

**PSYCHOLOGICAL AND SOCIO-ECONOMIC IMPACT OF
TSUNAMI ON THE COASTAL INHABITANTS**

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CENTRE FOR AGRICULTURAL AND RURAL DEVELOPMENT STUDIES
TAMIL NADU AGRICULTURAL UNIVERSITY
COIMBATORE – 641 003**

2007

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TSUNAMI ON THE COASTAL INHABITANTS**

*Thesis submitted in part fulfillment of the requirements of the Degree of
DOCTOR OF PHILOSOPHY (Agriculture) in AGRICULTURAL EXTENSION
to the Tamil Nadu Agricultural University, Coimbatore.*

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2007

CERTIFICATE

This is to certify that the thesis entitled “**PSYCHOLOGICAL AND SOCIO-ECONOMIC IMPACT OF TSUNAMI ON THE COASTAL INHABITANTS**” submitted in part fulfillment of the requirement for the award of the degree of **DOCTOR OF PHILOSOPHY (AGRICULTURE) IN AGRICULTURAL EXTENSION** to **TAMIL NADU AGRICULTURAL UNIVERSITY, COIMBATORE**, is a record of bonafide research work carried out by **Mr. G. ANAND** under my supervision and guidance and that no part of this thesis has been submitted for the award of other degree, diploma, fellowship or other similar titles or prizes and that the work has not been published in part or full in any scientific or popular journal or magazine.

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CONTENTS

CHAPTER NUMBER	TITLE	PAGE NUMBER
1.	INTRODUCTION	1-11
2.	REVIEW OF LITERATURE	12-26
3.	RESEARCH METHODOLOGY	27-54
4.	FINDINGS AND DISCUSSION	55-122
5.	SUMMARY AND CONCLUSION	123-128
	REFERENCES	129-132
	ANNEXURES	133-154

LIST OF TABLES

Table No.	Title	Page No.
1.	Countrywise estimated death toll of Tsunami 2004	2
2.	Districtwise lives lost and impaired due to Tsunami 2004	6
3.	Districtwise property lost and damaged due to Tsunami 2004	7
4.	Value of damages in Tamil Nadu due to Tsunami 2004	8
5.	Coastal districts of Tamil Nadu and their coastal length	28
6.	Effect of Tsunami in Tamil Nadu with special reference to Nagaipattinam	29
7.	Villages and Hamlets affected by Tsunami in Nagaipattinam district	32
8.	Sampled taluks, blocks and villages of Nagaipattinam district affected by Tsunami.	34
9.	Psychological Impact among Farmers	56
10.	Psychological Impact among Fishermen	57
11.	Psychological Impact among Traders	58
12.	Socio-Economic Status of Farmers Before and After Tsunami	62
13.	Socio-Economic Status of Fishermen Before and After Tsunami	64
14.	Socio-Economic Status of Traders Before and After Tsunami	66
15.	Family Structure Before and After Tsunami	73
16.	Perceived Degree of Physical Infrastructural Damage Felt Before and After Tsunami	77
17.	Perceived Degree of Social Interaction Felt Before and After Tsunami	91
18.	Perceived Degree of Social Problems Felt Before and After Tsunami	105

LIST OF FIGURES

Figure No.	Title	Page No.
1.	Coastal and inland taluks of Nagaipattinam district	31
2.	Sampled Taluks and blocks of the study	35
3.	Psychological impact (Depression) of Tsunami on Farmers, Fishermen and Traders	59
4.	Socio-Economic Status of Farmers Before and After Tsunami	63
5.	Socio-Economic Status of Fishermen Before and After Tsunami	65
6.	Socio-Economic Status of Traders Before and After Tsunami	67
7.	Family Structure Before and After Tsunami	75
8.	Perceived Degree of Physical Infrastructural Damage (Road Before Tsunami)	78
9.	Perceived Degree of Physical Infrastructural Damage (Road After Tsunami)	78
10.	Perceived Degree of Physical Infrastructural Damage (Transport Before Tsunami)	80
11.	Perceived Degree of Physical Infrastructural Damage (Transport After Tsunami)	80
12.	Perceived Degree of Physical Infrastructural Damage (Communication Before Tsunami)	81
13.	Perceived Degree of Physical Infrastructural Damage (Communication After Tsunami)	81
14.	Perceived Degree of Physical Infrastructural Damage (Drinking Water Before Tsunami)	83
15.	Perceived Degree of Physical Infrastructural Damage (Drinking Water After Tsunami)	83
16.	Perceived Degree of Physical Infrastructural Damage (Street Lights Before Tsunami)	84

17.	Perceived Degree of Physical Infrastructural Damage (Street Lights After Tsunami)	84
18.	Perceived Degree of Physical Infrastructural Damage (Electricity Before Tsunami)	86
19.	Perceived Degree of Physical Infrastructural Damage (Electricity After Tsunami)	86
20.	Perceived Degree of Physical Infrastructural Damage (Sanitation Before Tsunami)	87
21.	Perceived Degree of Physical Infrastructural Damage (Sanitation After Tsunami)	87
22.	Perceived Degree of Physical Infrastructural Damage (School Buildings Before Tsunami)	88
23.	Perceived Degree of Physical Infrastructural Damage (School Buildings After Tsunami)	88
24.	Perceived Degree of Physical Infrastructural Damage (Community Hall Before Tsunami)	90
25.	Perceived Degree of Physical Infrastructural Damage (Community Hall After Tsunami)	90
26.	Social Interaction - Cooperation Before Tsunami	93
27.	Social Interaction - Cooperation After Tsunami	93
28.	Social Interaction - Compition Before Tsunami	94
29.	Social Interaction - Compition After Tsunami	94
30.	Social Interaction - Conflict Before Tsunami	96
31.	Social Interaction - Conflict After Tsunami	96
32.	Social Interaction - Accommodation Before Tsunami	97
33.	Social Interaction - Accommodation After Tsunami	97
34.	Social Interaction - Assimilation Before Tsunami	98
35.	Social Interaction - Assimilation After Tsunami	98
36.	Alcoholism Before Tsunami	106
37.	Alcoholism After Tsunami	106

38.	Smoking Before Tsunami	108
39.	Smoking After Tsunami	108
40.	Crime Before Tsunami	109
41.	Crime After Tsunami	109
42.	Drug Addiction Before Tsunami	110
43.	Drug Addiction After Tsunami	110
44.	Unemployment Before Tsunami	112
45.	Unemployment After Tsunami	112
46.	Sexual Harassment Rape Before Tsunami	113
47.	Sexual Harassment Rape After Tsunami	113
48.	Prostitution Before Tsunami	114
49.	Prostitution After Tsunami	114
50.	Poverty Before Tsunami	116
51.	Poverty After Tsunami	116
52.	Suicide Before Tsunami	117
53.	Suicide After Tsunami	117
54.	Orphans Before Tsunami	119
55.	Orphans After Tsunami	119
56.	Class Discrimination Before Tsunami	120
57.	Class Discrimination After Tsunami	120
58.	Dependency Before Tsunami	121
59.	Dependency After Tsunami	121

LIST OF PLATES

Plate No.	Title	Page No.
1.	Epicerter of Tsunami 2004 and its approach towards India	3
2.	Intrusion of sea-water in Nagaipattinam district	9
3.	Helpless depressed Tsunami widow	16
4.	Tsunami victim breaking out of sadness	61
5.	Tsunami victim under depression	61
6.	Houses demolished by Tsunami	69
7.	Houses slashed by Tsunami waves	69
8.	Household articles damaged by Tsunami	70
9.	Displacement of Tsunami victims	70
10.	Tsunami affected paddy field	71
11.	Tsunami affected groundnut field	71
12.	Boats damaged by Tsunami	72
13.	Destroyed boats of Tsunami	72
14.	Link road eroded by Tsunami	99
15.	Debris accumulated on the street roads by Tsunami	99
16.	Bridge damaged by Tsunami waves	100
17.	Road transport affected by Tsunami dragged boat	100
18.	Railway track hindered by boat moved by Tsunami waves	101
19.	Tsunami dragged boat hindering railway transport at Nagaipattinam junction	101
20.	Physical capital damaged by Tsunami	102
21.	Electric post damaged by Tsunami	102
22.	Telephone lines damaged by Tsunami	103
23.	Water contamination by the deadbodies of people hit by Tsunami	103
24.	Orphans of Tsunami	122
25.	Dependency showing widows of Tsunami	122

LIST OF ANNEXURES

Annexure No.	Title
1.	Update on the Tsunami related activities in Tamil Nadu (As on 28.02.2007)
2.	Housing construction and their stages (As on 28.02.2007)
3.	Interview schedule

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ABSTRACT

PSYCHOLOGICAL AND SOCIO-ECONOMIC IMPACT OF TSUNAMI ON THE COASTAL INHABITANTS

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The coastal communities faced a horrifying effect of Tsunami in 2004. The victims faced psychological as well as socio-economic problems after Tsunami. India has already faced the natural disaster in the year 2001 in Gujarat, but then we have not develop any disaster prediction and management strategies to tide over similar natural disaster in future. The recent Tsunami has caused huge damage to the Indian economy, hence studying the effect of an issue and developing base line data can help the policy makers to tide over the contingency situation. Keeping this in view the present study was focused on studying the impact of Tsunami.

The study was taken up to analyse the psychological impact, to understand the changes in socio-economic condition, to know the structural changes occurred and to study the social problems caused after the incidence of Tsunami. The study was conducted with 180 respondents comprising of three categories of people i.e sixty fishermen sixty farmers and sixty traders in the Tsunami affected villages of Nagaipattinam district. The respondents were asked to give responses based on these perceived level of damage or change. The data were collected using interview schedule. The salient findings of the study are highlighted below.

The results of the findings indicates that 80.00 per cent of the farmers had medium level of depression in the Beck's depression scale, whereas in fishermen category medium level of depression and moderate level of depression put together constitute to 81.66 per cent, thus their distribution on the Beck's depression scale was towards high level, in traders category again 71.67 per cent of respondents had medium level of depression. On overall perspective the fishermen had severe depression level on the Beck's depression scale.

The statistical analysis (t-test) showed that among farmers category, there was no change in the socio-economic condition, whereas in fishermen and traders category there was considerable change in the socio-economic status after Tsunami. The statistical analysis also showed that after the incidence of Tsunami there was slight change in the family structure with respect to type of family and the family head, and there was slight increase in female headed family.

After Tsunami the physical infrastructures like road and sanitation were perceived to be more affected and the other infrastructure like drinking water, street lights, electricity, school buildings, and community halls were perceived to be moderately damaged.

The social interaction processes like co-operation and competition were perceived to be most among the respondents after the incidence of Tsunami whereas the social interaction process like accommodation was more after Tsunami.

The findings of the study also showed that, the social problems like smoking, alcoholism, unemployment, poverty, orphans and dependency was more among the Tsunami victims after the incidence of Tsunami and the other social problems like crime, prostitution, suicide and class discrimination was at moderate level after Tsunami.

It could be concluded that among the three respondent groups, the fishermen category followed by traders were psychologically depressed more, proper psychological counselling can recover them in due course. Similarly the socio-economically fishermen were affected badly after Tsunami. Hence, the relief measures should concentrate on house construction and for replacement of boats and agricultural lands affected by Tsunami. The infrastructural damages should be given more concern to replace the present situation after Tsunami and to get back to the old situation. Further, whenever there is natural disaster along the coastal areas, the government should give prime concern to manage the possible outbreak of social problem and should be proactive in solving the problems without any delay.

CHAPTER - 1

INTRODUCTION

In general the growth and development of any nation mainly depends on the progress in Science and Technology. Since independence, India has seen many obstacles like famine, flood, earthquakes and recent Tsunami in its economic perspective but so far there is no (or) very few initiatives taken on the part of disaster prediction and management. This is very evident from the Gujarat quake in the year 2001 and Tsunami 2004. While comparing to other developing countries like Korea, Japan, Malaysia which are smaller in geographical area as well population, India has enormous resource and brain power but unfortunately we lack somewhere due to one (or) more reasons. The fact is that the recent Tsunami 2004 had its origin i.e. the epicenter of the quake was nearer to Indonesia if there would be sophisticated techniques and technologies to predict these event. India might have reduced the socio-economic damages created by Tsunami.

The history of the coastal ecosystem can be divided into two regimes i.e. first being the one before 26th December 2004 and the second after that day. The killer waves christened as 'Tsunami' has entirely shaken the livelihood of millions of people dwelling in the fragile coastal ecosystem. On 26th December 2004, several countries on the Indian Ocean were hit by Tsunami. This phenomenon was triggered by a massive earthquake 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 (Plate-1). The Tsunami of December 26, 2004 ranks among the worst natural disasters in the past century. The estimated numbers of death toll in affected countries are given below in **Table-1**.

Table-1: Country wise estimated death toll

Sl.No.	Country affected by Tsunami	Estimated death toll (In Numbers)
1.	Indonesia	1,56,354
2.	Srilanka	35,322
3.	India	16,389
4.	Thailand	5,395
5.	Somalia	298
6.	Myanmar	90
7.	Maldives	82
8.	Malaysia	68
9.	Tanzania	10
10.	Bangladesh	2
11.	Kenya	1
	Total	2,14,011

Source: www.msnbc.msn.com

DAMAGES AT NATIONAL LEVEL

The massively destructive Tsunami that struck across the Indian rim caused extensive loss of life and injury as well as devastation to property and community resources. Invariably all the sections of the community *viz.*, farmers, fishermen, traders and general public were affected by the giant waves and its repercussions were of unimaginable magnitude. An overall estimate of the government report showed that 75 per cent of the fatalities were women and children. The report also added that around 1,089 villages were affected in Andhra Pradesh, Kerala, Tamil Nadu, Pondicherry and the Andaman and Nicobar Islands, in which nearly 2,35,377 houses were destroyed. The government report also added that almost 83,788 boats were damaged and 31,755 livestock were lost. The total estimated value of damages was around \$2.56 billion (Approx. Rs. 11,300 crores) and total estimated need for long-term recovery would be \$2.1 billion (Approx. Rs. 9240 crores). (**Source: Situation Report, No. 32, 5/2004, Ministry of Home Affairs Govt. of India**).

DAMAGES AT STATE LEVEL- TAMILNADU

The Tsunami waves struck the mainland with a height of 3 to 10 meters and penetrated 300 m to 3 km inland, affecting approximately 2,260 km of coastline with varying intensity. In Tamil Nadu, Nagaipattinam, Kanyakumari, Cuddalore, Kandipuram, Villupuram and Chennai districts were the most severely affected districts. The lives lost and impaired are furnished in the **Table-2**. Apart from human loss, Tamil Nadu also experienced huge loss in property. The degree of damages to the property are given in the

Table-3. The value of damages due to Tsunami is given in the **Table-4** and the detail of rehabilitation activities as on 28.02.07 is given the **Annexure-II**.

DAMAGES AT DISTRICT LEVEL- NAGAIPATTINAM

In Tamil Nadu Nagaipattinam was very badly damaged by the harsh Tsunami waves and the sea water intrusion was also high in this district when compare to other districts (**Plate-2**). In Nagaipattinam around 38 villages and 73 Hamlets were damaged by the Tsunami which led to death toll of 6065 in the district and around 1922 people were injured, and approximately 1.96 lakh persons were evacuated and beside this about 11864 cattle were lost due to Tsunami. (**Source: Office of the district collector, Nagaipattinam**).

Keeping the above scar in mind the researcher of 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.***

1.1. 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 coastal society as a result of Tsunami. This study also expected to yield valuable results of the impact of Tsunami as a natural disaster, and it would show the degree of effect 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 total impact of Tsunami and this would be a record for the future browsers to visualize the Tsunami 2004 at Indian rim.

1.2. Limitations of the study

As an individual, the researcher encountered limitations such as time, resources and the like that any researcher will face 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 elicit information from the respondents and cross checks were made at several points to confirm the accuracy. Since the study was conducted in a restricted area, generalizations have to be done with utmost care taking the limitations into consideration.

1.3. Organization of the Thesis

In addition to the current introductory chapter, four more chapters have been organized in a logical sequence. The second chapter deals with Review of Literature, the third chapter concentrates on Research Methodology, while Findings and Discussion are

presented in the fourth chapter. The summary of the study with the major findings and their implications is presented in the fifth chapter. The suggestions for future research are also included at the end of the fifth chapter.

CHAPTER - 2

REVIEW OF LITERATURE

Any research study warrants a sound theoretical understanding of the problem under study. Hence, an attempt was made to peruse the available literature pertinent to the study. After thorough review of all the possible sources, it was observed that on certain dimensions of the study, either very few or no studies have been conducted earlier. Due to limited literature on the subject of study, the closely related literature which had sound meaningful relation to the study was also considered and is appropriately presented in this chapter under the following sub-heads pertaining to the specific objectives set forth.

2.1. Psychological impact

2.2. Socio-economic impact

2.3. Structural changes and

2.4. Social problems

2.1. PSYCHOLOGICAL IMPACT

Anonymous (2005-A), reported the psychological problems felt by the survivors and the community

- Hearing voices of the dead crying out for help
- Withdrawn and aloof mindset
- Sleeplessness
- Lack of interest

- Addict to alcohol due to sadness
- Panic while hearing wave sound
- Feeling of not belonging to any family (or) group (orphans)
- Fear of leaving family members alone
- Fear of future
- Lower self esteem
- Feeling of insecurity among adolescent girls due to loss of home
- Women who lost the clothes in the waves feel embarrassed to face others.

Psychological problems felt by the women group of the society are

Death of husband resulted in isolation of the widows by the husband's family

- Forcing the widow for remarriage
- Premature delivery due to panic
- Decrease in appetite
- Ill treatment by in-laws
- Fear about the future
- Feeling of vacuum and emptiness
- Restless and not able to sit in one place.

Psychological problems felt by the children's are

- Fear of water and sea
- Fear of separation from parents
- Wanting to move over to a place away from the sea

- Crying without any reason
- Over sensitive to loud noises
- Feel scared when the sky looks cloudy
- Longing for parental love and affection (those who have lost their parents).
- Children in Anganwadis now play games, where in one child acts like dead and the other children trying to shift the dead body.

Haroon (2005), found that 40 per cent of the children were with post-traumatic stress and the prevalence of mild and moderate common mental disorders in the population was 10%, severe mental health problems such as psychosis (or) severe depression had felt with 2-3% of the population.

Anonymous (2006), reported that among survivors of the Tsunami in Southern Thailand, symptoms of anxiety and depression was more than post- traumatic stress disorder (PTSD) symptoms.

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.

2.2. SOCIO-ECONOMIC IMPACT

Anonymous (2005-A), the economic problems felt by the survivors and the community are

- Loss of house
- Damage and loss of house hold articles
- Agricultural land was affected
- Fishing occupation was affected
- Loss of cattle and poultry
- Small industries along seaside were affected
- Loss of property, documents and jewelry.
- Import and export of fish and related goods were affected.
- Scarcity of essential commodity
- School children lost educational aides and certificates
- Anganwadi building and infrastructure was affected.

Some of the economic problems felt by the women group are.

- Death of husband left nobody to spend for the family
- Loss of household property
- Loss of job for the husband
- No savings and the irresponsible spending by the men resulted in no money on hand
- Inabilty to fulfill the basic needs of the children and the family due to lack of money.

Anonymous (2005-B) stated that total loss of 28,453.24 million baht loss due to Tsunami in Thailand. The value of capital loss was 8.5 million baht in agriculture,

1,757.5 million baht in fishery, 17.6 million baht in livestock, 12,852.6 million baht in enterprises, 1,060.7 million baht in infrastructure, 361.5 million baht in damaged house (whole), 60.5 million baht in damaged house (partial), 12,222.6 million baht is income loss and 11.74 million baht in cost of injury.

Anonymous (2005-C) reported that the estimated reduction of income from tourism has measured 40,000 million baht (or) about 0.6 per cent of GDP.

Anonymous (2005-D) revealed that Tsunami affected 324 hotels, 345 restaurants and 364 shops and as many as 4,306 small stalls selling miscellaneous items. The total value of destruction to private enterprises totaled to 12,852 million baht.

Anonymous (2005-E) In Tamil Nadu the damage caused due to Tsunami with respect to erosion and inundation was around 449 crores, the value of damage caused to panchayat union roads, water supply and street light, panchayat offices, noon meal centres, panchayat school buildings were around 255.61 crores, damage caused to highway, roads and bridges were around 380.64 crores, apart from this, the value of damage caused to mechanized boats, country boats, engines, nets were approximately around 1054.06 crores.

Chamhuri et al. (2005), as a result of Tsunami, a total of more than 8,000 people were either made homeless (or) had their livelihoods disrupted. Damages included loss of income, destruction to fish cages, fishing vessels and gear, as well as other assets. The

property lost (Houses) and damaged in Kola Kuala Muda was nearly RM (Ringgit Malaysia - The Malaysian national currency) 4.5 million and damages of luxury boats were estimated to be about RM 6 million.

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 Sri Lanka.

2.3. STRUCTURAL CHANGES

The 'Structure' of anything consists of the relatively strong interrelationship among its parts. Moreover, the term "Part" itself implies a certain degree of stability. Since a social system is composed of interrelated acts of people, its structure must be sought in some degree of regularity or recurrence in these acts.

The term 'structure' during the sixteenth century was used mainly in anatomical studies, to refer to the inter-relationships between the component parts of anything.

Ginsberg (1947) considered that social structure is concerned with the principal forms of social organisation - type of groups, associations and institutions and the complex of these which constitute society. In the narrow sense of the term, social structure is a system of differentiated roles, the types of which it is composed how they are distributed within the social system and how they are integrated with each other.

According to **Radcliffe and Brown (1952)**, social structure is referred to as some sort of ordered arrangement of parts or components. The components or units of social structure are persons and a person is considered not as an organism but as occupying a position in a social structure. Thus, the concept of social structure includes not only persons as occupying positions in a network of social relations, but also the institutions, and interests and values which guide the people.

Mukherjee (1957) presented the views that the social structure of rural society and the changes taking place in it cannot be studied without examining its economic structure. According to him, it had specific functions to perform in that structure, but because of the changes in the economic structure, it had lost its utility.

To **Nadel (1957)**, structure is indicated as an ordered arrangement of parts, which can be treated as transposable being relatively invariant, while the parts themselves were variable, and the structure of society could be arrived at through abstracting from concrete population and its behaviour the pattern or network of relationships obtaining between actors in their capacity of playing roles, relative to one another.

In the opinion of **Rao (1957)** the association of occupation with caste and hereditary matrilineal descent, readiness to pool family labour and caste as a unit of economic structure constituted the traditional order. Technical knowledge and reformatory movements had led to a change in the occupation today which has resulted in the changes in 'Tarwad'

(Mongamy taking the place of polyandry and hypergamy), decrease of religious activity and ancestor worship and change in leisure time activity of the individuals.

Marx (1959) was the first to elaborate the idea of social structure in his own words: "the sum total of these relations of production constitutes the economic structure of society, the real basis on which rise legal and political super structures and to which correspond definite forms of social consciousness".

For **Mannheims (1960)**, social structure is the web of interacting social forces, from which have arisen the various modes of observing and thinking.

For **Maclver and Page (1962)**, various mode of grouping together comprise the complex pattern of social structure. In the analysis of social structure, the role of diverse attitudes and interest of social beings was revealed.

Bottomore (1964) examined various definitions of social structure, and referred the most useful definition was that which regarded social structure as the complex of major institutions and groups in a society. According to him, economic, political, family and kinship, public opinion, religion and mortality, all were elements of social structure.

Johnson (1966) stated that the structure of a social system includes the following.

- 1) Sub groups of various types, inter connected by related norms.

- 2) Roles of various types, within the larger system and within sub groups. Each role system is also connected with others, of course through related norms.
- 3) Regulative norms governing sub-groups and roles.
- 4) Cultural values and anyone of these elements - a type of sub groups, a role, a social norm or a value - may be called a "partial structure". The social structure is the standard by which we define social deviation. Every social system must solve the four functional problems pattern maintenance and tension management, adaptation, goal attainment and integration.

He further stated that when a social structure solve problems, that action in conformity with a social norm or value makes some contribution towards meeting the "need" of the system. When conformity to any partial structure makes such a contribution, that structure is said to have a "function" for the system. Function is to be distinguished from purpose which is subjective, but a function in an objective consequence of action. A partial structure may have indirect function and dysfunctions. A functional or dysfunctional structure may be called a "mechanism".

Cameron *et al.* (1972) stated that one of the main dimensions of social structure was industrialization and the extent of secondary economic activity, or conversely the extent of organism.

Chitambar (1973) defined social structure is the systematic arrangement of characteristics of a society, the smaller parts arranged to form a larger discernible unit. A Society's structure is composed of such parts as groups, institutions (Government and

School) neighbourhood, communities, organisations and collective. The kind and number of parts are important in structural analysis; the relations among component parts are also significant. He defined function as an aspect of the relationship between components. It involves the service provided by one component to another within the total structure. According to him, change means some aspect of function or structure, differs at later times from what it was at earlier times. Change involves the processes of disorganisation, organisation or reorganisation. When one component changes, it may no longer fit with other parts and changes or modification of other parts and reorganisation of the whole structure may result.

Jammu (1974) considered the village as a 'whole' structure, comprising sub-structures which are various types of groups of people engaged in different activities, the roles of which have been institutionally defined. According to him, it is a study of institutions like economy, caste, religion, family and marriage and the traditional panchayat etc., as have automatically evolved in the village, while others like school, legal panchayat, co-operatives etc., are those which are being incorporated into the village structure.

Rastogi *et al.* (1985) in his computer simulation model of the Indian Rural System, stated that rural social structure in the model consisted of seven socio-economic strata ; large, medium, semi medium, small and marginal farmers, landless labourers and rural non-agricultural workers. Each structure was depicted in terms of its demographic, income and production characteristics.

Considering the various definitions and meanings of social structure given by various authors the following operational definitions of social structure was framed.

Social structure for the purpose of this study means structural component like family structure physical infrastructure and social interaction which normally exist in the society and which are considered as essential for a society(rural or urban) irrespective of origin.

Family Structure

In present enquiry the family structure attempts to study the size of family (small or big), type of family (nuclear or joint) and type of head the family has (male headed or female headed).

Physical Infrastructure

Physical infrastructure in the present study focuses on the existing physical facilities/ physical capital in a given society such as road, transport, communication, sanitation, school buildings, drinking water, community hall, electricity and street lights which are commonly seen in any society for public utility purpose and which gives physical structure to the society.

Social Interaction

Sutherland and lippncott (1961) defined social interaction as the "dynamic interplay of forces in which contact between persons and groups results in a modification of the attitudes and behaviour of the participants.

If society is considered a playing field, society members are players, norms are the rules of the game, and roles the position of each player. All this together comprise the framework (or) structure of the society. When the game displayed within this framework, it constitutes social interaction the dynamic element of society. The aspects of social interaction are social contact, communication, social structure and forms of interaction (**Chitambar 1997**).

Thus social interaction paves way for the formation of social structure. The present study focuses on the forms of such social interaction process as given by **Chitambar (1997)** in his book entitled "Introductory rural sociology", and the forms of social interaction process are as follows

- Co-operation** : Two (or) more individuals (or) groups work or act together jointly in pursuit of a common objective.
- Competition** : Process of seeking to monopolize a reward by surpassing all rivals (**Horton, 1964**)
- Conflict** : Process of seeking to monopolize a reward by eliminating (or) weakening the competitors - **Horton, 1964**
- Accommodation** : Process of developing temporary working agreements between conflicting individuals or groups - **Horton, 1964**

Assimilation : It is the process of mutual cultural diffusion through which persons and groups become culturally alike - **Horton, 1964**

Anonymous (2005-B), revealed that damage and losses to infrastructure totalled 8.2 trillion baht and were dominated by the damage to transportation (61% of total impact) and irrigation, flood control and coastal protection (25%) with 7.7 per cent in energy, 3.4 per cent in water and sanitation and 2.5 per cent in communications.

Anonymous (2005-D), reported that waves have damaged 83 harbors, 17 bridges, 11 wooden bridges, 77 roads, 6 dams, 32 electricity lines, 15 pipe water systems, and these damages to physical capital totaled to 1,028 million baht in Thailand.

Chamburi et al. (2005) reported that the value of damage caused by Tsunami to the infrastructure build by department of irrigation and drainage was RM 0.86 million and it was RM 0.90 million for public works department, apart from this RM 0.35 million was due to damage caused to Mosques. RM 0.45 million to rural clinics, RM 0.02 million to school buildings and RM 0.04 million for police stations in Malaysia.

2.4. SOCIAL PROBLEMS

Anonymous (2005), reported that there was increase in alcohol consumption among men and teenage boys, and there were large number of absenteeism and a high number of droupouts recorded in schools in affected districts since the Tsunami.

Carballo *et al.* (2005), reported that many of the young children who survived became vulnerable with no mothers to care for them. Some lost both parents and became orphans.

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 counselling for distress.

The report of **Karunee *et al.* (2006)** showed that cigarette and alcohol consumption was higher among the male participants, after the Tsunami, 17.4% of men smoked more and the percentage of alcohol consumption was 68.0% for men and 13.5% for women and after Tsunami some men (13.0%) and women (4.7%) drank more often after the Tsunami.

CHAPTER - 3

RESEARCH METHODOLOGY

The methodology used in achieving the objectives of the research study is described in this section. The survey method of research design was adopted to seek answers from the respondents. The details are given under the following headings.

- 3.1. Locale of research and description of study area.**
- 3.2. Sampling procedure and sample size**
- 3.3 Research design**
- 3.4. Operationalisation of variables and their measurement**
- 3.5 Method of data collection**
- 3.6. Statistical tools used for analysis.**

3.1. LOCALE OF RESEARCH AND DISCRPTION OF STUDY AREA

3.1.1. Selection of District

The present study pertains to the impact of Tsunami on the coastal inhabitants of Nagaipattinam district of Tamil Nadu. As Tsunami is a coastal phenomenon it was largely experienced by the coastal districts alone, thus only the Coastal districts of Tamil Nadu were affected by the Tsunami. The coastal length of Tamil Nadu is 1076.80 Kilometers comprising of 13 coastal districts (**Table-5**).

Table-5: Coastal Districts of Tamil Nadu and Their Coastal Length

Sl.No	Coastal Districts	Coastal length (in Km)
1)	Ramanathapuram	236.80
2)	Nagaipattinam	187.90
3)	Thoothukudi	163.50
4)	Kancheepuram	87.20
5)	kanyakumari	71.50
6)	Cuddalore	57.50
7)	Thirunelveli	48.90
8)	Thiruvarur	47.20
9)	Thanjavur	45.10
10)	Pudukkottai	42.80
11)	Villupuram	40.70
12)	Thiruvallur	27.90
13)	Chennai	19.00
	Total	1076.80

Source: Tamil Nadu Marine Fisher folk Census, 2004

From the **Table-5**, it is evident that Ramanathapuram district covers the major share of coastal area, but fortunately the effect of Tsunami was not experienced much in the Ramanathapuram district, thus the next larger coastal district is Nagaipattinam where the incidence of Tsunami was much higher both in death toll as well as infrastructural

damages to basic infrastructure like house, boats, road, electricity supply, school buildings, etc. As per the basic record of Tamil Nadu Government, Nagaipattinam was the most affected coastal district due to Tsunami (**Table-6**). Thus for this study *Nagaipattinam district alone was purposefully selected.*

Table-6: Effect of Tsunami in Tamil Nadu with special reference to Nagaipattinam District

Details	Tamil Nadu	Nagaipattinam	
		Number	Per cent
Human loss	8018	6065	76
Missing	1126	791	70
Cattle loss	17404	11864	73
Injured	3446	1922	56
Number of persons evacuated (In Lakhs)	4.70	1.96	42

Source: Office of the district collector, Nagaipattinam

3.1.2. Description of the study area and Tsunami affected areas in Nagaipattinam district

The Nagaipattinam district has an area of 2715.83 sq.km in total and is situated at a height of 9 meters above the mean sea level. It lies between 10.10' & 11.20' North latitude and 79.15' & 79.50' East longitude. The Nagaipattinam district lies along the Bay of Bengal coast. The major source of irrigation is from the river Cauvery. The average maximum temperature is about 32.46°C and the average minimum temperature is about

24.75°C, the major share of rainfall is from North East Monsoon (Oct. - Dec) which contributes 60% of the total rainfall, Sandy coastal alluvium soil covers 88.71% of the district.

Nagaipattinam district comprises of seven Taluks namely Nagaipattinam, Keevelur, Vedaranyam, Tarangampadi, Sirkali, Thirukkuvalai and Mayiladuthurai. The severity of Tsunami was felt in the coastal Taluks of Nagai expect for two inland Taluks viz Mayiladuthurai & Thirukkuvalai (Fig-1). In Nagaipattinam district totally 72 villages were affected by Tsunami, the list of affected villages are furnished in the **Table-7**.

Table-7: Villages and Hamlets Affected by Tsunami in Nagaipattinam District.

