

A Comprehensive Study on Damages Caused by Thane Storm as Experienced by the Cashew Growers in Cuddalore District of Tamil Nadu

M. Balarubini¹ and C. Karthiekeyan²

1. Ph.D Scholar, Department of Agricultural Extension & Rural Sociology, TNAU, Coimbatore.

2. Professor, Agricultural College and Research Institute, TNAU, Coimbatore.

Corresponding author e-mail : rubinibala@gmail.com

ABSTRACT

“Thane” was a cyclone with severe intensity was developed in the Bay of Bengal during the last week of December 2011. The nature and extent of damage occurred to the cashew farmers would be a new approach in data base creation attempted in this study. The study was conducted in Panruti block of Cuddalore district with sample size of 194 Thane affected cashew growers and the study analyses nature and extent of damage due to Thane cyclone. The respondents were interviewed personally by a well-structured interview schedule. The regression analysis was worked out. The damage due to Thane in the cashew fields in the increasing order was crop damage followed by soil damage, fencing damage, and damage of bunds. The damage for water and livestock was negligible.

Key words : Thane, Cashew Growers, Crop Damage, Soil Damage, Fencing damage, Damage of bunds, Disaster, Extension, policy.

Damage is an, inevitable phenomenon with respect to incidence of any natural disaster. It could be mortal damages to people, material damages to resources/properties and livelihood damages affected the income sources etc. According to U.N. surveys, 81 per cent of the 116,000 acres of agriculture land damaged by Tsunami waves in Indonesia, Srilanka, Maldives, India and Thailand is again cultivable. Bart Dominicus of the U.N. Tsunami response programme reported that the worst hit areas may take three to five years to recover (FAO, 2005). The cyclonic storm severely damaged the roads and other main transport passages and hence the rescue team could not reach the needy people with offering of needy services (Indo-Asian News Service, 2011). Besides the power network of entire cuddalore district was severely paralyzed as about 4500 transformers of the district got terribly damaged in this cyclonic storm (Times of India, 2011). Puducherry is the nearest township for cuddalore district. The main approach road to this nearest town was extremely affected with the cover of uprooted trees and twigs (The Hindu Business Line, 2011). Cashew farmers of Cuddalore district affected by cyclone Thane are ruing their misfortune of crop losses even till now, so long after the disaster. Back then, a special package was announced for reviving (Sachdeva, 2013). Thane has damaged their house, livestock hut, trees, fencing and others. Besides, cashew crop losses are in terms of cashew yield loss, tree loss, damage of bunds, fencing loss and other losses. Among the farm groups, the loss is high for the marginal and small farmers than others (Damodaran, 2015).

Studying the nature and extent of damages caused due to Thane storm will facilitate to metricize

and analyze the same in the context of the present study. This would enable the stakeholders in developing in-depth knowledge on various types of damage and their intensity to enable better planning and execution of mitigation efforts.

METHODOLOGY

In order to measure the nature and extent of damage to cashew growers affected by Thane cyclone considering the criteria viz., maximum area under cashew cultivation as well as maximum number of farmers affected by Thane storm, panruti block of cuddalore district was selected for the study. For selecting the villages, the researcher has approached the Block Development Office and villages viz., Vegakollai, Kadampuliyar and Marangur where area under cashew cultivation was high were selected as per the suggestion given by the officials. Employing proportionate sampling method, 194 Thane affected cashew growers were selected randomly from the three selected villages. The primary data was collected during November, 2014.

RESULTS AND DISCUSSION

Nature and extent of damage caused to cashew farmers on account of Thane : For determining the nature and extent of damage to cashew farmers on account of Thane the damage function was worked out. The regression analysis was worked out with ‘total damage incurred in rupees’ as the dependent variable with soil damage, water damage, crop damage, livestock damage, bunds damage and fencing damage as independent variables. The results obtained are given in Table 1.

