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Ram Sateesh Pasupuleti

School of Architecture and the Built Environment

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UNDERSTANDING THE ROLE OF CULTURE IN THE POST DISASTER RECONSTRUCTION PROCESS

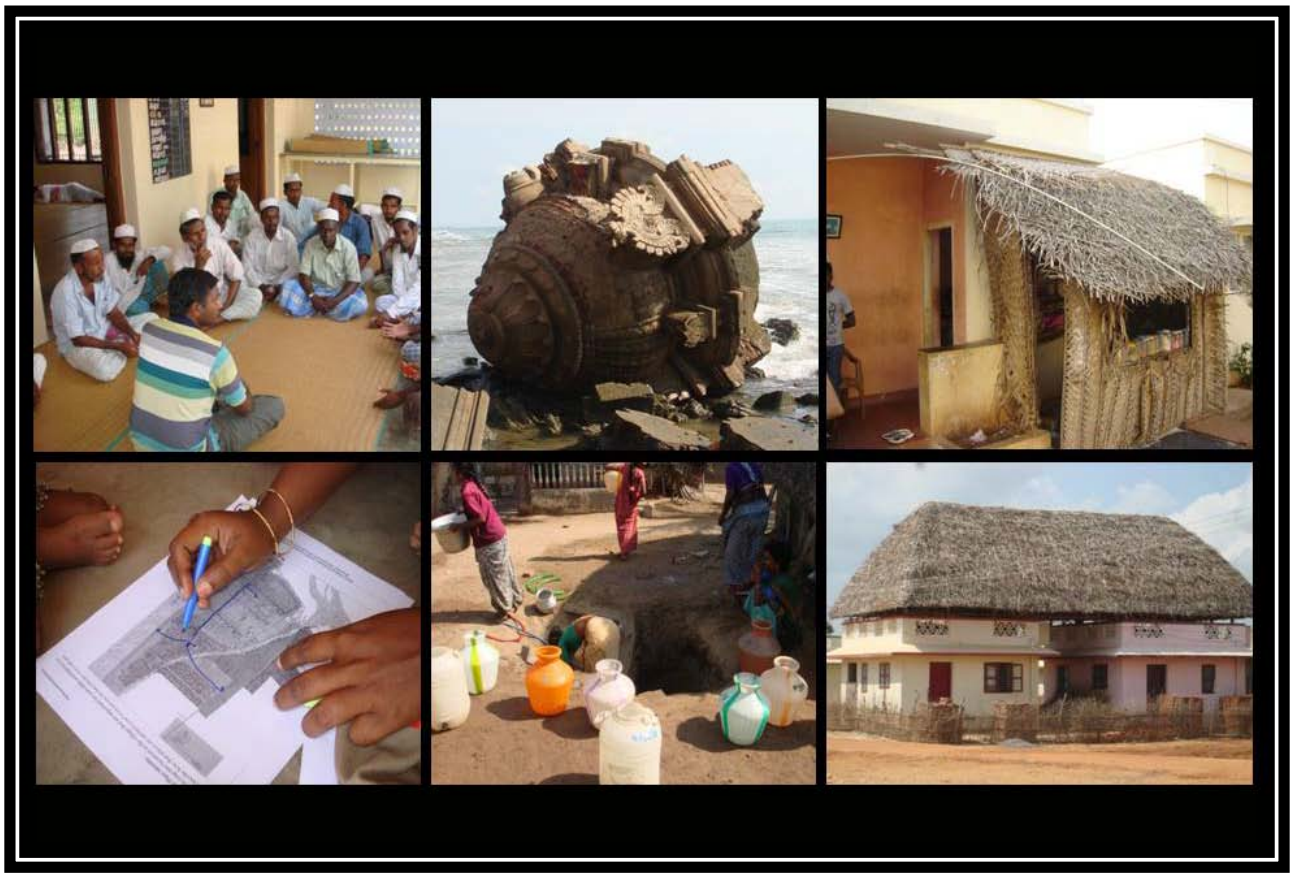
THE CASE OF TSUNAMI RECONSTRUCTION IN TAMILNADU, SOUTHERN INDIA

RAM SATEESH PASUPULETI

A thesis submitted in partial fulfillment of the requirements of the University of Westminster for the degree of Doctor of Philosophy

May 2011

Doctor of Philosophy | **2011**



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University of Westminster
School of Architecture and Built Environment
London

Submitted in partial fulfillment of the requirements for the degree of
Doctor of Philosophy

DECLARATION

I confirm that the work submitted is my own, has not been submitted for any other award, and do not contain any copyright material. The content of the paper submission is identical to the content of the electronic submission.

Date: May 2011 Signature

Ram Sateesh Pasupuleti

Dedicated to

All the people who supported me in this journey

- *For my beloved wife and daughter*
- *For my parents and sister*
- *For my friends*
- *For all the people in Tamilnadu, who have cooperated with me in this study.*

Biography of the Author

Ram Sateesh Pasupuleti is an Architect from India, attained his Bachelor's degree in 2003 from School of Planning and Architecture (Jawaharlal Nehru Technological University) Hyderabad. He started his career as a research assistant at Church of South India Institute of Technology, Secunderbad. With his background experience working on Vernacular Architecture and Disaster and Development issues, he moved to Oxford UK, in 2004, for pursuing his post graduation course in M.A.International Studies in Vernacular Architecture under the guidance of world's renowned expert Dr.Paul Oliver at International Studies in Vernacular Architecture Unit (ISVA presently known as IARD), School of Built Environment, Oxford Brookes University, Oxford UK. His Master's dissertation (which he achieved Distinction) focused on- Reconciling the gap between community groups and development groups in 2004 Tsunami reconstruction process in Tamilnadu, Southern India.

After his post graduation, he moved to the role of designer in Benfield Advanced Timber Frame Technologies, South Wales UK. Here he has been actively involved in various building projects within UK and Europe. He is also involved with reconstruction process in Azad Kashmir, Pakistan, as a part of UNWTO project. In 2006, he got registered for doctoral research program at Department of Urban Development and Regeneration, University of Westminster, Central London, UK. He was also awarded with SABE fellowship for a period of three years for pursuing his PhD. During his PhD and Masters course, he has been involved with various research projects in abroad and India. He has been also working as a project person for an Urban Design consultancy, Building Interfaces Ltd. London.

In 2009, he moved to North Cyprus, as a Lecturer at Cyprus International University, Lefkosa North Cyprus. Since 2010, he is working as Assistant Professor at School of Planning and Architecture, Bhopal, Madhya Pradesh India.

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In Kovalam, I am grateful to the church father Justus, who has introduced me to the villagers and provided access to interact with the public. In Tharangambadi, I am thankful to Architect Benny Kuriakose, and all the members in SIFFS. In NCRC, Annie George who has directed me to various case study areas. In Chennai, TRNC people, Dr.Nalini, Dr. Pari, Sankar, who gave their time and necessary contact information in the affected villages of Tamilnadu. In Lighthouse Kuppam, Iam grateful to SIGA Staff and especially Vel who has dedicated his sincere efforts in introducing me to the public and taking around to nearby villages including zamilabad and Palaykar veedu.

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Ram Sateesh Pasupuleti

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Abstract

This thesis is developed in built environment context on the premise that integrating cultural aspects in development produces sustainable ways of living for communities affected by natural disasters. It employs a conceptual framework to validate the argument that cultural dimensions of the affected communities are not effectively and sufficiently addressed in the current post disaster humanitarian and development processes.

This has been well articulated in this study from the analysis of shelter reconstruction process in 2004 tsunami hit fishing villages of Tamilnadu. The main contribution of this thesis to theory and practice is delivered in three sections. Firstly, it explains the relevance of the conceptual framework that synthesises two different fields of enquiry i.e. cultural anthropology and urban design to analyse the role of culture in the evolution and development of traditional settlements in post disaster contexts. As culture has got multiple interpretations in different contexts, this framework contextualises and defines the cultural dimensions through which communities tend to give meanings to their living or built spaces in the post disaster development contexts. This is followed by the analysis of reconstruction processes in three tsunami hit fishing villages in Tamilnadu, Southern India, in which the author has carried out primary research as part of his PhD study. It also explains the relevance of the conceptual framework in selecting the casestudy areas for this study. It is aimed to identify how diversified cultural settings respond to the tsunami reconstruction processes to sustain their lives and livelihoods. The analysis of this primary research unfolds the specific impacts and the reasons for such responses in the post tsunami reconstruction process, by comparing and contrasting the findings from the three case studies. From the comparative and combined analysis general development issues that are observed from all the case studies has been elaborated briefly.

This thesis discusses the disaster reconstruction process in two different ways. Instrumentally – in a positivist way. Physical distances are increased due to relocation and extended families have separated, certain activities are no longer possible and ultimately the family suffers. Development agencies operate at an instrumental level in their discussion of vulnerability. Here

the frame of discussion is about the role of governance, agencies and its direct physical relations. The findings of this research have demonstrated that the impact of development on traditional settlements (pre and post disaster) raises broader issues from the side of both beneficiary and development groups. Secondly, the findings on the outcome of the reconstruction process have been discussed from the perspective of cultural anthropology. Here the consideration is of a 'way of life' – a habitus. This was changing for the fishermen anyway in pre and post disaster development processes and the tsunami represented the prospect of a cataclysmic change. The concept of habitus is not determinist and as the 'way of life' is inevitably altered, different individuals and families have different responses. At the extreme, cataclysmic change can also lead to increased vulnerability. This perspective is addressed from a different philosophical framework to positivism of development studies and draws on cultural anthropology – that is looking at the world as a social construct that operates through a physical spatial field. When the spatial relations change, this has an impact on social relations, but the relationship is not direct and deterministic, because the social and the spatial are mutually constructed. In this research, urban design concepts have operated at both levels. The layout can be viewed instrumentally and functionally in terms of the way it supports (or not) the issues of income and livelihood and it can be interpreted as a socio-spatial construct that supports the performances of social and cultural life that have been identified in this study.

Some of the findings and process of this research either has already been disseminated in various international conferences including TCDPAP, conference (2007) in Pakistan, IASTE conference (2008) at Oxford, Culture Space (2009) symposium at Istanbul, Understanding Places symposium (2009) at London. Very recently, in 2010 this has been presented in the Knowledge Exchange Series at School of Planning and Architecture, Bhopal, which has been mentioned in leading 'Pioneer' news paper. In 2011, an article has been published in ABACUS journal.

Acknowledgements

Abstract

Table of Contents

List of Tables and Figures

PART ONE

Chapter One

Background Discussion and Research Problem

1.1 Past experiences formulate the background setting for this research:……...1
1.2 Background discussion ……..4
1.2.1 Vulnerability in disasters and development:..... 6
1.3 Summary of research……...11
1.3.1 Research question: 11
Sub Questions: 11
1.3.2 Aims of the research: 12
1.3.3 Objectives of this research:..... 12
1.3.4 Case study method: 12
1.3.5 Scope and limitations:..... 13
1.3.6 Value of the research: 14
1.4 The Rationale of this study and its parts: 14
Part 1:..... 15
Chapter - 1: 15
Chapter-2: 15
Chapter-3: 16
Chapter-4: 16
Part 2: Case studies 16
Chapter-5, 6 and 7:..... 16
Part 3: Conclusion of the whole study 17
Chapter 8: Post disaster development issues in cultural context 17

Chapter Two

Theoretical Discussion for Developing a Conceptual Framework for Analysis

2.1 Defining 'culture' in this research context……...……21
2.1.1 Relavance of Bourdieu's concept of 'cultural capital' 21
2.2 Traditional settlements in development context……..22
2.3 Disasters and development……..25
2.4 Theoretical discussion on various approaches for analysing disaster vulnerability……28
2.4.1 Techno-centric Analysis 28
2.4.2 Target Group Analysis 29
2.4.3 Situational Analysis 30
2.4.4 Community based analysis 33
2.5 Moving towards a situational approach……...33
2.6 Defining the framework to understand the role of culture in post disaster development contexts……..34
2.6.1 Patterns of use 36
2.7 Relevance of urban design principles: towards an analytical framework……37
2.8 Design issues and the relevant urban design qualities……39
2.8.1 Permeability: Public and private 39
2.8.2 Variety and robustness 39
2.8.3 Legibility 39
2.8.4 Personalisation 40
2.9 Dimensions that determine culture in terms of built environment……..41
2.9.1 Geography and natural environment 41
2.9.2 Family gender and kinship 42
2.9.3 Religion and belief systems 45
2.9.4 Economy 51
2.9.5 Politics 53
2.9.6 Social and cultural interaction 60
2.10 Integrating constructs of culture and urban design principles to formulate conceptual framework of analysis:……...……61

Chapter Three

Research Methods

3.1 Addressing vulnerability by ethnographic methods……64
3.2 The research process: choice of methods ……64
3.2.1 Qualitative approach 65
3.2.2 Case study method 66
3.3.3 Criteria for selecting case study areas..... 66
3.4 Fieldwork process……69
3.4.1 Methodological procedure deployed in Kovalam case study..... 70
3.4.2 Methodological procedure deployed in Tharangambadi case study..... 70
3.4.3 Methodological procedure deployed in Lighthouse Kuppam..... 71
3.5 Methods……72
3.5.1 Field observation through direct and indirect participation..... 72
3.5.2 Documentation and recording..... 73
3.5.3 Interviews..... 74
3.5.4 Mental Maps 77

Chapter Four

Disaster Management Practices in Indian Sub Continent

4.1 Disaster management as an international concern..... 81
4.2 Disaster management as a national concern..... 82
4.3 Pre-disaster management practices..... 82
4.3.1 Planning regulations and building guidelines..... 83
4.3.2 Training and awareness programmes..... 84
4.3.3 Early warning systems.....85
4.4 Post disaster management practices..... 86
4.4.1 Institutional structure and policy framework..... 86
District level..... 89
4.4.2 Community participation in rural development..... 90
4.4.3 Technology transfer to rural communities.....91
4.5 Conclusion: emerging issues and the research question..... 93

PART TWO

Chapter Five

Kovalam Case Study

5.0 Development context of Tamilnadu……96
A. Location and topography……96
B. Historic significance of Tamilnadu……97
C. Poverty in the development context of Tamilnadu……98
D. Housing culture in coastal Tamilnadu ……98
Case Study One: Kovalam Village – Kovalam Panchayat…….. 102
5.1.Introduction to the case study area: geographical location…… 102
5.2 Socio-economic and political profile of the village……103
5.3 Traditional fishing settlements: How this place works?…… 104
5.3.1 Assessing physical context of vernacular settlements in the usual development context…… 104
5.4 Characteristics of fishing village in pre tsunami context…… 105
5.4.1 Public space network in fishing village: permeability……105
A. Main village square in front of the church……105
B. Sunset point: tourist's landmark ……106
C. Sea coast: places of interest for economic activity…… 108
D. Village Development Cell and school: places of institutional interest……111
Street Typologies:……111
E. Primary Streets…… 111
F. Secondary Street / Bishop's Street…… 112
G. Narrow access ways…… 113
5.4.2 Vernacular housing: plots and buildings…… 114
5.5 Post tsunami reconstruction process……118
5.6.1 Analyzing qualitative data: responsive design qualities…… 121
B. Religion and belief systems……123

C. Economic networks.....127
D. Social networks..... 133
E. Political and institutional networks..... 137
5.7 Legibility analysis..... 138
5.8 Summary.....142

Chapter Six

Case Study -2: Tharangambadi
6.1 Introduction to the case study area.....143
6.1.1 Location and geographical context.....143
6.1.3 Socio-economic profile.....144
6.2 Traditional settlements: how does this place work?.....146
6.2.1 Assessing the physical context of vernacular settlements in the development context 146
A. Colonial Housing.....146
6.2.2 An overview of the fishing village..... 148
6.3.1 Assessing the physical context of traditional settlements.....151
Public space network in fishing village: how permeable..... 151
6.3.2 Street network and connectivity.....155
A. Primary streets.....156
B. Secondary streets..... 156
C. Access ways to seacoast..... 158
D. Sandy paths along the seacoast.....160
6.4 Public space network: responsive design qualities.....160
6.4.1 Connectivity for economic necessity..... 162
6.4.2 Religious connectivity.....162
6.4.3 Social connectivity..... 163
6.4.4 Institutional and political connectivity..... 163
6.5 Plots and dwellings: Land subdivision in traditional settlements..... 166
6.6 Tsunami reconstruction process..... 168
6.7 Analysing qualitative data: Responsive design qualities..... 172

6.7.1 Assessing physical context with cultural context: After the tsunami.....172
A. Family kinship and gender.....172
B. Religion and Belief systems.....175
C. Economic networks..... 178
D. Social networks.....183
E. Political and institutional networks..... 186
6.8 Legibility analysis.....187
6.9 Summary.....192

Chapter Seven

Lighthouse Kuppam Case study

7.1 Introduction to Lighthouse Kuppam, Pulicat.....193
7.1.1 Socio-economic and political profile of the village.....193
7.2 Traditional Fishing Settlements: How this place works?.....194
7.2.1 Assessing physical context of vernacular settlements in the usual development context.....194
7.2.2 Characteristics of fishing village in Pre tsunami context
Public space network in fishing village: How Permeable.....195
7.3 Plots and buildings.....198
7.4 Post tsunami reconstruction process.....201
7.5 Assessing physical context with cultural context of fishing communities in morphological context after tsunami.....203
7.5.1 Analysing Qualitative data: Responsive design qualities.....205

PART THREE

Chapter Eight

Conclusions: Post disaster Development Issues in Cultural Context

8.1 Analysis ……211

8.1.1 Development issues from Kovalam and Tharangambadi Case studies……..211

A. Impacts on post disaster vulnerabilities……..211

B. Reasons for the post tsunami responses in Kovalam case……..220

C. Reasons for the post tsunami reconstruction responses in Tharangambadi case……..225

8.1.2 Development issues from Lighthouse Kuppam case study…….228

B. Reasons for post disaster responses in Lighthouse Kuppam case……..230

8.2 Findings from comparative and combined analysis……..231

8.3 Towards the development of strategic directions …….242

Chapter Nine

Conclusion, Summary and a Way Forward

9.1 Conclusion of the whole study…….243

9.2 Summary and a way forward……..……..248

9.3 Brief recommendations to integrate cultural dimensions in the reconstruction process…..251

References

Annexure-1

Annexure-2

Compact Disc attached

List of Tables

Table 2.1 Family Kinship and Gender impact on settlement form in the pot disaster context
Table 2.2 Religious and Belief systems impact on the settlement form in post disaster contexts.
Table 2.3 Impact of economy on the settlement form in post disaster contexts.
Table 2.4 Political impact on the settlement form in post disaster contexts.
Table 2.5 Social and Cultural interaction impacts on the settlement form in post disaster contexts.
Tables 2.6 showing the proposed framework developed to analyse (A and B) physical context of traditional settlements in post disaster development context.
Tables 2.7 Diagrams showing the proposed framework to analyse (A and B) cultural context of traditional settlements in post disaster development context.
Table 3.1 Qualitative methodologies in cultural anthropology: research appropriateness (adapted and developed from Getty Conservation Institute, 2002)
Table 3.2 Shows the criteria made for selection of three case study areas.
Table 3.3 Details of the officials and experts in the disaster related field, consulted for interview purposes.
Table 3.4 Showing the application of research methods in the three case study areas.
Table 5.1 Timeline showing the period of various dynasties that ruled Tamilnadu
Table 5.2 Occupied dwellings in the relocated clusters
Table 6.1 Table of research methods selected for the assessment of the physical aspects of quality aspects of the traditional settlements in post disaster context

List of Figures

Figure 1.1 New house constructed by CARITAS (an NGO) in Bhuj District, Gujarat Earthquake
Figure 1.2 New relocated village in Bhuj District, Gujarat Earthquake
Figure 1.3 Showing the cyclic relationship between Culture-Vulnerability-Development
Figure 2.1 Showing Lee's (1997) model of the dialectics of habitus and the objective conditions of existence
Figure 2.2 Showing the relationship between the concepts of local, regional, sub-national, national and global

identities.
Figure 2.3 Showing Lim's (2008) model of Cultural Environment and the areas of inquiry within it
Figures 2.4 (A and B) Changing relationship between vulnerability reduction and development
Figure 2.5 Pressure and Release (PAR) model
Figure 2.6 Developed model from DFID Sustainable Livelihood Guidance Sheets
Figure 2.7 Model developed to explain the components of built environment
Figure 2.8 People in Kutch constructing their houses (bhoongas) Using mud material.
Figure 2.9 People in Zakopano (in Poland) constructed their houses using timber and other local resources
Figure 2.10 View of joint family house in Kovalam village Tamilnadu, India
Figure 2.11 View of nuclear family house in Kovalam village Tamilnadu, India
Figures 2.12 A (left) and B (right) Srirangam, Tamil Nadu (14th century) comprised seven concentric enclosures each with a gopuram (entrance gateway) of diminishing size.
Figure 2.13 Tri-pada
Figure 2.14A Plan of Walled City of Jaipur
Figure 2.14B View of Jaipur Street near hawa mahal; (Photo taken on April 2008)
Figure 2.15 View of typical muslim house in Tharangambadi
Figure 2.16 View of typical Hindu house in Kuilapaleyam, Pondicherry, Tamilnadu (photo taken on 17th jan 2008)
Figure 2.17 People celebrating Christmas 2007 on the main street of Kovalam
Figure 2.18 People celebrating Mattu pongal on the streets of Kuilapaleyam, Pondicherry, Tamilnadu (photo taken on 17th jan 2008)
Figure 2.19 Hindu household in Tharangambadi celebrating pongal inside the courtyard of the house but not on the street (photo taken on 15th jan 2008)
Figure 2.20 People celebrating cow races on the streets of Kuilapaleyam, Pondicherry, Tamilnadu (photo taken on 17th jan 2008)
Figure 2.21 Showing how streets are used for economic activities in Tharangambadi Tamilnadu (photo taken on 15th jan 2008)
Figure 2.22 Layout of Ludhiya village in Gujarat composed of family clusters.

Figure 2.23 Layout of Tharngambadi Tamilnadu
Figure 2.24 Sequence of spaces from more public to private

Figure 2.25 Diagram showing the conceptual framework developed to analyse traditional settlements in post disaster development context and the appropriate research methods used in the study.
Figure 3.1 Map showing the three case study areas and variations in the sea waters in coastal Tamilnadu.
Figure 3.2 Methodology Diagram
Figure 4.1 Interaction Pattern in UN system
Figure 4.2 Interaction pattern in central, state and district level.
Figure 4.3 Interactive Patterns for Disaster Management at Central Level
Figure 4.4 Interaction pattern at State Level
Figure 4.5 Institutional coordination at district level
Figure 5.1 Showing the topographic and Location map of Tamilnadu.
Figure 5.2 Foundations stone laid ritually on the occasion of Foundation (Bhoomi puja) ceremony.
Figure 5.3 Various housing typologies that are commonly found in coastal Tamilnadu.
Figure 5.4 Showing the location of Kovalam village in Kanyakumari District.
Figure 5.5 Women selling fish near by auction yard
Figure 5.6 Middlemen is fixing price for the collected fish at auction yard
Figure 5.7 View of the main village square in front of the Historic Parish church.
Figure 5.8 View of Sunset Point at Kovalam
Figure 5.9 Fishermen repairing nets and interacting with their friends near the sunset point.
Figure 5.10 Fishermen making a combined effort to drag the nets from the sea.
Figure 5.11 View of Auction centre at the Sandy beach
Figure 5.12 Characteristisc maps of Kovalam, Kanyakumari district, Tamilnadu
Figure 5.13 View of Main Street passing through the village from the Kanyakumari City Centre
Figure 5.14 People celebrating on Christmas Eve night in the main street.
Figure 5.15 View of Secondary Street/ Bishops Street
Figure 5.16 (a & b) Narrow walk ways passing through the fishermen housing clusters connecting secondary roads and the sea coast in perpendicular directions.
Figure 5.17 Showing arrangement of houses in traditional cluster in Kovalam.
Figure 5.18A Plan of Duplex model House
Figure 5.18B Model House of a Joint Family house

Figure 5.19A Plan of single family dwellings
Figure 5.19B View of single family dwelling

Figure 5.20 View of typical traditional door used in Kovalam village.
Figure 5.21 Showing the new layout in D.C Nagar.
Figure 5.22 Fishermen explaining the impacts on family kinship structures in reconstruction process.
Figure 5.23 Illustration showing that women use to wait for their husbands to return from the sea.
Figure 5.24 A housewife living in old location explains how reconstruction has impact on the religious festive occasions.
Figure 5.25 Diagram showing the religious connectivity (Pre Tsunami)
Figure 5.26 Diagram showing the religious connectivity (Post Tsunami)
Figure 5.27 People celebrating Christmas in the old location
Figure 5.28 People celebrating Christmas at the new location (D.C.Nagar)
Figure 5.29 Housewife explaining her husband's health has made them to decide to stay back in the pre-tsunami location.
Figure 5.30 A young couple returned to the old location as it is convenient for sustaining livelihood needs.
Figure 5.31 Families extended a shop in front of their new house.
Figure 5.32 Diagram showing the economic connectivity (Pre Tsunami)
Figure 5.33 Diagram showing the economic connectivity (Post Tsunami)
Figure 5.34 Community leader explains the difficulties in adjusting with her new neighbours.
Figure 5.35 Housewife says that living separately has an advantage of resolving disputes in the village.
Figure 5.36 Women expressing their interest to have a common compound wall for their group.
Figure 5.37 Diagram showing the social connectivity (Pre Tsunami)
Figure 5.38 Diagram showing the social connectivity (Post Tsunami)
Figure 5.39 Women organising children's parliament play at the adjacent areas.
Figure 5.40 Settlement map of Kovalam, Kanyakumari district, Tamilnadu

Figure 6.1 Location and Connectivity map of Tharangambadi
Figure 6.2 Damaged Ancient Masilamaninatha temple located in front of the sea shore.
Figure 6.3 View of Danish fort in Tharangambadi
Figure 6.4 View of colonial Entrance in Tharangambadi
Figure 6.5 View of Jerusalem Church
Figure 6.6 View of Beach Bungalow that was renovated as a hotel for the tourists.
Figure 6.7 View of Tamilian house in a poor state of disrepair.
Figure 6.8 View of Interior courtyard of house in Goldsmith lane that got renovated as a guest room and office.
Figure 6.9 Map showing various characteristics built forms of Tharangambadi
Figure 6.10 View of Tamilian house in the fishing village.
Figure 6.11 Village women standing in a queue to collect water at the municipal tap.
Figure 6.12 Showing the extent of damage before and after the Tsunami in Tharangambadi.
Figure 6.13 View of Bus stop at city centre.
Figure 6.14 View of temporary shops on the street
Figure 6.15 (left) View of Renugadevi temple.
Figure 6.16 (right) View of Buckingham canal
Figure 6.17 Men resting under tree shade
Figure 6.18 Women drying the fish
Figure 6.19 Women buying fish in the Auction yard at Tharngambadi
Figure 6.20 Analysis of Secondary Street – Queen's street
Figure 6.21 Analysis of Access ways to seacoast
Figure 6.22 Sandy path passing along the seacoast with one side house fronts and edges facing towards sea and other side a protective barrier build with rock boulders.
Figure 6.23 Showing the sequence of spaces in fishing settlement of Tharangambadi.
Figure 6.24 Connectivity patterns in fishing settlement of Tharangambai: Before Tsunami
Figure: 6.25 Street fronts with semi open verandas as house fronts
Figure 6.26 Street with closed veranda's as house fronts
Figure: 6.27 Street with front set backs
Figure 6.28 People still living in the temporary shelters provided after tsunami.

Figure 6.29 Design professionals explaining the proposed models with beneficiaries.
Figure 6.30 Face to face meeting with the households.
Figure 6.31 Map of Tharangambadi with old locations and newly relocated areas after tsunami
Figure 6.32 Women running a shop after she lost her husband in the tsunami.
Figure 6.33 Verenda converted as a shop to provide an income.
Figure 6.34 House wives explaining how the new house is unable to accommodate their joint family comprised of 11 members
Figure 6.35 A and B In order to accommodate joint family of 11 members, people extended their house on first floor with thatched roof.
Figure 6.36 Housewives, making arrangements for cooking pongal inside the courtyard of the house.
Figure 6.37 A old man explaining about the consideration of vasthu in new location.
Figure 6.38 Bhoomi puja executed in the present meenavar colony location.
Figure 6.39 Toilet converted as puja (worship place)
Figure 6.40 Fishermen group living in temporary shelters express their willingness to go and live with their fellow fishermen families in the new location, though it is far away from the sea.
Figure 6.41 Fishing family using their traditional home in the old location as a second house to sustain their livelihood, as it is nearby sea.
Figure 6.42 Fisherwomen expressing their economic difficulties that were raised due to the increased distance from sea.
Figure 6.43 Connectivity networks in fishing settlement : After Tsunami
Figure 6.44 Street analysis in newly relocated SIFFS Housing
Figure 6.45 Women explaining the reason why she preferred the veranda option?
Figure 6.46 View of veranda porch composed with arch in a newly built house.
Figure 6.47 Village men practicing folk songs for Renukadevi festival near Dansborg fort area during night time.
Figure 6.48 Village men practicing Kotang play for

festival near Goldsmiths Street (pre colonial area)
Figure 6.49 Fishermen gathered for panchayat meeting in front of Renukadevi square to resolve village issues.
Figure 6.50 Mental Map 1
Figure 6.51 Mental map 2
Figure 6.52 Mental map 3
Figure 7.1 Location map of Lighthouse Kuppam village.
Figure 7.2 Boats used for commuting facilities between Pulicat and Lakehouse Kuppam
Figure 7.3 View of Dockyard at Lighthouse Kuppam village.
Figure 7.4 View of a temple near the village centre
Figure 7.5 View of a temple in the adjacent village towards the eastern side of Lighthouse Kuppam
Figure 7.6 Lighthouse Kuppam village map
Figure7.7(left) View of lighthouse in the village
Figure 7.8 (right) School children spending their tot-lot near the village centre.
Figure 7.9 Men spending their leisure time under a tree shade near the village center
Figure 7.1 .View of traditional house in a village adjacent to lighthouse kuppam
Figure 7.11 View of traditional house in a village adjacent to lighthouse kuppam
Figure 7.12 Newly constructed houses provided by the government.
Figure 7.13 women living presently in temporary shelters.
Figure 7.14 Map showing the religious connectivity within the village and from the other villages.
Figure 7.15 Economic connectivity
Figure 7.16 backyard meeting house fronts: women constructing her own kitchen outside her house.
Figure 7.17 Social Connectivity
Figure 7.18 Showing the institutional and political connectivity
Figure 8.1 Illustration showing the allocation process in the reconstruction process.
Figure 8.2 Illustration showing how community realise about their in appropriate aspirations in the post tsunami response situations.
Figure 8.3 Diagram showing the impacts and causes of the post disaster response situations in the post tsunami reconstruction process at Kovalam and Tharangambadi.
Figure 8.4 Showing how the concept of Core dwelling units has failed in 2004 tsunami reconstruction process.

Figure 9.1 Methodology diagram showing how the transformation process took place in the empirical case study areas.

List of Abbreviations and Local Terms

BIS	Bureau of Indian Standards
BMTPC	Building Materials Technology Promotion Council
CBRI	Central Building Research Institute
CDMM	Center for Disaster Mitigation and Management
CEPT	Center for Environmental Planning Technology
CRC	Central Relief Commissioner
CRF	Calamity Relief Fund CRF
CRZ	Coastal Regulation Zone
CSEB	Compressed Stabilized Earth Blocks
DFID	Department for International Development
ECR	East Coast Road
ETRP	Emergency Tsunami Reconstruction Project
HTL	High Tide Line
IDNDR	International Decade for Natural Disaster Reduction
IMD	Indian Meteorological Department
INTACH	Indian National Trust for Art and Cultural Heritage
IS	Indian Standard
ISDR	International Strategies for Disaster Reduction
ISVA	International Studies in Vernacular Architecture
KRRC	Kanyakumari Research and Resource Center
LTL	Low Tide Line
NCRC	NGO Coordination and Resource Center
NDZ	No- Development Zones
NFCR	National Fund for Calamity Relief
NGO	Non-Government Organisation
NISA	National Industrial Security Academy
OCHA	Office for Co-ordination of Humanitarian Affairs
PAR	Pressure And Release
PRIs	Panchayat Raj Institutions
RICS	Royal Institute of Charted Surveyors
SIFFS	South Indian Federation of Fishermen Societies
SIGA	Siera Grassroots Agency
SIRD	State Institute of Rural Development
STD	Standard Trunk cal Dialing
TC	Tropical Cyclones
TEAP	Tsunami Emergency Assistance Project
TNTRC	Tamilnadu Tsunami Resource Center

UN	United Nations
UNDP	United Nations Development Programme
UNCHS	United Nations Coordination of Humanitarian Services
UNISDR	United Nations International Strategy for Disaster Reduction
UNWTO	United Nations World Tourism Organization's
UT	Union Territory
VDC	Village Development Cell
WCDR	World Conference on Disaster Reduction

PART 1

Background Discussion and Research Problem

1.1 Past experiences formulate the background setting for this research

This study concerns post disaster reconstruction in the context of developing countries, taking the 2004 Indian Ocean Tsunami[1] reconstruction process in Tamilnadu, Southern India as its case study. It looks at how current post disaster recovery processes interfere with normal development processes and increase the vulnerability of affected communities living in traditional settlements. The interest in this field of study is very much related to past field experience of the author, which suggest that culture, traditional settlements, disasters and development are all closely related and interdependent. This experience led to questions about the past, present and future of traditional settlements in disaster and development contexts; to understand the culture of place and people in post disaster development contexts, and how all this relates to the role of built environment professionals.

In 2002, immediately after the major earthquake in Kutch region of Gujarat State, I began my Bachelor's dissertation on the subject of earthquake resistant housing in the affected areas in Kutch region. This study focused on technical issues in earthquake resistant housing, but gradually shifted emphasis to cultural concerns about people's adaptation to the new technical interventions.

The non-government organisations in the reconstruction processes adopted participatory approaches. Depending on the intensity of damage and with consideration to the public opinion,

[1] A tsunami is a Japanese word (津波） referred to tidal wave caused by the displacement of a large volume of a body of water, such as an ocean or a large lake. Due to the immense volumes of water and energy involved, tsunamis can devastate coastal regions.

On 26 Dec 2004, 00:58:53 UTC (7:58:53 am local time IST), a magnitude 9.0 earthquake occurred off the west coast of northern Sumatra, Indonesia. The epi-centre was located under sea water at 3.32 N 95.85 E. This is the fourth largest earthquake in the world since 1900. The earthquake generated tsunamis which swept across the Indian Ocean within hours. Over 120,000 people lost their lives in this disaster. Causalities report on 24th June 2005 reveals that 10,749 people were dead; 5,640 missing; 6,913 injured. Tamil Nadu was the worst affected area with 7,983 deaths reported (Source: Asian Development Bank, 2005).

villages were either built in a new location or reconstructed at the same locations. Retrofitting activities were also taken up in these affected areas. Several training programmes were provided for the affected communities to enhance their construction skills using alternative technologies. The buildings were constructed using locally available resources utilizing both traditional and newly developed building techniques with the collaboration of professional designers, architects, engineers, local craftsmen and builders.

Such participatory approaches resulted in noticeable negative impacts in the long run. Villagers who were moved to new locations have difficulty in terms of securing employment and sustaining other daily household needs. With the *in-situ* reconstruction cases also there were mismatches between the local aspirations and the project expectations (Pasupuleti 2003).

Figure 1.1 New house constructed by CARITAS (an NGO) in Bhuj District, Gujarat Earthquake

Figure 1.2 New relocated village in Bhuj District, Gujarat Earthquake

In the above figure 1.1, damaged houses were constructed in-situ by the NGO's without considering the needs and aspirations of beneficiaries. Public were not involved in the reconstruction process. Ultimately, it has been found that people were reluctant to stay in this kind of houses as it does not suit with their local climatic conditions and neither accommodates their day to day livelihood and social needs. For instance, in another case (See figure 1.2), villages were relocated in the nearby place. People were involved in the reconstruction process. Communities were given some kind of training programs in the alternative technologies and the houses were constructed by adopting participatory process. However, such approaches have also overlooked the issues of livelihood and other day to day needs in the long run. There were

instances where people tend to migrate for nearby towns to secure their livelihood. These problems and concerns could have been better addressed as development goals early in the conceptual stage of the project development and throughout the design, construction and post-project implementation stages.

This Gujarat experience highlights the limitations and constraints of design practice based on principles developed in architecture schools, which often isolate the housing project design from its cultural context. Design has implications for both the consumers and producers: social, political, economic, and cultural. In design practice, particularly through the architect's training there is an absence of concern for designing for consumers in post disaster development contexts. In order to understand the built environments in cultural contexts current design practices turn towards the study of vernacular architecture in traditional settlements Oliver (1997).

While pursuing postgraduate course in the International Studies in Vernacular Architecture (ISVA) programme at Oxford Brookes University, I developed an awareness of various design and development issues in traditional settlements from different cultural backgrounds. My master's dissertation Pasupuleti (2005) focused on reconciling the gap between community groups and development experts involved in the 2004 post tsunami reconstruction process. The case of the tsunami reconstruction in Tamilnadu, South India was studied to identify the interaction gap between the two groups. To get an integrated and dynamic picture of the existing interaction gap, how local knowledge and capacities play an vital role in reconstruction process, and how the development is carried by the developer's group is observed. Semi-structured interviews were conducted with the fishing communities affected by the 2004 tsunami, and also with the non-governmental organisations and government departments. The problematic aspects which were responsible for this continuing interaction gap between these two groups were identified. Finally this study has recommended that development and beneficiary groups should realize the importance of the concept of cultural continuity. Change has to be positive and linked to the agreed values of the community.

The study of vernacular architecture in post disaster contexts captures the essence of problems encountered in the traditional settlements in developing world and it recognizes the relevance of culture and tradition in the process of creating built environments offering a much broader approach for understanding the nature of built environments that affects both the consumers and producers. Having access to such learning, and the use of models from vernacular architecture and traditional settlements, opens up the concept of socially responsible design that considers the well being of producers and of consumers.

Later, in 2006, while working as a design technician at Benfield Advanced Timber Frame Technologies, as a part of a United Nations World Tourism Organisation's (UNWTO) project, I was involved in the design of dwelling units for earthquake affected areas in Azad Kashmir. This involved a flat-pack approach, where the housing components were manufactured in the United Kingdom, then shipped to Pakistan where they were erected by teams of skilled builders. It was clear from this experience that houses were designed erected and allocated without any proper consultation with the beneficiaries'. The topic of the present research is a result of the personal experiences both as a researcher aiming to understand the issues and as designer involved with a purely technical response.

1.2 Background discussion

The area of inquiry on development and creating built environments sensitive to cultural and environmental contexts has been around for some time and the interdisciplinary approaches, together with the multiple benefits it brings to professionals and people across various fields including anthropology, sociology, archaeology, geography, art and architecture history (Bourdier 1989). Amos Rapoport, (1989: 90-91) also, makes the critical connections between the understanding of environments, culture and their values to the design profession. He states that

> ….environments are thought before they are built, and design tries – however imperfectly – to reach some ideal embodied in an image, schemata or model…It follows that traditional environments are those that result from traditional models or schemata, from

> traditional beliefs and modes of thinking and acting. … As a result, such built environments will be difficult to understand without first understanding the culture…

This implies that models and schemata are likely to be highly culture-specific and the traditional environments are likely to be highly place-specific. Having access to such learning, and the use of models from vernacular architecture and traditional settlements, opens up the concept of socially responsible design wherein the design profession involves itself in projects that consider the well-being both of producers and of consumers. The topic of the present research is therefore a result of personal experiences that were discussed in previous section concerned with relating the design profession and the built environment to methodologies for addressing problems of the built environment as it relates to people's cultures and traditions; culture as that which provides meaning in people's lives, tradition which can be on-going and not stuck in the past, and a built environment that addresses appropriate issues, concerned with the well-being of a community.

In the built environment context the evolution and transformation in traditional settlements remains deeply rooted in elements of the cultural environment much of it remains relevant to development concerns which look towards a future through a well-connected and properly understood past. In observing such patterns of change within a settlement and the manner in which the vernacular built form evolves, and how this is culturally embedded, we also learn about that deep sense of identity with which members of the community relate to their vernacular architecture (Bourdier and AlSayyad, 1989; Oliver 2003) and how and what influences it as it is used by people in traditional settlements allows deeper insights into the management and operation of place within its cultural context. Lim (2008) has identified a methodology for understanding how identity is constructed by investigating the matrix of cultural environment, provides a basis for analysing forms of identity (detailed explanation provided in section 2.2 in chapter 2) which range from those influenced by different cultural dimensions and those related to the phenomena of globalization. These include shared experiences, collective memory, geographic conditions, economy, and social structures of family, kinship, politics and relion and beliefs systems. These are collectively contextualized and referred to as various dimensions of culture in this research. These constructs of culture and how they determine the spatial expressions were recognized and understood by analysing particular case studies.

For instance, family and kinship relations is thereof determines the spatial expression such as house size, whether it is occupied by a joint family or nuclear family, and even its location and house form also helps to understand the socio-spatial relations. At a settlement level, the social network of interrelations in villages between households, between the household and the neighbourhood and between home and work are formed through space and in space therefore, street layout, neighbourhood clusters and their relationship to the main centre, house fronts and backs, together as a layout plays a vital role in the maintaining the relationship between public and private spaces. Even the gender-space relations are determined by the certain activities that housewives prefer to work in household, independently such as opening up a small shop and supporting their husbands through domestic work cutting fish and cooking.

In such processes, the evolution of these traditional settlements are deeply rooted in culture, the future and the development ideals it brings cannot be conceived without clearly factoring in properly understood cultural values. As each culture is different, definitions of development will also vary. However, in this research, disasters are considered to be the agents for cataclysmic change in the development of traditional environments. Therefore, it is very much essential to establish a relationship between culture and development in post disaster recovery context.

A literature on the relationship between culture and development demonstrates a view that efforts to integrate cultural dimensions and development produce more sustainable ways of living for communities affected by natural disasters (Oliver 1997, 1989, 2006; Eder 1987; Lim 1999, 2008). However, those involved in development practice, such as architects, planners and political leaders, often fail to address the cultural contexts in which these disaster recovery programmes are set (Lim 2008). It is argued that post disaster development projects in developing countries such as India, Sri Lanka, Pakistan and Indonesia, with their set agendas and principles are mainly concentrated on rebuilding the social fabric and economic livelihoods and with physical infrastructure such as shelter and other facilities for the affected communities. They seldom demonstrate an adequate focus on cultural concerns and traditional practices of those communities.

Moreover, in post disaster contexts, especially in the developing world, development is viewed or carried out in a manner that is distinct from the usual development processes that takes place before the disaster. Pre-disaster development processes are aimed at addressing existing development issues such as inadequate housing, poor infrastructure, water supply and sanitation facilities, education, health and other livelihood related issues. They are carried out irrespective of natural disasters, which are responsible for negating the ongoing development processes (Jigyasu 2002). They have little or no intentions in developing the early warning systems and disaster mitigation and prevention measures, whereas post disaster development processes are primarily concentrated at immediate relief, rehabilitation and reconstruction efforts. Such post disaster development efforts are aimed to produce better living conditions in the affected settlements. It is commonly noted that during the aftermath of disaster, there is huge pressure on the development process from the affected communities, those left homeless, political organisations and funding agencies supporting the recovery programs. Such pressure causes pressure on post disaster recovery process to be conceptualised and executed in a rush. In that rush, there has been a growing concern among the disaster and development experts that cultural concerns of the affected communities often get sidelined in the post disaster development processes.

The United Nations already considers indigenous knowledge within Priority 3 of the Hyogo Framework for Action (WCDR 2005), which highlights the use of traditional and indigenous knowledge and cultural heritage in assisting mainstream disaster reduction policies and practice. In the last decade, participatory approaches were adopted in different post disaster development processes in the Asia-Pacific region, addressing the indigenous construction methods and technologies and social systems and processes of the affected communities to reduce disaster vulnerability (ISDR 2008). Indigenous knowledge and social processes are culture specific, and represent a community's life style over time with respect to particular geographic location they live in. Therefore in the recent decade, a new perspective that has been taken on board in design moves from an approach dominated by an architect's singular design vision towards a field of study which recognizes the processes of creating built environments involving shared visions by a larger community of users. The recent literature on disasters and development recognises that built environment professionals including architects, planners and urban designers face

challenges in their attempts to apply design practices and knowledge that is culturally sensitive and responsive, in the post disaster development processes (ISDR 2008, Jhonson 2006). My earlier studies suggested that there has been a wide gap between the designer's creative modernistic ideas for housing and their practical impacts which are not sensitive in the cultural and environmental contexts (Pasupuleti 2005). Architectural concepts of modernity dominate over vernacular built forms. It appears that the design culture promoted in the architecture schools today does not adequately encompass the interdisciplinary methodological procedures for understanding the cultural issues in the built environment and their transformation especially in post disaster development contexts.

The study of vernacular architecture and how traditional settlements respond to the current post disaster development processes form the core theoretical thinking of this research. The area of inquiry that is related to the development and creating built environments that are culturally sensitive and responsive has been there in the recent literature study, where scholars from various disciplines formulated interdisciplinary approaches in the dwelling research in various contexts (Rappoport (1989), Lim (2006), Punekar (2006), Handel (2006)). However, there has been very little implication of such interdisciplinary approaches when it comes to built environment training and practice and especially in the post disaster contexts.

With respect to the disaster context, development varies relatively with the stages in the disaster event such as pre and post disaster and during the time of actual disaster itself. As a result of the sequence of pre disaster, during disaster and post disaster contexts, the impacts of disaster vary accordingly with the given cultural contexts of the traditional settlements (Hewitt 1997, Jhonson 2006). The impacts of disaster can be referred within the complex phenomenon of vulnerability which is elaborated in the following section.

1.2.1 Vulnerability in disasters and development

Vulnerability is a widely studied concept and is understood in different ways, because it arises from various circumstances of everyday life. Maskrey (1989) points out that natural disaster is the coincidence between natural hazard and conditions of vulnerability. Therefore he says that

Disaster risk = Vulnerability +Hazard.

Hewitt (1997) defines six forms of vulnerability. They include the following.

1. Exposure to dangerous agents and environments
2. Weaknesses such as pre dispositions of persons, communities and buildings.
3. Lack of protection
4. Disadvantage: Lack of resources
5. Lack of resilience
6. Powerlessness

Blakie et.al's (1994) model states that such forms of vulnerability and the ability of people to deal with the impact of natural hazards is directly related to the given household's access to resources which were categorised and defined later as livelihood assets in Sustainable Livelihoods framework by DFID (1997). As far as this research is concerned it is important to see how this concept of vulnerability is related with disasters and development.

There has been extensive theoretical thinking by various disaster experts for investigating the relationship between vulnerability and development of traditional settlements (Blakie et.al 1994, Cuny 1983). The most recent literature on vulnerability reduction also reveals that socio-cultural setting of the traditional settlements is often responsible for setting out vulnerable conditions for disasters to take place and such cultural dimensions were often sidelined in both pre and post disaster development processes (Jigyasu 2004, Jhonson 2006). Until the 1980's, the connection between disasters and the development issues was not clearly recognised (Cuny 1983). However, in the late 90's the debate focused on the notion of 'vulnerability' in relation to disasters and development (Blaike, et al 1997). According to Davis (1978) development in disaster context provides an opportunity for change and is carried out within an idea that better development reduces vulnerability. Development, including access to education, healthcare, land and adequate housing, can reduce people's vulnerability and therefore increase their ability to cope with natural disasters. As vulnerability and development are inter-related phenomena, vulnerability in this research is defined in the three different disaster-development settings on which this research focuses. These are as follows:

- Existing vulnerabilities in the pre-disaster development setting: vulnerabilities relating to the lives and livelihoods of people in low income rural settlements such as lack of access to essential infrastructure and other facilities like health, water supply, electricity, roads,

education, markets; unstable economic conditions and declining fish or agricultural stocks.

- Additional vulnerabilities resulting from disasters including those resulting from the destruction of the lives of fellow members of the affected community, destruction of infrastructure and livelihoods and often irrevocable damage to the integrity of ecosystems, built environment, health and education of affected people.
- Vulnerabilities produced as a result of post disaster reconstruction failures, including those resulting from newly developed settlement patterns that are incompatible with sustaining local needs. They include economic difficulties, lack of water supply and sanitation facilities, weakening social networks, transportation, and distance, environmental and technological impacts. In addition, post disaster development practices can leave the communities more prone to the future disasters or similar hazardous events.

From the above definitions, it can be seen that vulnerability changes with the situation whether it is pre-disaster, in the period immediately following a disaster or in the post disaster reconstruction setting. Jigyasu (2002) observed that in post disaster responses, people tend to adjust or modify their ways of living and their places using their indigenous knowledge and capabilities. This is reflected not only socially but also in the physical evolution of the traditional settlements and vernacular architecture. Under such a transformation, Rapoport (1969) and Oliver (2003) consider it important to track, measure, observe and understand these changes as expressed in the evolution and development of the settlement patterns and vernacular architecture, because such expressions demonstrate on how people draw on their cultural practices to create physical and material forms that are built to meet changing and new needs of the group.

It is argued in this study that the existing literature on disasters and development does not provide adequate insights into the theoretical methodologies that could address the relationship between the three different conceptual terms including culture; vulnerability and development in post disaster contexts. Enough theoretical thought has not been developed so far on how these three concepts bear the relevance on each other in the evolution of built environments.

From the above discussion on vulnerability and development whether in pre-disaster or post-disaster contexts, it follows that vulnerability gets transformed (either reduced or increased) with the nature of development performance and inputs. This transformation does not only depend upon development initiatives but to a large degree on the cultural setting of the affected settlements, which in turn has an influence on the development initiatives. It is also necessary to address the agency of the affected people. Under such complex phenomenon of the transformation process, people with their capacities and abilities, either tend to resist or try to adapt to the development change. In that process, people also develop innovative practices for adapting to the change. Therefore cultural practices themselves are also subject to change in the development process. Hence the question arises here - in the first instance, 'what has influenced what'?

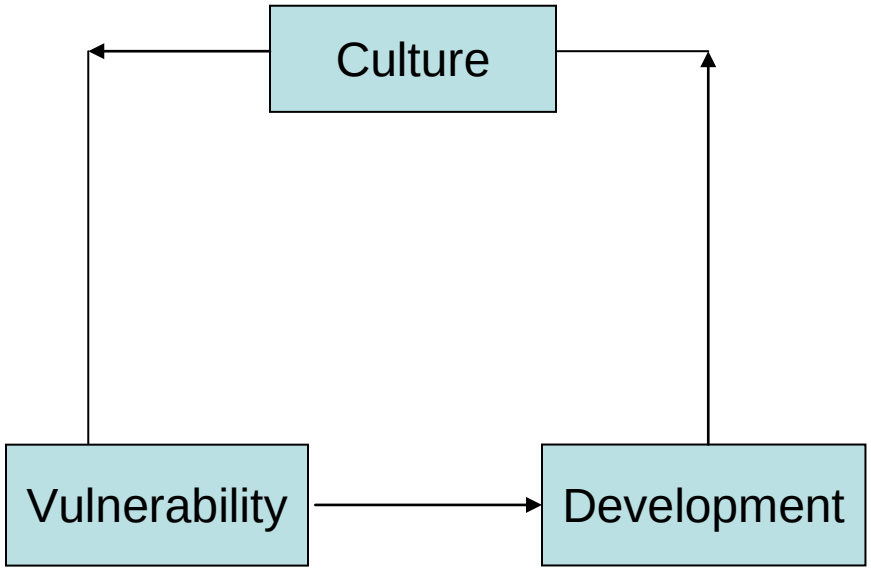


Figure 1.3: Showing the cyclic relationship between Culture-Vulnerability-Development.

As previously noted, the socio-cultural setting of traditional settlements affects the conditions of vulnerability to disasters (Jigyasu 2002 and Jhonson 2006). Depending on the nature of the vulnerability, various development initiatives will be organised by government and other non-government agencies in the affected settlements to support the communities for sustaining their lives in a better way. Support activities include provision of alternative resources for livelihood

and necessary housing and other infrastructural facilities to the affected households. Gradually, people tend to develop innovative practices or reform their existing daily practices either for adapting or resisting to the development change brought by the support agencies. Such changes in the cultural practices of affected communities also have an influence on their coping capacities for reducing vulnerability. Here coping capacities refer to individual and collective capacities of the communities that help to develop mutual support systems for their existence and survival process. Therefore any linking context that connects the transforming nature of cultural practices with that of vulnerability can be seen as key to the development of a given settlement within a disaster context (figure 1.1). Similarly, the key component that influences both development and vulnerability is the changing cultural dimensions of the traditional settlements. Finally, the resulting component of the whole cyclic phenomenon is the vulnerability, which in turn acts as an initiating cause.

Working with the inter-related concepts of culture and vulnerability in the built environment and development, presents a major challenge for emergency humanitarian and development practice. As far as the theoretical knowledge base is concerned, there are recent studies by commentators such as Lim (2008), Oliver (2006), explaining the issues of cultural environments in the development situation. Such studies highlight the critical relationship between culture and development and argue that long-term sustainable development should be carried out by integrating cultural concerns of the communities.

An extensive review of the literature reveals, there has been no theoretical analysis specifically addressing the influences of transforming cultural practices on vulnerability reduction and vice versa in a post disaster development context. In practice, development organisations have developed different participatory approaches involving communities in order to address cultural concerns in the post disaster development processes (ISDR 2008). However, such current development approaches often fail to understand and address the inter-relationship between culture, vulnerability and development and how each component influences the other two components and vice versa. Cases such as the Latur earthquake rehabilitation in 1993, Gujarat earthquake reconstruction in 2002, and Orissa super cyclone recovery in 1999 substantiate this argument (Jigyasu 2002). Thus there is a need to develop analytical frameworks that can explain

the inter-relationship between these three components in a pre and post disaster context, to further inform theory and practice.

By demonstrating the inter-relationships between culture, vulnerability and development practice in the post disaster reconstruction context, it is possible to track and measure the success and failure aspects of the development approaches aimed at supporting better living conditions in the affected settlements.

These concerns about the cultural dimensions of the disaster-affected settlements has led to the question of an interdisciplinary approach towards a new design paradigm that includes urban design, as a discipline that is concerned with creating physical spaces sensitive to their cultural context.

Though urban design may deal with spaces and buildings at a larger scale than the scope encompassed by the study of the vernacular architecture of traditional dwellings and settlements, the methods for understanding the cultural context in which these vernacular dwellings and settlements continue to exist and how they fit into the present social, political and economic culture of a people and place are very much the same. They are issues that concern urban designers in their attempt for creating better places.

This study argues that-
“Cultural dimensions of local communities are not effectively and sufficiently addressed in the current post disaster humanitarian and development processes to the disadvantage of both the communities affected and the humanitarian and development agencies helping them."

Based on the above stated hypothesis, this research takes a critical look at the problems and issues in post disaster housing process, offering an interdisciplinary approach integrated with urban design principles for understanding the role of culture in the post disaster reconstruction process and how it influences the vulnerability component and development goals. Hence it aims to answer the following research question.

1.3 Summary of research

1.3.1 Research question

How to understand the role of culture in the post disaster recovery process and its relation to the vulnerability, in particular to the built environment of affected traditional settlements?

Sub Questions

1. What are the underlying cultural dimensions that enable communities to sustain their local needs and maintain their resilience in a built environment context?
2. How to develop a theoretical framework for understanding the transformation of the settlement patterns in the built environment context and evaluate how the cultural dimensions of the affected communities are addressed (or ignored) by various post disaster development processes?
3. How the outcomes of this investigation on culture can relate to the vulnerability component of the communities affected by the transformation of settlement patterns in the post disaster recovery process? And finally how such analysis and findings of this inquiry can inform the true knowledge related to cultural discourse of disasters and development?

