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NATURAL DISASTERS – A NON-COASTAL PHENOMENON IN CUDDALORE DISTRICT

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Abstract:

The Cuddalore district has been classified as a multi-hazard prone district. Since the District has a long coastline, therefore the district is vulnerable to the cyclonic depressions and the resultant rains which causing floods. Cyclones and flood have wreaked havoc in the district several times in the past few centuries. Cyclone "Nisha" in November 2008 and the cyclone "Thane" in December 2011 were caused heavy damage to this district in many aspects. This Cuddalore district had experienced worst impacts of Tsunami during the year 2004. The Cuddalore District experiences a tropical wet and dry climate and witnesses heavy rainfall during North East Monsoon season. Five Major rivers runs through the plains of the Cuddalore District and drains into the Bay of Bengal. The Cuddalore district is categorically classified as Disaster Prone Area because of its geological position and Low Lying Areas. The present study tries to assess the natural disasters and its effects on rural communities of non coastal areas in Cuddalore District, Tamilnadu. The result of the study indicates that rural communities must improve their capacity to manage natural disasters in the District.

Key Words: Natural Disasters, Flood, Cyclone.

Introduction:

Cuddalore District is situated in the South Indian State of Tamilnadu between 110 45' and 120 27' of Northern latitude and 780 48' and 800 12' of East longitude and covering an area of 3,698.68 Sq.K.M. The Cuddalore District is encircled by Pondicherry and Villupuram District on the North, Nagapattinam and Ariyalur District on the South, Bay of Bengal on the East and Perambalur District on the West. The eastern side of the district has a coastline of 52 Kms covered by the Bay of Bengal. The Cuddalore District has a population of 26,05,914 (as per 2011 census) out of which the proportion of rural population is 18,00,133 and Urban population is 8,05,781 and the population density is 702/sqkm. The Cuddalore district being a coastal zone is mostly covered by plain terrain without any high relief zone. The Cuddalore District experiences a tropical wet and dry climate and witnesses heavy rainfall during North East Monsoon season.Cuddalore is high Cyclone prone zone of the East-coast. The Gadilam and Pennaiyar rivers flow in the northern side of the Cuddalore District and Vellar and Kollidam River (Coleroon) flows in south.

The average annual rainfall for the past 12 Years:-

Sl.No	Year	Average Annual Rainlfall (mm)
1	2009	1,219.52
2	2010	1,461.84
3	2011	1,397.93
4	2012	793.09
5	2013	988.18
6	2014	1,186.72
7	2015	1,748.14
8	2016	588.32
9	2017	1,449.68
10	2018	936.62
11	2019	1,242,18
12	2020	1,494.00

https://cuddalore.nic.in

Demography:

According to 2011 census, Cuddalore District had a total of 6,35,578 households. There were a total of 11,69,880 workers, comprising 1,36,035 cultivators, 3,25,599 main agriculture labourers, 19,151 in house hold industries, 3,56,486 other workers, 3,32,609 marginal workers, 29,135 marginal cultivators,2,13,813

marginal workers in household industries and 76,785 other 8 marginal workers. The district has a population density of 702 inhabitants per square kilometer [702/sq. km]. The most part of the district is a flat plain sloping gently from the west to the sea on the east.

Cuddalore is a socially backward district with a majority of the population belongs to either backward, most backward castes or the schedule castes. Agriculture and fishing are the two main sources of livelihood in the district. Analysis of cultivable land holding indicates skewed cultivable landowner- ship pattern; 92.83% small farmers (owninglandupto2ha) own 63% of the cultivable and while, balance 7.61% farmers (owning land morethan2ha) own 36.93% of the cultivable area of the district. These demographic and socio-economic character, being adverse and increase the vulnerability of the district.

Statement of problem:

India is having along coast line of 7500 km, and TamilNadu state, situated on the south east of peninsular India. It has extensive coast line of 1000 km in the east and south bordering Bay of Bengal and Indian Ocean and faces maximum threats from tropical cyclones and associated storm surges during the North East monsoon (October–December). The damage from tropical cyclones is mainly due to rain, strong winds and storm surges. The magnitude and risk of disasters depend on the vulnerability of exposed population.

Cuddalore District has been traditionally vulnerable by natural disasters on account of its unique geo - Climatic Conditions. The district is frequently subjected to natural disasters such as Flood, Tsunami, Cyclone, Drought, etc., Major disasters in Cuddalore district are Tsunami (2004), Cyclone NISHA (2008), Cyclone THANE (2011), Flood (2015), Drought (2013), Drought (2016). Floods, cyclones, droughts, are recurrent phenomena. The district has many other special and hazardous industries, which are classified as "Red by TNPCB". These are mostly chemicals, textiles and pharmaceutical industries.