Name of the Tsunami Affected Taluk	Names of the Tsunami Affected Villages
Nagaipattinam	North Poiyur, Akkaraipettai , Keechankuppam , Theederkuppam , Velipalayam, Nambiyarnagar, Velipalayam Beach, Ariyanattu Street, Nalliyanthottam, Pattinacherry, Palpannaicherry, Palpannaicherry, Samanthappettai, Silladi, Pandagasalai Street, Beerodum Street.
Keevelur	Vellankani , South Poigainallur, Kallar , Veerangudikadu, Prathamaramapuram, Seruthur, Kameshwaram, Vairavankadu , Manaimedu, Vilunthamavadi
Vedaranyam	Pudupalli, Vettaikkaraniiruppu, Vanavanmadevi, Vellapallam, Naluvadapathy, Kovilpathu, Pushpavanam, Arkattuthurai Periyakuthagai , Kollitheevu, Maniyantheevu, Mottandithoppu, Agasthiyampalli , Kodiyakkadu, Kodiyakkarai.
Sirkali	Thirumulaivasal, Thoduvai, Valuthalagudi, Thianthottam, Vanagiri, Poombukar, Pudukuppam, Vellapallam, 76.Perunthottam, Nayakkarkuppam/Chavadikuppam, Kosalakuppam, Kadaikkadu, Keelamoovarkarai, Melamoovarkarai, Koolaiyar, Palaiyar, Madavamadu, Kettavaimadu, Olakattaimedu, Kottaimedu, Kodiyampalayam, Chinnurpettai
Tarangampadi	Chandrapadi, Tarangampadi, Perumlpettai, Vellakoil, Perumlpettai, Thalampettai, Kuttiyandiyur, Veppancherry, Chinnangudi, Chinnamedu

Sampled villages for the study

Source: Office of the collector, Nagaipattinam district.,

3.2. SAMPLING PROCEDURE AND SAMPLE SIZE

Out of seven Taluks of Nagaipattinam district only the five coastal taluks were affected by Tsunami, out of which three taluks were taken-up for the study. Since *the study comprises of three categories of respondents namely fishermen, farmer and traders* the selection of respondents were restricted to the respective Taluks having larger proportion of the above mentioned respondent group, thus from the affected Taluk the most affected blocks and villages were short listed based on the extent of damage (both death toll and infrastructure damage) and from the most affected first three villages the respondents were selected (@ 20 per village) using simple random sampling technique as illustrated in **Table 4**. Thus the sampling procedure adopted for the current study is *Multistage Simple Random Sampling* i.e. taking Nagaipattinam district as first stage followed by most affected Taluk as second stage followed by most affected Block as third stage (Fig. 2) and finally most affected Village as the fourth stage from which samples were drawn using Simple Random Sampling (SRS) technique @ 20 per village, as because at the time of survey clear documentation of number of death tolls were not furnished so the researcher opted the second criteria i.e. extent of damage to identify the most affected villages .Thus the total sample size taken for the entire study was one hundred and eighty ($n=180$) i.e. Sixty farmers, sixty fishermen and sixty traders . The rationale in taking sub-sample as 60 for each respondent group was due to the following reasons –

- Lack of exact frame during survey
- Manageable and better administration
- Lack of financial support

Table-8 : Sampled Taluks, Blocks and villages of Nagaipattinam district affected by Tsunami

Table-8(a) : Sampled Taluk, Block and Villages (Farmers)

Name of the Taluk	Most affected Block	Most affected villages	Sample size
Vedaranyam	Vedaranyam	Periyakuthagai	20
		Arkattuthurai	20
		Agasthiyampalli	20
		Total	60

Table-8(b) : Sampled Taluk, Block and Villages for Fishermen

Name of the Taluk	Most affected Block	Most affected villages	Sample size
Nagaipattinam	Nagai	Keechankuppam	20
		Akkaraipeattai	20
		Theederkuppam	20
		Total	60

Table-8(c) : Sampled Taluk, Block and Villages for Traders

Name of the Taluk	Most affected Block	Most affected villages	Sample size
Keevelur	Keelaiyur	Vellankani	20
		Vairavankadu	20
		kallar	20
		Total	60

3.3. RESEARCH DESIGN

The design of research is the most important and crucial aspect of research methodology. In a broad sense, research design is the entire process of planning and carrying out the research, to put it in **Kerlinger's (1978)** words. "Research design is the plan, structure and strategy of investigation so as to obtain answers to research questions and to control variance".

Any sudden disturbance caused by nature on its ecological entities takes its own time to settle back to normal but with slight change of already existed form, such sudden disturbances like Tsunami, forest fire, flood etc are generally unexpected, thus only the effect alone can be studied and no artificial situation can induced to study the effect, in such cases the post effect of that particular incidence are studied using Ex-post facto methodology to arrive at a conclusion.

Keeping the above strategy in mind the researcher in consultation with various experts of the field opted to take *ex-post facto design* for the present study. Since the study is an ex-post facto method, the respondents were asked to respond to the items in the interview schedule in terms of perception felt before and after the incidence of Tsunami and the effect of the incidence(Tsunami) was measured by administering percentage analysis and student t-test wherever necessary.

3.4. 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 operationalised meaning and their measuring procedure are discussed below under various sub-heads pertaining to the specific objectives of the study.

OBJECTIVE-1: MEASUREMENT OF PSYCHOLOGICAL IMPACT

Any sudden disturbance in the nature directly (or) indirectly affects its ecological entities irrespective of origin may be human beings (or) animals (or) plants. In general we the human beings dominate the ecological entities due to the virtue of our mental stability and power of thinking cum reasoning, thus when the predominant part of ecology is affected mentally, the natural balance among & within the ecological entity gets collapsed for example the outbreak of social problems as a result of mental instability in terms of abnormality (or) social deviance, keeping this in view the researcher in discussion with various experts in the field of psychology identified the tool to study the psychological disturbance/impact of Tsunami on coastal inhabitants. As per the discussion with the experts Beck's depression inventory was suggested and the same was used for this study.

Beck's depression inventory

This inventory was a outcome of the efforts taken by Beck, ward, Mendelson and Erbaugh during 1961. The Beck's depression inventory is a self-report measure used to

asses the behavioral manifestations of depression. The inventory comprises of 21 categories of symptoms and attitudes (so called items). Each category describes specific behavioral manifestations of depression and consists of a graded series of 4 to 5 self evaluation statements. Each component has statements with different weightage points as given below and the respondents are instructed to choose any one of the response for each item and the total is arrived at by summing –up the individual weight age for all the 21 items.

Beck's depression inventory

Sl.No.	Statements	Weightage
1.Mood / Sadness		
(a)	I do not feel sad	0
(b)	I feel blue (or) sad	1
(c)	I am blue (or) sad all the time and I can't snap out of it	2
(d)	I am so sad (or) unhappy that it is quite painful	2
(e)	I am so sad (or) unhappy that I can't stand it	3
2. Pessimism		
(a)	I am not particularly pessimistic (or) discouraged about the future	0
(b)	I feel discouraged about the future	1
(c)	I feel I have nothing to look forward to	2
(d)	I feel that I won't ever get over my troubles	2
(e)	I feel that the future is hopeless and that things cannot improve	3

3. Sense of failure		
(a)	I do not feel like a failure	0
(b)	I feel I have failed more than the average person	1
(c)	I feel I have accomplished very little that is worthwhile (or) that means anything	2
(d)	As I look back on my life all I can see is a lot of failures	2
(e)	I feel I am a complete failure as a person (Parent, husband, wife)	3
4. Dissatisfaction		
(a)	I am not particularly dissatisfied	0
(b)	I feel bored most of the time	1
(c)	I don't enjoy things the way I used to	1
(d)	I don't get satisfaction out of anything any more	2
(e)	I am dissatisfied with everything	3
5. Guilty		
(a)	I don't feel particularly guilty	0
(b)	I feel bad (or) unworthy a good part of the time	1
(c)	I feel quite guilty	2
(d)	I feel bad (or) unworthy practically all the time now	2
(e)	I feel as though I am very bad (or) worthless	3
6. Sense of punishment		
(a)	I don't feel I am being punished	0
(b)	I have a feeling that something bad may happen to me	2

(c)	I feel I am being punished (or) will be punished	3
(d)	I feel I deserve to be punished	3
(e)	I want to be punished	3
7. Self hate		
(a)	I don't feel disappointed in myself	0
(b)	I am disappointed in myself	1
(c)	I don't like myself	1
(d)	I am disgusted with myself	2
(e)	I hate myself	3
8. Self accusations		
(a)	I don't feel I am any worse than anybody else	0
(b)	I am very critical of myself for my weakness (or) mistakes	1
(c)	I blame myself for everything that goes wrong	2
(d)	I feel many bad faults	3
9. Self punitive wishes / Suicidal ideas		
(a)	I do not have any thoughts of harming myself	0
(b)	I have thoughts of harming myself but I would not carry them out	1
(c)	I feel I would be better off dead	2
(e)	I feel my family would be better off if I were dead	2
(d)	I have definite plans about committing suicide	3
(f)	I would kill myself if I could	3

10. Crying spells		
(a)	I don't cry any more than usual	0
(b)	I cry more now than I used to	1
(c)	I cry all the time now. I can't stop it	2
(d)	I used to be able to cry but now I can not cry at all even though I want to	2
11. Irritability		
(a)	I am no more irritated now than I ever	0
(b)	I get annoyed (or) irritated more easily than I used to	1
(c)	I feel irritated all the time	2
(d)	I don't get irritated at all at the things that used to irritate one	3
12. Social withdrawal		
(a)	I have not lost interest in the other people	0
(b)	I am less interested on other people now than I used to be	1
(c)	I have lost most of my interest in other people and have little feeling for them	2
(d)	I have lost my interest in other people and do not care about them at all.	3
13. Indecisiveness		
(a)	I make decisions about as well as ever	0
(b)	I am less sure of myself now and try to put-off making decisions	1
(c)	I can not make decision any more without help	2
(d)	I can make any decision at all any more	3

14. Body image		
(a)	I do not feel I look any worse than I used to	0
(b)	I am worried that I am looking old (or) unattractive	1
(c)	I feel that there are permanent changes in my appearance and they make me look unattractive	2
(d)	I feel that I am ugly (or) repulsive looking	3
15. Work inhibition		
(a)	I can work about as well as before	0
(b)	I take extra effort to get started at doing something	1
(c)	I do not work as well as I used to	1
(d)	I have to push myself very hard to do anything	1
(e)	I can not do any work at all	2
16. Sleep disturbance / Insomnia		
(a)	I can sleep as well as usual	0
(b)	I wake-up more tired in the morning than I used to	1
(c)	I wake up 1-2 hours earlier than usual and find it hard to get back to sleep	2
(d)	I wake up early every day and can not get more than 5 hours' sleep	3
17. Fatigability		
(a)	I do not get any more tired than usual	0
(b)	I get tired more easily than I used to	1
(c)	I get tired from doing anything	2
(d)	I get too tired to do anything	3

18. Loss of appetite / Anorexia		
(a)	My appetite is no worse than usual	0
(b)	My appetite is not as good as it used to be	3
(c)	My appetite is much worse now	4
(d)	I have no appetite at all any more	5
19. Weight loss		
(a)	I have not loss much weight, if any lately	0
(b)	I have lost more than 5 pounds	1
(c)	I have loss more than 10 pounds	2
(d)	I have lost more than 15 pounds	3
20. Somatic pre-occupation		
(a)	I no more concentrate about my health than usual	0
(b)	I am concerned about aches and pains or upset stomach (or) constipation (or) other unpleasant feelings in my body	1
(c)	I am so concerned with how I feel (or) what I feel that it's hard to think of much else	2
(d)	I am completely absorbed in what I feel	3
21. Loss of libido		
(a)	I have not noticed any recent change in my interest in sex	0
(b)	I am less interested in sex than I used to be	1
(c)	I am much less interest in sex now	2
(d)	I have lost interest in sex completely	3

The maximum score would be 63 and minimum would be zero, thus the respondents were classified into four major types as below based on the total score obtained on this scale.

Beck's depression score category

Sl.No.	Depression Category	Scores range
1.	Low	0-16
2.	Medium	16.1-32
3.	Moderate	32.1-48
4.	Severe	48.1-63

OBJECTIVE-2: MEASUREMENT OF STRUCTURAL CHANGES

The structure refers to the patterned arrangement of the units in a system, which gives stability and regularity to the individual's behavior in a system. The structural indicators will help to predict behavior with some degree of accuracy. In this study the Social structure was measured using three major components of the society namely **family, physical infrastructure and social interaction**. The measuring procedure adopted for individual components are discussed below under respective sub-heads.

COMPONENT – 1: FAMILY

Family is the basic and primary unit irrespective of any society (rural/urban), thus the structural (or) functional changes in a family is held responsible for the changes in the society as whole in long run. In this study to arrive at the changes in family structure the

researcher has opted to study four basic and foremost sub-components of family namely

i) Type of family and ii) Head of family.

Nature of family referred to type and size of family. Type of family referred to the family orientation, whether it was a nuclear family or a joint family. Head of the family was operationalised as the type of head the family had (i.e.) whether it was male headed family (or) female headed family, the scores were subjected to percentage analysis.

Nature of family		Score
a) Type of family		
i)	i) Nuclear	1
ii)	ii) Joint	2
b)Head of family		
i)	Male Headed	2
ii)	Female Headed	1

COMPONENT – 2: PHYSICAL INFRASTRUCTURE / PHYSICAL CAPITAL

In any society the basic infrastructure like road, transport, communication, drinking water, street-light, schools, electricity, community hall, sanitation, public utilities etc frames the physical outlay in and around the people settled over their, whenever there is change (or) disturbance in these infrastructures, automatically the physical structure of the society gets collapsed and takes time to regain. In this study some of the foremost important infrastructures mentioned above were studied to know the level of physical structural change happened due to Tsunami on the coastal society. The

scoring was assigned based on the extent of damage as perceived by the local inhabitants of the study area. The scoring procedure adopted for the study is as follows.

Sl.No.	Degree of damage perceived	Score
1.	Very badly affected	5
2.	Badly affected	4
3.	Moderately affected	3
4.	Less affected	2
5.	Least affected	1

Thus a five point continuum was prepared, in which the maximum score was 5 for very badly and the minimum score was 1 for least affected damage. The scores were subjected to percentage analysis.

COMPONENT – 3: SOCIAL INTERACTION

“Social interaction is the dynamic interplay of forces in which contact between persons and groups results in a modification of the attitudes and behavior of the participants” (Sutherland, 1961). In this study the major social interactions process like competition, cooperation, conflict, accommodation, assimilation and acculturation were studied to know the level of human interface. The interaction between and among the local inhabitants also reflects the social structure in term of social relationship. Thus for the study of social interaction among the people a five point continuum scale was developed as follows and the scores were subjected to percentage analysis.

Sl.No.	Perceived change in social interaction	Score
1.	Most	5
2.	More	4
3.	Moderate	3
4.	Less	2
5.	Least	1

OBJECTIVE-3:MEASUREMENT OF SOCIO-ECONOMIC STATUS

Measuring the socio-economic status would indicate the position of an individual and his/her family in the society. In this study fourteen parameters were taken to study the overall socio-economic status, they were 1. Type of house, 2. Type of Kitchenware, 3. Material possession, 4. Source of lighting, 5. Number of rooms, 6. Kitchen type, 7. Fuel used 8. Toilet facility, 9. Source of drinking water, 10. Purifying water, 11. Health care, 12. House possession, 13. Agricultural land holding and 14. Livestock possession. These parameters were drawn from the index developed by National Family Health survey questionnaire, In general this index was termed as standard of living index (SLI). The same index was used for this study with slight modification suiting to the study area. The respondents were classified into low, medium and high using cumulative frequency based on their individual total scores. The respondents were asked to give their response and how they felt on their socio-economic condition before and after the incidence of Tsunami. The scoring procedure adopted and followed in the study is given below. The

impact of Tsunami on the socio-economic condition of the coastal inhabitants was derived by comparing the before-after situation with the help of statistical interpretation using student t-test.

Socio-economic scale

Sl.No.	Category	Score
1.	House possession (Own house) – Yes/No	2/1
2.	Type of house	
	a. Pucca	3
	b. Semi-pucca	2
	c. Kachha	1
3.	Number of rooms	
	a. Without any partition	1
	b. One room	2
	c. Two rooms	3
	c. Three rooms	4
	d. More than three rooms	5
4.	Separate kitchen – Yes/No	2/1
5.	Kitchenware	
	a. Clay	1
	b. Aluminium	2
	c. Cast iron	3
	d. Brass/copper	4

	e. Stainless steel	5
	f. Other (Plastic)	6
6.	Type of fuel used for cooking	
	a. Wood	1
	b. Crop residues	2
	c. Dung cakes	3
	d. Bio-gas	4
	e. Kerosene	5
	f. LPG	6
	g. Electricity	7
7.	Source of lighting	
	a. Electricity	5
	b. Kerosene	4
	c. Gas	3
	d. Oil	2
	e. Other	1
8.	Source of drinking water	
	a. Piped into residence/yard/plot	11
	b. Public tap	10
	c. Hand pump in residence/yard/plot	9
	d. Public hand pump	8
	e. Well in residence / yard / plot	7
	f. Public well	6
	g. Spring	5

	h. River / steam	4
	i. Pond / lake	3
	j. Dam	2
	k. Tanker / truck	1
9.	Purifying drinking water	
	a. No purifying adopted	1
	b. Strain by cloth	2
	c. Alum	3
	d. Water filter	4
	e. Boiling	5
	f. Electronic purifier	6
10.	Health care	
	a. Govt. hospital / PHC	5
	b. NGO / trust hospital	4
	c. Private hospital / private doctors	3
	d. Traditional healer	2
	e. Self medication	1
11.	Toilet facility	
	a. Own flush toilet	7
	b. Shared flush toilet	6
	c. Public flush toilet	5
	d. Own pit toilet/latrine	4
	e. Shared pit toilet/latrine	3
	f. Public pit toilet/latrine	2

	g. No toilet facility/bush/field	1
12.	Material possession – Yes / No	2/1
13.	Agricultural land - Yes / No	2/1
14.	Livestock possession – Yes / No	2/1

OBJECTIVE-4:MEASUREMENT OF SOCIAL PROBLEM/DISTURBANCES

Social problems may be classified into three main categories based on the nature and type, they are physical, ameliorative and moral. The present study focuses on the first type/nature of social problem ie physical, wherein the physical calamity itself acts as agent to create a platform /situation for the outbreak of social problems e.g. earthquakes, floods, droughts etc.

In this study a set of fourteen problems/ disturbances were opted to study. They were Alcoholism, Smoking, Crime, Drug Addiction, Unemployment, Sexual Harassment/Rape, Prostitution, Poverty, Suicide, Orphans, Class Discrimination, School Drop-Outs and Dependency. The individuals were asked to respond to the items (type of problem) as they perceived before and after the incidence of Tsunami. The degree of outbreak of social problems after the natural disaster (Tsunami) was obtained using a five point continuum. Here the respondents were asked to exhibit the perceived degree of social problem before and after the Tsunami incidence, In order to have a clear cut interpretation the scores obtained for an individual item (problem) were subjected for percentage analysis to study the exact level of social problem felt before and after the occurrence of Tsunami.

Sl.No.	Perceived degree	Score
1.	Most	5
2.	More	4
3.	Moderate	3
4.	Less	2
5.	Least	1

3.5. METHOD OF DATA COLLECTION

Taking into consideration of the scope and objectives of the study a comprehensive interview schedule was prepared. The interview schedule comprises of four parts viz, Part one dealing with the measurement of psychological impact , part two dealing with measurement of changes with respect to social structure & function , Part three dealing with the measurement of socio-economic impact and Part four dealing with the measurement of outbreak of social problems on the coastal societies as a result of Tsunami. The prepared **interview schedule** was pre-tested and the corrections were made and were used for the study (see *Annexure-III* for details). Using the pre-tested interview schedule individual sample respondents were interviewed personally during the field survey, apart from direct face to face interview few videos; photographs were taken to substantiate the occurrence. The secondary data were taken with the help of on line websites of both government and non- government organization (NGO), government records and other related publications. In order to arrive at a conclusion the collected data were further coded and tabulated for statistical analysis.

3.6. 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.

3.6.1. 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.

3.6.2. Cumulative Frequency

This method was suggested by **Rao (1987)** to categories 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. The frequency value was multiplied by 1/3 and 2/3 to find out the two boundaries namely L1 & L2 respectively. The exact values of these boundaries were calculated by using the following formula

$$Li = K + \frac{Li-C}{f}$$

Where,

Li = Boundary value namely L1 & L2

K = Median between the lower limit of the class in which L_i occurs and the upper limit of the previous class.

C = Cumulative square root of frequency up to the classes preceding the class in which L_i lies.

n = Class interval

f = Square root of the frequency in the class in which the median lies.

The categories were formed as detailed below

- 1) Below L_1 value = Low
- 2) Between L_1 & L_2 value = Medium
- 3) Above L_2 value = High

3.6.3. Independent Student t- Test

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

CHAPTER - 4

FINDINGS AND DISCUSSION

“The scientific value of a fact depends on its connection with other facts, and in this connection the most common place facts are often preciously the most valuable ones, with a fact that strikes the imagination or stirs the moral feeling may be either isolated or exceptional or so simple as to involve hardly any problem”

The present chapter highlights the findings of the study in accordance with the objectives set forth along with suitable discussion under the following sections.

Section A: The section deals with the psychological impact among the respondents as a result of Tsunami.

Section B: This section deals with the socio-economic changes among the respondents as a result of Tsunami.

Section C: This section deals with the structural changes felt before and after the Tsunami in the study area.

Section D: This section deals with the social problems raised as a result of Tsunami in the coastal society.

SECTION – A

4.1. PSYCHOLOGICAL IMPACT

As discussed in the previous chapter the psychological aspect measured in this study is “**Depression**” which was measured using 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 results are presented in **Tables-9, 10 &11** below. (Fig-3)

Table-9: Psychological Impact on Farmers

(n = 60)

Sl.No.	Depression Category	Respondent Category	
		Farmers	
		Number	Per cent
1.	Low	8	13.33
2.	Medium	48	80.00
3.	Moderate	4	6.67
4.	Severe	0	0.00
	Total	60	100.00

The result in **Table-9** reveals that in Farmer's category about 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.

Table-10: Psychological Impact among Fishermen due to Tsunami (n=60)

Sl.No.	Depression Category	Respondent Category	
		Fisherman	
		Number	Per cent
1.	Low	0	0.00
2.	Medium	26	43.33
3.	Moderate	23	38.33
4.	Severe	11	18.33
	Total	60	100.00

From the **Table-10** it is clear that in the fishermen category nearly equal per cent of the respondents had medium to moderate level of depression i.e. 43.33 and 38.33 per cent respectively followed by 11.00 per cent of the respondents in severe depression category, the possible reason for such result is that they were situated near the sea shore which resulted in human loss in their family as well as damage to the occupational related infrastructure like boat, fishing nets etc, thus they were more depressed than others.

Table-11: Psychological Impact among Traders due to Tsunami (n=60)

Sl.No.	Depression Category	Respondent Category	
		Traders	
		Number	Per cent
1.	Low	6	26.67
2.	Medium	43	71.67
3.	Moderate	9	15.00
4.	Severe	2	3.33
	Total	60	100.00

The **Table-11** shows that in Traders category almost three fourth of the respondents (71.67%) had medium level of depression followed 26.67 per cent were in low depression category followed by 15.00 per cent in moderate depression category and only 3.33 per cent of the respondents had severe depression, the possible reason is that traders had their shops very close to the sea-shore along the beach hence they lost their shops along with goods and most of their shops were completely washed away by the huge waves hence they were psychologically depressed and disturbed.

From the above **Table 9, 10 and 11** it is evident that sever depression was felt among the fishermen category followed by traders and farmers. The psychological impact (Depression) as a result of Tsunami was mainly due loss of human lives in one (or) other family of the respondents and lost their occupation related infrastructures like boats, fishing nets, shops and goods, agricultural fields, crops apart from household damages.

SECTION – B

4.2. 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 studied using the Socio-Economic Scale developed by National Health Survey (NHS) with slight modification to suit the present study. The results of the study are presented in the **Tables-12, 13 and 14** below. (**Fig. 4, 5 and 6**)

Table-12: Socio-Economic Status of Farmers Before and After Tsunami

Socio-Economic Status	Before Tsunami (n = 60)		After Tsunami (n = 60)	
	Number	Percentage	Number	Percentage
Low	19	31.67	17	28.33
Medium	32	53.33	35	58.33
High	9	15.00	8	13.33
Total	60	100.00	60	100.00
Mean	32.83		32.77	
Difference in mean	0.06			
't' value	1.47 NS			

NS- Not Significant

The result in the **Table-12** highlights the socio-economic condition of the farmers who were affected by the incidence of Tsunami. It is evident from the **Table-12** that 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.

Table-13: Socio-Economic status of Fishermen Before and After Tsunami

Socio-economic status	Before Tsunami (n = 60)		After Tsunami (n = 60)	
	Number	Percentage	Number	Percentage
Low	24	40.00	38	63.33
Medium	30	50.00	17	28.33
High	9	10.00	5	8.33
Total	60	100.00	60	100.00
Mean	31.60		30.15	
Difference in mean	1.25			
't' value	2.74*			

* Significant at 5% confidence level

The result in the **Table-13** shows that before Tsunami half of the respondents (50%) were of medium category with respect to socio-economic status on other hand after

Tsunami little more than half of the respondents were of low socio-economic category. A small portion of high socio-economic group and medium socio-economic group moved to low socio-economic state after the incidence of Tsunami as because most of their houses and household articles were washed away by the harsh Tsunami waves. Apart from the damages to household properties, the occupational related infrastructures like fishing nets and boats were also damaged. This huge loss over very short span due to Tsunami might have resulted in slash of economic condition of the fishermen. This might have been the possible reason for such decline in socio-economic status of the fishermen after Tsunami.

The mean value of Socio-Economic Status and the difference in mean was slightly higher than that of the farmers category and the 't' value showed significance at 5% level of probability which underlay that their was significant change in the socio-economic status before and after the incidence of Tsunami among fishermen category.

Table-14: Socio-Economic Status of Traders Before and After Tsunami

Socio-economic status	Before Tsunami (n = 60)		After Tsunami (n = 60)	
	Number	Percentage	Number	Percentage
Low	10	16.67	16	26.66
Medium	39	65.00	36	60.00
High	11	18.33	8	13.33
Total	60	100.00	60	100.00
Mean	32.77		29.78	
Difference in mean	2.99			
't' value	2.65*			

* Significant at 5% confidence level.

The **Table-14** reveals that little more than half of the traders (65.00% and 60.00%) both before and after the incidence of were of medium socio-economic category Tsunami respectively, when compared to before Tsunami situation, the number of respondents increased slightly in low socio-economic category after Tsunami, this shows that there was slight difference in the socio-economic status before and after the Tsunami incidence. The slight increase of 9.99 per cent in low socio-economic category after Tsunami might be due to the reason that the shift of medium socio-economic to the low socio-economic category as a result of loss and damage due to Tsunami to their house, property and occupational related infrastructures.

The mean for socio-economic status before Tsunami was higher than that of the mean of socio-economic status of after Tsunami and the difference in mean was considerably high, moreover the 't' value also showed significance at 5% level of confidence, this confirmed that there was change in socio-economic status before and after Tsunami. Since Tsunami is a disastrous phenomenon, the change in socio-economic status would naturally be in the negative side i.e. the probability of decline in socio-economic status will be more due to loss of property, household articles and occupational related infrastructure. This might be the possible reason for such outcome.

In general the fishermen and traders were affected more after Tsunami with respect to socio-economic status, whereas the farmers were not affected much as their houses were far from the shore except for agricultural lands.

SECTION – C

4.3. 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. The results pertaining to this objective is present in the **Table 15, 16 and 17** as given below.

Table-15: Family structure before and after Tsunami (*n = 180)

Sl.No	Family structure	Before Tsunami (n = 180)		After Tsunami (n = 180)	
		No.	%	No.	%
(a)Type of family					
(i)	Nuclear	142	78.88	169	93.88
(ii)	Joint	38	21.11	11	6.11
(b)Head of the family					
(i)	Male headed	176	97.78	172	95.56
(ii)	Female headed	4	2.22	8	4.44

* Multiple responses

4.3.1. Family structure

The results pertaining to the variable family structure are presented in the **Table-15**. 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 in the **Table-15** 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, where as 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 in **Table-15** 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 among the families of the respondent's taken for study.

4.3.2. 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 pertaining to this are presented in the **Table-16** and the results are discussed under the following sub-heads.

4.3.2.1. Road

The result in the **Table-16** reveals that before Tsunami about 62.22 per cent of the sampled respondents perceived that there 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 (**Fig. 8 and 9**).

4.3.2.2. Transport

From the **Table-16** 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 (**Fig 10 and 11**).

4.3.2.3. Communication

The results in the **Table-16** shows that 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 (**Fig. 12 and 13**).

4.3.2.4. Drinking water

From the Table-16, it is evident that 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 these 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 Salinisation of ground water (**Fig. 14 and 15**).

4.3.2.5. Street Lights

The result in **Table-12** shows that 62.22% of the respondents perceived that their 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 (**Fig 16 and 17**).

4.3.2.6. Electricity

From the **Table-12** we could infer that three-fourth (75.55%) of the respondents felt that their 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 (**Fig 18 and 19**).

4.3.2.7. 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 (**Fig 20 and 21**).

4.3.2.8. School Buildings

The result in the **Table-16** shows that 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 (**Fig. 22 and 23**).

4.3.2.9. Community Hall

The **Table-16** reveals that 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 over crowding which might have resulted in damage to the community hall (**Fig 24 and 25**).

On an overall perspective the results in the **Table-16** 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.

4.3.3. 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 to this are given in the **Table-17** and subsequently the results of each social interaction process are discussed as given below under respective sub-heads.

4.3.3.1. Co-operation

From the **Table-17** it is evident that 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 (**Fig 26 and 27**).

4.3.3.2. Competition

The results in the **Table-17** shows that little more than half of the respondents (62.22%) felt that their 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 (**Fig 28 and 29**).

4.3.3.3. Conflict

From the **Table-17** it 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 (**Fig. 30 and 31**).

4.3.3.4. Accommodation

The **Table-17** reveals that little more than half of the respondents (56.11%) perceived that their was *moderate level of accommodation* among their society members before Tsunami but after Tsunami 67.22 per cent of respondents felt that their 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 (**Fig. 32 and 33**).

4.3.3.5. Assimilation

The results in **Table-17** shows that major share of the respondents both before and after Tsunami (82.22% and 69.44%) perceived that their was only *least level of assimilation process* in their society. The probable reason is that in Nagaipattinam district almost the three major religion people *viz.*, Hindus, Christians and Muslims were widely spread and over time there was no major change but the slight difference in response shows that after Tsunami their was meagre proportion of people (which was temporary) who have shifted from one religion to other only for the purpose of getting assistance and financial support provided by the religious organisation (**Fig. 34 and 35**)

SECTION – D

4.4. 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 (**Table-18**) the results were interpreted and were discussed under different sub-heads.

4.4.1. Alcoholism

The results in **Table-18** 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)** (**Fig. 36 and 37**).

4.4.2. Smoking

From the **Table-18**, 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) (Fig. 38 and 39).**

4.4.3. Crime

It is clear from the Table-18 that great majority (93.33%) of the respondents perceived that crime was *less* in their society before Tsunami but on other hand little more than half of the respondents (62.22%) felt that crime was of *moderate level* after Tsunami, this slight increase might be due to thefts of property from houses damaged by Tsunami and from other members of the society for the livelihood (Fig. 40 and 41).

4.4.4. Drug Addiction

The results in the Table-18 reveals that cent percent of the respondent felt that their was *least level of drug addition* among their society member both before and after Tsunami (Fig.42 and 43).

4.4.5. Unemployment

The results in Table-18 shows that majority of sampled respondents (86.67%) perceived that there was only *less degree of unemployment* among their society member but after Tsunami 66.67 per cent of the sampled respondents perceived that there was *more number of unemployment* prevailing in their society, the possible reason might be

that the damages caused by the Tsunami waves to the occupational related infrastructure like boats, nets, agricultural lands, shops etc. would have led to the additional increase in the percentage of unemployment. The results are in line with findings of Nisha Arunatilake (2006) (Fig. 44 and 45).

4.4.6. Sexual Harassment / Rape

The results of the study in the Table-18 shows that majority of the sampled respondents (77.77%) perceived that there was *least degree of sexual harassment / rape* in their society both before and after Tsunami (Fig. 46 and 47).

4.4.7. Prostitution

From the Table-18 it is evident that 86.67 per cent of the sampled respondents perceived that there was *less prostitution* in the society, before Tsunami, but per Tsunami only 13.33 per cent of the respondents perceived that there was less prostitution whereas majority of the sampled respondents (86.67%) perceived that there was *moderate level of prostitution* existing in their society the possible reason is that women who became widows and the teenage girls who have become orphans and many of the stress affected females, widows would have entered into prostitution for their livelihood sustenance (Fig. 48 and 49).

4.4.8. Poverty

The results in the Table-18 reveals that little more than half of the respondents (55.55%) perceived *moderate level of poverty* before Tsunami on other hand majority of

the respondents (80.00%) perceived *more poverty* after the incidence of Tsunami, the possible reason is that the household articles were heavily damaged by the intrusion of sea water making the victims to move to poverty level without any permanent residence and household articles to sustain life immediately after Tsunami. (Fig. 50 and 51).

4.4.9. Suicide

The results in the Table-18 shows that before Tsunami cent per cent of the sampled respondent perceived that there was *least degree of suicide* attempts in their society whereas after Tsunami majority of the respondents (83.3%) perceived that there was *moderate level* of suicide attempts in their society, the slight increase in suicidal attempt might be due to Tsunami which resulted in the psychological stress, depression, and loss of occupational related, infrastructure, loss of job, deaths, occurred in their family on their relatives, lost of parents, orphans would have disturbed them mentally leading to suicidal attempts. The finding derives support of **Arusatilate (2006) See Fig. 52 and 53).**

4.4.10. Orphans

The results in the Table-18 reveals that cent percent of the respondent perceived *least number of orphans* in their society before Tsunami but whereas after Tsunami little more than three-fourth of the respondents (83.33%) perceived *more number of orphans* after Tsunami, the reason is that the incident (Tsunami) happened early morning of Sunday and most of the people were sleeping in their houses which was nearer to sea shore this resulted in loss of human lives in most of the family due to intrusion of huge waves (Fig.54 and 55).The result draws support from the findings of **carballo et al (2005)**

4.4.11. Class Discrimination

From the Table-18 it is clear that little more than half of the respondents (66.67%) perceived moderate level of class discrimination irrespective of incidence of Tsunami (i.e.) class discrimination was at same level both before and after Tsunami (Fig. 56 and 57).

4.4.12. Dependency

The Table-18 reveals that 68.00 percent of the respondents perceived *less degree of dependency* before Tsunami but on other hand little more than half of the respondents (66.67%) felt *more number of dependencies* in their society after Tsunami, as there were loss of human lives in one (or) other family which resulted in dependency among old age people, non-earning members and children, this would be the possible reason for such result (Fig.58 and 59).

CHAPTER - 5

SUMMARY AND CONCLUSION

The history of the coastal ecosystem can be divided into two regimes i.e. first being the one before 26th December 2004 and the second after that day. India was affected by Tsunami besides Indonesia, Srilanka, Thailand, Malaysia, Maldives, Myanmar, Bangladesh, Somalia, Tangania, Kenya and Yemen.

The Tsunami triggered by a massive earthquake 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.

The massively destructive Tsunami that struck across the Indian rim caused extensive loss of life and injury as well as devastation to property and community resources. The Tsunami waves struck the mainland with a height of 3 to 10 meters and penetrated 300 m to 3 km inland, affecting approximately 2,260 km of coastline with varying intensity. The largest number of villages impacted was in Tamil Nadu about 376 villages were affected by Tsunami. In Tamil Nadu, Nagaipattinam district was very badly damaged by the harsh Tsunami waves.

In order to assess the impact of Tsunami on the coastal inhabitants, the present study was undertaken in Nagaipattinam district with the following specific objectives.

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 in the coastal society.
4. To study the social problems caused by Tsunami in the coastal society.

A study was conducted with 180 respondents @ 60 farmers, 60 fishermen and 60 traders of coastal villages of Nagaipattinam district affected by Tsunami by adopting multistage simple random sampling technique. To assess the impact of Tsunami and to collect the required data a well constructed interview schedule was used for the study. The statistically analysed and salient findings of the study are as follows.