1.3.2 Aims of this research

The primary aim of this research is developed in order to validate the hypothesis of this research that post disaster development efforts immediately following the impact of the disaster fail to integrate the diverse cultural needs and aspirations of local communities in the development process. Therefore, this research aims to understand the role of culture in the post disaster recovery process and its relation to the vulnerability, in particular to the built environment of affected traditional settlements.

1.3.3 Objectives of this research

1. To develop a conceptual framework through an extensive literature review, for analysing the relationship between vulnerability, culture, and development.
2. To employ this conceptual framework for analysing the transformation process in traditional fishing settlements of Tamilnadu, those affected by the 2004 Indian Ocean Tsunami.
3. To use the analysis and findings of this primary research to inform the development of strategies that can inform the true knowledge related to the cultural discourse of disasters and development.

1.3.4 Case study method

This study adopts an empirical case study approach. This research selects on the 2004 tsunami disaster, which affected South Asian countries including Indian sub continent as a case study. The 2004 tsunami disaster was found appropriate as case study because these countries are facing a disaster of this kind for the first time and therefore the development agencies concerned with its impacts are not experienced in dealing with this type of disaster. The contribution of this research will be of immediate use for their redevelopment work. Secondly, the disaster is still fresh in the memories of all the actors concerned, so that it is possible to capture historical information using primary data collection techniques.

Due to the complex nature of this research involving culture, this study attempts to develop a new theoretical framework for understanding the transformation in affected traditional settlements in post disaster contexts by using an interdisciplinary approach, bringing the concepts that are derived from urban design and cultural anthropology.

The Tamilnadu coast in southern India was subjected to huge extent of damage in terms of loss of life and property damage. The author's previous interaction with the state of Tamilnadu,

working as an intern architect at Auroville Building Centre at Auroville and as a team member in the socio technical assessment of the tsunami affected villages conducted by Hunarshala (on behalf of United Nations Development Programme), provided useful insights about the Tamilnadu region and its characteristics. Such primary awareness about the region and the local authorities also helped the author to collect the required information and to attain convenient access for interacting with the beneficiaries and concerned officials. However, after careful consideration of the Tamilnadu cultural context, three tsunami affected fishing villages were selected for the case study purposes. They include 1. Kovalam village 2. Tharangambadi 3. Lighthouse Kuppam village. Detailed explanation on these case study areas and their criteria of selection will be explained in the later chapters.

1.3.5 Scope and limitations

This research looks into the dynamics of the existing situation and the factors affecting the everyday life of fishing communities damaged by 2004 Indian Ocean Tsunami. It does not focus on the geological phenomenon that is responsible for causing the tsunami or any particular phase of the disaster, such as pre-disaster, emergency or post disaster, in isolation. Particular emphasis will be placed on the cultural aspects of traditional fishing settlements, along with other aspects such as social, economic, natural, human, technical, and political aspects and their inter-relationships with each other. It examines how cultural aspects influence physical (built) space (existing and emerging) and vice versa. Due to the time constraints, the study looks in depth at three tsunami affected cases. This study is intended to develop a conceptual framework and to employ that framework for analysing the role of culture in the recovery processes in different cultural contexts.

1.3.6 Value of the research

This research deals with development issues in the post disaster recovery process, through exploring these issues in three different tsunami fishing settlements in Tamilnadu, Southern India. It aims to contribute to the cultural discourse in the disasters and development process. It

also aims to provide new insights on using urban design approaches in rural development and in disaster management practice. The final outcomes of the study will include recommendations to the development agencies and organizations. They are developed with regard to the strategic development methods by which cultural dimensions of the traditional settlements could be better addressed by using interdisciplinary approaches that integrates urban design methods and cultural studies to produce sustainable recovery processes.

1.4 The rationale of this study and its parts

This dissertation is divided into three parts. First part comprises of four chapters. They include background discussion for this research study, developing conceptual framework for analysis and research methods that were implemented to conduct this study and the fourth chapter elaborates on the current disaster management practices in both national and international setups.

Second part consists of three chapters along with the detailed explanation of the case studies and clear-cut analysis of the collected information from the fieldwork.

Third part comprise of chapters eight and nine, which demonstrates the analysis and final conclusions of this study and further recommendations to the disaster and development practice.

Part 1:

Chapter - 1: Development of an understanding of the notion of cultural aspects and vulnerability, in disasters and development in the Indian context, and in particular and elsewhere, in general.

The first step in the study was to review the literature (documents, Internet, articles, books) on a range of subjects related to disasters and development in general and tsunami in particular. A Literature review was carried out to derive concepts of culture, community, vulnerability, disasters and development (for e.g. Culture – Lim (2008), Orbasli (2000), Bourdieu (2000), Oliver (1987), Rapoport (1969); poverty and development (Hamdi (1997), (2004); DFID (1997);

vulnerability- Wisner (2001), Birkmen (2006) Bankoff et.al (2004); cultural diversity and inter-communal conflict (Bavnick (2003); Kauffman (1981); and research methods - Silverman (2006) Taylor and Bogdan (1998)). The current development control mechanisms and policies prevailing in the disaster affected areas in India and more specifically to Tsunami affected areas in Tamilnadu were also reviewed.

Chapter-2: Based on chapter 1, the author has reviewed the literature and developed an appropriate conceptual frame of reference by synthesising cultural anthropology and urban design as a field of enquiry to understand the critical relationship between vulnerability, culture and development. It has primarily adopted a case study method and a qualitative approach implemented within it, following the statement of Yin (1981) that a case study method is an empirical inquiry that investigates a contemporary phenomenon within its real life context. After reviewing various approaches to address vulnerability in the post disaster recovery process from a cultural dimension, this research deals with the day-to-day dynamic situation (situation analysis) of the fishing settlements by integrating principles derived from urban design and cultural studies to get a better understanding of transformation of vernacular settlements in a post disaster development context. In this sense, the case study method is a way of investigating an empirical topic by following a set of pre-specified procedures in a situational analysis.

This investigation demands a careful follow-up study of both short-term effect and long-term impact of the vulnerability process on individuals, communities and their living environment. It needs the application of a range of data collection strategies and diversified sources of evidence in the fieldwork.

Chapter-3: Based on the conceptual frame of reference developed in chapter 2, methods of evaluation are developed based on the work of Bentley, et al. (1985), Birkman ed. (2006), Blaike et.al (1997), Cuny (1983), DFID (1997), Jigyasu (2002), Rapoport (1969), RICS (2006), Low (2002). Qualitative methods of research, such as observational, ethnographic, and cognitive methodologies are being evaluated in this research to analyse the transformation process in the affected settlements. Community interests are recorded through direct and indirect observation in

the field and through the implementation of semi-structured interviews, mapping exercises, photographic and video graphic recordings within the study area to map out transformation processes, development practices and local involvement (e.g. Hamdi, 1997).

Chapter-4: This Chapter provides an insight on various national and international disaster management practices and explains on how their networks are operated at the time of disaster event and in the reconstruction processes. At international level, how the current disaster management system exits within the United Nations and within Indian sub-continent detailing the organizational setups at state, district and village levels have been discussed here.

Part 2: Case studies

Chapter-5, 6 and 7: Qualitative research methods identified in chapter 3 are employed in the field survey (conducted from December 1st 2007 to April 2008) with key actors (producers, consumers and controllers) and local community groups in the three case study areas. The perceptions of spatial community, community of interest and key actors (planners/ architects, community leaders, and development agencies) concerning the relocated fishing settlements were described to discover how the post tsunami built form supports or constraint fishing communities interests and daily life practices. The collected data is presented in systematic formats as a part of the analysis.

Part 3: Analysis and Findings of the whole study

Chapter 8: Post disaster development issues in cultural context

The main idea of this chapter is to compare and contrast the findings from the three different case study areas described in Part 2. A triangulation method is used to compare different kinds of qualitative data from different methods (e.g. observation and interviews) to see whether they corroborate each other. This chapter considers the specific impact situations on vulnerability, the

reasons of such impact situations that were explored in the different case studies and focuses on why cultural dimensions have been sidelined in post disaster development process.

Chapter 9: Conclusion, Summary and a way forward

This chapter discusses the conclusion of the whole study and theory and methods which were discussed in chapter 2 and 3 will be revisited at this stage to see its theoretical relevance which can further develop a unique contribution to the universal knowledge data base. It also develop further recommendations towards the integration of underlying cultural aspects of local communities in the development processes is drafted based on the local and universal frame of references.

Theoretical Discussion for Developing a Conceptual Framework for Analysis

It is important to understand the links and relationships between concepts of culture, vulnerability and development in post disaster contexts. The objective of this chapter is to explore how these three concepts can be brought together to form the conceptual framework of analysis.

2.1 Defining 'culture' in this research context

Culture forms the focus of important debates in the writings of anthropologists such as Geertz (1973), and sociologists such as Bourdieu (1986, 2000), King (1997 and 2004), and Castells (1997), vernacular architecture experts such as Oliver (1997 and 2006), Lim (2008) and Bourdier and Alsayyad (1989) and also urban designers such as Bentley and Watson (2006). Because these debates cover a wide range of relevant topics to this study, it is difficult to find a commonly accepted definition for culture in built environment context, as it has been articulated more in sociological and anthropological fields. Since the mid 80's, experts from built environment professions have either critically or uncritically explored or employed the sociological concept of 'cultural capital' concept that has gained widespread popularity and is particularly relevant to this study as it encompasses notions of culture and place.

2.1.1 Relavance of Bourdieu's concept of 'cultural capital'

Pierre Bourdieu and Jean-Claude Passeron first articulated the term cultural capital (*le capital culturel*) in Cultural Reproduction and Social Reproduction (1973). This concept of cultural capital is fundamentally based on the concepts of *fields* and *habitus* on which Bourdieu (1986) had developed most of his work. 'Habitus' is defined as

> a system of durable, transposable dispositions, structured structures pre disposed to function as structuring structures, that is, as principles which generate and organise practices and representations" (Bourdieu 1990:53).

It is considered as a social space: a sense of one's place and a sense of others place, where as a "field is a space of play within a network of objective relations between positions". Based on these concepts Bourdieu (1986 p47) classifies cultural capital into three types, which comprise embodied, objectified and institutionalised states.

1. "An embodied state is both the inherited and the acquired properties of one self; inherited not in the genetic sense, but more in the sense of time, cultural, and traditions bestowing elements of the embodied state to another usually by the family through socialization.
2. An objectified state includes things that are owned, such as scientific instruments or works of art. These cultural goods can be transmitted physically (sold) as an exercise of economic capital, and "symbolically" as cultural capital.
3. An institutional state is an institutional recognition of the cultural capital held by an individual, most often understood as academic credentials or qualifications. It allows easier conversion of cultural capital to economic capital by guaranteeing a certain monetary value for a certain institutional level of achievement."

Researchers and theorists such as Emirbayer & Williams (2005) have explored or employed Bourdieu's theory similar to the way that Bourdieu articulated it. They usually apply it uncritically, and depending on the measurable indicators of cultural capital and the fields within which they measure it, Bourdieu's theory works to support their argument totally, or in a qualified way.

Criticisms of Bourdieu's concept rest on a specific understanding of his theories. It is noted from Gorder (1980) and Robbins (1991) work that the cultural capital has indeed limited to understanding inequality (for e.g. educational inequality). Lareau and Weininger (2003) have noticed in Bourdieu's work that culture shares properties, which can either directly or indirectly characterised into economic capital. Because Bourdieu particularly asserted that cultural capital comprises cultural resources available to any individual or group in any field, capital is either valued, or not, depending on the field it is located within and can be transmitted from one generation to the next.

In his book Distinction (1984), Bourdieu incorporates a number of non-economic criteria for stratification into his social class framework; in such a way that economic capital is not necessarily to be the most relevant way of determining class groupings. This shows that there have been misunderstandings of Bourdieu's theory and the arguments of distinction clearly demonstrate that he does not reduce everything to economics.

In the built environment context, Dovey (2005) notes that habitus as the aspect of human behaviour that causes culture to happen and cultural capital is the result. To complicate things Dovey (2005 p285) considers it to be embodied in people as well as their physical environments and also refers to Bourdieu's work on Pascalian meditations stating that

> it is subjected to constant change, but such revisions always based on social practices through which the habitat may change radically; the habitus evolves (Bourdieu 2000:161).

Neil Leach (2005 p298) recognizes that architecture in Bourdieu's terms can be understood as a type of objectified cultural capital. He points out that Bourdieu's theory of habitus as discussed by Dovey (p285) did not address any commonly accepted framework for exploring how people make sense of space and relate to it. Therefore in order to establish a schematic framework, Leach (2005) develops a tentative theory of identification with space by bringing three discreet theoretical models. They include the following:

1. How we territorialize and make sense of space through a process of *narrativisation.* Here demarcation is developed through narrative description, for instance, a street defined by urban planning is transformed into a space by walkers.
2. How a sense of belonging is achieved through *performatives*. Here the performatives refers to the spatial practices, through which spaces are demarcated by certain groups by a kind of social appropriation.
3. How eventual identification within a particular space is forged through a series of *mirroring*. Mirroring refers to the repetitive performatives and their various modes of perception that a mirroring can be enacted and sense of identification with place can be developed and reinforced through habit.

From the above discussed theoretical aspects it can be understood that architecture offers a potential mechanism for inscribing the self into the environment and how the narrative and performative discourses tend to give meanings to the spaces in the everyday life. It also supports Lee's (1997) model that states:

> "…the practice or set of concrete actions will over time adjust the original objective conditions of existence of a place, there by leading to the modification of the original habitus in response to these changes, will accordingly generate changes to practice."

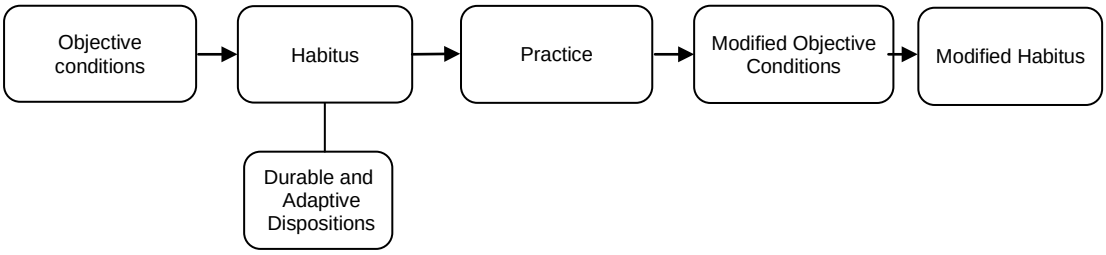


Figure 2.1 Showing Lee's (1997) model of the dialectics of habitus and the objective conditions of existence.

Bourdieu's concepts of habitus and fields provides a basic approach for understanding the role of culture in more sociological terms rather than within built environment contexts in particular. His theory connects physical structures and agency in a dialectical relationship between culture and structure. In the built environment context, the question is whether culture formulates physical structure or physical structure is responsible for the evolution of cultures, and what can be termed as culture and what dimensions fall under structure. In various contexts, Bourdieu's concept of habitus has often been criticised for not sufficiently addressing such aspects of culture and structure and the conditions of change in relation to the space (Waterson 2005), Dovey (2005) Leach (2005). From Dovey (2005) and Leach's (2005) understandings of Bourdieu's theory – the former considers habitus as embodied form and the latter consider architecture as an objectified form of cultural capital. Further Leach (2005) describes a tentative theory of identification with space through the process of narrativism, performatives, and mirroring. Meaning is constructed through narrative and performative processes. These take place in specific spatial and architectural layouts. From the above articulated theoretical models, it can

be understood that culture is a way in which people give meanings to their lives and the places they live in. However, such meanings are also subjected to change with the day-to-day needs and demands of the people in the disaster and development processes. Such transformation is reflected in the evolution of traditional dwellings and settlements in the disaster and development context. Therefore in this research, which is related to built environment, Bourdieu's theory only helps in questioning the role of agency and the constructs of culture in the evolution of traditional settlements in the post disaster development contexts and Leach (2005) theory helps in understanding how these constructs of culture are determined with the changing daily practices and narratives.

2.2 Traditional settlements in development context:

It is important to understand what makes a traditional settlement. The word 'tradition' comes from the latin word '*traditionem*' and in more basic theoretical level, tradition(s) can be seen as information or composed of information that is passed down from generation to generation (Edward Shils 1981). These traditions are in the form of knowledge and practices in religion or beliefs, political systems, social hierarchies, economies and way of living that are developed relatively to the cultural landscapes of defined geographic territory, whether it is land or sea.

Traditional settlement is a means a way of organising space from the scale of the house to the scale of the village and the town using models and practices which are a legacy of the past (Charpentier 1989: pp136-137). This means transmitting the same meanings or knowledge from one generation to the next through building or planning practices. According to Leach's (2005) theory, in a traditional settlement, traditions help to create, define, and defend territorial boundaries and this limit is applied to geographical areas to include both land and seascapes on which the people rely for their livelihood and ways of living (Lim 2008 p58). It is important to understand how various aspects of tradition are used to create a sense of belonging in relation to the evolution of physical space and how these traditions can serve the existence and continuity of people and place. Because cultural landscapes differ from culture to culture whether they are nomadic, pastoralist, sea-dependent or mountain based, the

traditions that are passed on to the next generation also differs to suit the cultural landscapes. Such a process of transmission of practices frames up a collective identity for the people connecting to the place they live in. Therefore the concepts of local, regional, sub-national and national identities help to define cultural groups who share common practices within clearly defined physical boundaries of land and sea (figure.2.2).

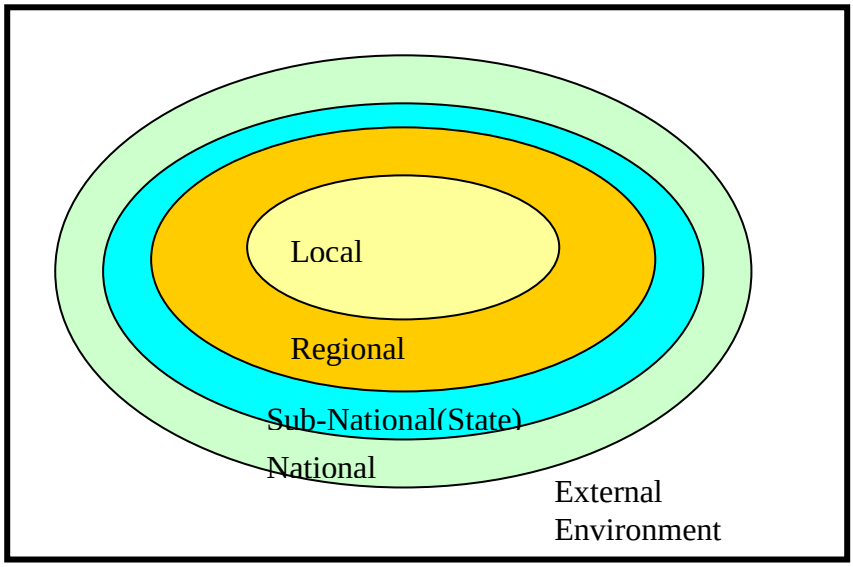


Figure 2.2. Showing the relationship between the concepts of local, regional, sub-national, national and global identities.

Figure 2.3 Showing Lim's (2008) model of Cultural Environment and the areas of inquiry within it.

Lim (2008) used the term 'cultural environment' in her work on Philippine settlements relating to the different cultural aspects through which communities construct their identity either at national, regional and local level. The order in which she presented these different aspects is in accordance with the process of construction of identity how an individual becomes a social individual (Lim 2008 pp32-41). They include family, kinship and gender roles, politics, economy, cultural interaction, religion and belief systems, and the ecological environment. Lim (2008) considers these components as fundamental aspects that can provide a means for a holistic understanding of culture and also elaborates on how these aspects bear upon each other influencing other components in creating identity for people and the places they live in. Here it is important to consider that such identities also get transformed due to changing social, economic and political contexts, which formulate the development context for any traditional settlement. Development acts an agency in the evolution and transformation of traditional settlements.

In the recent theories of globalization, it is also argued that people also draw upon the imaginative aspirations and practical experiences of 'modernity' (Giddens, 1990). Deborah Lupton (1999, p75) in the writing on Giddens (1990) aptly summarises the impact of modernity in the pre-industrial communities and states

> People now cannot simply rely on local knowledge, tradition, religious precepts, habit or observation of other's practices to conduct their everyday lives, as they did in pre-modern and early modern times.

Such modernistic arguments open up new challenging dimensions in this research. The key role which choice (either tradition or modern) plays has complex and contradicting implications for the identity and construction process (Bentley and Watson 2006). These arguments challenge the main argument of this research, which is that people draw upon their culture to create physical and material spaces to sustain their needs. Therefore it is important to consider how modernity is perceived in the evolution of the traditional settlements and what is the source expression of such modernity especially in post disaster development contexts? Does the experience of modernity play an equal and similar role in both pre and post disaster development context? To answer such questions on modernity, it is necessary to have a deeper understanding of disasters and development theories in both local and global context.

2.3 Disasters and development

The relationship between disasters and development is particularly relevant when it comes to the vulnerability that affects the masses of urban and rural poor in the developing world who have little access to the resources, power and choice mechanisms needed to improve their life circumstances. Much of the theoretical knowledge surrounding the relationship between disasters and development focuses on how post-disaster response can better relate to development (Cuny 1983). On the other hand, the pre disaster development processes has the risk of being interrupted and impeded (or even negated) by disasters and post disaster responses.

Vulnerability is a potential product of all activities and undertakings of society. It is the product of sets of prevailing conditions within which disasters may occur. While explaining the disaster-development concept, Lewis (1999) advocates that vulnerability has to be addressed therefore, not only by post-disaster concern and response, but as a part of the day-to-day management of change – whether or not this change is called development.

According to the concise Oxford Dictionary a developing country is a 'poor and primitive country that is developing better economic and social conditions'. In the post colonial years following World War II, development was widely thought to mean economic growth and industrialisation, and the European or western example was presented as the model for the rest of the world. Development is (usually) seen as a planned process of change which as the creator of prevailing conditions and contexts within which people live and participate, becomes the framework within which all else happens – planned or unplanned. Amartya Sen (1999) considers that development can be seen as a process of expanding the real freedom that people can enjoy. Here freedom also depends as much on improved governance, democratization and respect for human rights as it does on social and economic arrangements. Greater freedom enhances the ability of people to help themselves and also to influence the world, and these matters are central to the process of development (ibid p18).

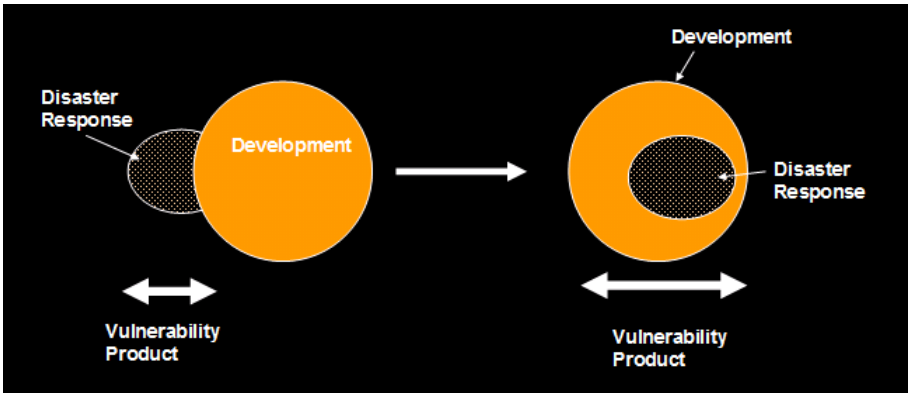
As much of development thought is hinged to economic measures set in the context of a globalised consumer market, experts like Lavell (1999) put forward the view that it is difficult to imagine that these economic growth models reduce levels of vulnerability, as such models in reality continually lead to an increase in poverty. Those affected by poverty end up living on unsafe land, in unsafe houses and without safe livelihoods and thus become more vulnerable to natural hazards. Such old economic growth models continue to be alongside of the newer human development models following Sen's contributions. Human development models require investment by public sector in health and education. This in itself requires economic growth for development and which in turn depends on the globalised consumer market. So there is a need for such development models that can reduce vulnerability to natural hazards and enhances the ability of people to help themselves and also to influence the globalised consumer market.

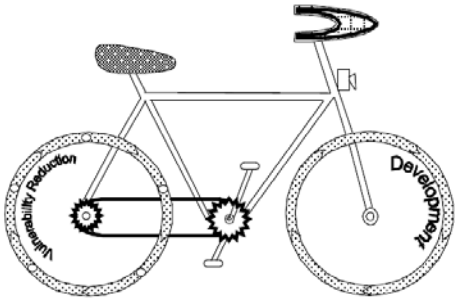
In the jargon of disaster experts, disaster-development include a pre-disaster situation in which the structural conditions for disaster are established, the period of onset, when natural hazard strikes and resulting development of disaster conditions as such, and finally, the subsequent responses of society during what are known as the relief, rehabilitation and reconstruction 'phases'.

Lewis (1999) considers in a disaster continuum approach that disaster, reconstruction and development are conventionally perceived and represented linearly. In reality however they are simultaneous, each 'stage' overlapping with others in the same or neighbouring places and in response to the same or different disasters and responded to by the same or different authorities and organizations. Jigyasu (2002) brings out the Cuny's (1983) explanation of the order in which disasters and development is perceived; either first disaster and then development or first development and then disaster. According to Cuny (1983 p129)

> "For a single disaster event, disaster, reconstruction and development, usually represented linearly, are in reality cyclical. Though a disaster may commence a process that leads to development, development has invariably preceded disaster and had a bearing upon the extent and implications of the disaster that ensued – for better or for worse (p. 129)".

Following the arguments of Lewis and Cuny the conceptual framework developed here considers disaster causes, consequences and social response in the same analytical framework. The 'disaster continuum' approach positively attempts to align post disaster recovery with development, recognizing the intervening stages of relief, rehabilitation and reconstruction. However, this linear model doesn't acknowledge that there are other sectors of activity continuing outside the cycle (Jigyasu, 2002). Development or simply 'change' is also taking place – either haphazardly or in a planned and programmed way. Lewis further suggests that there is not one 'cycle' but two; it was not a 'disaster cycle' but a 'disaster bicycle' (See figure 2.4B). However, he is careful to point out that the disaster cycle and the development cycle were not, and still are not, driven by the same forces. Therefore in order to understand the interpretation of the impact of disaster on development process, it is important to consider the ways in which different models or approaches and patterns of economic growth have contributed for the vulnerability reduction in traditional settlements.





Figures 2.4 (A and B): Changing relationship between vulnerability reduction and development (Source: adapted from Lewis (1999) and Jigyasu (2002).

2.4 Theoretical discussion on various approaches for analysing disaster vulnerability

In this section various approaches for analysing disaster vulnerability are critically discussed under four main clusters. Over the eighties and nineties, disaster experts developed different approaches to address disaster vulnerability. Ben Wisner (2001) has classified them as techno-centric, target group, situational or community based approaches.

2.4.1 Techno-centric Analysis

Under techno-centric approach, vulnerability and risk are objectively defined as the degree of loss to a given element at risk or set of such elements resulting from the occurrence of a phenomenon of a given magnitude. It categorises elements at risk to varying degrees, given hazards with certain characteristics and an array of elements with differing degrees of potential for damage or loss including structural vulnerability of buildings, bridges and social vulnerability of health care systems and people. These approaches tend to consider human beings as one of many elements at risk, defined as the population, buildings and civil engineering works, economic activities, public services and infrastructure, etc. exposed to hazards. (Emergency Management Australia, 1998) However Jigyasu (2002 p43) identifies that this kind of approaches has no reference to people in society, their community and social associations, networks and processes that underpin and facilitate life in our society. He also adds to that the list of vulnerable groups is also limited and restricting and looks at only one dimension of vulnerability. Therefore, such limitations to these approaches have clear potential to affect planning and management in practice (Buckle 2000).

2.4.2 Target Group Analysis

There has been a major shift from the conventional use of the term “vulnerable” that does not clearly differentiate between things, systems, and people (Jigyasu 2002).

Jigyasu (2002) points out that it particularly focuses on the vulnerability of target social groups, and is concerned with the causes of this social vulnerability. These approaches start from empirical observation, which determines that different groups of human beings often suffer different degrees of injury, loss, disruption in the same event, and also experience different degrees of difficulty, success or failure, in the process of recovery (Hewitt, 1996; Blaikie et al., 1994). These approaches tend to break vulnerability down into different kinds including social, economic, environmental, cultural and informational and they tend to classify such as the vulnerability of women, children, elderly people, the disabled, ethnic/ racial/ or religious minorities, illegal immigrants.

Jigyasu (2002 pp44-45) notes that these lists do not explain the characteristics of a specific hazard, specific circumstances and specific persons, all of which are capable of change.

2.4.3 Situational Analysis

By considering the drawbacks in both techno-centric analysis and target group analysis, a third approach has been developed to address the actual situation. It does not just look at what kind of group a person or family belongs to, but the nature of their daily life and their actual situation, including the way it may have changed recently or may be changing. According to Wisner (2001) situational analysis is an expert oriented approach done for the affected or vulnerable people and it also recognises different forms of contingencies, which includes the dynamic nature of the social vulnerability of a person or group as such circumstances change dramatically as the life cycle of a person or group unfolds (ibid p5). This approach is used in the "pressure and release (PAR) model" and "access model" utilized by Blaikie et al. (1994) and Sustainable Livelihoods Framework by DFID (1997).

The Pressure and Release (PAR) model is a way in which 'underlying factors' and 'root causes' embedded in everyday life give rise to 'dynamic pressures' affecting particular groups, leading to specifically 'unsafe conditions' (see figure 2.5). The access model analyses how vulnerability is generated by economic and political

processes. It indicates more specifically how conditions need to change for reducing vulnerability and thereby improve protection and capacity for recovery. It also avoids the oversimplification of the PAR model, which suggests that the hazard event is isolated and distinct from the conditions that create vulnerability (Jigyasu P46).

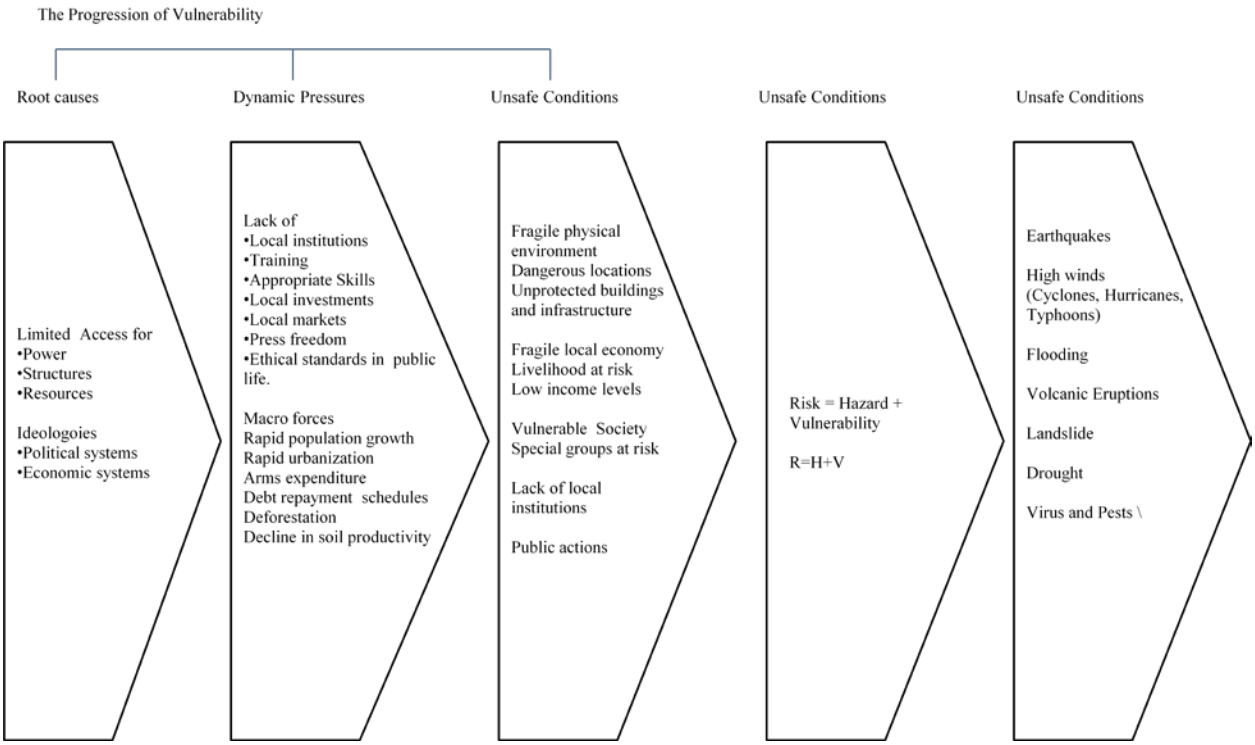


Figure 2.5 Pressure and Release (PAR) model by Blaikie et.al (1994).

These models establish clear links between disaster vulnerability and poverty, land, livelihood, power, dependency and governance. Here vulnerability is conceived as both a biophysical hazard as well as a social response within a specific geographical domain.

Drawing on a decade from 1997, much attention was being paid to livelihoods in various development approaches and models that have been targeted to eradicate poverty, deprivation and maintain the well being nature of communities. One of such model, which has been central in the thinking of Department for International Development (DFID) is Sustainable Livelihoods Framework. This SL Framework was actually developed by DFID in 1997 to analyse how household, or groups

construct their livelihoods both on the basis of the assets which are available to them and within broader socio-economic contexts (Carney 1998).

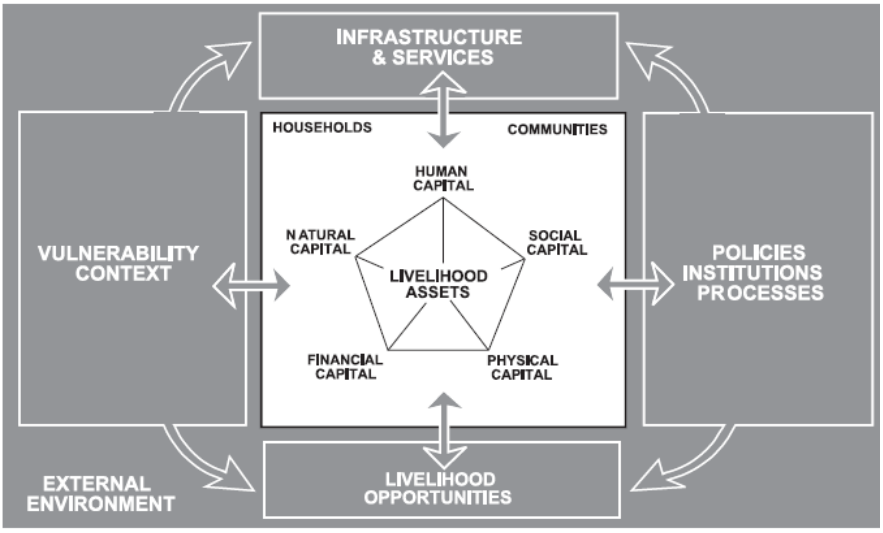


Figure 2.6 Urban livelihoods interpretation of the original DFID Sustainable Livelihoods model, by Tony Lloyd Jones (Rakodi and Jones p9) and also cited in Max Lock Centre 2005)

From the above figure 2.6 it can be noticed that the asset framework (the pentagon) is presented at the centre of the diagram. This specifies the asses that are the resources that people use to build a livelihood and as source of capability to act, engage and change the world. Lloyd Jones and Rakodi (2002) further analyse the contextual factors such as sources of insecurity and policies and organisational relationships between individuals and communities that influence the livelihood assets of poor people and their vulnerability context. In this asset framework, vulnerability is mostly understood in terms of poverty and access to livelihood assets. In order to analyse vulnerability Carney (1998), cited in Lloyd Jones and Rakodi (2002 pp 14-15) suggests that analysing vulnerability involves identifying trends (resource stocks, demographic change, available technologies, political representation and economic trends) and shocks such as illness, natural disaster and conflict.

From the Max Lock Centre's report (2005) and Lloyed Jones and Rakodi (2002) on Community Asset Management, it can be understood that - It is not just for the economic necessity which households or groups act upon, but it's with the social and cultural factors by which people manage their assets and make their livelihood

choices. This supports Lim's (2008 p18) argument that culture produces management systems particular to place-specific bio-regions.

2.4.4 Community based analysis

The fourth form of analysis is quite different from the other three. In this case communities and groups appropriate the concept of vulnerability to inquire into their own exposure to damage and loss. The concept becomes a tool in the struggle for resources that are allocated politically. The employment of the concept of social vulnerability as a tool in and by the community also involves a thorough analysis with and by the residents of their own resources and capacities/ capabilities (Jigyasu 2002). In some parts of Latin America and southern Africa such community based vulnerability assessment has become quite elaborate, utilizing all sorts of techniques to map and make inventories, seasonal calendars, and disaster chronologies (Wisner et al., (1979); Cuny, 1983).

2.5 Moving towards a situational approach

Having looked at various models, we can conclude that there has already been considerable debate on the analysis of vulnerabilities taking into consideration various 'technical' as well as 'social' factors. This has addressed various quantitative as well as qualitative aspects that contribute to increasing vulnerability in traditional settlements. Recent theory has shifted from techno-centric analysis towards social-based responses in the disaster contexts. However, in all the above discussed models there is little emphasis on community capacities or strengths and none of the above models has emphasised the dynamic relationship between the capacity and vulnerability in traditional settlements.

In particular, in these development approaches or models, the question of detachment of culture has not so far been adequately addressed in relation to communities living in traditional settlements. Also, it has to recognise that there is a significant difference between the implication aspect of pre disaster development model and post disaster

development models. The vulnerability situation changes with the kind of development implications. Such development implications differ normally by the type of disaster and its impact on the victims and their places and also for the same disaster, development approaches also differ depending on the existing socio-cultural, economic and political context of the affected places. Aspects of culture which are place specific and their impact on vulnerability of communities living in traditional settlements are side lined in pre and post disaster development models.

This study aims to investigate the changing situation of the affected settlements from pre disaster to post disaster situation in order to answer why cultural dimensions of affected communities are sidelined in the post disaster development process. In this context, situational analysis would seem to be the most appropriate form of analysis for understanding the day to day changing situation of affected communities in the post disaster development process. A situational approach will enable the investigation of the existing status of traditions and the capacity of the affected communities to cope with the post disaster consequences.

2.6 Defining the framework to understand the role of culture in post disaster development contexts

As discussed in section 3.1 Rappoport (1982 and 1990) and others have developed various approaches to study the meaning of the built environment. Rappoport develops a non verbal communication approach out of critical examination of semiotic and symbolic approaches that traditionally have been used in the historical study of high style and vernacular architecture. However, this research is not just about studying meaning in the built environment in the usual development context; rather it aims to look at the transformation of such meaning and its impact in post disaster development contexts. Such transformation is reflected not only socially but also in the physical evolution of the traditional settlements and their vernacular architecture. The framework developed here categorises the components through which built environment can be read and elaborates upon the role of the cultural

dimensions that influence the transformation of traditional settlements in post disaster development contexts.

Kim Dovey (2005, 1999) states that our everyday life takes place within the clusters of rooms, buildings, streets and cities we inhabit and action. It is structured and shaped by walls, doors and windows framed by the decision of designers. Taking this aspect of our everyday life, the following components are considered as the physical spaces ranging from very public domains to the more private domain:

1. **Geographical landscape:** formed in relation to landscape features such as hills, rivers and the overall topography, which mostly predate human intervention, and which are likely to remain even if any particular settlement eventually disappears.
2. **Public space structures:** Streets, squares, parks and other spaces in public ownership, with free public access. These are usually the longest lasting level of human intervention.
3. **Plots:** A plot is a continuous area of land, not intersected by public space, and in a single ownership. Plots change more rapidly than public space structures through subdivision or amalgamation, but they usually change less rapidly than any buildings which may be constructed on them.
4. **Buildings:** Buildings are often changed relatively rapidly. They may be adapted and/or extended every few years, but their basic typological form often stays relatively unchanged for several generations until they are demolished and replaced.

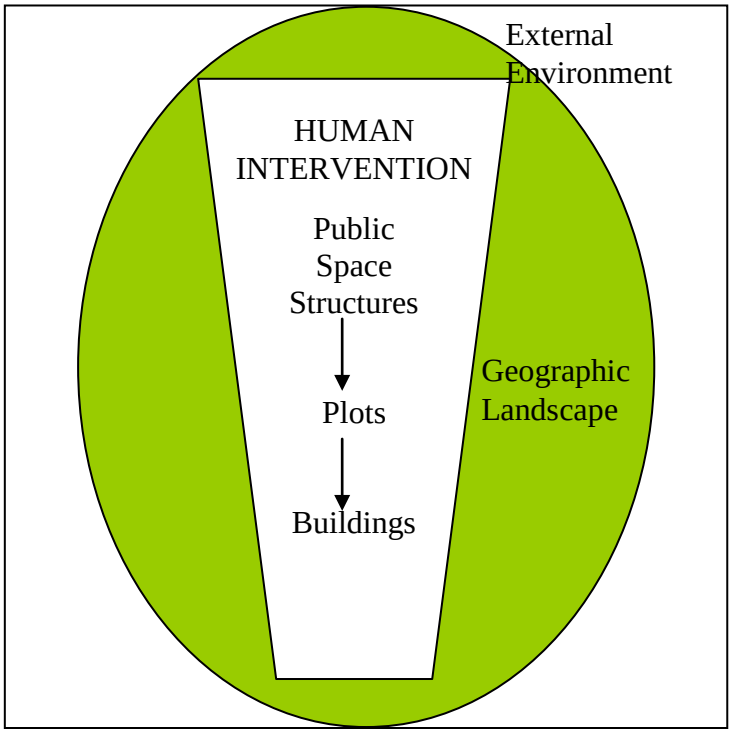


Figure 2.7 Model developed to explain the components of built environment

2.6.1 Patterns of use

The patterns of usage of the above discussed components, and how they change over a period of time can be described within any defined (pre or post disaster) development context, are discussed in the following sections. For instance, the patterns of use often change independently of physical structures, on varied timescales: streets might accommodate traffic six days a week but a market only one day; whilst many buildings can accommodate radically different uses during their lifetime. These usage patterns are mainly based on the local geographic conditions and are customarily developed over a generations to meet specific needs, accommodating the values, economies and way of living of the cultures that produce them (Oliver 1997). From Oliver's (1997) definition of vernacular architecture, it can be understood that place specific.

Enquiries into culture can provide a critical approach on the current post disaster development models and better understanding of alleviation of vulnerability of traditional settlements. The framework developed in this study employs two different fields of enquiry, namely cultural anthropology and in morphological analysis as a

particular form of urban design analysis. In this framework cultural anthropology is mainly used to understand and define the constructs of culture through which people tend to give meanings to their lives and to their places in the pre and post disaster development contexts. By identifying the constructs of culture in post disaster development context, it is possible to develop a criterion to select the case study areas that are different in terms of their cultural composition and development context.

The following section explains the relevance of urban design principles in developing a theoretical framework for this research in particular is employed in this study to analyse the case study areas of three tsunami hit villages in Tamilnadu.

2.7 Relevance of urban design principles: towards an analytical framework

Definitions of urban design are constantly being reshaped by practice and new theoretical insights (DETR 2000b; Parfect and Power 1997). However, there is agreement that urban design, as the discipline is both concerned with the physical attributes of built (urban) form and with the processes that produce that form. Moreover, in itself it is considered a process by which the environmental quality of the built environment is sought and facilitated (DETR 2000a, 2000b; McGlynn 1993).

The concerns of this discipline are broadly derived; they cover issues such as the functional, visual, environmental quality and aesthetic aspects of places. Because of this wide range of issues, urban design has been conceived of as the middle ground of many associated design professions such as engineering, architecture and town planning (McGlynn 1993) and more recently other non-design professions. It is therefore, recognised as an activity of an interdisciplinary and collaborative nature. Within the urban design process there is an explicit aim to combine knowledge from different disciplines.

Urban design qualities or principles can be used in the analysis and assessment of urban form (Punter and Carmona, 1997). Urban design principles are reflected in the physical context and are used in two distinct ways:

• To give design guidance when developing a site or project (new or existing), and

• To provide a kind of benchmark as to whether the aims of creating better places have been achieved or not (Parfect and Power, 1997; Punter and Carmona, 1997).

According to Schurch (1999) the use and definition of urban design qualities are considered mainstream activities within the discourse of the discipline. Much of the literature and research in the last thirty years has elaborated on the subject (e.g. Alexander 1977, 1987; Bentley, et al., 1985; Jacobs 1961; Lynch 1960, 1981; Punter and Carmona 1997). Bentley et.al set out various principles that are believed to help in delivering a responsive environment. So far these have related to different aspects of urban form; for example, aesthetics, planning control and development, and have affected to different extents the form of the built environment and the social relationships of the people using that environment (Parfect and Power, 1997).

Although seemingly of a prescriptive nature, the qualities set out in the responsive environments and urban design principles are not fixed. Their degree of importance, transferability and applicability needs to be related to the different priorities and cultural contexts where they intend to be used. The different relationship between qualities themselves, and between qualities and context, is what gives them their relative value or relevance (Punekar 2010).

There has been little application of these urban design principles in the assessment of rural contexts and especially in the post disaster development contexts. Given the transferable nature of these principles, this study aims to apply the following listed principles derived from the ‘responsive environments’ theory of urban design (Bentley et.al 1985) to assess the transformation in affected rural environments as a part of post disaster response: Permeability, Legibiltiy, Variety, Robustness, Personalisation. Such principles must be contextualised with respect to the assessment

of rural settlements in post disaster contexts. How the following listed urban design qualities are related with the cultural dimensions will be discussed in the later part of this chapter.

2.8 Design issues and the relevant urban design qualities

2.8.1 Permeability: Public and private

Concerning street layouts and patterns of built form, as well as limited and controlled land-uses, the quality that addresses these is known as 'accessibility' (Chapman and Donovan 1996; Lynch 1981) or 'permeability' (Bentley, et al., 1985). Access is enabled in two ways: (a) physically, by having unrestricted access for transit and communication such as avoiding fences and shacks; (b) visually, by allowing people of different classes, beliefs and persuasions to establish relationships among themselves and the built environment (Soen 1979).

2.8.2 Variety and robustness

To Bentley, et al.(1985), the concept of variety is the outcome of diversity of building forms and types, variety of users and different hours for using the space for different uses. Places, which can be used for many different purposes, offer more choice than places whose design limits them to a single fixed use. Environments that offer this choice have a quality that can be termed as 'robustness'. These concepts are also regarded as an aspect that emphasises the degree of choice in a given place during its use by different users for different purposes.

2.8.3 Legibility

Legibility is a quality that makes a place understandable in terms of physical form and its activity patterns. The Responsive Environments approach considers that in order to use a place to its full, potential to the full, users must have an awareness of physical form and patterns of use that complement one another. Kevin Lynch (1981) considers

that through a legible layout people are able to form clear, accurate images of a place. In reality, it is user rather than the designer who forms the image. This legibility is very important in traditional settlements as people from diverse groups are conditioned by the images of their previous house forms, lifestyles, cultural practices, rituals and other celebrations even in the post disaster response situations. Landmarks which form the core to Lynch's (1965) analysis of legibility are also covered in the description of public spaces and in the mental map analysis of the case studies.

2.8.4 Personalisation

Personalisation is a process in which people built their spaces to represent their sense of belonging either in an individual or collective sense, for instance, building up compound walls to define their boundary of their house. In a similar way a particular community will consider the surrounding natural features such as hill or tree as their territorial areas and landmarks. Personalisation is very important in the morphological analysis of traditional settlements as people tend to represent their belonging in terms of their caste, or a religious and economic group through territorialisation of spaces.

In responsive environments (Bentley et.al 1985), there are two other qualities, 'visual appropriateness' and 'richness', which have not been directly adopted in this study. People do interpret places as having meanings. A place has visual appropriateness when such meanings help to make the people aware of the choices offered by the other qualities. 'Visual appropriateness' is indirectly covered within the concepts of visual permeability and legibility. Similarly, the quality of richness is also considered as a part of variety and choice, as it is also deals with the visual and non-visual aspects and the selection of appropriate materials and construction techniques for achieving the sensory choices.

Enquiry into these urban design qualities is not sufficient in itself to achieve the intended objectives of this research. As this study aims to investigate the cultural dimensions of affected traditional settlements, it is essential to define the constructs of culture and how these constructs of culture along with the above discussed urban design qualities are relevant to understanding the evolution of traditional settlements

in post disaster development contexts. The following section explains how constructs of culture in the built environment context and related research can be used to observe the evolution of traditional settlements in post disaster development contexts.

2.9 Dimensions that determine culture in terms of built environment

2.9.1 Geography and natural environment

Geography and natural environment affects the built environment, such as, design of typical dwellings, construction materials, and the location of the settlement: The natural geographic features, physical constraints, and climatic resources dictate the livelihood sources and depending on such livelihood needs, the house forms and the settlement pattern are partially defined to meet the specific needs of changing day to day needs and environment (Lim 2008). For instance, communities based in coastal areas, develop sea based livelihoods and built their house forms or settlement layouts to suit the local saline and windy climatic conditions and livelihood needs. Similarly settlements based inland, depend on agricultural livelihoods and in some cases mining, where as desert settlements develop using the local resources involving mud as building material. In the case of the Kutch settlements in Gujarat, people developed indigenous built forms using mud as building material in order to resist the heat and severe earthquakes (See figure 2.8). As far as the case studies in this present study are concerned, all the three settlements are distinct from each other in terms of their geography (both land and sea), climate, vegetation and topography. Therefore, geography and the natural environment form the basis in the evolution of traditional settlements and helps in understanding how people develop their livelihoods and shelter forms using indigenous resources.

Figure 2.8 People in Kutch constructing their houses (bhoongas) using mud material.

Figure 2.9 People in Zakopano (in Poland) constructed their houses using timber and other local resources

2.9.2 Family gender and kinship

According to Ross (1977), variations and transitions in family structure and life and its practices among different cultures are reflected in the evolution and transformation of traditional dwellings and settlements. For instance in a patrilineal societies, usually father leaves his property to his son, where as in matrilineal societies, the mother leaves her property to her daughter. Such variation in the family typologies, also determine the power and authority of gender in the inherited built forms. Because once a place has been chosen or provided, the production of an individual space begins. (Low 2002). Such power patterns within the genders again restrict or at times allow using particular spaces in traditional settlements.

Depending on the family type, such as joint (see figure 2.10) or nuclear families (see figure 2.11), family life and daily practices also vary and are reflected in the size of spaces within the dwelling and the manner they use them in their daily life. Family practices including marriages, and marking births and deaths are very much intertwined with the religious practices. After the death or marriage, how the properties are inherited and how they get modified by the next generation are also important factor in understanding the transformation in traditional settlements. In the case of a conflict or economic necessity, the inherited property gets split between the family members or with the external members and in some cases.

Figure 2.10 View of joint family house in Kovalam village Tamilnadu, India

Figure 2.11 View of nuclear family house in Kovalam village Tamilnadu, India

Family, kinship and gender is a basic dimension in which an individual starts his journey to become a social individual in a geographic space. Inquiry into family typology is one principal way to relate social form to physical form in traditional settlements. The following table 2.1 demonstrates the inquiry on the impacts of family and Kinship and Gender on traditional settlements in the post disaster development process.

	Public Spaces	*Plots*	*Buildings*
Family/Kinship/Gender *Type of family before disaster event: joint or nuclear or other type.* *Type of family after disaster event: joint or nuclear or other type.*	How typical public spaces and other forms of interactive spaces provide interaction between different family groups and genders in the traditional settlements? What is the impact of reconstruction on such kind of public spaces and their relation with the family and kinship existence? How different kinds of public interactive spaces have evolved in the post disaster response situation?	How are the plots subdivided before and after the disaster event? What kind of ownership existed before and after the disaster event? What kind of activities happens within front yard and backyard of the house? How are they transforming in the post disaster response situation?	What is the role of family and gender in the construction of buildings? How such traditional methods of construction do enhanced the continuity and existence of family and kinship in traditional settlements? What is the role of family and gender in the reconstruction programme? How the new building forms are able to accommodate the interests of the changing family and gender living patterns?

Table 2.1 Family Kinship and Gender impact on settlement form in the pot disaster context.

2.9.3 Religion and belief systems

At the macro level, Indian traditional settlements have been influenced by a very diverse religious and cultural history. These diverse influences are based on the origin and the religious faith of the regimes that ruled the areas, and are reflected in the architectural form and composition of historic settlements. There are historic settlements, which are predominantly Hindu, as in Jaipur (figures 2.14A and 2.14B), Jaisalmer, Hampi, Badami, Srirangapatana (figure. 2.12 A and B), and at other former seats of Hindu power in India. Apart from predominantly Hindu settlements, there were also Muslim towns and cities such a Bijapur in Karantaka State and Shajanabad in Old Delhi.

Figures 2.12 A (left) and B (right): Srirangam, Tamil Nadu (14th century) comprised seven concentric enclosures each with a gopuram (entrance gateway) of diminishing size. Source- Vistara, 1986, Google Earth 2007.

For instance, the layout of Jaipur (1726) follows the dictates of *Shastras* (Hindu planning ideals) and is developed on a nine square *Mandala* (figure 2.13). The *Mandala* being a metaphysical plan is put to use in site planning and architecture through a process called the *Pada Vinyasa*. *Pada Vinyasa* is a way of dividing a site into uniform grids or modules or *padas*. A site of any shape can be divided using Pada Vinyasa.

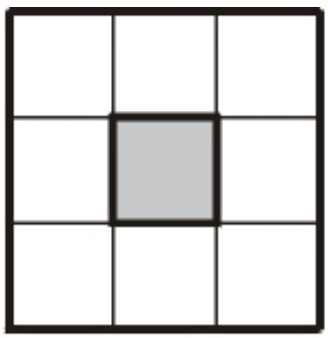


Figure 2.13 Tri-pada

Site is known by the number of divisions on each side. A few examples of *Mandalas* with their corresponding names are given below.

- Sakara (1 square) corresponds to Eka-pada (single divided site).
- Pechaka (4 squares) corresponds to Dwi-pada (two sided site).
- Pitha (9 squares) corresponds to Tri-pada (three sided site) (Figure 2.13) and so on.

In the case of Jaipur, despite some deviations from the overall nine squares grid pattern such as a tilted square (see figure 2.14A), orientation towards the northeast instead of due north, and the greater square being unevenly divided to get a rectangular form, all of which were due to either topographic or astrological considerations, the layout was however acceptable to the *Shastras* (Lang, et al. 1997). This was essentially based on the need to segregate people belonging to different castes and ranks, situating the royal palace and the temple in the centre of the city whilst the serving class occupied the peripheral areas (Gupta, 2003). Even the lanes were named after the occupations of the inhabitants, such as *Maniharan ka Rasta* (Lane of Bangle Sellers), etc.

Figure 2.14A: Plan of Walled City of Jaipur

Figure 2.14B: View of Jaipur Street near hawa mahal; (Photo taken on April 2008)

At the dwelling level, religious beliefs plays an important role in the construction of individual or collective household's dwellings. In Hindu settlements, *vasthu* plays a major role in the house design. In Indian context, vasthu shasthra is considered to be astrological science that determines the location and orientation of buildings and interior arrangements. For instance kitchens should be located on the southeast corner of the site. The house forms reflect the religious affiliation of the household based on the religious practices conducted in their day-to-day life. The elements that could be dictated by the religious beliefs and systems include allocation of the spatial orders, colour of the buildings, and decorative interior building elements. For instance Muslim households mostly prefer green colour in their buildings that is different to hindu houses (refer to figures 2.15 and 2.16).