Normally during the northeast monsoon, cyclonic storms are formed in the Bay of Bengal. In the past century 60 cyclonic/severe cyclonic surges crossed Cuddalore coast (IMD eAtlas, 2011) and in the past 4 decades, on five occasions (in years 1978, 1991, 1993, 2000 and 2011), considerable damage has been created to Cuddalore district due to cyclonic storms. Understanding and assessing the risk is fundamental to enhancing the resilience of vulnerable communities.

Disaster causes sudden disruption to the normal life of the people and causes damage to the properties and lives so that social and economic mechanism available to the society get disturbed and those who are unaware and unprepared generally get affected more.

The scale of vulnerability changes with individuals and households as it encompasses the response to risk, coping and potential to react and with stand a disaster (Kumpulainen, 2006). To mitigate the ill effects of hazards, a thorough understanding of the vulnerability causing factors is required. Efficacy of policy interventions for disaster management would depend on proper understanding of the vulnerability of exposed community and its coping capabilities. Vulnerability assessment helps the decision makers to identify analyses and reduce the causal factors of disasters by taking systematic efforts to reduce exposure to hazards, lessening vulnerability of people by improving their preparedness and resilience to adverse events apart from wiser management of land and environment. Vulnerability analysis, therefore, is the key activity in risk reduction, preparedness and management of the disasters. As the intensity and frequency of hazards and the extent of exposure to mankind are on the increase, building resilient communities and reducing disaster risk exposure are the two core initiatives for effective disaster management which are assessed only through vulnerability analysis.

Objectives of the study:

- To assess the damages caused in general on rural communities of non coastal areas.
- To know about the prevention and preparedness measures for natural disasters among rural communities of non coastal areas.

Material and Methods:

The present study used the secondary sources of data which have taken from various books, research papers, published journals, and reports from newspaper.

Natural Disasters – Cuddalore District

1) Tsunami- 2004

The Tsunami that smashed into the coasts of Tamil Nadu on the 26th of December 2004 and left behind an unprecedented trail of devastation and despair. Totally 31 fishing hamlets in Coastal areas of Cuddalore District were affected badly due to this Disaster.

Devastating Effects

S.No.	Incidents	Nos.
1	No. of Coastal Villages affected	31
2	Human Loss	610
3	Human Missing	38
4	Houses	2872
5	Cattle Death	262

6	Catamarans Damage	4253
7	FRP Boats damaged	503
8	Mechanised Boats damaged	350

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2) Cyclone NISHA-2008

On November 24, 2008, a low pressure formed near Srilanka and started moving into the Bay of Bengal within the next 24 hours. On November 26th the system was upgraded to a cyclonic storm and made landfall in Cuddalore district on the same day. The cyclonic storm named "NISHA" claimed the lives of 29 people and 222 cattle died because of heavy rain and flooding.

Northeast Monsoon 2008 (NISHA Cyclone)		
Sl.No	**Loss of Life**	**Nos**
1	Human Loss	29
2	Cattle Loss	222
Hut damages		
1	Fully affected	42616
2	Partly affected	27090
3	Special Packages of Rs.1000- each per house in water marooned area	321489
Crop Loss		
1	Rainfed	55535 hec
2	Assured Irrigation	10069 hec
3	Total	65604 hec

https://cuddalore.nic.in

2) THANE Cyclone-2011

Cyclone Thane hit the Cuddalore district on 29th and 30th December 2011 which destroyed houses, boats, standing crops, Livestock's and livelihoods. As per the Government data the cyclone claimed the lives of 40 people and 271 cattle. The storm brought wind speed of up to 135 kmph and tidal surges reaching 1.5 m which forced coastal fishing and farming communities left their houses and moved towards the cyclone shelters.

Northeast Monsoon 2011 (THANE Cyclone)		
Sl.No	**Loss of Life**	**Nos**
1	Human Loss	40
2	Cattle Loss	271
Hut damages		
1	Fully affected	57436
2	Partly affected	371825
3	Special Packages of Rs.2000- each per house in water marooned area	157377
Crop Loss		
1	Rainfed	33214.17(Hec)
2	Assured Irrigation	96136.07(Hec.)

https://cuddalore.nic.in

4) Flood – 2015

Unlike regular monsoon, the rainfall during North East Monsoon (NEM) – 2015, is sporadic because of the El-Nino year. A low pressure area consolidated into a depression and slowly intensified into a deep depression before crossing coast of Tamilnadu. During North East Monsoon 2015, the Cuddalore district received 1748.14 mm. of rains which was recorded as very high rainfall against the normal average rainfall of

1206.7 mm. Particularly on November 9, 2015 the District recorded very high rainfall of 480mm. in Neyveli against the average rainfall.

Breach in sengal odai and middle paravanar affected 8 villages in Kurinjipadi Taluk such as Maruvai, Arangamangalam , Kalkunam , T.V.Nallur, Boothampadi, Parathampattu, Adoor agaram and Kundiyamallur. The Periyakattupalayam village, Panruti Taluk, had experienced never seen flood on 9th November 2015.