Table 1
Regression analysis of independent variables towards the total damages incurred

Variable	Coefficient	Standard error	t-ratio	P{ T >t}
Constant	-107256.172	11636.977	-9.217	.000
Soil X ₁	2565.962	995.164	2.578	.011
Water X ₂	-1010.283	1088.003	-0.929	.354
Crop X ₃	8671.129	464.991	18.648	.000
Livestock X ₄	46.214	1997.722	0.023	.982
Elimination of Bunds X ₅	2869.258	3534.485	0.812	.418
Fencing X ₆	15321.799	3083.764	4.969	.000

The estimated damage function is given below:

$$D = -107256.172 + 2565.962 X_1 + (-1010.283) X_2 + 8671.129 X_3 + 46.2214 X_4 + 2869.258 X_5 + 15321.799 X_6$$

$$T = \begin{matrix} (-9.217) & (2.578) & (-0.929) & (18.648) & (0.023) \\ (0.812) & (4.969) & & & \end{matrix}$$

$$R^2 = 0.89 \quad N = 194 \quad F = 277.690$$

The R² value showed that 89.00 per cent of variation in damage expenditure was explained by the six independent variables included in the model. The R² value was significant. When all X values are zero, the damage expenditure was Rs. -107256.172. Keeping other variables at constant, an unit score increase in soil will increase the damage by Rs. 2565.962. One unit score increase in water will increase the damage expenditure by Rs. -1010.283 keeping other things constant. Keeping all other variables constant, increase in one unit score in crop acreage will increase the damage expenditure by Rs. 8671.129. One unit increase in livestock (standard unit) will increase the damage expenditure by Rs. 46.214. Keeping all other variables constant, increase in one unit score in damage of bunds will increase the damage expenditure by Rs. 2869.258. One unit increase in fencing (standard unit) will increase the damage expenditure by Rs. 15321.799.

The contribution of water damage to the total damage (incurred) is minimum compared to damage to fencing, crop, elimination of bunds and soil. This supports the reports of Damodaran, (2015) reported that the various losses such as tree loss, cashew crop loss, damages of bunds, fencing loss and other losses. Cashew tree loss due to Thane cyclone is higher than the other losses (yield loss, damages of bunds and fencing loss) in cashew cultivation. The hypothesis

highlights the costs that impose heavy loss due to Thane cyclone. Cashew tree loss due to Thane cyclone is higher than the other losses (yield loss, damages of bunds and fencing loss) in cashew cultivation is proved. Further estimates have been made to find out the damage with respect to soil, water, crop, livestock, damage of bunds and fencing and the results are presented as follows:

Soil damage due to Thane : Healthy soil base is necessary for the production of valuable crops to meet the food requirement of human and animals. The soil base should be strong as it supports number of biological processes which maintains the soil nutrient status and physical tilth to keep a profitable crop reserve. The natural disasters continuously remove the soil nutrients and damage the soil physical constraints and makes it sterile offer. So the nature and extent of damage faced by the Thane affected cashew growers was worked out in economic terms with respect to soil and its sub components and the results are furnished in Table 2.

It may be inferred from Table 2 that modification of topography was the major damage (38.03%) which incurred heavy loss to the farmers followed by trash and debris accumulation (16.53), deposit of greyish brown silt material in low fields (16.42%) deposition of sand (10.09%) that an almost

Table 2
Soil damage due to Thane

S.No.	Particulars	Total damage (in Rs./ unit)	Per cent
1	Deposit of greyish brown silt material in low fields	1540	16.42
2	Deposition of sand	946	10.09
4	Loss of fertile soil due to upper layer being washed away	880	9.38
5	Trash and debris accumulation	1550	16.53
6	Erosion of soil	896	9.55
7	Modification of topography requiring land leveling	3566	38.03
	Total soil damage per farm	9378	100.00
	Soil damage for 194 farmers comprising 236.12 ac	1819332	
	Soil damage for one acre	7705.116	

equal proportion of damage loss was observed due to erosion of soil (9.55) and loss of fertile soil due to upper layer being washed away (9.38). Table 2 also reveals that an amount of Rs. 9378 per farm is lost due to soil damage as a result of Thane. Taking this as the base value the soil damage per acre on an average is worked out which amounts to Rs.7705.12.

Water damage due to Thane : Deficiencies in water systems can increase the vulnerability of communities. During disasters, water is another important natural resource that gets impacted heavily. The impact may be in terms of contamination of tanks, reservoirs etc., In this perspective the sub components of water bodies and the damage witnessed were assessed in economic terms and the results are furnished in Table 3.