Psychological Impact of Tsunami

The psychological impact was measured in terms of depression using Beck's depression inventory. The results showed that in farmers category 80.00 per cent of the respondents had medium level of depression, in fishermen category majority of the respondents (81.66%) had medium to moderate level of depression whereas in traders category 71.67 per cent of the respondents had only medium level of depression. The level of depression was felt more by the fishermen followed by traders and farmers.

Socio-Economic Impact of Tsunami

The socio-economic status was assessed by using the parameters drawn from the index developed by National Health Survey with slight modification so as to suit the respondents of the study area. The results showed that there was no drastic change in the socio-economic status of the respondents belonging to farmers category both before and after Tsunami, whereas the socio-economic status of fishermen and traders category showed slight differences before and after Tsunami i.e. there was decline in socio-economic status for both category after the induce of Tsunami.

Structural changes caused by Tsunami

Structural change was measured in three aspects namely family structure, physical infrastructure and social interaction. The respondents were asked to respond to the items based on their perceived degree of change with respect to before and after Tsunami situation.

The results of the study showed that before Tsunami 78.88 per cent of respondents had nuclear family type, but after Tsunami great majority of the respondents (93.88%) had nuclear family type. The considerable increase in percentage in nuclear family type was due to disintegration of joint family due to the deaths in the respondents' family (or) due to displacement. On the other hand, the study result also showed that there was slight change in the type of head the family had after Tsunami.

The physical capital like road and sanitation was perceived to be damaged more and other physical infrastructure like transport, communication, drinking water, streetlights, electricity, school buildings and community hall were moderately damaged after the incidence of Tsunami.

Social Problems Before and After Tsunami

At times natural disturbance also leads to the outbreak of social problem. In the present study the perceived degree of social problem felt by the respondents before and after Tsunami was studied. The results showed that before Tsunami only few social problems like smoking, alcoholism, unemployment, prostitution, poverty and class discrimination was at moderate level and rest were less in the coastal society but after Tsunami these problems were more, in the coastal society and the dependency was most among the victims, the possible reason for such results might be due to psychological stress as a result of Tsunami would have forced the coastal inhabitants to do so very frequently in order to ventilate themselves out of sorrows.

To conclude, after Tsunami the fishermen and traders were psychologically depressed more compared to farmers and their socio-economic condition was changed to a small extent. The post-tsunamic situation showed that there was huge damage to the physical capital. The social problems caused after Tsunami were increase in alcohol consumption, smoking frequency, prostitution and dependency. The local government should be vigilant in preventing them in future during any outbreak of natural districts.

Implications and Suggestion

Based on the findings emerged from the study the following implications and suggestions were drawn.

1. The fishermen and traders were more psychologically depressed when compare to farmers, hence it is suggested that in future if their 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 inorder 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.

REFERENCES

- Anonymous, 2005 E.** Tsunami: Impact and damage, Government of India, Ministry of Home affairs, India.
- Anonymous, 2005.** Sri Lankas tsunami survivors suffer from social stigma : Report, People's Daily Online. **Dec.**
- Anonymous. 2005A.** Lest we forget, Office of the Collector, Nagaipattinam.
- Anonymous. 2005B.** Economic loss from Thai Tsunami, Department of disaster prevention and mitigation. Ministry of Interior, Thailand.
- Anonymous. 2005C.** Estimated Tourism impact of Tsunami in 2005. Bank of Thailand, Thailand.
- Anonymous. 2005D.** Economic impact of Tsunami on Thailand, Natural Resources and Environment program, Thailand Development Research Institute, Thailand.
- Anonymous. 2006.** Mental health problems among adults in Tsunami affected area. The Journal of American Medical Association. Vol. 296, No. 5.
- Bottomore, T.B. 1964.** Sociology, Mc Graw Hill Publication, New York
- Cameron, D.R., J.S. Hendricks and R.J. Hofferbert. 1972.** Urbanization, social structure and mass policies. Comparative Political Studies, 5(3): 259-290.
- Carballo, M. Hernandeg, M. Schneider, K. WelleE, 2005.** Impact of tsunami on reproductive health, Journal of social medicine, 98: 400-3.

Chamhuri Siwar, Mohal Zaki Ibrahim, Siti Haslina and Roslina Kamaruddin. 2005.

Impact of Tsunami on fishing, aquaculture and coastal communities in Malaysia,
University of Kebangsaan, Selangor, Malaysia.

Chitamber, J.B. 1973. Introductory Rural Sociology. Wiley Eastern Private Limited,
New Delhi.

Chitambar, J.B. 1997. Introductory rural sociology, New Age International, New Delhi.

Ginsberg, M. 1947. Reason and Unreason in Society, Mc Graw Hill Publication, New
York

Haroon Ashraf. 2005. Tsunami wreaks mental health havoc, Bull World Health
Organisation. Vol. 83, No. 6.

Horton, P.B. and Hunt, C.L. 1964. Sociology, McGrawHill Publications, New York.

Ibrahim Komoo and Maglan Ottman. 2006. The 26.12.04 Tsunami disaster in
Malaysia an environmental, socio-economic and community well-being impact
study. Institute for environment and development, Malaysia.

Jammu, P.N. 1974. Changing social structure in rural Punjab. Sterling publishers Pvt.
Ltd., New Delhi, pp. 2-37.

Johnson, M.H. 1966. Sociology : A systematic induction. Allied Publishers Pvt. Ltd.,
Madras, pp. 1-14.

Karunee, K. Wanbunjan, Rungwit Mas. Ngammueng and Yupa chuson of gang.
2006. Health and nutrition survey of Tsunami victims in phang-NGA province,

Thailand, Department of Tropical Nutrition and Food Science, Mahidol University, Bangkok, Thailand.

Kerlinger, F.N. 1978. Foundation of behavioural research, Holt Rinehart and Winston Inc., New York.

Maclver, R.M. and Page. 1962. Society, Mc Graw Hill Publication, New York

Mannheims, K. 1960. Ideology and Utopia, Mc Graw Hill Publication, New York

Marx, K. 1959. Articles on India, New Age International, New Delhi

Mukherjee, R.R. 1957. A pilot survey of fourteen villages in U.P. and Punjab, Bombay.

Nadel, S.F. 1957. The theory of social structure, Mc Graw Hill Publication, New York

Nisha Arunatilake, 2006. Post Tsunami Reconstruction and rehabilitation: Household views on progress and process, MG Consultants, Colombo, Srilanka.

Premachandra Athukorala and Budy P. Resosundarmo. 2005. The Indian Ocean Tsunami: Economic impact, disaster management and lessons, Division of economics, Research School of Pacific and Asian Studies, Australian National University.

Radcliffe and A.R. Brown. 1952. On social structure in structure and function in primitive society, Mc Graw Hill Publication, New York

Rao, M.S.A. 1957. Social change in Malabar, Bombay.

Rastogi, P.N., Q.A. Ahimad ena F.A. Chowdhurry. 1985. India's Rural Features :
Policyexperiments and limits to growth. Diversification Rural Economy., (1): 17-
42.

Setherland and J.B. Lippincott. 1961. Sociology. Mc Graw Hill. Book Company, New
York

Tamil Nadu Marine Fisher Folk census. 2004. Directorate of Fisheries. Chepak,
Chennai.

www.msmbc.msn.com.

www.tn.gov.in

www.tntrc.org

Table-2: Districtwise lives lost and impaired due to Tsunami 2004

S.No	District	No. of villages affected	No. of kuppams affected	Population of the district as per 2001 census	Population affected by tsunami	Population Evacuated	Human lives lost	Person injured
1.	Chennai	4	25	4343645	73000	30000	206	*9
2.	Cuddalore	8	43	2285395	99704	61054	610	259
3.	Kancheepuram	30	44	2877458	100000	60000	130	24
4.	Kenniyakumari	16	33	1676034	178650	46280	799	754
5.	Nagaipattinam	38	73	1488839	196184	196184	6065	1922
6.	Pudukottai	25	29	1459601	66350	4857	15	-
7.	Ramanathapuram	40	114	1178604	84000	8315	20	2
8.	Thanjavur	22	-	2216138	29278	4600	37	482
9.	Tiruvallur	6	38	2754756	15600	-	29	-
10.	Tiruvarur	-	-	-	-	-	29	3
11.	Tirunelveli	10	-	2723988	27948	11170	4	6
12.	Thoothikudi	23	-	1572273	110610	11625	3	-
13.	Villupuram	8	19	2960373	78240	37500	48	46
	Total	230	418	28715578	1068564	471585	7995	3960

Source: www.tn.gov.in

Table-3: Districtwise property lost and damaged due to Tsunami 2004

District	Cattle	Houses		Total	Agricultural Land (Ha)	Horticultural Land (Ha)	Catamarams		Boats	
		Partially damaged	Fully damaged				Wooden	Fiber	Vallams	Motor
Chennai	2	-	16839	16839	-	-	1493	169	-	-
Cuddalore	949	544	2328	2872	1925.48	196.51	5530	862	-	-
Kancheepuram	4	898	3702	4600	248.48	-	1994	784	19	-
Kanniyakumari	1187	3953	3379	7332	12.57	9.7	6582	-	694	-
Nagaipattinam	12821	2169	17461	19630	4657.47	456.98	6144	-	1761	-

Pudikottai	-	-	-	-	-	-	191	-	473	
Ramanathapuram	-	-	-	-	-	-	0	-	290	
Thanjavur	-	-	3	3	-	-	47	-	232	
Tiruvallur	220	-	-	-	-	-	516	570	-	
Tiruvarur	-	-	716	716	-	-	-	-	19	
Tirunelveli	899	-	-	-	-	-	1285	-	82	
Thoothukudi	-	-	630	630	-	-	644	-	600	
Villupuram	-	106	834	940	1616.34	6.63	1691	1017	-	
Total	16082	7670	45892	53562	8460.34	669.82	26117	3402	4170	

Source: www.tn.gov.in

Table-4: Value of Damages in Tamil Nadu due to Tsunami 2004

Damages	Rs. (in Crore)
Damage caused to mechanized boats, country boats, catamarans, nets, engines fishing harbours, etc.	1054.06
Damage caused by sea erosion and inundation of Nagaipattinam district	449.00
Damage caused to highways, roads and bridges	380.64
Damage caused to Panchayat Unionroads, water supply and street light arrangements, Panchayat offices, noon meal centres, paanchayat school buildings, etc	255.61
Damage of crops	76.80
Damage caused to minor ports at Cuddalore, Nagaipattinam and Colachal	74.70
Damage caused to water supply systems like infiltrationwells, open well, bore wells etc. maintained by TWAD	25.00
Damage caused to Tamil Nadu Electricity Board installations	16.93
Damage caused to government buildings maintained by P.W.D	8.50
Damage caused to beach resorts and hotels maintained by Tamil Nadu Tourism Development Corporation	4.48
Damage caused to food grains stored in the godowns of Tamil Nadu Civil Supplies Corporation at Port godowns, Nagaipattinam	2.44
Damage caused to Salt Corporation	1.50
Damage caused to Anganwadi Centres	1.41
Damage caused to ferry services run by Poompuhar Shipping Corporation at Kanniyakumari	1.04
Damage caused to protected monuments to Tamil Nadu Archaeological Department	1.00
Damage caused to godowns run by Tamil Nadu Warehousing Corporation	0.27

Source: www.tn.gov.in

Table-18: Perceived Degree of Social Problems Before and After Tsunami

(*n = 180)

Social Problems	Most				More				Moderate				Less				Least	
	Before Tsunami		After Tsunami		Before Tsunami		After Tsunami		Before Tsunami		After Tsunami		Before Tsunami		After Tsunami		Before Tsunami	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Unemployment	0	0	36	20.00	24	13.33	144	80.00	126	70.00	0	0	30	16.67	0	0	0	0
Migration	0	0	168	93.33	30	16.67	12	6.67	150	83.33	0	0	0	0	0	0	0	0
Displacement	0	0	0	0	0	0	0	0	12	6.67	112	62.22	168	93.33	68	37.78	0	0
Eviction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	180	100
Homelessness	0	0	24	13.33	0	0	120	66.67	24	12.33	36	20.00	156	86.67	0	0	0	0
Food insecurity/ malnutrition	0	0	0	0	0	0	0	0	0	0	0	0	40	22.22	40	22.22	140	77.77
Healthcare access	0	0	0	0	0	0	0	0	24	13.33	156	86.67	156	86.67	24	13.33	0	0
Disaster preparedness	0	0	6	3.33	6	3.33	144	80.00	100	55.55	30	16.67	30	16.67	0	0	44	24.44
Community support	0	0	0	0	0	0	0	0	0	0	150	83.33	0	0	30	16.67	180	100
Government response	0	0	0	0	0	0	150	83.33	0	0	30	16.67	0	0	0	0	180	100
Education disruption	0	0	0	0	22	12.22	30	16.67	120	66.67	120	66.67	38	21.10	30	16.67	0	0
Infrastructure damage	0	0	0	0	0	0	120	66.67	0	0	60	33.33	122	68	0	0	58	32

* Multiple respondents

 Before Tsunami  After Tsunami

Table-16: Perceived Degree of Physical Infrastructural Damage Felt Before and After Tsunami
 (*n = 180)

Infrastructural Category	Most affected				More affected				Moderately affected				Less affected				Least affected	
	Before Tsunami		After Tsunami		Before Tsunami		After Tsunami		Before Tsunami		After Tsunami		Before Tsunami		After Tsunami		Before Tsunami	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Buildings	0	0	11	6.11	0	0	108	60.00	27	15	29	16.11	112	62.22	20	11.11	41	22.78
Water supply	0	0	0	0	18	10	21	11.66	21	11.66	142	78.88	122	67.77	17	9.44	19	10.56
Education	0	0	20	11.11	10	5.55	8	4.44	31	17.22	122	67.77	40	22.22	16	8.88	99	55.00
Water supply	0	0	32	17.77	0	0	22	12.22	11	6.11	119	66.11	160	88.88	7	3.88	9	5.00
Buildings	0	0	0	0	2	1.11	28	15.55	19	10.55	93	51.66	47	26.11	38	21.11	112	62.22
Water supply	0	0	0	0	0	0	72	40	6	3.33	101	56.11	38	21.11	7	3.88	136	75.56
Buildings	0	0	10	5.55	2	1.11	142	78.88	66	36.66	18	10	92	51.11	10	5.55	20	11.11
Buildings	0	0	0	0	0	0	8	4.44	0	0	172	95.55	20	11.11	0	0	160	88.89
Water supply	0	0	0	0	0	0	11	6.11	0	0	91	50.55	22	12.22	49	27.22	158	87.78

* Multiple Responses

 Before Tsunami  After Tsunami

Table-17: Perceived Degree of Social Interaction Before and After Tsunami

(*n = 180)

Response	Most				More				Moderate				Less				None	
	Before Tsunami		After Tsunami		Before Tsunami		After Tsunami		Before Tsunami		After Tsunami		Before Tsunami		After Tsunami		Before Tsunami	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Very High	12	6.66	119	66.11	144	80.00	48	26.66	20	11.11	13	7.22	4	2.22	0	0	0	0
High	0	0	137	76.11	22	12.22	32	17.77	112	62.22	11	6.11	29	16.11	0	0	17	9.44
Medium	0	0	7	3.88	13	7.22	9	5.00	36	20.00	40	22.22	89	49.44	92	51.11	42	23.33
Low	16	8.88	21	11.66	31	17.22	121	67.22	101	56.11	18	10	28	15.55	1.7	0.94	4	2.22
None	0	0	0	0	0	0	0	0	11	6.11	24	13.33	21	11.66	31	17.22	148	82.22

*Multiple response

 Before Tsunami  After Tsunami

ANNEXURE - II

SL No.	Name of the District	No. of houses proposed for			No. of houses for which work started and stages				Not	
		Rural	Urban	TOTAL	Under initial stage	Under construction	Completed and yet to be handed over	Handed	Rural	U
1	Chennai	-	17364	17364		1392	156	3330		
2	Tiruvallur	692	4284	4976	-	478	461		3816	
3	Nagaipattinam	18220		18220	-	7044	4205	3907	2549	
4	Kanchipuram	4086		4086	-	1394	370	1739	583	
5	Kanniyakumari	2578		2578	-	160	315	2045	58	
6	Cuddalore	2323		2313	-			1321	0	
7	Villupuram	2881		2881	-	565	676	827	813	
8	Tirunelveli	1444		1444	-	SO	1211	153	0	
9	Thoothukudi	781		781	0	160	576	4S	0	
	Total	33005	21648	54653	0	11273	7977	14369	7819	

Source : www.tntrc.org

ANNEXURE - I

Update on the Tsunami related activities in Tamil Nadu

(As on 28.02.2007)

The Government of Tamil Nadu has so far sanctioned funds to the tune of Rs.1770 crore upto 28.02.2007 for relief and rehabilitation activities in the areas affected by tsunami with the assistance of Government of India. The details of relief on the various items of assistance are given below:-

(A) AGRICULTURE

- Rs.1,80,13,930/- as relief to the crops damaged over an area of 5211.79 hectares. This relief has benefited 11400 farmers affected due to Tsunami. An additional amount of Rs. 29,971/- has been sanctioned to Kancheepuram District out of which a sum of Rs. 85.306 lakh has been disbursed.
- Rs.1269.05 lakh for reclamation of sand cast and saline agricultural lands at the rate of Rs.15,000/- per ha. covering an extent of 8460.34 ha. affected by Tsunami. So far, a sum of Rs. 10.39 crore has been deposited in the names of 11522 farmers.
- Rs. 100.48 lakh has been sanctioned to take up the relief works in 669.82 hectares of Tsunami affected horticultural lands at the rate of Rs. 15,000/- per hectare. So far, a sum of Rs. 84.35 lakh has been deposited in the names of 2237 farmers.

(B) FISHERIES SECTOR

- Government of Tamil Nadu sanctioned a sum of Rs. 65 crore from the Calamity Relief Fund as an immediate package of following assistance to the fishermen.
- Replacement of gill nets for Vallams at Rs.20,000 per unit for 10,000 units at a total cost of Rs.20 crore.
- Replacement of gill nets for catamarans at Rs.10,000 per unit for 20,000 units at a total cost of Rs.20 crore.
- Repair / rebuilding of Vallams at Rs.15,000 per unit for 10,000 boats at a total cost of Rs.15 crore.
- Repair / rebuilding of catamarans at Rs.10000 per unit for 20,000 catamarans at a total cost of Rs.20 crore.
- The Government sanctioned a sum of Rs. 150 lakh for repairing 3000 Out Board Motors / In Board Engines which have been damaged during Tsunami at the rate of Rs. 5,000 per engine.
- The Government also sanctioned Rs. 395.56 crore for the following items of assistance:
 - Replacement of fully damaged / lost wooden catamarans with a wooden catamaran inclusive of net, at a full subsidy of Rs.32000 per catamaran. (or)
 - Replacement of fully damaged / lost Wooden catamarans with FRP catamarans – 35% subsidy of the total cost subject to the maximum of Rs. 52,500/- at an unit cost of Rs.1.5 lakhs (inclusive of engine and net).

- Replacement of fully damaged / lost FRP catamarans -50% subsidy of the total cost subject to a maximum subsidy of Rs. 75000/- calculated at an unit cost of Rs. 1.5 lakhs inclusive of engine and net -- loan is optional.
- Replacement of fully damaged / FRP Vallam – 50% of the total cost as subsidy subject to a maximum subsidy of Rs. 75000/- calculated at an unit cost of Rs.1.5 lakh (inclusive of engine and net) -- loan is optional
- Repairs to mechanised boats – the subsidy is 60% of the assessed value of the damages restricted to a maximum subsidy of Rs.3 lakhs per boat -- loan is optional.
- Replacement of fully damaged / lost mechanised boats – 35% subsidy of the total cost restricted to a maximum subsidy of Rs.5 lakhs per boat -- loan is optional.
- Rs. 2.25 lakh for the damage caused to the damaged mechanised fishing boats, docking and beaching machineries at Chennai District.
- Rs. 3.00 lakh for the damage caused to contractors materials, parts etc, at Fish Landing Centre, Nagapattinam
- Rs.2.80 lakh for extending relief to 26 fishermen who lost their patti nets due to tsunami.
- Rs. 4,38,767/- for extending relief to the persons whose “kotiyas” were damaged due to tsunami at Cuddalore district. Out of the above sanction, the following amounts have been disbursed:
 - Rs. 54.10 crore for repair / rebuilding / reconstruction of all types of Catamarans;
 - Rs. 8.98 crore for repair / rebuilding / reconstruction of all types of Vallams;
 - Rs. 49.46 crore for fully / partly damaged mechanised boats;
 - Rs. 37.28 crore for disbursement of nets.

- Rs.1.51 crore for repairing Out Board Motors
- A sum of Rs.10 lakh towards subsidy of Rs.25,000/- each for prawn / crab farm owners, fish seeding farm owners, fish transport owners, ice manufacturing units, etc. who have lost their assets due to tsunami in Cuddalore District.
- A sum of Rs. 6.64 crore as assistance for resumption of fishing activities, dredging operations and repair of fishing harbours and fish landing centres.
- A sum of Rs. 430.50 lakh as assistance for the damage to the fishing harbour and fish landing centre, repairs, dredging operations and related activities for resumption of fishing activities, restoration of damages to Chennai I and II fishing harbours.
- A sum of Rs. 2.70 lakh for provision of new printers and Rs. 3.46 lakh to meet unforeseen expenditure by the Fisheries Department.
- A sum of Rs. 50 lakh to meet the unforeseen expenditure such as preparation of the assessment report and amenities to the staff of Director of Fisheries engaged in relief work.
- Rs.110.36 crore sanctioned as additional relief assistance to fisherman.
- Renovation of jetty at Mallipatnam in Thanjavur District at a cost of Rs.55 lakh.
- A sum of Rs. 5 lakh for repairing Chinnamuttom boat yard and Rs.1.89 lakh for repairing Kanniyakumari boat yard to speed up the process of repairs of boats.
- The Government has ordered for exemption of payment of sales tax on the purchase of catamarans, new FRP catamaran, new FRP / wooden vallam, goods including timber intended for repairing damaged mechanized boats including fiberglass boat fitted with OBM.

- The Government has directed that the assistance allotted for FRP Vallams shall be extended to similar FRP beach landing fishing crafts whether they are called as Vallams or Catamarans.
- Rs. 10.5 lakh as 35 % subsidy for building 40 pettis at the unit cost of Rs.75,000/- in Nagapattinam District.
- Rs. 6 lakh towards 35% subsidy as relief for the damages caused to the properties of Tamil Nadu Fisheries Development Corporation and TAFCOFED (Tamil Nadu State Apex Cooperative Federation).
- Rs. 1 crore as relief for loss of shore seines in Kanniyakumari District.
- Rs. 74.07 lakh being 35% subsidy of total amount required for revival of affected Small Scale Industries Units (SSI) in the districts of Nagapattinam, Cuddalore, Chennai, Kancheepuram and Kanniyakumari districts.

(C) ANIMAL HUSBANDRY

- Rs.2,80,11,150/- was sanctioned as relief to the loss of livestock such as cattle & buffalo, sheep and goat, poultry, etc. So far, a sum of Rs.1.75 crore has been disbursed for this purpose and the balance amount has been remitted. The total number of affected families given assistance is 12490.

(D) MEASURES TO RESETTLE DESTITUTES, ORPHANS AND WIDOWS

- Three orphanages have been opened for children rendered orphans in the districts of cuddalore, Nagapattinam and Nagercoil (Kanniyakumari) with facilities to maintain one hundred children at each centre. Government sanctioned a sum of Rs. 47.93 lakh for this purpose.
- Orphaned adolescent girls are admitted in the service homes run by the State Government. Two new service homes have been opened in Kanniyakumari and Nagapattinam districts - 17 girls in Nagapattinam and 4 girls in Kanniyakumari district have been admitted. Governments have sanctioned Rs. 41.74 lakh for this purpose.
- State Government is investing a sum of Rs.5 lakh as fixed deposit in the name of each orphaned child and orphaned adolescent girl rendered homeless. This amount will be available to them when they attain the age of 18 for further studies / self employment, etc.
- Unmarried orphaned girls over 18 years of age are being admitted in service homes and given technical training to acquire vocational skills. So far 6 girls in Kanniyakumari district and 10 girls in Nagapattinam district have been admitted. A sum of Rs.3 lakh will be invested as a fixed deposit in each of their names.
- The Government have sanctioned a sum of Rs.78 lakh towards payment of relief from the Calamity Relief Fund to create a fixed deposit to the children who lost both the parents in Kanniyakumari, Kancheepuram and Nagapattinam Districts. So far, a deposit of Rs. 7.41 crore has been made in the names of 223 children with the funds from CRF, CM's Public Relief and PM's NRF.

- Ongoing pension schemes have been extended to cover all those rendered destitute by the calamity. Old Age Pension has been sanctioned to 242 persons, physically handicapped pension to 80, Destitute Widow pension to 380, Destitute Agricultural Labourer pension to 50 and Destitute and Deserted Wives Pension to 14, totaling 766 persons.

(E) HOUSING

- In the first phase, 54653 partially and fully damaged houses will be replaced with new disaster resistant houses costing Rs.1.5 lakh each with built up space of 325 sq.ft. In Rural, 33005 houses and in urban areas 21648 houses are proposed to construct with the help of NGOs. Out of 54653 houses taken up for construction, 22346 houses have been completed. 3779 houses will be completed by March 2007, 6350 houses by June 2007. 4561 houses by September 2007 and 1315 houses by December 2007. The balance 16302 houses will be ready by 30.09.2008. Out of 22346 houses completed, 14369 houses have been handed over to the beneficiaries. For the progress of housing construction programme .
- The houses are being constructed mostly by the NGOs'/Corporates and by the Tamil Nadu Slum Clearance Board. The habitations will have other infrastructure facilities funded either by NGOs or by the Government under the Emergency Tsunami Reconstruction Project (World Bank) and GoI assistance. Further, out of 11,662 houses for which repairs had to be carried out, 10427 houses have been repaired and 1006 will be repaired by June 2007 with funds from ETRP. Thus, totally, 66315 houses will be repaired / reconstructed in Phase I of the programme. The extent of

land required for house building programme is 656 Ha of which the Collectors have already taken possession of 589.3 Ha including 435 Ha of private and temple lands purchased at a cost of Rs.39.71 crore.

- Additional 2274 houses taken up for Irulas (Scheduled Tribes) and for families living close to sea.
- In the second phase, it has been proposed to construct 52,569 houses for the vulnerable people in the coastal districts of Tamil Nadu. Government of Tamil Nadu has recently issued a Government Order for constructing 22000 houses in vulnerable areas of the coastal districts under the Government of India package at a cost of Rs.552 crore. It has been proposed to construct 5000 houses by December 2007, 8000 houses by March 2008 and the balance 9000 houses by June 2008. The rest of the houses will be completed by March 2009. The houses are being built by Rural Development & Panchayat Raj Department in the rural areas and Tamil Nadu Slum Clearance Board in the urban areas. Each house will have an area of 325 sq.ft. with all disaster resistant features with all amenities costing Rs.2.50 lakh (Rs.2.10 lakh for the house and Rs.0.40 lakh for amenities). They will also be insured for ten years for which Rs.1000/- per house is provided.

(F) INFRASTRUCTURE

- A sum of Rs. 64.15 core for immediate repair of Highways and other roads has been sanctioned and the Department has so far executed works to the tune of Rs. 49.68 crore.

- Rs.1.40 crore for construction of a temporary bridge connecting Melamanakkudy and Keelamanakkudy villages in Kanniyakumari District.
- Construction of Rubble Mound Sea Wall for 1 km at Azhical, Kottilpadu and Maramady villages at a cost of Rs.2 crore and at a cost of Rs. 19 lakh at Melamanakudy village in Kanniyakumari district.
- Rs. 19.75 crore as relief for the damages suffered to the Tamil Nadu Electricity Board (Rs.5 crore); TWAD Board (Rs.14.25 crore); and Poompuhar Shipping Corporation (Rs.0.5 crore)
- Rs.1.10 crore for the damages caused to Perarignar Anna and Dr. MGR memorials in Chennai.
- Rs. 47.31 lakh for damaged Anganwadi Centres of which Rs. 20 lakh released from CRF.
- Rs.10.09 lakh for providing public address system to convey emergency messages to public in Nagapattinam District.
- Rs. 30 lakh for restoration of Anna Swimming Pool (ASP),Marina Beach, Chennai.

(G) EDUCATION

- Free text books, note books and uniforms have been disbursed to the students of 1st Std to 12th Std who are studying in Government / Govt. aided schools located in Tsunami affected areas. 1,05,264 students were benefited. Rs. 1.31 crore has been spent for this purpose. Rs. 2.91 crore has been sanctioned for uniforms.
- The tuition fees and special fees payable by the students of Tsunami affected families for the period from 01.01.2005 to the end of the academic year 2005-06 will be borne

by the State Government. The scheme has been extended further for the academic year 2006 - 07. In addition, the students will be exempted from payment of examination fees from March 2005 to the end of academic year 2005-2006 and 2006 - 07.

- Rs.14.48 crore to settle the claims of fees due to the Educational Institutions has been sanctioned to District Collectors of which Rs. 14.05 crore has been settled to the Educational Institutions.
- Separate public examinations for the students studying in 121 number of Tsunami affected schools have been conducted. The pass percentage of these students was 79.38% in Higher Secondary and 81.31% in X std exams which are better than the average pass rates of the State.

(H) MISCELLANEOUS

- An ex-gratia of Rs.2500/- each totaling Rs.1.20 crore was paid to 4799 sanitary workers in recognition of their efforts.
- A sum of Rs. 7.98 lakh has been released for settling the claims of the private hospitals where 47 persons affected due to tsunami had undergone recanalisation operation.
- A sum of Rs.0.08 lakh has been released for settling the claim towards damages to a mini bus.

Source : www.tn.gov.in

Table-2 : District wise lives lost and impaired due to Tsunami 2004

S.No	District	No. of villages affected	No. of kuppams affected	Population of the district as per 2001 census	Population affected by tsunami	Population Evacuated	Human lives lost	Person injured
1.	Chennai	4	25	4343645	73000	30000	206	*9
2.	Cuddalore	8	43	2285395	99704	61054	610	259
3.	Kancheepuram	30	44	2877458	100000	60000	130	24
4.	Kenniyakumari	16	33	1676034	178650	46280	799	754
5.	Nagaipattinam	38	73	1488839	196184	196184	6065	1922
6.	Pudukottai	25	29	1459601	66350	4857	15	-
7.	Ramanathapuram	40	114	1178604	84000	8315	20	2
8.	Thanjavur	22	-	2216138	29278	4600	37	482
9.	Tiruvallur	6	38	2754756	15600	-	29	-
10.	Tiruvarur	-	-	-	-	-	29	3
11.	Tirunelveli	10	-	2723988	27948	11170	4	6
12.	Thoothikudi	23	-	1572273	110610	11625	3	-
13.	Villupuram	8	19	2960373	78240	37500	48	46
	Total	230	418	28715578	1068564	471585	7995	3960

Source: www.tn.gov.in

Table-3: District wise property lost and damaged due to Tsunami 2004

District	Cattle	Houses		Total	Agricultural Land (Ha)	Horticultural Land (Ha)	Catamarams		Vallams	Mo
		Partially damaged	Fully damaged				Wooden	Fiber		
Chennai	2	-	16839	16839	-	-	1493	169	-	
Cuddalore	949	544	2328	2872	1925.48	196.51	5530	862	-	
Kancheepuram	4	898	3702	4600	248.48	-	1994	784	19	
Kanniyakumari	1187	3953	3379	7332	12.57	9.7	6582	-	694	
Nagaipattinam	12821	2169	17461	19630	4657.47	456.98	6144	-	1761	
Pudikottai	-	-	-	-	-	-	191	-	473	
Ramanathapuram	-	-	-	-	-	-	0	-	290	

Thanjavur	-	-	3	3	-	-	47	-	232	
Tiruvallur	220	-	-	-	-	-	516	570	-	
Tiruvarur	-	-	716	716	-	-	-	-	19	
Tirunelveli	899	-	-	-	-	-	1285	-	82	
Thoothukudi	-	-	630	630	-	-	644	-	600	
Villupuram	-	106	834	940	1616.34	6.63	1691	1017	-	
Total	16082	7670	45892	53562	8460.34	669.82	26117	3402	4170	

Source: www.tn.gov.in

Table-4: Value of Damages in Tamil Nadu due to Tsunami 2004

Damages	Rs. (in Crore)
Damage caused to mechanized boats, country boats, catamarans, nets, engines fishing harbours, etc.	1054.06
Damage caused by sea erosion and inundation of Nagaipattinam district	449.00
Damage caused to highways, roads and bridges	380.64
Damage caused to Panchayat Union roads, water supply and street light arrangements, Panchayat offices, noon meal centres, paanchayat school buildings, etc	255.61
Damage of crops	76.80
Damage caused to minor ports at Cuddalore, Nagaipattinam and Colachal	74.70
Damage caused to water supply systems like infiltration wells, open well, bore wells etc. maintained by TWAD	25.00
Damage caused to Tamil Nadu Electricity Board installations	16.93
Damage caused to government buildings maintained by P.W.D	8.50
Damage caused to beach resorts and hotels maintained by Tamil Nadu Tourism Development Corporation	4.48
Damage caused to food grains stored in the godowns of Tamil Nadu Civil Supplies Corporation at Port godowns, Nagaipattinam	2.44
Damage caused to Salt Corporation	1.50
Damage caused to Anganwadi Centres	1.41
Damage caused to ferry services run by Poompuhar Shipping Corporation at Kanniyakumari	1.04
Damage caused to protected monuments to Tamil Nadu Archaeological Department	1.00
Damage caused to godowns run by Tamil Nadu Warehousing Corporation	0.27

Source: www.tn.gov.in

Table-7: Villages and Hamlets Affected by Tsunami in Nagaipattinam District.