The Effects of Flood -2015:

- Breach in sengalodai and middle paravanar affected 8 villages in KurinjipadiTaluk.
- During North East Monsoon 2015 period, Veeranam tank foreshore was inundated and anaicut area of 720 acres of agricultural land had been affected.
- The Periyakattupalayam village, PanrutiTaluk, had experienced never seen flood on 9th November 2015. The flood water washed away the huts which were on the path and caused the loss of lives of 8 members from a same family.
- The floods had caused heavy damages to the lives of the people, Cattle and many houses were damaged partly & fully and many lost their cloth, utensils, Certificates and valuable things and people left with empty hands.
- The causeway at Pasimuthanodai in Chidambaram taluk was washed away by the flood and the habitation was cut off from road connectivity. Foot Bridge across VelliangalOdai at Kumaratchi block also washed away.

Causes for Flooding in Cuddalore district

- ❖ All the rivers are draining into Bay of Bengal at closer intervals.
- ❖ Since the terrain is flat and just 1.50m above M.S.L, all the flood water got accumulated in this area could not be easily drained in to the Sea.
- ❖ The bed levels of rivers are lying minus 1m from the sea. Due to this, the back water in the rivers causes all the flood damages.

Damages caused by Major Rivers in Cuddalore district:

Then pennaiyar:

Originating from Chennakesava hills of Karnataka state, Confluence in Bay of Bengal at Thazhanguda of Cuddalore District Length of river is 432 km. Length in Cuddalore District 45 km.

Gadilam:

Originating from Sankarapuram Taluk of Villupuram District, confluence in Bay of Bengal at Devanampattinam of Cuddalore District. Length of river is 121 km. Length in Cuddalore District 52 km.

Paravanar:

Originating from Neyveli Mines-II of Cuddalore District, confluence in Bay of Bengal near Devanampattinam of Cuddalore District. Length of river is 62 km.

Vellar:

Originating from Kalrayan hills of Salem District, confluence in Bay of Bengal at Portonovo of Cuddalore District. Length of river is 205 km. Length in Cuddalore District 103 km.

Coleroon:

Originating from Upper Anicut (Cauvery River) of Trichy District, confluence Originating from Upper Anicut (Cauvery River) of Trichy District, confluence in Bay of Bengal at Chinnakaraimedu of Cuddalore District. Length of river is 168 km. Length in Cuddalore District 60 km (Left Bank only).

Flood Prone Basins (12)

- Coleroon Delta area
- Veeranam Tank Drainages
- Chidambaram Town
- Vellar river meandering
- Paravanar
- Perumal Tank
- Sengal odai
- Jungle streams in Visoor, Meliruppu¬ & Kiliruppu area
- Gadilam River
- Pennaiyar¬ & Malattar River
- Manimuktha river
- Cuddalore and Nellikuppam Towns

Identification of Vulnerable Areas

The District Administration had identified 269 Vulnerable areas based on their vulnerable intensity by collectively compared past disaster experience of the district that faced. The vulnerable areas have been classified into 4 categories.

Very Highly Vulnerability – 38
High Vulnerability – 54
Medium Vulnerability – 19
Less Vulnerability – 167
Total - 278

Disaster Mitigation:

Measures taken prior to the impact of a disaster to minimize its effects called disaster mitigation (sometimes referred to as structural and non-structural measures). Mitigation embraces all measures taken to reduce both the effect of the hazard itself and the vulnerable conditions of future disasters and its impacts. Mitigation also includes measures aimed at reducing physical, economic and social vulnerability. It has also executed many works such as laying of roads, repairs school buildings, construction of culverts and overhead tanks as a part of mitigation works.

Mitigation activities such as de-silting and strengthening of bunds in the lakes, tanks and channels, repair works of sluice and shutters, construction of culverts and drainage for free flow of water are undertaken before and after emergencies.

There are 2750 channels in Cuddalore District with cross masonries such as regulators and shutters. In the year 2016, Cuddalore District faced heavy drought, because of this ground water level depleted. Hence, during the rainy season, the rain water could be harvested in various places by implementing Kudimaramathu Scheme and Water Conservation Mission.

Disaster Prevention:

Measures taken to avert a disaster, that it does not have any harmful effects. After the devastating "Thane Cyclone", 79,325 concrete houses in rural areas were constructed under Pradhan Mantri Awaas Yojana (Gramin) to replace the thatched huts. After Floods 2015, 2687 numbers IAY houses were constructed under permanent restoration works.

Structural interventions includes construction of Check dams, Farm ponds, Recharge shaft, Community pond, Recharge wells and subsurface dykes are programmed through the scheme activities of PWD – WRO, DRDA, Municipalities, Village and Town Panchayats Agricultural Engineering, DWDA, and ground water department.