Table 3
Water damage due to Thane

S. No.	Particulars	Total damage (in Rs./unit)	Per cent
1	Contamination of water ponds with sea water and deposits	1250	40.26
2	Damage to agro wells	0	0.00
3	Damage to water tanks	900	28.99
4	Damage to sewer (underground drain)	0	0.00
5	Sedimentation of drainage channels, lagoons and water ways	955	30.76
	Total water damage per farm	3105	100.00
	Water damage for 194 farmers comprising 236.12 ac	602370	
	Water damage for one acre	2551.12	

It may be inferred from Table 3 that damage loss was observed due to contamination of water ponds with sea water and deposits (40.26%) followed by

sedimentation of drainage channels, lagoons and water ways (30.76%) and damage to water tanks (28.99%).

An amount of Rs. 3105 has been the water damage loss per farm. Taking this as the base value the water damage due to Thane for one acre on an average was calculated which amounted to Rs. 2551.12.

Crop damage due to Thane

To have better understanding of the exploit of the damage due to natural disaster, sector wise data on

losses are most essential. The disaster cause huge loss to lands, farm buildings and standing crops. Such conditions in a large area it occurs repeatedly will slow down the economic growth of the country and affects the national Gross Domestic product (GDP) continually. The economic impact of disasters trends on sub components of crop, damage was calculated in economic terms and the results are furnished in Table 4.

Table 4
Crop damage due to Thane

S.No.	Particulars	Total damage (in Rs.)	Per cent
1	Shedding of leaves	1500	8.70
2	Pest and disease infestation	1000	5.80
3	Trees uprooted (fully and partially)	14750	85.51
	Total crop damage per farm	17250	100
	Crop damage for 194 farmers comprising 236.12 ac	3346500	
	Crop damage for one acre	14172.88	

It may be inferred from the Table 4 that damage loss has incurred due to trees uprooted 85.51 per cent followed by 8.70 per cent of the damage loss due to shedding of leaves.

Table 4 also reveals that an amount of Rs. 17250 per farm was lost due to crop damage as a result of Thane. Taking this as the base value the crop damage per acre on an average was worked out which amounted to Rs.14172.88.

Livestock damage due to Thane : Livestock are ancillary income sources for farmer making their enterprise an integrated income generation system. Any natural disaster will have a direct impact on livestock in terms of death or diseases resulting in value losses to the farmers. The results of livestock damage due to Thane are furnished in Table 5.

Table 5
Livestock damage due to Thane

S. No.	Livestock particulars	Number	Total damage (in Rs.)	Per cent
1	Cow	0	0	0
2	Bullock	0	0	0
3	Poultry	13	650	100
4	Buffalo	0	0	0
5	Sheep/goat	0	0	0
Total			650	100

Table 6
Damage of bunds due to Thane

S.No.	Particulars	Total damage (in Rs.)	Per cent
1.	Bunds damage for 191 farmers comprising 226.095 ac	286500	100.00
	Fencing damage for one acre	1267.17	

Damage to fencing due to Thane : Fencing is essential for a farm as it acts as a border, protection and fixes boundaries. Fencing ensures safety of the farm from trespassing animals and humans. Farmers expressed that they need to protect the farm from animals and humans for fruits, nuts, fuel etc., Thane storm has caused extensive damage to the fences of cashew farms and the results are furnished in Table 7.

Table 7
Fencing damage due to Thane

S.No.	Particulars	Total damage (in Rs.)	Per cent
1.	Fencing damage for 21 farmers comprising 127.85 ac	463802.5	100.00
	Fencing damage for one acre	3627.708	

The wire fencing damaged for only 21 farmers comprising 127.85 ac. The results also show that only big farmers have adopted for fencing as it adds up to the costs. Where as small and marginal farmers do not have fencing and they guard their farm themselves.

To make some meaningful conclusion, the distribution of respondents based on the economic damage was worked out and the results are furnished in Table 8.