Name of the Tsunami Affected Taluk	Names of the Tsunami Affected Villages
Nagaipattinam	North Poiyur, Akkaraipettai , Keechankuppam , Theeder , Nambiyarnagar, Velipalayam Beach, Ariyanattu Str, Pattinacherry, Palpannaicherry, Palpannaicherry, San, Pandagasalai Street, Beerodum Street.
Keevelur	Vellankani , South Poigainallur, Kallar , Veerangudikadu, Seruthur, Kameshwaram, Vairavankadu , Manaimedu, Vilu
Vedaranyam	Pudupalli, Vettaikkaraniiruppu, Vanavanmadevi, Vellap Kovilpathu, Pushpavanam, Arkattuthurai Periyak , Maniyantheevu, Mottandithoppu, Agasthiyampalli , Kodiala
Sirkali	Thirumulaivasal, Thoduvai, Valuthalagudi, Thianthottam, Pudukuppam, Vellapallam, 76.Perunthottam, Nayakkarku, Kosalakuppam, Kadaikkadu, Keelamoovarkarai, Melam, Palaiyar, Madavamadu, Kettavaimadu, Olakatta, Kodyampalayam, Chinnurpettai
Tarangampadi	Chandrapadi, Tarangampadi, Perumlpettai, Vell, Thalampettai, Kuttiyandiyur, Veppancherry, Chinnangudi,

Sampled villages for the study
collector, Nagaipattinam district.,

Source: Office of the

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	Total	230	418	28715578	1068564	471585	7995	3960

Source: www.tn.gov.in**Table-3: Districtwise property lost and damaged due to Tsunami 2004**

District	Cattle	Houses		Total	Agricultural Land (Ha)	Horticultural Land (Ha)	Catamarams		Boats	
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Ramanathapuram	-	-	-	-	-	-	0	-	290	
Thanjavur	-	-	3	3	-	-	47	-	232	
Tiruvallur	220	-	-	-	-	-	516	570	-	
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Damage of crops	76.80
Damage caused to minor ports at Cuddalore, Nagaipattinam and Colachal	74.70
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Damage caused to protected monuments to Tamil Nadu Archaeological Department	1.00
Damage caused to godowns run by Tamil Nadu Warehousing Corporation	0.27

Source: www.tn.gov.in

Table-18: Perceived Degree of Social Problems Before and After Tsunami

(*n = 180)

Social Problems	Most				More				Moderate				Less				Least	
	Before Tsunami		After Tsunami		Before Tsunami		After Tsunami		Before Tsunami		After Tsunami		Before Tsunami		After Tsunami		Before Tsunami	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Unemployment	0	0	36	20.00	24	13.33	144	80.00	126	70.00	0	0	30	16.67	0	0	0	0
Migration	0	0	168	93.33	30	16.67	12	6.67	150	83.33	0	0	0	0	0	0	0	0
Displacement	0	0	0	0	0	0	0	0	12	6.67	112	62.22	168	93.33	68	37.78	0	0
Eviction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	180	100
Homelessness	0	0	24	13.33	0	0	120	66.67	24	12.33	36	20.00	156	86.67	0	0	0	0
Food Insecurity	0	0	0	0	0	0	0	0	0	0	0	0	40	22.22	40	22.22	140	77.77
Health Issues	0	0	0	0	0	0	0	0	24	13.33	156	86.67	156	86.67	24	13.33	0	0
Loss of Property	0	0	6	3.33	6	3.33	144	80.00	100	55.55	30	16.67	30	16.67	0	0	44	24.44
Disruption of Services	0	0	0	0	0	0	0	0	0	0	150	83.33	0	0	30	16.67	180	100
Loss of Community	0	0	0	0	0	0	150	83.33	0	0	30	16.67	0	0	0	0	180	100
Loss of Identity	0	0	0	0	22	12.22	30	16.67	120	66.67	120	66.67	38	21.10	30	16.67	0	0
Loss of Livelihood	0	0	0	0	0	0	120	66.67	0	0	60	33.33	122	68	0	0	58	32

* Multiple respondents

 Before Tsunami  After Tsunami

Table-16: Perceived Degree of Physical Infrastructural Damage Felt Before and After Tsunami
 (*n = 180)

Infrastructural Category	Most affected				More affected				Moderately affected				Less affected				Least affected	
	Before Tsunami		After Tsunami		Before Tsunami		After Tsunami		Before Tsunami		After Tsunami		Before Tsunami		After Tsunami		Before Tsunami	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Buildings	0	0	11	6.11	0	0	108	60.00	27	15	29	16.11	112	62.22	20	11.11	41	22.78
Water supply	0	0	0	0	18	10	21	11.66	21	11.66	142	78.88	122	67.77	17	9.44	19	10.56
Education	0	0	20	11.11	10	5.55	8	4.44	31	17.22	122	67.77	40	22.22	16	8.88	99	55.56
Water	0	0	32	17.77	0	0	22	12.22	11	6.11	119	66.11	160	88.88	7	3.88	9	5.00
Streets	0	0	0	0	2	1.11	28	15.55	19	10.55	93	51.66	47	26.11	38	21.11	112	62.22
Other	0	0	0	0	0	0	72	40	6	3.33	101	56.11	38	21.11	7	3.88	136	75.56
Other	0	0	10	5.55	2	1.11	142	78.88	66	36.66	18	10	92	51.11	10	5.55	20	11.11
Building	0	0	0	0	0	0	8	4.44	0	0	172	95.55	20	11.11	0	0	160	88.89
Other	0	0	0	0	0	0	11	6.11	0	0	91	50.55	22	12.22	49	27.22	158	87.78

* Multiple Responses



 Before Tsunami  After Tsunami

Table-17: Perceived Degree of Social Interaction Before and After Tsunami

(*n = 180)

Response	Most				More				Moderate				Less				None	
	Before Tsunami		After Tsunami		Before Tsunami		After Tsunami		Before Tsunami		After Tsunami		Before Tsunami		After Tsunami		Before Tsunami	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Agree	12	6.66	119	66.11	144	80.00	48	26.66	20	11.11	13	7.22	4	2.22	0	0	0	0
Disagree	0	0	137	76.11	22	12.22	32	17.77	112	62.22	11	6.11	29	16.11	0	0	17	9.44
Strongly Disagree	0	0	7	3.88	13	7.22	9	5.00	36	20.00	40	22.22	89	49.44	92	51.11	42	23.33
Strongly Agree	16	8.88	21	11.66	31	17.22	121	67.22	101	56.11	18	10	28	15.55	1.7	0.94	4	2.22
Don't Know	0	0	0	0	0	0	0	0	11	6.11	24	13.33	21	11.66	31	17.22	148	82.22

