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A study on the impact of tsunami in the coastal society in Kerala

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Abstract
The 2004 Tsunami in India was another disastrous disaster which shook the world and wiped away many communities and their own culture and traditions. Among other Tsunami affected countries, India stood third in the list of tsunami-affected countries. In this paper, I am discussing the impact of tsunami in the coastal area who are located in Azheekal, Kollam district, Kerala after the 2004 Tsunami. The Alappad in Kollam district was the most Tsunami –Affected region in Kerala. As the community was belongs to the fishing related works their major source of income was also connected to that area. Till the day the when the tsunami came into their life they were living in a unique habitat which was convenient for them in their day to day activities, living style, the source of income etc. Everything has changed within a glance of second and it created a great impact to this coastal community. However, they were forced to move from their existing environment to an entirely new place as part of Tsunami rehabilitation process since a huge number of people lost their beloved ones and their houses after Tsunami. The paper seeks to emphasize the various types of impacts especially the Psychological impact, Socio- Economic impact, Structural changes and also the social problems faced and adopted by the community after the Tsunami. Further it will examine the past and present social, cultural and economic dimensions and dynamics of Azheekal community.

Keywords: Tsunami, disastrous, disaster, Economic

Introduction
In general, the growth and development of any nation basically depends on the progress in Science and Technology. Since independence, India has seen numerous deterrents like famine, flood, earthquakes and recent Tsunami in its economic point of view. but so far there is no (or) very few initiatives and activities taken on the part of disaster prediction and its management. This is very apparent from the Gujarat earthquake in the year 2001 and Tsunami 2004. Whereas comparing to other developing countries like Korea, Japan, Malaysia which are smaller in geographical area as well population, India has enormous resource, asset and brain power but unfortunately, we lack somewhere due to one (or) more reasons. The reality is that the recent Tsunami 2004 had its origin i.e. the epicenter of the quake was closer to Indonesia if there would be sophisticated techniques, modern methods and technologies to foresee these occasions. India might have reduced the socio-economic damages created by Tsunami. The history of the coastal environment can be divided into two administrations i.e. first being the one before 26th December 2004 and the second after that day. The killer waves named as 'Tsunami' has totally shaken the livelihood of millions of people dwelling within the delicate coastal ecosystem. On 26th December 2004, several countries on the Indian Ocean were hit by Tsunami. This phenomenon was triggered by an enormous seismic tremor with the recorded magnitude of 9.0 on the Richter scale, with the epicenter just off the West Coast of North Sumatra at 0:58:53 UTC. India was affected by Tsunami besides Indonesia, Srilanka, Thailand, Malaysia, Maldives, Myanmar, Bangladesh, Somalia, Tanzania, Kenya and Yemen.

The present enquiry opted to study the impact of Tsunami in the coastal society with the specific objectives as given below.

1. To study the psychological impact of Tsunami on the coastal inhabitants.
2. To study the socio-economic impact of Tsunami on the coastal inhabitants.
3. To study the structural changes caused by Tsunami to the coastal society.
4. To study the social problems caused by Tsunami in the coastal society.

Scope of the Study
The study was formulated with the main objective of understanding the psychological, socio-economic impact, social problems and structural changes that had taken place in the costal society as a result of Tsunami. This study also expected to yield valuable results of the impact of Tsunami as a natural catastrophe, and it would appear the degree of impact on the coastal inhabitants with respect to psychological state, socio-economic status and physical capital (Infrastructure).The aforesaid information will be useful to understand the entire impact of Tsunami and this would be a record for the future browsers to visualize the 2004 Tsunami at Indian frame.

Limitations of the Study
As an individual, the researcher experienced limitations such as time, resources and the like that any researcher will confront during any scientific investigation. Being pioneer study, the researcher had difficulties in obtaining data from the respondents who might have recalled the situation and

problem. However, utmost care was taken to evoke data from the respondents and cross checks were made at several points to confirm the exactness. Since the study was conducted in a limited range, generalizations have to be done with utmost care taking the impediments into consideration.

Literature Review

Ibrahim and Maglan (2006), stated that Victims affected by Tsunami were still having flashbacks of horrifying Tsunami tragedy. In Tanjong Tonkong, a nine years old child refused to go back to school as he was haunted by the horror of watching his father busy saving his boat until he forget that his son was still in the house. There were also children experiencing fear of bathing while many had nightmares of big waves coming to kill them

Premachandra and Budy (2005), the report of world bank using a standard assessment technique developed by the United Nations Economic Commission for Latin America and the Caribbean has estimated the total damages and losses caused by the earthquake and Tsunami in Indonesia was approximately US $ 4.45 billion and it was around US $ 1 billion (4.5% of GDP) in Srilanka.