Multi Purpose Evacuation Shelters

1 Pachayankuppam	8 Veerankoilthittu
2 Kudikadu	9 Killai (N) Koozhaiyar
3 Thiyagavalli	10 Pinnathur (E)
4 Nanjalingampettai	11 Thillaividangan
5 Thirunaraiyur	12 Killai (N) MGR Thittu
6 Keezhakundalapadi	13 Parangipettai
7 Ambikapuram	14 Punjai magathuvazhkai

Disaster Preparedness:

Measures taken in anticipation of a disaster to ensure that appropriate and effective actions for aftermath. Preparedness includes Plans and Preparations made to save lives, in response and rescue operations and conducting mock drills, renovation of shelters, lighting facilities and sanitary arrangements. Evacuation plans and Stocking of medicine, food materials and protected drinking Water are examples for preparedness.

Cyclone shelters, Evacuation shelters, schools, community halls are utilized to accommodate the people to save from disaster. Provision of drinking water, electricity facility appropriate toilet facilities for men and women shall be ensured. Repair works, white washing shall be done and maintained neatly. Whenever the message about disaster reaches the Emergency Operation Centre, that shall be disseminate to all nodal officers through wireless, VHF sets and through media and early warning system. The village level team will receive the message from Nodal officer and pass it to public. The General Public shall be in alert position themselves and they shall voluntarily migrate to shelters to protect their life.

Disaster Early Warning System

Further due to bitter experience gained in the field of Communication during the last 2004 TSUNAMI, in this district, 83 numbers of Early Warning Systems at vulnerable places have been installed.

A flood control room with toll free four digit public utility service telephone No.1077 with incoming facility alone has already been installed at the district headquarters for receiving information on disaster. The four digit toll free telephone has been placed in the control room / Emergency operation centre and manned round the clock. Wide publicity is given in the dailies/media about this facility. The contact numbers of India Meteorological department (IMD) and Indian National Centre for Ocean Information services (INCOIs) for accessing information on cyclone, rains or tsunami are provided in the Collector's office, Cuddalore with a direct line phone. Similarly flood control rooms are opened in Divisional and Taluk offices also. This setup will

function round the clock and any emergency will be reported to the Collector's office and concerned Taluk and Divisional offices.

There are two kinds of warning system viz. (1)Warnings of seasonal calamities received from the area cyclone-warning centre, Chennai (India Meteorological Department) (2) Information about any actual occurrence of unprecedented and occasional calamity received from the local VAOs. On receipt of warning message from the meteorological Department in theCollector's office, the same will be communicated to the R.D.O's, the Tahsildar and the BDO's.

Conclusion:

It is not the intensity of natural hazards but the degree of vulnerability, i.e., sensitivity and resilience of the exposed population, which decides the magnitude and risk of disasters caused by natural hazards. Villagers hold informal meetings to discuss about the risk exposure and to identify the ways to reduce it as in their perception vulnerability is a dynamic phenomenon which changes temporally. The general perception of the community is that administrative authorities should interact with the community before drawing and formulating the community development policies, plans and programs and their implementation in general and disaster mitigation planning in particular, and monitoring needs to be done in a participatory and transparent manner. A top down approach by the administration to draw up disaster management plan does not fully serve the purpose. The local community of non coastal areas needs to be involved at every stage from the very beginning in developing a disaster management plan. Appropriate land use planning and proper management of available resources play a critical role in reducing risks. Disasters pose a sudden and heavy burden on the affected areas. The first response to disasters usually comes from the local population. National and international support a well as regional resources are mobilized over time. The result of the study indicates that rural communities of non coastal areas must improve their capacity to manage natural disasters.

References:

1. Cuddalore district disaster management plan – 2017, https://cuddalore.nic.in.
2. S.Saxena,V.Geethalakshmi, A.Lakshmanan (2013), Development of habitation vulnerability assessment framework for coastal hazards:CuddalorecoastinTamilNadu, India – A casestudy, Weather and climate extremes 2 (2013) 48-57, journal homepage: www.elsevier.com/locate/wace.
3. Vijayaprasad Gopichandran (2016), The Chennai floods of 2015: urgent need for ethical disaster management Guidelines, Indian Journal of Medical Ethics Vol I No 2,April – June 2016, DOI:10.20529/IJME.2016.025, https://www.researchgate.net/publication/315988089.
4. A. ArivudaiNambi (2012), Adaptation to Climate Change and Livelihoods: An IntegratedCase Study to Assess the Vulnerability and Adaptation Options of the Fishing and Farming Communities of Selected East, Coast Stretch of Tamil Nadu, India, *Asian Journal of Environment and Disaster Management*, Vol. 4, No. 3 (2012) 297–321 © Research Publishing Services, doi:10.3850/S1793924012001691.