*Multiple response

 Before Tsunami  After Tsunami

Fig. 36. Alcoholism Before Tsunami

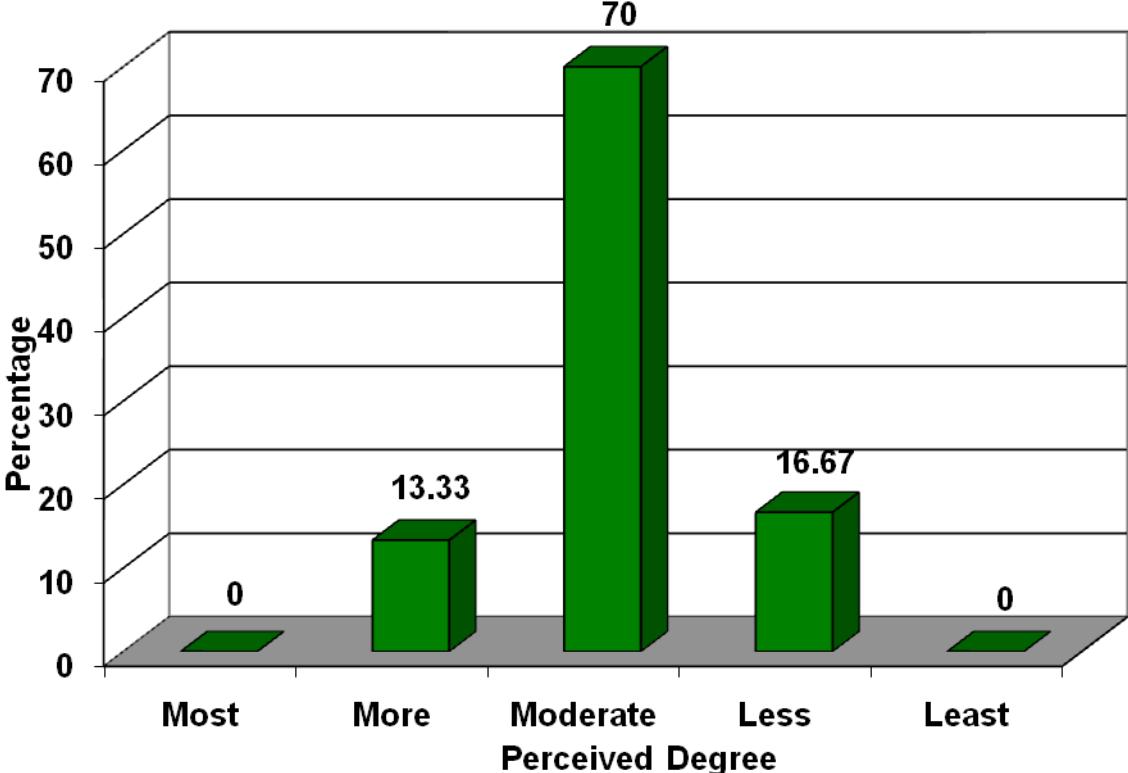


Fig. 38. Smoking Before Tsunami

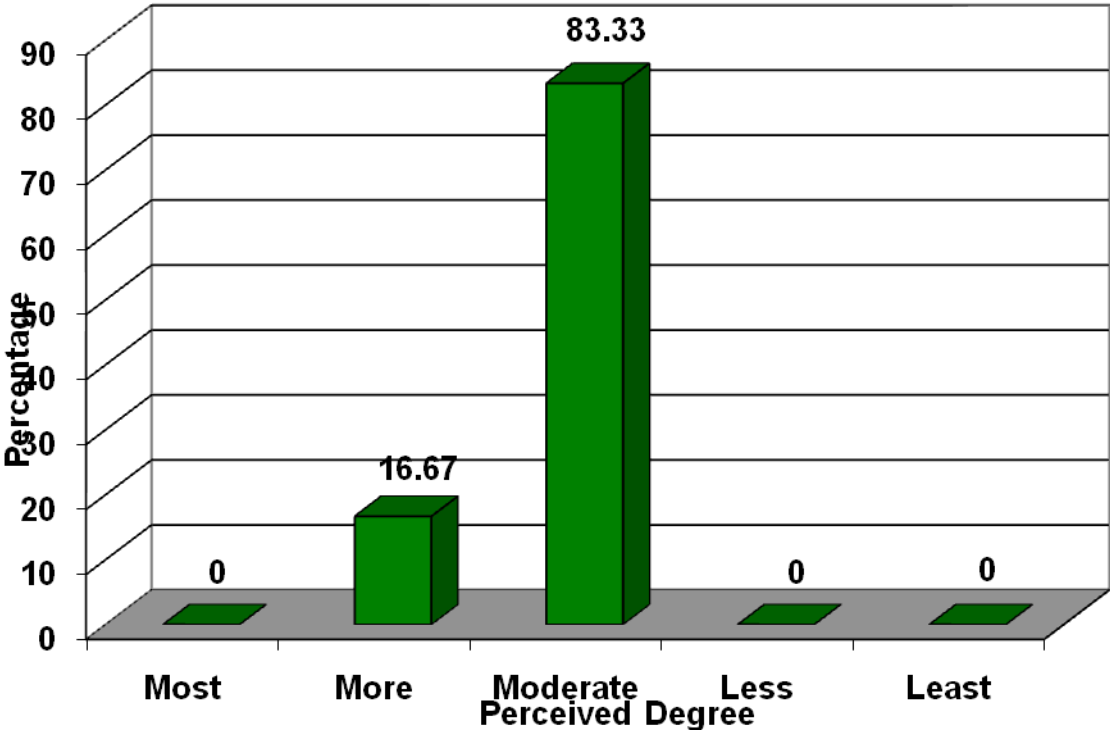


Fig. 40. Crime Before Tsunami

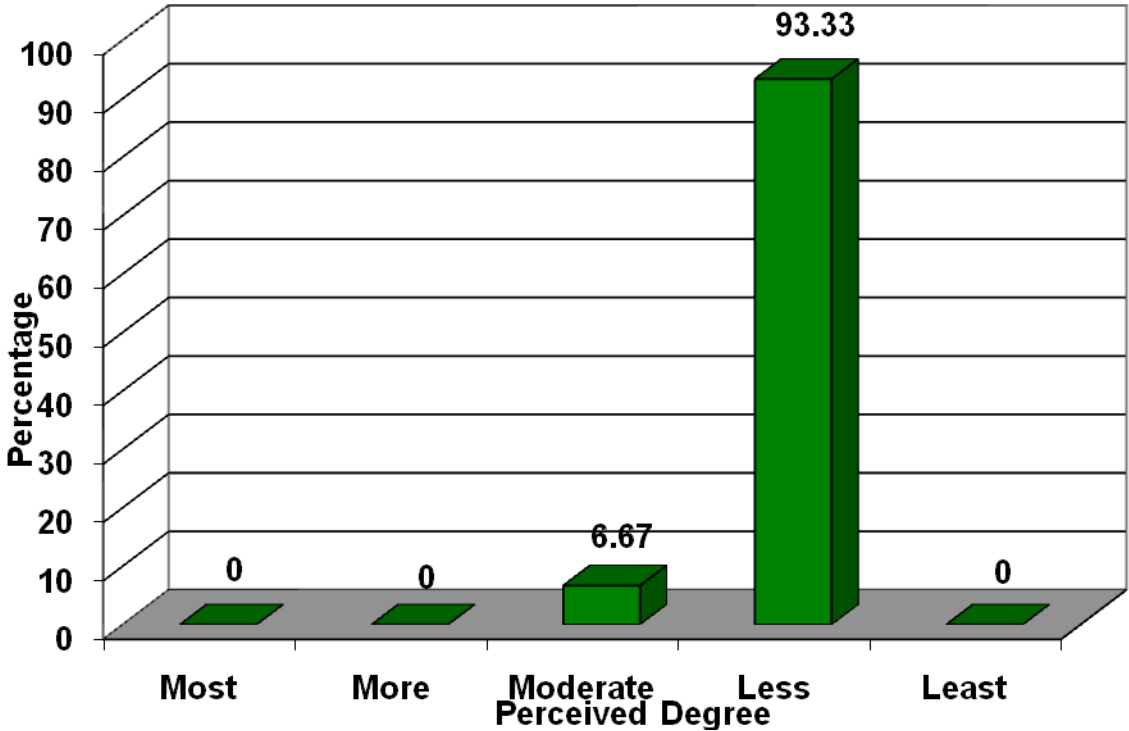


Fig. 42. Drug Addiction Before Tsunami

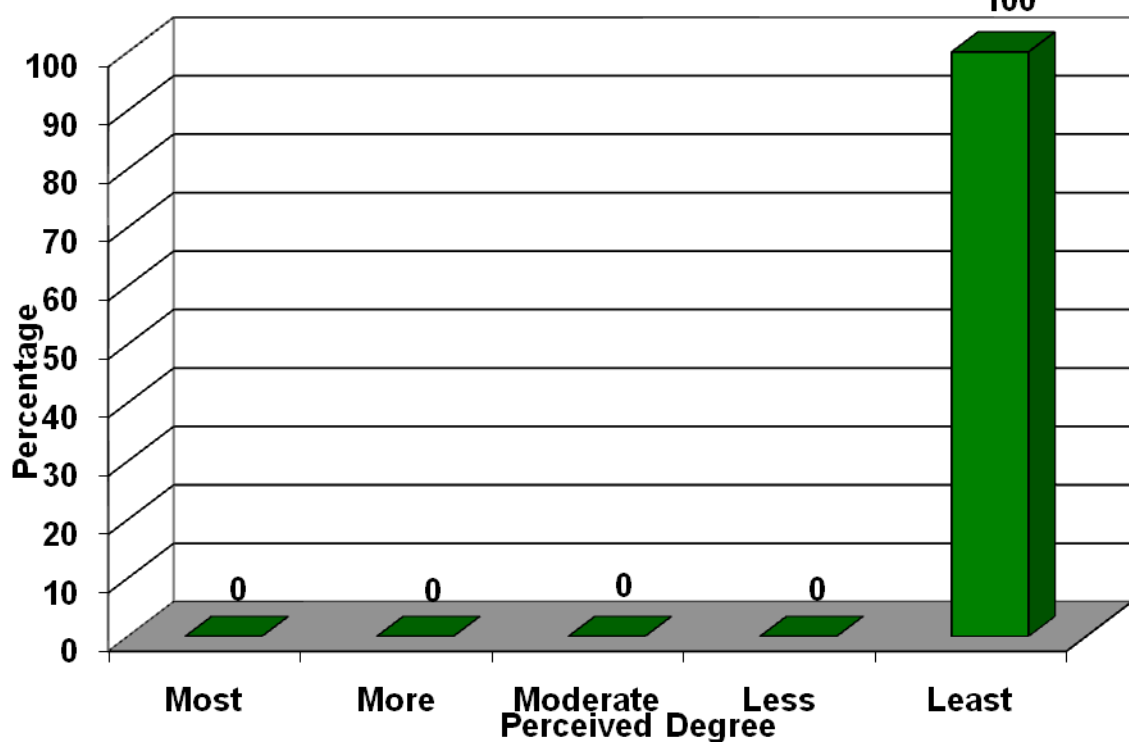


Fig. 44. Unemployment Before Tsunami

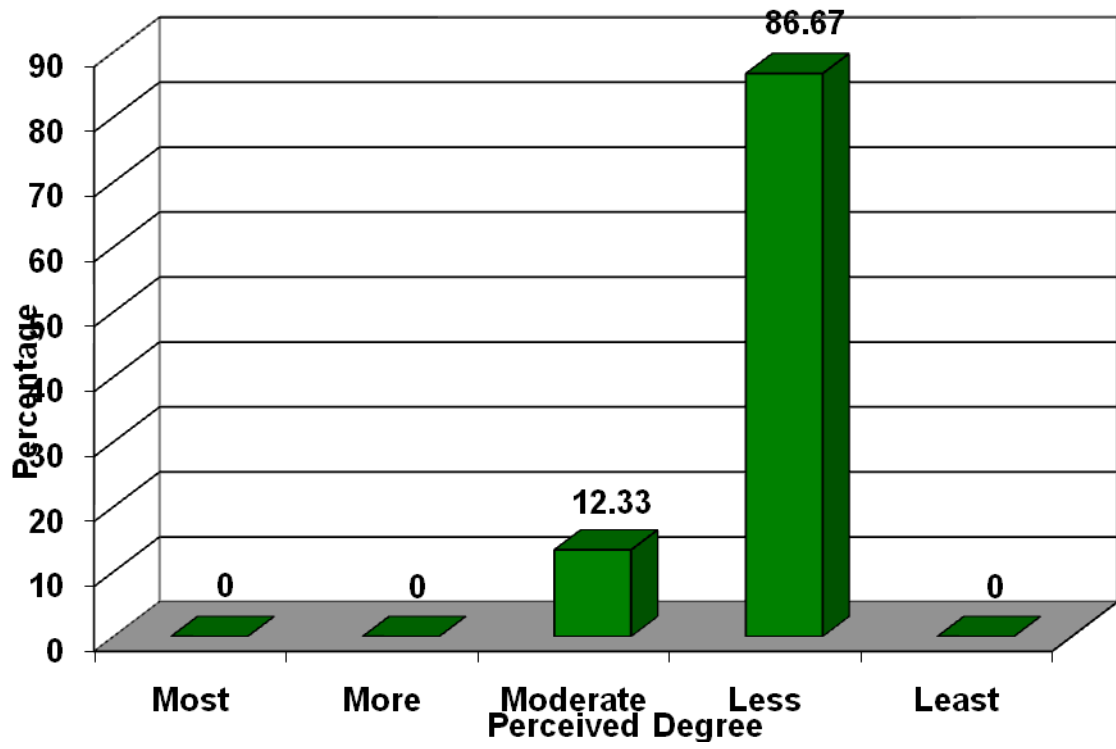


Fig. 46. Sexual Harrassment/ Rape Before Tsunami

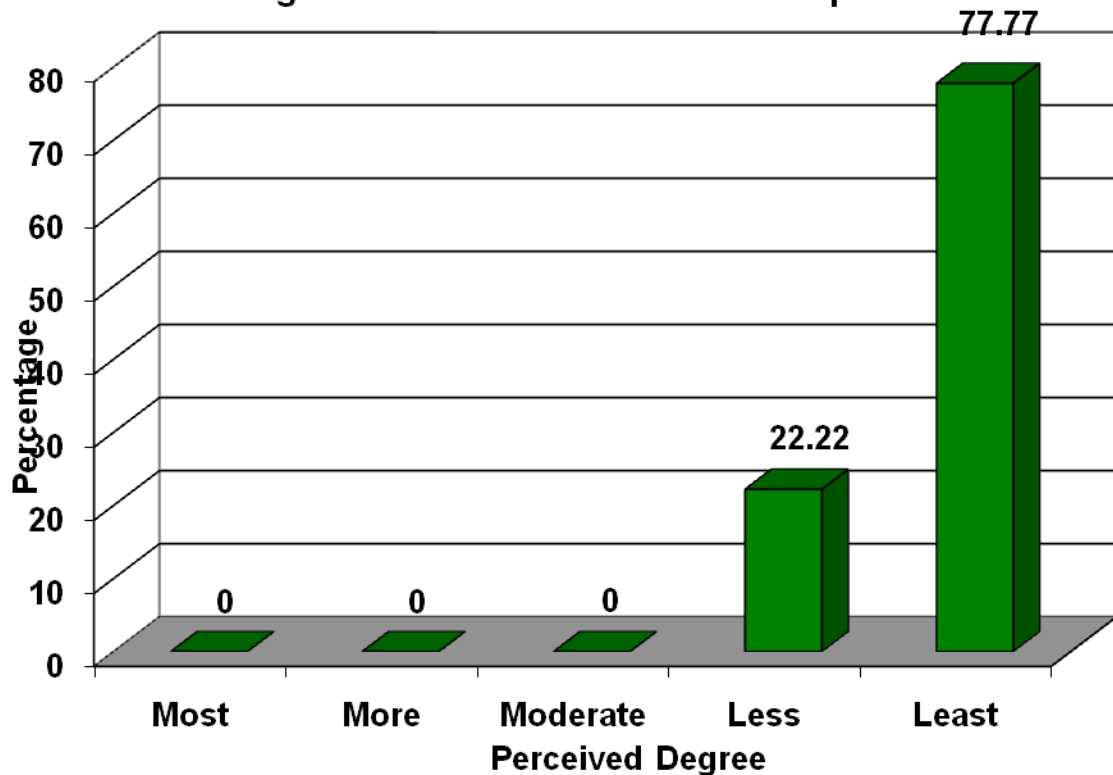


Fig. 48. Prostitution Before Tsunami

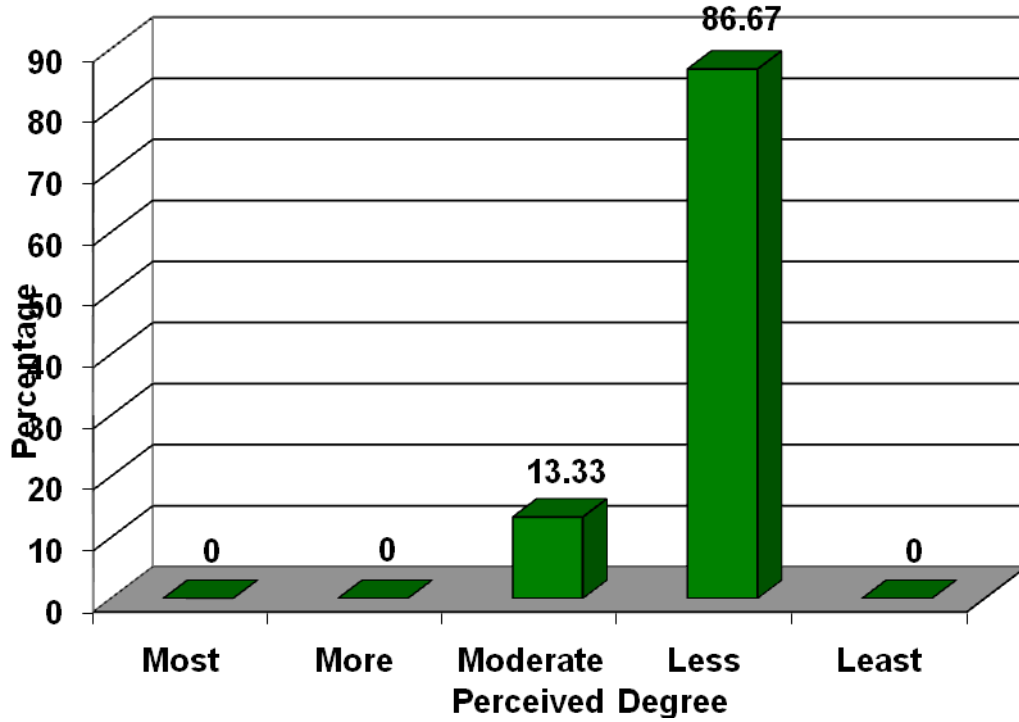


Fig. 50. Poverty Before Tsunami

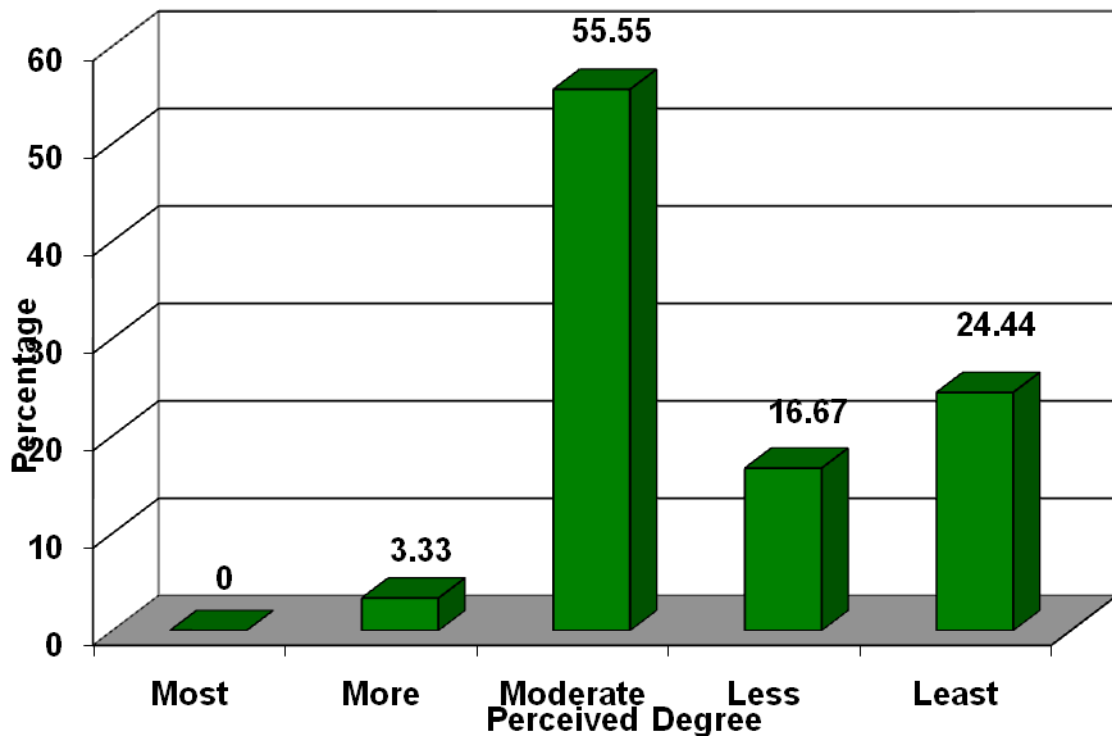


Fig. 52. Suicide Before Tsunami

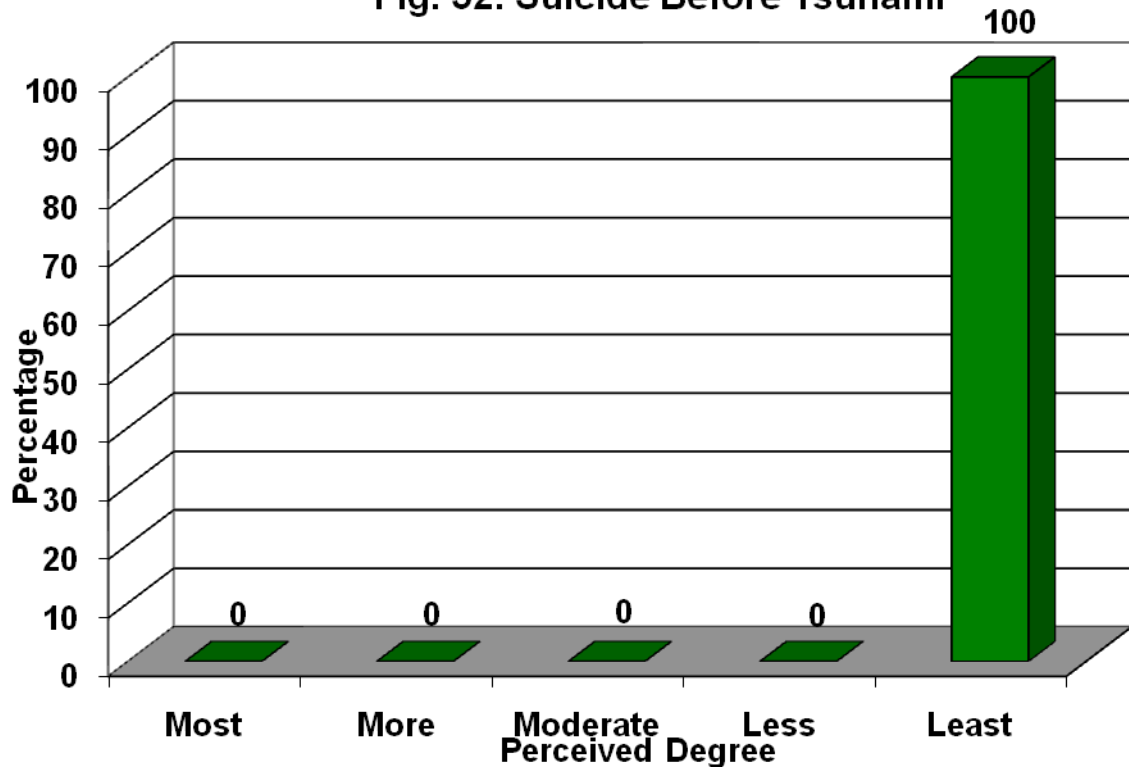


Fig. 54. Orphans Before Tsunami

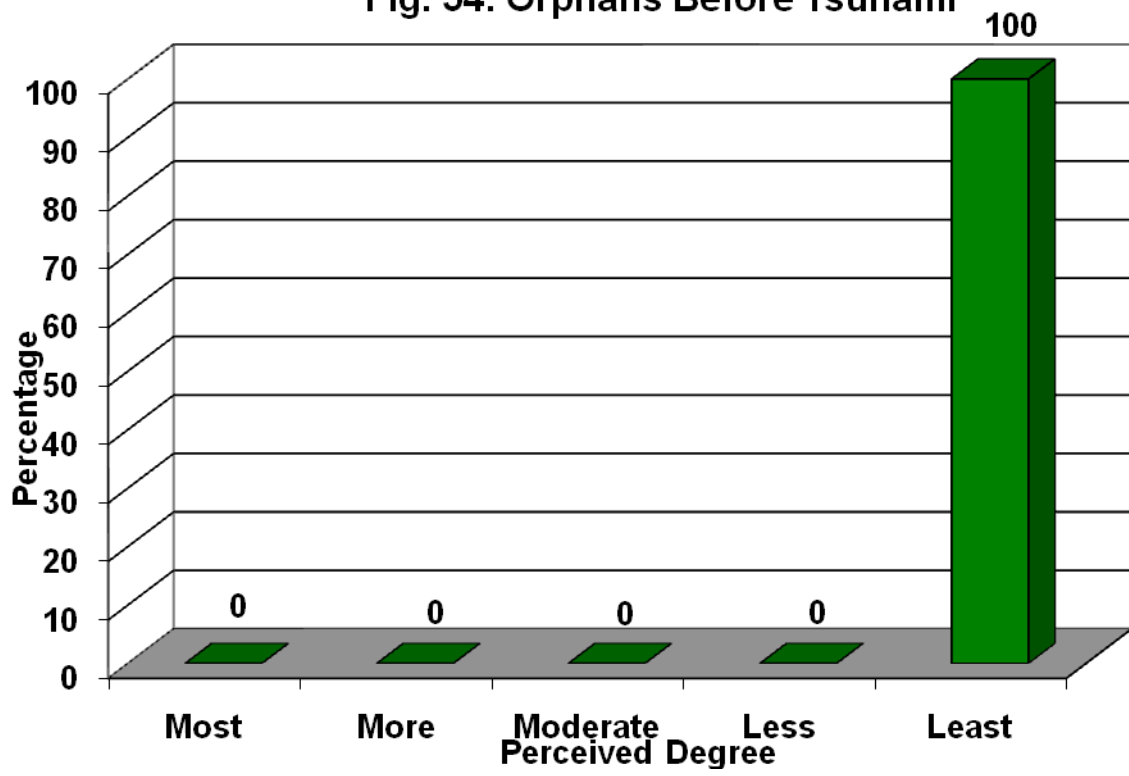


Fig. 56. Class Discrimination Before Tsunami

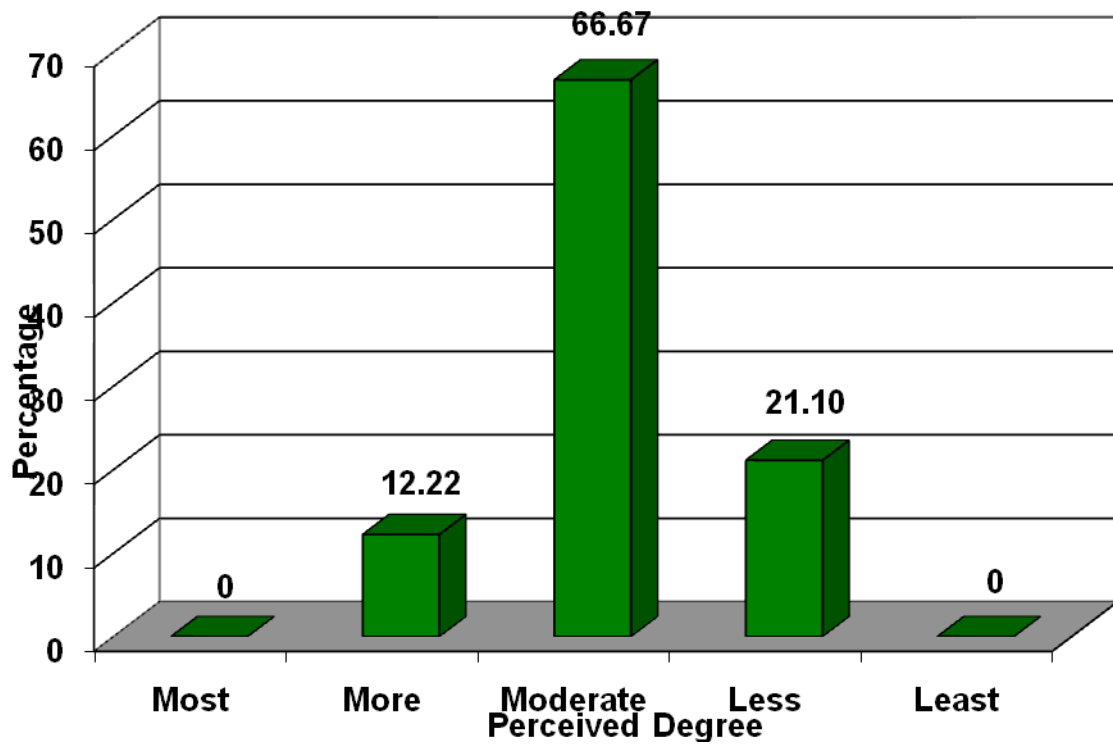


Fig. 58. Dependency Before Tsunami

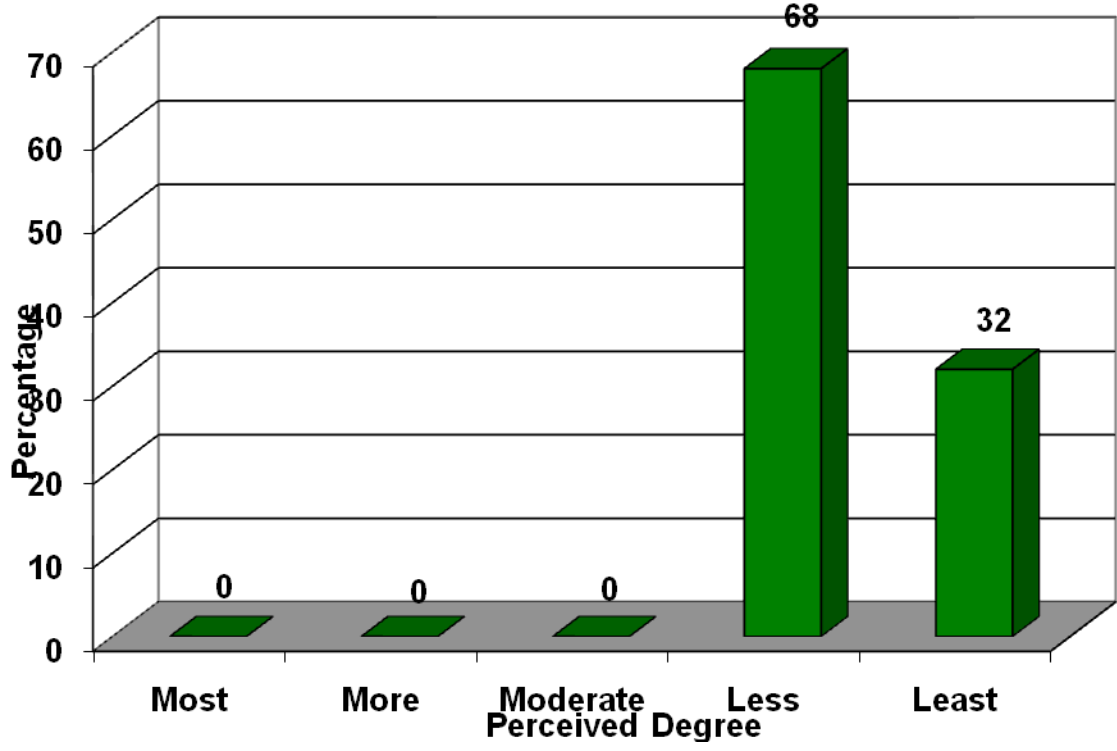


Fig. 3. Psychological Impact (Depression) of Tsunami on

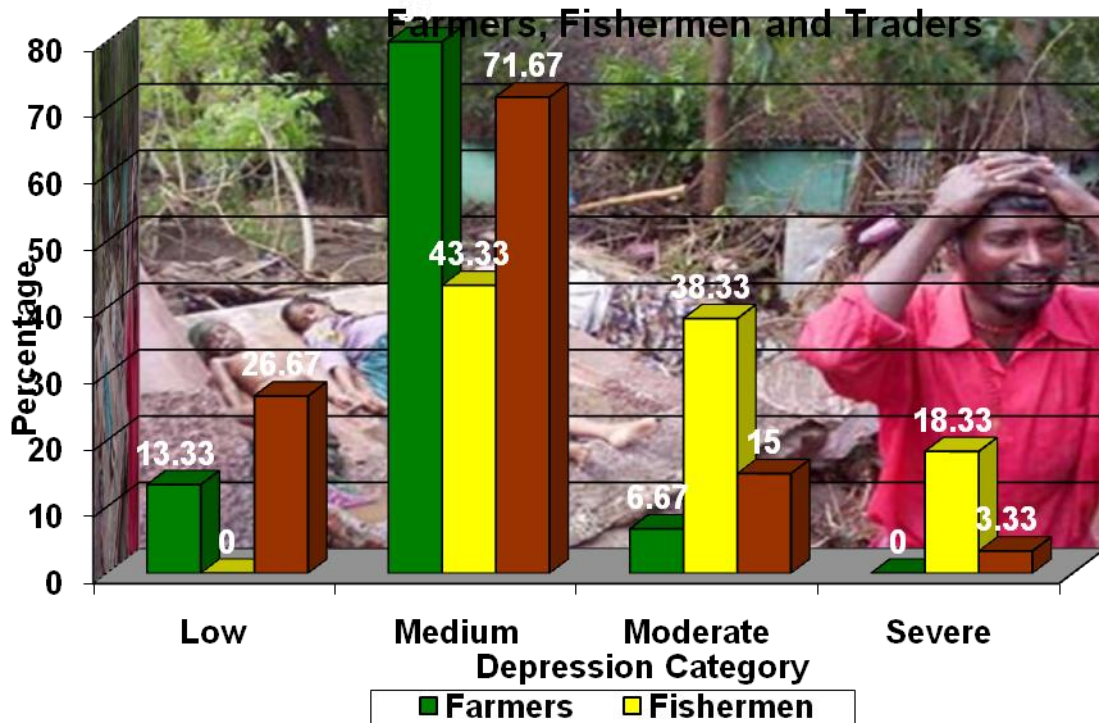


Fig. 4. Socio-Economic Status of Farmers Before and After

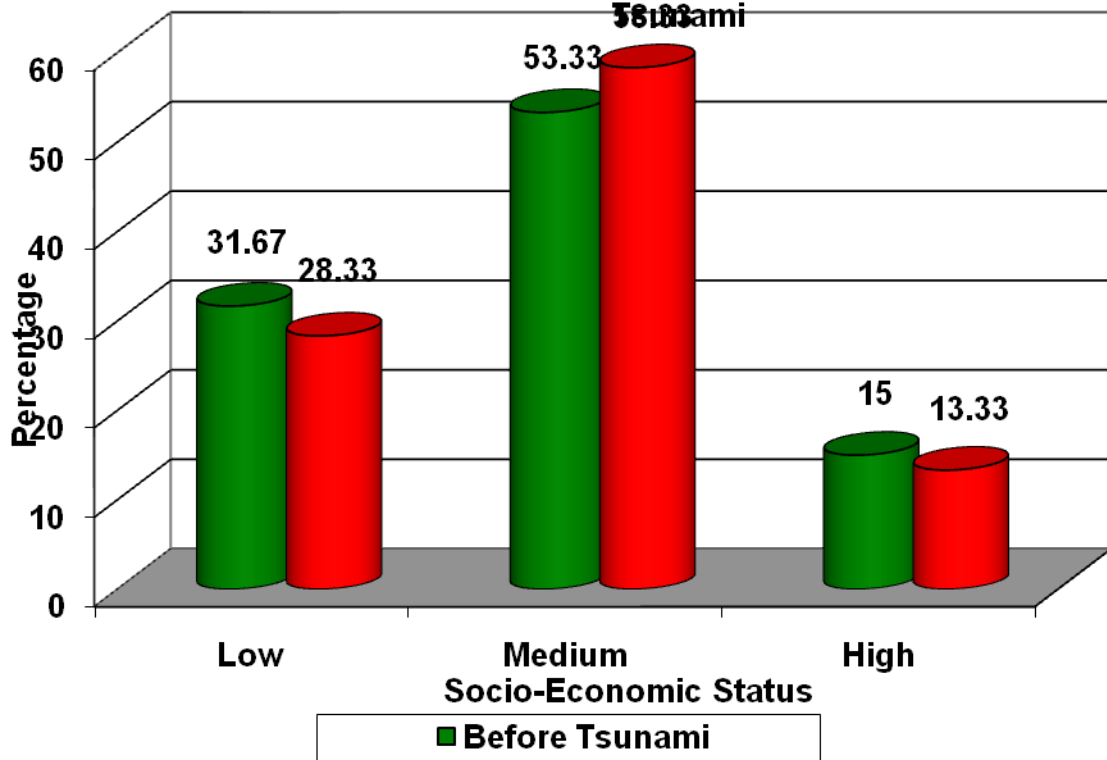


Fig. 5. Socio-Economic Status of Fishermen Before and After Tsunami

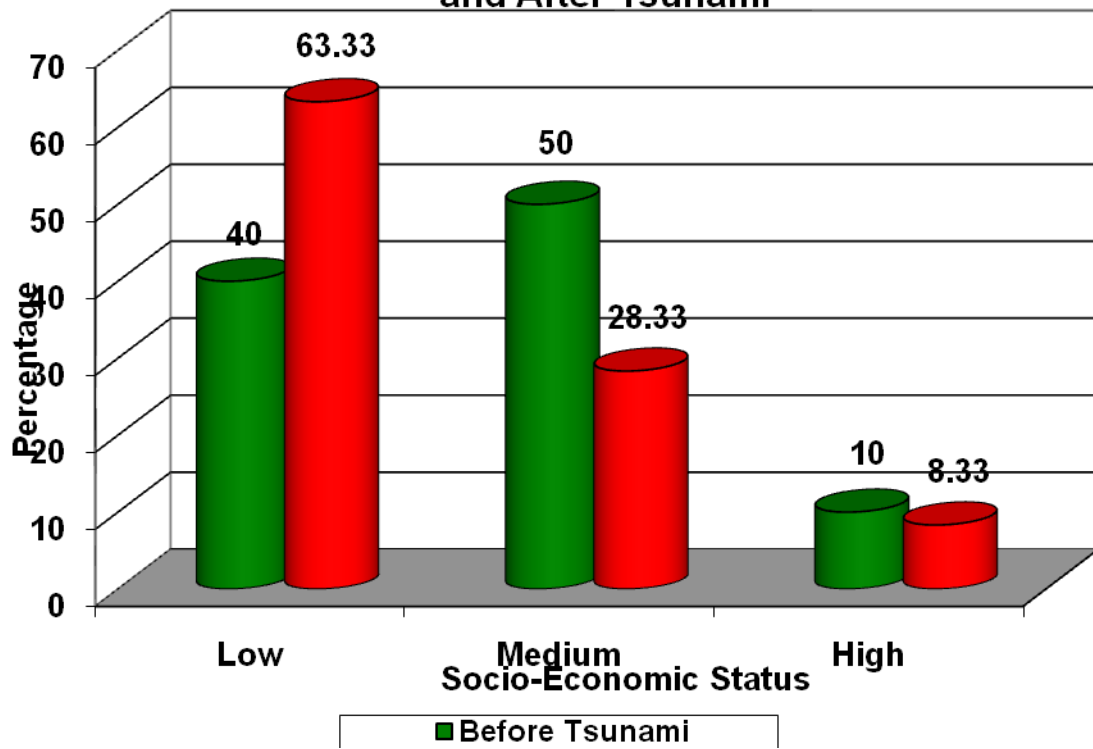


Fig. 6. Socio-Economic Status of Traders Before and After Tsunami

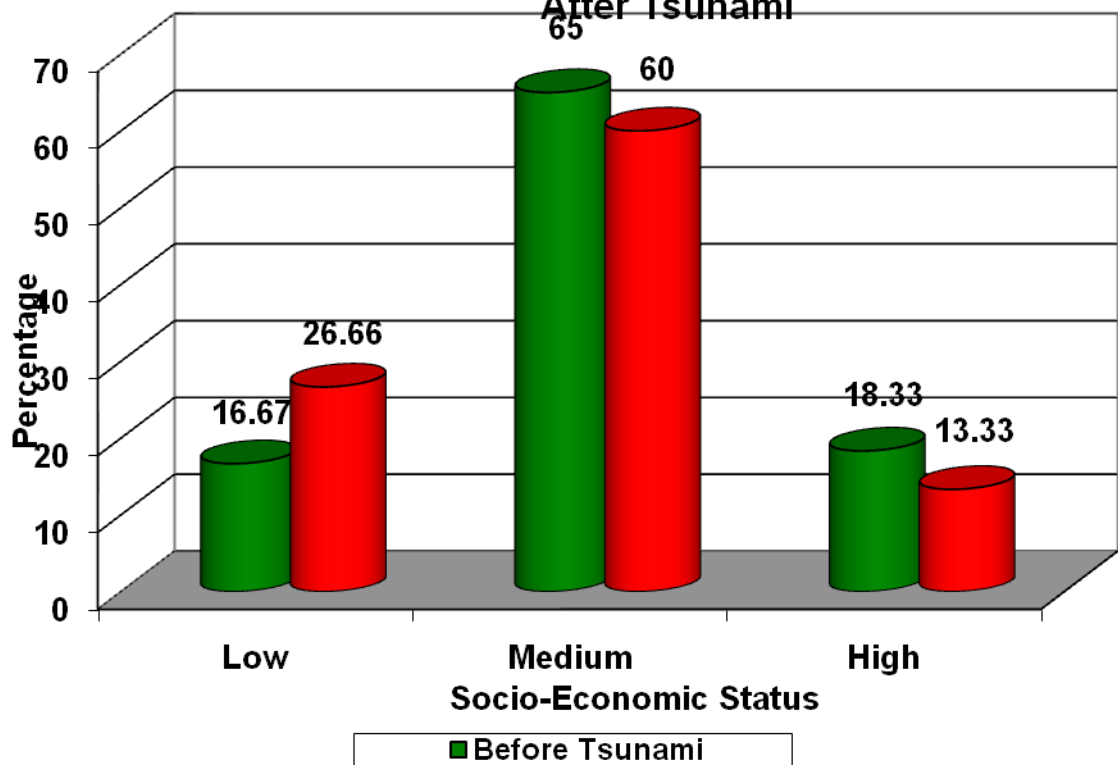


Fig.- 37: Alcoholism After Tsunami

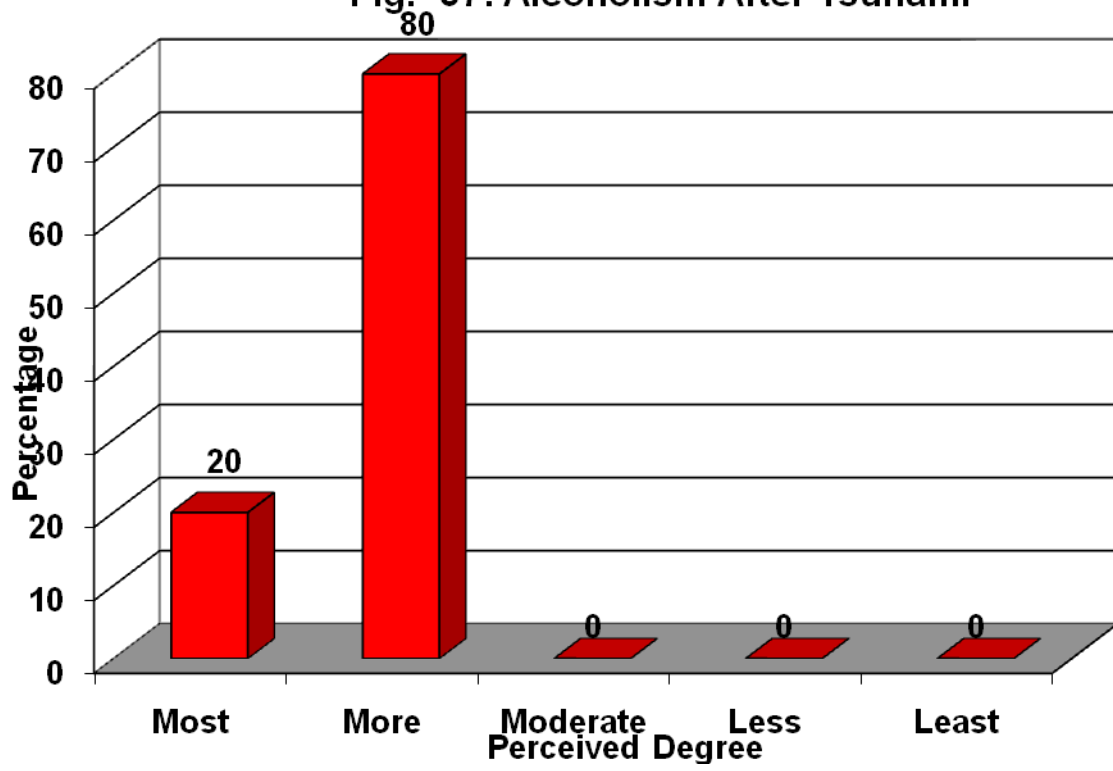


Fig.- 39: Smoking After Tsunami

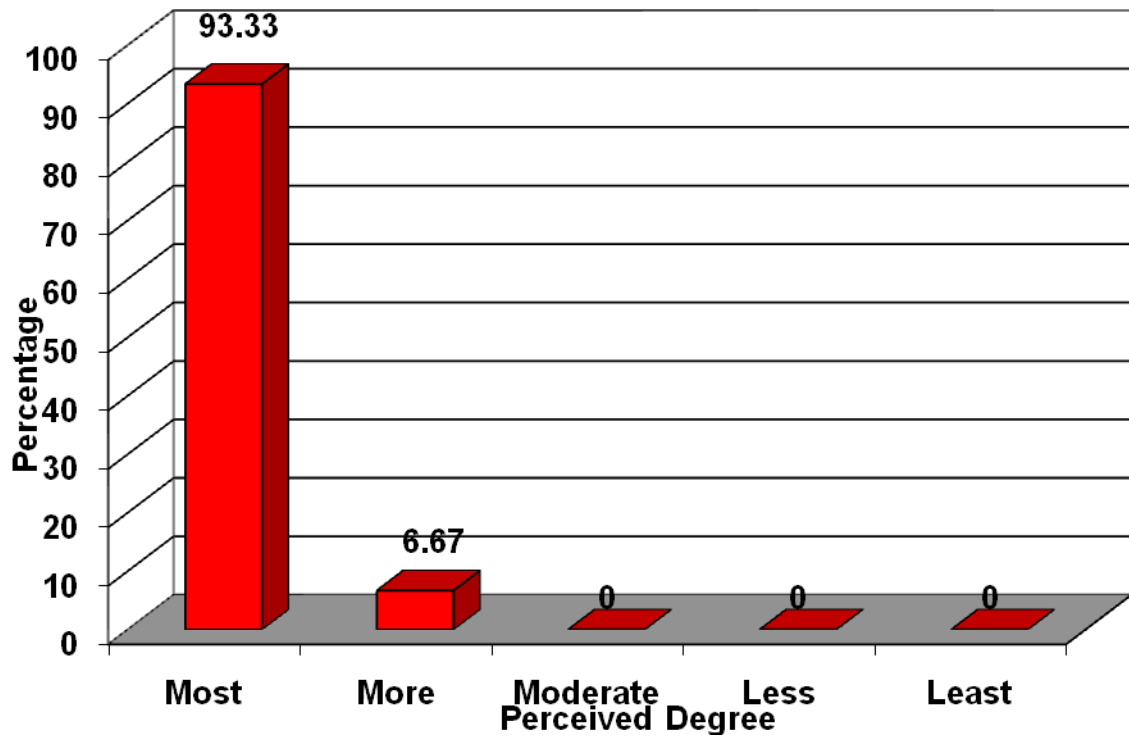


Fig. 41. Crime After Tsunami

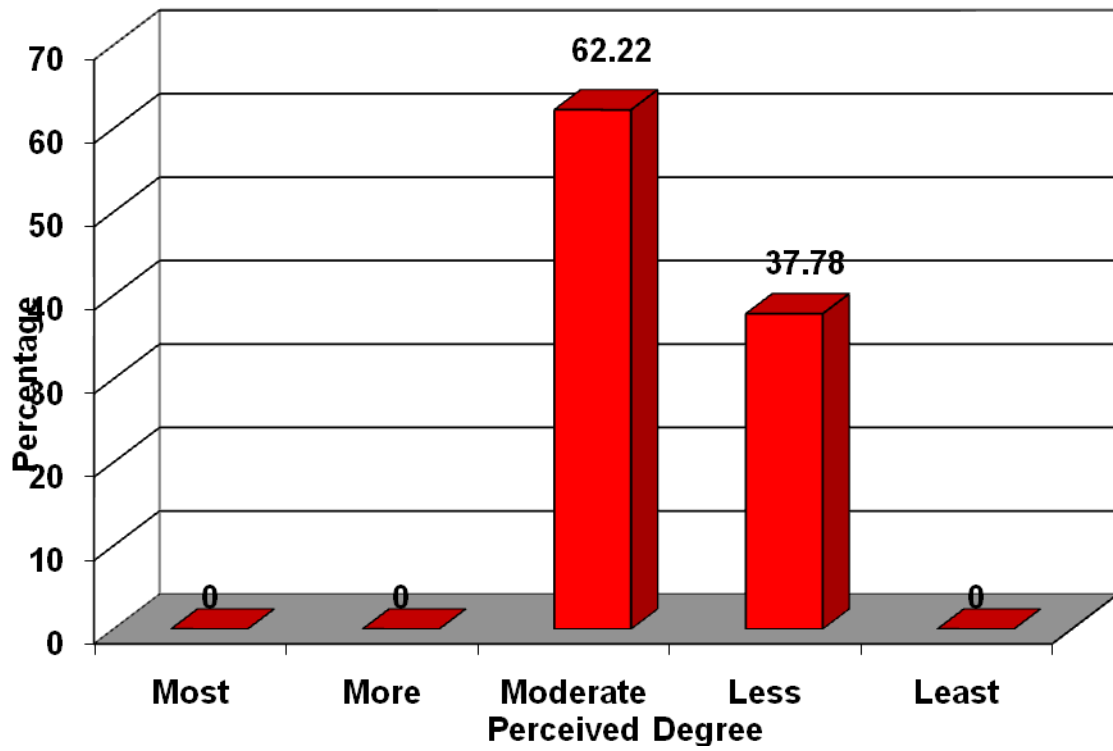


Fig.- 43: Drug Addiction After Tsunami

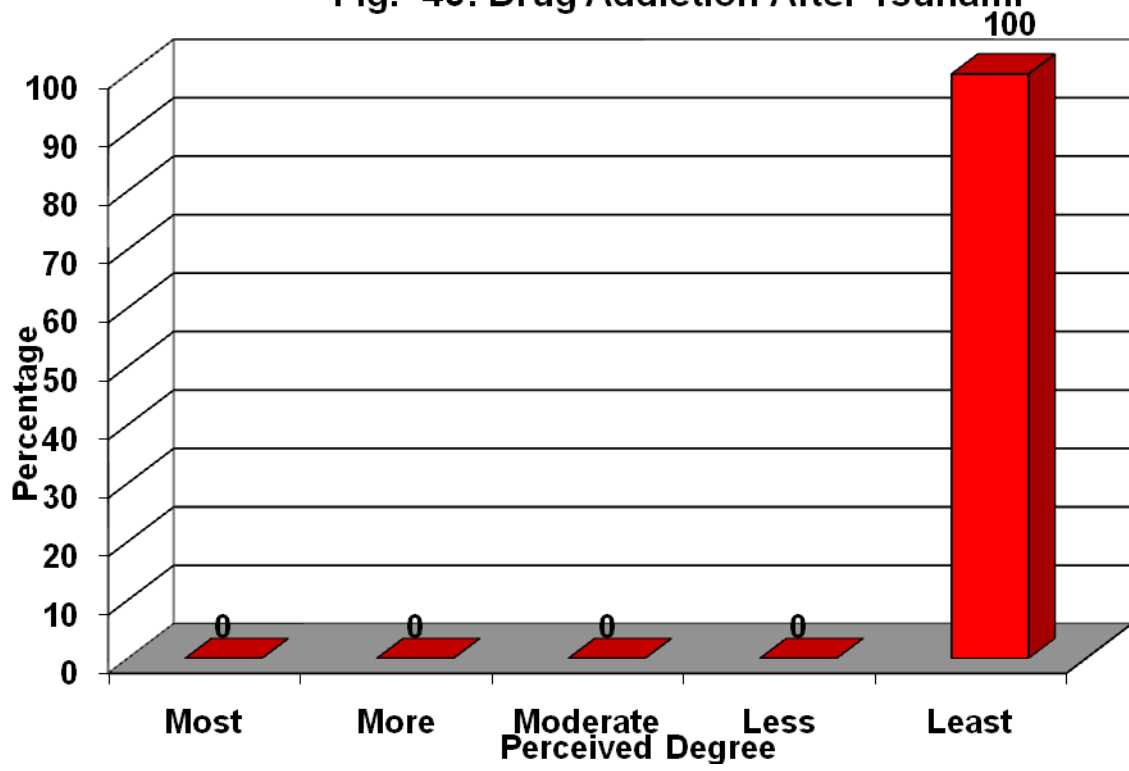


Fig.- 45: Unemployment After Tsunami