Arunatilake, *et al*. (2006) reported that about 8 per cent of the households have changed their livelihood while 21 per cent were unemployed after the incidence of Tsunami. The major constraints faced by the household were in recovering their incomes include loss of equipment, loss of work places, lack of working capital and personal injuries. She also reported that about 11 per cent of the households know of someone committing suicide because of the Tsunami. One third of the households have been offered or given counseling for distress.

Selection of District

The present study pertains to the impact of Tsunami on the coastal inhabitants of Kollam district of Kerala. As Tsunami is a coastal phenomenon it was largely experienced by the coastal districts alone, thus only the Coastal districts of Kerala were affected by the Tsunami.

Sampling Procedure and Sample Size

Out of two Taluks of Kollam district only the five coastal Taluks were affected by Tsunami, out of which one taluk were taken-up for the study. Since the study comprises of three categories of respondents namely fishermen and farmer the selection of respondents were restricted to the respective Taluks having larger proportion of the above mentioned respondent group.

Operationalisation of Variables and Their Measurement

The present investigation is an ex-post facto research, thus the researcher concentrated only on the dependent variables framed based on the specific objectives already set-forth. The operationalized meaning and their measuring procedure are discussed below under various sub-heads pertaining to the specific objectives of the study

Statistical Tools Used

In the present study the independent student t-test was performed for before-after comparison apart from percentage analysis along with cumulative frequency in the appropriate conditions to have better statistical interpretation.

Percentage Analysis

Percentage analysis was used for making simple comparisons. For calculating percentages, the frequency of the particular cell was multiplied by 100 and divided by the total number of respondents. Percentage was corrected to two decimal places.

Cumulative Frequency

This method was suggested by Rao (1987) to categorize the respondents into three groups viz., low, medium and high. Based on the score value the number of respondents belonging to each class was determined.

Independent Student T- Test

This was employed to test the significance of the difference between the before and after situations with respect to Tsunami.

Data analysis

Psychological impact

The psychological angle measured in this study is "Depression" which was measured utilizing Beck's Depression Inventory. During the study the respondents were asked to respond to the items of Beck's Depression inventory scale and they were rated based on the scores obtained.

The result reveals that in Farmer's category approximately 80.00 per cent of the respondents had medium level of depression on the Beck's depression scale, followed by meager proportion of respondent in rest of the depression category. The possible reason for majority of respondents in medium depression category was that they did not face any human loss in their family as a result of Tsunami, only the agricultural lands were affected due to the intrusion of sea water and the crops were damaged at a larger extent due to excess flooding of water in the fields

Socio-Economic Impact

This section deals with socio-economic changes as a result of Tsunami on the coastal inhabitants. The Socio-Economic condition of the respondents was considered utilizing the Socio-Economic Scale developed by National Health Survey (NHS) with slight modification to suit the present study.

The socio-economic condition of the farmers who were affected by the event of Tsunami. Half of the respondents were of medium Socio-Economic status in general irrespective of incidence of Tsunami. The mean score of the respondents with respect to Before and After Tsunami was nearly same and the mean difference also didn't exhibit any vast variations. The 't' value was not-significant which showed that there wasn't any change in the Socio-Economic Condition of the farmers before and after the incidence of Tsunami. The farmers' house and agricultural lands were located separately in such a way that the agricultural lands (cropped lands) were nearer to the seacoast whereas the residential lands were situated away from shore, thus only the agricultural lands alone were damaged heavily by the intrusion of sea water, but the houses and household articles were not damaged. In the present study measure of Socio-Economic Status was restricted to household infrastructure and basic amenities. The results showed that the household infrastructure and basic amenities were not damaged at an overall perspective, hence this might be the possible reason

for such results.

Structural Change

This section deals with structural changes (social structure and physical structure) caused by Tsunami in the coastal society. The structural changes was studied under three sub-components namely family structure, physical infrastructure and social interaction. Since the present study is on structural change in whole coastal society all the respondents all the three categories fishermen, farmers and traders were asked to respond to the items in the interview schedule based on their experience and degree of perception.

Family structure

The result of the study shows that there exists slight difference in the family structure among the respondents' family after the incidence of Tsunami. The details are explained below under respective sub-heads. (a) Type of family The results shows that before Tsunami 78.88 per cent of the respondents had nuclear family type and rest of the respondents (38%) had joint family type, whereas after Tsunami 93.88 per cent of the respondents had nuclear family type and only 6.11 per cent of the respondents had joint family type. There was slight change in the family type after Tsunami. Those small proportion of respondent's family who had joint family type before Tsunami changed to nuclear family after Tsunami, as a result at deaths in their family. This led to increase in nuclear family type among the respondents, (i.e.) the proportion of respondents who lost one (or) more family members during Tsunami and who were displaced to different places led to the change in family type from joint structure to nuclear structure after Tsunami. Hence, the possible reason for such change may be due to death of family members (or) due to displacement of the respondents' family members. b) Head of the family The results shows that before Tsunami 97.78 per cent of their respondents had male as head of the family and only 2.22 per cent of them had female headed family, but after Tsunami 95.56 per cent of the respondents had male headed family and rest of the respondents had female headed family. From the results it is clear that there was slight increase in the percentage of female headed family, after Tsunami, the slight increase of 2 per cent in female headed type might be due to the reason that, the death of the head of the family in male headed would have led in shift of responsibility to the female member in the family, thus after Tsunami female headed family constitute 4.44 per cent among the respondents taken for study. It is evident from the results that there was change in both family type and type of head the family had. Thus it is clear that there was change in the family structure after Tsunami.