Figure 2.15 View of typical muslim house in Tharangambadi

Figure 2.16 View of typical Hindu house in Kuilapaleyam, Pondicherry, Tamilnadu (photo taken on 17th jan 2008)

Figure 2.17 People celebrating Christmas 2007 on the main street of Kovalam

Figure 2.18 People celebrating Mattu pongal on the streets of Kuilapaleyam, Pondicherry, Tamilnadu (photo taken on 17th jan 2008)

Religious and ceremonial events usually take place in the relevant clusters of the settlement. Hindu festivals such as *pongal* are celebrated at Hindu clusters of the settlement, whereas Christmas is celebrated at the local Christian clusters (See figures 2.17 and 2.18 and 2.20). During *pongal*, in rural tamil custom, streets are used for cooking on *pongal* day and cow races will also be held on the village streets (figure 2.19). Therefore, religion and belief systems play a vital role in the evolution and transformation of traditional settlements. Such beliefs and customs are very well intertwined with the other dimensions such as economy, geography, family, social interaction and politics.

Figure 2.19 People celebrating cow races on the streets of Kuilapaleyam, Pondicherry, Tamilnadu (photo taken on 17th jan 2008)

The following table 2.2 demonstrates the inquiry on the impacts of religious and other belief systems on traditional settlements in the post disaster development process.

	Public Spaces	*Plots*	*Buildings*
Religion and Belief systems *Type of religious group:* *Hindu* *Muslim* *Christian* *Dalit (formally Untouchable social group)* *What are the belief systems and practices that are usually inherited from their parents and day to day socialisation process?*	How typical public spaces such as *churches, market squares* and other forms of interactive spaces evolve to sustain traditional beliefs, hierarchies and practices of the affected communities? How the public spaces (old and new) are able to accommodate the traditional beliefs and practices in the post disaster context?	What is the role of religious beliefs and practices in managing the plots of individuals and groups in traditional settlements? How are these religious practices addressed in the post disaster reconstruction process? What kind of religious practices takes place within front yard and backyard of the house? How are they transforming in the post disaster response context?	How buildings are shaped based on the religious beliefs and practices that people rely on? How such traditional practices are addressed in the post disaster reconstruction process? How the new building forms are able to accommodate the religious interests of the affected communities in post disaster development context?

Table 2.2 Religious and Belief systems impact on the settlement form in post disaster contexts.

2.9.4 Economy

An economy involves production exchange, distribution and consumption of goods and services. A given local or national economy is the end result of a process that involves its technological evolution, cultural history and social organization, as well as its geography, natural resource endowment, and ecology. Such factors give context, content, and set the conditions and parameters in which an economy functions. In the built environment context, depending on the economic needs, the house forms and use of public spaces vary from culture to culture. For instance in a fishing village in Tamilnadu, people use streets for weaving net, drying fish, and other economic activities (see figure 2.20). The same streets are also used for the religious and political activities during the festive occasion. In rural households, economies are also developed and managed by family setups and through social networks. It is important to understand, how built form gets shaped depending on the economic necessities of the households and larger community in the concerned settlements.

Figure 2.20 Showing how streets are used for economic activities in Tharangambadi Tamilnadu (photo taken on 15th jan 2008)

The following table 2.3 demonstrates the inquiry to find out the impacts of economy on the traditional settlements in the post disaster development process.

	Public Spaces	*Plots*	*Buildings*
Economy *Type of Economy and their interconnectedness within themselves and with other systems of daily lives.*	How typical public spaces such as *Auction yards, boat yards, market squares* and other forms of interactive spaces are evolved to sustain the economic needs of the affected communities? How the public spaces (old and new) are able to accommodate the economic necessities in the post disaster context?	How do people manage the plots of individuals and groups depending on their changing economic needs in post disaster context? How are these economic necessities addressed in the post disaster reconstruction process? How front and back yards of the buildings are used to accommodate the economic needs of the affected communities in the post disaster contexts?	How traditional building typologies are constructed to suit the changing economic necessities of the affected communities? How such economies are addressed in the construction of building typologies that are constructed in the post disaster reconstruction process? How the new building forms are able to accommodate the economic needs of the affected communities in post disaster development context?

Table 2.3 Impact of economy on the settlement form in post disaster contexts.

2.9.5 Politics

As described in the above economy involves distribution of wealth and resources. The immediate question raises here is 'who' decides to distribute 'what' to 'whom'? Politics is the process by which groups of people make decisions. It consists of social relations involving authority or power to control and manage the resources and systems. From ancient times, the power relations within the region or settlement guided Indian historic settlements. Untouchable communities were only allowed to reside on the periphery of the settlement. For instance, in the rural part of Kutch district in Gujarat, the family clusters are developed in relation with the understanding between families relating to kinship, and strictly following the dominant religion and caste systems (figure 2.21). In Tharangambadi, one of the Tamilnadu case studies, colonial settlement is located on the high level areas, followed by pre-colonial houses occupied by muslims at mid level, followed by fishermen's dwellings on low level areas, and finally dalit (untouchable) families residing on the periphery of the settlement (figure 2.22). This type of analysis shows the influence of power in the evolution and transformation of traditional settlements (Dovey 1999).

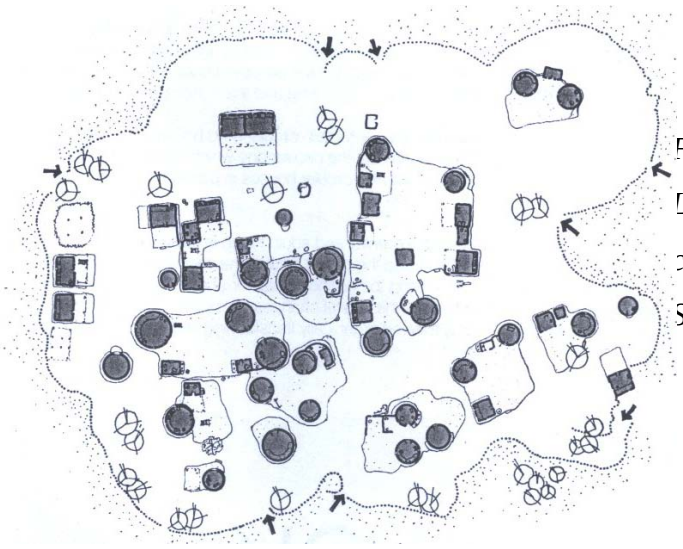


Figure 2.21 Layout of Ludhiya village in Gujarat composed of family clusters, Source: (Jain 1992)

The following table 2.4 demonstrates the inquiry about the impacts of politics on the traditional settlements in the post disaster development process.

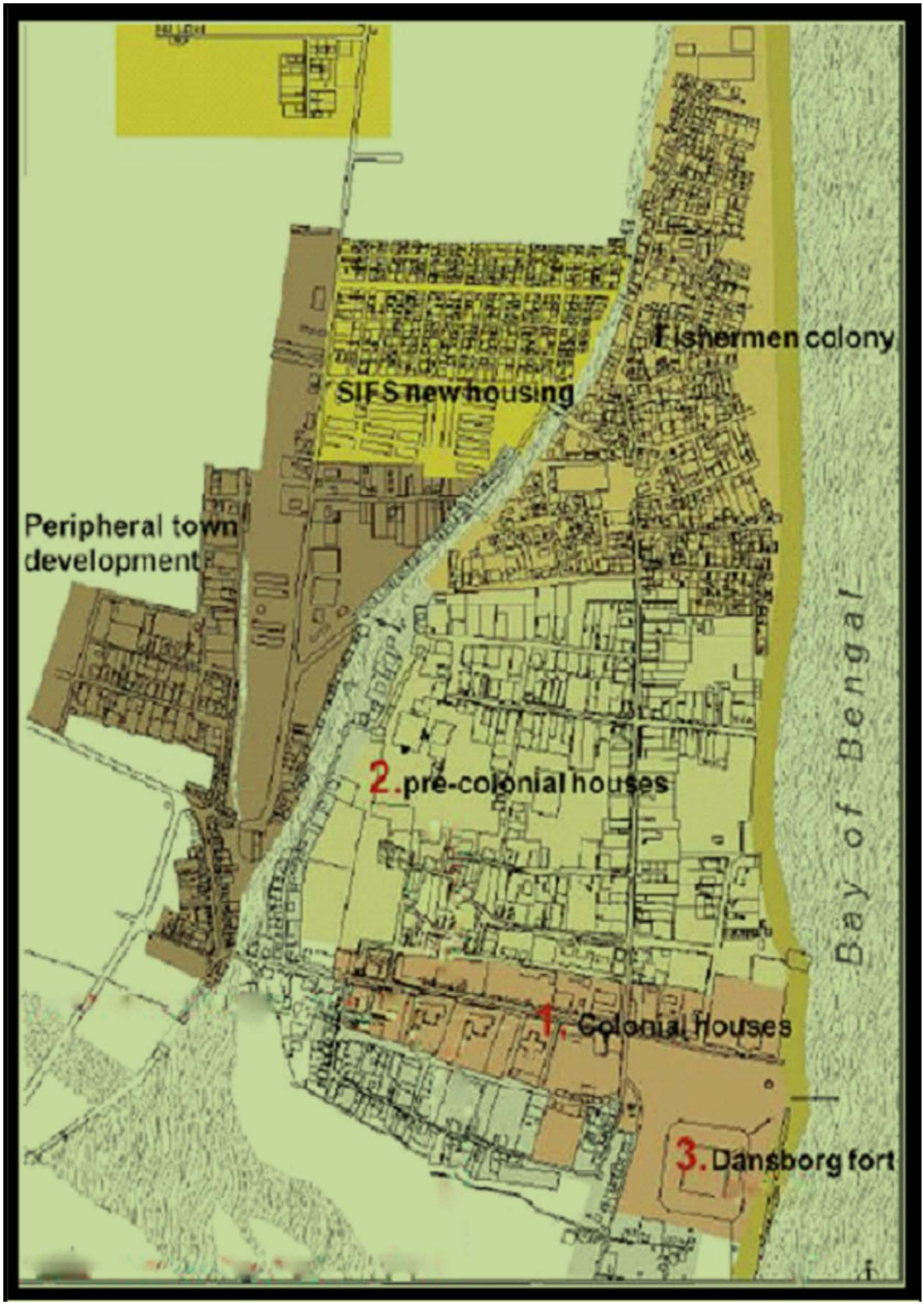


Figure 2.22 Layout of Tharangambadi, Tamilnadu, (Source :CEPT 2008)

	Public Spaces	*Plots*	*Buildings*
Politics *Type of political setup in the traditional settlements such as religious institutions (traditional panchayat) governing the location, village panchayat, or other local bodies.* *What is the role of these political institutions in the post disaster recovery process?*	How public spaces such as *village squares and market squares* and other forms of interactive spaces are influenced by the political structures that govern the continuity of traditional settlements? How the public spaces (old and new) are able to accommodate the dynamic political context of traditional settlements in the post disaster context?	What is the role of political institutions in the allocation of plots to households in traditional settlements? What is the role of dynamic political setups in allocating the plots to households in the disaster reconstruction process? How front and back yards of the buildings are able to accommodate political representation of the affected communities in the post disaster contexts?	How the political networks in the affected settlements influence traditional building typologies in the affected settlements? How the role of political institutions and their character has been addressed in the construction of building typologies that are constructed in the post disaster reconstruction process? How the new building forms are able to enhance the political governance of the affected communities in post disaster development context?

Table 2.4 Political impact on the settlement form in post disaster contexts.

2.9.6 Social and cultural interaction in a rural neighbourhood

The concept of neighbourhood unit was evolved due to the advent of industrial revolution and degradation of city environment caused due to high congestion, heavy traffic movement through the city, insecurity to school going children's, distant location of shopping and recreation activities. Hence to create a safely healthy physical environment in which children will have no traffic streets to cross on their way to school, schools which are within walking distance from home; an environment in which women may have an easy walk to a shopping places where they may get the daily households goods, employed people may find convenient transportation to and from work. It is an environment in which a well equipped playground is located near the house where children may play in safety with their friends for healthy development of their mind and spirit. Many such concepts have framed the neighbourhood unit that is bounded by arterial roads or other boundaries, with open spaces, school, community centre and local shops Shambarkar (2008). Most importantly there was no through traffic within the neighbourhood unit. Lewis Mumford (1954) argued in the favour of the notion of 'planning by neighbourhoods'. Despite of many criticisms on the concepts of neighbourhood, Madanipour (2001) sets out to find out the reasons for this recurrence of neighbourhood concepts and asks whether it is relevant in the contemporary situation and further argues that the development of small-scale, distinctive urban areas has been embedded in political, economic and cultural frameworks of contemporary societies, portrayed as and /or playing the role of urban management, a sustainable urban form, a vehicle of market operation, a means of differentiation, a refuge from the unknown and a framework for social integration. For these reasons, planning by neighbourhoods keeps coming back to urban agenda, despite its many short comings. However, in rural context, the issues are not much related to high traffic congestion as it is the case of urban case, but it is always a sensitive issue towards the connectivity patterns that creates social and cultural interactions in rural environment.

Social and cultural interaction in a rural neighbourhood unit provides an opportunity to diffusion of knowledge and thoughts of action within the cultural environments. Through the socialization process and cultural interaction, people tend to share similar

causes, decisions and at times attempt to act in united manner for creating collective identity.

In the built environment context, how different neighbourhood spaces within the dwellings or even in the overall settlement provide an opportunity for interaction between neighbours, or neighbourhood clusters or between adjacent settlements. It is also relevant how different clusters are provided with convenient access to their work areas and to perform their day to day needs. The hierarchy in public spaces flows from main village square to smaller neighbourhood squares and further to inner spaces (figure 2.23). At the dwelling level, verandas are usually regarded as 'talking streets', used for social interaction with neighbours and visitors. Enquiry into social and cultural networking patterns can help in understanding how the settlement form or dwelling design, connectivity patterns allows and restrict social and neighbourhood interaction in the affected settlements. The following table 2.5 demonstrates the inquiry on the impacts of social and cultural interaction on the traditional settlements in the post disaster development process.

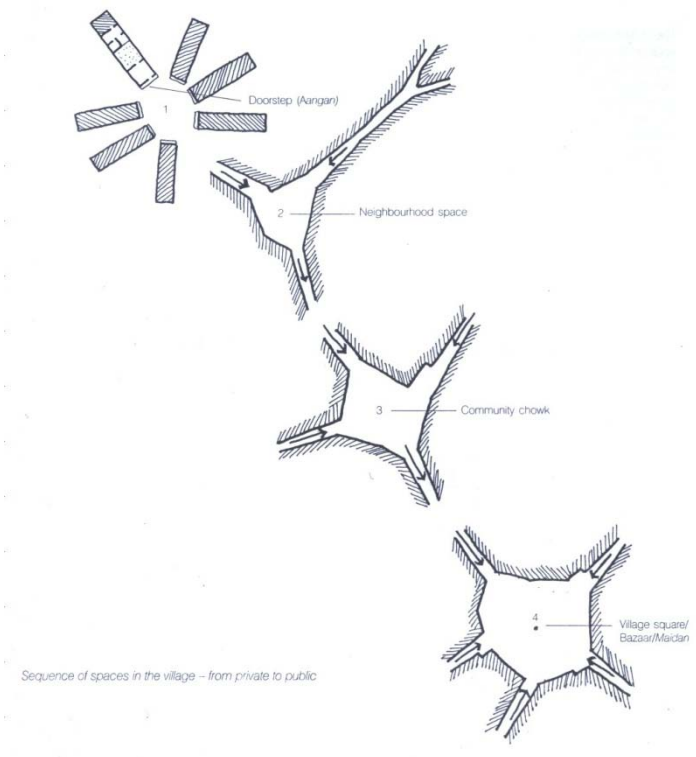


Figure 2.23 Sequence of spaces from more public to private, Source: (Jain 1992)

	Public Spaces	*Plots*	*Buildings*
Social and Cultural interaction: *What are the contexts that provides a interaction either between the following groups:* 1. *Within the family:* 2. *Neighbourhood families:* 3. *Neighbourhood groups:* 4. *Social groups within the village* 5. *Different village groups*	How public spaces such as *village squares and market squares* and other forms of interactive spaces accommodate the socio-cultural interactive events and practices in traditional settlements? How the public spaces (old and new) are able to accommodate the dynamic social and cultural interactions within traditional settlements in the post disaster context?	What is the role of social interactions in the evolution of plots to households in traditional settlements? What is the impact of post disaster reconstruction process on the socio-cultural interaction of the affected communities? How front and back yards of the buildings are able to accommodate social & cultural interaction of affected communities in the post disaster contexts?	How traditional building typologies accommodate socio-cultural interactions in the affected households? How the role of social networks and their privacy character has been addressed in the construction of building typologies constructed in the post disaster reconstruction process? How the new building forms are able to accommodate the interactive character of the affected communities in post disaster development context?

Table 2.5 Social and cultural interaction impacts on the settlement form in post disaster contexts.

2.10 Integrating constructs of culture and urban design principles to formulate conceptual framework of analysis:

This study brings together theoretical ideas on culture, vulnerability and development, which will ultimately be applied in the analysis of traditional settlements. Throughout this analysis, culture is the principal focus as it pertains to traditional settlements and development, hence the initial part of this chapter focused on culture and the construction of identity. As this study investigates the role of culture in post disaster development context, the second part of this chapter focused on various approaches to analysing the concept of vulnerability in post disaster contexts. The 'situational approach' is considered to be an effective way of understanding the changing situations in order to analyse the vulnerability aspects of traditional settlements in post disaster contexts. The third section discusses how urban design principles are relevant for analysing traditional rural settlements in post disaster development contexts. As the principal aim of this research is the investigation into cultural dimensions of traditional settlements in post disaster contexts, the fourth section defines the constructs of culture in the built environment context. This section brings together all the above discussed theories culture, vulnerability, development, and urban design principles and formulates a new conceptual framework for analysis for investigating the primary aim of this research.

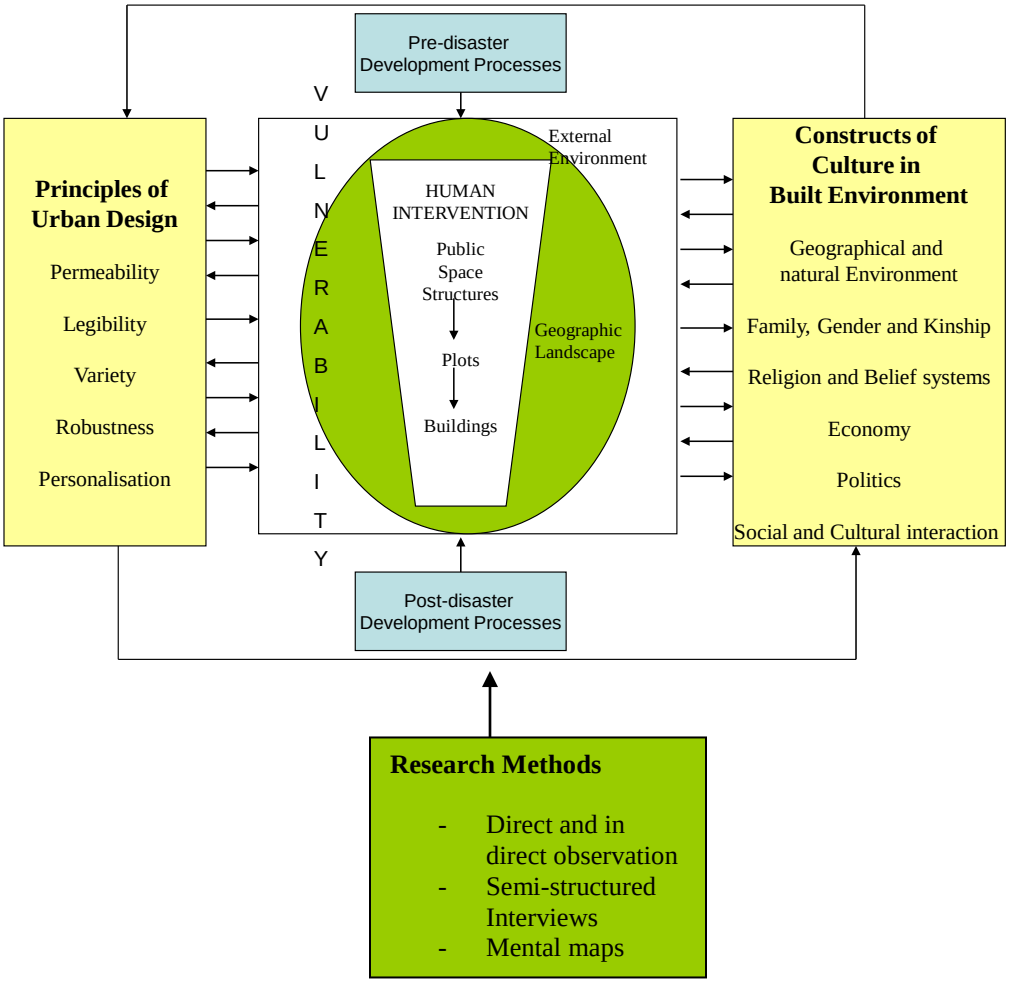


Figure 2.25 Diagram showing the conceptual framework developed to analyse traditional settlements in post disaster development context and the appropriate research methods used in the study.

This proposed conceptual framework is applied to acknowledge the research question by synthesising the positivism of development studies and the post-structuralism of cultural anthropology from two dimensions for each of the case study area. One dimension is assessed using the qualitative urban design principles that are explained in the previous sections. This investigation uses primary and secondary data that were collected by the author during a field survey in affected areas. A second dimension of the assessment employs methods from cultural anthropology in order to assess the relation of built form to cultural dimensions of the affected communities that are defined in the earlier sections.

As Maslow (1954) argues in his theory of 'hierarchy of needs' that basic physiological needs are obvious for any settlements to exist, as they are the literal requirements for human survival. If these requirements are not met (with the exception of food, clothing, shelter, and sexual activity), the human body simply cannot continue to function. With their physical needs relatively satisfied, the individual's safety needs take precedence and dominate behaviour. After physiological and safety needs are fulfilled, the third layer of human needs is social and involves feelings of belongingness. This aspect of Maslow's hierarchy involves emotionally based relationships in general, such as friendship, intimacy, family. Therefore, the first dimension of the assessment looks on how the settlement form, street layouts, arrangement of plots, and building designs have given scope for satisfying such needs of the communities in the pre and post disaster development processes. This will be assessed using the relevant qualitative design principles based on the theory of responsive environments. However, due to the complexity of socio-spatial relations and communities basic needs that cannot be taken for granted in the post disaster development process, it is necessary to address both philosophical positions through the urban design analysis and social investigation. Therefore the second dimension of the assessment adopts methods from cultural anthropology and this would then provide support to the mixture of different research methods.

From the above discussion it can be noticed that the conceptual framework for analysis that was developed by synthesising different philosophical positions will be used to investigate the primary aim of this research. How this new theoretical approach could provide new insights on the impacts of post disaster development process on culturally diverse traditional settlements will be discussed in the part 2 of this research.

Research Methods

This chapter describes the various methods deployed during the research process and the criteria for selection of those methods. In the previous chapter, concepts of cultural geography, urban design and sustainable livelihoods were evaluated. A conceptual framework for analysis was developed by integrating some of these concepts. This chapter explores the methods of research that are appropriate to this conceptual framework for analysis addresses the following questions:

1. What are the best ways to collect the evidence for answering the research questions?
2. How does the conceptual framework for analysis affect these methods?
3. How do these methods relate to the role of researcher?

3.1 Addressing vulnerability by ethnographic methods

As this research deals with the situational analysis (as discussed in chapter 2 Section 2.4.3), the key question is not just on what kind of group a person or family belongs to, but the nature of their daily life, their actual situation (including the way it may have changed recently or may be changing). Wisner (2001; p5) states that;

> Situational analysis recognizes two or three kinds of contingency. First, social vulnerability is not a permanent property of a person or group but changes in respect to a particular hazard. The second kind of contingency concerns the constantly changing daily, seasonal, and yearly circumstances of a person's situation as regards access to resources and power.

Jigyasu (2002) considers that situational analysis is a better sensitive tool of analysis that recognizes complexity, change, and contingency in everyday life. An important thing to be borne in mind here is that this approach is expert-oriented as here the analysis is done by the 'experts' for the affected / vulnerable people (also refer to the "pressure and release (PAR) model" and "access model" utilized by Blaikie et al. (1994) as discussed in previous chapter).

To analyse the changing life situation of the fishing communities it is also very important to get a thorough understanding of meanings, particularly spiritual and social ones, for the communities

concerned. These could be oversimplified or distorted if the researcher does not have a thorough local knowledge influencing the perception of these (Clifford, 1983). The research should not only explain what is already known but also the hidden meanings in the present settings and the old meanings which have disappeared or have been changed in the present and have not been known by the users (Nooraddin, 1996).

This kind of research falls within the anthropological field of study. Within the cultural branch of anthropology dealing with traditions in human behaviour and works, ethnology is one of the three principal subdivisions. The task of ethnology is the study of living cultures. Anthropologist Clifford Geertz (1983) stated that a critical part of ethnography is thick description, a rich detailed description of specifics. He further says that

> A thick description of a three minute event may go on for pages. It captures the sense of what occurred and the drama of events, thereby permitting multiple interpretations. It places events in a context so that the reader of an ethnographic report can infer cultural meaning.

Hess (1992, p.4) has discussed research techniques that are useful to carry out ethnographic research.

> Ethnography … means particularly participant observation, and is literally to write about a people.

In the context of the above discussion, the author has developed certain limitations on participant observer mode. Being a total participant may make it difficult for the researcher to detach themselves from the observed reality and in turn, values may influence him or her. They may force him to be partial in observing, collecting and analysing data.

Pike (1954) has differentiated between ‘emic’ and ‘etic’ approaches in the anthropological field of research (Pelto and Pelto, 1970). According to him the views of the former, cultural behaviour should always be studied and categorized in terms of the inside view about the actors’ definition of human events. Also the intent of the former is to seek the categories of meanings, as nearly as possible in the ways “the natives define things”, while for the latter, it is to seek patterns of behavior, as defined by the observer. Also while the methodological strategy of the former is fundamentally inductive, for the latter, it can range from "pure induction” to various mixtures of

inductive and deductive research. Therefore, this research draws on 'etic' approach with the researcher as an outsider interpreting the actions and behaviour of the rural communities that they may be unaware of and also 'emic' methods to interpret the behaviour. The primary research method in 'emic' is interviewing, in depth, in native language, while for 'etic' is observation of behavior. The intent of the former is to seek the categories of meanings, as nearly as possible in the ways "the natives define things", while for the latter, it is to seek patterns of behavior, as defined by the observer.

Apart from the danger of the researcher becoming too subjectively influenced by a too intensive local involvement, participant observation is used only in limited way in this research. However, a purely ethnographic research would need a longer process of interaction with the local communities, which was not practically possible for the author. Therefore some sociological aspects have to be explored but not in depth as required in a full ethnographic study as the main objective of this study is the built environment itself.

3.2 The research process: choice of methods

The first step in the study was to review literature from various sources (documents, Internet, articles, books) on diverse subjects related to disasters in general and tsunami in particular. The author used multiple methods to collect data for the research, from primary as well as secondary sources. Secondary data was collected from official records, previously conducted studies, book publications, journal articles, reports and other relevant documents. For collecting the primary data, the author mainly used techniques of field observation of role of communities and development groups in the evolution of built form, documentation and recording, semi-structured key informant interviews and mapping exercises.

Triangulation methods were employed, comparing different kinds of data (qualitative) and using different methods (eg. observation and interviews) to corroborate and moderate the findings. Therefore the issue of validity of the theoretical orientation is appropriate in selecting the

methods that falls under qualitative or quantitative approaches or sometimes both (Silverman 2006).

3.2.1 Qualitative approach

In this research, the author has used a qualitative approach following a flexible research design. Qualitative methods in cultural studies are characterized by their humanism and holism (a philosophical position which argues that humans and human behaviour cannot be understood or studied outside the context of a person's daily life, life world, and activities) (Low, 2002). Methods conducive to this definition include: cognitive, observational, phenomenological, historical, ethnographic, and discourse approaches (Low, 1987). Each of these approaches focuses on distinct aspects of the social world, and the approaches vary in terms of their appropriateness for different problems, their levels of analysis, and the role of the researcher. In the following 3.1 each methodological approach is evaluated by (a) the focus or scale of the research - individual, group or societal; (b) the degree of contact with the social object of the research - minimal, moderate, or total; and (c) the kind of problem most often associated with the methodology.

Table 3.1 Qualitative methodologies in cultural anthropology: research appropriateness (adapted and developed from Getty Conservation Institute, 2002)

Methodological Approach	**Scale/Level of Inquiry**	**Degree of Involvement**	**Research Problem**
Cognitive	Individual	Minimal	Rules, ideals & perceptions
Observational	Community Group (Individual)	Minimal	Behaviour, observable actions and activity sites
Historical	Societal	Minimal	Social and cultural trends, comparison of sites
Ethnographic	Community Group (individual)	Moderate	Cultural motivations, norms, values, intentions, symbols and meanings
Discourse	Individual (societal)	Moderate	Underlying meanings of speaking/ conversation

These approaches are appropriate for different kinds and levels of research. This study draws on cognitive, observational and ethnographic approaches. Often a study begins with only vaguely formulated research questions. The researcher doesn't know what to look for or what specific questions to ask until we have spent some time in a setting. As Neuman (2000) states

> Qualitative researchers remain open to the unexpected, are willing to change the direction or focus of a research project, and may abandon their original research question in the middle of a project. (p. 145-146).

This aspect of qualitative research is very relevant for examining the sequence of events and transformation processes that emerge over time, from pre-disaster to emergency relief to long-term post disaster reconstruction. Qualitative research has quite often been used in the field of disaster research. In many cases it is preferred over the quantitative research.

In this research, a qualitative interview aims to understand people's terms and judgements or decisions, and to discover the complexities of their individual and collective perceptions and experiences. We enter the field without predetermined phrases or categories, which might constrain respondents' answers. Hence, such interviewing aims to capture what is in someone else's mind and to find out things, which we cannot directly observe.

3.2.2 Case study method

Fundamentally this research recognises 'geography' as an object of social or physical space or concrete geographic features and how they are reproduced or consumed or sometimes rejected for sustaining people's cultural needs. Within this defined object, people with their diversified backgrounds and behavioural contexts will be observed. In the context of preceding discussion, author has primarily adopted a case study method and a qualitative approach implemented within it.

A case study is an empirical inquiry that investigates a contemporary phenomenon within its real life context (Yin, 1981). As this research deals with the day today dynamic situation of the fishing settlements, in this context, the case study is a way of investigating an empirical topic by

following a set of pre specified procedures. It involves the collection, recording and analysis of a single case or a number of cases with set criteria. It can be based on variety of qualitative evidence. Such a method provides opportunity to apply a range of data collection techniques and use evidence from multiple sources.

3.3.3 Criteria for selecting case study areas

In order to select the case study areas and as a part of plan of work in this research, initial site visits to tsunami affected areas in Tamilnadu, Southern India, were undertaken during the second week of April 2007. During those site visits in the affected areas and relocated villages, various development agencies were consulted to obtain information regarding their approaches and feedback from their experiences. The journey started from Tamilnadu Tsunami resource Centre (TNTRC) which is based in Chennai, and information collected regarding the damage that occurred in various districts and villages affected, and also regarding respective development agencies undertaking the reconstruction programmes in the affected areas. The site visits were planned to a number of villages based on the following criteria.

1. Type of Community (Hindu / Muslim / Christian, other social groups)
2. Type of Livelihood (Fishermen / Non fishermen)
3. Type of NGO undertaking the reconstruction (Local NGO, INGO, or government)
4. Type of reconstruction output of the development approaches (In-situ / Relocated)

Initial site visits were made to tsunami affected areas in Tamilnadu during March 2007. Based on ecological views (Hornell (1927) and Department of Fisheries (2000)) the coastal belt is classified into three zones. These are as follows (see figure 3.1).

1. Coromandal coast – which stretches out over 400km of sandy shore, is surf beaten and relatively poor in fishing stocks.
2. To the south lies the Palk Strait, 230km long, with relatively shallow calm waters, well endowed with fish resources.
3. Lastly the Gulf of Mannar, is 370 km long, and wraps around southern-most tip Kanyakumari, to meet the border of Kerala. Here the water is deep and rich in fishing.

All the above three zones not only vary by natural geographic features such as places of shallow waters and deep waters (where fish is abundantly available in deep waters) but also by socio-cultural, religious, economic and political aspects.

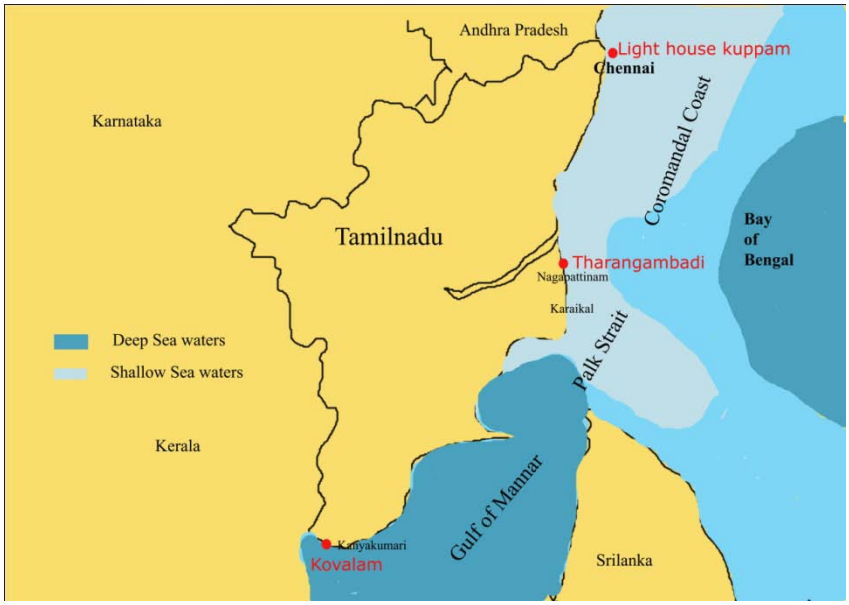


Figure 3.1 Map showing the three case study areas and variations in the sea waters in coastal Tamilnadu.

Following the identification of three different geographic and cultural regions on the coast, the question of scale and characteristics of the settlement in order to select for case study was addressed. The key question here is that whether the case study should be a village, which is a part of panchayat[2], or village panchayat level, or a town, or district. In order to study cultural environments, a deeper understanding of the settlement and its background setting of social, political and economic contexts is required. Therefore, by considering the intermediate level settlements in the political hierarchy, village panchayats in coastal Tamilnadu were found to be most appropriate for understanding cultural environments in post disaster contexts. The author

[2] local government bodies at village level in India

considered the Indian caste[3] composition along with the diversified cultural geographic context, and how this kind of varied settings can influence the development change process.

Criteria	**Tharangambadi in Nagapattinam district**	**Kovalam in Kanyakumari district**	**Lighthouse Kuppam, Chennai Coast**
Context (Rural/ village panchayat)	Town panchayat (larger scale)	Village panchayat (medium scale)	Village panchayat near Chennai City (small scale)
Geography location	Coromandal coast(south)	Gulf of mannar	Coromandal coast(north)
No. of households in village	1725 house holds	Approximately 1000 households	Approximately 255 households
Religious background	Hindus, Muslims and Christians including some Dutch settlers	Christian community	Dalit[4] Community
Major Occupation	Fishermen, traders, and others	Fishermen	Fishing (lake fishing)
NGO involved in reconstruction	South Indian Federation of Fishing societies	Parish church involving other NGO's	Government

Table 3.2 Shows the criteria made for selection of three case study areas.

Three different Panchayat settlements located in different geographic regions of Tamilnadu coast were studyed. The above mentioned table 3.2 explains the criteria made for the selection of the

[3] Indian caste system describes the social stratification and social restrictions in the Indian subcontinent, in which social classes are defined by thousands of endogamous hereditary groups, often termed as 'jatis' or 'castes'.
[4] Untouchable community in India.

three fishing settlements. As mentioned previously, the three case study areas for detailed study were as follows:

1)Tharangambadi town panchayat in Nagapattinam district,

2)Kovalam village panchayat in Kanyakumari district, and

3)Lighthouse Kuppam, a dalit village panchayat in Chennai coast.

These villages are different in scale, socio-cultural (mainly religious) and political composition, and represent the diverse geographic contexts of the Tamilnadu coastal region. This gave an opportunity to study how different cultures respond to the development change through different approaches. This kind of investigation demands a careful follow-up study of both short-term effect and long-term impact of the development process on the vulnerability individuals, communities and their living environment. This implies to apply a range of data collection strategies and diversified source of evidence in my fieldwork.

3.4 Fieldwork process

The first step in the fieldwork was to contact various public, semi public and non-governmental organisations that are working in the field of disaster management in the region. Contact was made through email and telephone. Visits were made to tsunami affected areas, during June 2005 during the author's master's dissertation and in July 2006 (during work with Hunarshala on socio-technical assessment in UNDP project) over different spans of time at different locations. In order to select the case study areas, as pre fieldwork, visits were made to tsunami affected villages (nearly 17 villages in 6 districts) in a car trip from Chennai to southern tip of Tamilnadu as far as the borders of Kerala. During this trip, through local NGO representatives, introductions were arranged with villagers, either individual contacts or in groups. Most of the subsequent semi structured interviews were conducted at village knowledge centres, or temples, or mosques or at verandas of the households.

During this interview process, it was observed arriving in a car gave local people the impression that the researcher was coming on behalf of government or some development agencies

providing shelter or other development facilities. This lesson learnt from the earlier visits, an opportunity to plan the fieldwork visits in a more informed and systematic manner.

Fieldwork was conducted from December 1st 2007 to April 30th 2007 in the selected three villages. Model questions were developed. The relevant authorities in the village were approached to introduce the survey to the villagers. Travelling in public transport, gave an awareness of the distance and the commuting difficulties faced by people travelling to nearest towns or cities in their daily life. Multiple visits were made to Kovalam and Tharangambadi, instead of doing the fieldwork at one long visit, so that it gave an opportunity to rethink, analyse and reframe the methods and approaches in the interval.

3.4.1 Methodological procedure deployed in Kovalam case study

During those multiple visits a ten percent sample of the relocated households, a total of 40 households, were contacted for interview purposes. Unexpected and related information obtained during the interview, was noted down in the same questionnaire as an alternative to field notes, to avoid later confusion. Out of 40 interviews 27 were video recorded. The rest were noted down in the form of field notes, as some respondents (mainly women) were restricted to video recording their interview. 28 mental maps were also taken from the respondents during the interview process.

3.4.2 Methodological procedure deployed in Tharangambadi case study

Through the pre-fieldwork visits, the author had contacts with SIFFS (a non-governmental organization, namely the South Indian Federation of Fishing Societies) and INTACH (Indian National Trust for Art and Cultrual Heritage), working in that area. SIFFS work is focussed on recovery of fishermen settlements in the tsunami affected areas and INTACH work is focussed on conservation of historic buildings in the colonial and pre-colonial areas of Tharangambadi. In the fieldwork, author visited Tharangambadi during the Pongal[5] festival time to document what

[5] Harvesting festival celebrated mainly in south India.

happens during the festival celebrations and documented with photographs. Four interviews with the local households were conducted. After collecting the maps and studying the location, interviews were carried out in three further visits at different times. In the first, the interviews were with Muslim and Christian communities who were not much affected by the tsunami. In the second stage, the interviews were conducted with local fishermen households who are already relocated into new houses. In the third, interviews were with the fishermen communities still residing at the old settlement. At each and every stage the researcher participated either directly or indirectly in activities such as 'Bhoomi Pooja'(local term for foundation ceremony) and observed face to face to interviews between architect responsible for the design of new housing layout in relocated areas and beneficiaries, in order to observe the process through indirect participation.

3.4.3 Methodological procedure deployed in Lighthouse Kuppam

Later the Tamilnadu Tsunami Resource Centre (TNTRC) was approached to suggest suitable affected cases on the Chennai coast and any relevant contacts, to help in providing access to the beneficiaries. Through the contacts given by TNTRC, SIGA a Non Government Organisation were contacted and there were visits to Zamillabad, and Lighthouse Kuppam in north coast, and Thiruvanmayur Kuppam on the south coast. The main factors for selecting the Lighthouse Kuppam related to cultural geography. Amongst the three villages, Zamillabad is composed of a Muslim migrant community whose livelihoods are based on pulicat lake fishing. This place was not much affected by the tsunami and reconstruction has not taken place yet. Lighthouse Kuppam is wholly comprised of Dalit communities. Geographically it is an island with 11 Dalit villages, surrounded by Pulicat Lake and the Bay of Bengal on other side. Here the Government itself is undertaking the reconstruction. This case has provided an opportunity to compare the situation with the other two cases (Tharnagambadi and Kovalam) in terms of varied cultural geographic backgrounds, and development approaches. Due to lack of road connections, a local boat service was used to go to the island, highlighting commuting difficulties in the daily life of the local community. During the initial visits to lighthouse Kuppam, an inspection was made of the village and surrounding areas to get an over all picture of the setting. This was followed by group interviews at communal gathering spots. During the following social map of the island

was collected from SIGA' site office at Pulicat centre. This SIGA office was set up to enhance local micro finance systems at the local neighbourhoods with the support of external aid. A member of that organisation assisted the author in introductions to the local people, who are presently residing in temporary shelters.

3.5 Methods

3.5.1 Field observation through direct and indirect participation

A main source of primary data was field observation to gain in-depth insights into local social dynamics and processes. These observations were made independently by the author or while directly or indirectly participating in various activities such as photographic recordings, face to face interviews between the architects and beneficiaries, 'Bhoomipuja' (foundation ceremonies) and Church Moss (tsunami day), which coincidentally took place in the field. Inspections were undertaken to help in the understanding the settlement pattern, and its built fabric, and in order to get an idea of how to develop the questionnaire for 'whom' and 'what'. During the inspections photographic and video recording were used to document the physical surroundings and on-going events.

3.5.2 Documentation and recording

An important technique in this research was on site documentation and recording, especially pertaining to physical transformation processes taking place in the village. Village maps, layouts and village details from the village panchayats or respective authorities or NGO's were collected for this purpose. In the case of Kovalam, there are no digitised base maps available in the records and these were digitised from Google Earth Satellite images. In the case of Tharangambadi, old and new village layouts were collected from INTACH and SIFFS. In the case of Lighthouse Kuppam, layouts of the settlement were not available. Therefore Google Earth Satellite images were taken as reference in this study.

3.5.3 Interviews

The author used contacts of local nongovernmental organisations to gain access to communities. Importantly, the author was not approaching local communities individually as a researcher, rather submersed himself in the normal activities of these NGOs, and made detailed observations. Otherwise, when approached individually as researcher, interviewees got afraid and became hesitant to open up a dialogue with an unfamiliar person. In Kovalam village, the local priest made the introductions to the local people and arranged for a local man to help with the Tamil translation. During the fieldwork, samples of 10 percent among the relocated clusters were selected for the study purpose. Semi-structured interviews and mapping exercises were conducted with the occupants in the relocated areas and in the old locations as well. The criteria for selection of the sample households were as follows:

1. Already relocated and have modified the dwellings to suit their daily needs.
2. Already relocated and have not modified any part of their dwellings and trying to adapt to the new forms.
3. New households, which were formed by coming apart from their own, joint families (pre tsunami) to acquire a new house in relocation.
4. Apart from the occupied households in relocated clusters, some families who have not occupied the new houses and still are residing at the old location.
5. In addition to all the above, Residents in the old village locations were also interviewed to understand the impact of the relocation in their daily lives.

Nearly 40 households were interviewed during the study.

It was soon clear that women did not respond well to the survey questions, because they were not accustomed to expressing themselves to outsiders. Additionally, modifications were made in the set of questions with respect to the gaps observed from the previous visits. During the next visit, interviews were planned involving a Tamil speaking female assistant accompanied with the local man who was introduced by the priest to make introduction to interviewees and help in the interviews. This time the women opened up on many issues to the assistant and she translated the responses in full when we returned from the field. Subsequently a local person from village

introduces the respondents. In this case there is a greater possibility that respondents respond without any doubt and fear.

As this research deals with fishing communities, interviews were also undertaken with fishermen, whilst travelling on their catamarans[6] to observe the fishing patterns and their working routines. It was observed that fishermen responded actively, when they were interviewed at sea. There were cases, where the fisherman responded differently, when posed with same questions on land and on the sea. Most of the interviews were video recorded, and some of the interviews were recorded in the form of field notes. Videos of interviews were composed in a compact disc. Apart from the affected households, various officials and experts in the disaster related fields were contacted to get an idea on their opinions and feedback. Direct contact was made through emails and telephone to fix an appointment for the interview. During the interview various issues and experiences regarding their approaches in the development process were discussed briefly. Depending on the response, further questions were asked to get better information in a subtle manner. The following table 3.3 shows the details of officials from different organisations, those were interviewed during the fieldwork.

RESPONDENTS	**ORGANISATION**	**POSITION**	**LOCATION**
Dr.Nalini	TNTRC		Chennai
Dr. Pari	"		"
Mr.Suresh	"		"
Ms Anuradha	"		"
Ar.Dharmesh Jadeja	BUILDAUR	Architect	Auroville, also a member in the assessment team.
Ms. Annie George	Convenor		Nagapattinam
Ar.Benny Kuriakose		Architect	Tharangambadi
Ar.Anbukarsi		Architect	Tharangambadi
Mr.Selvadas	SIFFS		Tharangambadi
Mr.Ashok panda	INTACH		Tharangambadi
Father Justus	Parish Church		Kovalam
Dr.Aruju sundaram	Disaster Management cell,		Anna university, Chennai
Ms Villu gopal	SIGA	Convenor	Chennai

Table 3.3 Details of the officials and experts in the disaster related field, consulted for interview purposes.

[6] Traditional wooden boat.

3.5.4 Mental Maps

The concept of mental mapping refers to a person's personal point of view or perception of his or her own world. These are maps sketched out by an individual that represent the mental image of an area that the person has. Sometimes it is also possible to identify a correlation between an individual sketch map and the same person's interview.

In the present research, mental maps were collected in the case study area from the respondent, immediately after the household informant interview. These maps provide an insight into the transformational aspects of two different locations in the same village. One location is the old village (identifying usage patterns before tsunami) and other location is the newly relocated clusters (identifying newly emerging patterns) that are physically expanding the settlement.
Mental maps were gathered through two methods. In Kovalam, maps were collected from the respondents by giving a blank paper (space at the back of questionnaire) where respondents were asked to sketch their village map (whatever they know about their village). Initially the author encountered some difficulties in getting these maps drawn by the local people, as some of them were afraid to draw, as they had never done it before. Many respondents have responded actively to the interview questions, but were scared, when they were asked to draw the maps of their village. Subsequently, the author showed maps from educated respondents those include from studying teenagers and young persons, as model maps for other respondents. People from different clusters have developed mental maps with their experiences in their daily life. Later the Tamil texts indicated on the maps were translated in English.

In Tharangambadi, an alternative method was used for collecting mental maps. The respondents were approached with two copies of a new base map (showing old and new settlements) of the village (after the relocation) to draw access maps and locate their daily use of spaces and respective activities before and after tsunami relocation. These were used to identify the use of spaces and activities and their access have changed after the relocation (Refer to legibility analysis in Chapter 5 and 6). The following table 3.4 demonstrates the application of research methods in the three case study areas.

Research Methods	Kovalam	Tharangambadi	Lighthouse Kuppam
Direct and Indirect observation	Daily activities Physical patterns Transformation process after (during) reconstruction.	Daily activities Physical patterns Transformation process after (during) reconstruction.	Daily activities Physical patterns Temporary shelter transformation
Documentation and recording	Village maps, Old and New housing layouts and building plans Photographic recording	Social segregation in the village, Historic data, Village maps, Old and New housing layouts and building plans Photographic recording	Village maps, Photographic recording
Semi-structured key informant interviews	Father, village panchayats, teachers, traders, and local people Video recorded	NGO's, village panchayats, teachers, researchers and local people video recorded, field notes	Local people, SIGA, Video recorded
Mental maps	Identity of the place	Identity of the place (done in different way)	Not implemented

Table 3.4 Showing the application of research methods in the three case study areas.

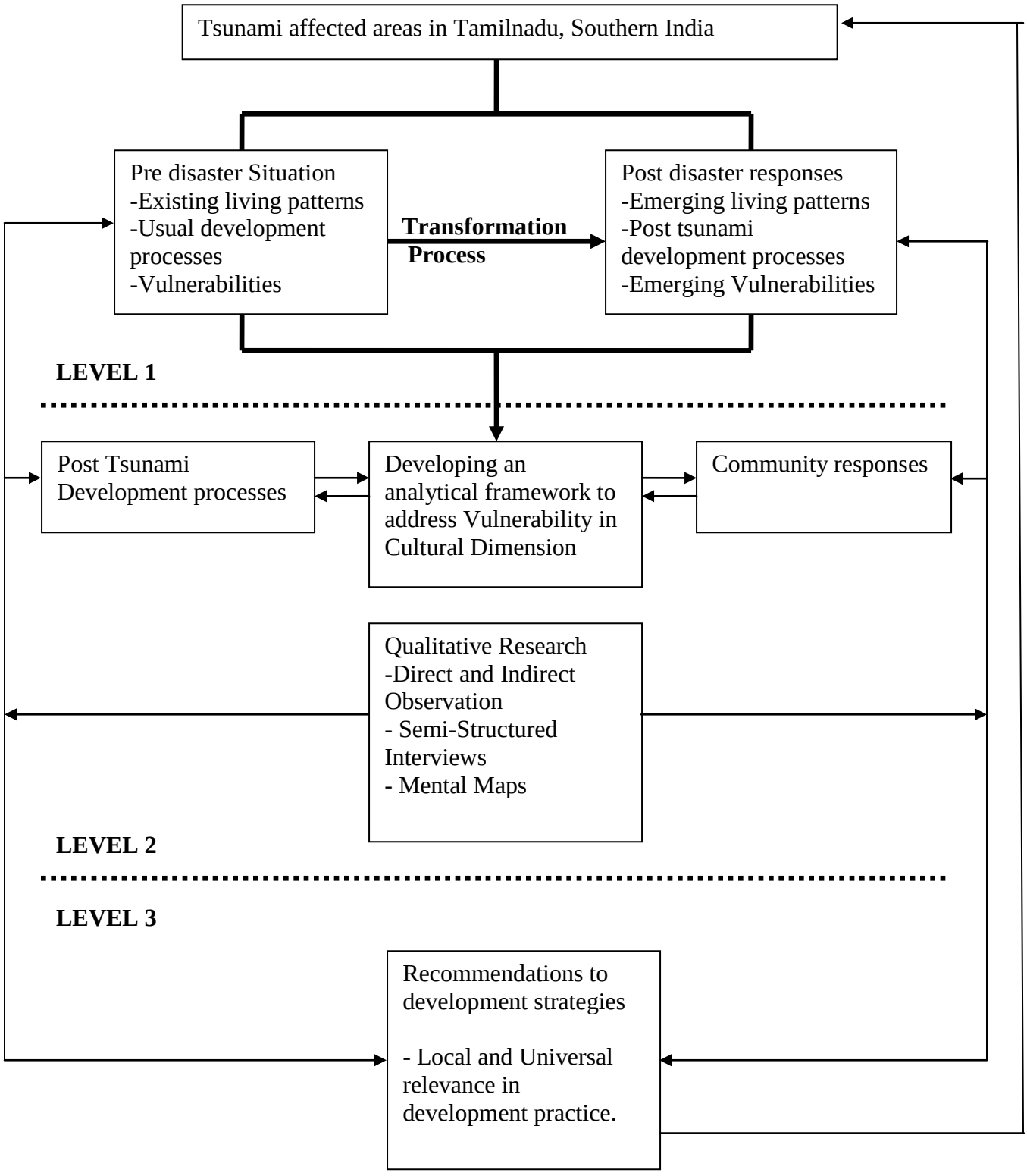


Figure 3.2 Methodology Diagram

Disaster Management Practices in Indian Sub Continent

This chapter discusses the development implications of existing pre-disaster and post disaster practices in disaster management, especially in the context of rural communities in Indian Subcontinent.

4.1 Disaster management as an international concern

The United Nations General Assembly, in 1989, declared the decade from 1990 to 2000 as the International Decade for Natural Disaster Reduction (IDNDR). The objective of the IDNDR was to reduce through intensive international action (especially in the developing countries), the loss of life, property damage and social and economic disruption caused by natural disasters. As per the plan of the IDNDR (1989), by the year 2000 all countries should have

(1) Comprehensive national assessments of risks from natural hazards, with these assessments taken into account in development plans;

(2) Mitigation plans at national and local levels, involving long-term prevention and preparedness and community awareness; and

(3) Ready access to global, regional, national and local warning systems and broad dissemination of warnings.

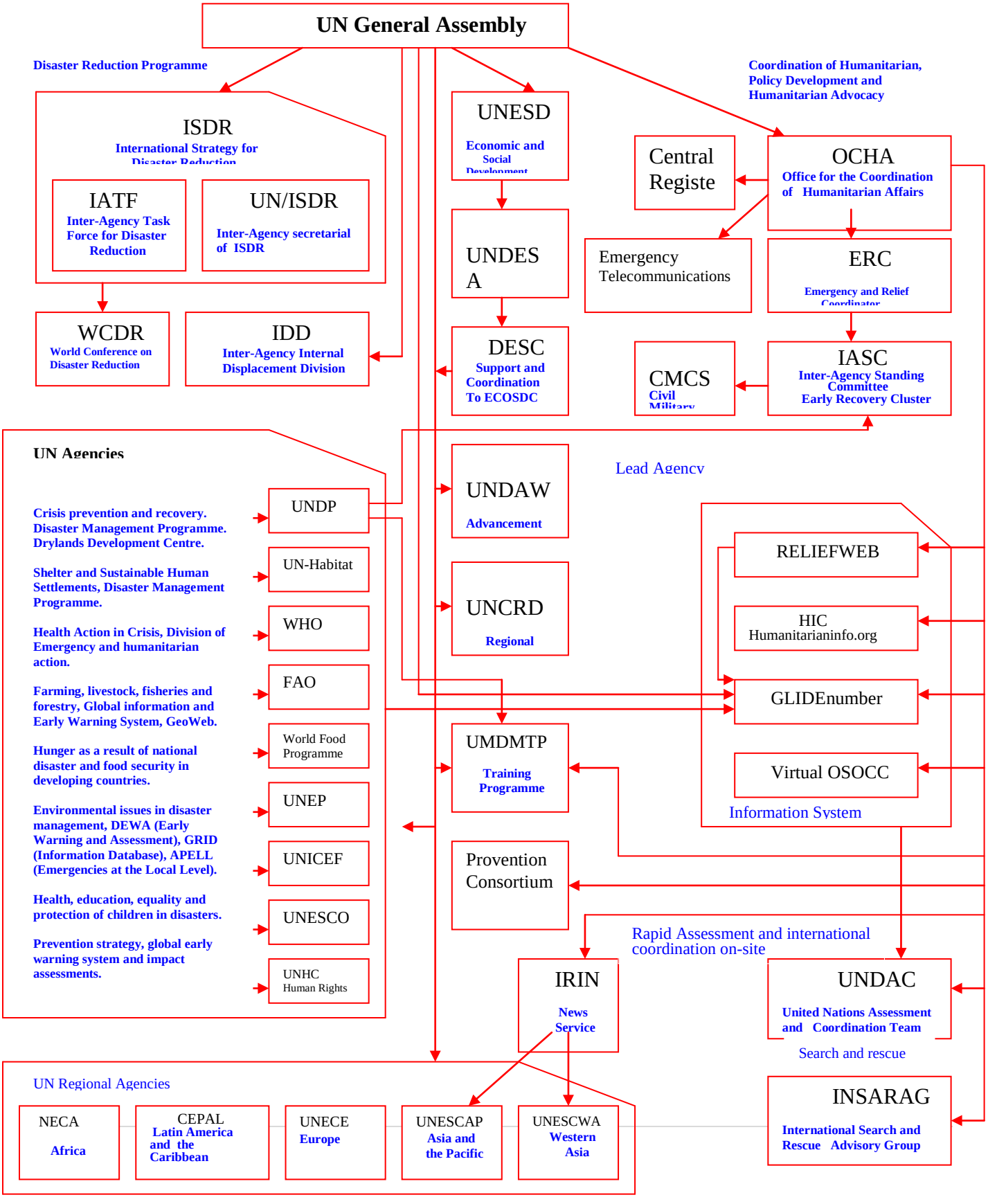
The last major conference of the IDNDR program was held in Yokohama in May 1994, where a plan of action for disaster reduction, called the `Yokohama Strategy' was evolved. The Yokohama strategy gave guidelines for natural disaster prevention, preparedness and mitigation. India was an active participant in this conference and in the formulation of the guidelines. By doing so, it recognized the need for further improvements in its disaster management mechanism and to develop a strong political will by way of a sound national policy in this regard (N.I.S.A 2006 P24). As the successor to IDNDR in 2000, the UN International Strategy for Disaster Reduction (ISDR) was initiated to foster this agenda by focussing on the processes involved in the awareness, assessment and management of disaster risks. An important tool in the

development of this agenda has been the ISDR Secretariat's publication *'Living with risk: A global review of disaster reduction initiatives'* (UNISDR 2003).