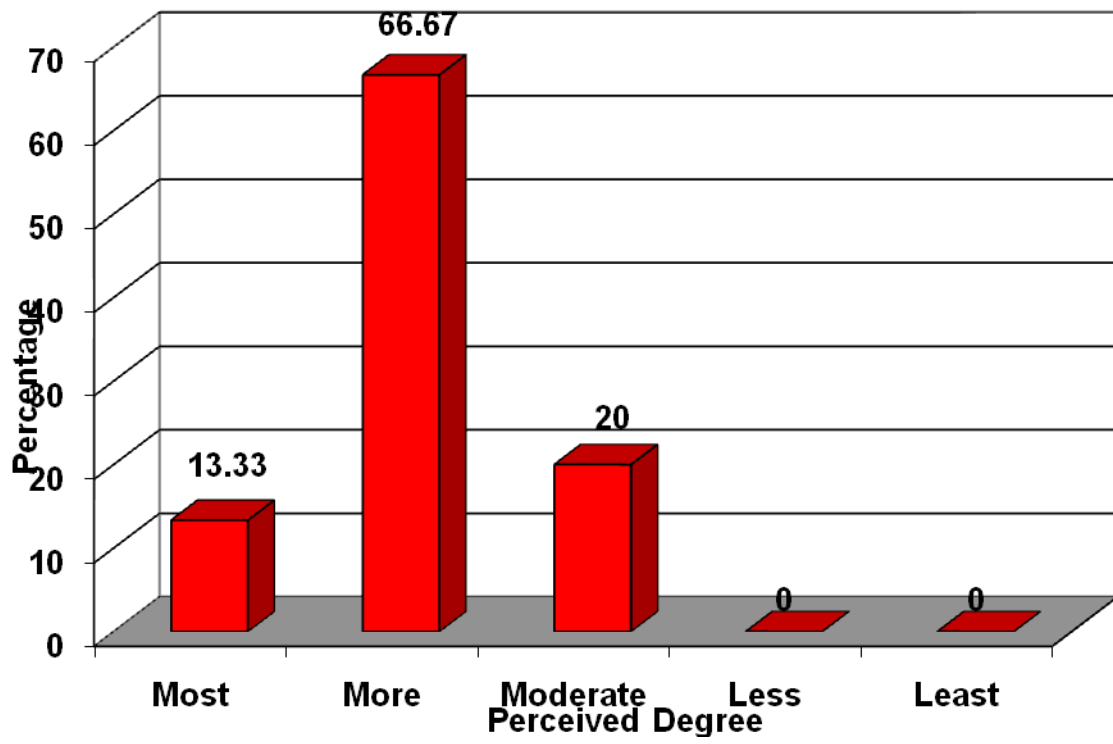


Fig.- 47: Sexual Harrassment/ Rape After Tsunami

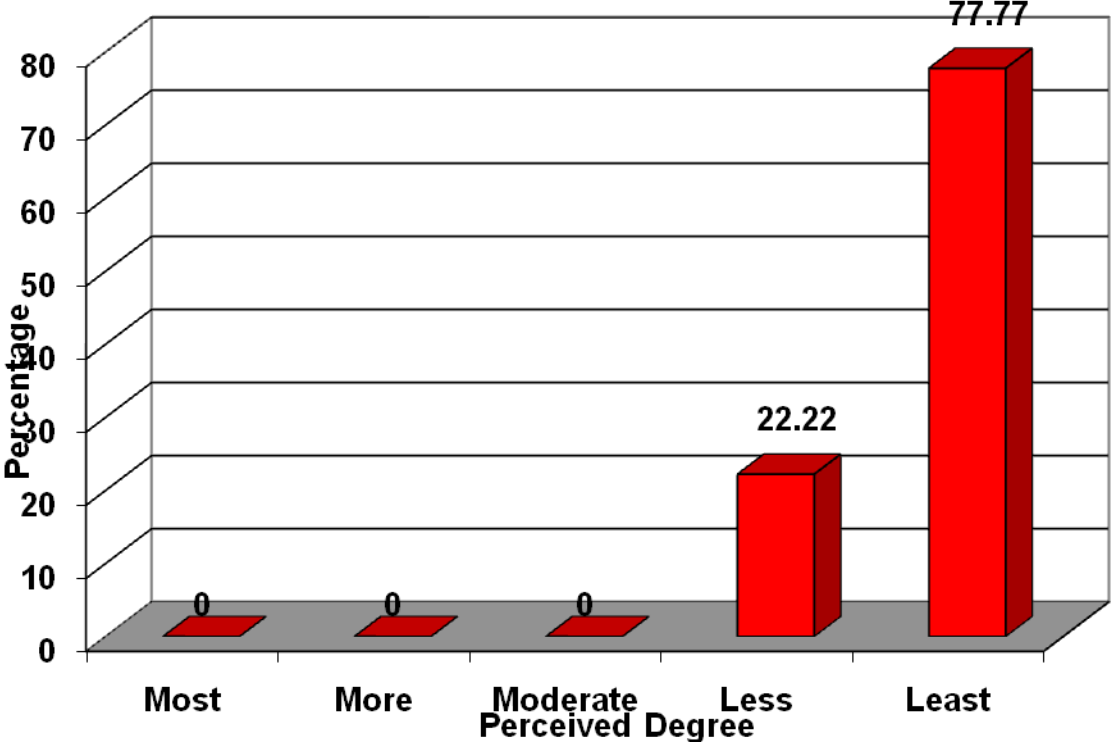


Fig.- 49: Prostitution After Tsunami

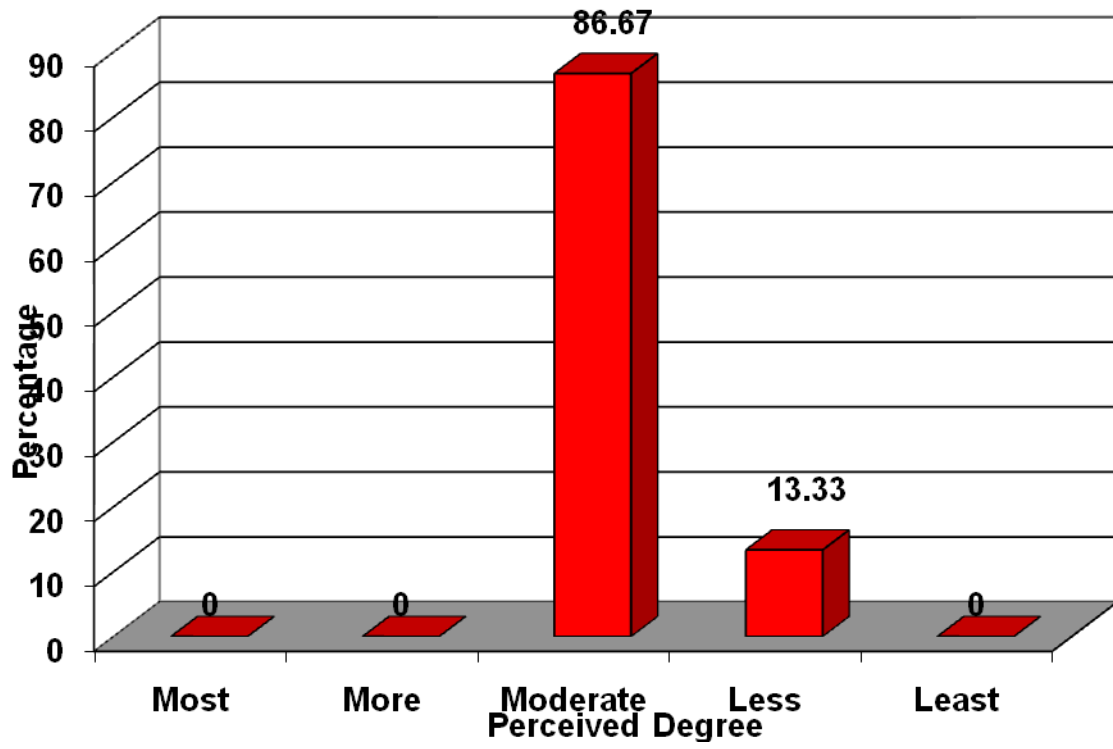


Fig.- 51: Poverty After Tsunami

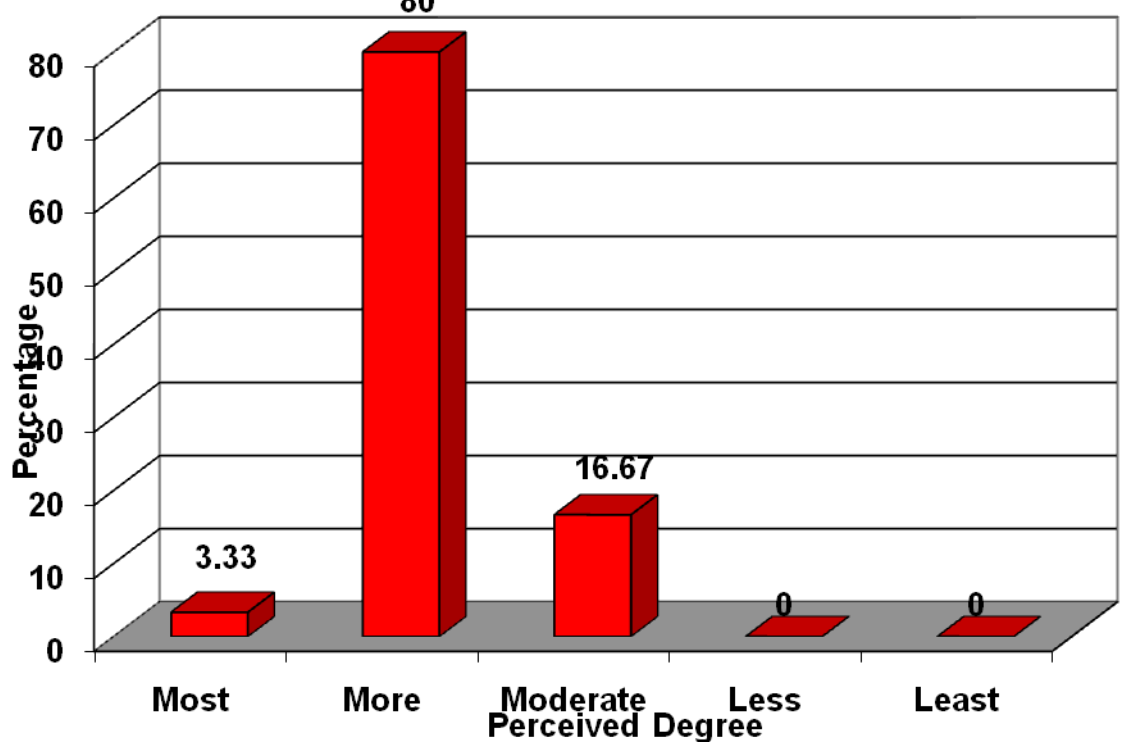


Fig.- 53: Suicide After Tsunami

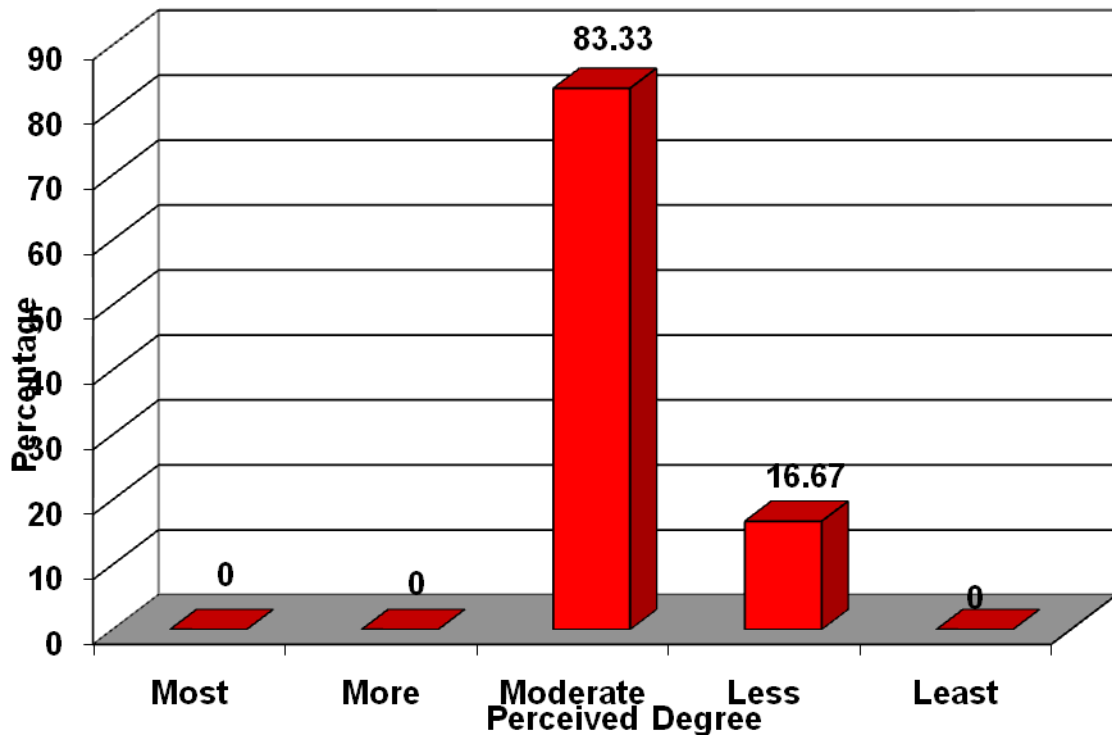


Fig.- 53: Suicide After Tsunami

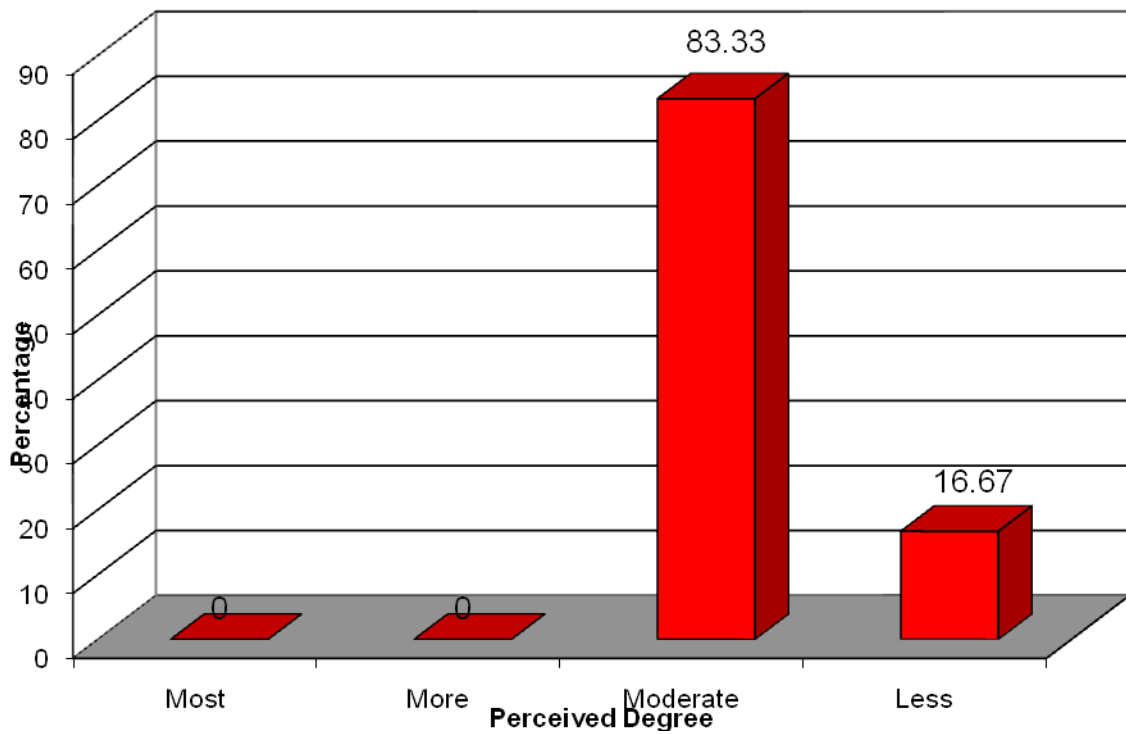


Fig.- 55: Orphans After Tsunami

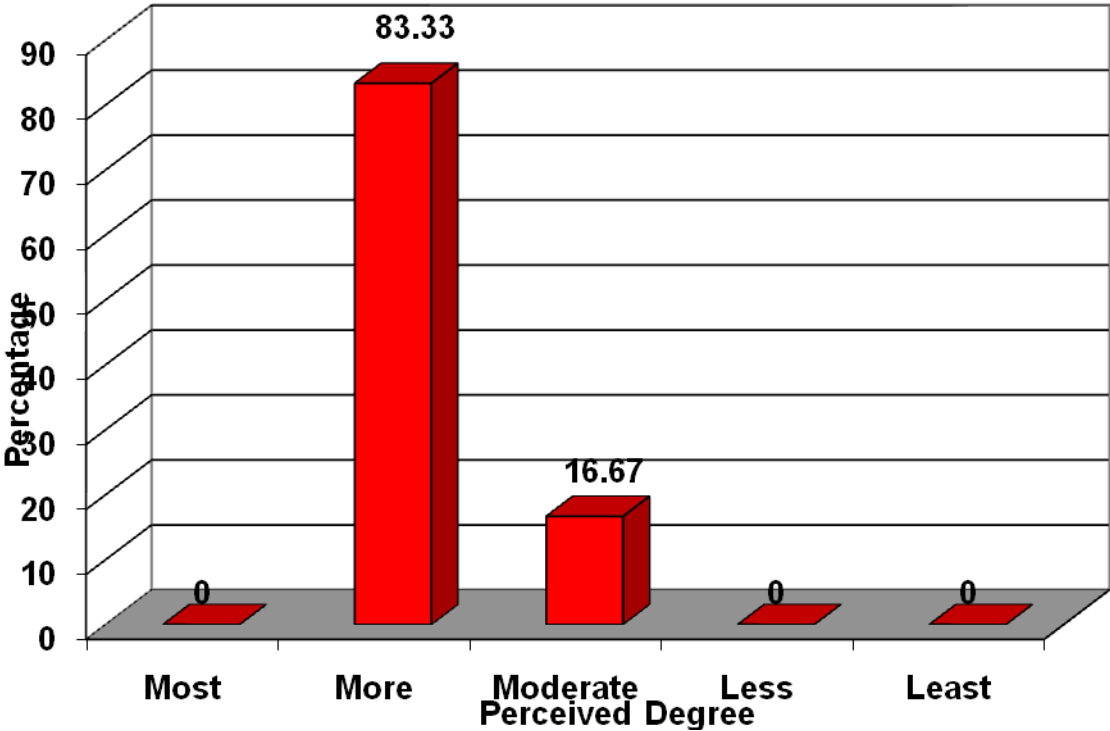


Fig.- 57: Class Discrimination After Tsunami

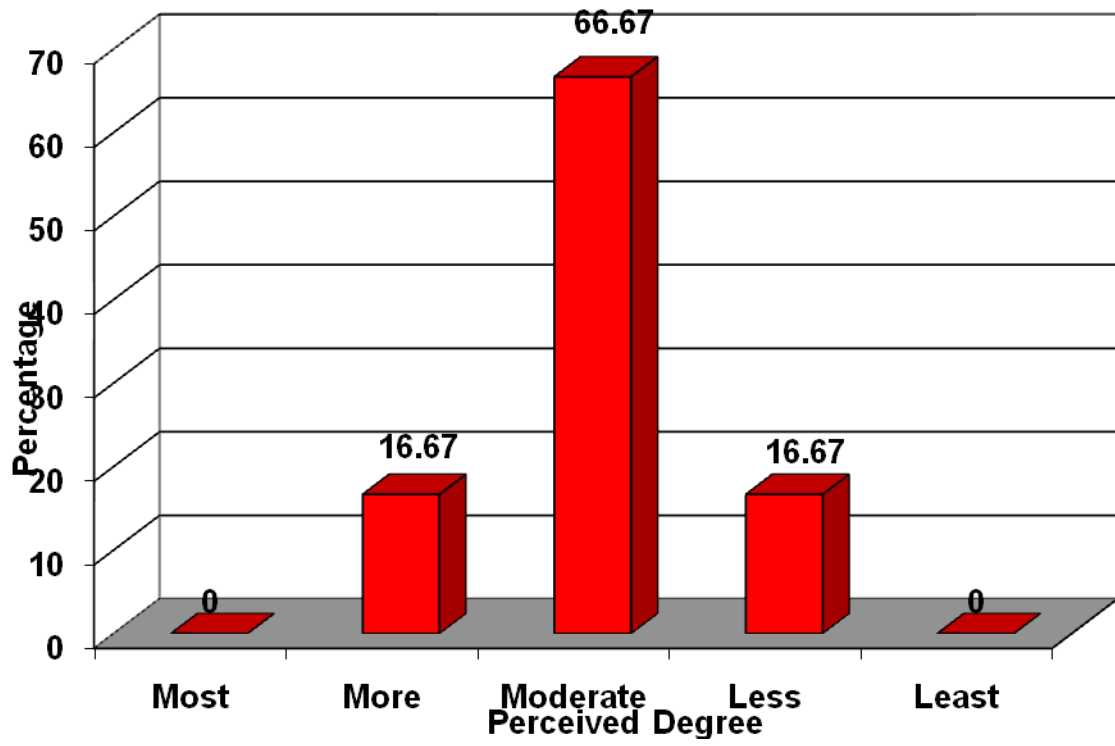


Fig.- 59: Dependency After Tsunami

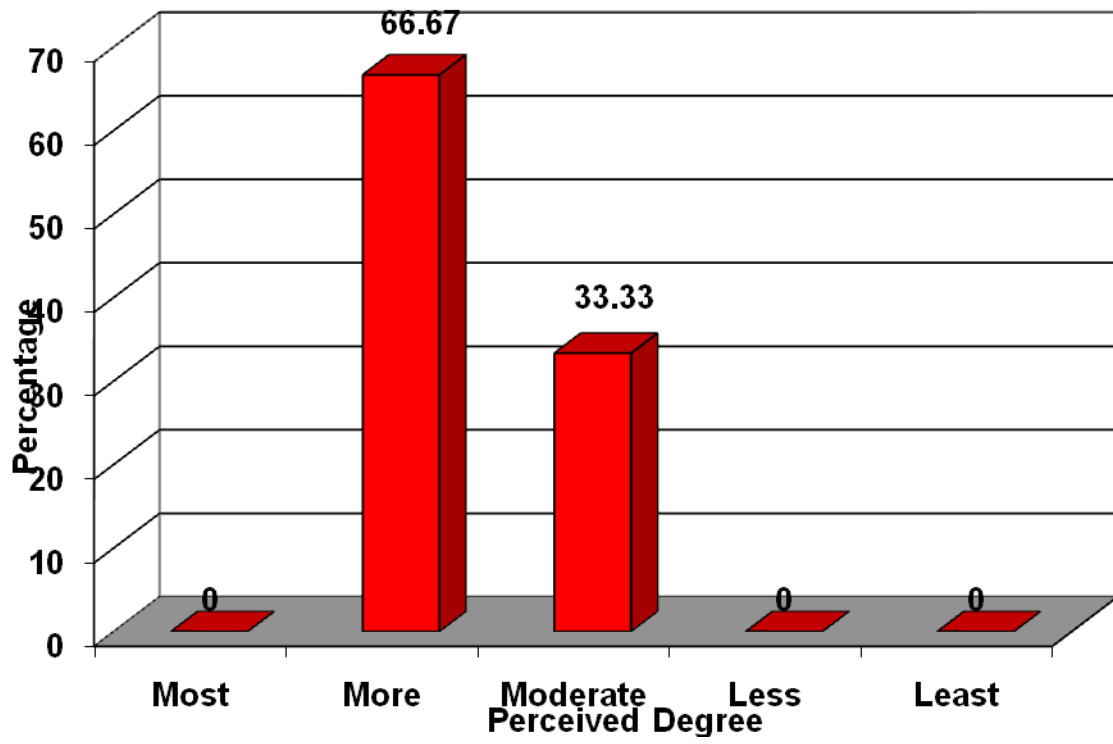


Fig. 7. Family Structure Before and After

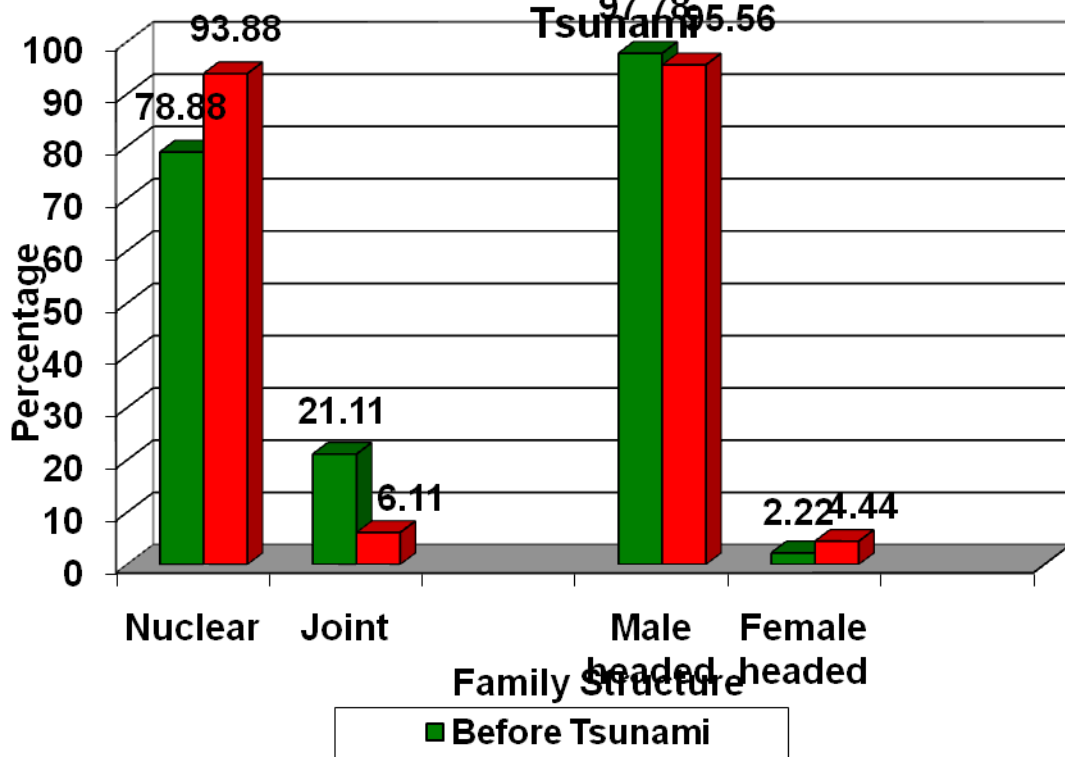


Fig. 8. Perceived Degree of Physical Infrastructural Damage (Road Before Tsunami)

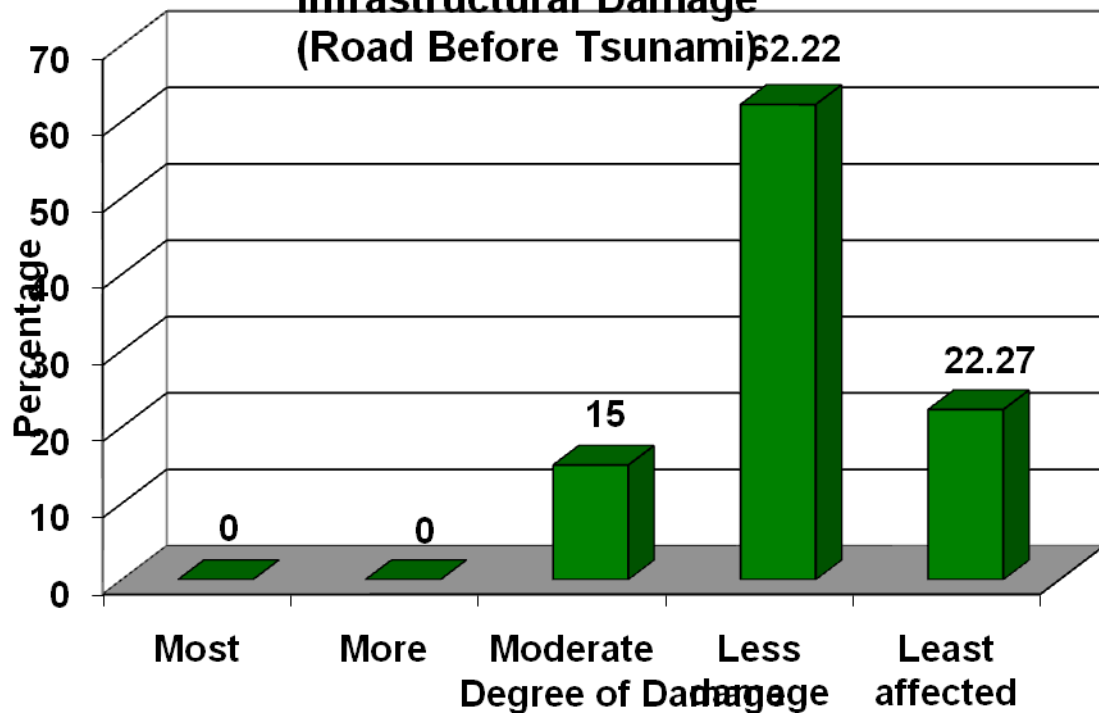


Fig. 9. Perceived Degree of Physical Infrastructural Damage (Road After Tsunami)

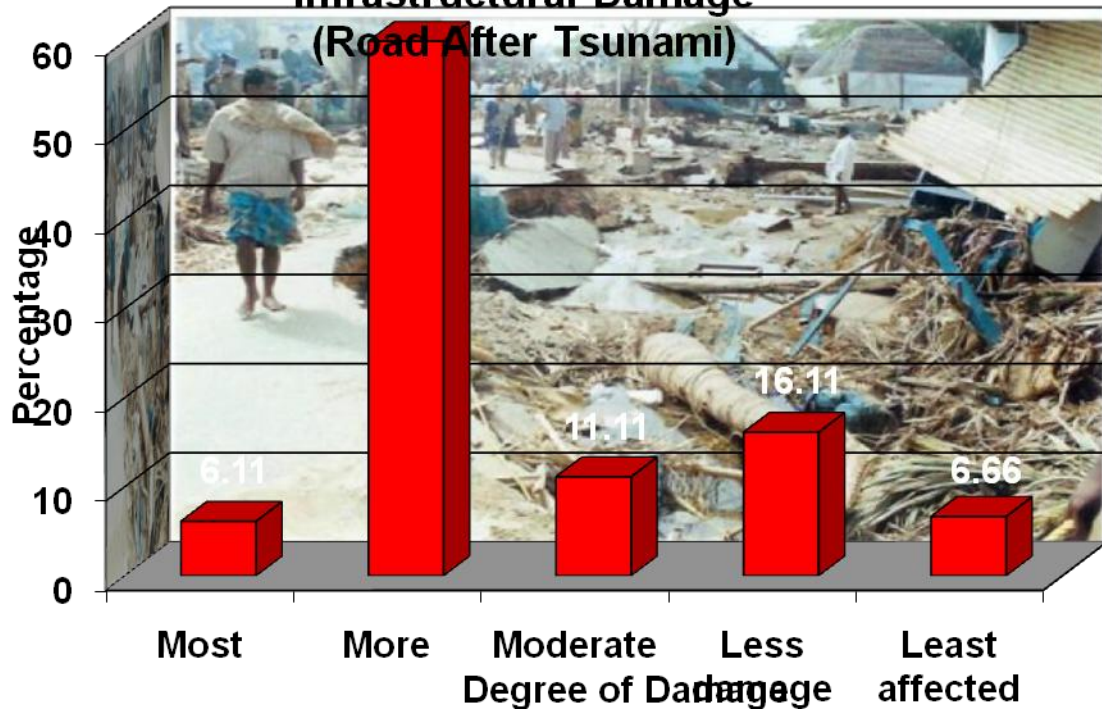


Fig. 10. Perceived Degree of Physical Infrastructural Damage (Transport Before Tsunami)

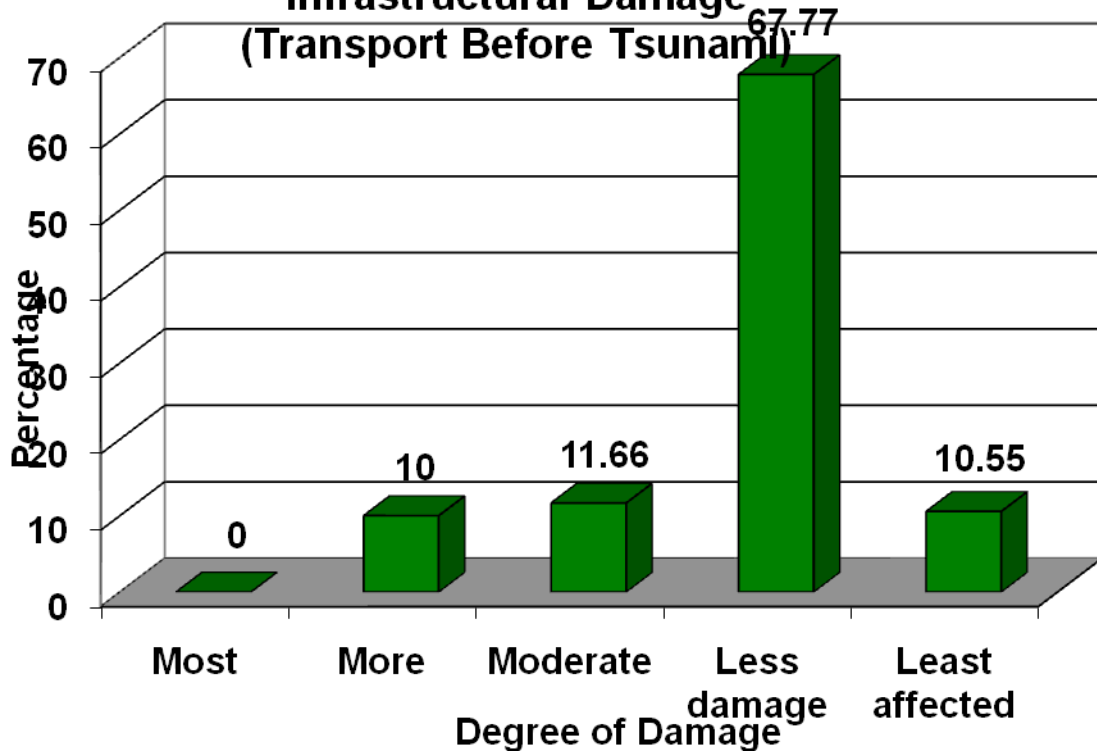


Fig. 11. Perceived Degree of Physical Infrastructural Damage (Transport After Tsunami)

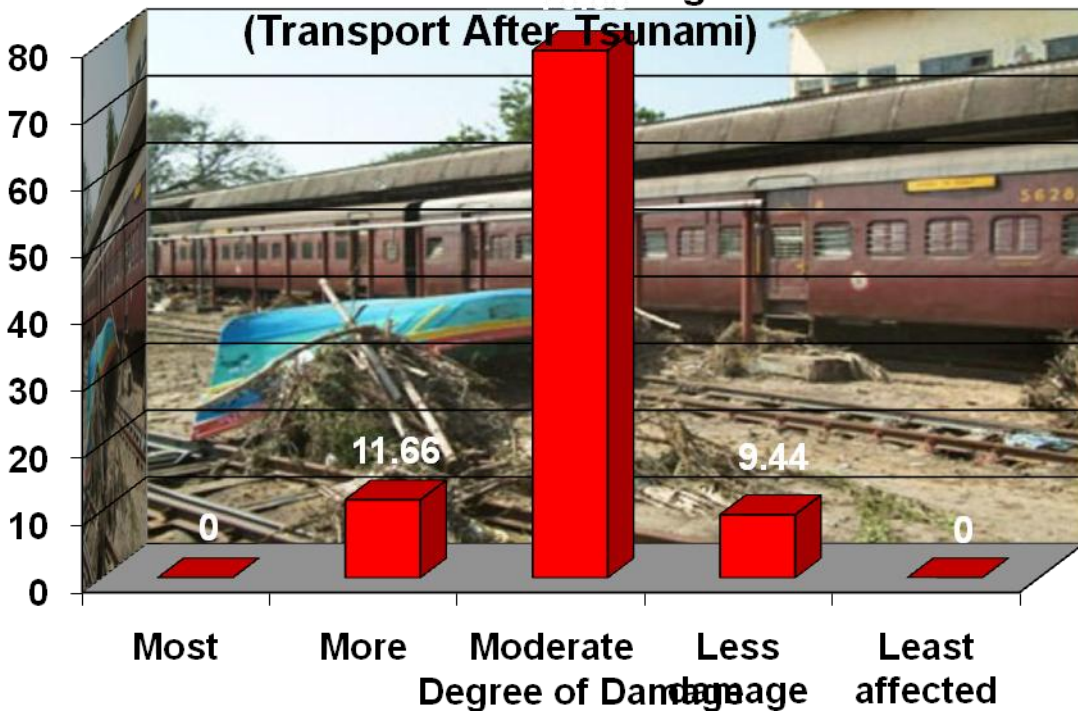


Fig. 12. Perceived Degree of Physical Infrastructural Damage

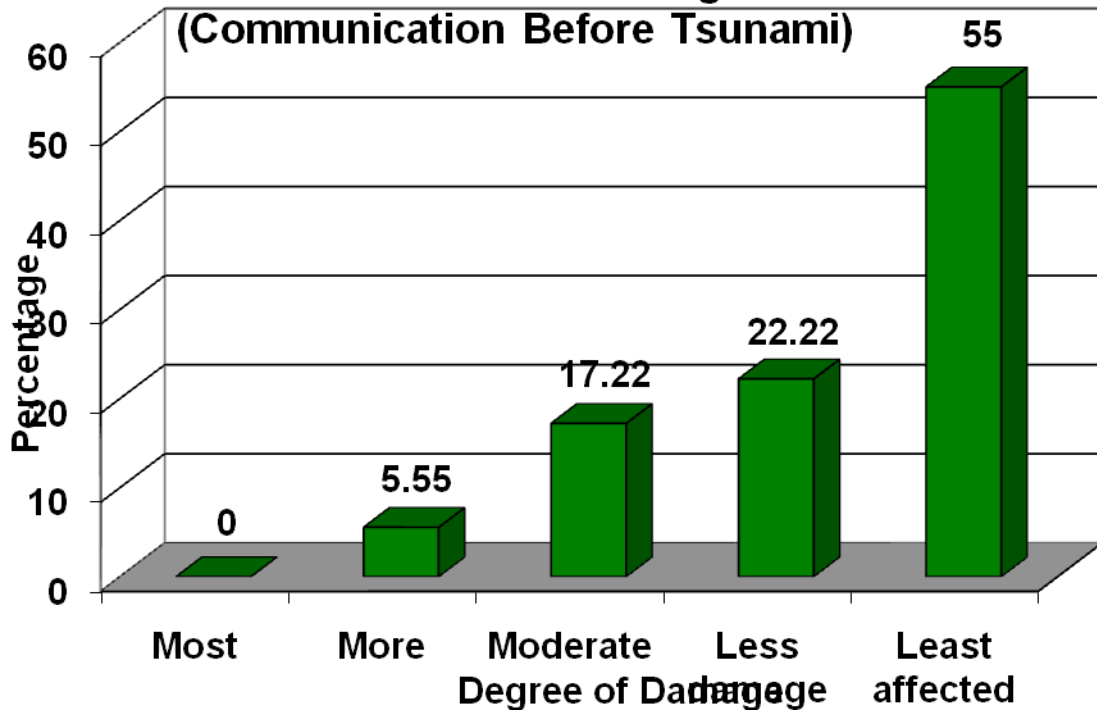


Fig. 13. Perceived Degree of Physical Infrastructural Damage

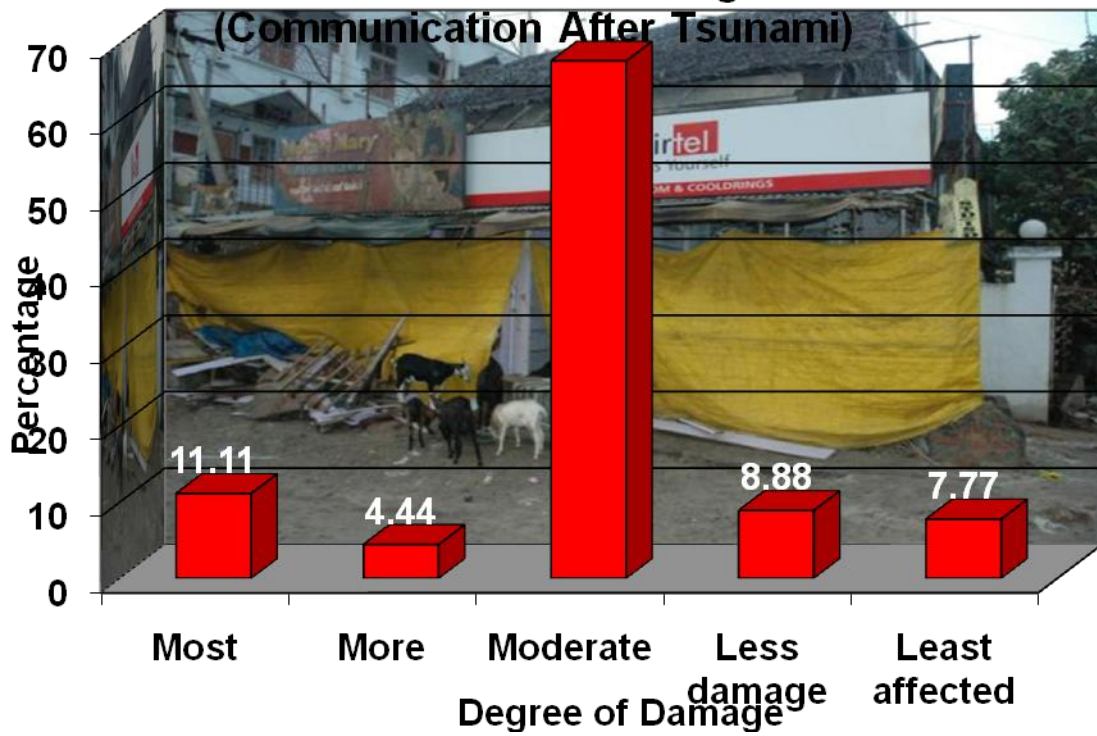


Fig. 14. Perceived Degree of Physical Infrastructural Damage

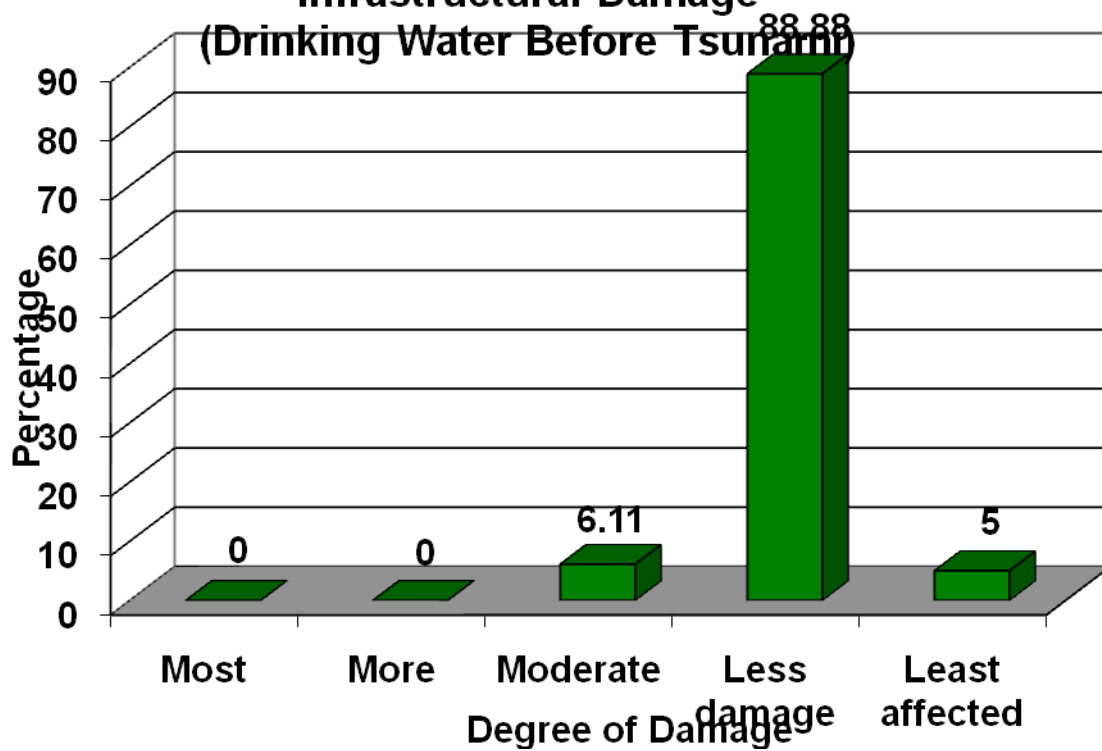


Fig. 15. Perceived Degree of Physical Infrastructural Damage

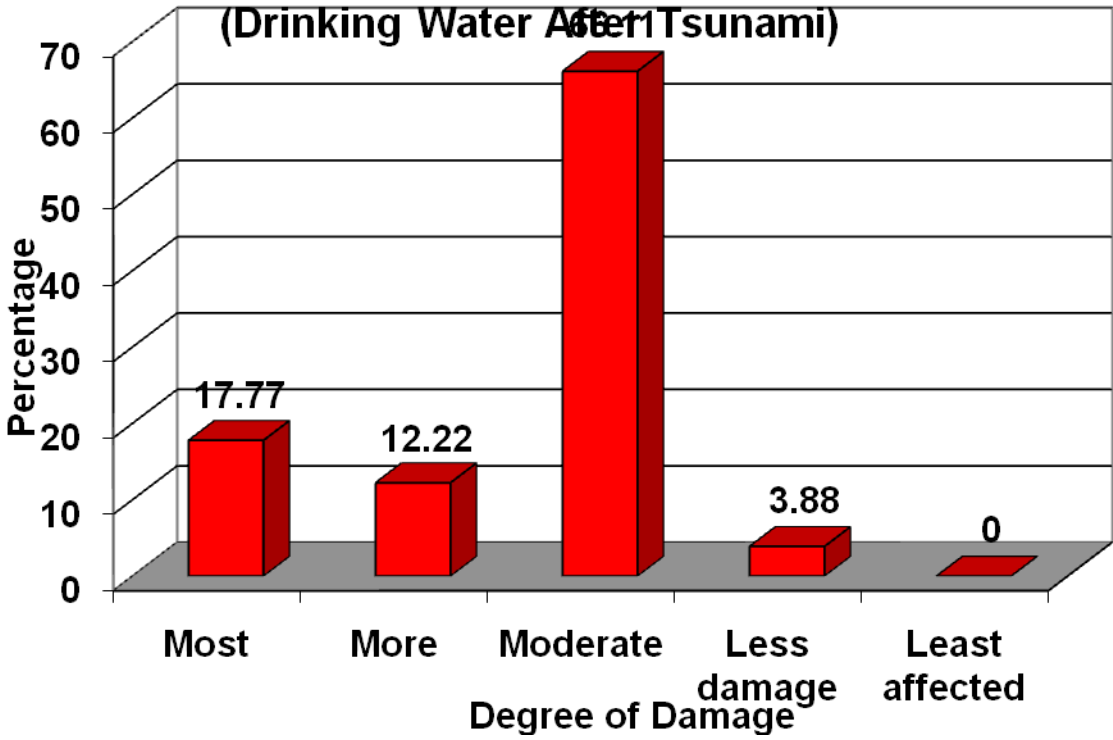


Fig. 16. Perceived Degree of Physical Infrastructural Damage

(Street Lights Before Tsunami)