Physical Infrastructural Damage

This part deals with result pertaining to the perceived degree of physical infrastructural damage as a result of Tsunami. The respondents were asked to respond to the items based on their perceived degree of damage felt before and after Tsunami with respect to the physical infrastructure available in their society. The results are discussed under the following subheads.

Road The result reveals that before Tsunami about 62.22 per cent of the sampled respondents perceived that was only less damage to the roads but After Tsunami the sampled respondents of about 60.00 per cent perceived that there was more damage to roads in and around their locality as because Tsunami waves that struck their coastal areas has resulted in considerable damage to the roads by means of erosion of roads and accumulation of debris, along the roads.

Transport

It is evident that about 67.77 per cent of the respondent perceived that transport was less affected by natural calamities like rain and improper maintenance before Tsunami, but after Tsunami three-fourth (78.88%) of the respondents felt that transport was moderately affected by Tsunami, the possible reason is that as discussed earlier the link roads were damaged by Tsunami waves due to accumulation of debris and sand this might have hindered the regular transport thus the results are justified.

Communication

Before Tsunami about 55 per cent of the sampled respondents perceived that there was only least damage to the communication structures whereas after Tsunami more than half of the respondents (67.77%) perceived that there was moderate level of damage to the communication structures. During the survey it was documented that some of telephone lines were damaged by the Tsunami waves in and around the coastal areas.

Drinking water

Before Tsunami majority (88.88%) of the sampled respondents perceived that there was only less damage to the drinking water whereas after Tsunami little more than half (66.11%) of the sample respondents perceived that there was moderate level of damage to the drinking water and subsequently 12.22 per cent of the respondents perceived that there was more damage to the drinking water, the possible reason for this would be that the drinking water would have been contaminated by the debris accumulated by the Tsunami waves and the intrusion of sea water either as seepage (or) flooding which would have resulted in Salanisation of ground water.

Street Lights

62.22% of the respondents perceived that there was least damage in the street lights before Tsunami but after Tsunami little more than half of the respondents (51.66%) felt that street-lights were moderately affected due to Tsunami, this is because of huge waves of Tsunami which entered into the streets of the villages nearer to the coastal area damaged to the street-lights

Electricity

We could infer that three-fourth (75.55%) of the respondents felt that there was only least damage to the electricity supply before Tsunami, whereas on other hand after Tsunami little more than half of the respondents (56.11%) felt that the electricity supply was moderately affected after Tsunami, the possible reason is that, the electric post which were damaged by the intruded sea-water and the broken buildings due to Tsunami might have damaged the electrical lines, on other hand, this would have prevented the electricity supply for a considerable period after Tsunami until its rectification.

Sanitation
We could infer from the Table-12 that little more than half of the respondents (51.11%) perceived that sanitation in and around their locality were less affected before Tsunami but after Tsunami three-fourth of the respondents (78.88%) felt that sanitation was more affected, the possible reason is that the dead-bodies and other debris accumulated by the flooded sea water might have resulted in contamination of drinking water and also might have be the reason for the spread of air and water borne disease among human beings and cattles in the coastal society

School Buildings
Before Tsunami majority of the sampled respondents (88.88%) perceived that there was only least damage to the school buildings. Whereas after Tsunami great majority of the respondents (95.55%) of the sampled respondents perceived that there were moderate level of damage to the school buildings, the possible reason is that the schools situated in the coastal village would have been affected by the intrusion of sea-water during Tsunami

Community Hall
Majority of the respondents (87.77%) felt that community hall was least affected before Tsunami but after Tsunami nearly half of the respondents (50.55%) felt that community hall were moderately damaged, the possible reason is that the home-less victims might have occupied the community hall leading to overcrowding which might have resulted in damage to the community hall. On an overall perspective the results reveals that the degree of damage as perceived by the sampled respondents of the study showed that the physical infrastructure like roads and sanitation were more affected and other physical infrastructure like transport, communication drinking water, streetlights, electricity, school buildings and community hall were moderately damaged after the incidence Tsunami.

Social Interaction
This part deals with social interaction as perceived by the respondents before and after Tsunami. The social structure comprises the social interaction among and within the society thus during the study the level of social interaction perceived before and after the incidence of Tsunami was studied and the results pertaining and subsequently the results of each social interaction process are discussed as given below under respective sub-heads.