In 1997, under the United Nations Programme for Reform, the General Assembly transferred the responsibility for operational activities on natural disaster mitigation, prevention and preparedness to UNDP. Since then, UNDP has made considerable progress in developing capacity building programmes in disaster reduction and recovery. In doing this, UNDP supports the implementation of the ISDR agenda at the national and regional levels. This work is reinforced by partnerships with the Office for Co-ordination of Humanitarian Affairs (OCHA) and other UN agencies and international organisations.

Disaster management in the UN System

Figure 4.1 Interaction Pattern in UN system, Source: RICS 2006



4.2 Disaster management as a national concern

Over the past decade, there has been a paradigm shift in the approach to disaster management in Indian sub continent. The new approach proceeds from the conviction that development cannot be sustainable unless disaster mitigation is built into the development process (UNDP 2004). Another cornerstone of the approach is that mitigation has to be multi-disciplinary spanning across all sectors of development. This approach has been translated into a National Disaster Framework [a roadmap] covering institutional mechanisms, disaster prevention strategy, early warning system, disaster mitigation, preparedness and response and human resource development. The expected inputs, areas of intervention and agencies to be involved at the National, State and district levels have been identified and listed in the roadmap (See attached Annexture-1). This roadmap has been shared with all the State Governments and Union Territory Administrations. Ministries and Departments of Government of India, and the State Governments/UT Administrations have been advised to develop their respective roadmaps taking the national roadmap as a broad guideline.

4.3 Pre-disaster management practices

The key terms that describe pre-disaster management practices are “disaster prevention”, “mitigation” and “preparedness”. Mitigation in relation to a disaster can be defined as measures that are aimed at reducing the impact or effects of a disaster (N.I.S.A. 2006 P38). The UNDP Disaster Management Manual defines it as a collective term used to encompass all activities undertaken in anticipation of the occurrence of a potentially disastrous event, including preparedness and long-term risk reduction measures (United Nations 1994). Disaster Preparedness includes those measures, which are aimed at impeding the occurrences of disasters and / or preventing such occurrences and its harmful effects.

According to the Disaster Management Manual of UNDP (1994), these include measures that ensure the readiness and ability of a society to

(a) Forecast and take precautionary measures in advance of an imminent threat (in case where advance warnings are possible), and
(b) Respond to and cope with the effects of a disaster by organizing and delivering timely and effective rescue, relief and other appropriate post-disaster assistance. The Red Cross has recognised disaster preparedness as an effective link between emergency response, rehabilitation and development programmes.

4.3.1 Planning regulations and building guidelines

The essential components of pre-disaster management practices are building guidelines and planning regulations for new construction incorporating earthquake and cyclone resistant features, and various technical measures regarding strengthening of existing buildings. The planning regulations specify zoning regulations to prevent construction on unsafe lands. They also specify controls on future development, so that communities can avoid risk of disaster. During the tsunami reconstruction process, the Coastal Regulations (1991) were amended 19 times (up to 2003) since then were enforced in order to control the physical development in coastal areas (Aarthi Sridhar 2005). As per the notification, 500 metres on the landward side from the High Tide Line (HTL) and the land area between the Low Tide Line (LTL) and HTL including 500 metres along the tidal influenced water bodies subject to a minimum of 100 m on the width of the water body, whichever is less is declared as CRZ area. Such norms have limited the construction activities in these zones as per the zone it falls under.

In the pre-tsunami context, these regulatory frameworks were rarely followed in practice and frequently violated. In particular, illegal construction took place in No- Development Zones (NDZ) of CRZ-III (CRZ-III indicates developed or under developed rural areas) (Swaminathan 2005). In the recent CRZ (2005) amendments, areas of the CRZ–III permit construction-related activities in the region between 200 and 500 metres from the HTL.

Rural construction is classified as non-engineered construction in the International Association of Earthquake Engineering manual (1986). Such non-engineered construction is defined as those buildings that were spontaneously and informally constructed in various rural places in the

traditional manner without any or little intervention by qualified architects and engineers in their design. Jigyasu (2002 P52) points out that these definitions undermine the embodied traditional knowledge in the evolution of these traditional structures.

In 1962 Bureau of Indian Standards developed the first Indian standard recommendations for disaster (earthquake) resistant design of structures (IS: 1983-1962), which has been further revised several times. With regard to cyclone resistant structures, IS: 15499: 2004 specifies the guidelines for the survey of housing and building typology in cyclone prone areas for assessment of vulnerability of regions and post cyclone damage estimation. Other standards relate to Concrete structures – the Indian Standard Code of Practice for Ductile Detailing of Concrete structures (IS 13920-1993) and Repair and Strengthening – Repair and Seismic Strengthening of Buildings – Guidelines (IS 13935-1993).

During the tsunami reconstruction in Tamilnadu, it was realized that most of the buildings which had collapsed or damaged due to tsunami was a result of poor construction practices that failed to consider the hazard proneness of the area. In order to mitigate such risks in future, the Revenue Administration, Disaster Management and Mitigation Departments of Tamilnadu together considered it is essential that all the houses and infrastructure to be constructed in hazard prone areas should incorporate disaster resistant technologies as stipulated in the above mentioned Bureau of Indian Standards Codes. Through a combined effort, detailed guidelines for construction of houses for the affected people at the relocated sites were brought out after the 2004 tsunami. The guidelines emphasised citing of buildings, planning aspects, construction of dwelling units and quality control of the new constructions and the retrofitting of damaged buildings.

4.3.2 Training and awareness programmes

As part of disaster preparedness measures, training and community awareness programmes are being initiated as an inclusive, cross-sectoral process involving various stakeholders. These include programmes for various stakeholders or target groups such as government officials and

policymakers, NGOs, professionals, trainers, children, volunteers, local community leaders as well as private sector.

The National Centre for Disaster Management at the national level has been upgraded and designated as the National Institute of Disaster Management. It is being developed as a Regional Centre of Excellence in Asia. The National Institute of Disaster Management will develop training modules at different levels, undertake training of trainers and organize training programmes for planners, administrators and command functionaries. Other functions assigned to the National Institute of Disaster Management include development of an exhaustive national level information base on disaster management policies, prevention mechanisms, mitigation measures; formulation of disaster management code; and providing consultancy to various States in strengthening their disaster management systems and capacities as well as preparation of disaster management plans and strategies for hazard mitigation and disaster response.

At a state level, in Tamilnadu, Anna University has established Centre for Disaster Mitigation and Management [CDMM] to train various officials including District Collectors, policy makers, engineers and other professionals.

4.3.3 Early warning systems

The goal of any early warning system is to maximize the number of people who can take appropriate and timely action for the safety of life and property. All warning systems start with detection of the event and with people getting out of harm's way. Such warning systems encompass three equally important elements namely; detection and warning; communication; and response.

The Indian Meteorological Department (IMD) is mandated to monitor and give warnings regarding tropical cyclones (TC). The monitoring process has been revolutionized by the advent of remote sensing techniques. A forecast scheme has been worked out using satellite image interpretation techniques, which facilitate forecasting of occurrence of natural hazards.

4.4 Post disaster management practices

4.4.1 Institutional structure and policy framework

The institutional and policy mechanisms for carrying out response, relief and rehabilitation have been established since independence. At the national level, the Ministry of Home Affairs is the nodal Ministry for all matters concerning disaster management. The Central Relief Commissioner (CRC) in the Ministry of Home Affairs is the nodal officer to coordinate relief operations for natural disasters. The CRC receives information relating to forecasting/warning of a natural calamity from India Meteorological Department (IMD) or from Central Water Commission of Ministry of Water Resources on a continuing basis. The Ministries/Departments/Organizations concerned with the primary and secondary functions relating to the management of disasters include: India Meteorological Department, Central Water Commission, Ministry of Home Affairs, Ministry of Defence, Ministry of Finance, Ministry of Rural Development, Ministry of Urban Development, Department of Communications, Ministry of Health, Ministry of Water Resources, Ministry of Petroleum, Department of Agriculture & Cooperation. Ministry of Power, Department of Civil Supplies, Ministry of Railways, Ministry of Information and Broadcasting, Planning Commission, Cabinet Secretariat, Department of Surface Transport, Ministry of Social Justice, Department of Women and Child Development, Ministry of Environment and Forest, Department of Food. Each Ministry/Department/Organization nominates their nodal officer to the Crisis Management Group chaired by Central Relief Commissioner. The nodal officer is responsible for preparing sectoral Action Plan/Emergency Support Function Plan for managing disasters.

India being a democratic country with a federal structure, the basic responsibility of undertaking rescue relief and rehabilitation measures in the event of natural disaster lies with the state government. The role of the central government is to support in terms of physical and financial resources, in the rescue, relief and preparedness operations. Moreover, the institutional structure is very bureaucratic and top-down being organised mainly at central, state and district levels.

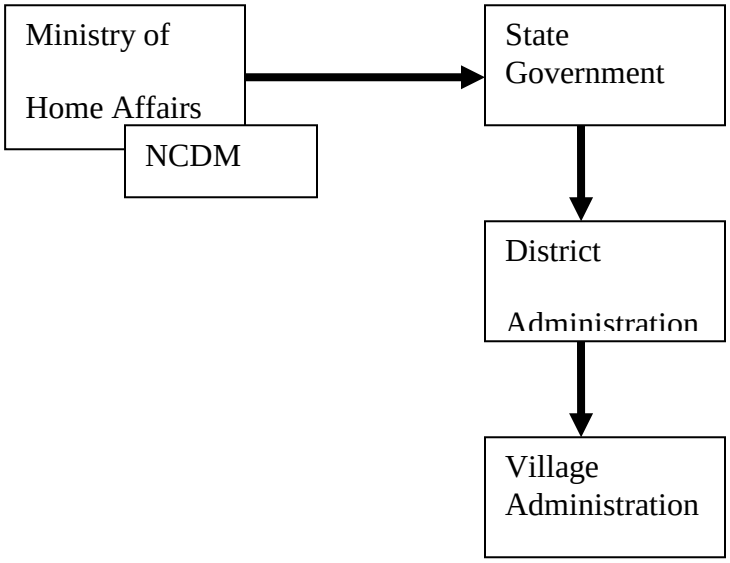


Figure 4.2 Interaction pattern in central, state and district level.

At central level, the policy and arrangement for financing the state governments to provide relief and rehabilitation measures in areas affected by natural calamities are governed by the recommendations of the Central Finance Commissions appointed from time to time. Under the present scheme, a Calamity Relief Fund (CRF) has been constituted for each state with contribution from the central and state governments to undertake relief and rehabilitation measures. A State Level Committee headed by the Chief Secretary decides the norms of assistance under each of the approved schemes. In addition to the CRF, a National Fund for Calamity Relief (NFCR) has also been constituted to deal with calamities of rare severity.

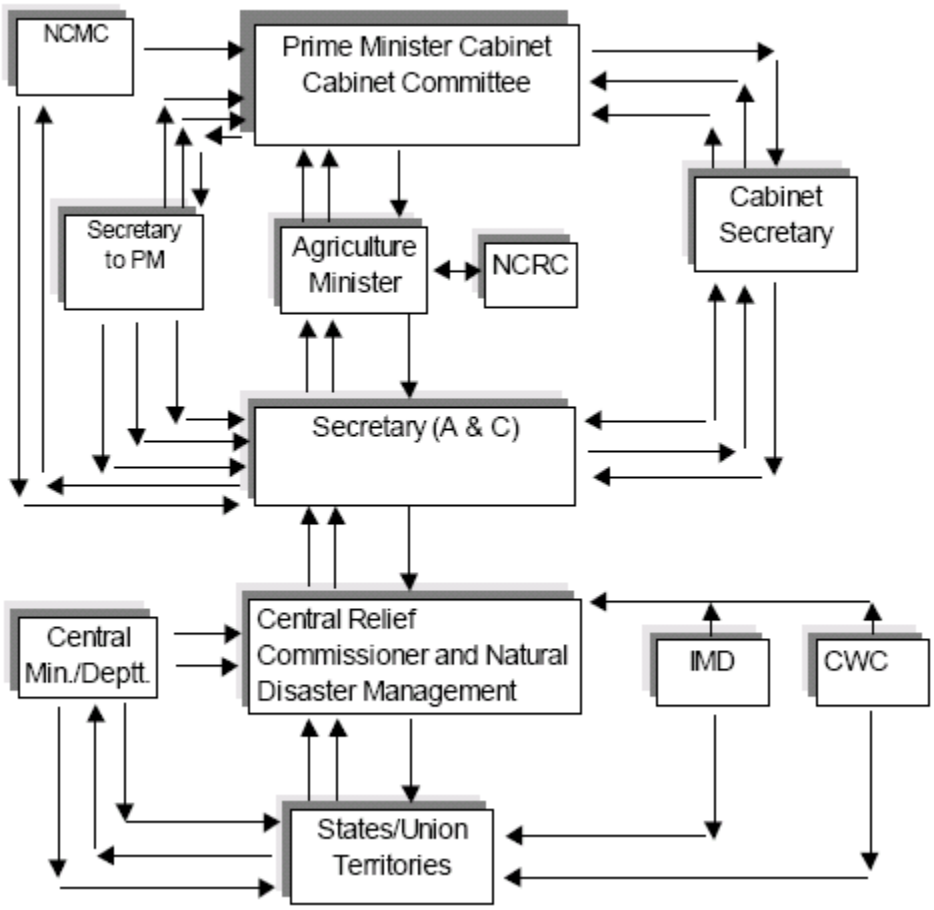


Figure 4.3 Interactive Patterns for Disaster Management at Central Level, Source: Adapted from Jigyasu (2002) and Sharma (1999).

At the state government level natural disasters are usually the responsibility of the Revenue Department or the Relief Department. While the Cabinet of the State headed by the Chief Minister makes important policy decisions at the State Headquarters, the Secretary in the Department carries out day-to-day decisions involving policy matters. In many states, Secretary, Department of Revenue, is also in-charge of relief. State governments usually have relief manuals and the districts have their contingency plan that is updated from time to time.

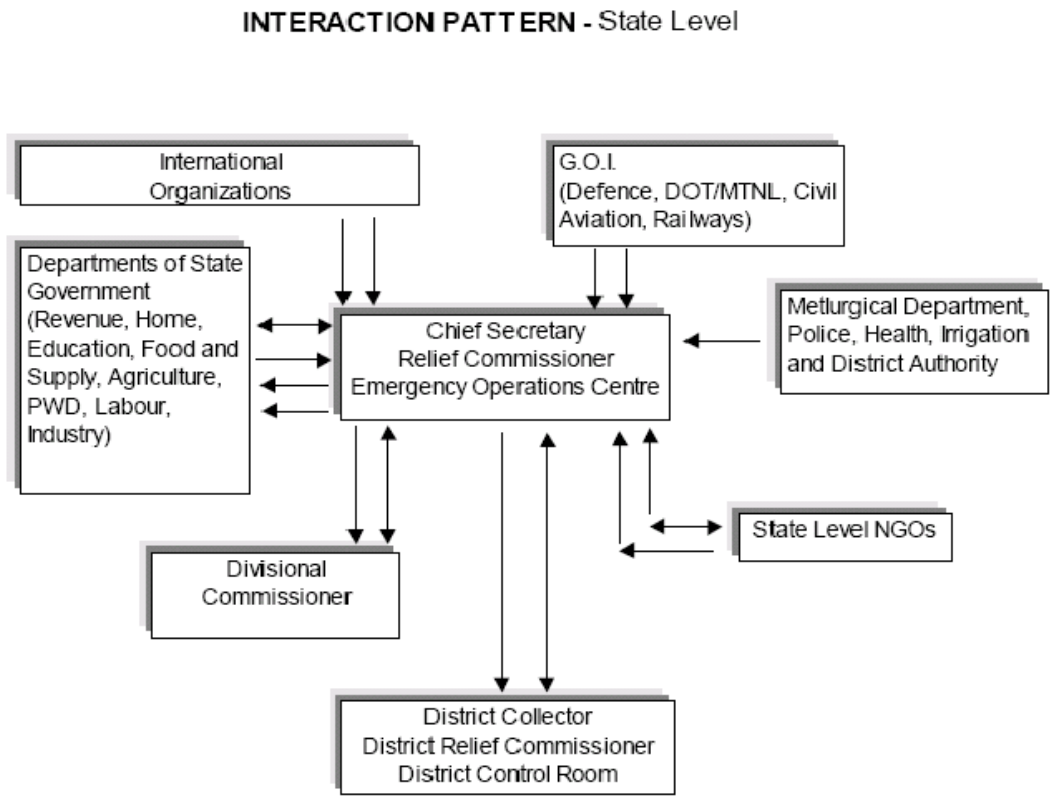


Figure 4.4 Interaction pattern at State Level, Source: adapted from Jigyasu (2002) and Sharma, (1999).

District level

The district administration is the focal point for implementation of all governmental plans and activities. The actual day-to-day function of administering relief is the responsibility of the Collector or District Magistrate or Deputy Commissioner, who exercises coordinating and supervising powers over all departments at the district level. Although not common, there also exists district level relief committees consisting of officials and non- officials. The Collector maintains close liaison with the Central Government authorities in the districts, namely, the Army, Air Force and Navy, Ministry of Water Resources and other ministries who supplement the effort of the district administration in the rescue and relief operation. The Collector is also responsible for coordinating voluntary initiatives by mobilizing the non-government organizations that are capable of working in such disaster situations.

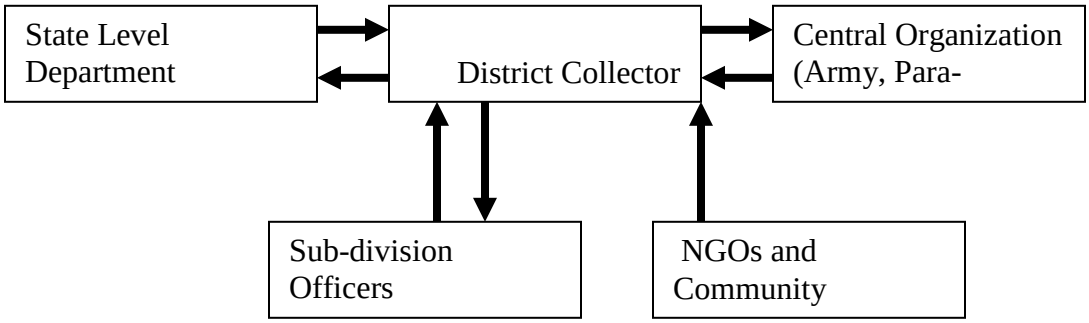


Figure 4.5 Institutional coordination at district level, Source: Adapted from Jigyasu (2002) and Sharma (1999).

4.4.2 Community participation in rural development

The contingency action plan that was prepared by the government covers all the main aspects from their view. A significant shift in the recent times is the increasing emphasis on people's participation in disaster management. This approach to people's participation has only come about since the late 80's largely due to the efforts of various non government organisations and the research sector. During the Marathwada earthquake in 1993, people's participation was largely ignored in the reconstruction process. Later on in 2001 during the Gujarat earthquake reconstruction, community participation was employed by various NGOs and the government sector. Experts like Hamdi and Geotheret (1997) suggested different participatory approaches in the development planning system especially in developing countries. Moreover, there is an extensive research that is already in progress on the communication processes in the development planning system Gandelson (2002). In the present context, this component of people's participation is being gradually strengthened in rural development and, as a consequence in disaster mitigation planning by various development agencies (ISDR 2008).

4.4.3 Technology transfer to rural communities

There has been some advance in the development of Alternative Building Technology and the use of alternative building materials and techniques, for building low-cost houses in rural and semi-urban areas. The need for producing disaster resistant housing using low cost alternatives has been realised by various public, semi-public and private agencies that are involved in the development practice sector (Pasupuleti 2003 and 2005). It was with this objective in mind that a five-year action plan was launched by Government of India on Innovative Building Materials and Housing in 1990. The nodal responsibility was entrusted to the Central Building Research Institute (CBRI), Roorkee, a premier research institute in the country. Several national agencies concerned with low cost building technologies were also involved. Different instruction manuals on appropriate building systems were released by the Development Alternatives, based on the experiences of the Shelter group in co-operation with the Building Materials Technology Promotion Council (BMTPC 1993), New Delhi.

At the same time, the Auroville Building Centre, based in Auroville, the International Township in Pondicherry, has developed alternative building technologies using earth materials such as Compressed Stabilised Earth Blocks (CSEB) for building disaster resistant houses (Pasupuleti 2003). During the Gujarat Earthquake reconstruction, such technology was employed to rebuild new houses in the affected areas. Local artisans and other building professionals were given sufficient training for using these latest technical methods and systems. In a similar way, such technology transfer was achieved in a very rapid manner during the Marathwada earthquake. However, it has been shown in various studies that in many cases technology transfer doesn't sufficiently take into account the cultural practices of the local beneficiaries and in turn they also face other difficulties in adapting to the latest technical inputs (eg. Jigyasu 2002). It is also questionable the extent to which these technology transfers address local cultural dimensions of the affected communities and in what ways they produce sustainable development in the long run.

4.5 Conclusion: emerging issues and the research question

Considerable progress in the networking patterns within different development stakeholders at United Nations, Central, State and District levels is evident. However questions remain as to the efficiency of their complex bureaucracy and the capacity of current disaster management practices to address the development failures identified in this study.

Pre and post disaster management practices are completely top-down. Technology transfer during the post disaster development process, needs to address the relevance of different cultural contexts and to what extent these local cultural contexts can accept new forms of development and technology in the post disaster recovery process.

There has been increased awareness among the government and non-government sectors of the importance of using local skills and technology in the disaster reconstruction processes, especially since the Gujarat earthquake in 2001. Architects and planners involved with the recovery programmes have tried to incorporate local skills and technologies in a more uniform and standardised manner. However, it is also important to consider the cultural needs and wants of the affected communities as they vary from region to region and even family to family.

Building and planning regulations have provided uniform sets of provisions, constraints and recommendations at state level but such regulatory frameworks are unable to accommodate local or regional contexts or address the lifestyles of rural communities which vary according to the geographic and climatic regions.

Therefore the next stage of this research aims to understand the issues in current disaster management practices by examining the case study areas in the real life context.

PART 2: CASE STUDIES

Case Studies

In this part 2 three selected case study areas are analysed using the conceptual framework (discussed in chapters two and three) developed to assess the role of culture of traditional fishing settlements in post disaster contexts. The framework is based on a multi-methods approach drawing on concepts derived from cultural anthropology and urban design. The vulnerability context of traditional settlements in a post disaster response situation is assessed by evaluating the transforming cultural landscapes within qualitative design parameters that are widely employed in the field of urban design (refer to conceptual framework in chapter two).

5.0 Development context of Tamilnadu

A. Location and topography

Tamilnadu, popularly known as the "Country of Tamils" is one of the 28 states of India. It is located in the southernmost part of the Indian peninsula and is bordered by Pondicherry, Kerala, Karanataka and Andhra Pradesh. Chennai being its capital city, Tamilnadu is bound by the Eastern Ghats in the north, the Nilgiri, the Anamalai Hills, and Palakkad on the west, Bay of Bengal in the east, Gulf of Mannar, Palk Strait in the south east and Indian Ocean in the south.

Figure 5.1: Showing the topographic and location map of Tamilnadu. Source: Maps of India

Tamilnadu has a population of 62,405,679 as per the census of 2001. It comprises of 31 districts, and covers an area of 130,058 square kilometres (50,216 sq mi). It is the eleventh largest state (by area) in India (Government of Tamilnadu 2009). This region has been the home of the Tamil civilization since at least 1500 BC, as attested by numerous archaeological sites in and around *Adichanallur*[7]. Its classical language, Tamil, has been used in the inscriptions and literature for 2500 years. Tamilnadu is home to many natural resources, grand Hindu temples of Dravidian architecture, hill stations, beach resorts, multi-religious pilgrimage sites and five UNESCO World Heritage Sites.

Tamilnadu has a coastline of about 910 kilometres (600 mi) and is the country's third longest coastline. Tamilnadu falls mostly in a region of low seismic hazard with the exception of the western border areas that lie in a low to moderate hazard zone; as per the 2002 Bureau of Indian Standards (BIS) map, Tamilnadu falls in seismic zones II & III.

B. Historic significance of Tamilnadu

Throughout its history, spanning the early Palaeolithic age to modern times, this region has coexisted with various external cultures. Historic records reveal that there existed four ancient Tamil empires including Chera, Pallavas, Chola and Pandyas (arranged in sequence). Together they ruled over this land with a unique culture and language, contributing to the growth of some of the oldest extant literature in the world. They had extensive maritime trade contacts with the Roman Empire (CEPT 2008). These dynasties were in constant struggle with each other vying for hegemony over the land. Rapid changes in the political situation of the rest of India due to incursions of Muslim armies from the northwest marked a turning point in the history of Tamilnadu. With the decline of the three ancient dynasties during the fourteenth century, the Tamil country became part of the Vijayanagara Empire, which has origins from the present Andhra Pradesh state region. Under this empire the Telugu speaking Nayak governors ruled the Tamil land. The brief appearance of the Marathas gave way to the European trading companies, who began to appear during the seventeenth century and eventually assumed greater sway over

[7] Adichanallur is an archaeological site near Thirunelveli in Tamilnadu, India. The town is known locally as *Adityanallur*, and has been the site of a number of very important archaeological discoveries.

the indigenous rulers of the land. The Madras Presidency then, comprising most of southern India, was created in the eighteenth century and was ruled directly by the British East India Company. After the independence of India, the state of Tamilnadu was created based on linguistic boundaries. The following timeline demonstrates clearly about the various dynasties, who ruled Tamilnadu in historic times. However, from this historical information it can be understood that the various historic political powers who ruled Tamilnadu affected the religious arrangements of traditional settlements. Such rulers have left their cultural impression on people and places over time.

PERIOD	GOVERNMENT
-500 to –300	Pre-Historic period
-300	Starting of Sangam period
-200 to 300	Early kingdoms in Sangam Period
300 to 600	Kalabhras
600 to 900	Pallava empire
900 to 1200	Chola empire
1200 to 1300	Pandyas empire
1300 to 1650	Vijayanagara (Nayaks)
1650 to 1850	Colonial
1850 to 1947	British India
1947 onwards	Independent Modern India

Table 5.1: Timeline showing the period of various dynasties that ruled Tamilnadu, Source: adapted from French Institute of Pondichery, 2009).

C. Poverty in the development context of Tamilnadu

Despite the many recent significant development achievements in the state of Tamilnadu, some 12 million people or 20 percent of the state's total population are still living in poverty (World Bank 2009). Poverty rates are higher in rural areas and intra-state disparities are pronounced. In fact, inequality in Tamilnadu is higher than the all-India average, and is indeed the highest among the 15 major states that include Andhra Pradesh, Karnataka, Maharashtra, Madhya Pradesh, and others. Thus, the exclusion of a large section of the rural population from the progressive achievements of the state provides a challenging agenda for development.

The Rural Development and Panchayat Raj Department is responsible for the implementation of various centrally-sponsored, state-funded, and externally-aided schemes for poverty alleviation, employment generation, sanitation, capacity building, women's social and economic empowerment and tsunami rehabilitation, in addition to the provision of basic amenities and services (TNRD(a), 2009). The department is also entrusted with the responsibility of enabling the various Panchayat Raj Institutions (PRIs) to function as effective units of local self-government. There are 12,620 Village Panchayats, 385 Panchayat Unions and 29 District Panchayats under the purview of the Department (TNRD(a) 2009). Usually the Deputy Chief Minister head the Rural Development and Panchayat Raj Department and the Municipal Administration and Water Supply Department. The State Institute of Rural Development (SIRD) is the state apex body for training, research and consultancy functions in the Rural Development and Panchayat Raj Department. It works as an autonomous organization under the Rural Development and Panchayat Raj Department of the government of Tamilnadu. SIRD was established in 1961 and attained autonomous status in 1990 (SIRD 2009). The Directorate of Rural Development and Panchayat Raj (including the training wing), the Tamilnadu Corporation for Development of Women Limited and the Tsunami Project Implementation Unit come under this Department. Indian Administrative Services officers head all of these units. This department also provides administrative support to the State Election Commission. The Project Director of the Tsunami Project Implementation Unit oversees the implementation of Tsunami Rehabilitation Schemes such as the Tsunami Emergency Assistance Project (TEAP) assisted by the Asian Development Bank, the Emergency Tsunami Reconstruction Project (ETRP) assisted by the World Bank and the Rajiv Gandhi Rehabilitation Package funded by Government of India.

According to the Annual Report on the functioning of Panchayats in Tamilnadu for the year 2008-09 (TNRD(b) 2009), there was no proper scheme to create basic infrastructure facilities like cement concrete roads and public buildings and other essential facilities. Further, it had become essential to make the assets created under National Rural Employment Guarantee Scheme durable by stabilizing them. Taking into consideration the representations received in this regard, a new Scheme called the 'Rural Infrastructure Scheme' was introduced during 2008-09 with an allocation of Rs.350 crores for the year 2008-09. Funds under this Scheme were

allocated at the rate of Rs.200 crores for Village Panchayats, Rs.100 crores for Panchayat Unions and Rs.50 crores for District Panchayats. Rupees 350 crores were released to the rural local bodies in the year 2008-09. Under these development schemes various development projects were also funded in the case study areas.

D. Housing culture in coastal Tamilnadu

According to Barenstein and Pittet's report (2007 p5), housing in coastal Tamilnadu is a culturally sensitive and highly ritualised process. The construction of a new house is a social event that involves several specialised communities. For instance, a family generally initiates the construction of a new house when the son gets married. In the first instance, they consult a local astrologer who recommends a design for the house that follows vasthu guidelines. This includes some critical issues such as the orientation of the main entrance, the length of each wall, and the number of doors and windows. The astrologer decides an auspicious date and time to begin with construction, which is termed as Bhoomi Pooja in local terms (See Figure 5.2).

Figure 5.2: Foundation stone was laid ritually on the occasion of the Foundation (Bhoomi Pooja) ceremony.

As fishermen are fully occupied with the fishing activities and other related trades, women play a vital role in house construction and often hold responsibility for employment of masons or local contractors, the purchase of construction materials, and the supervision of the works. The size of the house and its interior and exterior spaces completely depends on the size of family and their

individual and collective needs which change from time to time and their personal preferences and comfort considerations with respect to their livelihood. Barenstein and Pittet (2007 p5) explain how people start the house and develop it further in the present context.

> The first house of a newly married couple may be a small and fully thatched house. With growing age, family size, and financial resources they may decide to build a new house with brick walls and a thatched roof. A further improvement consists in replacing the thatched roof with hand-made or industrially produced tiles. Few families have the means or desire to build a flat-roofed RCC house. Those who have gone for this type of house realise after some time that it is not very comfortable under the local climatic conditions and may end up building a thatched roof on top of it.

This indicates that fishing communities are more influenced by urban housing patterns and models and tend to incorporate these urban models into their present housing aspirations. They tend to reproduce these forms without having an awareness of the richness of their own vernacular housing patterns.

Most of the houses comprise of two to three rooms and two kitchens (one outside and another inside the house). The most interactive building element of the fishermen dwelling is the 'veranda'. During the daytime, people spend their leisure time and entertain their guests in this semi-open space and in the nights this veranda is transformed as a sleeping area by rolling out straw mats on the floors. There are three to five distinct typologies found in the housing layouts. Mostly these houses are framed with brick walls or in some cases mud walls. The roof is mostly composed of country tiles or factory made Mangalore tiles. Due to the urban influences, people now tend to build the roof using Reinforced Cement Concrete (R.C.C) as it is more durable and provides a symbolic element of their economic status (See figure 5.3).

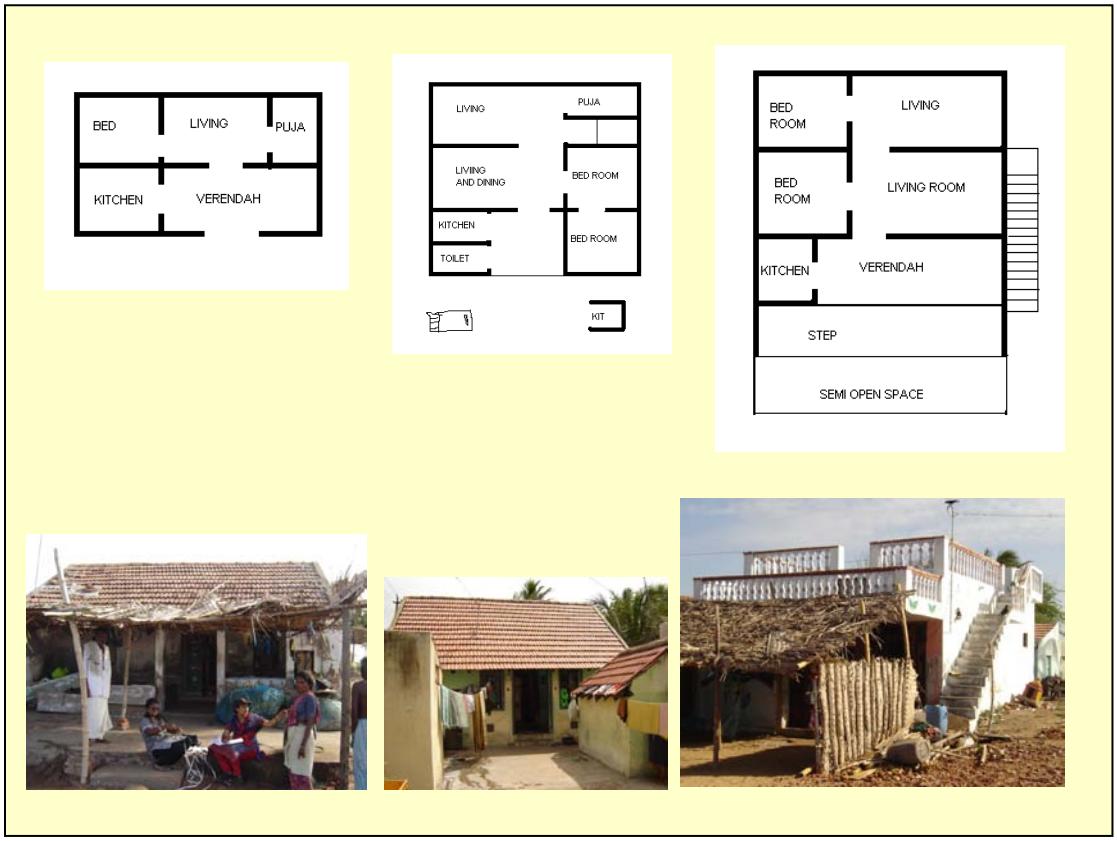


Figure 5.3: Various housing typologies that are commonly found in coastal Tamilnadu.

As explained in chapter 3 Section 3.3.3, the coastal belt of Tamilnadu is geographically and culturally varied. The three zones including the Coramandal coast, the Palk Straight and the Gulf of Mannar, not only vary by natural geographic features such as places of high and low level areas and shallow waters and deep waters (fish are abundantly available in deep waters) but also by socio-cultural, economic and political aspects. The fishing sector in these regions can be traced back many generations, and the specialised fishing profession manifests itself in different *castes (*Caste represents a social group in given location or region) that are concentrated in particular regions (Bavnick 2003).The Pattinavar caste is dominant along the Coromandal coast, the Paravar caste in the Palk Strait region, and the Mukkuvar caste in the southern most parts of Tamilnadu. The majority of Hindus are located in the northern parts of Tamilnadu, whereas fishermen in south are mainly Roman Catholic, and the Church is significant (Moose 1996).

Each class possesses different kinds of socio-cultural assets through which they organise their links and networks to sustain their economic livelihoods.

Any given fishing settlement will be comprised of these diversified classes or social groups who have already contextualised their sense of belonging in different ways in the evolution of the physical layout of the village depending on various historical and political influences. Built forms have influence from the Pallavas, Cholas, Pandhya and Vijayanagara empires and were further drastically influenced by Pre-colonial and Colonial rule and in the Modern period. In settlements where particular social groups were dominant there exists a particular understanding and organisational behaviour among themselves within the people and their responsible religious or other institutions that support them. The following part of this thesis discusses upon how the conceptual framework that was developed in earlier chapters will be deployed to investigate the post disaster responses in three different fishing settlements.

Case Study One: Kovalam Village – Kovalam Panchayat

5.1.Introduction to the case study area: geographical location

Kovalam village (also a *village panchayat*[8]), predominantly a Christian settlement, is one of the three case studies in this research. This village is located in the Agastheswaram Block or taluk[9] of Kanyakumari district. The district of Kanyakumari lies between $77^0 - 15'$ and $77^0 - 36'$ of the eastern longitude and $8^0 - 35'$ of the northern latitude. It is bordered by Kerala on the west and north west, and Thirunalveli to the north and the east, the Gulf of Mannar on the south eastern side, the Indian Ocean and the Arabian sea to the south and south west.

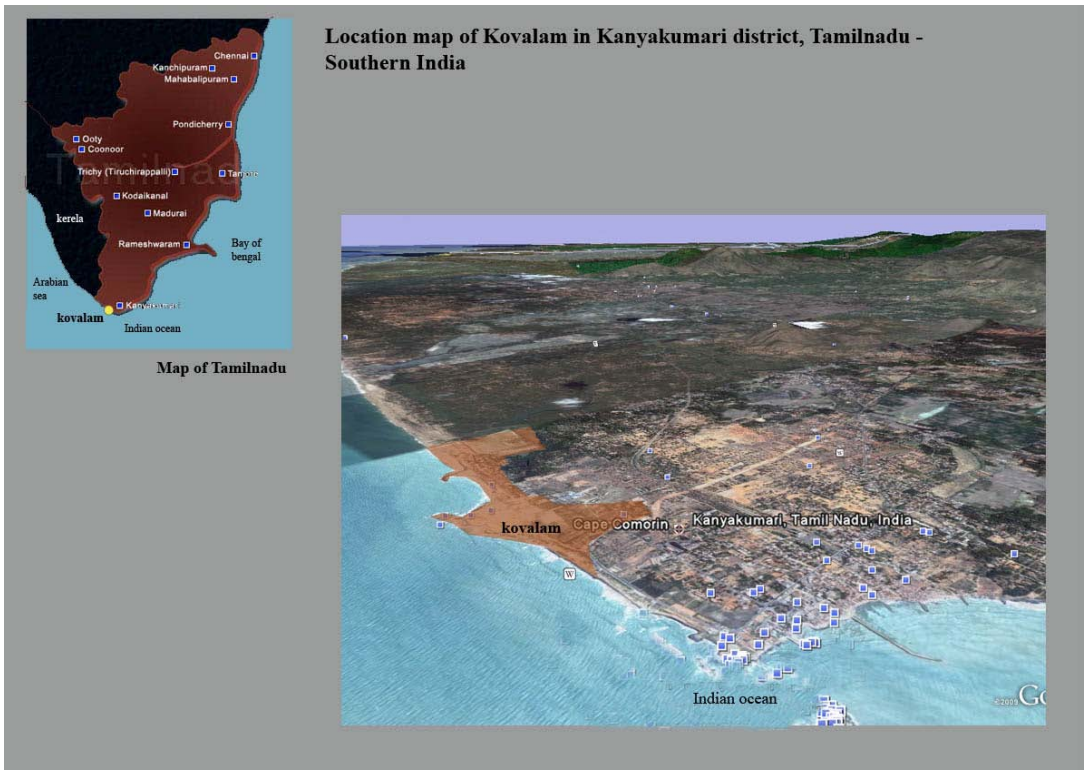


Figure.5.4 Showing the location of Kovalam village in Kanyakumari District.

[8] Village Panchayats are non state 'traditional' village councils with a set of 'Panchayat members'.

[9] Each district is sub divided into taluks or revenue divisions.

This district was a part of the princely state of Travancore during the pre-Independence period, and after Independence it remained as part of Travancore Cochin State until realignment on a linguistic basis was achieved. After the pronouncement of the States Reorganisation Act 1956, the newly formed district of Kanyakumari, comprising Agastheswaram, Thovalai, Kalkulam, and Vilavancode, the four southern taluks of Thiruvananthapuram, merged with the Tamil speaking then Madras State (Tamilnadu) on November 1st 1956. Therefore, it is important to understand the historical and political dynamics of this district and how they have influenced the evolution of the vernacular in the settlement of Kovalam.

5.2 Socio-economic and political profile of the village

Kovalam village is located approximately 4 km from Kanyakumari city centre. The whole settlement (including old and new housing) stretches for about 1.5 km along the (Lakshwadeep) sea coast. Historic reports and demographic records from the church authorities reveal that Kovalam comprises a mainly Roman Catholic community and fishing is their major occupation. Other than fishing, there are a few small shops, schools, and a church. Many youngsters from the village are now working as fishermen in the Gulf countries. For instance, in every three families we can find one or two persons will be working as fishermen in the Arabian Gulf. Women are also involved in alternative livelihoods such as tailoring and fish pickle making. A small number of villagers' rely on salt mining for their livelihood.

According to the census report after the 2004 tsunami (provided by the church), Kovalam is inhabited by 1124 Christian families comprising a population of 4492, living in approximately 1000 houses in total (out of which 385 houses are newly constructed houses in the recovery process). With regard to the administrative and political arrangements in the village, there are two kinds of panchayat systems. They include the church, which acts as a traditional panchayat and the normal village panchayat (at government level). Out of which, the church being the most powerful traditional panchayat (council) has formed six village development teams comprising 42 council members from the thirty neighbourhood communities living in the village. They cover different sectors of development as follows.

1. Public works department
2. Fisheries
3. Education
4. Human resource department
5. Health and hygiene
6. Religious (pastoral)

The village panchayat is responsible for overseeing development issues such as the water supply, electricity and sanitary arrangements and assistance to the government with regard to housing tenure for the fishermen's households.

5.3 Traditional fishing settlements: How this place works?

5.3.1 Assessing physical context of vernacular settlements in the usual development context

Kanyakumari fishing has unique features when compared with other parts of India such as Mumbai and Calcutta (KRRC 2006). It is distinguished by the kind of fishing vessels and patterns used for making a catch. *Catamarams* (wooden pegged boats) are a well known characteristic of the artisanal fishing in this area. In the post tsunami context many of the fishermen own motorised or mechanised fibre boats. As an occupation fishing includes boat and net owners, fishermen who go out to sea, K*oolies* or helpers who assist them in fishing and middlemen, who fix the price for the collected fish at the auction yard. Once the middlemen fix the price they try to sell and export the different varieties of fish to different places. Women play an important role in this kind of fish trading system. They buy fish from the auction yard and sell them in the village or in nearby town areas.

Figure 5.5 Women selling fish near by the auction yard

Figure 5.6 Middlemen fixing prices for the catch at auction yard

Almost 4 to 5 people per boat will go out to sea to fish; then the profit will be divided to 5 and half parts. One part is for the boat owner and second part is for the net owner, and the helpers will also share the remaining three parts and the remaining half part is for diesel expenses (from a fisherman's interview). It is important to understand and analyse how Kovalam as a traditional settlement has accommodated their cultural needs in the pre tsunami context and how such necessities were not sufficiently addressed in the post tsunami reconstruction process. Such morphological phenomenon can be studied by the application of the conceptual framework that was developed in earlier chapters.

5.4 Characteristics of fishing village in pre tsunami context

5.4.1 Public space network in fishing village: permeability

In Kovalam, public spaces may be categorized according to their use and in terms of their location and history (also refer to characteristics map).

A. Main village square in front of the church

The principal village centre of Kovalam is situated right in front of the main parish church and adjacent to the main road that passes from Kanyakumari connecting to Kerala. This village

centre is considered to be robust in nature, as it accommodates various purposes including shops, and mainly serves religious and political purposes. The main square accommodates the religious political and social practices of the fishing communities with the church acting as a traditional panchayat on one side and a marriage hall on the other.

B. Sunset point: tourist's landmark

Sunset point is an important landmark that attracts tourists, who come to visit the Kanyakumari temple, which is 2kms away from this point. This is considered to be the tip of southern India, where sunset is clearly visible. Therefore fishermen consider that this particular landmark defines the limits of Kovalam on the eastern side and the salt mines define it from the west. Fishermen, who reside at the eastern parts of Kovalam, usually dock their *catamarans* and spend their evening hours near Sunset Point, repairing nets, chatting with friends and watching the tourists. Thus Sunset Point acts as both a location for tourists and place of relaxation for the villagers.

Figure 5.7 View of the main village square in front of the historic parish church.

Figure 5.8 View of Sunset Point at Kovalam

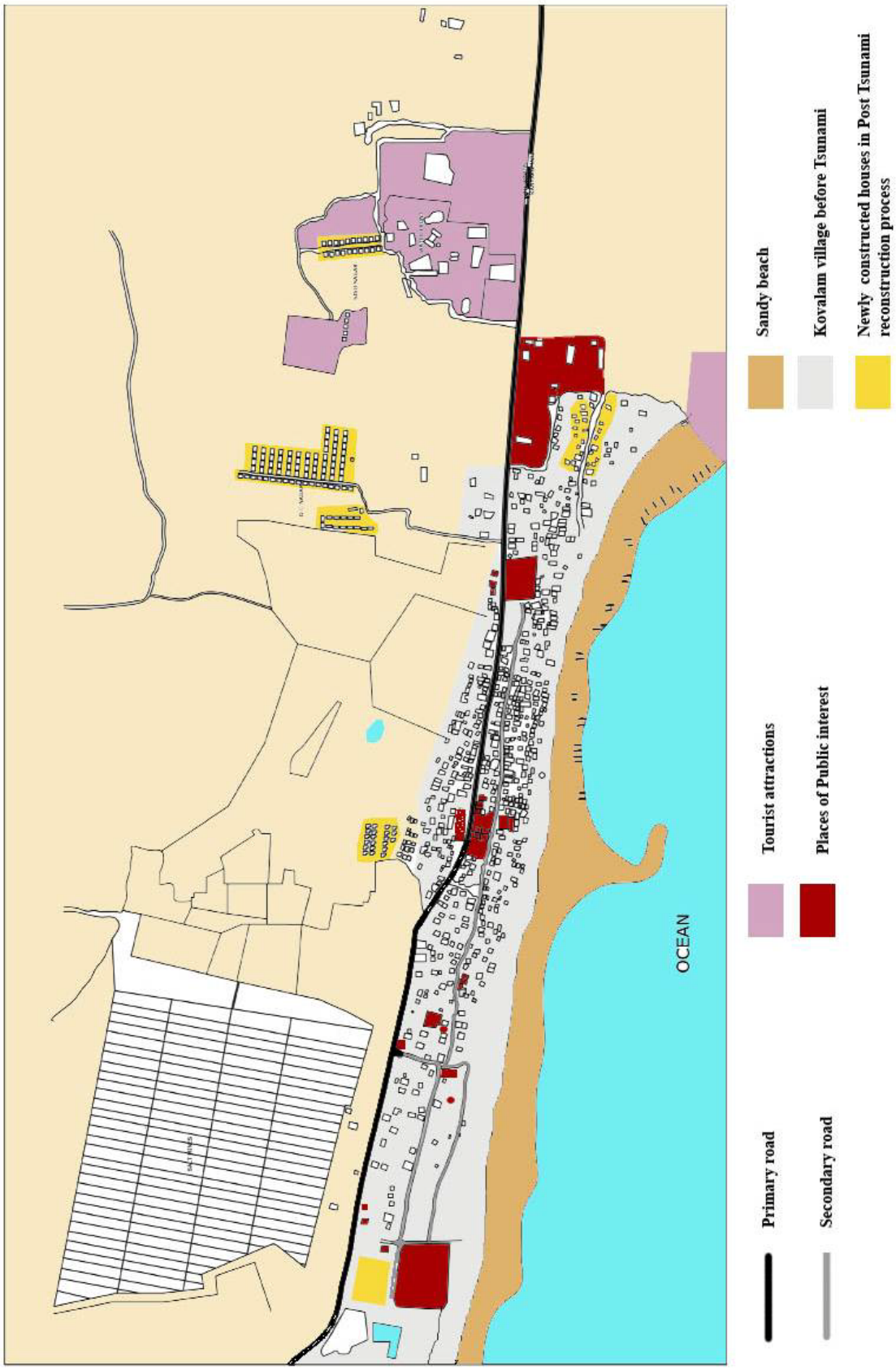
Figure 5.9 Fishermen repairing nets and interacting with their friends near Sunset Point.

C. Sea coast: places of interest for economic activity

The sea coast forms the most essential part of any fishing settlement. In Kovalam village, both agents (middlemen) and local fisherwomen come to buy fish from here. Various activities such as a fish auction, the collection and drying of fish, net maintenance, the docking of catamarans and fibre boats on the shore, repairing net gear, women buying fish and men relaxing under the shade of trees may be observed along the Kovalam sea coast. Fishermen organise their activities depending on their intuitive expectations of the timing and location of the catch (where and when they can get more fish). They mostly go out fishing in the early hours of the morning (approximately 4.30 am), but sometimes they go out to sea at midnight (1am) and sometimes at midday. During certain key periods, they even go out to sea more than once a day due to their close proximity to the sea. A typical day for a fisherwomen starts at the auction shed on the beach side, when their men come back from the sea with the day's catch. Women in the house prepare food for the time their husbands return to shore and they wait with the prepared food packs on the coast to feed their hungry husbands. In many indigenous fishing communities, this aspect of behaviour is considered to be a symbolic representation of love and affection in a relationship (identified from an interview with fishermen) (Pasupuleti 2008). Because the houses used to be located in close visual proximity to the seashore, it was possible for the women to identify their men returning home, and make their move to the shore with the food packs. Once their men return from the shore, the auction takes place under a circular concrete shed (see figure 5.10). Fisherwomen from local village and other nearby villages buy fish in the auction and sell it at the village centre or in the neighbouring villages or towns.

Figure 5.10 Fishermen making a combined effort to drag the nets from the sea.

Figure 5.11 View of the auction centre at the Sandy beach.



Characteristics map of Kovalam, Kanyakumatri district , Tamilnadu

D. Village Development Cell and school: places of institutional interest

The church's influence dates for over 450 years and started with the establishment of educational institutions and went on to further empower local communities in terms of other development issues. In Kovalam, during the early independence period, the person who owned a net was considered to be a leader of that particular community. In this context, the church encouraged democratic processes of leadership and other educational initiatives. The Village Development Cell (VDC) and the school provide education facilities for children and a source of alternative livelihood training for the youth in the village. As such the Village Development Cell is an administrative office that is recognised by the church and functions as an institutional and political body, which promotes education and deals with various development issues of the village in day to day life.

Street Typologies:

E. Primary Streets

The main street that passes through the village from Kanyakumari city centre towards Kerala can be classified as a Primary Street. It is laid with bitumen and tar materials. This road is mostly busy with vehicular traffic and the main bus stop is located in front of the church. In addition, intermediate bus stops are also provided at regular intervals on this road. This road connects the village to the nearby adjacent villages and the nearby towns and carries vehicular traffic. During festive occasions people celebrate on this road especially near the church square. Most of the buildings that line the street are well built and their social richness is represented by their spatial characteristics and their material composition.

Figure 5.13 View of Main Street passing through the village from the Kanyakumari city centre

Figure 5.14 People celebrating on Christmas Eve night in the main street.

F. **Secondary Street / Bishop's Street**

The main road is open for public access to both inhabitants and visitors. There is a secondary street, known as Bishop's street that maintains a sense of a semi-public character within the village. This street mostly serves the local needs of the villagers and carries less vehicular traffic and is predominantly pedestrian oriented. Both rich and poor quality housing may be observed on this street. The primary and secondary streets run in parallel directions but are connected via the village square and other intermediate squares. Other than these squares there are some intermediate narrow access ways that pass between buildings connecting the space between the primary and secondary streets.

Figure 5.15 View of secondary street/ Bishops Street

G. Narrow access ways

These are narrow walkways, which were laid in irregular patterns to cover short distances forming neighbourhood clusters (also see figure 5.16), connecting the secondary road and the seacoast in a perpendicular direction. Such narrow access ways are not wide enough for vehicular traffic and are mostly used by pedestrians who live in the associated clusters. These narrow access ways provide a sense of privacy within a family neighbourhood group. Such narrow paths and common interactive spaces have developed in patterns of growth that have emerged in a gradual process. It is notable that open canals pass along these narrow pathways, through which household liquid waste is directly disposed into the sea. Such an open drain system is unhygienic for the occupants living in these clusters and moreover in the pre tsunami context, such drain systems were the subject of many disputes within a neighbourhood.

Fig 5.16 (a & b) Narrow walk ways passing through the fishermen housing clusters connecting secondary roads and the sea coast in perpendicular directions.

5.4.2 Vernacular housing: plots and buildings

In the pre tsunami context, since pre modern times, the land of the whole village belonged to the church. It was responsible for the distribution and allocation of land for the villagers to construct their own houses. Such a process has contributed to the development of distinct housing typologies that vary according to the economic status of the household and the social structure. Family and kinship structures and other economic needs and wants of a household play an important role in defining the type and size of the house. As time went on, these plots and buildings were divided and further subdivided to accommodate the needs and wants of successive generations and their extended families, resulting in a congested living environment in Kovalam (Figure 5.17). For example, many households in Kovalam are comprised of joint families who share a common house. Such joint family arrangements allow families to share and support the difficulties of other extended families in day-to-day life.

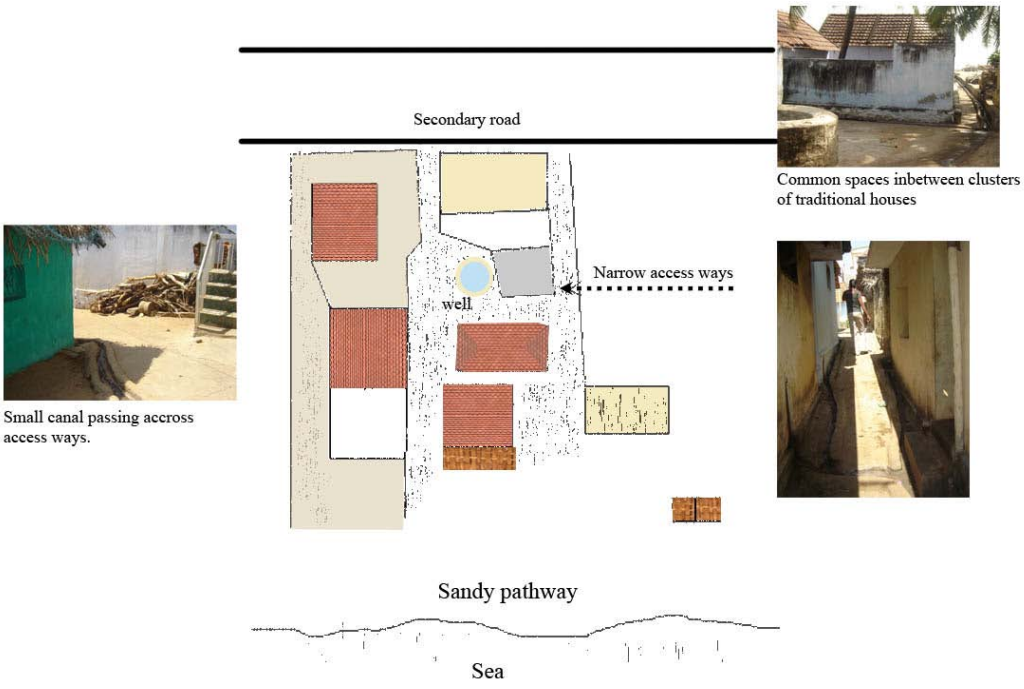


Figure 5.17 Showing arrangements of houses in traditional cluster at Kovalam.

