area was fully or partially destroyed. To identify the most suitable tree species in affected areas, a field survey followed by research was conducted. Observations were made two weeks after tsunami and thereafter at one-month intervals for a period of 8 months at four locations (Hambantota, Kirinda, Rekawa, and Tangalle) in Hambantota district. Observations were grouped into three different categories according to the distance from the sea (0-100 m, 100-200 m, and >200 m). Soil physical and chemical parameters were also measured (pH, EC, and texture). According to the diameter at breast height (dbh), trees were categorized into three groups (1-40, 41-80, and >81 cm); data were collected according to visual characters of the trees (dead, 50 % defoliated, recovering, and not affected). According to the results, *Azadirachta indica*, *Terminalia catappa*, *Cocos nucifera*, *Tamarindus indicus* were the most resistant species while *Artocarpus nobilis*, *Artocarpus heterophyllus*, and *Tectona grandis* were the most vulnerable species. *Erythrina indica*, *Cieba pentandra*, *Cariota urens*, *Areca catachu* were moderately resistant species. Two weeks after tsunami, soil salinity was  $8.34 \text{ mscm}^{-1}$  and it was reduced with time, after 8 months it was to  $2.94 \text{ mscm}^{-1}$ .*

**Introduction**

(Tsunami waves triggered flash floods, which spread rapidly into inland areas up to distance of over 1 km, through rivers, streams and irrigation canals, and inundated large extents of vegetation).

Tsunami disaster also led to a sudden mixing of inorganic and organic matter in soil and caused a great deal of disturbance to the coastal ecosystem. Apart from the direct impact on the fauna and flora, soil physical, chemical, biological properties would have changed. Among the existing tree species, coconut occupies a pre-eminent position in the coastal belt. Coconut being well adapted to the coastal climate, the extent of damage was minimal. However, as expected the damage to coconut seedlings and young palms was much higher than bearing palms.

In India Nalavedapathi village in Tammilnadu region had planted 80,000 coconut and casuarina plants along the coastal belt and the entire village was protected from Tsunami due to this thick coastal forest. Not only in India but also in Sri Lanka, some places have been well protected due to the huge sand dune formed as a result of shelterbelts. It emphasizes the importance of rehabilitating coastal area with suitable tree species to protect from natural disasters. After tsunami, salinity levels in soil were changed. According to soil analytical data, soil pH and EC values were raised one month after tsunami and ranged between 7-8 and 6-7  $\text{mscm}^{-1}$  respectively. Hence, objectives of the study are to evaluate the performance of existing tree species after tsunami in Hambantota district and to identify suitable plant species tolerant to natural disasters of this magnitude.

**Materials and Methods**

A Field survey followed by a research was conducted two weeks after tsunami and thereafter observations were taken at one monthly interval. Data were collected from four locations in Hambantota district (Hambantota, Kirinda, Rekawa, and Tangle). Observations were split in to three different categories in each area according to the distance from the sea (0-100, 100-200, and >200 m). At the same time, soil physical and chemical parameters were measured (pH, EC, and Texture). According to the diameter at breast height (dbh), trees were categorized into three groups (1-40, 41-80, >81 cm). Tree performances were measured according to visual characters of the trees (dead, 50 % defoliated, recovering, and not affected).

**Results and Discussion**

According to the results *Azadirachta indica*, *Terminalia catappa*, *Cocos nucifera*, *Tamarindus indicus*, *Prosopis juliflora*, and *Drespesia populnea* were the most resistant Species, one month and 8 months after tsunami.

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Table 1: One Month After Tsunami (0 – 100 m distance)

Species	Young (Below 5 yrs)			Matured (More than 5 yrs)		
	D	R	N	D	R	N
<i>Cocos nucifera</i>	15	-	85	4	-	96
<i>Bambusa vulgaris</i>	15	85	-	10	90	-
<i>Cariyota urens</i>	55	40	5	40	50	10
<i>Areca catechu</i>	60	40	-	55	45	-

  

	dbh 1-40			dbh 41-80			dbh >81		
	D	R	N	D	R	N	D	R	N
<i>Tamarindus indicus</i>	10	75	15	10	75	15	6	69	25
<i>Azadirachta indica</i>	28	32	40	15	45	40	8	42	50
<i>Terminalia catappa</i>	8	32	60	2	28	70	-	25	75
<i>Artocarpus nobilis</i>	75	25	-	68	32	-	58	42	-
<i>Artocarpus heterophylus</i>	80	20	-	65	35	-	58	42	-
<i>Tectona grandis</i>	75	25	-	78	22	-	76	24	-
<i>Erythrina indica</i>	-	-	-	48	52	-	40	60	-
<i>Ceiba pentandra</i>	34	66	-	40	60	-	42	58	-
<i>Prosopis juliflora</i>	4	8	88	4	2	94	-	5	95
<i>Drespesia populnea</i>	6	16	78	8	18	74	-	12	88

Table 2: Eight Months After Tsunami (0 – 100 m distance)

Species	Young (Below 5 yrs)			Matured (More than 5 yrs)		
	D	R	N	D	R	N
<i>Cocos nucifera</i>	18	-	82	5	-	95
<i>Bambusa vulgaris</i>	20	80	-	20	80	-
<i>Cariyota urens</i>	60	40	-	55	35	10
<i>Areca catechu</i>	65	35	-	62	38	-

  

	dbh 1-40			dbh 41-80			dbh >81		
	D	R	N	D	R	N	D	R	N
<i>Tamarindus indicus</i>	5	80	15	5	80	15	1	74	25
<i>Azadirachta indica</i>	20	40	40	12	43	45	5	45	50
<i>Terminalia catappa</i>	8	45	47	2	38	60	-	35	65
<i>Artocarpus nobilis</i>	68	32	-	45	55	-	30	70	-
<i>Artocarpus heterophylus</i>	60	40	-	45	55	-	45	55	-
<i>Tectona grandis</i>	70	30	-	70	30	-	65	35	-
<i>Erythrina indica</i>	-	-	-	45	55	-	40	60	-
<i>Ceiba pentandra</i>	30	70	-	30	70	-	35	65	-
<i>Prosopis juliflora</i>	2	10	88	4	5	91	-	8	92
<i>Drespesia populnea</i>	4	20	76	7	28	65	-	26	74

According to the soil texture, (sandy and clay sandy soil) no. of dead plants (some spp) was significantly different.

**Conclusions**

*Cocos nucifera*, *Azadirachta indica*, *Terminalia catappa*, *Tamerindus indicus*, *Prosopis juliflora* and *Drespesia populnea* are the most resistant species, two weeks, one and 8 months after tsunami. *Artocarpus nobilis*, *Artocarpus heterophyllus*, *Tectona grandis*, *Mangifera indica*, *Pylanthus spp* are the most affected tree species. *Erythrina indica*, *Ceiba pentandra*, *Cariyota urens*, *Areca catechu*, *Bambusa vulgaris*, *Glyricidia spp*, and *Leucaena leucocephala* are moderately resistant species.

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Two weeks after tsunami, soil salinity was  $8.34 \text{ mscm}^{-1}$  and it was reduced up to  $2.94 \text{ mscm}^{-1}$  at the end of 8 months after tsunami. According to the soil texture, tree performances vary in the tsunami affected areas.

### References

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