Co-operation
Before Tsunami majority of the respondents (80%) felt that there was more co-operation among and within their society members whereas on other hand after Tsunami the level of co-operation was the most, this was felt by 66.11% of the respondents, the possible reason is that after the incidence of Tsunami the neighbours and street members were jointly involved in rescuing their society members, thus the co-operation during this period was purely due to contingent situation and fear.

Competition
Little more than half of the respondents (62.22%) felt that there was moderate level of competition among their fellow members in their society but after Tsunami 76.11 per cent felt that the competition among their fellow mates was the most, the possible reason for slight increased degree of perception is that, as discussed earlier the fishermen, farmers and the traders were affected badly with respect to their profession thus this might have increased the competition among them to sustain themselves for their own livelihood.

Conflict
The study could be inferred that both before and after Tsunami in major share of the respondents (49.44 % and 51.11 % respectively) felt that the level of conflict was less, since conflict is an universal phenomenon irrespective of situation always a considerable level of conflict do exist in the society this might be directly (or) indirectly to increased competition in the professional level and livelihood sustenance hence the results are justified.

Accommodation
Half of the respondents (56.11%) perceived that there was moderate level of accommodation among their society members before Tsunami but after Tsunami 67.22 per cent of respondents felt that there was more accommodation among their society members, the slight increase in the degree of perception is clear from the results, the possible reason is that after Tsunami victims who escaped from the tragedy and family who lost one of more of their family members had more level of social adjustability, this mind-set might have led to more level of accommodation process among the coastal society members who have witnessed Tsunami and its horrifying results.

Social Problem
This section deals with the social problems perceived by the respondents both before and after Tsunami. The respondents were asked to express the perceived degree of social problem and on the basis of percentage analysis (the results were interpreted and were discussed under different sub-heads.

Alcoholism
The results reveals that 70.00 per cent of the sample respondents perceived that there was moderate level of alcoholism consumption among their peer groups before Tsunami, but after Tsunami almost majority of the sampled respondents (80.00%) perceived that there was more level of alcohol consumption. The possible reason for the increase may be due to the psychological stress, depression and anxiety as a result of socio-economic damages and human loss in one (or) other family, relatives might have forced the individuals to drink more frequently. The results of the study is in accordance with the findings of Anonymous (Dec. 2005) and Karunee *et al*. (2006) [14].

Smoking
It could be confirmed that before Tsunami majority of the sampled respondents (83.33%) perceived that there was moderate level of smoking among their members of the society, but after Tsunami great majority (93.33%) of the sampled respondents perceived that there was more level of smoking among the peer groups. The possible increase in the percentage of smoking might be due to frequent smoking as a result of anxiety and stress, and other psychological pressure created on the individuals due to Tsunami. The results are in line with the findings of

Karunce *et al*. (2006).

Summary and Conclusion

1. The fishermen and traders were more psychologically depressed when compare to farmers, hence it is suggested that in future if there is any natural disturbance (coastal disturbance like Tsunami, floods etc.) immediate psychological counseling must be given to fishermen followed by traders and then farmers so as to prevent further complication and apart from this management of psychological stress in future can be taught to the coastal inhabitants to help themselves from stress and depression.
2. Due to Tsunami the socio-economic status of fishermen was very badly damaged followed by traders and farmers, hence it is suggested that financial assistance like locus and grants can be diverted through proper changed to help the victims to get into their profession back and to recover themselves from damages caused by Tsunami to their household properties.
3. After Tsunami the physical capital like communication, drinking water and sanitation was very badly damaged / affected, hence it is suggested that periodic monitoring should be made for such physical capital which forms very basic during any natural disturbance to avoid unnecessary complications to health and future generations.
4. Some of the social problems like alcoholism, smoking, unemployment and prostitution on was high after Tsunami, hence it is suggested that after any natural disturbance local governance should have a strict vigilance and laws should be strictly enforced like temporally prohibition of narcotics and drugs to avoid such social problems.
5. During the study it was witnessed that some of the victims in order to get financial assistance, temporary shelter, cloths and food (or) either of these they were changing their religion hence it is suggested that religious institution should not be allowed directly to divert the funds, any assistance should be directed only through government (or) government recognised bodies to prevent such activities. Suggestion for future research

1. Similar studies can be done after a considerable period of five (or) ten year to assess the current status with the future.
2. The impact of Tsunami on gender can be studied in future
3. Studies can be done on the health aspects of coastal inhabitants after Tsunami.
4. Studies can be conducted on the assistance provided by different organisation for knowing the adequacy and promptness in solving the problems.
5. A comparative study can be done on the post-tsunami initiatives and assistance given by different organisation viz., private, NGO and governmental organisations.

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