It is inferred from Table 8 that 70.62 per cent of the respondents incurred soil and water loss ranging from Rs. 1000 to Rs.10000 followed by (11.34%) of respondents incurring soil and water damage loss ranging

from Rs. 10001 to Rs. 20000. The remaining respondents (18.04%) had soil and water damage loss ranging from Rs. 20,001 to Rs. 90,000. The crop damage loss revealed that 86.60 per cent of the respondents had crop loss upto Rs. 50,000 while the remaining proportion (13.40%) had crop loss ranging from Rs. 50,001 to Rs. 2,50,000.

It is inferred from the Table 8 that 97.42 per cent did not incur any loss due to livestock a meagre proportion 2.58 per cent of the respondents incurred loss ranging from Rs. 1 to Rs.10000.

With respect to damage to bunds it can be inferred from Table 8 that 46.91 per cent of the respondents incurred damage to bunds ranging from Rs. 1000 to

Table 8.
Distribution of respondents based on economic damage

Range in Rs.	Number of farmers	Per cent	Cumulative Per cent
Soil and water damage			
1000-10000	137	70.62	-----
10001-20000	22	11.34	81.96
20001-30000	9	4.64	86.60
Range in Rs.			
Number of farmers			
Per cent			
Cumulative Per cent			
30001-40000	9	4.64	91.24
40001-50000	4	2.06	93.30
50001-60000	4	2.06	95.36
60001-70000	2	1.03	96.39
70001-80000	3	1.55	97.94
80001-90000	4	2.06	100.00
Total	194	100	
Crop damage			
0-50000	168	86.60	-----
50001-100000	17	8.76	95.36
100001-150000	6	3.09	98.45
150001-200000	2	1.03	99.48
200001-250000	1	0.52	100.00
Total	194	100	
Livestock damage			
No loss	189	97.42	----
1-10000	5	2.58	100.00
10001-20000	0	0.00	100.00

20001-30000	0	0.00	100.00
30001-40000	0	0.00	100.00
40001-50000	0	0.00	100.00
Total	194	100	
Damage to Bunds			
No loss	3	1.55	-----
1000-5000	91	46.91	48.45
5001-10000	84	43.30	91.75
10001-15000	10	5.15	96.91
15001-20000	6	3.09	100.00
Total	194	100.00	
Damage to Fencing			
No loss	170	87.63	-----
1-10000	5	2.58	90.21
10001-20000	12	6.19	96.39
Range in Rs.	Number of farmers	Per cent	Cumulative Per cent
20001-30000	7	3.61	100.00
30001-40000	0	0.00	
40001-50000	0	0.00	
Total	194	100.00	

Rs. 5000 while 43.30 per cent of the respondents incurred damage of bunds ranging from Rs. 5001 to Rs. 10000. However a meagre proportion (8.25%) of the respondents incurred loss ranging from Rs. 5001 to Rs.30,000.

The fencing damage loss was explained in the Table 8 that 87.63 per cent of the respondents had no fencing loss while the remaining proportion (12.37%) had fencing loss ranging from Rs. 10,001 to Rs. 50,000.

CONCLUSION

The damage due to Thane in the cashew fields in the increasing order was crop damage followed by soil damage, fencing damage, and damage of bunds. The damage for water and livestock was negligible. The economic damage assessed for one acre revealed Rs. 2551.12 for water damage, Rs. 7705.12 for soil damage, Rs. 14172.88 for crop damage, Rs. 1500 for bund damage, Rs. 3627.71 for fencing damage and for livestock Rs. 650. Majority of the farmers (70.62%)

in the soil and water damage category had an economic loss ranging from Rs. 1000 to Rs. 10,000. Majority of the farmers (86.60%) in the Crop damage category had an economic loss up to Rs. 50000. A meagre level of the farmers (2.58%) in the Livestock damage category had incurred an economic loss up to Rs. 1 to Rs. 10000. Majority of the farmers (90.21%) under damage of bunds category had an economic loss up to Rs. 10,000 and only 12.37 per cent fencing damage had an economic loss up to Rs. 30,000. As a whole, the cashew crop loss is high and the severity of loss and cost is more for cashew growers. But, the government's action towards the problem is not up to the expectations of the cashew growers. The cashew growers expect additional relief funds, free saplings, free manure, no land tax for ten years and provision of agriculture loan for lands. The demands of the victims were also assessed to be genuine.

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