The most common typologies found in the Kovalam village are as follows.

1. Single dwelling unit for one family. (figures 5.19Aand B)
2. Dwelling unit shared by the joint family members. (figures 5.18 A and B)
3. Large dwellings made into smaller individual units through partition.

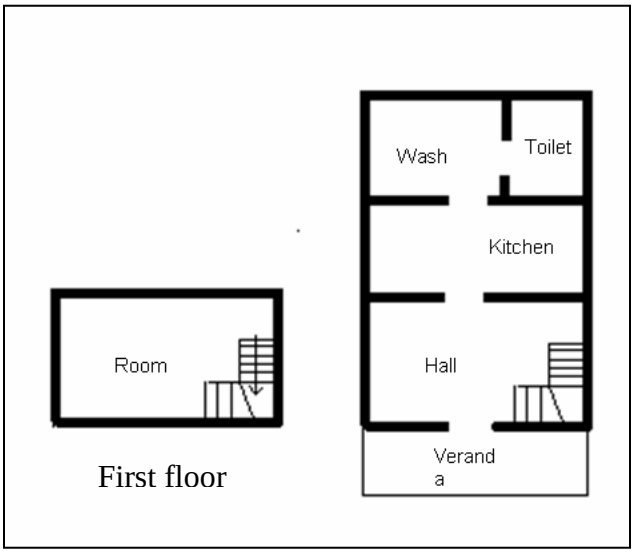


Figure 5.18A Plan of Duplex model House

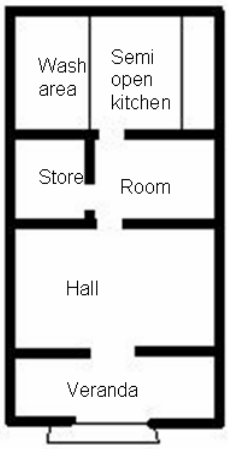


Figure 5.19A Plan of single family dwellings

Figure 5.18B Model House of a Joint Family house

Figure 5.19B -View of single family dwelling

These houses are introverted with the combination of open, semi-open verandas and closed spaces such as courtyards. Traditionally, a Mangalore tiled roof is used mostly in Kovalam and some of the buildings are constructed with a R.C.C. roof and others with thatch and asbestos. People in coastal areas mostly use wood and tiles as a roofing material, because it prevents corrosion from the through saline winds and keeps the inside of the house cooler. Walls are made up of brick and some are made up with mud. In many houses the flooring is made up of either the locally available *shabad* stone or cement flooring or with mud.

The veranda is the most important spatial element that acts as an interface between the semi-public or semi-private areas and the more private dwelling areas. This is a semi open space either covered with tiles or thatch in order to provide more shade for the residents to organise their fishing activities while socialising with neighbours and visitors. The kitchen and toilets are usually detached in traditional houses. The doors in the traditional settlement in Kovalam follow a particular style which is commonly observed in the adjacent state of Kerala. The doors are usually composed of two or four leafed doors. When a visitor comes to the house, women from inside the house open the top part of the door and talk to strangers or visitors to maintain their privacy (figure 5.20). Therefore such indigenous compositions of buildings have helped the fishing communities to construct their identities and accommodate their cultural needs in the long term.

Figure 5.20 View of typical traditional door used in Kovalam village.

5.5 Post tsunami reconstruction process

After the 2004 *tsunami*, according to government records, only 88 houses were damaged and no deaths in the village were recorded. In Kovalam, the church being the traditional panchayat took responsibility for the main development initiative during the tsunami reconstruction process. All the traditional panchayats in Kanyakumari district engaged experts and researchers from the rural development field, to identify the root causes for vulnerable situations. With a perspective towards the future, experts from various sectors developed a vision document (named Vision 2020) as a Comprehensive Development Plan for Kanyakumari District. This focused on spatial issues in the coastal villages that are directly or indirectly responsible for frequent disputes within the community, lack of infrastructure, and other necessary facilities. Drawing on the issues identified, the Church approached various support organisations to reconstruct the affected areas of the village in a more spacious manner in terms of better housing and infrastructure facilities. The following table sets out the statistics of occupied and unoccupied reconstructed houses which were constructed by the government and various NGO's.

Relocated neighbourhood name	**Houses reconstructed**	**Number occupied**	**Number unoccupied**
SISU nagar	55	41	14
D.c Nagar 1st phase	88	88	
D.c Nagar 2nd phase	80	45	35
K.S.S.S. nagar	42	42	
Praxis nagar	99	50	49
Rock Bible centre	21	21	
TOTAL	**385**	**287**	**98**
Total percentage		74.60%	25.40%

Table 5.2: Occupied dwellings in the relocated clusters Source: Village development cell, 2007.

View of newly constructed houses in SISU Nagar .

View of extended kitchen and toilet areas at the rear side of the house.

Layout of newly constructed housing in DC Nagar

Compund walls are constructed by the households.

Poor infrastructure facilities in DC Nagar 2nd Phase.

Figure 5.21 Showing the new layout in D.C Nagar.

During the relocation process, two different kinds of allocation processes were implemented in Kovalam village. First, the Government constructed 88 houses (as per damage records) at their own expense on government land, and allocated them using a lottery system. By running a lottery, none of the beneficiaries knew which house they were going to occupy, until the allotment chits were distributed. Throughout this process, they were not given an opportunity to express their individual household needs.

The church drew lessons from the first stage of reconstruction and started to extend the village, involving local communities in the reconstruction process. Following the church's initiatives, people invested in shares to buy land for the village expansion. Once the land was brought, the church approached various NGO's to support the reconstruction activities. When the NGO's came forward, each neighbourhood community organised meetings with their community members to discuss their aspirations regarding the house typologies and where they wanted to locate in pre sub-divided plots. When given an option, many families opted for brick and concrete structures, as they are more durable and also carry a symbol of an urbanised status. Besides all of these allocation processes, there are certain planning regulations and building standards that have guided the reconstruction process.

The CRZ (Coastal Regulation Zone) Notification was an attempt from both developed and developing countries to balance the need to inhabit coastal areas and the need to protect the coastal eco-system from haphazard development, so that the adverse impacts of environmental destruction on human beings are pre-empted. In India, the Coastal Regulations (1991) were amended 19 times (up to 2003) since they were enforced in order to control the physical development in coastal areas[10]. As per the notification, 500 metres on the landward side from the High Tide Line (HTL) and the land area between the Low Tide Line (LTL) and HTL including 500 metres along the tidal influenced water bodies subject to a minimum of 100 m on the width of the water body, whichever is less is declared as the CRZ area. In the pre-tsunami context, these regulatory frameworks, in practice, were rarely followed and were violated in many cases (Sharma 1997). In particular, illegal constructions were developed in the No Development Zones (NDZ) of CRZ-III (CRZ-III indicates developed or under developed rural areas) (Swaminathan 2005). In the recent CRZ (2005) amendments, areas of the CRZ –III are now permitting construction related activities in the region between 200 and 500 metres from the HTL, provided certain criteria are followed. Following this regulatory framework in the tsunami reconstruction process, and due to land acquisition issues, some of the fishing villages have been relocated between 200m and 500m with the majority over 500m away from the seashore depending on the specific zone within which an area falls, with varying restrictions depending on the nature and type of land-use permitted.

Relocation has physically expanded a congested village through the addition of new housing clusters following the CRZ notification (see characteristics map). In that process, some of the relocated clusters (D.C.Nagar phases 1 and 2, and Sisu Nagar) were built in safe locations, but are situated 1 km or even more (half an hour's walking distance), away from the sea shore and the old village centre. Such an expansion has complicated the access for local communities for their daily necessities. Prior to the tsunami, everything and everyone was considerably near and dear. This study has identified two kinds of responses from the relocated households to change in development. On the one hand households and individuals are adapting to the new situation, and

[10] Aarthi Sridhar (2005), A UNDP report: Statement on the CRZ Notification and Post-Tsunami Rehabilitation in Tamilnadu, made by Ashoka Trust for research in Ecology and the Environment, Bangalore.

on the other hand a few households are resisting it. Previously the resources required for people's cultural lives and livelihoods were rarely spread in geographical space. People developed close interactions with each other and become habituated to that geographic space over a period of time and they lived on it making their access to the resources for living. It not only offered a structure in functional terms but also created a structure of meaning to their life. Now in this relocation context, the expanded geographical space possesses a new character that has interrupted their access to resources in many ways. The following sections will explain in detail that how the issue of 'access to resources' is making the lives of fisher folk fishing vulnerable in term of their former cultural practices.

5.6 Assessing the physical context and cultural context of fishing communities after the tsunami

5.6.1 Analyzing qualitative data: responsive design qualities

From the characteristics map (figure 5.11), it can be demonstrated that the new housing was developed in a scattered manner and especially DC nagar and SISU nagar are physically located far away from the sea when compared to the location of the traditional housing.

A. Family kinship and gender

Semi structured interviews with local households in the relocated areas, reveal that family and kinship structures were largely ignored in the reconstruction process, which in turn is having an impact on social and economic networks. As explained previously, the location of the housing with regard to the sea has a practical and symbolic importance (Figure 5.23). After the tsunami reconstruction, the distance and the location of the new houses does not allow a feasible access for women to come and wait for their husbands, because as there is no direct view to the sea (to check if boats are returning or not) from the new locations as earlier. The Church has realised the

importance of the fishermen having food after returning from the sea, and Father Justus the head priest has made a proposal to build a canteen on the shore, which may be implemented in future.

Figure 5.22: Fishermen explaining the impacts on family kinship structures in the reconstruction process.

In addition the fishermen in this photo explains that

> Before the tsunami we use to live in closely knit joint families. Because of the relocation process after the tsunami, we are unable to express the same kind of love and affection especially towards the children of our extended families. Even though many fishermen are feeling that love and affection in the family are diminishing day by day, but with no choice, they are trying to adjust to the new fishing lifestyles.

Figure 5.23: Illustration showing that women use to wait for their husbands to return from the sea.

From the above case, it is clearly evident that family and kinship structures in fishing communities were not adequately addressed in the post tsunami reconstruction process.

B. Religion and belief systems

During the fieldwork, many households in Kovalam voiced concerns about how the distance to the Church had increased. In the pre tsunami context, the Church was easily accessible from their homes which were located at close proximity to the sea. People from nearby villages also come to the parish Church on festive occasions. For the fishermen, being a predominantly Christian

community, the church acted as an important converging node for all kinds of religious and political events.

Figure 5.24: A housewife living in old location explains how reconstruction has impact on the religious festive occasions.

A housewife living in the old location (her house is above 200m from sea level) reveals that

> Before the tsunami, at Christmas, our combined efforts lead to grand celebrations. Now our nuclear family situation has resulted in modest festivities. Christmas was a time of happiness for us, but now it is like mourning.

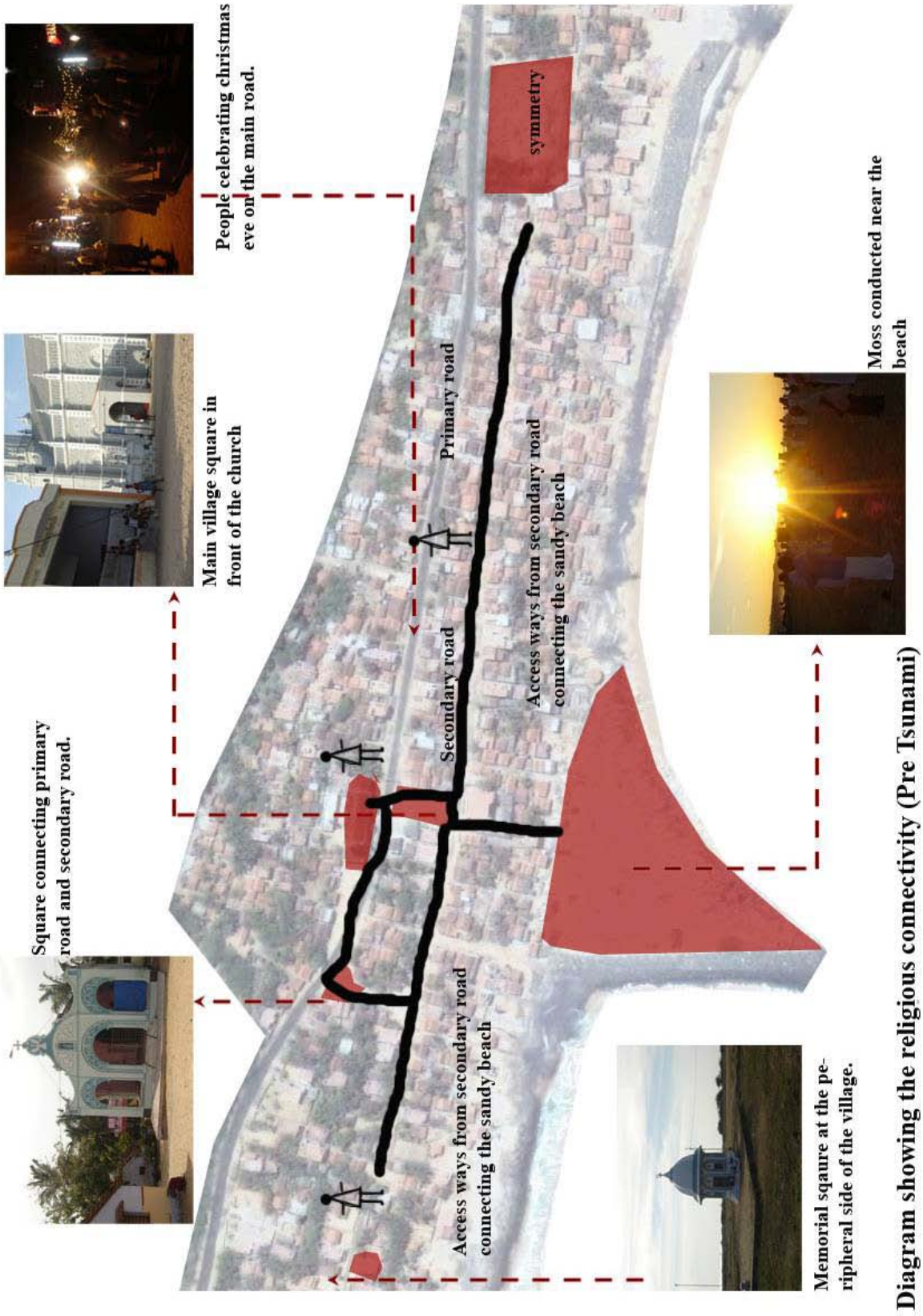


Diagram showing the religious connectivity (Pre Tsunami)

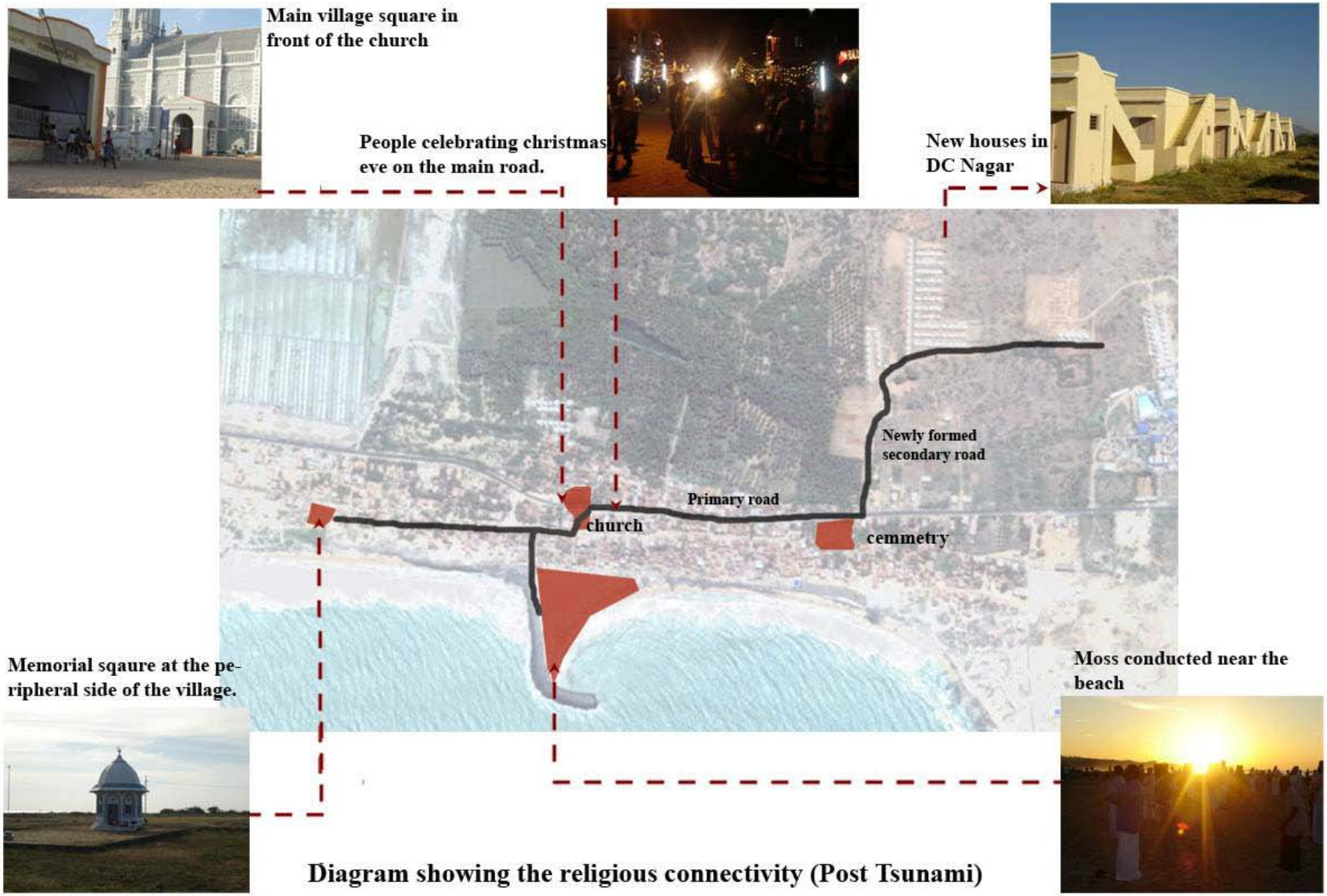


Diagram showing the religious connectivity (Post Tsunami)

Furthermore many joint families, who were split up during the relocation process are unable to feel the same kind of togetherness with their extended families. For instance, earlier they used to do joint shopping for their children and other family members, for which they worked out affordable budgets and took decisions in combination. In the post-tsunami, when they were split up, their savings were not adequate and the distance to the church and other extended families does not allow them to make such joint purchases. Under these circumstances, it is interesting to see that in the new location of DC nagar, people have started to celebrate Christmas on the streets in the same way as, they used to organise near the village centre. (Figure 5.27 and Figure 5.28)

Figure 5. 27: People celebrating Christmas in the old location.

Figure 5.28: People celebrating Christmas at the new location (D.C.Nagar)

C. Economic networks

The reconstruction process had a great impact on the livelihoods gained from fishing in Kovalam. Due to its close proximity to the sea, vernacular housing provided comfortable access to the sea coast and village centre. Under the immediate impact of tsunami and due to the enforcement of CRZ regulations and further depending on land acquisition issues, development agencies constructed new housing in different locations. Out of which, some of the relocated clusters such as DC nagar and SISU nagar are located far away from the sea, whereas KSS nagar and Praxis nagar are located adjacent to the old village. Such distance from DC and SISU nagar has created various changes in the livelihood networks, which has further influenced other dimensions that fishing relies upon. According to the fishermen's recent experiences, it now

takes more than 30 minutes to walk to the sea carrying their fishing utensils and gear. As the houses are not situated within visual proximity from the sea, the fishermen are unable to go to sea, more than once in a day. By contrast, in the pre tsunami context, depending on the fish catch they were able to go to sea more than twice and sometimes at night. As the distance restricts them from going to the sea more than once in a day, it has direct results in reducing the catch, which has a further impact on the overall fishing trade. With regard to the distance issue, some families have preferred to stay in the old location even though they have been allocated a new house at DC nagar.

In one case, a housewife states the reasons why they have come back to the old location. She says that,

> My husband had an operation recently, and it is very difficult for him to walk from a long distance to go to sea. We preferred not to relocate because he can go to sea at his convenience. At times he also goes to sea even during the middle of the night depending on the catch.

Figure 5.29: Housewife explaining her husband's health has made them to decide to stay back in the pre-tsunami location.

In another case, a young couple, who went to the new location during the reconstruction process, has now returned to the old location as it is convenient for earning their living. Once they started living in the old location they have noticed that

> We miss the company of our previous neighbours. Because our previous neighbours have already moved to the new location and this makes us feel lonely and bored.

Figure 5.30: A young couple returned to the old location as it is convenient for sustaining livelihood needs.

In another case, a fishermen family returned to go to the new location, as they feel that their present house is located right in front of sea and is more convenient for sustaining their way of life.

From the above discussion on economic networks after the tsunami, the respondents frequently complain about the time to get access to sea, which increases the vulnerability as regards their income, which in turn is responsible for various transformations in their lifestyle including social networks. People started modifying their new houses accordingly to suit their livelihood activities. They modified their built forms using local skills and materials. For example a shopkeeper has extended a shop in front of her new house that is built with thatch (Figure 5.31).

Figure 5.31. Families extended a shop in front of their new house.

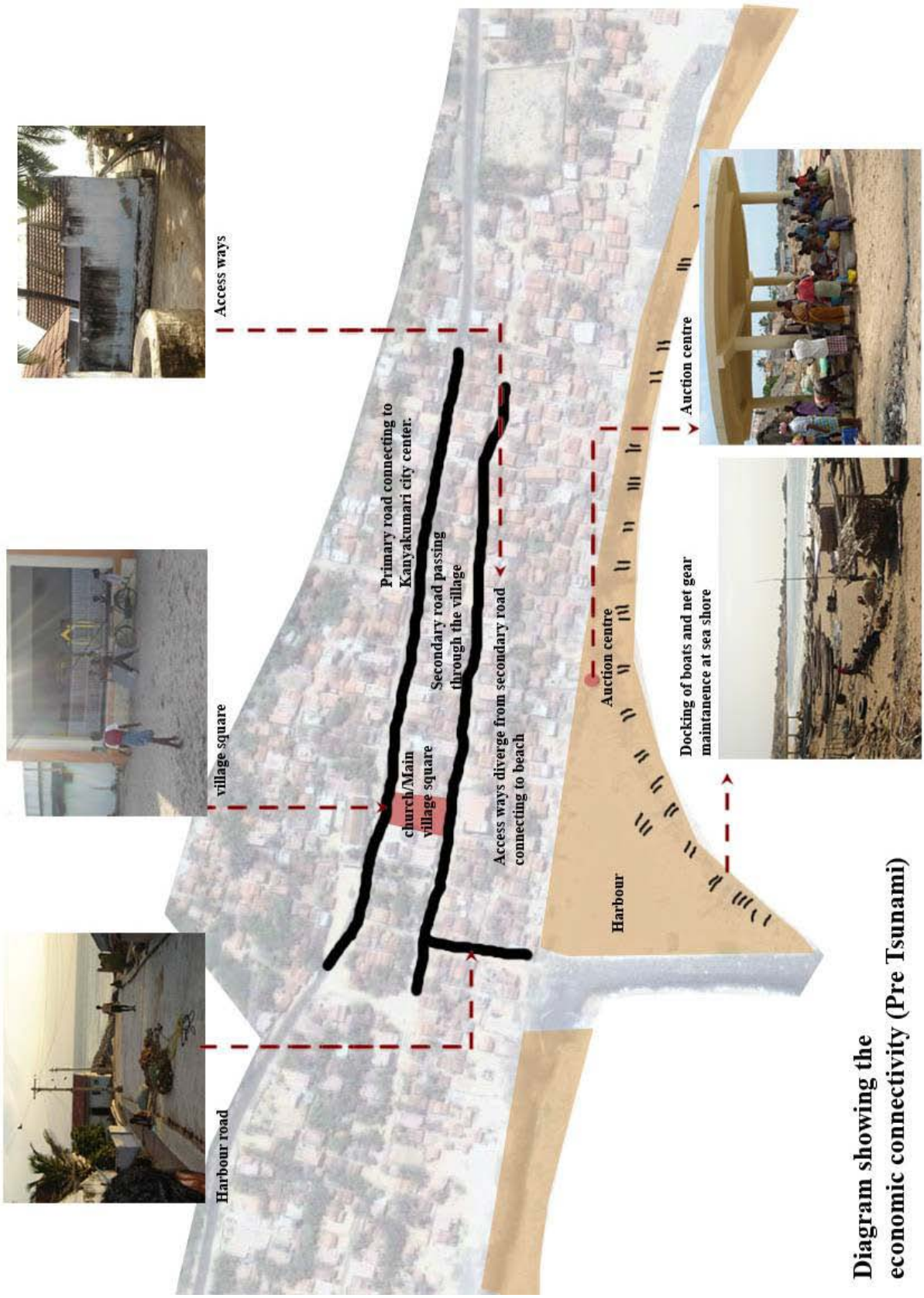


Diagram showing the economic connectivity (Pre Tsunami)

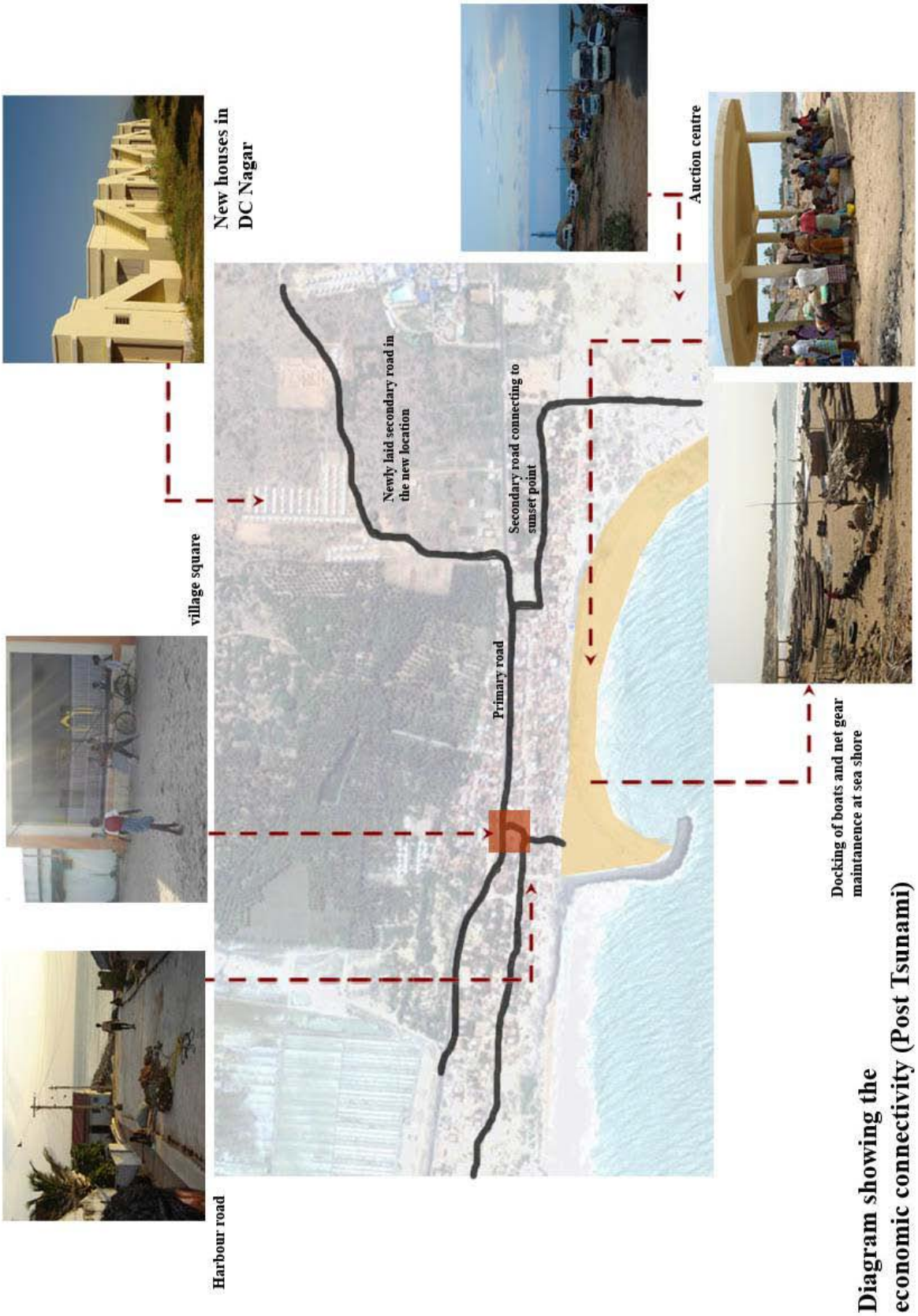


Diagram showing the economic connectivity (Post Tsunami)

D. Social networks

Social networks form an important aspect in any community life. Such networks help different families or groups of families living in a settlement to manage their resources for sustaining their continuity of their existence and belonging. In Kovalam the concept of social networks and neighbourhood interaction has been overlooked in the reconstruction process. The following cases validate this argument.

Primarily drawing on evidence from cases discussed in previous sections, family kinship and neighbourhood concepts were not properly addressed in the reconstruction process. Communities are facing difficulties as they are unable to live with their family members, extended families, close friends and neighbours. Some households are getting along with the new neighbours and some were finding it difficult to get along. A community leader from DC Nagar explains that

> In the pre tsunami context, we used to live very closely with our previous neighbours. We used to live with them like one family, sharing everything from curry to everyday family difficulties. We used to help each other in needy times and felt very safe living with them as close family members; whereas in the present context we are finding difficulties in adjusting with new neighbours as many of them consume alcohol in the residential area.

Figure 5.34 Community leader explains the difficulties in adjusting with her new neighbours.

It is fascinating to see a contradictory view on the same subject, from an interview with a housewife saying that

> It is so peaceful now living separately from the neighbours. Earlier there used to be many kinds of disputes in such a close living environment.

Figure 5.35 Housewife says that living separately has an advantage of resolving disputes in the village.

With regard to the different aspirations of the community, certain communities have different needs and desires for interacting with the other families. For instance two families in Praxis Nagar have discussed having a common compound wall for a group of 30 families living in that location in order to represent their belonging and to create a sense of unity.

Figure 5.36: Women expressing their interest to have a common compound wall for their group.

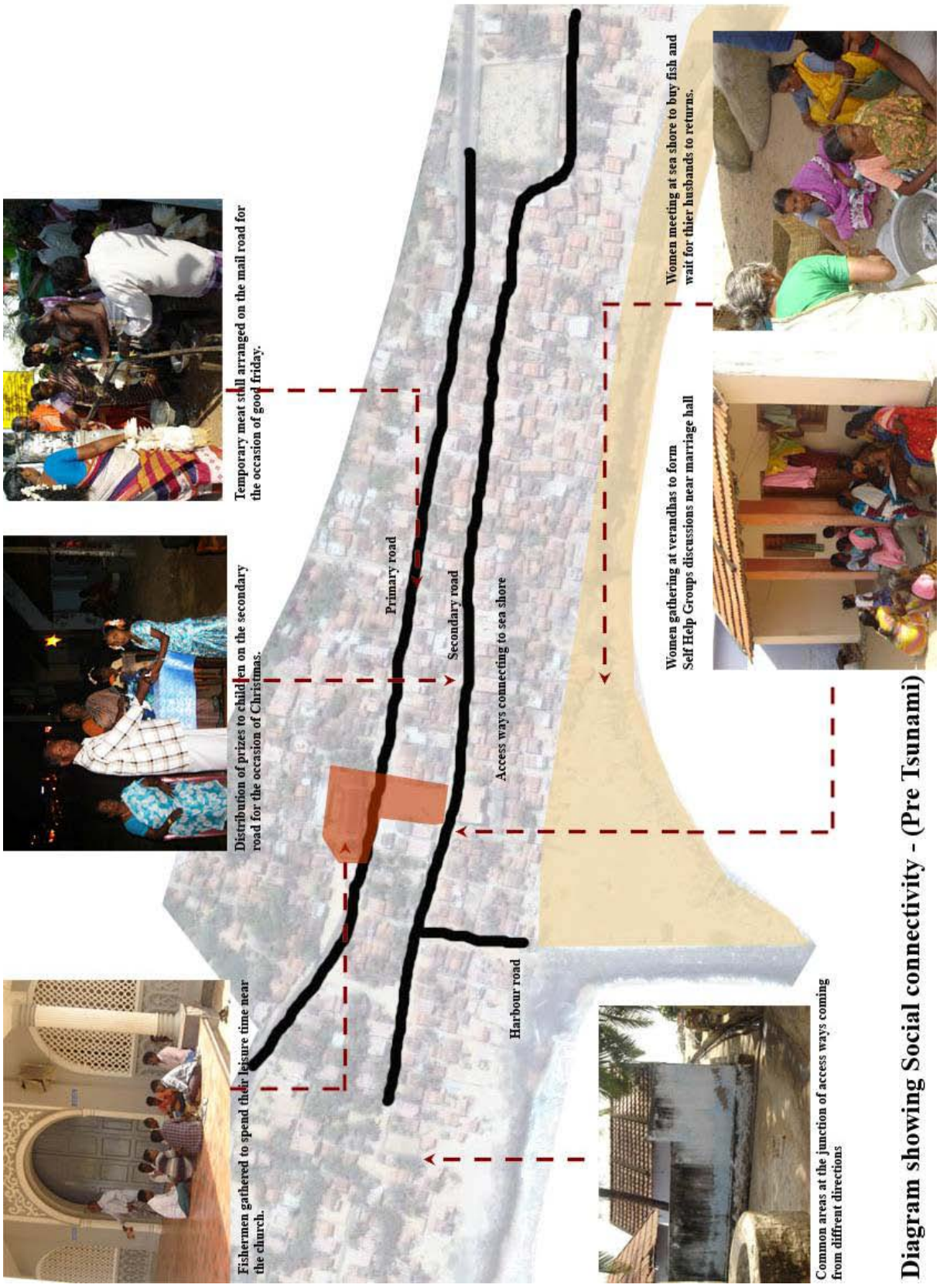


Diagram showing Social connectivity - (Pre Tsunami)
Temporary meat still arranged on the mail road for the occasion of good friday.
Distribution of prizes to children on the secondary road for the occasion of Christmas.
Fishermen gathered to spend their leisure time near the church.
Primary road
Secondary road
Access ways connecting to sea shore
Harbour road
Women meeting at sea shore to buy fish and wait for thier husbands to returns.
Women gathering at verandhas to form Self Help Groups discussions near marriage hall
Common areas at the junction of access ways coming from diffrent directions

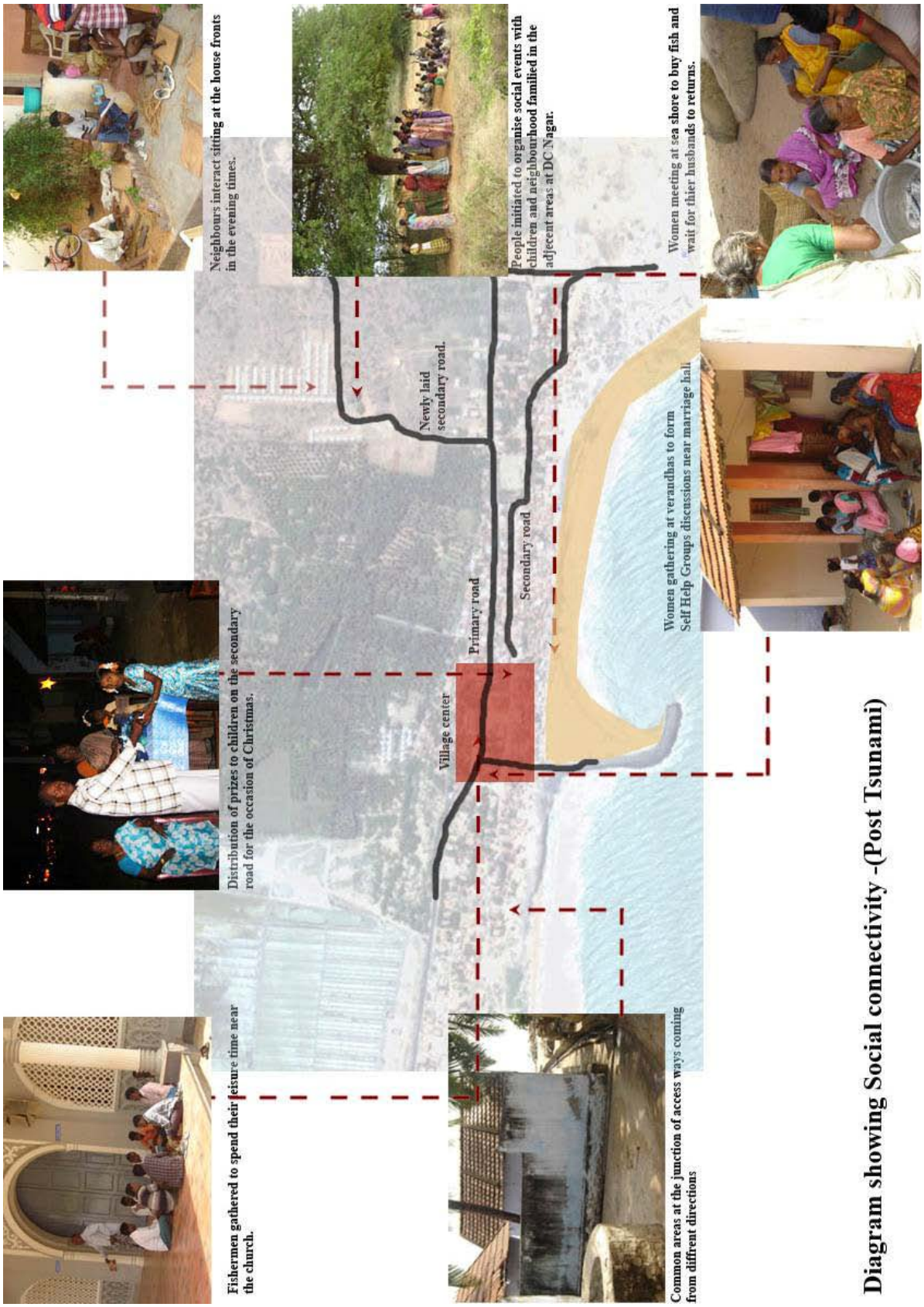


Diagram showing Social connectivity -(Post Tsunami)

Moreover, as the new layout does not allow any kind of public spaces for neighbourhood interaction, the church is presently encouraging people to organise some interactive sessions in the adjacent open spaces (figure 5.39).

Figure 5.39: Women organising children's parliament play at the adjacent areas.

E. Political and institutional networks

Kovalam being the head panchayat of the 6 villages in the Agastheswaram block, the Parish church is the main political and institutional body that looks after the welfare of the Christian communities living in the village. The newly constructed housing clusters such as DC Nagar and SISU Nagar are located far away from the church and village centre, but are at the same time located close to the school. Therefore, children from DC Nagar and SISU Nagar can easily access the school. For any political gatherings, which are usually conducted in the church or at the village development centre, people have to walk long distances from the clusters of DC Nagar and SISU Nagar. The tsunami reconstruction process has encouraged democratic

processes among the rural households, as many normal people were given the opportunity to lead their communities in the reconstruction process.

5.7 Legibility analysis

During the fieldwork, mental maps were collected from various respondents living in both old parts of the village and the relocated areas. All the mental maps were enclosed as an annexure-2 towards the end of this report. All such legible images of fishing communities in Kovalam are categorized into landmarks, edges, nodes, paths and districts following Lynch's (1965) idea. The following is the master mental map (see figure 5.40) that was developed by analysing all the mental maps collected during the fieldwork by using lynch's idea on mental maps. This master mental map shows that places of repetitive events at the old village are still legible in the minds of people, though they were relocated to different clusters. Places marked in the mental maps were remembered by the respondents either by the occurrence of event or by the name of prominent person or place they are connected in their daily life. Nevertheless it is important to identify that people have noted the places in the newly relocated housing clusters such as D.C Nagar or SISU Nagar, which shows that they are becoming familiar with the extended parts of the village. It might be because their extended families or friends moved there and still they are connected with them for daily livelihood and social necessities. Most of the respondents have marked the Main church centre, as it is one of the important places of interaction for the Kovalam village people to interact either for religious or institutional purposes.

SETTLEMENT MAP OF KOVALAM, KANAYKUMARI DIST., TAMIL NADU.
LEGEND
LANDMARK
EDGE
DISTRICT
NODE
PATH

5.8 Summary

This Kovalam case has looked at the post disaster reconstruction responses in a great detail and assessed the sequence of processes, decisions and their deciding factors. It has shown how existing basic cultural realities ultimately shape the transition in traditional settlements. Various development issues regarding external and internal responses have also been brought forward. More importantly, it has demonstrated various converging and diverging responses of local communities and the development efforts. By considering all such development responses identified in Kovalam case study, the analysis of concerned impact situations and the reasons for such responses will be discussed in chapter eight by comparing with the other two case studies.

Case Study -2: Tharangambadi

6.1 Introduction to the case study area

6.1.1 Location and geographical context

Tharangambadi (or Tranquebar) is a panchayat town in Nagapattinam district in the Tamilnadu. Historians such as Nagaswamy (1987 p1) provide the earliest reference to Tharangambadi which occurs in a 14th century inscription, mentioning the place as '*Sadanganpadi*', centre for a merchants guild known as *Pathinen Visha ayattar* (traders of 18 countries) and also a residence of a family of sailors called *Karaiar*. It is situated 15kms south of the celebrated ancient port of *Kaveripoompattinam,* (Pumpuhar) on the Coromandel Coast and is located near the mouth of a tributary of Cauveri river, on the southern side of the *Uppanaru* river. It borders the suburbs of the former ancient French quarter of Karaikal. Being located right on the seafront, the land is highly saline and unsuitable for agriculture. The main occupation of the town is fishering. The town has depended since early times for its survival upon the land and the sea. The sea provided trade, fishing, and salt and the land, food and shelter. Thus it has been an importance source of livelihood and sustenance. The recent literature on Tharangambadi, points out that it is composed of three different characters in separate quarters of the village. These are the Colonial, Pre-colonial and the fishermen's village. This research focuses on the fishing village of Tharngambadi, which was majorly affected in the recent tsunami in a major way.

6.1.2 Historical context

The history of the village can be traced back to the beginning of the Christian era. The Muslims arrived at Tharangambadi in the 14th century to trade with the local people. They came from the northern areas, which were under the Mughals. There were two types of Muslim traders: Marakalaiyars and Rauthars. The Marakaliyars used to come by boat and *Kattumarams* and the Rauthars came on horseback.

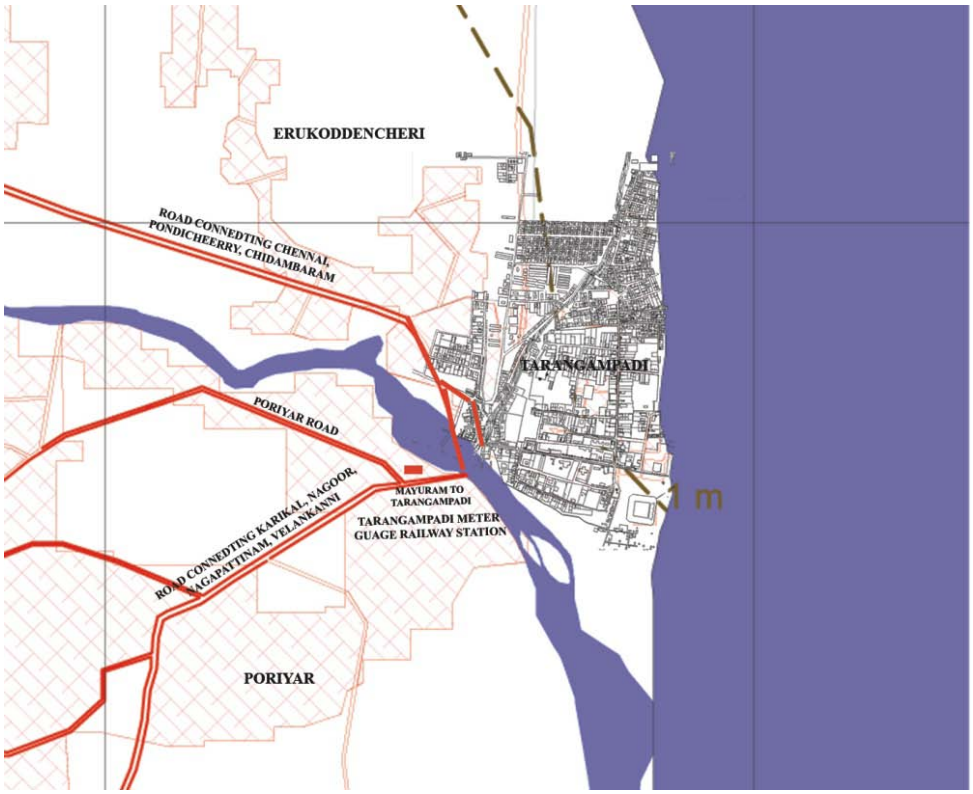


Figure 6.1: Location and Connectivity map of Tharangambadi Source: (CEPT 2008).

Later when the Danes arrived around 1620, there were already five Hindu temples, one Muslim religious edifice and a church propagating the Christian faith. The most ancient monument called *Masilamaninatha* temple (temple of lord Siva that was destroyed in the recent tsunami – See Figure 5.2) is situated on the sea-shore.

Figure 6.2 Damaged Ancient Masilamaninatha temple located in front of the sea shore.

According to the CEPT (2008) report, there are 113 Muslim families living in the pre-colonial part of Tharangambadi. About 30 Muslim families based in the Goldsmiths' Street of Tharangambadi left the village in the late seventies and settled in other places, after the passing of the Gold Control Act during the Janata government of Shri Morarji Desai. Ziengenbalg, started many institutions that are still contributing towards the development of Tharangambadi. The missionaries who visited Tharangambadi, both Protestants as well as Catholics have set up institutions such as schools, teacher training institutes and an orphanage.

Figure 6.3: View of Danish fort in Tharangambadi

Figure 6.4: View of colonial Entrance in Tharangambadi

6.1.3 Socio-economic profile

Tharangambadi is inhabited by 1725 households, including the populations of Velli Palayam. Pudu Palayam, Kesavan Palayam and Karan Street - hamlets inhabited predominantly by scheduled castes and located on the periphery of the town. The village population of 6991 people includes more men than women with a sex ratio of 971 women to 1000 men (Praxis 2006). Fishermen constitute the majority of the population, with 1112 households of Pattinavar's and 208 Scheduled castes (referred to a particular social group) inhabiting the fishing village. In the recent 2004 Tsunami, 266 houses were partially damaged and 904 houses fully destroyed and 304 lives were lost according to data from the panchayat.

6.2 Traditional settlements: how does this place work?

6.2.1 Assessing the physical context of vernacular settlements in the development context

Different land uses in Tharangambadi have created several distinguishable layers, built of elements that exist side by side with each other. There are separate districts or elements that make up the entire town. These distinctions can be made through a visual analysis and generally, on the basis of physical or architectural qualities. Today one can observe the following distinguishable clusters (*refer Figure 6.9. characteristic map below*).

1. Colonial housing
2. Pre colonial housing
3. Fishermen's colony (Before Tsunami)
4. Newly relocated Fishermen's housing (SIFFS housing after tsunami)
5. Outer peripheral development.

In the pre tsunami context, there were many development issues within Tharangambadi. The following section describes the pre disaster development activities undertaken by various agencies in their respective clusters.

A. Colonial Housing

A group of Colonial houses are located on Kings Street after crossing the town gateway (See Figure 6.4). Most of these colonial structures are now used as institutional buildings, for either educational or religious purposes. The colonial district is dominated with indo-Danish social remnants and a smaller number of residences in the area (CEPT 2008). The King's Way (street) ends at the historic Dansborg fort that is located in front of the beach. It is one of the most significant landmarks in Tharangambadi, which acts as a tourist attraction and as an interactive public space between the local village folk and tourists. Even today, a 'Tranquebar Association' is run by a group of Danish people residing in Denmark. Their main interest is in restoring the glories and beauty of the old village near the fort. Most of the conservation led development

activities are undertaken by Danish and German initiatives in the colonial part of Tharangambadi, to promote tourism and to protect the historical built heritage.

Figure 6.5: View of Jerusalem Church

Figure 6.6: View of Beach Bungalow that was renovated as a hotel for the tourists.

B. Pre-colonial housing

These houses are generally seen as being comparatively less elegant and rich in terms of their aesthetic qualities to that of Colonial housing. This area is completely residential and is predominantly occupied by Muslims. Therefore a *Madrasa* (religious mosque) is located in this neighborhood and also acts as traditional panchayat (council) representing the Muslim communities living in Tharangambadi. The street fronts in this neighborhood are predominantly made up with Tamilian houses, which have verandas and semi-open raised platforms on the street fronts and inner courtyards inside the house. Most of the pre-colonial houses are in a very poor state (see figure 6.7) and the houses that are in a good state (see figure 6.8) have been conserved by INTACH. However, the houses that are conserved by INTACH, are mostly used today as guest houses and offices. It is also western tourism initiatives that lead to the conservation of the built heritage of pre-colonial houses. It is important to note how this kind of conservation led development initiative has imposed three kinds of options on the occupants.

1. They will be offered a significant amount of money to handover or sell the whole house to INTACH, so that they can carry on with the conservation of the whole building and convert it to an office or guesthouse.

2. If the occupant doesn't want to relocate, then the front portion of the building can be sold or handed over to INTACH and the occupants can use the back portion of the building. That gives INTACH an option to conserve the street fronts.
3. If the occupant either doesn't want to relocate partly or completely, then INTACH will only conserve the front façade of the building itself.

In the further sections, it will be argued that such conservation led initiatives interfere with the overall existence and continuity of traditional settlements.

Figure 6.7: View of Tamilian house in a poor state of disrepair.

Figure 6.8: View of Interior courtyard of house in Goldsmith lane that was renovated as a guest room and office.

Figure 6.9: Map showing various characteristics built forms of Tharangambadi (Developed from Base map provided by SIFFS (2008)

6.2.2 An overview of the fishing village

Tharangambadi has as many as 1670 active fishermen, registered as members of the local cooperative society of fishermen. The traditional panchayat for the fishermen of Tarangambadi is the head panchayat for the 24 fishering panchayats of the northern part of Nagapattinam district. Given its advantageous location at the junction of the Chennai- Nagapattinam highway, the Bay of Bengal and the suburbs of Karaikal - (a township of Pondicherry State), it is also an important marketplace for auction, sale and purchase of fish.

The fishing village has existed from pre historic times. This settlement is located in a low lying area and due to the close proximity of the sea the fishing communities have developed various vernacular housing typologies to suit their daily needs and climatic conditions. Most of the houses are small in size and are generally made of walls or brick walls covered with either thatch or country (locally made) tiles. For many good reasons such as affordability, convenience, availability and lack of any alternatives, people tend to live in those areas even though they are prone to different natural hazards such as cyclones and heavy rains. In the case of the fishing communities there is an added economic necessity for them to live near the sea, as much of their livelihood depends on it. In addition to these vulnerabilities to natural hazards, there are also many existing development issues relating to the lives and livelihoods of fishing communities such as access to essential infrastructure and other facilities such as water supply, electricity, roads, markets, stable economic prices and declining stocks that are still evident even after the tsunami reconstruction process.

Figure 6.10: View of Tamilian house in the fishing village.

Figure 6.11: Village women standing in a queue to collect water at the municipal tap.

In order to resolve such development issues, the State government of Tamilnadu and fishermen's federations has taken initiatives such as providing shelters, a boatyard, water supply and other necessary facilities for the fishing communities living in the village. In the present location of the Meenavar colony, the government provided alternative shelter for the fishermen's communities that had been damaged in the recent 2004 tsunami (refer to figure 6.12).

In order to understand how this fishing village as a physical space is constructed to sustain the traditional practices and belief systems of fishing communities in the usual (pre tsunami) development context and how it gets transformed in the post disaster context, the conceptual framework that was developed in earlier chapters will be applied in the following section.

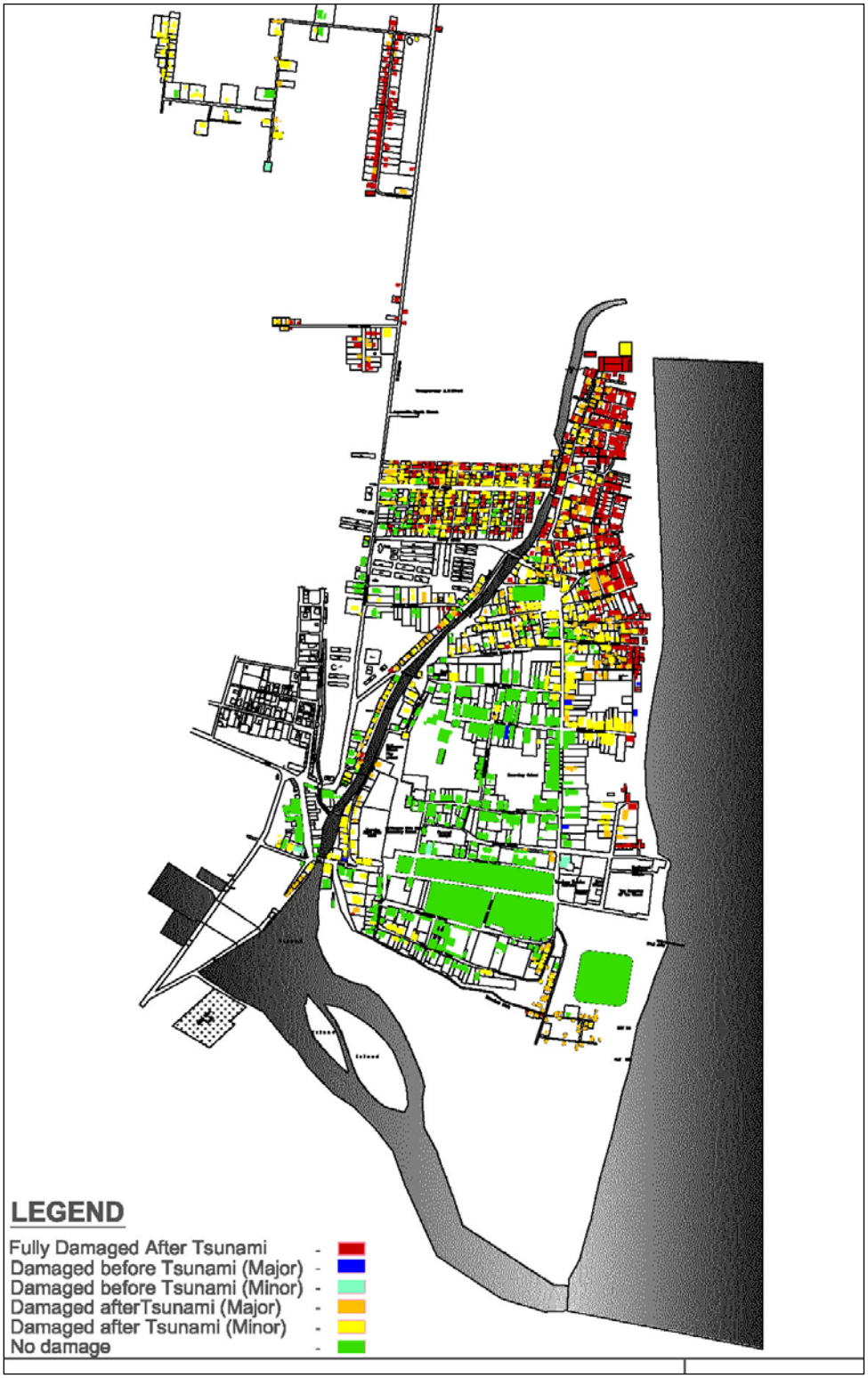


Figure 6.12 Showing the extent of damage before and after the Tsunami in Tharangambadi. Source: developed by SIFFS (2005).