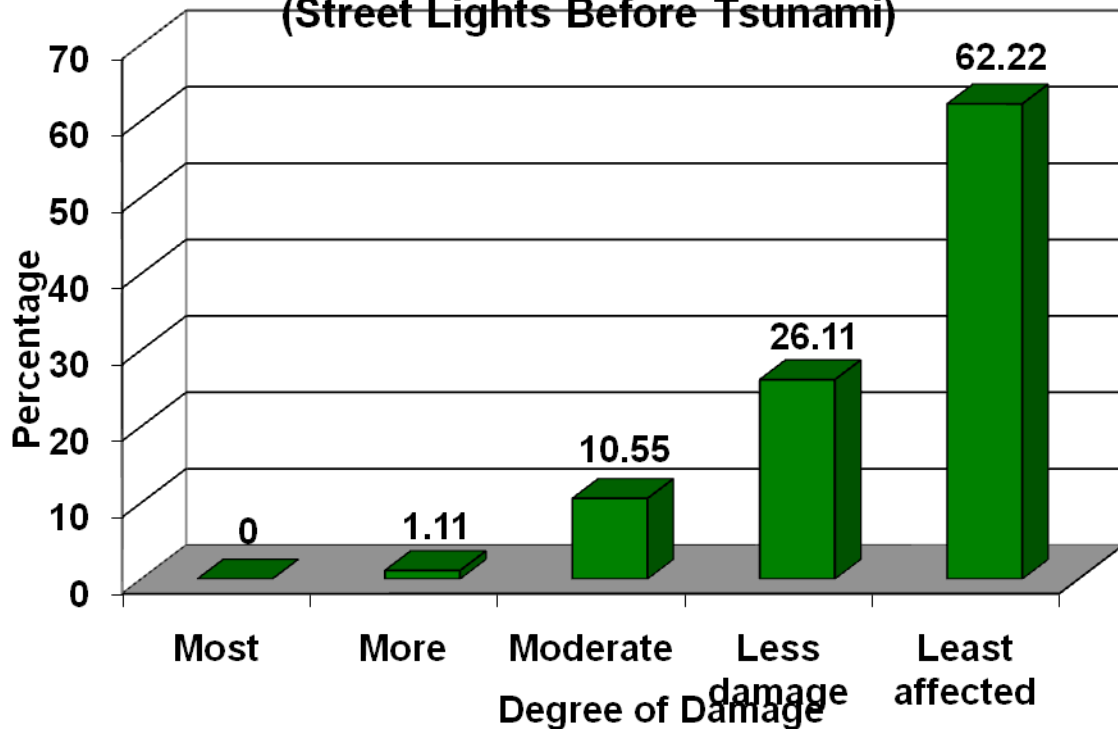


Fig. 17. Perceived Degree of Physical Infrastructural Damage (Street Lights After Tsunami)

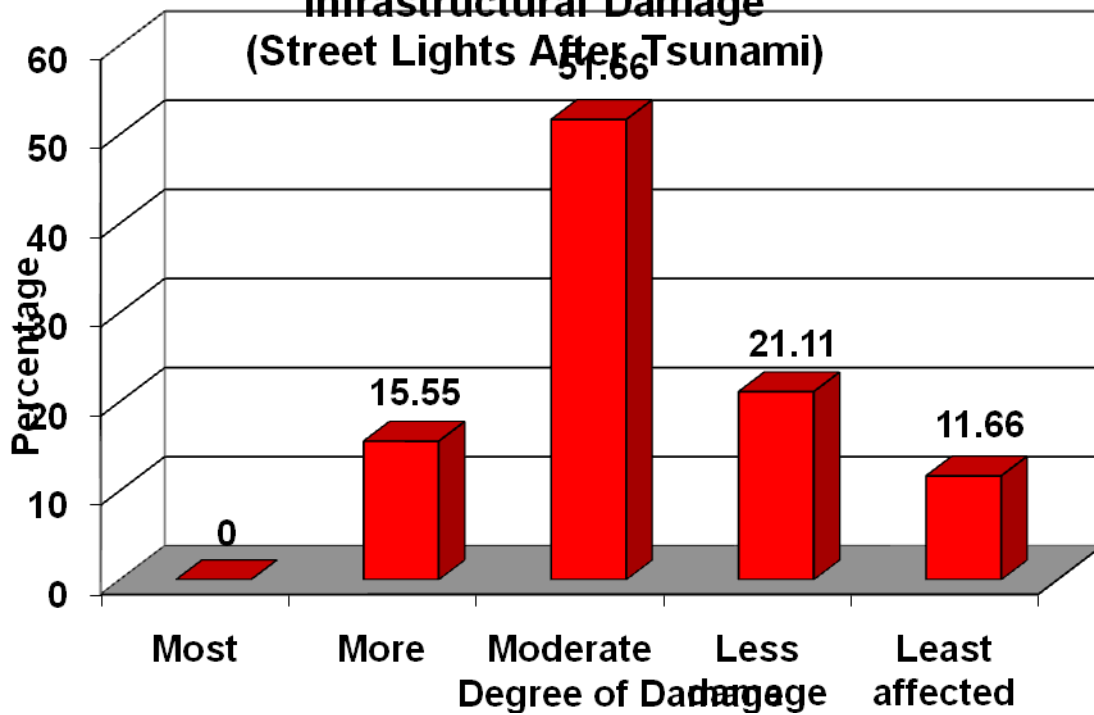


Fig. 18. Perceived Degree of Physical Infrastructural Damage (Electricity Before Tsunami)

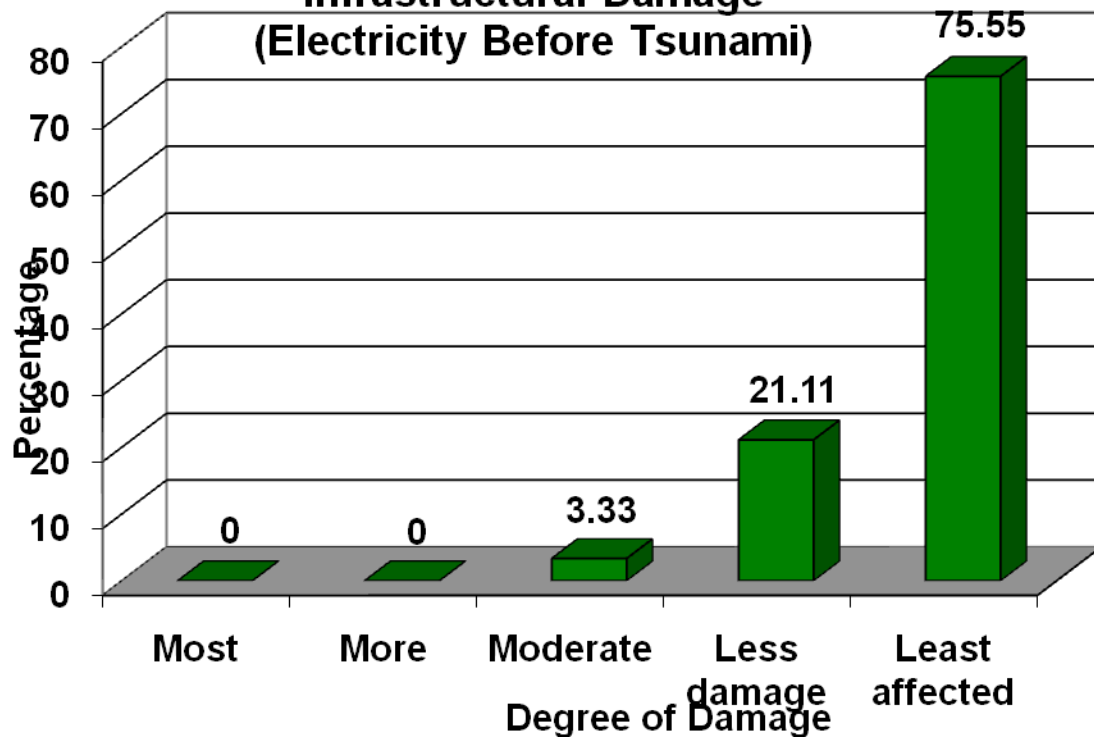


Fig. 19. Perceived Degree of Physical Infrastructural Damage (Electricity After Tsunami)

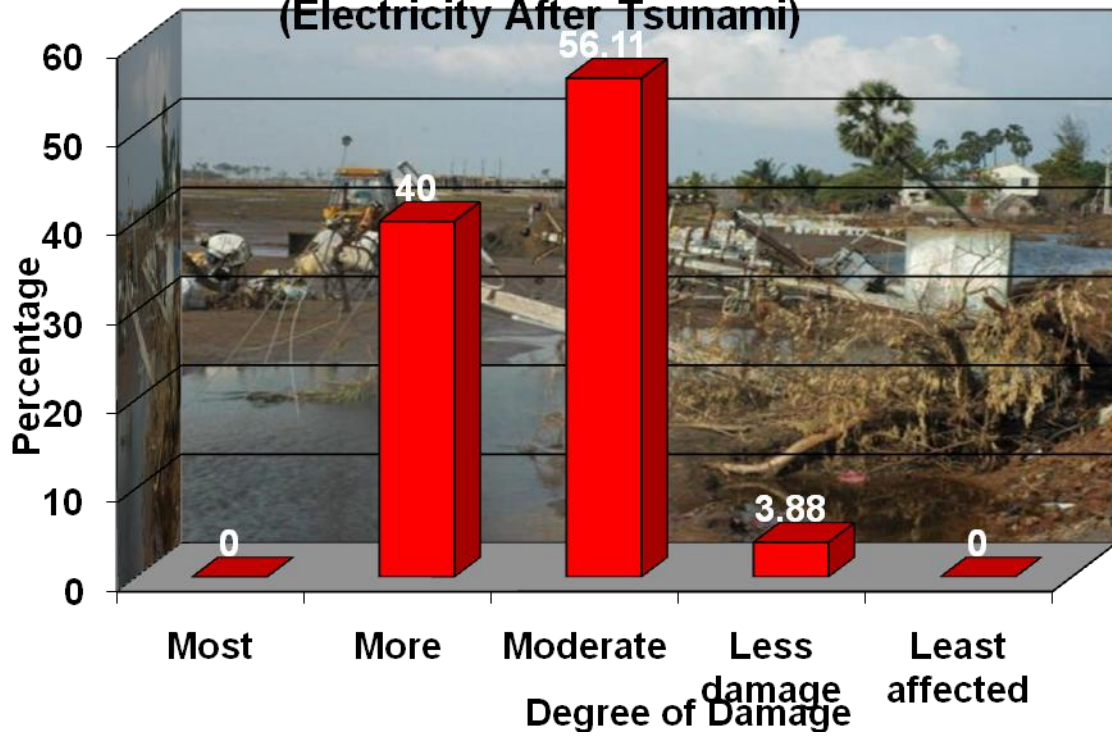


Fig. 20. Perceived Degree of Physical Infrastructural Damage

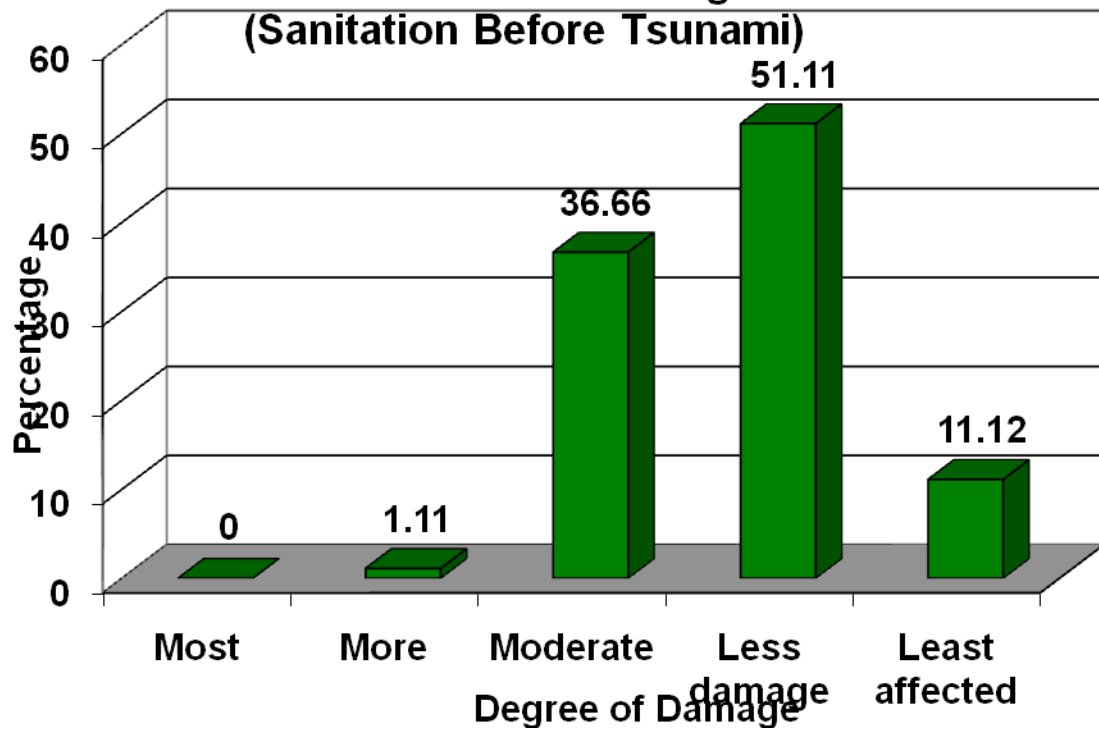


Fig. 21. Perceived Degree of Physical Infrastructural Damage (Sanitation After Tsunami)

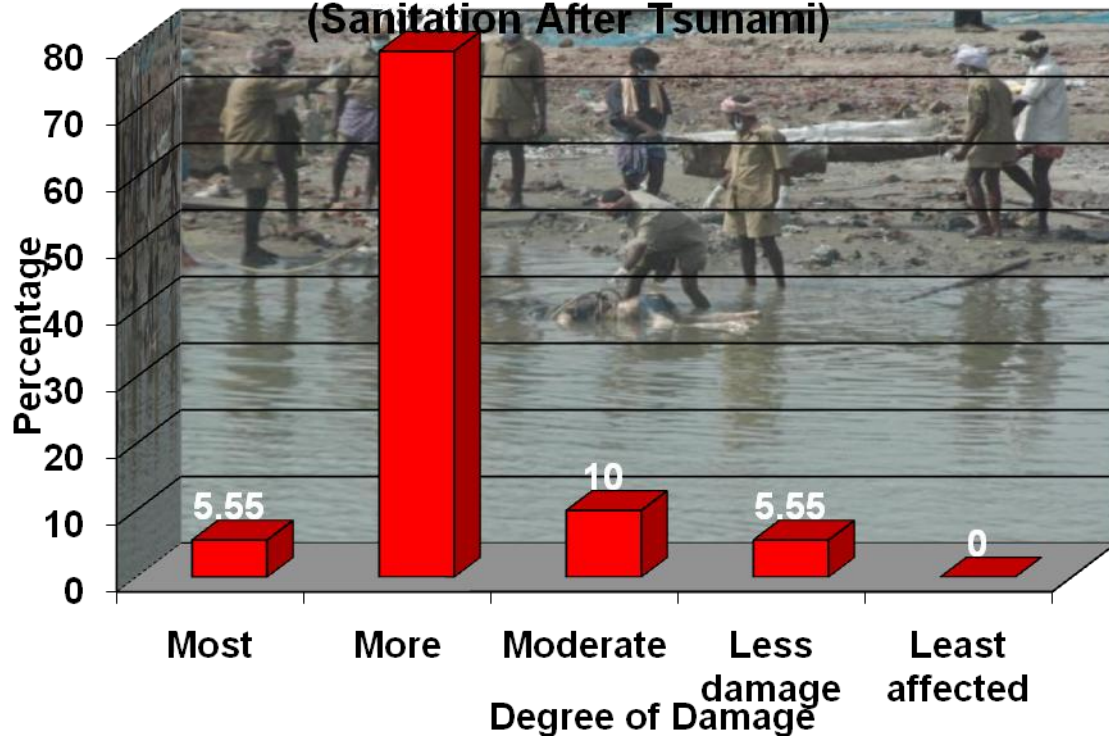


Fig. 22. Perceived Degree of Physical Infrastructural Damage

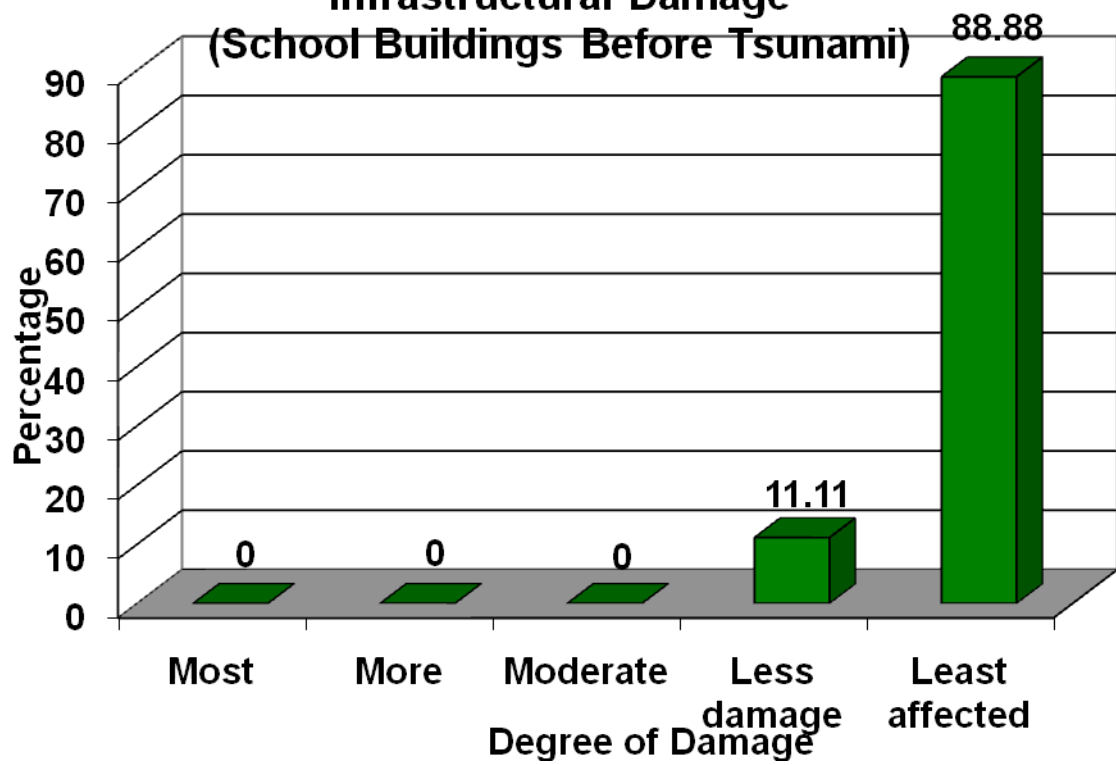


Fig. 23. Perceived Degree of Physical Infrastructural Damage

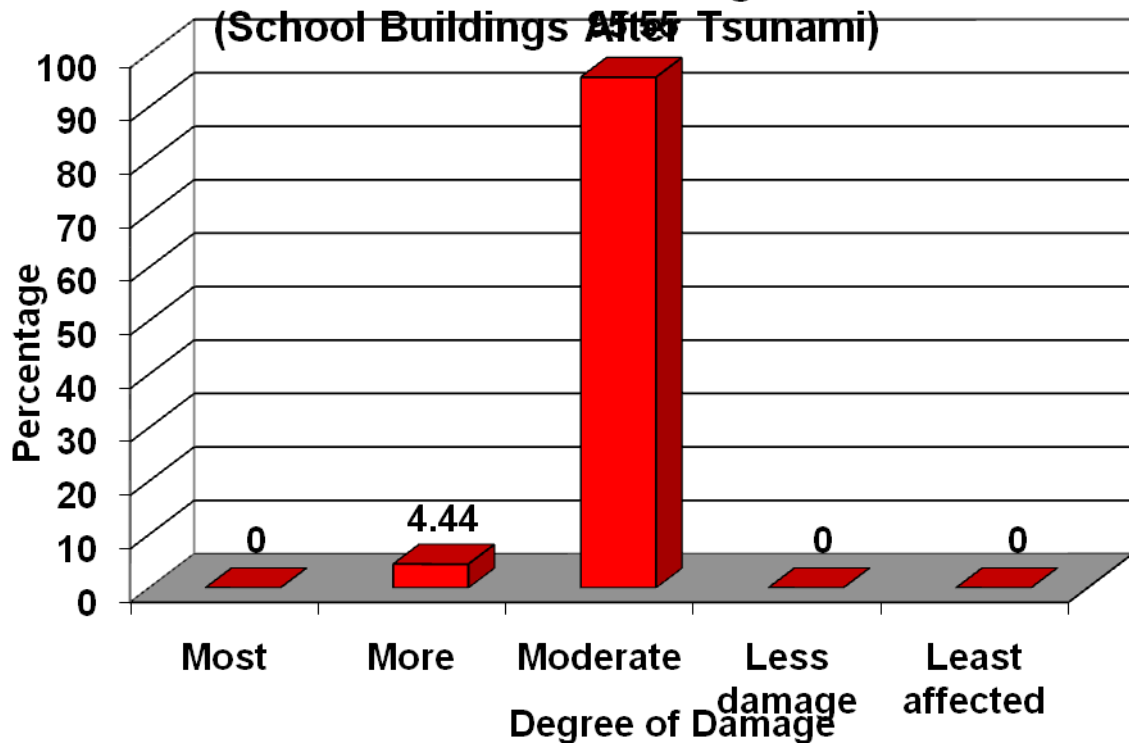


Fig. 24. Perceived Degree of Physical Infrastructural Damage

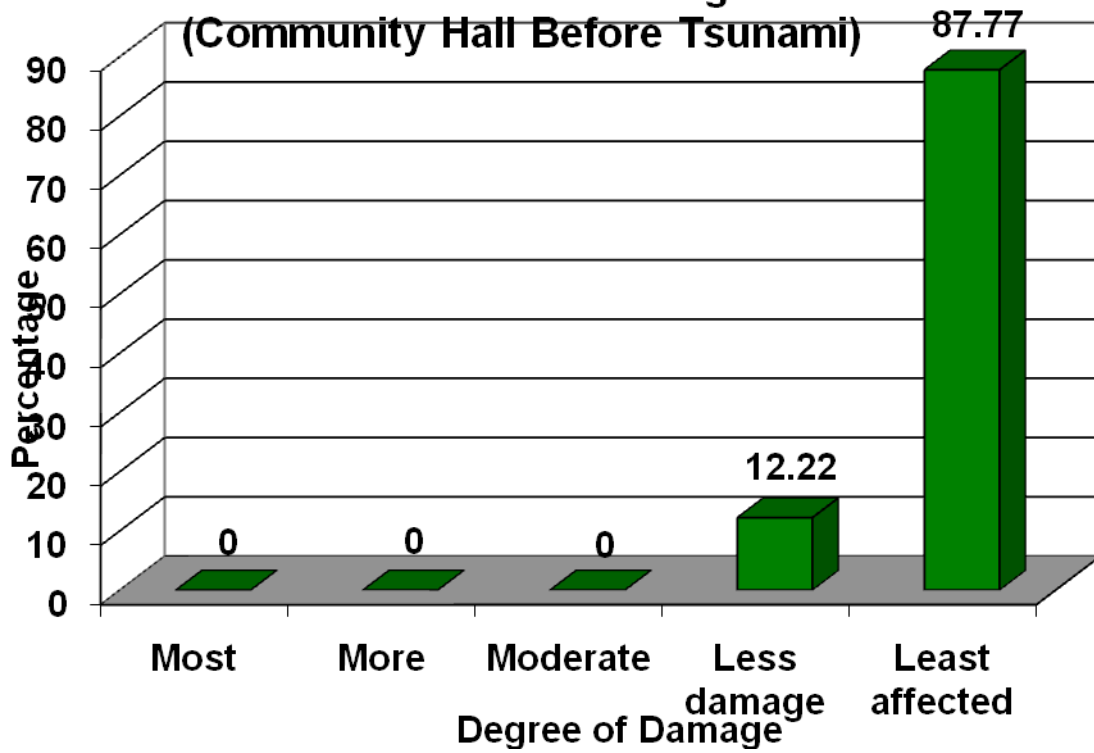


Fig. 25. Perceived Degree of Physical Infrastructural Damage

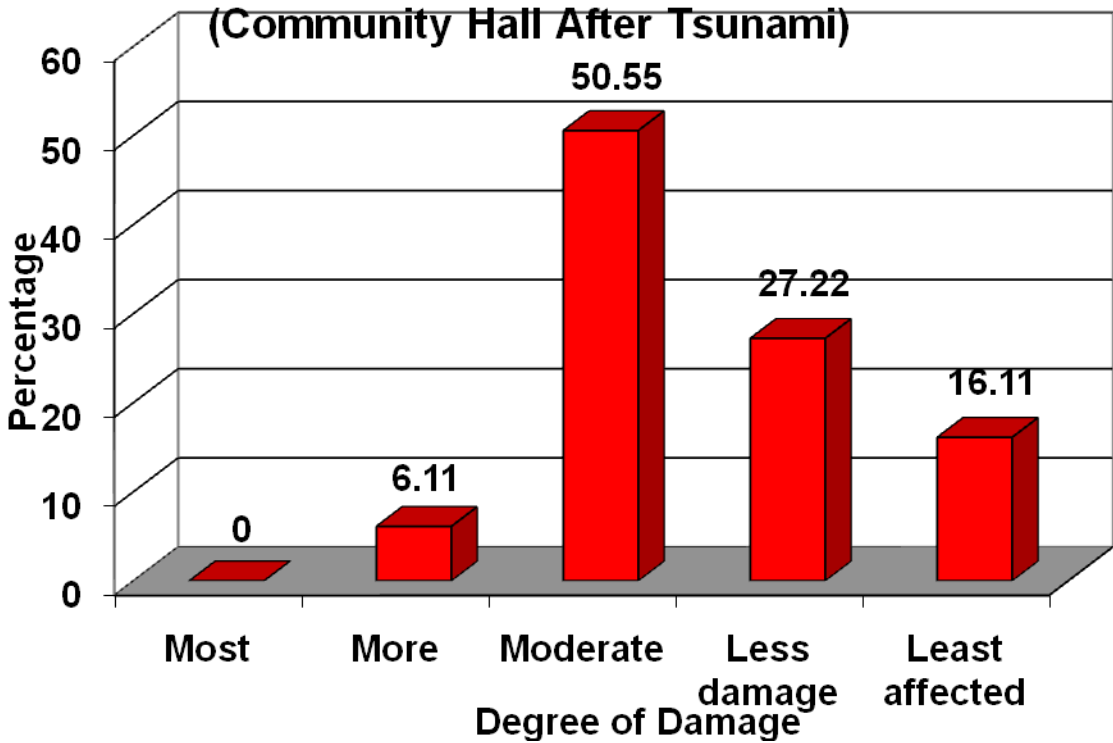


Fig. 26. Social Interaction - Cooperation (Before Tsunami)

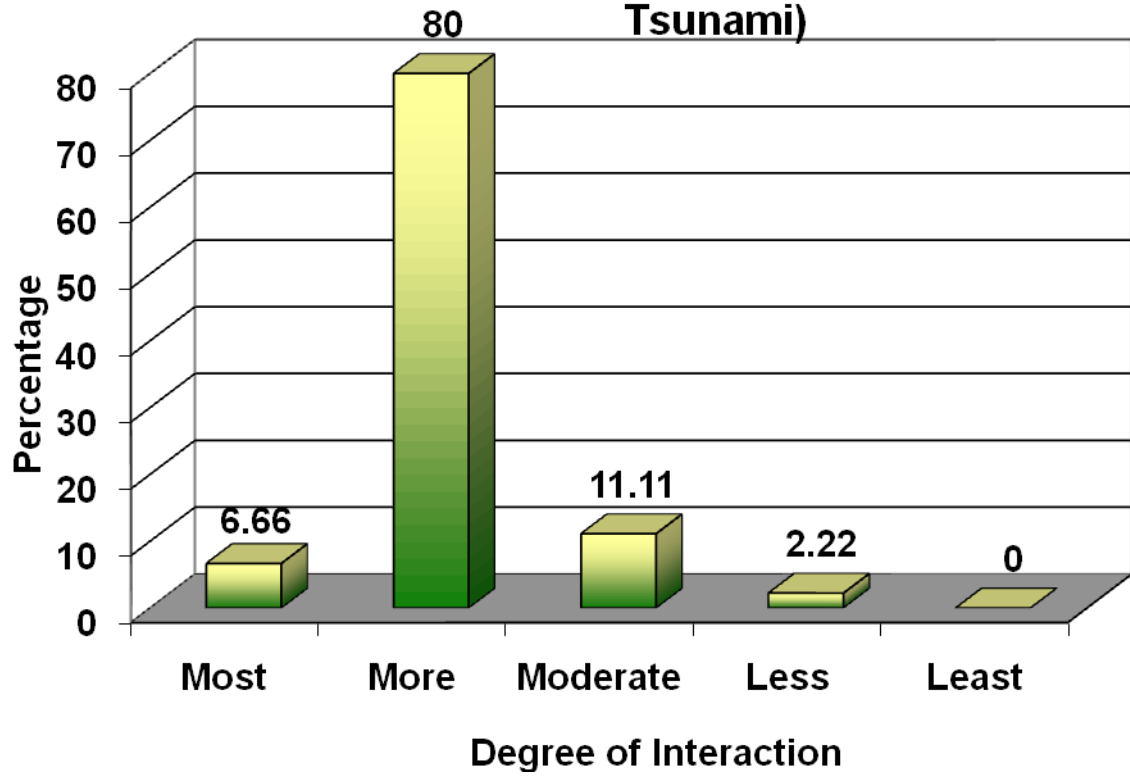


Fig. 27. Social Interaction - Cooperation (After Tsunami)