6.3 Application of the conceptual framework to analyse morphological character of traditional settlements in post disaster response situation

6.3.1 Assessing the physical context of traditional settlements

Public space network in fishing village: how permeable

In Tharangambadi, public spaces are categorised according to their use and in terms of their location and historical associations (also refer to land use map Figure 6.9).

A. Main town centre at the entrance

The town centre is situated very much at the entrance of the Tharangambadi. From the town centre, two roads branch off into the village making their different entries to the colonial, pre colonial neighbourhoods and the fishing village respectively **(**see figure 6.9). The town centre is situated right next to the ECR Highway and bus stops, auto and taxi stands are located there in order to provide convenient transportation for the local residents and visitors. The town centre consists of few commercial shops, such as general stores, a bakery, an internet cafe, small hotels, STD booths and other temporary shops selling vegetables, fish, and other miscellaneous items on the street (See figure 6.13and figure 6.14). This town centre acts as both converging and diverging point that facilitates economic and institutional necessities mainly for the fishing folk. The fishermen's wives come here to sell their fish and to buy other necessary daily household items.

Figure 6.13: View of Bus stop at city centre.

Figure 6.14: View of temporary shops

B. Places of religious interest: Renukadevi Temple

Even though two other temples (the Masilamaninatha temple that was damaged in tsunami and another temple that was damaged even before tsunami) are located near the colonial and pre-colonial parts of Tharangambadi, the temple that is important for the fishing communities is the Renukadevi temple (see figure 6.15). The fisher folk celebrate a number of festivals such as *Olugal mangalam Mariamman Kovil* (during March or April), *Kanni* (during February) and *Renugadevi Amman Kovil* that are unique to fishing communities in this region. This particular temple is important for fisher folk, because it was built by themselves (they pooled 45 lakhs rupees to build it) and a grand ritual called *Kumbhabhisekham* is performed every two years. In front of the Renukadevi temple, a big square has been formed at the intersection of various streets coming from different directions (See figure 6.9). Queens Street which comes from the Dansborg fort neighbourhood passes through the pre-colonial housing simultaneously connecting the schools on Kings Way and terminates in front of the Renukadevi temple. The fishing harbour is located just a few hundred yards away from this square. At the rear side of the temple area, the Buckingham Canal (See figure 6.16) passes along the length of the village, which physically segregates the main active part of the old settlement and the Meenavar colony area. Small pedestrian bridges are constructed with bricks to connect the old fishing village (before canal) and Meenavar colony (after canal). The piazza in front of the temple acts as the location for the village panchayat meetings, religious celebrations, and other economic and socio-cultural

activities that take place in the village. It also acts as connecting nodal point for various streets that accommodate the different groups of communities in Tharangambadi.

Figure 6.15. (left) view of Renugadevi temple.

Figure 6.16. (right) view of Buckingham canal

C. Places significant for livelihood

Seacoast: The seacoast forms most essential part of any fishing settlement. Because Tharangambadi is the largest fishing village, both agents (middlemen) and local fisherwomen come from nearby fishing villages to buy fish. Various activities such as a fish auction, the collection and drying of fish, net maintenance, the docking of catamarans and fibre boats on the shore, the repair of net gear, women buying fish, men relaxing under the shade from the tree may be observed along the Tharngambadi seacoast. In the pre-tsunami the fishermen followed the same schedule for fishing as the fishermen in Kovalam.

Figure 6.17 Fishermen resting under the shade of trees

Figure 6.18 Women drying the fish

As discussed in Kovalam case study, when the fishermen return from the shore, an auction takes place on a large concrete platform shed covered with asbestos. Adjacent to it is large open platform to cut and dry fish. Fisherwomen from the local village and other nearby villages buy fish in the auction and then sell their stock at the town centre or in the neighbouring villages or towns.

Figure 6.19. Women buying fish in the auction yard at Tharngambadi

Ice factory

The collected fish is usually then taken to ice factory which is located on one of the bifurcated main roads passing through the fishing village. Ice produced in this factory is used for preserving the fish, which is then packed and exported both nationally and internationally. In the current context, most of the fishermen use motorcycles to bring ice to the seashore and people who can't afford motorcycles will go by foot.

Institutional buildings

As mentioned in the earlier section (6.3.1 A), educational buildings such as schools and other institutions are located along the King's Way. Before the tsunami villagers used to access Queen's Street starting from Renukadevi Square and heading towards the King's Way via the pre colonial part of Tharangambadi. These street connections helped in creating and developing social networks between different groups within village. Other than the educational buildings on the King's Way, there is, a government hospital, and other public buildings on the road to the ice factory. People from the traditional part of the fishing village use the narrow bridges that were built across Buckingham canal to gain access to the Meenavar colony, hospital and other public buildings on the Kamrajar road, which connects the town centre and other surrounding villages.

6.3.2 Street network and connectivity

Streets comprise an important physical spatial element connecting different communities living in a particular village or town. In Tharangambadi, the streets can be categorised by their connectivity and built form composition. They are as follows:

1. Primary Streets
2. Secondary streets
3. Access ways to seacoast
4. Sandy Paths along the seacoast

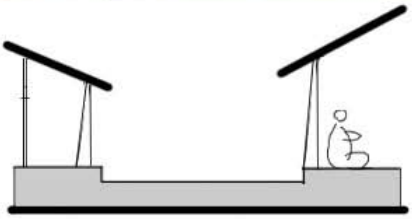
A. Primary streets

The streets, which branch off from the town centre, can be categorised as primary streets. In a literal sense, there are three main streets coming from two distinct neighbourhoods (colonial and fishing) of the village, which join at town centre. From which, one street takes a path through the colonial neighbourhood (King's Way) and the Kamrajar road leads to the fishing settlement and the neighbouring villages. The third street is Vellipalayam street, which also branches off from the town centre and extends a little further and ends in the direction of the post tsunami relocated SIFFS housing.

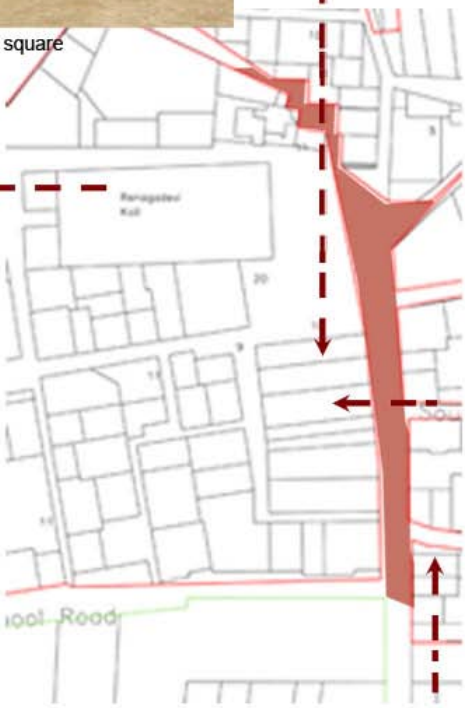
B. Secondary streets

The streets that branch off from the primary streets, and lead to the residential districts of the settlement can be considered as secondary streets. For instance, Queen's Street branch off from the King's Way and joins Renukadevi Square in the fishing neighbourhood. Similarly there are other streets that branches off from the Kamrajar Road and connect to Renukadevi temple Square or other parts of the fishing residential clusters.

Renukadevi temple square



wide street composed of semi open verandas on either side.



Traditional verandas with seating acts as a interactive space to the visitors and maintain privacy.

ANALYSIS OF SECONDARY STREETS - QUEEN'S STREET

C. Access ways to seacoast

These are narrow access ways that branch off from the secondary streets or from Renukadevi temple square and lead to the seacoast. For instance, Aryanattu street and Middle Aryanattu Street branch off from Queens street at Renukadevi Square to the seacoast. These streets are usually less than 4m in width and are mostly lined with residential buildings.

ANALYSIS OF ACCESS WAYS TO SEA COAST

D. Sandy paths along the seacoast

This is a typical spatial element observed in the fishing settlements of Tamilnadu. As the boats are docked on the beach, the sandy paths along the seacoast become most significant with different kinds of activities including drying fish, auctions, children playing on the beach, seashell collectors and tourist visitors. The eastern coast of Tamilnadu undergoes continuous coastal erosion from the sea waves. In order to prevent this coastal erosion, much of the sandy path in Tharangambadi is covered with huge rock boulders, which were constructed after the tsunami. Due to a lack of such precautionary measures before the tsunami, many fishing lives were lost and huge destruction occurred during the recent tsunami. The whole fishing settlement was frequently prone to natural hazards, as it is located in a low-lying area.

Figure 6.22 Sandy path passing along the seacoast with one side house fronts and edges facing towards sea and other side a protective barrier build with rock boulders.

6.4 Public space network: responsive design qualities

The following description of the public space network and the linkage structures of public space and infrastructure raise a broad spectrum of urban design issues. The key issues centre on permeability and linkages, legibility and orientation, and resource efficiency and resilience.

The discussion on public spaces above described landmarks such as town centre, Renukadevi temple square, the seacoast; and streets including primary streets such as Kamrajar Street, Vellapalayam Street; and secondary streets such as Queens Street, access ways to the seacoast and sandy paths along the seacoast. It can be seen that the sequence of these public spaces flows from more public to more private spaces. The following diagram demonstrates how the arrangement of public spaces in pre tsunami context is organised in a hierarchical manner.

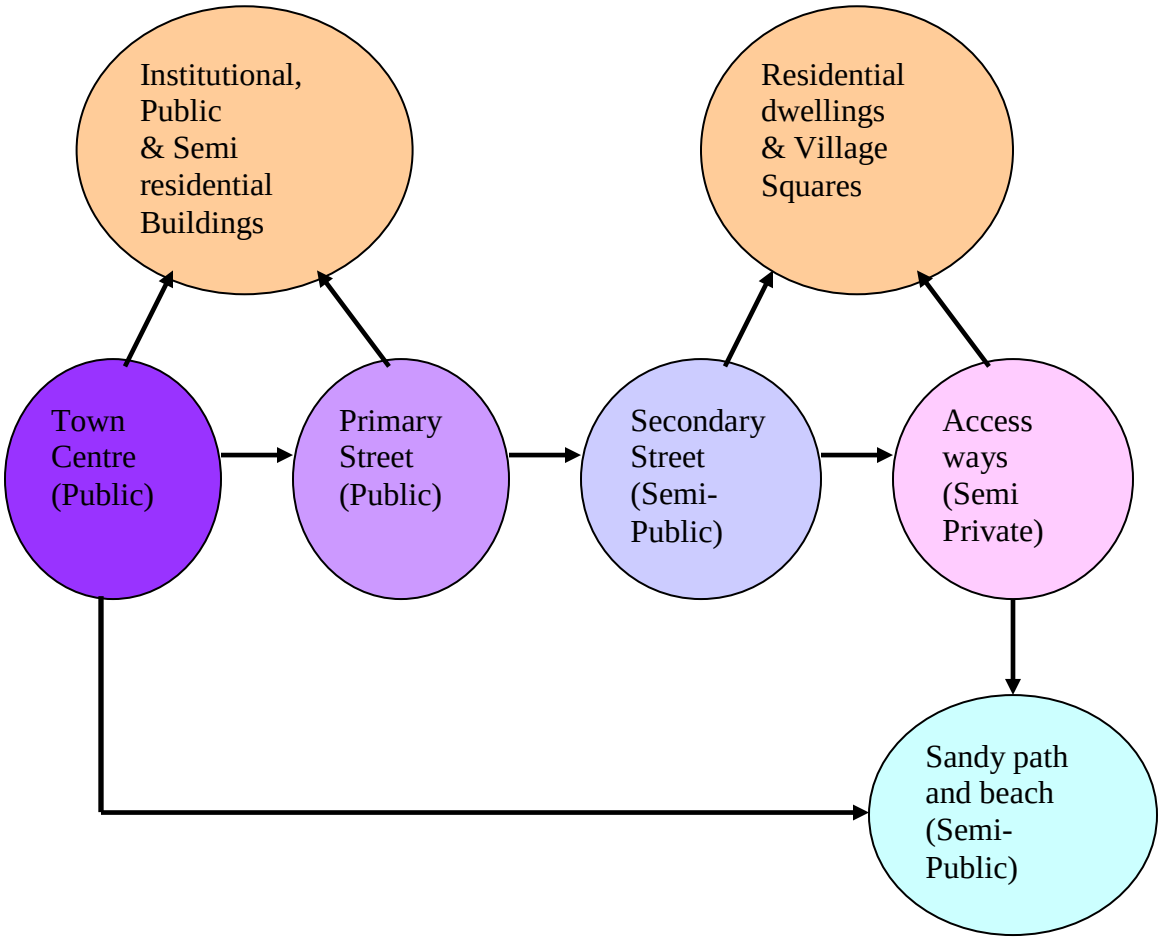


Figure 6.23: Showing the sequence of spaces in fishing settlement of Tharangambadi.

6.4.1 Connectivity for economic necessity

The following points explain various daily activities of fisher folk in Tharangambadi.

1. Fishermen starts from home and walk to the seacoast with their net gear and other fishing utensils.
2. Go to sea for fishing,
3. Return back from sea and dock the boats.
4. Women prepare food and come near the sea shore and wait for their husbands to return and have food. Women also help in cutting and drying the collected fish.
5. Fish collected is sorted and gets auctioned by agents to local fisherwomen and external traders.
6. Women buy fish in the auction and sell them at the town centre or nearby towns.
7. Agents either bring ice from ice factory or the fish is taken from auction place to ice factory for packing purposes.
8. Fish preserved with ice is then sent to other towns and cities both nationally and internationally.
9. Fishermen spend some time on the seacoast for the net and gear maintenance.
10. Fisher folk returns home (some from town centre; few from ice factory and other return home directly from seacoast).

The above mentioned activities take place in the fishing neighbourhood as an economic necessity. At the settlement level, in terms of the public space network, the following diagram shows the connectivity patterns in traditional fishing settlement. Such patterns developed over time to accommodate changing economic needs.

6.4.2 Religious connectivity

As mentioned earlier, there are five Hindu temples in Tharangambadi. The most important religious landmark is the Renukadevi temple. People from various clusters in Tharangamabdi and from other panchayats come here to participate in religious ceremonies and other rituals. The

fishermen's festivals are organised at the seacoast and as is Renukadevi amman Koil. Often religious processions take place in the streets of fishing village. Before the tsunami the Masilimaninatha temple that was located on the seacoast near the pre-colonial neighbourhood, was also a prominent destination for tourists. When it was destroyed in the recent tsunami, people's faith and beliefs consider that waves first hit their lord Shiva and then his people.

6.4.3 Social connectivity

Apart from religious and economic interests, people also develop different social networks within their neighbourhood (either family based or religious or caste based or occupation based) and with other clusters in the village and with people from nearby villages. People meet each other during family occasions, such as marriages, births, deaths and other communal occasions. In Tharangambadi, fishermen families in the traditional village had links with other families living in different locations such as the Meenavar colony and the Muslim and colonial neighbourhoods. Streets such as Queen's Street provide key links and access to interact with the Muslim communities living in the pre-colonial location and seacoast and Renukadevi square are the most prominent interactive spaces for people to gather either for occasions and celebrations.

6.4.4 Institutional and political connectivity

From historic times, educational institutions established by missionaries in the colonial part of Tharangambadi have provided the main source for education in the region. People from nearby villages and the fishing village came to Tharangambadi for schooling. It was clearly evident from the mental maps that people from the fishing village mostly preferred to take Queens Street to gain access to the educational buildings situated in the colonial neighbourhood. People used to pass over Buckingham canal on the narrow bridges via the Meenavar colony to the hospital and other public buildings located on Kamrajar Road. Political events such as the village panchayat or the fishermen's panchayat took place in front of the Renukadevi Temple in order to resolve community issues.

From the above discussion it can be demonstrated that the streets including, primary, secondary and access ways are the connecting threads for different nodal points and landmarks. The different types of street network converge at the nodal squares such as Renukadevi Temple, the town centre and the seacoast. These squares acts as important nodal points connecting residential quarters and places of cultural and livelihood interest (refer figure 6.24).

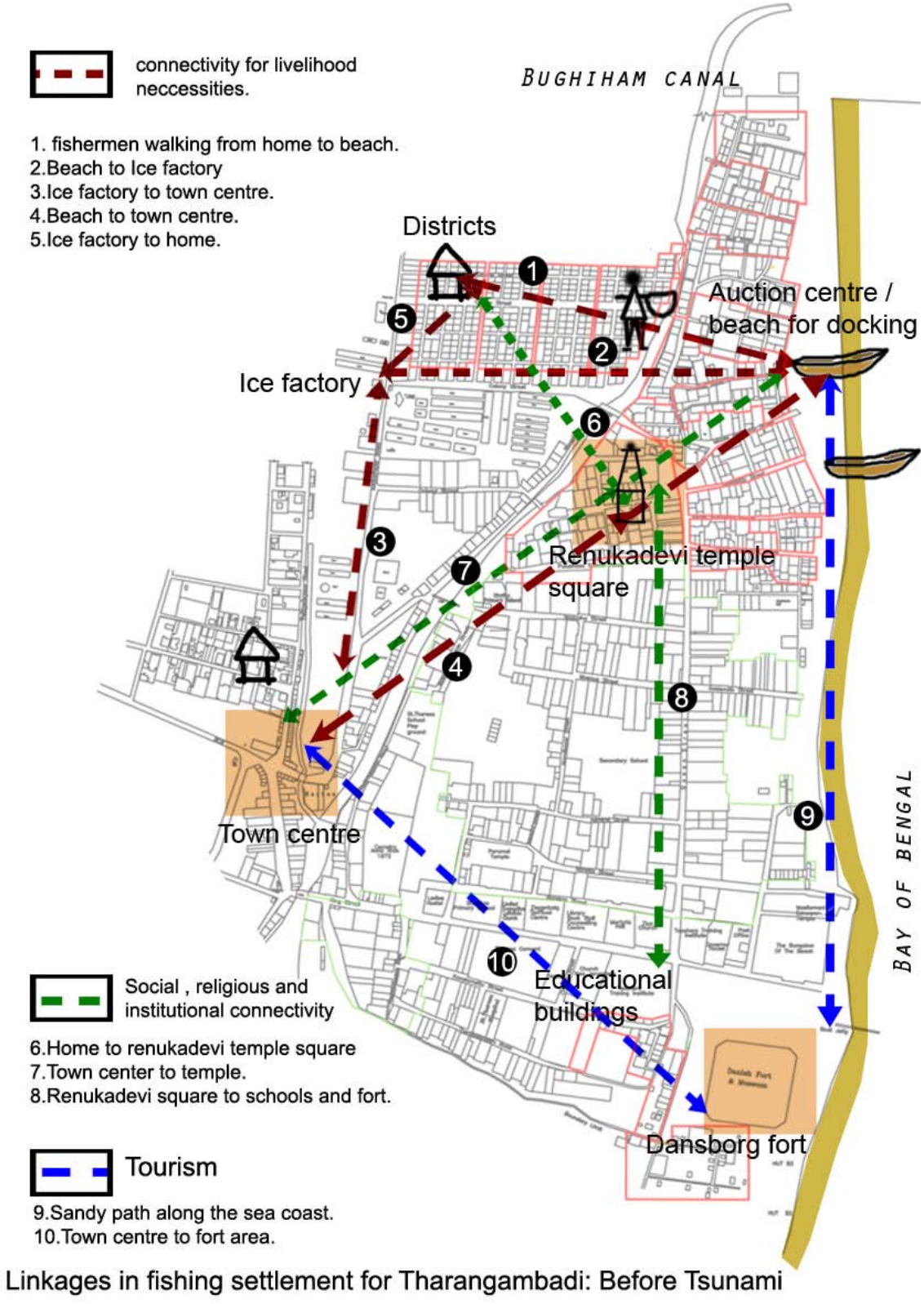


Figure 6.24 Connectivity patterns in fishing settlement of Tharangambai: before tsunami

6.5 Plots and dwellings: Land subdivision in traditional settlements

Certain major axes were marked out in the above map of the fishing village of Tharangambadi and the spaces between the major axes were left unplanned to allow cumulative development based on social hierarchy. This pattern led to hierarchical pattern of neighbourhoods and alleys that reflected the prevailing social order. Varied residential and civic neighbourhoods emerged over time with the public squares as landmarks forming the connecting social spaces both within and among the neighbourhoods. The resulting spaces defining a sequence of public and private buildings have built up a pattern of their own. In the Tharangambadi fishing settlement, plots can be categorised by two typologies. In the first type, plots that are customarily built by the residents in a gradual development process and secondly, that are allocated by the development agencies (before and after tsunami). In the Meenavar colony standard types of housing were developed in uniform sized plots arranged in a grid iron pattern. The second typology considers the composition of built spaces in relation to the street. Fronts and backs of these plots and buildings are defined by the use of those spaces for sustaining the cultural needs of fishing communities. The following are the various types of plots and how their composition with relevance to the streets will be described in the following part of the discussion.

1. Streets with semi open verandas as house fronts:
2. Streets with closed veranda's as house fronts
3. Streets with front setbacks

1. Streets with semi open verandas as house fronts

In this typology, the front of the dwelling has a semi-open veranda space that is used by residents to interact with the neighbours and visitors and to maintain their privacy. In Tharangambadi, these types of houses are mostly located in the Queens Street.

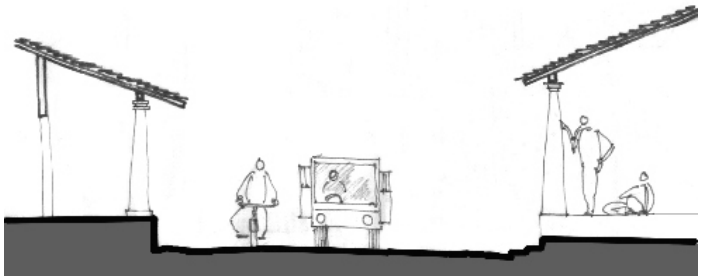


Figure: 6.25 Street fronts with semi open verandas as house fronts. Source:(CEPT 2008)

2. Streets with closed verandas as house fronts

In this typology the front of the dwelling has a closed veranda space that residents is use to interact with the visitors in a more secure way. Verandas are either covered with jaalis (made out of thin wire mesh or ferro cement mesh), so that vision is allowed from inside and at the same time restricted for outsiders. In Tharangambadi, these types of houses are commonly seen in the Pre-colonial areas.

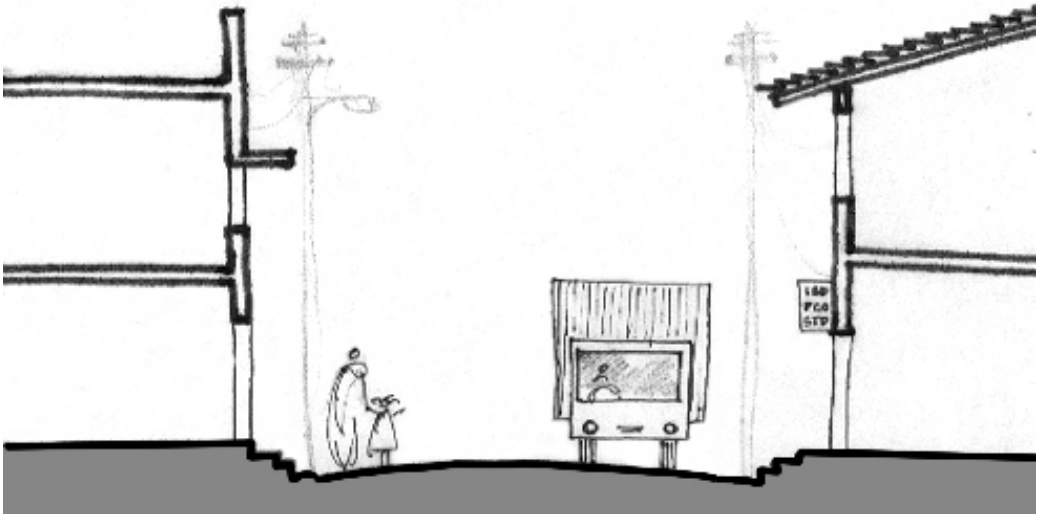


Figure 6.26: Street with closed veranda's as house fronts, Source: CEPT(2008)

3. Streets with front setbacks and compound walls

In this typology, street fronts have either fencing or compound walls and the dwellings are constructed in the plots leaving a front set back, which is used for daily household activities. These types of houses are commonly found in the fishing village of Tharangambadi.

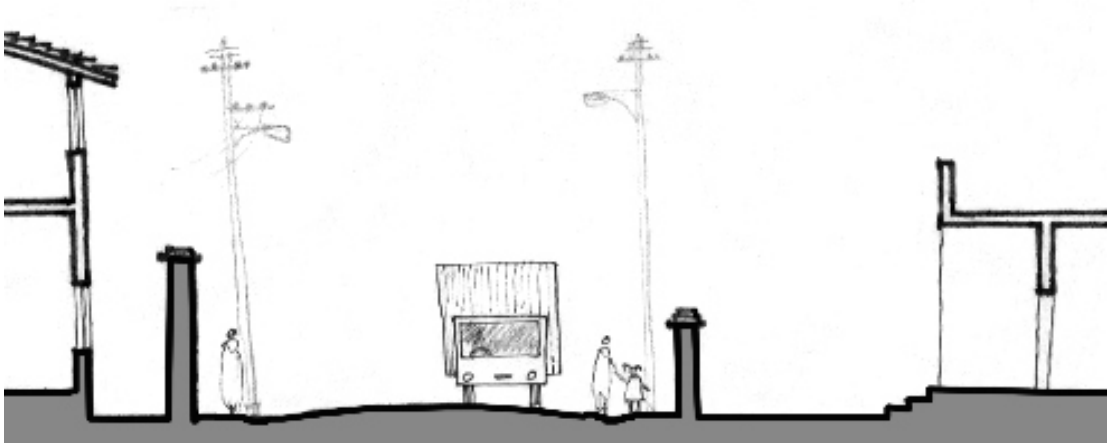


Figure: 6.27 Street with front setbacks, Source: CEPT (2008)

However, from the above descriptions on public space network, plots and dwelling arrangements, which formulate the settlement layout patterns, it is important to understand on how such traditional dwellings and settlements were transformed in the tsunami reconstruction process.

6.6 Tsunami reconstruction process

In the fishing village, people who lost their houses were given accommodation in temporary shelters. The government and the NGOs provided temporary shelters in a vacant space near the Buckingham canal and adjacent to the existing Meenavar colony. In the main part of Tharangambadi village (excluding the dalit hamlets), the government constructed 276 shelters and nongovernment organisations including SIFFS built 262 shelters, ROSA-50 shelters, OXFAM-72 shelters, and World Vision-190 shelters. The fishermen's traditional panchayat allocated the dwellings using a random method.

Figure 6.28: People still living in the temporary shelters provided after tsunami.

Following the CRZ regulations, people in the village became aware of safety and requested that their new houses be constructed behind the ice factory, which is about 600 to 700m from the seashore. While the fishermen affected by the tsunami were willing to relocate to safer areas, they did not want to give up possession of the location where their houses were situated before the tsunami. This was attributed to the convenience of getting into the sea whenever required, the convenience of storing the nets and boats close to the sea and the possibility of seeing the movement of fish easily. The ice factory owns part of the land where the new houses were built and rest of it is under private ownership.

SIFFS conducted various participatory studies with local people in order to analyse their needs and aspirations (see fig 6.29 and fig 6.30). They worked on a concept of developing 2000 plans for 2000 houses. Each household was allocated 3 cents (1cent is equal to 0.01 acre) of land for the reconstruction. Initially 7 model houses (refer the plans in appendix) were constructed as show homes for the beneficiaries and they were consulted again in face to face meeting during the allocation for further modifications. At present the new layout for the fishing community proposes to relocate the dalit family hamlet to another nearby location, following the main relocation process. Most of the housing has been laid out in a gridiron pattern. Choice was given

to the communities to supervise their plots and dwelling construction at each and every stage of reconstruction.

Figure 6.29 Design professionals explaining the proposed models with beneficiaries.

Figure 6.30. Face to face meeting with the households.

In a period of two to three years after the tsunami, SIFFS has undertaken responsibility for the construction of a new housing project in the area designated for relocation. The designers recognised the importance of the neighbourhood concept and attempted to keep neighbouring families together in the same street. In that process of allocation, households have their old neighbours facing them and a different set of neighbours residing at the back of their house. Small habitable public open spaces were left in the new layout to provide social interaction within the households in that cluster or street. The following map shows the old and new settlement, drawing on information provided by the SIFFS organisation (fig 6.31).

Figure 6.31 Map of Tharangambadi with old locations and newly relocated areas after tsunami

6.7 Analysing qualitative data: Responsive design qualities

6.7.1 Assessing physical context with cultural context: After the tsunami

From the new base map that was provided by SIFFS, it can be soon that the new housing was laid out in a different manner and physically further away from the sea when compared to the traditional housing pre tsunami.

A. Family kinship and gender

Semi structured interviews with local households in the relocated areas, reveal that family kinship structures were largely ignored in the reconstruction process, which in turn is having an impact on social and economic networks.

Figure 6.32 Women running a shop after she lost her husband in the tsunami.

A women running a small shop (refer video April 23rd 05556) in the relocated area, says that

> I was happy living in a joint family. After my husband's death, I am now left alone with my kids in the new house and am finding it difficult to manage shopping and other daily activities. Especially during festival times, I am feeling a huge difference in the way we celebrate, because my husband is with me no more and neither are my family members.

Figure 6.33 Veranda converted as a shop to provide an income.

In this case the absence of family members made a significant impact. In the respondent's daily life, it is now more difficult for her to run a shop and manage her kids without her husband's or other family members support. Even though family members from other locations often visit her to look over her welfare, still she is managing to run her household with great emotional difficulty. The distance from her family members creates difficulties in her everyday life.

Figure 6.34 House wives explaining how the new house is unable to accommodate their joint family comprised of 11 members.

In another case, two housewives from a joint family (refer video April 24th 05868) explained that the new house, which was provided in 3 cents land, is not large enough to accommodate their joint family comprised of 11 members in total. Their old house (before the tsunami), made out of thatched roof and brick walls, could accommodate her parent's family and the extended families of two brothers. Presently their extended families have been allocated different houses in the new housing scheme. As these houses are still under construction, the extended families are also residing in the same house. The new kitchen and other room sizes are not adequate enough for a big joint family like this. In order to accommodate such basic needs, the family members have made an extension on the first floor covered with big thatched roof, which is also shared by the adjacent house (Figure 6.35 A and B).

Figure 6.35 A and B In order to accommodate joint family of 11 members, people extended their house on first floor with thatched roof.

From the above two cases it is clearly evident that family and kinship structures in fishing communities were not adequately addressed in the post tsunami reconstruction process. It is worth to notice that, how people prefer to use locally available materials such as thatch and traditional forms to accommodate the family needs and climatic conditions. However, there is also an issue of cost to modify their houses. Depending on their budget constraints people tend to modify their houses either by investing solely or by mutual sharing with neighbours or other family members.

B. Religion and Belief systems

During the fieldwork, many households in Tharangambadi voiced concerns about the increased distance from Renukadevi Temple. In the pre tsunami context Renukadevi temple was easily accessible from their homes, which were located at close proximity to the sea. People from nearby towns also come to Renukadevi temple on festive occasions. The location of the SIFFS housing means that it is now becoming difficult for the fishing community to reach the temple square. Pongal festival, which is a symbolic celebration of the harvesting season, possesses more prominence in the farming communities rather than fishing communities. Nevertheless, fishing communities also tend to celebrate this pongal festival with a lesser importace compared to the

fishing festival that is specific for fishing communities. It can be noticed that such pongal festival and fishermen festivals are no longer carried out on a grand scale, as was the practice, pre-tsunami. As in the Kovalam casestudy, joint families experienced difficulties in maintaining family ties and in carrying out practical tasks such as shopping and other household responsibilities. The celebration process has also changed not only in economic terms, but also in location for the rituals associated with celebration. During the pongal festival households usually cook pongal (made with rice and jaggery) on the streets. Post tsunami, people started cooking pongal inside the courtyard or in the back yard of their houses. In Vellipalayem Street, people made their pongal preparations inside the courtyard of the house, which is quite distinct pattern from the usual style of cooking in front of the house (figure 6.36).

Figure 6.36. Housewives, making arrangements for cooking pongal inside the courtyard of the house.

Figure 6.37. A old man explaining about the consideration of vasthu in new location.

Whilst talking to an old person, it was revealed some people in that panchayat have consulted a vasthu expert from a nearby town to validate their new house according to vasthu. The village panchayat compiles and proposes the names of beneficiaries and hands them over to SIFFS for allocation. SIFFS then allocates plots to the individual households. Once the beneficiary knows which plot he or she has been allotted, they then organise bhoomi puja (ritual for starting any construction). With regard to building typology, beneficiaries were given an opportunity to select any one of the model houses for construction. After selecting the house model, the beneficiaries were called for a face to face meeting with the architect, to voice their suggestions and recommendations to alter the plans further to suit their needs. In that process, this research found mismatches in many households between what people asked for and how they subsequently used it. For instance, got a particular model house with an integrated toilet and once they started living in it, they realised that it ran against their religious norms and beliefs. Therefore they further

attempted to alter the use of interior spaces accordingly. The following photograph (figure 6.39) demonstrates that people converted the toilet space provided in the new house to their ‘ place of worship ‘ according to vasthu.

Figure 6.38. Bhoomi puja executed in the present meenavar colony location.

Figure 6.39. Toilet converted as puja (worship place)

C. Economic networks

The reconstruction process had a significant impact on fishing livelihoods in Tharangambadi. The traditional housing provided comfortable access to the seacoast, ice factory and town centre. Under the immediate impact of the tsunami and due to the enforcement of CRZ regulations and further depending on land acquisition issues, SIFFS developed new housing, which is far away from the sea. This distance created various changes in the economic networks, which further influenced other dimensions, that fishing lives rely upon. From the fishermen’s recent experiences, it now takes 30 to 45 minutes for them to get to the sea carrying their fishing utensils and gear. As the houses are not situated within visual proximity to the sea, the fishermen are unable to go to the sea more than once a day. In the pre tsunami context, depending on the fish catch they went to sea twice or more and some times during the night. As the distance restricts them from going to the sea more than once a day, it directly results in smaller catch which has a further influence in the overall fishing trade.

An interview with a group of fishermen currently living in temporary shelters reveals that they are aware of the distance issue when they will be relocated to the new housing in the near future. Despite this, still they prefer to go and live in that far away location with their fellow fishermen. Even though it is further away from the shore, they prefer to live with fellow fishermen families in whichever place it might be, as they consider the fishing community is like one family.

Figure 6.40. Fishermen group living in temporary shelters express their willingness to go and live with their fellow fishermen families in the new location, although it is further away from the sea.

Figure 6.41. Fishing family using their traditional home in the old location as a second house to sustain their livelihood, as it is near by sea.

Because of this issue of distance, a small number of families use their traditional houses (partly damaged in the tsunami) to store nets and for other fishing activities such as, cutting and drying fish. In one case, the fisherwoman explained the reasons why they still use this traditional house in the old village location and what is happening with the new house.

> Though we are not supposed to live in this old house, still we prefer to live in this old house, because it is convenient to carry out livelihood activities as it is near to the sea, and moreover it is huge in size and can easily accommodate five persons. The present house that we got in the relocation scheme is quite small and is not big enough for five people. One of my sons got married recently, and acquired a new house in the relocation scheme. Therefore that small house in the new location may not be able to accommodate the extended families. So we (parents) decided to stay in this old house, in summer time as it is hot over there and in the rainy season, we go and live at my son's place.

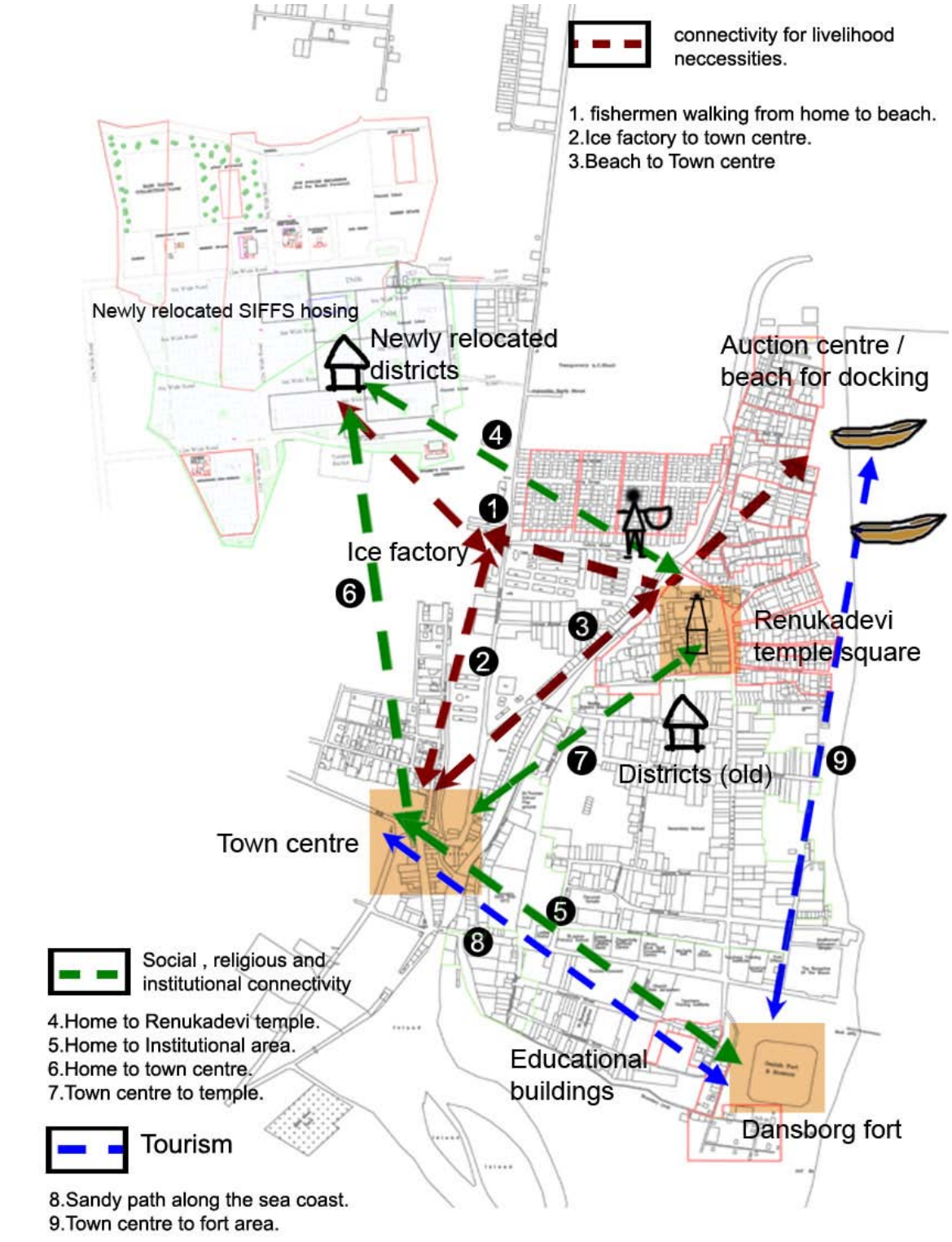
Figure 6.42. Fisherwomen expressing their economic difficulties that were raised due to the increased distance from sea.

In another case, a group of fisherwomen who are still supporting their men in fishing voiced concerns about the changes that are taking place with regard to their livelihood in the post tsunami context. Even though they are provided with better infrastructure facilities in the new

housing, they still like the old location, because of its close proximity to the sea and the surrounding greenery. Their husbands are only going to sea once in a day because of the distance issue. These women are now finding it difficult to walk to the long way to the seacoast to help their husbands and to collect or buy the fish from auction. This has had a direct impact on the amount of fish collected; it is further affecting the income of women selling fish at town centre. Because of this, at times the fisherwomen are encountering greater economic difficulties than earlier pre-tsunami.

Post-tsunami reconstruction has therefore increased the economic vulnerability of the fishing community, which in turn is responsible for various transformations in their lifestyle including festive celebrations and family maintenance and education. Some households have adapted to the situation by developing a ‘two house’ concept, in order to maintain their income.

The following map demonstrates the economic connectivity evolved in the village after tsunami.



Linkages in fishing settlement (old and new) for Tharangambadi: After Tsunami

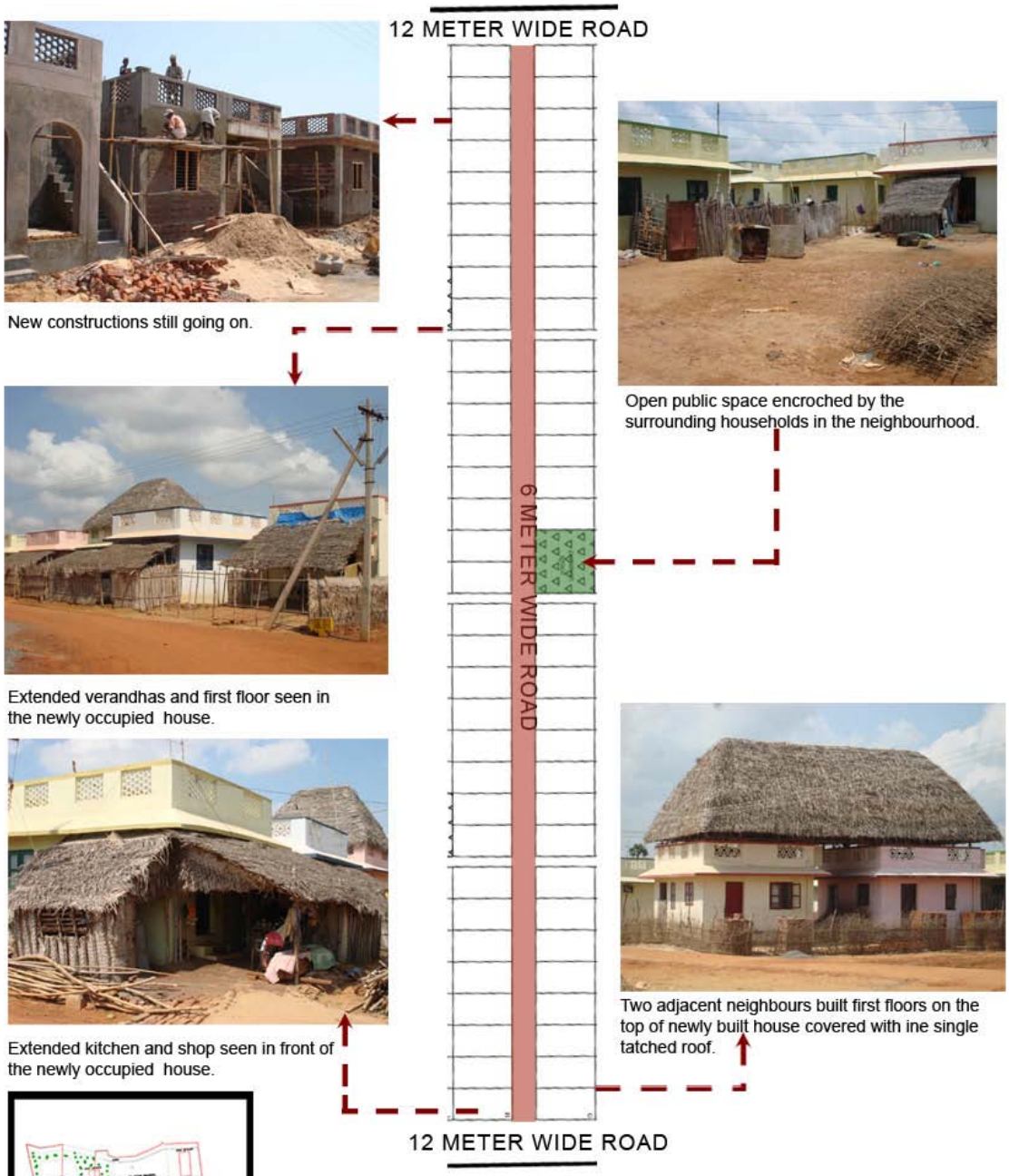
Figure 6.43 Connectivity networks in fishing settlement: After Tsunami

D. Social networks

Social networks formulate an important aspect in any community life. Such networks help different families or groups of families living in a settlement to manage their resources for sustaining their continuity and existence of their belonging. In order to facilitate social interaction amongst the beneficiary households, SIFFS made a provision for open spaces in each cluster design. The fieldwork found that the occupants in the properties that are adjacent to such public open spaces have been gradually encroaching on these common areas.

At a building and plot level, the veranda is one important traditional building element that acts as a semi-open space for interacting with visitors. If one walks in the Tharangambadi new housing area, it can be seen that many households have extended their verandas on their own initiative using local skills and materials (see figure 6.44). Most of the fishermen housewives spend their leisure time near the verandas talking to their neighbours and friends, simultaneously carrying out household work such as cutting and drying fish, and looking after their children. Some of the SIFFS models are composed without a veranda at the front of the house. From one of the cases (refer figure 6.45 and 6.46) a housewife was offered three options to choose. Out of option 1, option2 and option 3, she preferred option 3, and said that

> Because the veranda is composed with an arch, which catches more shade, so that we can sit outside and interact with neighbours. I prefer to spend most of the time outside the house as this concrete roofed house makes the interiors of the house hot and added to that there is a limited power supply.



STREET ANALYSIS IN NEWLY RELOCATED SIFFS HOUSING

A small number of families who haven't opted for veranda faced house option are now regretting that *they don't have the luck to experience veranda* (earlier video of fisher women group).

Figure 6.45 Women explaining the reason why she preferred the veranda option?

Figure 6.46. View of veranda porch composed with arch in a newly built house.

With regard to the sharing her daily life with the new neighbours, the interviewee had good relations with the new neighbours living on one side of her house, and she had the same neighbours as pre tsunami on the other side. SIFFS recognised the importance of neighbourhood and considered the option of relocation with previous neighbours and as well as with new

neighbours. SIFFS also recognised the importance of the veranda in creating the setting for neighbourhood interaction.

The spaces for men to interact include tea stalls at the town centre and beach side or under the shade of the trees near the coast. The Renukadevi temple square continues to function as an interactive nodal point for communal occasions and festivals. Fishing communities also come towards the colonial and pre colonial parts of Tharangamabdi to practice traditional martial arts and folk dances to perform in festive occasions (figure 6.47 and figure 6.48).

Figure 6.47: Village men practicing folk songs for Renukadevi festival near Dansborg fort area during night time.

Figure 6.48: Village men practicing Kotang play for a festival near Goldsmiths Street (pre colonial area)

E. Political and institutional networks

As the leading panchayat for the 24 panchayats in that region, Tharangambadi fishermen's panchayat is known for its political and institutional significance. In the present context, different NGO's such as the HOPE foundation have contributed by building schools in the relocated area. Even though new schools have been locally established in the new neighbourhood, people prefer to educate their children in the Missionary schools located on the Kings Way. Access to the school has drastically changed in the adaptation process post-tsunami. Children pass through the town centre from the new location to the schools located on Kings Way. These changes were identified from the mental maps drawn by the respondents during the fieldwork. After the tsunami, SIFFS established their site office on the Kamrajar Road near the ice factory and

hospital. Therefore the SIFFS office and hospital are more easily accessed than the school and the beach.

Figure 6.49. Fishermen gathered for panchayat meeting in front of Renukadevi square to resolve village issues.

As a part of its responsibilities, the fishermen's panchayat also organises political gatherings in a thatched shed located in front of the Renukadevi temple. The village panchayats deal with all kinds of village issues including any disputes among the families or other livelihood issues. One interview with a group of housewives revealed that before the tsunami, communities from Karan street (Dalit families) and Pudhu palayam, used to have frequent disputes for many communal reasons. In the relocated area, there are many instances when they noticed that disputes have gradually reduced amongst those groups when they started living in the same new location due to the allocation process.

6.8 Legibility analysis

During the fieldwork, mental maps were collected from the interviewees, to understand the legible images in their minds and how they have changed following the reconstruction process. From every interviewee, two mental maps were collected, one before tsunami and other after tsunami. The following were some of the mental maps that were collected during the fieldwork and it can be noticed that access paths have changed after the tsunami.

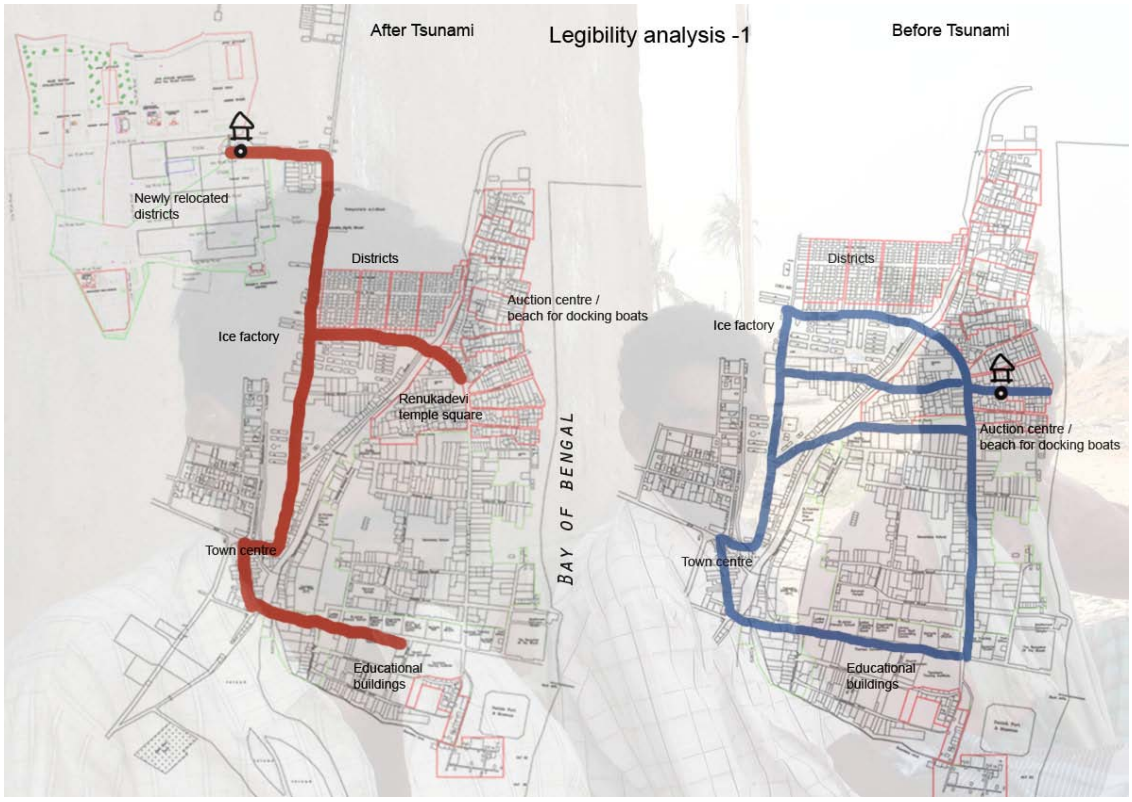


Figure 6.50 Mental map 1

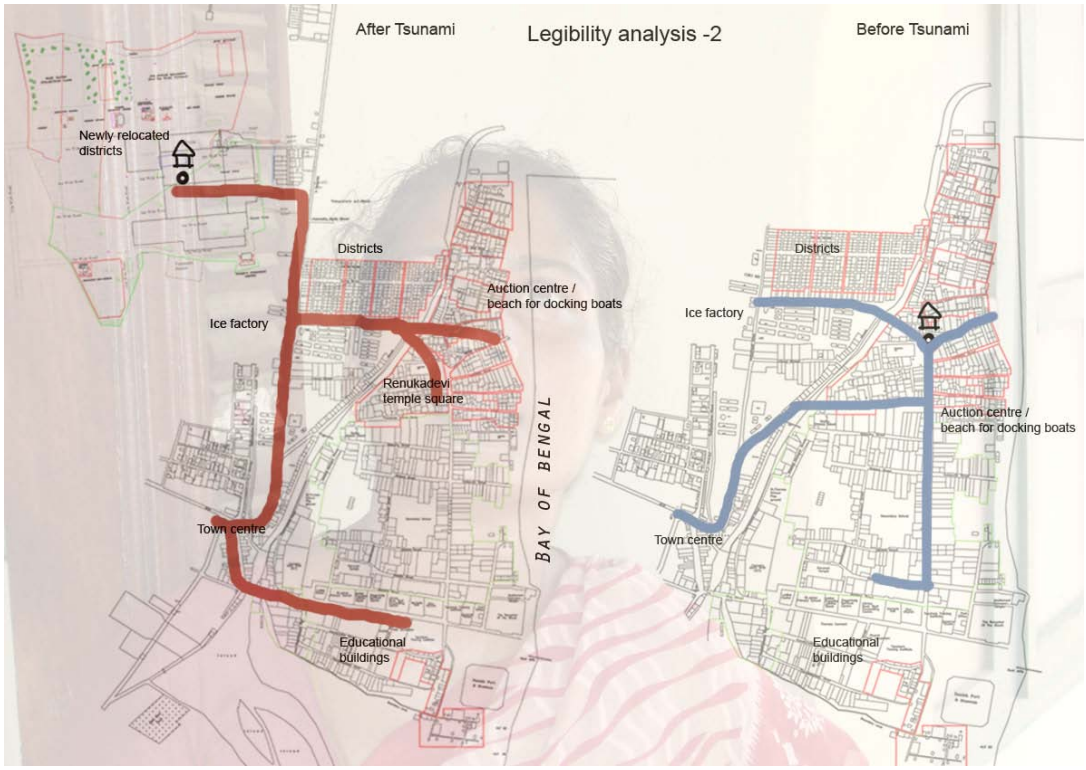


Figure 6.51 Mental map 2

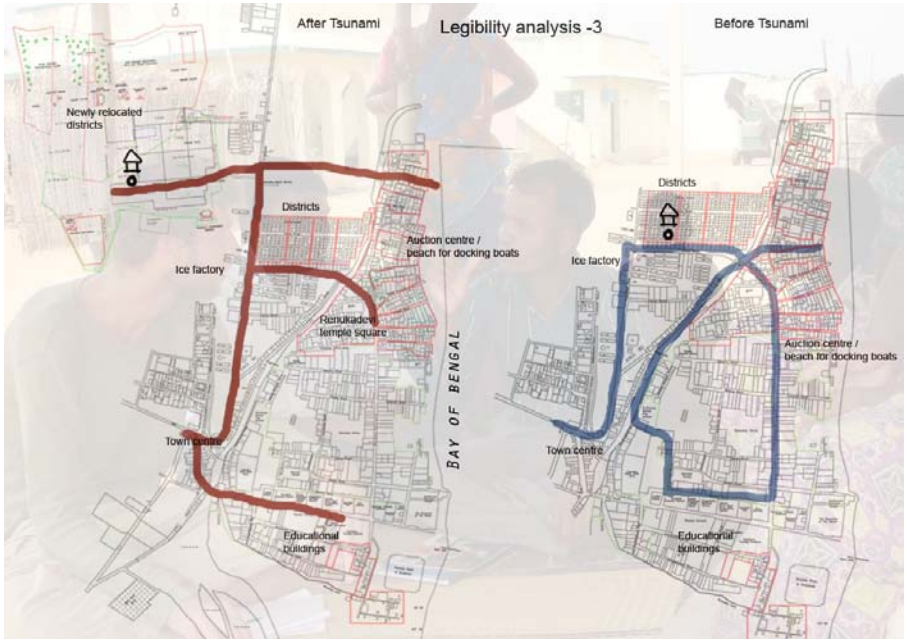


Figure 6.52 Mental map 3

From the above maps it can be noticed that the main pedestrian access has changed from the interior of the village to its periphery. In the pre tsunami context, people use to walk across Queens Street, thus maintaining relations with the residents living in the muslim and colonial parts of Tharangambadi. It is also seen that though people have moved to new locations, but they are still connected with the historic areas but through other means of connecting patterns. Before the tsunami children used to go to the school that is located on Kings Way, passing through Queens Street, whereas in the post tsunami context, they prefer to go through the town centre as it has become a more convenient access to reach school.

The most interesting aspect of this method of taking mental maps on printed layouts has revealed that the respondents have easily recognised the landmarks, paths, and the respective districts of their settlement, which indicate that they still carry some legible images of the past experiences along with the current experiences for adapting to the new locations. This legibility analysis also helps in providing evidence on how the places, streets and paths connects people from diverse cultural backgrounds and change in such pedestrian movement patterns also have direct or indirect impacts on the social well being of the local communities.

Case Study 3- Lighthouse Kuppam Case Study

7.1 Introduction to Lighthouse Kuppam, Pulicat

Lighthouse Kuppam is the Gram panchayat (village council) for 11 dalit villages that are located on an island, which is surrounded by the Pulicat lake on three sides and on one side by the sea. Pulicat lake is India's second largest coastal lagoon, joining the Bay of Bengal in the Southern state of Tamil Nadu. This lake is located approximately 60 km north of Chennai city and in particular its water bodies are directly linked with the chemical and industrial belt of Chennai through the Buckingham canal. Such urban and industrial expansion resulted in conflict situations in terms of the needs of fishing communities to maintain their livelihoods (Coulthard 2005).

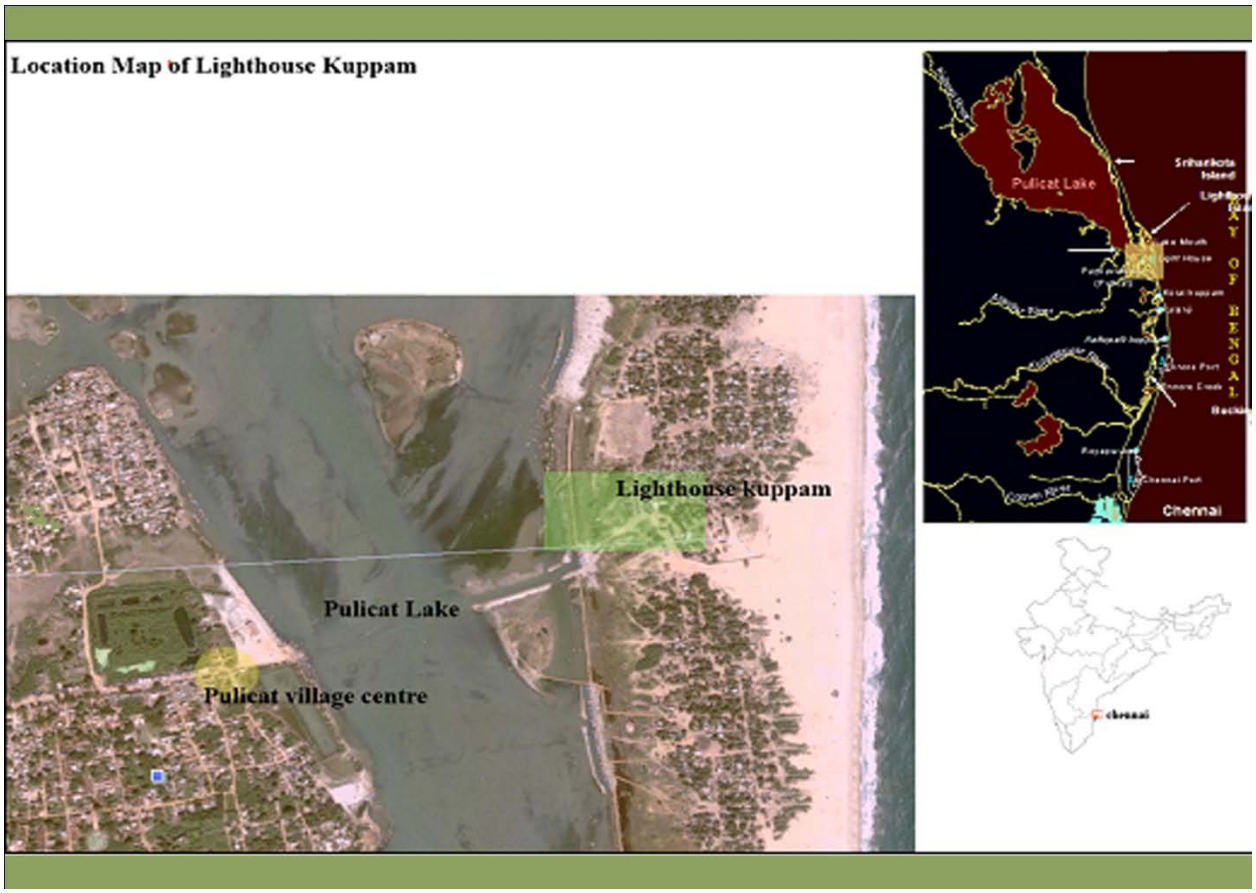


Figure 7.1: Location map of Lighthouse Kuppam village.

7.1.1 Socio-economic and political profile of the village

There are 11 dalit villages, on that island, wholly comprised of *dalit (untouchable)* fishing communities. Lighthouse kuppam is the main village panchayat for all the 11 hamlets and their main livelihood is based on fishing. Hamlets facing the lake side will depend on lake fishing and hamlets facing the sea make their livelihood from sea fishing. According to the demographic records Lakehouse kuppam is inhabited by 255 families living in 214 houses and lake fishing is their main occupation. People from the pulicat area have evolved a traditional institution for managing the fishery known as the *Padu system*. The informal Padu system operating in Pulicat Lake is a verbal agreement of traditional fishing rights, largely dominated by the Pattinaver caste people. According to Mathew (1991:5) the Padu system at Pulicat is described as:

> A traditional system of granting entitlements to eligible members of a particular community for undertaking specified fishing activities in certain designated fishing grounds in the lagoon.

7.2 Traditional fishing settlements: how this place works

7.2.1 Assessing physical context of vernacular settlements in the usual development context

As Lighthouse kuppam livelihoods are completely based upon lake fishing, it is important to explain how the traditional Padu system allows the Pulicat fishing communities to organise their fishing activities in a fair manner. Coulthard (2005) also explains that the specifications of the Padu system are on caste specific[11], location specific[12], and, in some cases, gear specific[13], and

[11] Traditionally only the *Pattinaver* fishing caste is included in the Padu system. However, Scheduled caste fishers have claimed Padu rights since as early as 1920. Pattinaver fishers, however, remain the dominant group within the system and hold the better Padu fishing grounds.
[12] Regulation of fishing access is through *rotational access* of specific fishing grounds or *Padu's* between Padu fishing villages. Each village in the Padu system goes for fishing (as a whole village) on their specific allotted fishing day.
[13] Only eligible 'Padu fishermen' are able to use Padu fishing gears which are highly efficient at catching large quantities of prawn (and fish): Stake nets (Suthu valai) and Beach seine (Badi valai).

even, species specific[14]. The *Padu* system is founded upon specific fishing grounds known as '*Padu grounds'* or '*Padus*', where eligible fishermen can place their stake nets for catching prawn. The allocation of such Padu grounds is decided in an annual meeting, the '*Padu Kulukkal* day' (Mathew 1991). Each fishing unit of the village is allotted a specific place in the rotation of Padu fishing grounds. Thus in such a padu system, each fishing boat (3 men for each boat) gets the opportunity to fish at least once in all the Padu grounds throughout the entire year. Since the Padu grounds vary in terms of productivity, this is a fair system which evenly distributes richer and poorer fishing grounds amongst all *Padu* fishermen (Courthard 2005). Therefore once the Padu grounds have been allocated to a fishing unit from the Padu village, no other fisherman outside the rotational system of Padu can fish. It is important to understand and analyse how Lighthouse Kuppam as a traditional dalit panchayat settlement has accommodated their cultural needs in the pre tsunami context and how such necessities were or were not sufficiently addressed in the post tsunami reconstruction process. The conceptual framework, developed in chapter 3, will be used as a tool for analysis.

7.2.2 Characteristics of fishing village in pre tsunami context: public space network in fishing village: how permeable

Lake fishing is the main source of income for the dalit communities living on the island. Being an island the whole settlement is very much prone to frequent disasters such as cyclones, floods and the recent tsunami. The island is mainly accessed by boat from Pulicat town centre due to the lack of any bridge infrastructure as a result of, which people have encountered many difficulties in running their daily lives.

Those without rights must adopt other less efficient 'Non Padu' fishing gears: Cast nets (Mani valai) Gill nets (Araivalai) and Hand fishing

[14] Stake nets are specialized in catching the valuable prawn. The Padu fishermen monopolise the Prawn fishery at Pulicat lake.

A. Dockyard

Each small village on the island has built up their dockyards either on the seacoast or on the lakeside, depending on the nature of fishing they do for their living. Lighthouse Kuppam villagers and its adjacent villagers have built up their dockyards for their convenience. Most of these boats are also used for fishing purposes, but others are used for commercial commuting purposes taking people between Lighthouse Kuppam and Pulicat town centre. They normally charge outsiders about 3 Rupees for one return trip from Pulicat town centre, where as it is free for the villagers living on the island.

Figure 7.2. Boats used for commuting facilities between Pulicat and Lakehouse Kuppam

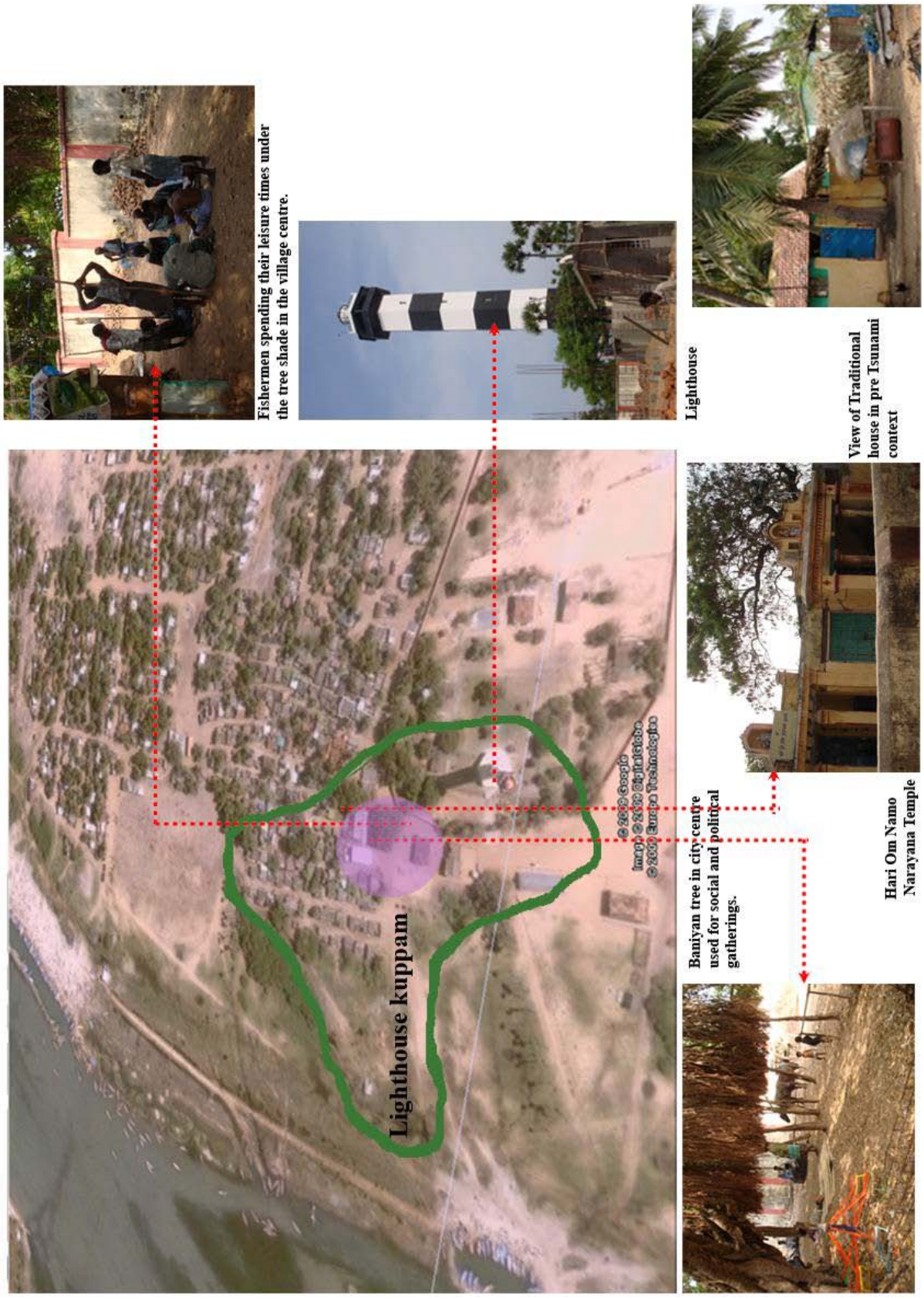
Figure 7.3.View of Dockyard at Lighthouse Kuppam village.

B. Places of religious interest

There are some religious buildings located at different corners of Lighthouse Kuppam reflecting the importance of religion to the traditional fishing communities. They include Sadai Amman Temple, Vinayakar temple and Mariamman Temple. People from the island perform their religious events at these temples.

Figure 7.4: View of a temple near the village centre

Figure 7.5: View of a temple in the adjacent village towards the eastern side of Lighthouse Kuppam


Lighthouse kuppam
Fishermen spending their leisure times under the tree shade in the village centre.
Lighthouse
View of Traditional house in pre Tsunami context
Baniyan tree in city centre used for social and political gatherings.
Hari Om Namo Narayana Temple

C. Lighthouse and village centre

This is the most important landmark of this village, as the lighthouse was installed from colonial times to support navigation. Thus the name for this village is Lighthouse Kuppam. Therefore, adjacent to this lighthouse, village centre acts as an important converging point for various purposes including school, children's tot-lot (play area), religious, social and political gatherings.

Figure 7.7 (left): view of lighthouse in the village

Figure 7.8 (right): School children spending time in their tot-lot near the village centre.

Figure 7.9: Men spending their leisure time under a tree shade near the village centre.

7.3 Plots and buildings

During the fieldwork, it was difficult to record the existing building typologies in Lighthouse Kuppam, as the houses had already been demolished in the reconstruction process and new house forms have replaced the existing building typologies in the same plots. The building typologies from the adjacent villages were recorded to understand the existing built forms and patterns of Lighthouse Kuppam island.

Figure 7.10. View of traditional house in a village adjacent to Lighthouse Kuppam

Figure 7.11. View of traditional house in a village adjacent to Lighthouse Kuppam

Family kinship structures and other economic needs and wants of a household play an important role in defining the type and size of the house. Over time these plots and buildings were divided and further subdivided to accommodate the needs and wants of successive generations and their extended families. These houses are introverted with a combination of open, semi-open verandas and closed spaces. In this village, when compared with the other two case studies houses are composed mostly with an open court on the front side of the dwelling unit. The family members generally share such open spaces for domestic purposes such as cooking, cleaning utensils and washing clothes. With regard to the construction materials, similar materials to the other two case studies such as brick and tiles were used in the house construction.

The open compounds in the front of the houses provide a significant spatial element that acts as an interface between the semi-public or semi-private areas and the more private dwelling areas. This semi open space is covered with either tiles or thatch in order to provide more shade for the

residents to organise fishing activities while interacting with neighbours and visitors. Kitchen and toilets are usually detached in the traditional houses. In order to store nets people construct a raised wooden platform either in front of the house or inside the compound of the house.

7.4 Post tsunami reconstruction process

After the 2004 tsunami, no deaths were recorded in this village and Tamilnadu State Government responsibility at the start of the reconstruction process. The government is also presently making efforts to construct a bridge across Pulicat lake connecting Pulicat village centre and the Lighthouse Island. Following the CRZ Regulations, the Government has allocated land for relocating these fishermen communities in Bharatiya nagar, which is 2 km away from Pulicat village. The impact of relocation to temporary shelters in the new location has raised many difficulties for the fishermen communities such as unemployment combined with no proper water supply and other facilities. After a certain period, people realised the importance of being near to the lake or sea with regard to sustaining their livelihoods. When they decided to move back to their original location, the Government supported them by providing new houses on the same plots that they used to live in the pre tsunami context. However, the government followed the latest amendment of the CRZ regulations by specifying the relaxation of construction activity in the 200m to 500m zone. The authorities conducted a primary survey and prepared a list of 214 beneficiaries for the new housing scheme.

Figure 7.12 Newly constructed houses provided by the government.

7.5 Assessing physical context with cultural context of fishing communities in morphological context after tsunami

7.5.1 Analysing qualitative data: Responsive design qualities

A. Family kinship and gender

Semi structured interviews with local households in Lighthouse Kuppam reveal that family kinship structures were largely ignored in the reconstruction process, which in turn is having an impact on their social and economic networks. A group of housewives explained in an interview that

> During the reconstruction process, many joint families were split up into nuclear families, and we are not feeling a sense of togetherness living in nuclear families.

Figure 7.13: women living presently in temporary shelters.

From the above case, it is clearly evident that family and kinship structures in fishing communities were not adequately addressed in the post tsunami reconstruction process.

B. Religion and Belief Systems

In contrast to the earlier case studies the villagers don't have difficulty in going to worship, as they have not relocated elsewhere. As explained in previous interviews, the housewives also explained that they were unable to celebrate religious festivals with the whole family combined, which has implications for the size of grand celebration, because of the family being split into nuclear sub families. Previously they used to get together at religious events.

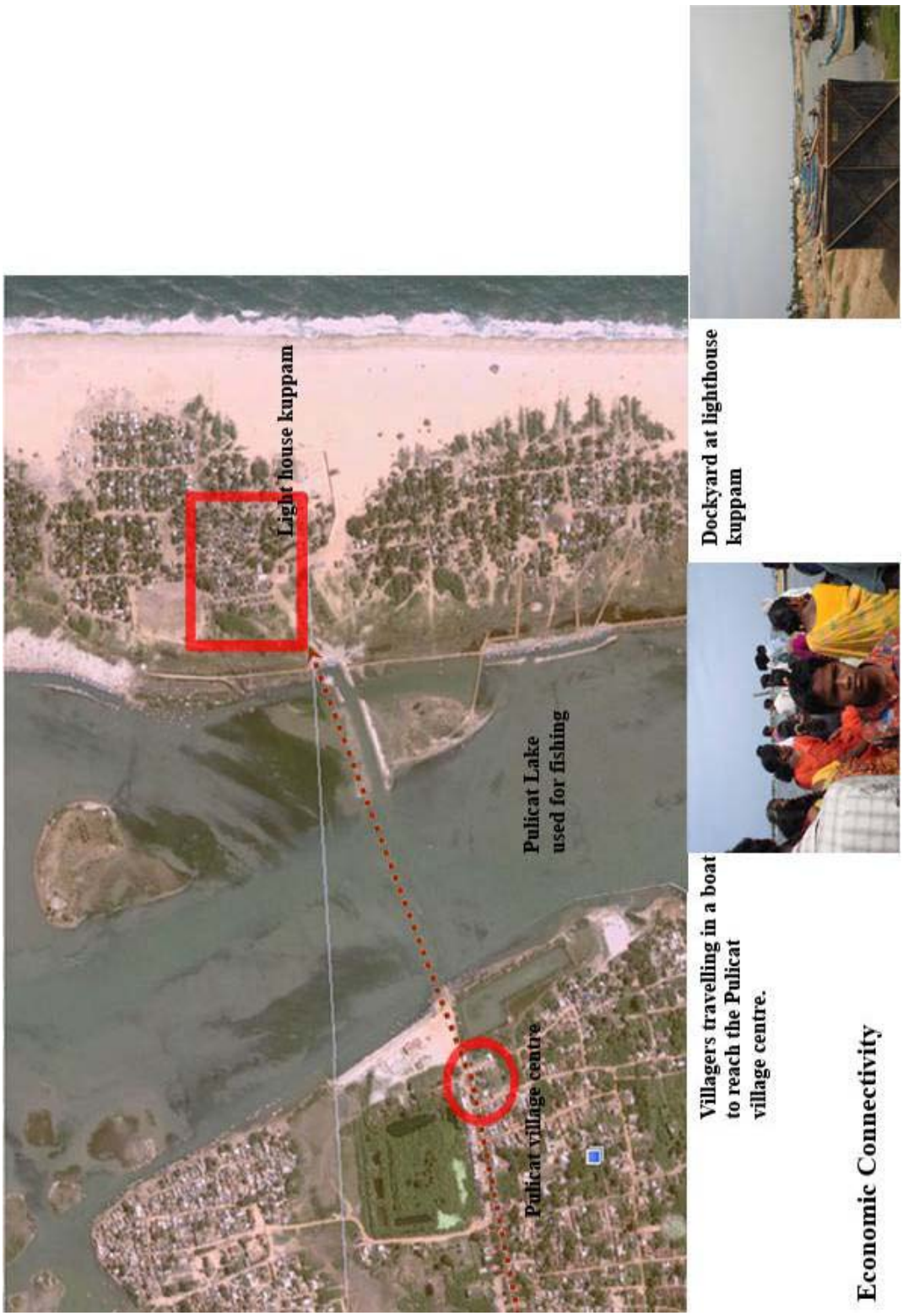
Figure 7.14: Map showing the religious connectivity within the village and from the other villages.

The above map demonstrates that people from the villages on the island come to Lighthouse Kuppam for many religious occasions and they also gather at Pulicat village centre for special occasions.

C. Economic networks

Surprisingly, the reconstruction process had not created much impact on the fishing livelihoods in Pulicat fishing communities, compared to the other case studies. Many fishermen said that their income levels have not changed much, for instance they were earning 50-100 rupees per day, before and after tsunami. Women take the fish to the market yard in Pulicat village centre and sell them in the market yard. Some people from the Lighthouse Kuppam will come to Pulicat village centre or Ponneri Town centre for carrying out alternative activities to support their

livelihood. For instance, few housewives come to pulicat town for working in the market or with non-government agencies, and other micro finance systems.

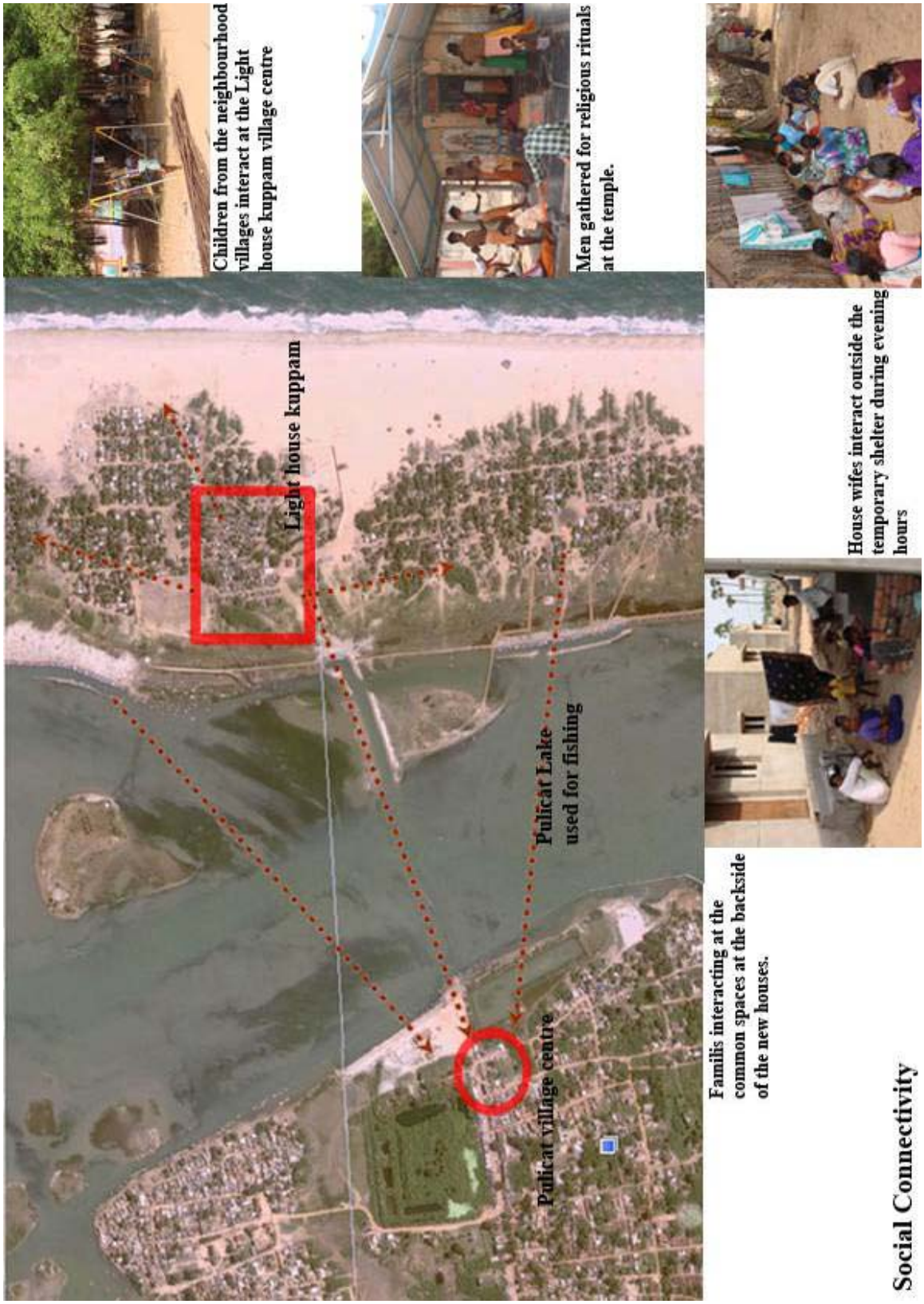


D. Social Networks

Social networks form an important aspect in any community life. Such networks help different families or groups of families living in a settlement to manage their resources for sustaining their continuity and representing their identity. Villagers have started interacting with their neighbors as the backyard of a house in a first row meets the front yard of the house in the second row (see figure 7.16). Though, most the beneficiary households were not allotted the new houses, the researcher observed that people who have already started living in the newly constructed homes, have extended their kitchens at the backyard of their house, which can provide a better neighborhood space for interaction.

Figure 7.16: backyard meeting house fronts: women constructing her own kitchen outside her house.

Other than that, people have got the same kind of social relationships with other villagers in the Pulicat lake area. They normally gather for economic needs discussing padu rota system, religious purposes, and other political occasions at the Pulicat village centre.



Social Connectivity

E. Institutional and political connectivity

Lighthouse Kuppam being a dalit village panchayat for all the 11 villages on the island is a congregation point for all kinds of institutional and political purposes. Lighthouse Kuppam Village centre is the main interactive centre for all institutional and political gatherings. Lighthouse Kuppam panchyat has formulated its own rules and regulations for continuity and existence of the settlement. For instance, in case of disputes within the village, the guilty person should pay 5000 rupees to the village panchayat and the council won't recommend the involvement of police for any kind of disputes. Another important aspect is that the village panchayat collects money from the villagers and uses that common fund for village development such as providing little informal scholarships for the education of village youth and children. All such systems are still active in Lighthouse Kuppam even after the tsunami.

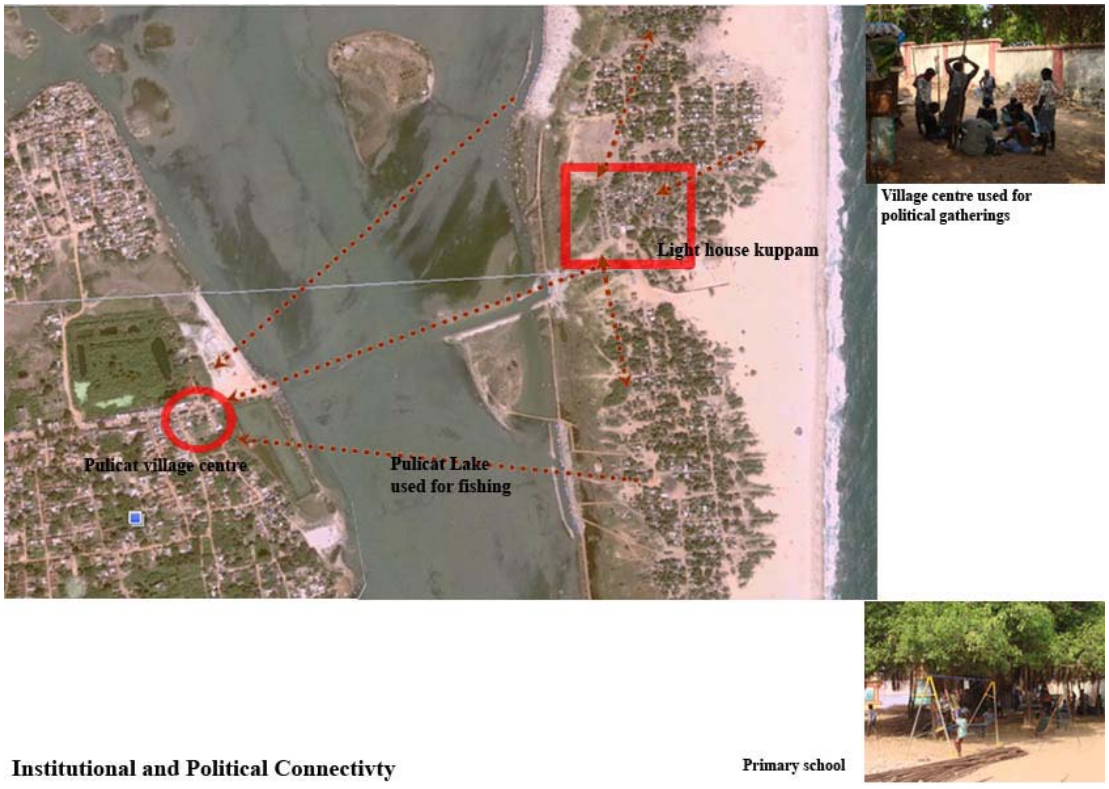


Figure 7.18 Showing the institutional and political connectivity

The above discussion recognizes specific development issues and conflicts that are raised from the Lighthouse Kuppam case study. Some of the development issues identified were proved to be different when compared with the findings from other two case study areas. The key findings were classified into specific impacts and their causes of post disaster vulnerabilities that are discussed below by considering all the information and narratives from the three case studies that were described in chapter 5, 6 and 7 are taken into account collectively as data. The following part 3 of this research dissertation comprises combined and comparative analysis of the findings from the three case studies and the final conclusions of this research will be explained.

Conclusion - Part Three

Post disaster Development Issues in Cultural Context

The main idea of this chapter is to compare and contrast the findings from the three different case study areas described in Part 2. This analysis suggests that the current post disaster development paradigm should be modified. There is ample evidence that the cultural dimensions of traditional fishing communities are not being adequately addressed in the reconstruction process. This chapter considers the specific impact situations on vulnerability, the reasons of such impact situations that were explored in the different case studies and focuses on why cultural dimensions have been sidelined in post disaster development process. It also addresses the second objective of this research, which was to apply the conceptual framework for analysis (discussed in part one) and develop a methodology for identifying the role of culture in post disaster development processes. The conceptual framework draws on principles derived from urban design, with a particular focus on the concept of connectivity in the traditional fishing settlement case studies. Connectivity was evaluated by assessing the impacts of reconstruction on cultural elements such as family and kinship, gender, socio-economic networks, religion and belief systems, institutional and political life of traditional settlements. This conceptual framework has provided a basis for insight into how communities with differing cultures respond to different development approaches in post disaster contexts. The following are the specific development issues identified in the three case studies – Kovalam, Tharangambadi and Lighthouse Kuppam villages.

8.1 Analysis

8.1.1 Development issues from Kovalam and Tharangambadi Case studies

The following discussion concerns specific development issues that are raised in the Kovalam and Tharangambadi case studies. The key findings of these case studies were classified into specific impacts on post disaster vulnerabilities and their reasons for such response situations. These are discussed below, considering all the information and narratives from the Kovalam and

Tharangambadi case studies (discussed in part 2). Impact situations from both the cases were discussed in combined manner where as the reasons for such post disaster reconstruction responses are explained separately, as the development contexts of the two cases are different from each other.

A. Impacts on post disaster vulnerabilities

Impact 1: Livelihood and household difficulties

From Kovalam case

In the case of Kovalam, access to necessities to sustain a livelihood has become more difficult following the post tsunami response, due to the extended distance to the sea from the newly relocated clusters, resulting in a lower fish catch. This directly impacts the fishing households' income and the overall fishing economy of Kovalam. The reduced income is also in turn having impacts on cultural dimensions including family and kinship and the social, cultural and political necessities of fishing communities for sustaining their daily needs. Taking such conditions into consideration the church is now planning to build a canteen facility at the sea shore.

However, in Kovalam not all the relocated households have faced the issue of distant access to sea. For instance, households residing at clusters including K.S.S.S Nagar, Praxis Nagar, and Rock Bible Centre (as indicated in the characteristics map of Kovalam, refer figure 5.12) have easy access to sea and the village centre, as they were built adjacent to the old village, whereas clusters such as D.C. Nagar and SISU Nagar have been constructed in distant locations. Although households in K.S.S.S Nagar and Praxis Nagar have been relocated, they feel that they are still connected to the neighbourhood for sustaining their livelihood activities. It is also important to note that although they feel connected with the activities that happen at the village centre, nevertheless, they feel separated from extended family members, relatives and neighbours those were relocated to D.C.Nagar and SISU Nagar.

From Tharangambadi case

From this Tharangambadi case study, it can be observed from both the physical and cultural analysis that the concept of connectivity has been largely ignored with regard to various cultural dimensions in fishing communities. Access to necessities to sustain livelihood has become more difficult due to the impact of relocation. The resulting distance from the sea does not allow fishermen to go fishing more than once per day; where previously they may have gone twice depending on the available catch. Such variation in the frequency of fishing trips has resulted in a smaller fish catch, which has had a direct impact on the fishing household's income and the overall fishing economy of Tharangambadi. Under such conditions, people have started using motorbikes for attaining easy access to the sea shore.

Semi-structured interviews with various respondents from both the cases has noted how their reduced income was in turn affecting other cultural dimensions of their life including family and kinship relations, social, cultural and political necessities. Apart from livelihood difficulties, this study has also found that the core dwelling units that were constructed in the reconstruction process do not sufficiently accommodate daily needs of the fishing households. For instance, kitchens provided in the new houses are considered small and do not accommodate the fishermen's household activities. Moreover, the core dwelling units are not large enough to accommodate extended families.

Summary

In the post tsunami response situation, it has been observed from Kovalam and Tharangambadi cases that physical distances were increased and people have to walk for long distances to sustain their daily livelihood necessities. This has resulted in reducing the overall fishing economy of the village which in turn has affected other cultural dimensions of the fishing lives including family and kinship relations, social, cultural and political needs. Households, which were relocated to far away locations, are having much difficulty to access the necessities to sustain a livelihood and other cultural needs. Households those located in the nearest and adjacent locations feel that they are still connected to the neighbourhood for sustaining their livelihood necessities.

Adaptation strategies observed

Communities have developed different strategies for survival. For instance, Church in Kovalam is planning to build a canteen facility at the sea shore and in Tharangambadi, fishermen has started using motor bikes to overcome long distances.

Impact 2: Weakening family and kinship relations

From Kovalam case

In Kovalam, a well-intentioned church aimed to expand the village to address issues of overcrowding in the previously congested location. However, the study demonstrates the gradual weakening of family and neighbourhood bonds in the post tsunami response situation. The weakening family and neighbourhood interaction varies with the nature of the existing family and neighbourhood situation in the pre tsunami context. For instance, as explained in section 5.6.1 A and D, one or two members of the family chose to live in a separate nuclear family household because of pre-existing misunderstandings and dispute with other members of the extended family or neighbours. At the same time, other extended families opted for combined living setup due to the strong family and social bonds and mutual support systems. As a consequence it has been challenging for humanitarian and development professionals to address these divergences in community aspirations for neighbourhood housing.

Additionally, the increased distance from the new locations does not allow fishermen's wives to go to the seacoast and provide food for their husbands, which is regarded as a symbol of love and affection in family relations. In the post tsunami context, the issue of wives going to the beach is really significant because it must really mess up their day and mean they can't get on with other tasks as they use to perform other activities such as taking care of children, cutting and drying fish. This has a huge impact on their housework. Though the housework is unpaid work but necessary for the reproduction of the household, in fact it can be understood that insufficient attention is paid to the relationship between the domestic life of the household and the gender

relations therein. It indicates that women's unpaid work was not being considered in post disaster development process.

From Tharangambadi case

As in the Kovalam case study, the Tharangambadi case study has revealed that family and kinship ties were not sufficiently addressed in the reconstruction process. From section 6.8.1-A, in the interview with the shopkeeper we can see how difficult it was for her to manage daily livelihood activities in the absence of extended family members. Living away from family members also created greater difficulties in sustaining everyday household activities. In other cases, nuclear households that have been separated from their parent families in the post tsunami reconstruction process were presently supported by the individual sources of income for their daily household survival. Previously, for sustaining household necessities in a combined family household, they were sustained through mutual sharing of the overall income from the family members. Even if one person had lower income, the other persons who earned higher income supported the family of the lower earning member along with other members of the family in a balanced manner. The present livelihood income of nuclear families are adequate enough to sustain their individual family needs, but not sufficient enough to share and support their extended families living in a different location. The cost of living per household has increased, as each family has to maintain their daily commodities such as electricity, gas bills and taxes, from the individual sources of income.

As a result nuclear families in the post disaster response situations are having difficulty in participating in festive occasions and religious rituals in a combined manner on a mutual sharing basis. The role of family and kinship during any kind of religious occasion and festival is especially important in the traditional settlements, as they mutually support each other in such instances, which help to bond them with more love and affection. Individual sources of income and the resulted living patterns either directly or indirectly have implications on the existence and continuity of family and kinship relations and vice versa. It would have been better if they were allocated the nearest locations that could have enhanced greater possibility and access to the extended family. In Tharangambadi case, it is significant to note that families who were allocated in adjacent plots have modified their houses by making extensions both vertically and

horizontally in a mutually shared process for accommodating their extended family interests and represent their belonging as one single household even in the present situation.

Figure 8.3 Showing how two nuclear families have extended their houses to represent the sense of oneness.

Summary

In the post tsunami response, it has been a challenging issue for the built environment professions working in shelter reconstruction process to address the converging and diverging needs of beneficiaries.

This study brings out the evidence that livelihood activities are also related with the extended family and kinship relations and to the locations they live. Family and kinship relations play an important role in the celebration of religious festivals and other ceremonial gatherings. In the present situation, nuclear households living in different housing clusters are having difficulty in participating in religious festivals and other ceremonial events for sharing their love and affections with the extended family members and their children.

In post tsunami, lower income of fishing households is inadequate to maintain their nuclear family household needs and it is becoming difficult to support their extended family needs. Moreover, core dwelling units are not large enough to accommodate the extended family members and their needs.

Adaptation strategies observed

In Tharangambadi it is significant to note that extended families located in adjacent plots have made modifications to their core dwelling units to represent their sense of oneness and accommodate mutual family interests.

Impact 3: Religious practices and belief systems and political connectivity

From Kovalam case

This study found that the newly constructed housing clusters such as DC Nagar and SISU Nagar are located far away from the church and village centre, but within the close proximity to the school allowing children easy access from these newly built clusters. For any kind of political and religious gatherings that are usually conducted in the church or at the village development cell, people have to walk for long distances from the DC Nagar and SISU Nagar clusters. It is surprising to note that communities living in DC Nagar and SISU Nagar have initiated Christmas celebrations by placing a Christmas tree on the street corners for motivating the residents in new locations.

Moreover, due to the weakened family connections in the post tsunami recovery process, family members from the extended families are unable to co-ordinate with each other for celebrating the religious festivals in a mutually sharing process, which was supposedly considered to be a part of the grand celebration process in the fishing communities.

From Tharangambadi case

With regard to religious practices and beliefs, it was acknowledged by different household groups that there has been a drastic change in the way people perform their religious practices such as fishing festivals and other festivals in Tharangambadi. For instance, street fronts that served for ritual purposes are rarely used in celebrations during the post tsunami context. During the relocation process families that were separated from their extended family members, experienced negative impacts in terms of religious practices and other festive celebrations.

At the level of dwelling, during the reconstruction process, '*vasthu*', which is a traditional hindu system of design, based on directional alignments, was not sufficiently addressed in the design of new houses. Examples discussed in section 6.8.1 substantiate this argument, with the observation that newly built toilet spaces are currently being used as worship places (puja rooms) to meet '*vasthu*' guidelines.

Summary

Certain cataclysmic change in the religious practices and other belief systems of fishermen households is considered as a threat to their lifestyles and further symbolic proof that ties of love and affection have weakened.

Adaptation strategies

In Kovalam, relocated households have initiated some religious activities by planting a christmas tree at the corner of street for motivating the communities in the new locations. Similarly, in Tharangambadi we can notice that toilet spaces have been converted as worship areas to meet '*vasthu*' guidelines.

Impact 4: Social and cultural interaction in the neighbourhood units

From Kovalam case

In Kovalam, this study has found that the concept of social networks and neighbourhood interaction has been overlooked in the reconstruction process. Mainly, the connectivity issue has been flagged up in the D.C.nagar and SISU nagar clusters, as people living in these clusters have to travel for longer distances and also have to cross the main road for going to sea, and to reach main village center. Certain activities such as women taking food to the sea shore, fishermen going to sea more than twice a day is not possible with the resulted connectivity patterns and longer distances. In many of these cases, their extended families have been split apart and the physical connectivity patterns have limited the access to benefit from the social and cultural interactions with their extended families and previous neighbours.

In the newly relocated neighbourhood clusters, certain households are facing difficulties in adjusting to the new neighbourhood environment, as they are unable to live with their family members, extended families or in some cases close friends and neighbours. A few households are getting along with the new neighbours and some are finding it more difficult (see interview with the community leader in section 5.6.1 D). On the other hand, there are also some contradicting opinions that the new relocation context has provided more peaceful neighbourhood environments when compared to the pre tsunami situation, as there used to be many kinds of disputes in such a close living environment (see interview in compact disc). Such contradictory behaviours and opinions demonstrate that the choice and feelings of individuals vary depending on their preferences.

From Tharangambadi case

A. A way how pedestrian movements connect

Mental map analysis (see section 6.8.2) indicates that in the post tsunami context, pedestrian movement patterns have shifted drastically from secondary streets onto primary streets. Prior to the tsunami, people used to use Queens Street, a secondary street that passes from the interior

parts of the village connecting pre-colonial and colonial neighbourhoods and assuring comfort and safety. Such safe pedestrian movements underpin developing social links between fishermen communities and muslim communities living in pre-colonial areas. In the post tsunami context, pedestrian movement patterns have now shifted mainly to Kamrajar Street. Due to the increasing vehicular traffic on this primary road, fishing communities now consider that pedestrian movement is not as safe as it was previously. Such transformations in the pedestrian movements have weakened the social links between different communities living in Tharangambadi. People living in new locations have started accessing the town centre through Vellipalayem Street, because it is the nearest possible walk way to the town centre from the new location.

B. Neighbourhood interaction: Public and private spaces

In order to create a sense of neighbourhood, SIFFS allocated the same set of neighbours from the previous locations in the same street at the new location. It does not mean that they are located adjacent or shifted as it was in the previous location. SIFFS have tried to allocate the houses of those neighbours either in opposite direction or at the nearby location in the same street. As a result people might be getting their previous neighbours either on the opposite side of their house or else within the same street. As the layout reflects a grid iron pattern, the rear side of household is a new neighbour from a different street. Even in such an allocation process, people don't have an option to choose the location of their own plot within the same street, in case they want to live closely with their old neighbours or with their extended families. The needs and wants of each household vary depending on the pre and post disaster contexts and also with the family extensions. For instance, women who lost their husbands at the time of the disaster would have been more comfortable staying near their extended families, where they could get moral support. There were some instances (refer section 6.8.1) where families are having difficulties in getting along with the new neighbours whereas others were getting along with new neighbours well.

The overall composition of the street fronts in the new location has taken a completely uniform and standardised character in contrast to the traditional built character. The traditional streets are composed with verandah faced fronts that used to act as an interface between public and private

elements of the dwelling. During the allocation process, different households were given an opportunity to choose amongst the pre-designed models in pre allocated plots. In this process, it was evident that traditional built spaces were not sufficiently well addressed in the new designs. Households added verandah spaces using local skills and materials in front of the newly built buildings in order to allow for public interaction and simultaneously providing a sense of privacy. Even though the SIFFS designs had allowed open spaces at regular intervals for public interaction, surrounding households had encroached on them.

Summary

This study has shown that social and neighbourhood interactions are directly determined with the physical evolution of traditional settlements. Certain activities such as women taking food and fishermen going to sea are not possible in the present context, as the resulted connectivity patterns and long distances do not allow them to do so. It is not only to do with the street patterns, public spaces, plots, and dwelling elements, but also to do with the allocation of dwelling units and their location and orientation of fronts and backs in the reconstruction process.

Adaptation strategies observed

Many people have built up veranda spaces, compound walls and outdoor kitchens in front or adjacent or often at the rear side of the newly built houses using their local skills and materials. Such additions to their dwellings allow public interaction and simultaneously provide a sense of privacy. Extensions and encroachments into the public areas are commonly observed in both the case studies.

During the reconstruction process the concept of connectivity has been largely ignored with respect to the cultural dimensions discussed above. Clearly, the impact of the situations discussed above overlap with each other within different contexts. Moreover, the intensity of the impacts varies from cluster to cluster depending on their proximity to work places and in relation to other social and neighbourhood interactions. However, it is relevant to list out the concerned reasons for the post tsunami reconstruction responses. The reasons for the post tsunami reconstruction responses from Kovalam and Tharangambadi cases are discussed under separate

sections, because the development approaches and agencies that were implemented in both the cases are different from each other.

B. Reasons for the post tsunami responses in Kovalam case

Speed of relocation: Inability to understand the role of vernacular architecture of the place and its people

In Kovalam, following the CRZ (Coastal Regulation Zone), it was obvious from the development agencies point of view that they would have preferred to relocate the affected communities in the nearest safe area to their pre-tsunami location. At the same time there were also constraints on land availability near the pre-tsunami location and its affordability. However, in such circumstances neither the funding agencies nor the architectural professionals who contributed to the new developments in the relocated clusters have considered the relevance of the vernacular architecture of Kovalam and its people. From the earlier narratives as discussed in chapter 5, it can be inferred that they have not adequately addressed cultural dimensions including family, kinship and other socio-economic, religious and political needs of the affected communities in the reconstruction process. The question raised here is why such funding agencies and built environment professionals have failed in this respect.

Firstly, the whole reconstruction process is executed in a rush. Under such pressure from both the government and the beneficiary community and because of the time constraints for the execution of the project, built environment professionals tend to develop quick housing proposals without a proper understanding of traditional architecture of the place. This speeding-up process is quite commonly observed in post disaster situations. In addition, there is not enough recently updated literature on the vernacular architecture of fishing settlements in that area or region, relating concepts of development specifically to place and culture. Literature such as updated village base maps, cadastral maps, socio-economic profile and accounts of the cultural and political aspects of the affected settlements in pre disaster contexts were not readily accessible for the development professionals to understand the existing development issues of

traditional settlements in pre tsunami context. Even from among the available sparse existing literature, the comprehensive master plan document produced by KRRC (2006) on traditional fishing settlements of Kanyakumari district was not properly addressed to inform the design and development of new housing proposals either in the settlement layouts or in the building typologies. Little of the existing literature recognises the role and relevance of family, kinship and other cultural aspects in the evolution of traditional fishing settlements especially in post disaster development contexts. Rural settlements in Tamilnadu have no established building regulations or frameworks or planning guidelines which can accommodate the traditional practices and other cultural systems of that region or locality for producing culturally sensitive environments.

In addition, from the mental map analysis (see figure 5.40) of the primary study, the study found that people still carry their traditional (pre-tsunami) built forms and spaces as a series of images in their mind along with the newly developed (post tsunami) built forms and spaces in post tsunami recovery process. Such images portrayed by the interviewee's reveal how their perceptions still connect with the pre tsunami settlement life and as well as to the new places that they are presently adapting to live in. They also inform on how the movement patterns in spaces have changed with their constantly changing day-to-day needs and practices in the post tsunami context. Such images which have reflected the past and present life systems of affected communities can influence the formulation of design requirements, regarding the kind of spaces needed and how they should be connected to organize their daily activities. It is clear that the earlier patterns of daily life revealed in these images were not addressed in the reconstruction process. As a result of the issues discussed earlier in sections 5.6 and 5.7, the newly developed housing layouts in the different clusters failed to address the diverse cultural needs and wants of fishing households. As a result the people are developing their own adaptations of the built form to meet these needs.

Uniform and standardised core dwelling unit designs have failed to accommodate the diverse household needs of affected fishing communities

The new layouts, which are built in uniform and standardised manner, do not allow sufficient public space for social and neighbourhood interaction purposes and neither do the newly constructed building typologies. Fishermen's housewives have stated that they need a large indoor kitchen and a small outdoor kitchen and a veranda to carry out their daily household activities. In practice, they have been provided with small indoor kitchens and verandas, which in turn were located or oriented in ways that failed to meet cultural norms and day-to-day needs. Though designers have produced two or three different housing typologies in 3 cents of land, household needs vary according to family structures and livelihood necessities and therefore are unable to accommodate diverse cultural needs of the communities.

More sensitivity is required in the allocation process recognising the appropriate needs and wants of fishing communities

As discussed in section 5.5 and 5.6 and also from the videos compiled in the compact disc, communities are now realising that these new brick and concrete building types are not appropriate for the local climatic conditions and for accommodating their daily needs. Such building typologies actually reflected the aspirations of communities in both pre and post tsunami development context. These aspirations are usually inspired by the urbanisation process, through which rural people become aware of urban built forms by personal interaction with relatives or friends residing in urban areas and through film and media sources. Rural communities tend to consider such urban forms as desirable without having much knowledge about their relevance in sustaining their daily lives.

The question raised here is, if there is lack of understanding of the importance of vernacular building and settlement forms to a sustainable life style, when it is shared by the development agencies, who as educated professionals, should know better than the communities who lack

technical knowledge. It is not just a problem of communication, if the development groups do not recognize the importance of these forms and use the communities accordingly. It is also to do with the communication methods and approaches that were implemented by the development groups during the housing allocation and reconstruction process. Lack of proper education in the community might also be responsible for such misconceptions with regard to their aspirations towards urban forms. In addition, the process of allocation using lottery method does not allow much freedom for beneficiaries to express their priorities and needs, and lacks sensitivity to family, neighbourhood relations and other economic factors. This implies that development groups might have not put adequate efforts to understand the underlying sensitive aspirations and concerns of the affected communities. More authentic evidence is needed to see how present education systems in communities and development professionals are responsible for leading to such misconceptions in the allocation process.

Figure 8.1: Illustration showing the allocation process in the reconstruction process. Source: Pasupuleti (2006)

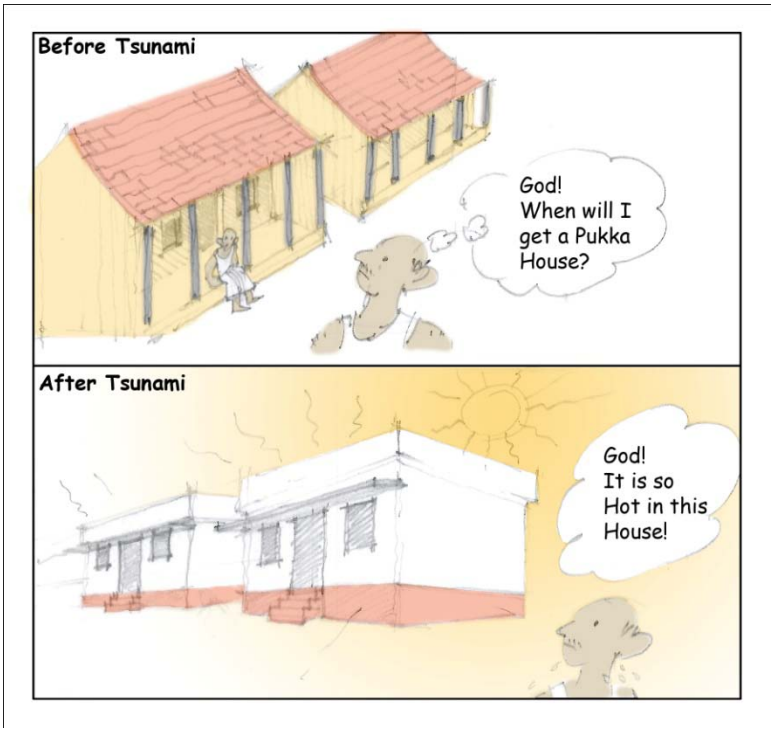


Figure 8.2 Illustration showing how community realise about their inappropriate aspirations in the post tsunami response situations.

However, it is fascinating to see how villagers on their own have initiated changes and additions to personalize physical fabric that was tailor-made for them. The study noted changes in reconstructed houses such as the addition of rooms, outdoor kitchens, upper floors, compound walls and access points (doors and verandas). However, the most noteworthy change was in materials and decorative treatments for walls, floor, openings, sunshades and other interior elements.

Previous disaster experiences and the recent tsunami context have demonstrated that personalization is a natural response to cultural deficiencies in the reconstruction process, which has allowed a scope for haphazard development in these affected areas, such as road and neighbourhood land encroachments, over stepping height limits, illegal developments and misusing the provided infrastructure facilities. Hence there is a need to develop redevelopment strategies and other development alternatives to limit and channel such haphazard developments

and giving more scope for accommodating local needs of fishing communities in the longer term.

C. Reasons for the post tsunami reconstruction responses in Tharangambadi case

Analysis of primary surveys has not been appropriately addressed in the new housing designs

Even though the efforts of SIFFS are appreciable with respect to the habitat mapping of Tharangambadi, it is clearly evident from the above discussed impacts on traditional settlements that the literature on cultural environments was not adequately assessed and addressed in the new housing proposals. From the survey questionnaires that are used in the Habitat mapping of Tharangambadi, it can be noted that the experts have assessed many important cultural aspects of their daily life such as flora and fauna, family details, physical surveys of road layouts, plots and buildings, locations of communal amenities, and other necessary information for developing a habitat proposal in the new locations. Apart from these surveys, SIFFS has also conducted many face to face interactions with the benefeciary communities and discussed various alternatives to modify the housing typologies. Even then it is observed from the above discussed impact situations that there are issues related to family and kinship, religious and belief systems, social and cultural interaction, and economy of the fishing households. Such evidence informs that the design of layouts and buildings in the new locations have failed to sufficiently address the cultural dimensions of the fishing communities.