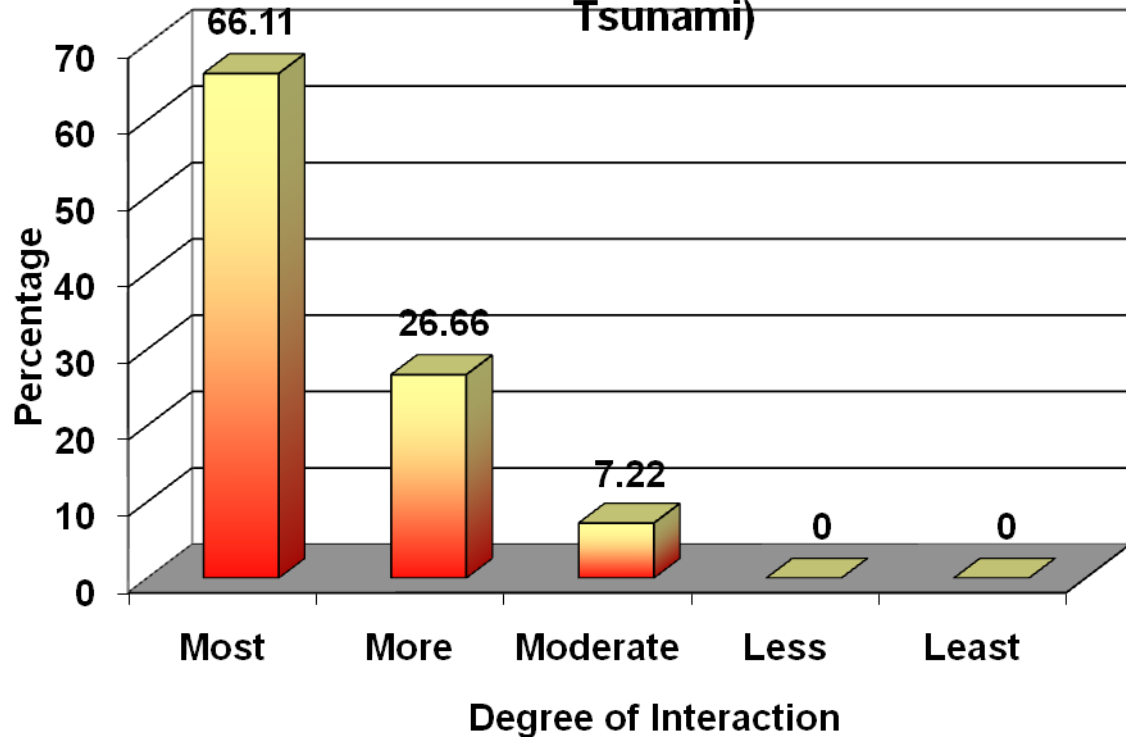


Fig. 28. Social Interaction - Competition (Before

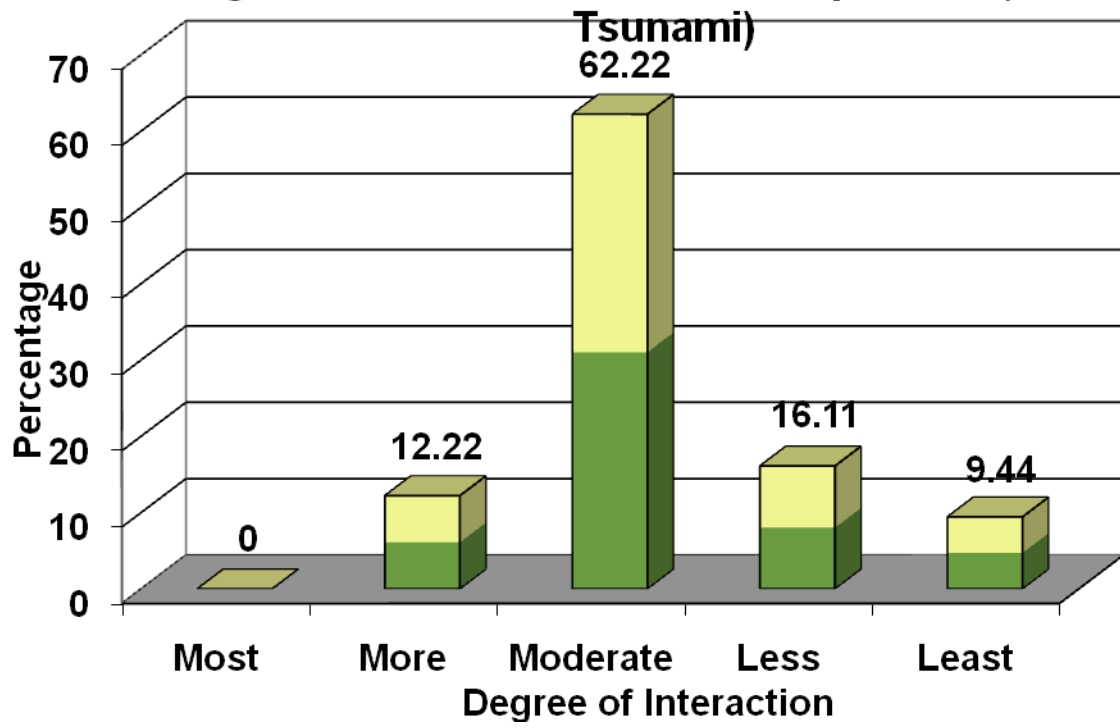


Fig. 29. Social Interaction - Competition (After Tsunami)

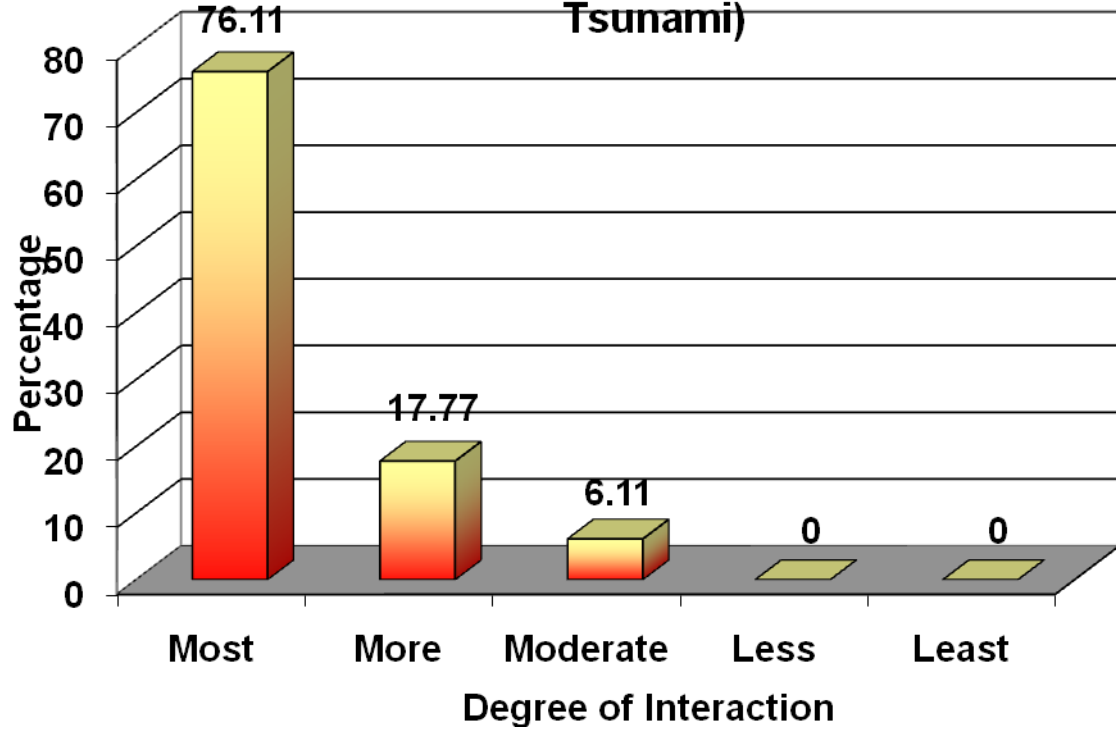


Fig. 30. Social Interaction - Conflict (Before Tsunami)

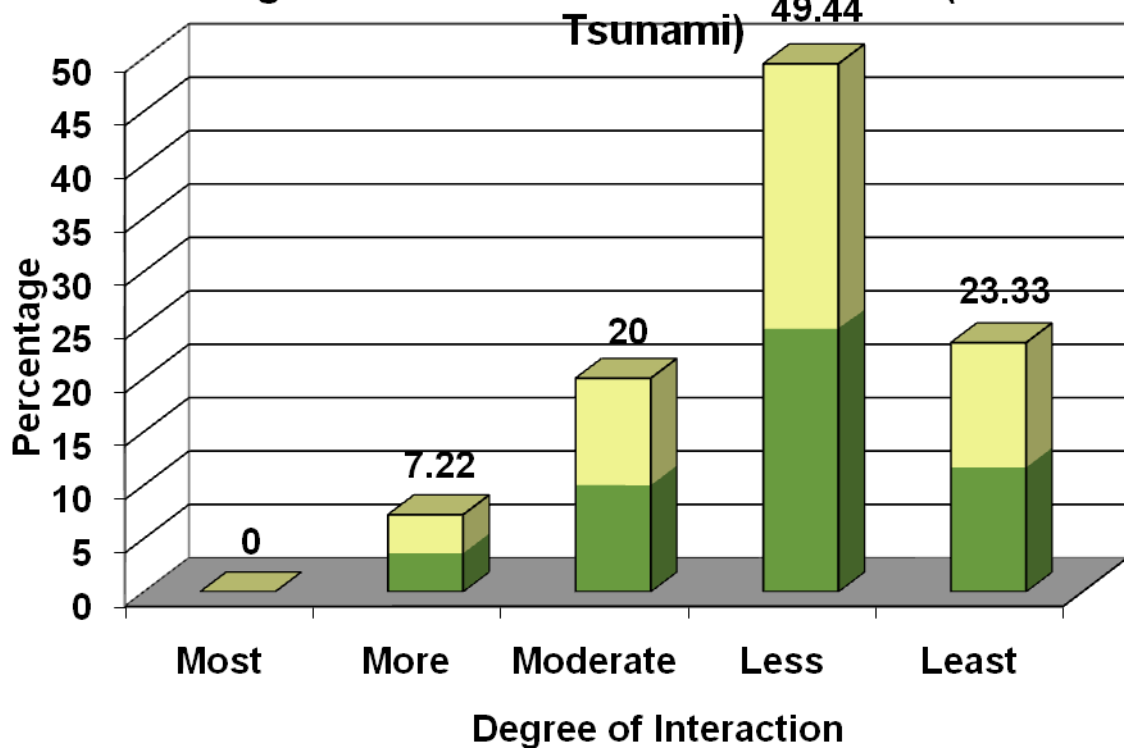


Fig. 31. Social Interaction - Conflict (After Tsunami)

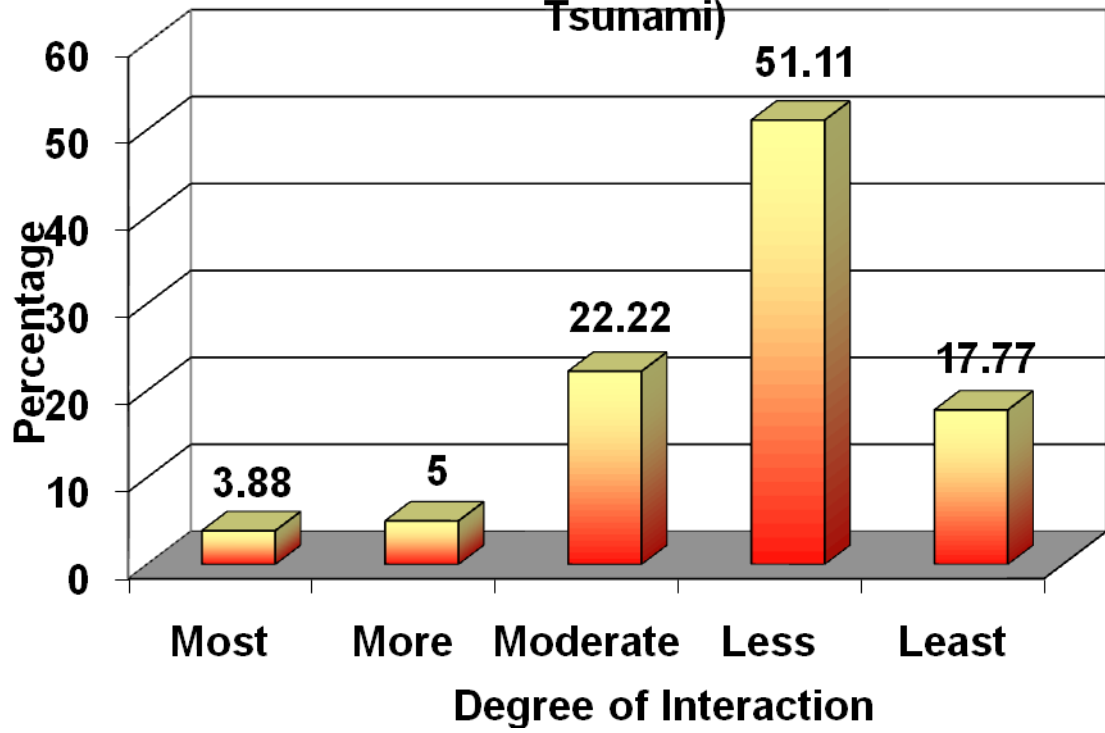


Fig. 32. Social Interaction - Accommodation
(Before 5/11/2011)

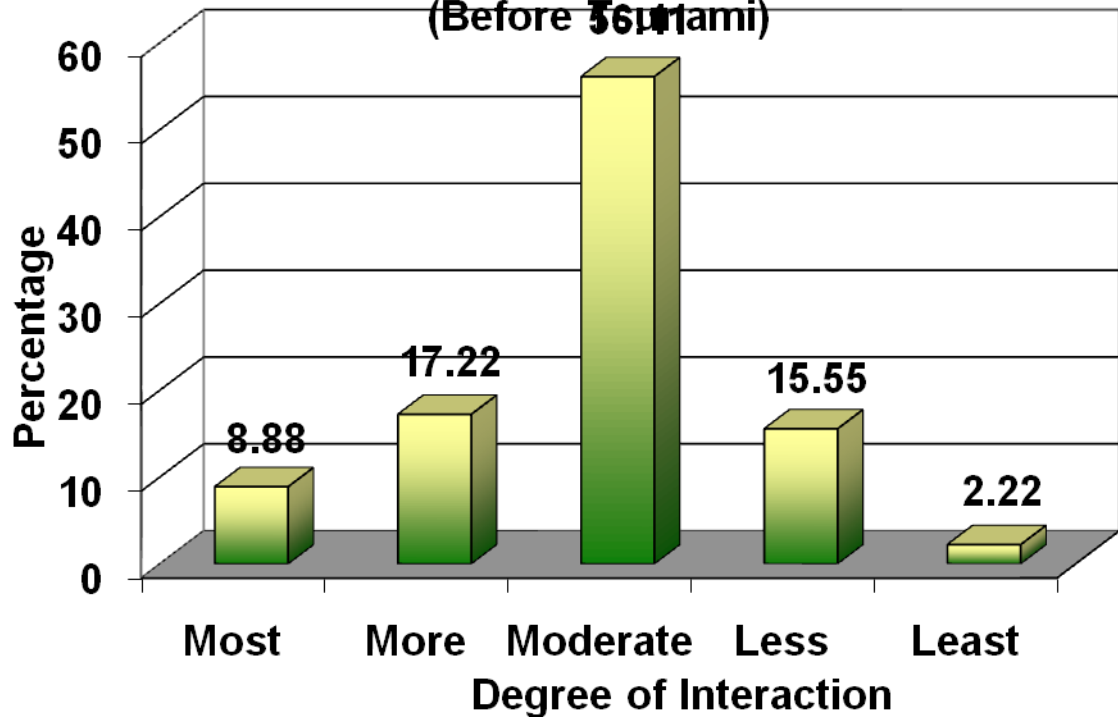


Fig. 33. Social Interaction - Accommodation

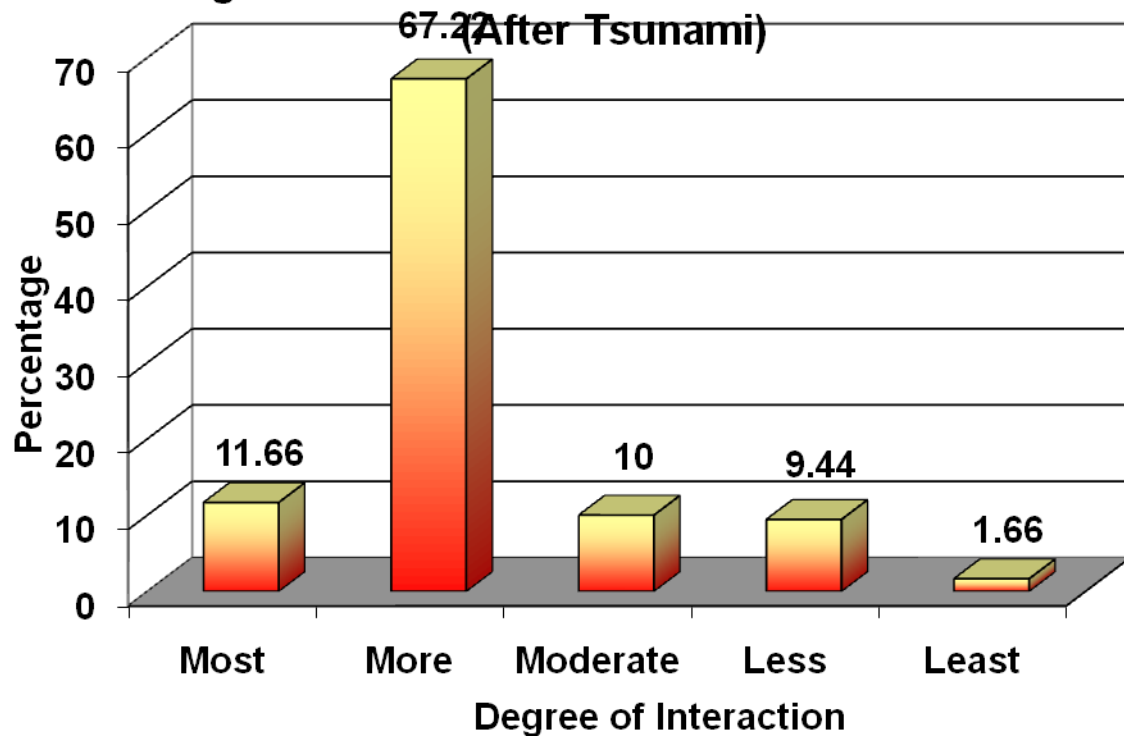


Fig. 34. Social Interaction - Assimilation (Before Tsunami)

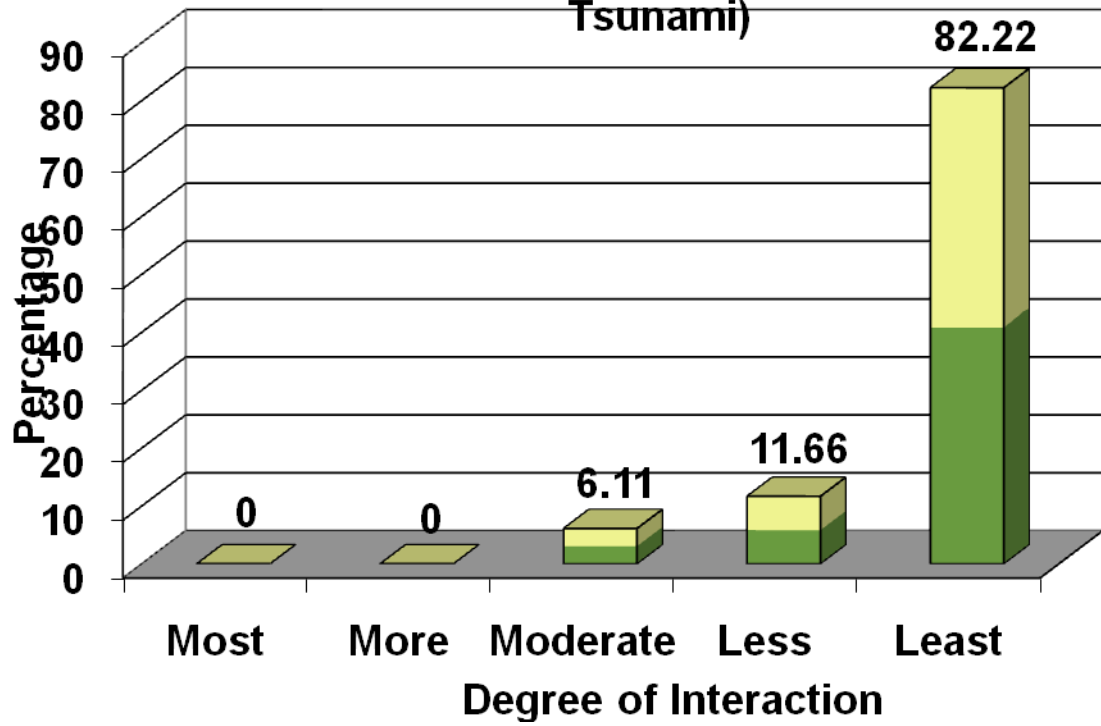


Fig. 35. Social Interaction - Assimilation (After Tsunami)

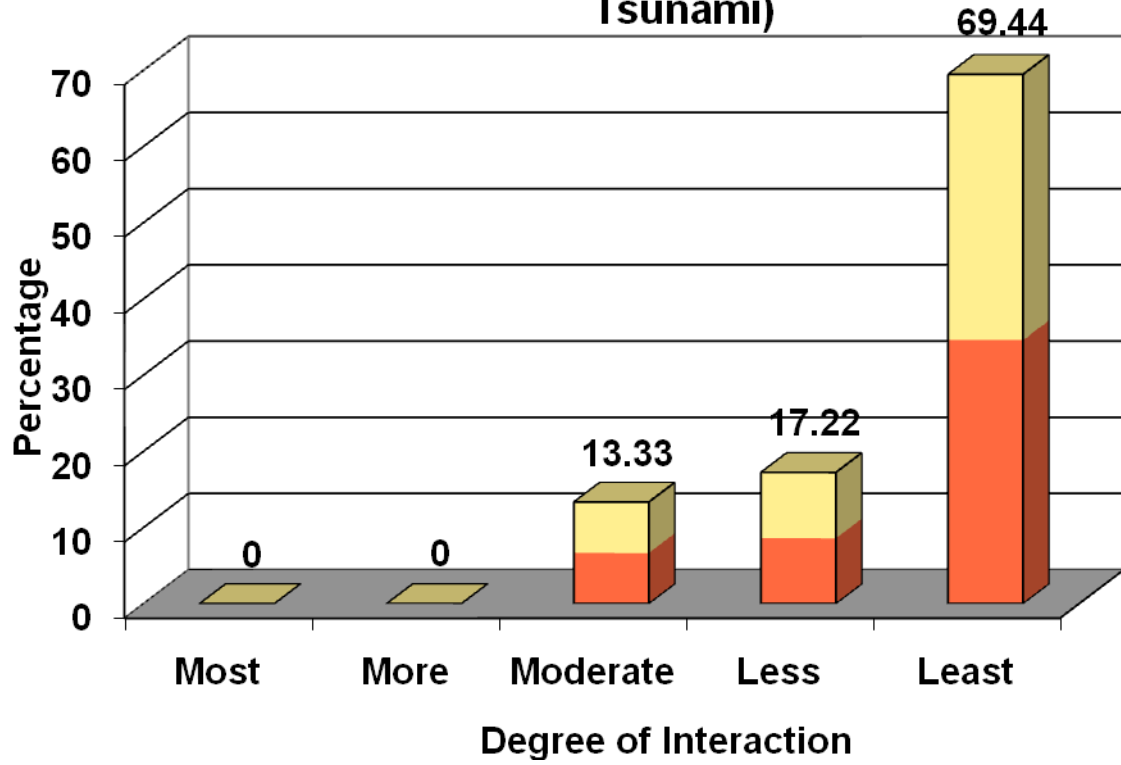




Plate 22. Telephone lines damaged by Tsunami



Plate 23. Water Contamination by the deadbodies of people hit by Tsunami



Plate 20. Physical capital damaged by Tsunami



Plate 21. Electric post damaged by Tsunami



Plate 18. Railway track hindered by boat moved by Tsunami waves



Plate 19. Tsunami dragged boat hindering railway transport at Nagaipattinam junction



Plate 16. Bridge damaged by Tsunami waves



Plate 17. Road transport affected by Tsunami dragged boat



Plate 14. Link road eroded by Tsunami



Plate 15. Debris accumulated on the street roads by Tsunami



Plate 12. Boats damaged by Tsunami



Plate 13. Destroyed boats of Tsunami



Plate 10. Tsunami affected paddy field



Plate 11. Tsunami affected groundnut field



Plate 8. Household articles damaged by Tsunami



Plate 9. Displacement of Tsunami victims



Plate 6. Houses demolished by Tsunami



Plate 7. Houses slashed by Tsunami waves



Plate 4. Tsunami victim breaking out of sadness



Plate 5. Tsunami victim under depression



Plate 3. Helpless depressed Tsunami widow

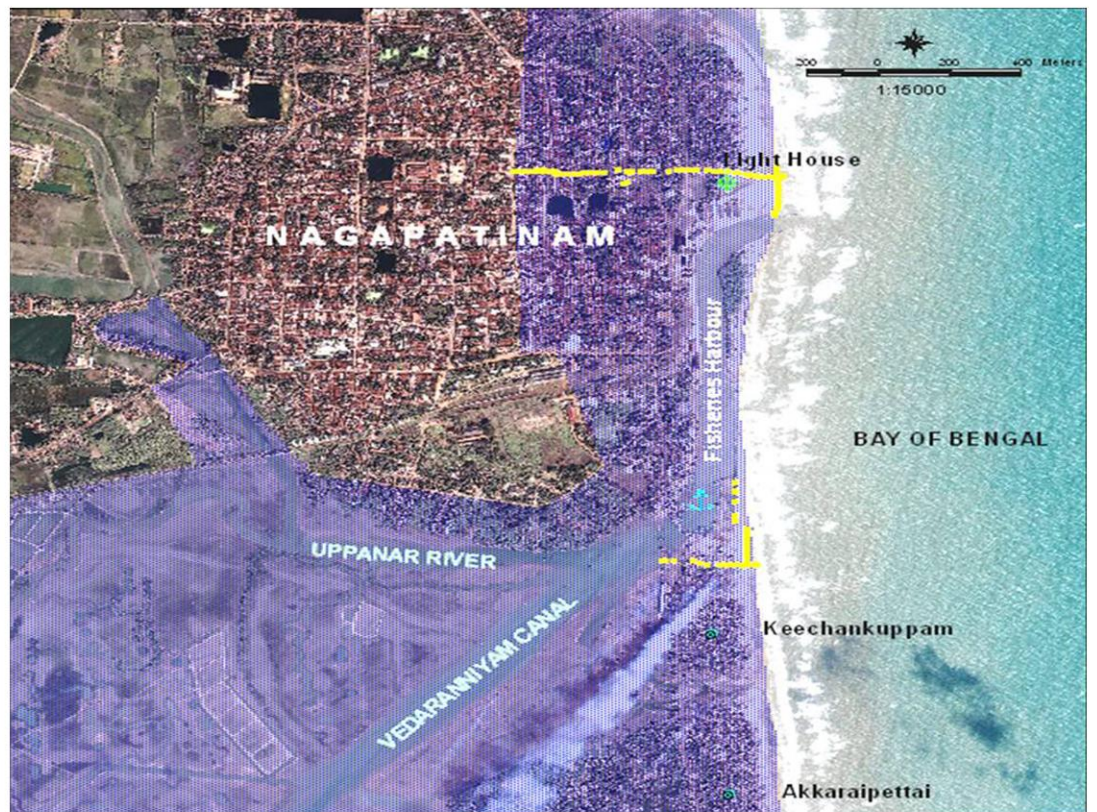


Plate 2. Intrusion of sea-water in Nagapattinam district

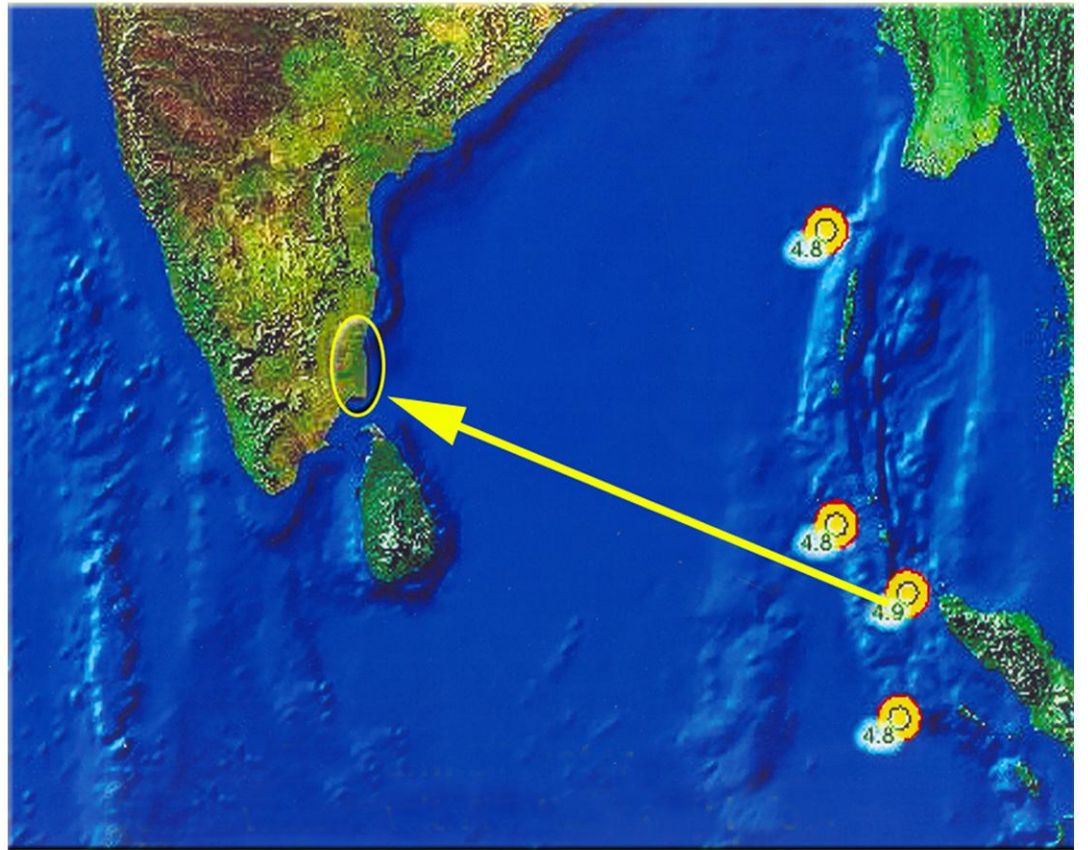
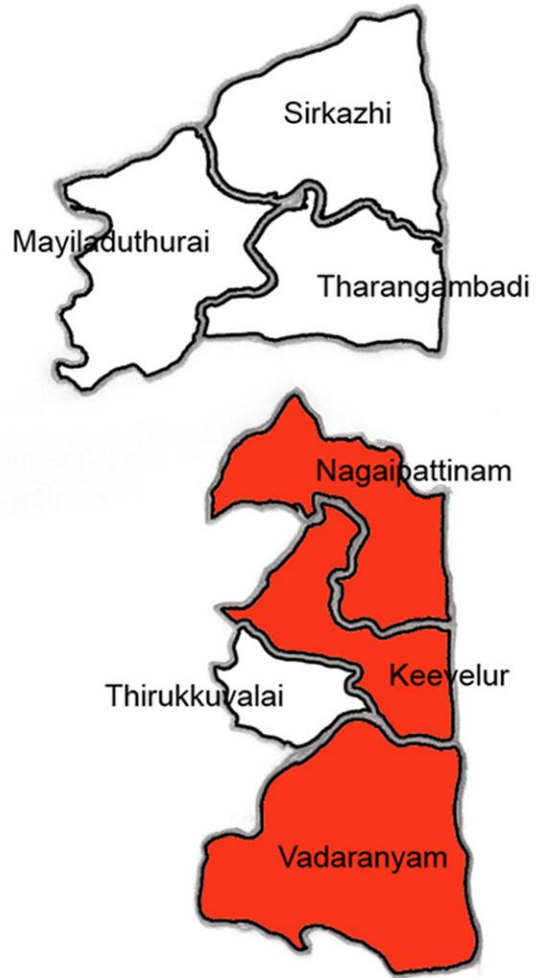


Plate 1. Epicenter of Tsunami 2004 and its approach towards India

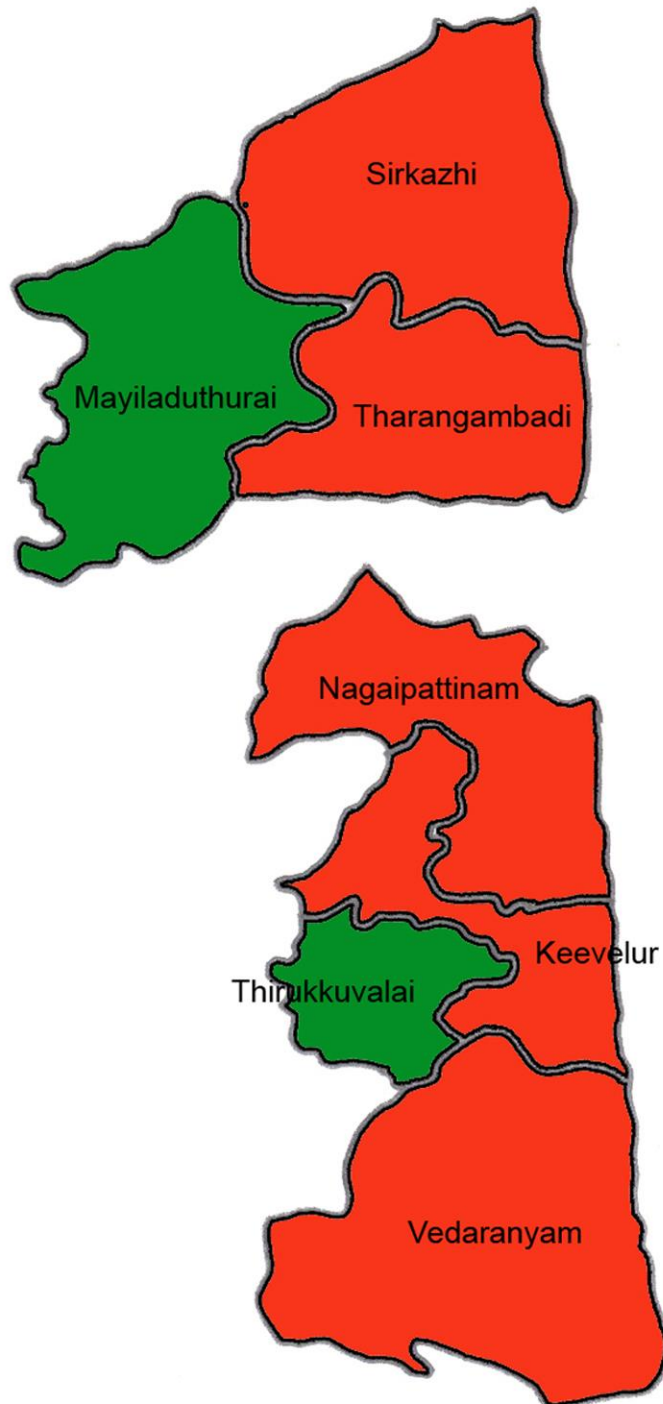
Fig. 2. Sampled taluks and blocks of the



Taluks

 **Sampled Taluks**

Fig. 1. Coastal and inland Taluks of Nagaipattinam district



 Coastal Taluks



Plate 24. Orphans of Tsunami



Plate 25. Dependency showing widows of Tsunami