More sensitivity is required in the allocation process and face to face interactions, recognizing the appropriate needs and wants of fishing communities

SIFFS developed housing layouts composed of uniform sized plots (3cents land) designed in gridiron pattern. Plots were allocated by SIFFS and households were given an opportunity to choose among the pre designed 7 housing typologies. From author's indirect participation in face-to-face meetings, it was observed that families often referred to their friend or relative's house model to suggest alterations, which often may not meet their household's needs partially or completely. Once they started living in these new houses, households realised that these new building typologies made of brick and concrete were not appropriate for the local climatic conditions and cultural needs. This may be because the cultural needs of local communities were not properly analysed by the development professionals and secondly, due to a lack of appropriateness of the technical solutions to meeting those individual and collective needs. As in Kovalam case the findings of this case study also suggests that this is not just a communication issue but a knowledge gap exists between the communities and the development groups, which needs to be researched further with a deeper concern.

Lack of design guidelines and planning regulations that accommodates traditional living patterns and systems

Rural settlements in Tamilnadu do not have building regulations or sufficient planning guidelines which can accommodate the traditional practices and other cultural systems of that region or locality for producing culturally adaptive environments. In this particular case, following the coastal regulations, SIFFS made participatory efforts to integrate the cultural dimensions of affected communities, which subsequently failed as discussed above. Even SIFFS was not able to develop any such building regulations for Tharangambadi, because it was for the first time that they had taken up such a huge reconstruction project using a participatory approach and moreover it was not within their scope of work to develop building regulations at regional level. Nevertheless, SIFFS primary survey reports on habitat mapping of Tharangambadi and

Chinnakudi villages will help in future to inform the development sector in the formulation of building regulations and design guidelines for that region of Tamilnadu. Therefore there is an immediate need to develop such design guidelines, which can accommodate the traditional aspects of fishing settlements.

Double-house concept and extensions and encroachments: variety and choice

As identified in the case of Kovalam, villagers of Tharangambadi on their own have initiated changes and additions to a physical fabric including the addition of rooms, outdoor kitchens, upper floors, compound walls and access points. It was also observed that people have developed double-house concept in the post disaster response situation. Double-house concept is referred to the process of simultaneously using the old houses which were either partially or not damaged in the tsunami, for their livelihood purposes in the post tsunami response. People carry their fishing activities such as drying fish and weaving and storage of nets in the old houses, which are located near the sea. Though it was agreed that they have to handover the old houses to the village panchayat and occupy the new houses in the reconstruction process, however, there has been no practical enforcement of such agreement in reality.

In this situation and drawing from previous disaster experiences and earlier case of Kovalam, it is clear that there is a need to develop redevelopment strategies and other development alternatives to limit and channel such haphazard developments and to give more scope for accommodating local needs of fishing communities at the outset and in the longer term. Redevelopment strategies may include the development of regulations and standards that could define and limit the growth patterns within the settlement such as height limits, public and private spaces, and usage of infra structure and green spaces.

The following diagram demonstrates the key findings of Kovalam and Tharangambai case studies, which were classified into specific impacts and their causes of post disaster vulnerabilities in a built environment context.

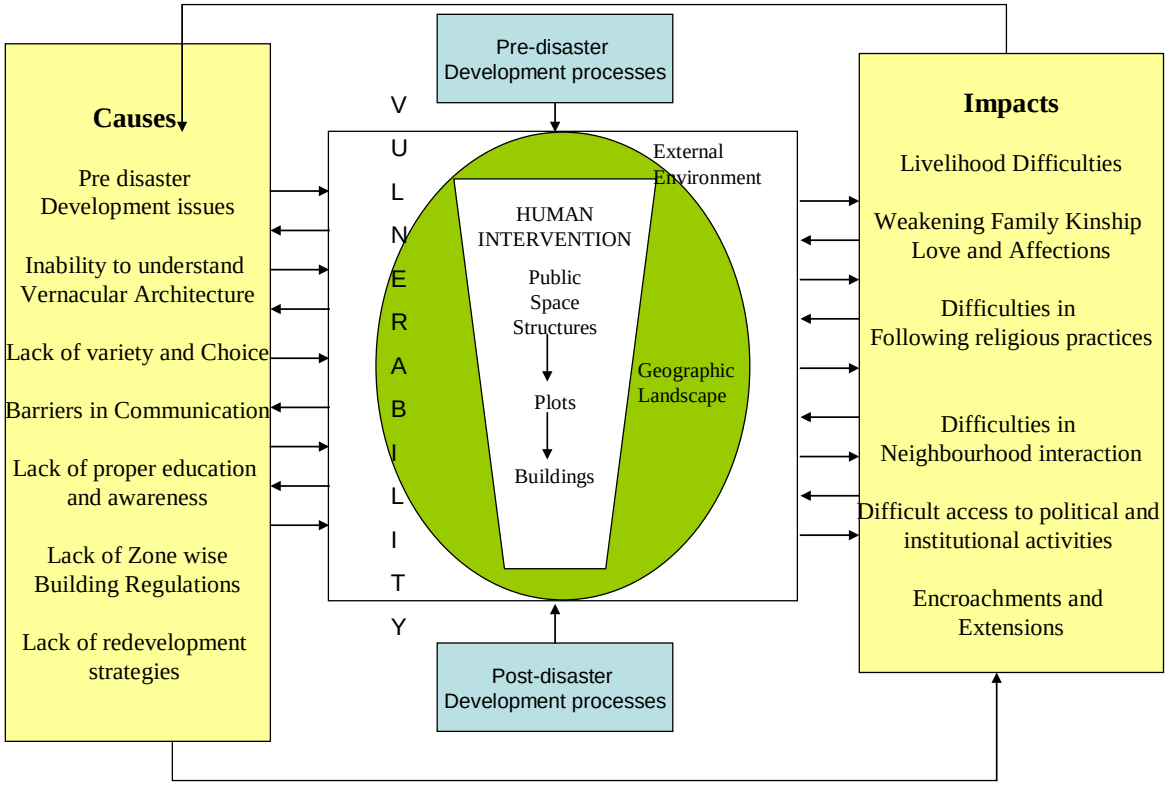


Figure 8.3 Diagram showing the impacts and causes of the post disaster response situations in the post tsunami reconstruction process at Kovalam and Tharangambadi.

8.1.2 Development issues from Lighthouse Kuppam case study

A. Impacts of post disaster development processes

Impact 1: Livelihood systems unaffected

In the Lighthouse Kuppam case, the impacts on traditional livelihood systems and their networks were less pronounced for the following reasons.

1. The livelihoods of the affected communities are still based on lake fishing rather than the sea fishing and they still follow the traditional 'padu' system (refer chapter 7) to organise the fishing activities.
2. Though they were given the option of relocating to remote places, the people decided to continue living in the previous village. Therefore as previously, Pulicat Lake remains easily accessible following reconstruction, and people do not have any major changes in their livelihood patterns.
3. Villagers whose livelihood is other than fishing still travel to other places either in the Pulicat village centre or to the nearest town centres as they used to in the pre tsunami context.

While there have been no serious impacts on the livelihood systems of the affected communities at Lighthouse Kuppam village, there are still difficulties in commuting to nearby villages, as there is no bridge constructed yet, although construction has now started.

Impact 2: Weakening family and kinship relations

As in other two case studies, this primary study has found that the extended families, which were split into nuclear families during the reconstruction process, were unable to maintain the previous ties. Such changes in the family arrangements make it difficult for nuclear families to celebrate and participate in religious ceremonies in a combined manner and on mutual sharing process as they did previously, even though they were not relocated far away from their extended families.

Impact 3: Social and neighbourhood interaction

New housing layout patterns and the orientation of the newly constructed buildings allow a scope for neighbourhood interaction in the present context. As the location hasn't changed the physical access to sustain their livelihood is not much affected. However, the access to the nearby villages is still seen as a prominent issue, due to lack of proper transportation network and facilities from the island.

Villagers have started interacting with their neighbours as the backyard of a house in the first row faces the front yard of the house in the second row. It is also observed that people who have already started living in the newly constructed homes, have started extending their outdoor kitchens at the backyard of their house or in some cases at the front of the house, possibly creating better networks of neighbourhood interaction, as they did in other two case studies. Moreover, social relations and networks of the Lighthouse kuppam villagers with the social groups from other villages in the island and pulicat mainland village have not changed much as they still meet for socio-economic needs such as discussing padu rota system, religious events, and other political occasions at the Pulicat village centre and other adjacent villages.

The political system in the dalit village was little affected by the reconstruction process, and the population seems to have recognised the negative consequences of relocation before hand and have preferred to opt for in-situ reconstruction. Traditional economic systems such as padu system have enhanced the political connectivity not only in terms of the village, but also helping to develop the villager's relationship with people from surrounding fishing villages.

B. Reasons for post disaster responses in Lighthouse Kuppam case

Existing development issues and safety measures are not properly addressed in pre tsunami context

As discussed in Kovalam and Tharangambadi cases, this study has found that government authorities have not sufficiently considered the existing development issues in Lighthouse Kuppam such as roads, sanitation, infrastructure facilities, health and education in the pre tsunami context. Lighthouse Kuppam being a small dalit island, the development processes in the pre-disaster context did not address safety measures to prevent disaster risk, leaving the villagers living on the island vulnerable to natural disasters. It may be because the island was occupied by dalit communities since many years and conventionally prior to Indian independence, development in dalit communities in India was very little and even today in many cases it can be seen comparatively less than the settlements belonging to forward social groups.

Nevertheless, it is appreciable that government and other local governing organisations have made some efforts for the development of these settlements by constructing school, temples, water supply, electricity and tenure to the communities. Even the cadastral map of the settlement is not readily accessible for the development authorities in the reconstruction process, because such maps were not developed by the concerned authorities prior to tsunami. However, in this case the cultural impacts have been minimal, because they choose not to be relocated, so there were little or no connectivity issue and livelihoods were not disrupted as a consequence.

8.2 Findings from comparative and combined analysis

From Kovalam and Tharangambadi case studies it can be concluded that the distance of the relocated areas from the original settlement not only caused livelihood difficulties but also resulted in weakening of family bonds and other social networks in the village. Moreover, these effects were not only a result of the impact of the CRZ regulations and relocation in remote locations, but were also the result of housing layout patterns, building designs and the allocation methods employed. However, in the case of Lighthouse Kuppam, the people have rejected the relocation option and preferred to remain in previous locations, whilst aware of their continuing vulnerability to future natural disasters. All these development processes have sidelined the underlying cultural needs and aspirations of affected communities in one way or the other way. The following points explain how different development issues overlap with each other specifically with regard to Kovalam, Tharangambadi and Lighthouse Kuppam cases.

1. In the pre tsunami context, communities with their day- to-day challenges have aspired for changes that could make their lives better. The findings from all the three cases suggest that communities are lacking necessary knowledge and experience to be able to evaluate how their aspirations for change can impact their cultural life styles in negative ways. For instance, people who showed a preference for a brick and concrete house are now realising through the post tsunami reconstruction that such houses are not accommodating their cultural living patterns or creating suitable environmental comfort conditions. However, this research identifies that rural communities tend to consider such

urban forms, which adds a symbolic element defined by the concepts of modernity and durability. Therefore such situations demonstrate that people are aware of certain possible aspects of difficulty in beforehand, but they are still carried away by the modernised solutions that do not adequately address their daily cultural practices.

Similarly, in Tharangambadi case, SIFFS has adapted PRA techniques in extensive public consultation for documenting the pre disaster development issues and community aspirations for housing, which were supposedly considered to be the priority in the reconstruction process. Different core building models were designed by the architects to provide a choice to the beneficiaries. Suggestions from the beneficiaries to improve the core dwelling models are also encouraged by the architects in this process. The idea of providing core dwelling units is to provide opportunities for the beneficiaries to extend their homes using local resources and any finance as it becomes available in the future. This suggests that development professionals are aware that people develop their habitation in an incremental process, and housing should be considered not as a product but as a process (see Turner 1972). However, despite the use of such participatory approaches in the reconstruction process, this study shows that neither the allocation of core dwelling units nor the design of such dwelling units is satisfactory with respect to the cultural needs of affected communities in the post disaster situation. This implies that the idea of designing a variety of core dwelling units and leaving an option for the beneficiaries to extend it in future according to their convenience is considerably a better option, only in the case that the communities can make their choices that are appropriate to their individual and collective needs.

As mentioned in section 6.7, during face to face meetings with the architect (also see the video in compact disc) it was clearly demonstrated that people tend to be overly influenced by the preferences of few responsible persons who are economically or politically powerful within the community, whether such ideological choices suit their family or individual needs or not. This may be due to that lack of awareness and appropriate education among the beneficiaries on how to identify their appropriate technical solutions to meeting those needs. At the same time, built environment professionals lack appropriate methodological

approaches to understand and analyse the needs of beneficiaries and how to address such needs in the development of varieties of core dwelling units.

In all the three cases, architects have provided core dwelling units in uniform sizes and shapes. Such uniform and standardised forms are often not acceptable to sustain large families as family structures vary and their individual and collective occupancy and economic needs also vary accordingly. (See sections 5.6.1 A, 6.8.1A, 7.5.1A) The designs of core dwelling units do not sufficiently address religious beliefs and customs of the inhabitants (See section 5.6.1 B, 6.8.1B, 7.5.1B).

The location and orientation of the core dwelling unit itself has shown impacts on the lives of inhabitants. Here the word location refers to both the location of the site on a larger layout and also the location of dwelling unit within the plot. The relationship between the core dwelling units and within the plot and also with its surrounding elements located outside the plot do plays a very essential role in creating a sense of neighbourhood within the community. Such relationship between the dwelling unit, plot and the surrounding neighbourhood is not considered well in terms of location and orientation of core dwelling units in the new locations.

Similarly the aspect of verandah and open court components is not sufficiently provided for public interactions and for carrying out everyday household needs. Use of modern materials such as steel and concrete were not suitable for local sea climatic conditions (see masons interview in compact disc).

The purpose of fronts and backs of the core dwelling units have not been sufficiently thought by the designers especially on how a sense of privacy can be created by the users.

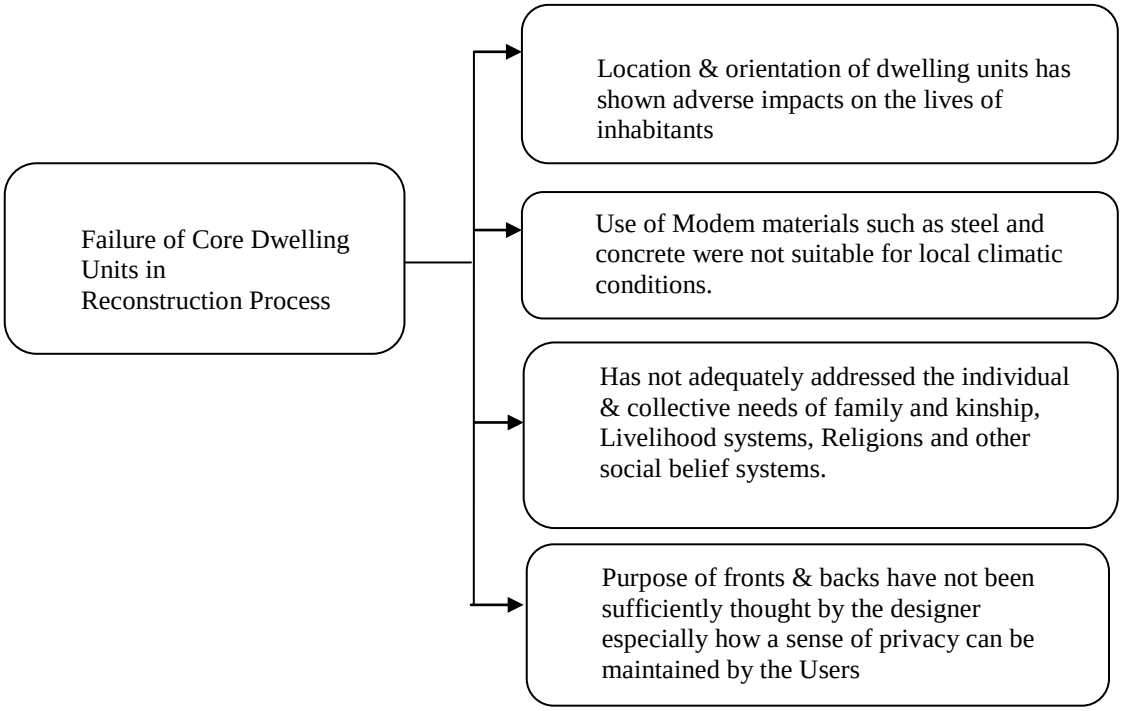


Figure 8.4 Showing how the concept of Core dwelling units has failed in 2004 tsunami reconstruction process.

The following are the general development issues that are commonly found in this study from all the three case studies:

1. Pre and post disaster development approaches vary according to geographic location and cultural setup. Recognising that development is culture specific. The current methodological approaches that were employed by the agencies do not sufficiently address the needs of different stakeholder groups. Therefore the current methodological approaches have to be better formulated for addressing diverse cultural needs.
2. Building design and planning guidelines do not sufficiently address the cultural needs of traditional settlements.
3. The concept of neighbourhood is not well addressed in the reconstruction process.
4. Inability to access local knowledge resources and existing pre disaster development issues.

5. Barriers in communicating needs and wants
6. Changes in land use and ownership / tenure

8.2.1 Discussion on Findings

Finding 1: Pre and post disaster developments is specific to cultural environments

All the three case studies show how pre disaster development contexts are historically and culturally rooted to the location. In the case of Kovalam it is evident that the church has a significant role in the development of traditional fishing settlements in both the pre and post disaster development contexts. In Tharangambadi, this is reflected in traditional clusters of colonial, pre colonial and fishing village areas. International interest is focused on the colonial and pre colonial parts of the village in order to promote tourism in those parts of the village, whereas in the fishermen's settlement, the development initiatives are usually governed by state government policies and fishermen federation initiatives. In the third case, Lighthouse Kuppam island, the key development issue is the lack of basic infrastructural facilities.

In Kovalam, the Church has involved other support organisations in the tsunami reconstruction process and brought in a design team from Ahmadabad. Their designs did not completely meet with the cultural needs of the affected communities (as explained in section 5.6.1). There are challenges for humanitarian and other support agencies to address the diverse needs of community groups through a common methodological approach to integrate cultural dimensions into the post disaster development process. Moreover, the present training of the architectural professions in architecture schools in India have little focus on developing such methodological approaches for integrating culture in the development process.

Finding 2: Building design and planning guidelines do not sufficiently address the cultural needs of traditional settlements

A. Livelihood impacts

New housing was proposed and constructed in locations far away from the sea, due to the requirements of the coastal planning regulations and by considering land acquisition issues in the areas near the coast. In the case of Kovalam and Tharangambadi, this greater distance has caused negative impacts on the fishing livelihoods. In the Lighthouse Kuppam case, new housing has been constructed in the same location and therefore has not had such a drastic impact on the fishing economy. After relocation, affected fishermen from Kovalam and Tharangambadi were unable to go fishing more than once in a day.

It is important to understand the importance of Padu system in helping Pulicat fishing communities to sustain their livelihood in a balanced manner (see section 7.1). Fishermen in Tharangambadi have started using motorbikes to commute from the new locations to the seacoast. In Kovalam, the church is trying to construct a canteen near the shore so that fishermen don't need to walk for long distances to have their breakfast or lunch at home. Such efforts to adapt with the resulted physical and social environments in the post disaster response situation are often seen as a natural habitation processes and happens with very little intervention of external support.

B. Family kinship structures are overlooked

In addition to the livelihood impacts, the reconstruction process has overlooked the role of family kinship structures in the evolution of traditional settlements. In all the three cases, many extended families have been split up into nuclear families in the relocation process. Such changes in the family structure created greater impact on the mutual support systems that are underscored by traditional family and kinship structures and which enable fishing communities to mitigate the effects of natural disasters and cope with the physical, social and psychological

trauma. The new housing units that were designed in the 3 cents land failed to sufficiently accommodate family needs, as they are too small. Moreover, extended family members were not allotted houses in the same clusters or in the nearby locations. In Lighthouse Kuppam, though the new houses were constructed in the same location, there were some instances where extended families got split up into nuclear families and were allotted separate houses in the reconstruction process. Previously they lived in nuclear family arrangements, but in the same houses either partially divided by partitions or in clusters of family houses. In the reconstruction process, such family clusters and partially divided family dwellings were demolished and were reconstructed into uniform sized individual housing units. This was a consequence of the restrictions of house and plot sizes.

Finding 3: The concept of neighbourhood is not well addressed in the reconstruction process

The concept of Neighbourhood connectivity is not well addressed in the newly relocated layouts. Because of the current connectivity patterns, certain activities and rituals are no longer possible in Kovalam and Tharangmabadi cases. Fishermen are facing difficulties for going to sea more than twice a day, as they use to go more than twice a day from the previous location. Women are unable to take food to seashore and wait for their husbands. Even the family members of the nuclear households those relocated to new locations have difficulty in connecting to their extended families and to their children residing either in old location or a different cluster. Apart from the connectivity patterns linking the overall settlement there are also many other issues within the neighbourhood clusters.

Though in Tharangambadi case, SIFFS has taken care in getting previous set of neighbours relocated in the same street and tried to allocate the houses of those neighbours either in opposite direction or at the nearby location in the same street. As a result people might be getting their previous neighbours either on the opposite side of their house or else within the same street, where as on the rear side they have got different neighbours. It is noted that people are still facing difficulties in getting along with such new neighbours who were allocated either adjacent

or in some cases at rear side to their plot. It may be so because of differences in their habitual practices of the households.

It is not only to do with the variances in habitual practices of people, but also to do with the kind of interactive spaces that were built in the new location. For instance, the veranda element was not chosen by some families, when they were given an option to choose among the design alternatives. People's interest was towards such urban housing models that have not sufficiently addressed their cultural needs. In the present context it is observed that families started extending their outdoor kitchens and verandas using local materials in order to meet the local needs and climatic conditions. In Lighthouse kuppam, the new housing layout patterns and the orientation of the newly constructed buildings are allowing a scope for neighbourhood interaction in the present context. Villagers have started interacting with their neighbours as the backyard of a house in the first row faces the front yard of the house in the second row. In Kovalam case, it is observed that there is little of option to interact with the people from the backside row, as the housing layouts are developed in as cul-de-sacs. A household can only interact with those adjacent and there are no neighbours on the rear side of their house. This particular finding from this study contradicts the successful concepts of urban housing where interior street pattern should be designed and constructed through use of cul-de-sacs, curved layout and light duty surfacing, so as to encourage a quiet, safe, low volume traffic movement and preservation of the residential atmosphere in an urban setting. Such above discussed instances observed from this primary study inform that it is not just housing layout patterns and building designs but also as discussed earlier, the process of allocating dwelling units to affected household's bears the responsibility for weakening social networks and neighbourhood interaction.

Finding 4: Inability to access local knowledge resources and existing pre disaster development issues

The traditional knowledge of rural and fishing communities has evolved over many centuries. At the physical level, such knowledge is embedded in the built forms, including construction

systems, building design and use of materials. At the social level, it is embedded within the cultural dimensions including family, kinship, social, economic, political systems.

In some degree or other development has implied modernisation i.e. the transformation of "traditional" society towards "modern" society. There is little in the literature, on such transformation processes in affected fishing settlements of the case study areas or regions and little on place specific concepts of development. Updated village base maps, cadastral maps, socio-economic profiles, reports on the cultural and political aspects of the affected settlements in pre disaster contexts, were not readily accessible for development professionals to understand existing development issues of traditional settlements in pre tsunami context.

Finding 5: Barriers in communicating needs and wants

As noted in the Kovalam and Tharangambadi case studies, there has been a failure in the methods and approaches employed on development agencies in their communication with communities. This is not just to do with the finding out of superficial aspirations of the community embodied in modern images and ideas of living, but to find out the underlying aspirations, needs and wants that sustain their cultural needs. Though the communities were consulted in person by implementing many participatory approaches and methods, it has been noticed that people have opted for modern forms and the usage of brick and concrete materials. Later on, when people experienced living in the houses provided by the NGO's and government, they have realised their misconceptions and issues in their preferences. Moreover, architects and agencies may not have foreseen such consequences. Therefore it is not just a problem of communication but also of knowledge gaps affecting the practices of both the development agencies and communities. It probably implies further research into the process of modernisation and its impacts on built form and lifestyles in this context.

Finding 6: Change in Land ownership and Tenure

As noted in Kovalam, there is variation in terms of tenure of the beneficiary households relocated in different clusters. For instance, the beneficiaries of D.C.Nagar Phase 1are not provided with permanent title documents, as they have funded neither the land nor the house. In the other clusters the households got together to buy the land and so have full title. Such variation in status is reflected in the people's sense of belonging through ownership status. Some households who owned a house or land prior to the tsunami no longer do so. Others, who did not own any house or land before, had the opportunity to get a house for free in the reconstruction process. In most cases, extensions and alterations to the properties including compound walls, floor tiles and decorative treatments were observed in the owner occupied households. Tenure and ownership status, directly or indirectly influences the personalisation of properties by households.

8.3 Towards the development of strategic directions

This section is concerned with assessing the wider value of the research and the transferability of its findings to similar disaster affected rural settlements both in South India and internationally. This research proposes an integrated urban design and culture led theoretical framework that addresses the diverse cultural needs and aspirations of rural community groups that could provide the basis for a better approach to physical and social change in the post disaster context.

In the process of addressing the research question, new ideas, methodologies and methods of inquiry concerning the vulnerability of communities with diverse cultural backgrounds were developed; specifically in relation to the impact of the reconstruction process on built form.

The following chapter concludes how the outcome of this research could help to improve development practice and academic research.

Conclusion Summary and a Way Forward

9.1 Conclusion of the study

This research has started with the study of culture relating to disasters and development because there is a need to find an alternative to the current development models and it analyses the vulnerability context in a cultural environment of the built form of traditional settlements. The case studies from three different cultural complexes and geographical landscapes indicate a correlation between the evolution of culture and how it is helpful in the management of place for the existence of the community.

The following diagram is developed to get a clear understanding of this relationship between the impacts and reasons of post disaster responses that were generally noted in the three case studies. From that description it further evaluates how the three theoretical concepts of culture, vulnerability and development are related or influence each other.

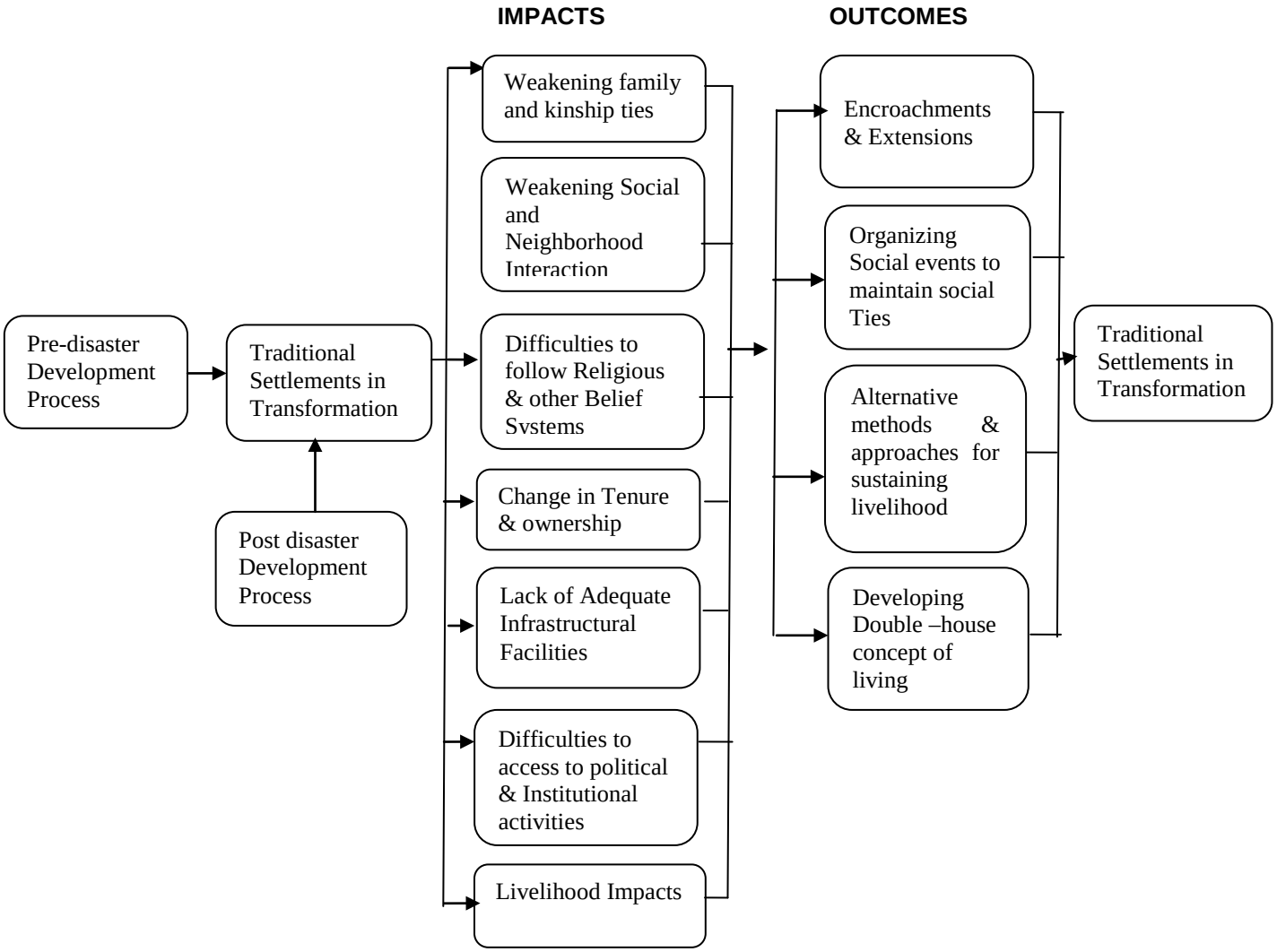


Figure 9.1: Methodology diagram showing how the transformation process took place in the empirical case study areas.

This diagram suggests that traditional fishing settlements were continuously subjected to transformation not only by the post disaster development processes but also from the pre disaster development processes. Before the occurrence of natural hazard certain aspects of pre disaster vulnerabilities, form the context or setting for the disaster. Subsequently, post disaster recovery process may help in eradicating or reducing certain kinds of difficulties, changing certain difficulties to different kinds

and reinforcing or compounding or strengthening or even increasing others. In this research, it has been noted that the resulting vulnerable impacts on the cultural environments include weakening family and kinship ties, livelihood difficulties, weakening social and neighbourhood interaction, lack of adequate infrastructural facilities, difficulty in following religious and other social belief systems, access to political and institutional networks, change in land tenure and ownership. Such vulnerable impacts are not independent but indeed are inter-related with each other.

However, communities facing such difficulty have developed approaches for their daily life such as encroachments and extensions of the dwelling units, plots and public spaces, alternative methods and approaches for sustaining livelihood, organising social events to maintain social ties within the community and developing a double-house concept of living. Such outcomes of the post disaster development process would be considered as a product of cataclysmic change, as it changes over time it can be viewed as a process. Here the patterns of adaptation from the communities to the development inputs are highly relevant outputs in all the three case studies, because certain aspects of disaster vulnerability precede a disaster, and thus create a setting for the disaster. These can get reinforced and changed after a disaster as a result of various response decisions that took place in the overall processes of cultural environment. With many good intentions and practices, certain aspects of vulnerability are still carried forward since the underlying causes remain unchanged.

This thesis discusses the disaster reconstruction process in two different ways. Instrumentally – in a positivist way. Physical distances are increased due to relocation and extended families have separated, certain activities are no longer possible and ultimately the family suffers. Development agencies operate at an instrumental level in their discussion of vulnerability. Here the frame of discussion is about the role of governance, agencies and its direct physical relations. The findings of this research have demonstrated that the impact of development on traditional settlements (pre and post disaster) raises broader issues from the side of both beneficiary and development groups. From the development agencies side, they include the following:

1. Development groups are unable to assess the local knowledge resources and existing pre disaster development issues from diverse cultural backgrounds.
2. Lack of proper zonal building and planning regulations.
3. The design of core dwelling units did not accommodate individual and collective household needs and aspirations.
4. Barriers in understanding individual and collective needs and wants.
5. Though development groups have undertaken primary household surveys to assess the pre disaster development issues, but in reality the housing layout and building designs have not sufficiently addressed the analysis of such primary or secondary surveys / study's of the affected areas.
6. Issues of land tenure and ownership.

From the community side the following are the issues.

1. Unable to assess the relevance of traditional knowledge and modern resources to their daily lives and livelihoods.
2. Lack of experience of new developments.
3. Barriers in communicating needs and wants to development agencies.
4. Encroachments and extensions do not conform to regulations.

Secondly, the findings on the outcome of the reconstruction process have been discussed from the perspective of cultural anthropology. Here the consideration is of a 'way of life' – a habitus. This was changing for the fishermen anyway in pre and post disaster development processes and the tsunami represented the prospect of a cataclysmic change. The concept of habitus is not determinist and as the 'way of life' is inevitably altered, different individuals and families have different responses. At the extreme, cataclysmic change can also lead to increased vulnerability. This perspective is addressed from a different philosophical framework to positivism of development studies and draws on cultural anthropology. In this study it has been established that space is portrayed as a neutral container that can be understood through positivist science, rather than something that is dependent on the social and cultural processes and substances that make it up. Positivism considers a place as objective, bounded, self contained and measurable. Although these positivist legacies can be detected in all the three case studies, but in contrary to the dominance of positivism in the contents of socio-spatial constructs examined in this study, their

processes show a shift towards post-modernist approaches, which is looking at the world as a social construct that operates through a physical spatial field. This study has witnessed that when the spatial relations change, this has an impact on social relations, but the relationship is not direct and deterministic, because the social and the spatial are mutually constructed. In this research, urban design concepts have operated at both levels. The layout can be viewed instrumentally and functionally in terms of the way it supports (or not) the issues of income and livelihood and it can be interpreted as a socio-spatial construct that supports the following aspects (performances) of social and cultural life that have been identified in this study.

- family and kinship
- religious and political practices
- social and neighbourhood interaction

Here the methods of urban design appraisal help to tease out the spatial elements of these practices (eg mental maps, identification of the way in which space is demarcated, segregated or appropriated). Such spatial elements were determined by these habitual practices of the communities explicitly reflect Leach's ideas as discussed in Chapter two. Leach's concepts are very useful in this research. People have defined the places with certain activities such as the patterns of walking, drying fish on streets, panchayat meetings and 'constructing place' in symbolic terms, which was analysed in the three villages. Such appropriation and demarcation of spaces can be referred to 'Narrativism' in Leach's theory. Women waiting with the food and the importance of religious rituals which are 'performed' in specific places which the tsunami reconstruction process has shifted in location and practice and hence has had an impact on those rituals. Finally 'performance' and 'mirroring' – habitual repetition of performances has been discussed in relation to fishing and gender relations. The whole study flags up the importance of 'connectivity' as a construct of culture that links a positivist approach with a socio-spatial understanding of traditional settlements in post disaster reconstruction process.

9.2 Summary and a way forward

This research concerns post disaster reconstruction in the context of developing countries and aims to bring a new insight by arguing that cultural dimensions of the affected communities are not effectively and sufficiently addressed in the current post disaster humanitarian and development processes. In the recent decade, participatory approaches were adopted in different post disaster development processes in the South Asian region, addressing the indigenous construction methods and technologies and social systems and processes of the affected communities to reduce disaster vulnerability. However, built environment professionals working in humanitarian development sector, face challenges in their attempts to apply practices and knowledge for addressing individual and collective cultural needs and aspirations of affected communities in post disaster shelter reconstruction processes. This has been well articulated in this study from the analysis of shelter reconstruction process in 2004 tsunami hit fishing villages of Tamilnadu.

This study considers three case study areas namely, Kovalam, Tharangambadi, and Lighthouse Kuppam, which are diverse in nature in terms of its geographical location, cultural environments, and development inputs. In order to assess the role of culture in post disaster development processes this study develops a theoretical framework by synthesising two fields of inquiry, drawing from the positivism of development studies and the studies of cultural anthropology. In order to investigate culture in terms of built environment perspective, this study utilises urban design principles derived from theory of responsive environments namely Permeability, Legibility, Variety and Robustness, and Personalization. Though Visual appropriateness is not covered directly but is partially covered within the concepts of visual permeability and legibility. Similarly, the quality of richness is also considered as a part of variety and choice. Landmarks are covered in the description of public spaces and in the mental map analysis of the case studies. However, due the complex nature of socio-spatial relationship in the post disaster development process, it is necessary to address both philosophical positions through the urban design analysis and social investigation. Therefore, the second dimension of the assessment adopts methods from cultural anthropology. Here the constructs of culture which were defined by Lim

(2008) has been used to understand the socio-spatial relationship. These include Geographic landscape and natural environment, Family and Kinship and Gender, Religion and Belief systems, Economy, Social and Cultural interaction, Political and institutional systems that influence the evolution of traditional settlements. However, the synthesis of these two philosophical fields of inquiry has helped to derive a variety of appropriate methods to conduct the fieldwork in the affected settlements. The methods include:

- direct and indirect observation
- semi-structured interviews with community groups and development professionals.
- photographic and video recording
- mental Maps.

The analysis of this primary research unfolds the specific impacts and the reasons for such responses in the post tsunami reconstruction process, by comparing and contrasting the findings from the three case studies. From the comparative and combined analysis general development issues that are observed from all the case studies has been elaborated briefly. The impacts of the post disaster development processes include weakening of family and kinship ties, livelihood impacts, social and neighbourhood interactions, difficulty in following religious belief systems and political and institutional gatherings. This study has also elaborated on the reasons for such impacts of post disaster reconstruction process. From such impacts there has been a shift in the villagers habitual practices, which are 'performed' in specific places and the tsunami reconstruction process has shifted the location, practice, as certain activities are no longer possible in the relocation context and hence has had an impact on those rituals. People started extending their homes, and encroaching the public spaces, and some of them have started double house concept of living for surviving their livelihood activities more easily. Such outcomes of this study has reflected back to the Leach's ideas of 'performatives', 'narratives', and 'mirroring' which were discussed in chapter two.

However, at the end of this study, it is recognized that there are certain unfilled gaps in the analysis of this research, which could be dealt as the future areas of research. The following are the issues that need to be taken care for future research.

This study has not acquired strong evidence to support some of the aspects of the communities that it is the same in pre disaster context. Development was happening even before the disaster. It is still in question whether the communities aspired for modernistic urban forms even in the pre disaster situation, when the housing was not implemented in such a rapid process and with external intervention of funding agencies.

Coastal regulations existed even before 2004 tsunami, if they have existed for a long time; it is still in question whether they were appropriately implemented in the pre disaster housing process by the development agencies. This suggests that more research is needed to investigate on whether communities and local development bodies were aware of any such regulations in the pre disaster development context. When it comes to housing process neither the government nor the development agencies have made enough efforts to formulate the building regulations and planning standards at a regional level. It is very much essential to investigate on the factors responsible for such situations.

Though the government has made its efforts to provide education for the rural communities, it is suggested that more research is needed to analyse the inputs of such education schemes especially on risk management and helped the rural communities to understand their day to day issues and foresee the possible impacts of the shelter reconstruction process.

In the reconstruction process, when the communities were given option to recommend any changes for their housing typology, this study has noted from the face to face meetings with the architect, people were referring to the other typologies of their friends or relatives house. This research has not investigated deeply whether the communities have really thought about their needs and priorities or simply referring to other house models. Moreover, this research also suggests that more thought is needed

for looking into the factors by which the architects have not adequately addressed the analysis of the primary household surveys in the housing layouts and building designs.

Within the research much has been accomplished relating the values of culture to post disaster development processes with methodologies of research developed towards this goal. These initial steps have opened up the following recommendations to include:

9.3 Brief recommendations to integrate cultural dimensions in post disaster development process

Hamdi (1996) emphasis the need to move on from 'reductionist' or 'critical research' towards the methods that promote a variety of connected learning and teaching settings to explore ideas and devise new practices. This last section of this study proposes broad strategic directions for improving disaster management policies and practices. These points to the need for essential shift in the existing policy approaches so that vulnerability of rural communities to the inappropriate modernistic solutions for disaster recovery can be effectively reduced in the Indian context.

To be effective the recommendations has to permeate pedagogical, political, social, and economic arenas from the very local to the global. For this it is important to design appropriate means of communicating the ideas and providing democratic platforms for discussing principles of development which accommodate multiple and diverse cultural identities, needs and aspirations.

A. Empowering grass root level governance

As discussed in chapter 4, governance in disaster recovery programmes, which has been top-down, mostly with central, state and district level administrations. Therefore, in order to raise awareness on the local and regional cultural needs, there should be efforts to establish the grass root level governance in the execution of disaster management projects. For instance, village panchayats or Village Development

Authorities (VDA) should be empowered to organise the reconstruction processes in their respective villages or council areas. By doing so, it will be easier to get access to local people and even the people will become more open in expressing their needs and wants, because the local people would find it easier to convey their needs and wants to the decision makers, as communities from Kovalam have cooperated with the church. However, this implies that these organisations are strengthened politically as well as economically. Some degree of autonomy needs to be given to these local level institutions, so that they can take decisions and execute them. Additionally, funding agencies should need to ensure that their support to NGOs does not undermine the centrality of the local government in planning and service delivery.

B. Appropriate training and awareness programmes for local governing bodies

In exploring the new avenues of communicating ideas particularly in the field of traditional knowledge, it is important to continue providing workshops, which encourage the use of oral and visual media to include video, digital photography and other means of recording information. Enabling people to engage in other-than literate research methods provide opportunities both for communicating valuable traditional knowledge and for accessing this information. People from particular cultural groups can learn to use a variety of media for presenting local culture and future ideas on development.

C. Documentation of existing settlement layouts and development issues in traditional settlements by spatial information and digital technologies

The success of this study is largely dependent on how broadly the ideas on the values of culture and development can be communicated, discussed, transformed and improved through participatory means. This would require further work on packaging the data and research findings in an accessible and affordable format using available

state of the media and technology. The problems of presenting this to remote settlements must be addressed.

Both the research information and discussions must reach different educational institutions with limited or varying levels of technology. Producing other-than-literate material on the research is a design problem that should be addressed.

The lack of available information of the culture of traditional settlements became evident during the Kovalam and Lighthouse Kuppam case studies. Clearly, there is a need to generate this information if the agenda is to be furthered. Creating other-than-literate projects that would document the cultural diversity that exists in the Tamilnadu fishing villages and coordinating an exchange programme through different educational institutions can be a means for generating this much needed information. Creating training sessions so these data can be locally produced and presenting these local productions on television, radio and the internet would likewise contribute towards promoting national awareness and an ongoing dialogue by providing a network where cultural information can be exchanged and accessed.

D. Development of building and planning regulations with local and regional concerns

This research has found from all the three case studies that building and planning regulations and standards have not sufficiently addressed the local and regional context. Therefore, this study recommends the development of building and planning regulations that take account of the local and regional cultural context.

In concluding this study, I return to the introduction where it is pointed out that this dissertation initiates a process of transformation of myself as an architect and designer, acknowledging that there are ways of examining problems, opening up avenues for ways of designing that provide appropriate solutions. Through the subject matter of traditional settlements in post disaster recovery process, new approaches towards examining problems and the creation of new methodologies which inform the practice of design are formulated. The benefits of the study are not limited to

architects concerned with the built environment but are of use to development practitioners, political leaders, and all agents of change concerned with development, which remains sensitive to local cultures.

As the different stages of this research clearly demonstrate, the process of designing for development requires an understanding of family kinship relations, social, cultural, political and economic issues. The entire dissertation journey focuses on this reform using collaborative process, designing methodologies and interdisciplinary methods of inquiry where necessary. It recognizes the roles of community, development practitioners, professional designers, planners, political leaders, community leaders, researchers, culture experts, the business community and all other agents of change in the field of development for the collaborative role they have in redefining post disaster recovery strategies.

On the pedagogical level, the study demonstrates that the design profession and the services it offers particularly in the field of architecture can clearly extend to traditional settlements and other beneficiaries that fall outside of the normally defined client domain. To do this requires the designer or architect and all others involved in the process to have the ability to recognize appropriate development projects which can benefit from design solutions whether it be a project engaged in reconstruction of a village and infrastructure, water and irrigation systems, schools and educational policies, ecological and environmental policies and other projects of relevance to the traditional settlement. This can only be done in close collaboration with members of the traditional settlement and with a means for understanding local culture and the multiple identities involved in defining what development is.

The focus of creating built environments without recognizing what is appropriate to a particular settlement is a common and frequent failure in such post disaster development projects.

This research brings the built environment into the context of development, focusing on the methods for recognizing what is appropriate development and puts forward few strategic directions for integrating cultural diversity in development. The process

demonstrates how designing for post disaster development requires a broad understanding of the cultural context in which any project is set and how the political, economic and social aspects are all integrated.

The thesis, on the political level recognises the necessity for working with institutions and provides methods for engaging state, regional and local leaders; it links state level laws with global legislation which promotes an agenda on cultural diversity in development.

On the social level, it creates interactive methodologies engaging members of traditional settlements, the culture experts from within, and professionals in designing for development. The study emphasises the values of both engaging and understanding local knowledge among development practitioners, reaffirming the relevance of culture and traditions in the culture- vulnerability-development equation.

In terms of economy, the research analyses the importance of re-linking culture and economy and vulnerability by providing methodologies for understanding ways of living that are culturally integrated on the level of traditional fishing settlements.

As a final point, this project was researcher driven although it is foreseeable that future projects like these would ideally be driven by the subjects once the methodology is established.

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Annexure -1

NATIONAL DISASTER MANAGEMENT FRAMEWORK

I. INSTITUTIONAL MECHANISMS

Expected Outputs	Areas of intervention	Agencies/sectors to be involved and resource linkages.
Nodal agency for disaster management at the national level with appropriate systems	(i)Constitution of National Emergency Management Authority with appropriate legal, financial and administrative powers. (ii)Roles and responsibilities of the NEMA: -Coordinating multi-hazard mitigation, prevention, preparedness and response programmes. - Policies for disaster risk reduction and mitigation -Preparedness at all levels. -Coordination of response -Coordination of post disaster relief and rehabilitation. -Amendment of existing laws, procedures, instructions.	Ministries/ Departments of Health, Water Resources, Environment and Forests, Agriculture, Railways, Atomic Energy, Defence, Chemicals, Science & Technology, Rural Development, Road Transport & Highways etc.

Creation of State Departments of Disaster Management	Departments of Relief & Rehabilitation to be re-designated as Department of Disaster Management with enhanced areas of responsibility to include mitigation, prevention and preparedness	State Governments/ UT Administration.
Setting up State Disaster Management Authorities	(i) State Disaster Management Authority to be headed by the Chief Minister. (ii) The Authority to lay down policies and monitor mitigation, prevention and preparedness as also oversee response.	Ministers for Agriculture, Home, Disaster Management, Water Resources, Health, Road & Transport, Civil Supplies, Environment & Forests, Rural Development, Urban Development and Public Health Engineering Departments as Members.

II. DISASTER MITIGATION/PREVENTION

Disaster mitigation/prevention to be mainstreamed into the development process.	(i) Each Ministry /Department which has a role in mitigation /prevention will make appropriate outlays for schemes addressing mitigation/prevention (ii) Where there is a shelf of projects /schemes, projects / schemes contributing to mitigation to be given a priority. (iii) Wherever possible	Ministries / Department of Govt. of India / State Governments /UT Administration

	schemes/projects in areas prone to natural hazards to be so designed as to contribute to mitigation, and preparedness. (iv) Projects in vulnerable areas/areas prone to natural hazards to be designed to withstand natural hazards.	
Techno-legal regime	(i) regular review of building codes and its dissemination (ii) construction in seismic zones III, IV and V to be as per BIS codes/National Building Codes. (iii) Construction in areas vulnerable to cyclones to be so designed as to withstand the wind hazard as per BIS codes/National Building Codes. (iv) Comprehensive review and compliance of - Town and Country Planning Acts -Development Control Regulations -Planning and Building Standards Regulations	Bureau of Indian Standards/Ministry of urban Development State Urban Development Department / Urban Local Bodies State Urban Development Department / Urban Local Bodies State Urban Development Department / Urban Local Bodies

	(v)Put in place appropriate techno-financial regime (vi)Capacity enhancement of Urban Local Bodies to enforce compliance of techno-legal regimes	State Urban Development Department / Urban Local Bodies State Governments
Land-use Planning and Zoning regulations	(i) Legal framework for Land-use planning and zoning regulations to be reviewed. (ii) Zoning regulations to be enforced.	Ministry of Urban Development Department of Land Resources[MORD] Ministry of Environment and Forests[GOI] State Governments
Plan schemes for vulnerability reduction and preparedness.	State Governments. to formulate Plan Schemes and submit to Planning Commission	State Governments

III. LEGAL/POLICY FRAMEWORK

Disaster Management to be listed in List – III – [Concurrent List] of Seventh Schedule to the Constitution	(i) Bill to be drafted. (ii) Bill to be brought before Parliament	Ministry of Home Affairs/ Ministry of Law (Legislative Department)
State Disaster Management Acts	Model Act to be circulated to the States.	Ministry of Home Affairs State Governments
National Policy on Disaster Management	(i) Mainstreaming disaster management into planning and development process.	Ministry of Home Affairs, Ministry of Finance, Planning Commission, Ministry of

	(ii) Mandate safe construction. (iii) Coordinated action by all relevant Departments as per policy	Environment & Forests, Rural Development, Urban Development and other relevant Ministries to be consulted.
States to enunciate Policy on Disaster Management .	(i) Mainstreaming disaster management into planning and development process. (ii) Mandate safe construction. (iii) Coordinated action by all relevant Departments as per policy -	State Governments
State Disaster Management Codes	Amendment of existing relief codes/scarcity codes/famine codes to incorporate mitigation, preparedness and planning measures at all levels from community to State, constitution of Emergency Support Teams /Disaster Management Teams /Committees /State Disaster Management Authorities, delegation of administrative and financial powers to disaster incident managers etc, protocol to update the inventory of resources and plans,	State Governments

IV. PREPAREDNESS AND RESPONSE

National Emergency Response Force/ Specialist Response teams	(i) Designation of units for conversion into Specialist Response Teams. (ii) Designation of training centres. (iii) Training of trainers. (iv) Procurement of equipment (v) Training of teams.	Ministry of Home Affairs Central Industrial Security Force/ Indo-Tibetan Boarder Police/ Border Security Force/ Central Reserve Police Force

Specialized Response Teams at State level	(i) Designation of units for conversion into Specialist Response Teams. (ii) Designation of training centres. (iii) Training of trainers. (iv) Procurement of equipment using CRF resources (v) Training of teams.	State Department of Disaster Management/State Home Department State Police Traning College/ State Fire Training Institute

V. NATIONAL NETWORK OF EMERGENCY OPERATION CENTERS [NNEOCs]

Setting up Emergency Operations Centre[EOC] at National level	(i) Multi- hazard resistant construction. (ii) Communication system linkages. (iii) Mobile EOCs for on-site disaster information management	Central Public Works Department Department for Central Public Works Ministry of Home Affairs
State level EOC	(i) Multi- hazard resistant construction. (ii) Communication system linkages. (iii) Mobile EOC for on-site disaster management information	State Governments
District level EOC	(i) Multi- hazard resistant construction. (ii) Communication system linkages.	State Governments
Putting Incident Command System in Place	(i) Designate nodal training centres. (ii) Putting in place protocols/SOPs for Incident Command System.	Ministry of Home Affairs/ Department of Personal and Training/ Lal Bahadur Shastri National Academy of Administration / State Governments/ Administrative Training Institutes
Emergency Support Function Plan	(i) epartments/agencies which perform emergency support functions to draw up ESF plans, constitute teams,	Central Government Ministries/ Departments State Governments

	and set apart resources in advance so that post-disaster response is prompt.	
India Disaster Resource Network	(i) A web enabled GIS-based resource inventory listing out all the necessary resources for emergency response available at the district and State level throughout the country so that resources can be mobilized at short notice. (ii) Set up servers, draw up and install programmes, input data. (iii) Half yearly updating	Ministry of Home Affairs State Governments.
Communication linkages which will be functional even post-disaster.	(i) Draw up communication plan. (ii) Obtain sanctions. (iii) Put communication network in place.	Ministry of Home Affairs Directorate Coordination of Police Wireless State Governments
Regional Response Centres	(i) Identify location of Regional Response Centres. (ii) Identify caches of equipment required. (iii) Obtain sanctions. (iv) Put teams and caches of equipments in place.	Ministry of Home Affairs Border Security Force/ Indo-Tibetan Border Police /Central Reserve Police Force/ Central Industrial Security Force

Training in response to be made a part of training curriculum of CPMFs and State Police Forces.	(i)Draw up capsules. (ii) Train trainers	Ministry of Home Affairs State Governments
State Disaster Management Plans	(i) Plan to be drafted under the supervision of the Chief Secretary. (ii) Plan will include mitigation, preparedness and response elements. (iii) The plan will be multi-disciplinary to be drawn up in conjunction/consultation with all relevant Departments concerned with mitigation, preparedness and response. (iv) Plan to be updated once a year.	State Governments/ State Disaster Management Authorities
District Disaster Management Plans	(i) To be drawn up under the supervision of District Magistrate/Collector and to include mitigation, preparedness and response. (ii) Emergency Support Functions by various Departments to be included. (iii) To be drawn up in consultation with all	State Governments/ State Disaster Management Authorities

	relevant Departments. (iv) District inventory of resources to be maintained.	
Block Disaster Management Plans	(i) To be drawn up under the supervision of District Magistrate/Collector and to include mitigation, preparedness and response. (ii) Emergency Support Functions by various Departments to be included. (iii) To be drawn up in consultation with all relevant Departments. (iv) District inventory of resources to be maintained.	State Governments/ State Disaster Management Authorities / Block Development Administration

Community based mitigation, preparedness and response plans	(i) Enhance community capacity in multi-hazard prone States and districts to respond effectively to disasters-special attention to be given to empowering and capacity building of vulnerable communities and groups including women. (ii) Set up and train village/ Panchayat (for rural areas) and wards/municipal council/corporations (for urban areas) disaster management committees and disaster management teams e.g. -Identification of safe shelters and management -Stockpiling of relief materials etc. -early warning dissemination -first-aid and counselling -assist in search and rescue (iii) such plans to be made integral to annual development plan of local bodies (iv) mitigation plans of the community and Panchayats to receive priority under various rural development schemes administered by Panchayats and Urban local bodies	State Governments/ District Administration/ Panchayati Raj Institution /Urban Local Bodies

VI. EARLY WARNING SYSTEMS

(i) State of the art sensors to be set up. (ii) Hazard monitoring, tracking and modelling.	(i) IMD/CWC to carry out a review of sensors available and draw up plans for strengthening the system. (ii) Models to be updated to improve prediction accuracy.	Indian Meteorological Department/ Central Water Commission/ National Centre for Medium Range Weather Forecasting
Warning Protocols	(i) Warning protocols to be user friendly. (ii) Warning to be communicated as quickly as possible to the States/districts/community. (iii) Protocols should be simple to understand. (iv) Districts to set up protocols for communication of early warning to the community. (v) Panchayats/local bodies to be used for early warning communication. vi) Communication linkages for early warning.	.Ministry of Home Affairs/ State Governments /Indian Meteorological Department/ Central Water Commission/ National Remote Sensing Agency/ Information and Broadcasting/ Doordarshan/ All India Radio

VII. HUMAN RESOURCE DEVELOPMENT & CAPACITY BUILDING

Training for services /cadres/ agencies involved in mitigation, preparedness or response.	(i) Training needs analysis/ Human Resource Development Plan (ii)Drawing up of capsule courses for	Ministry of Home Affairs State Governments

	training. (iii) Training of trainers. iv) National Institute for Disaster Management to be strengthened. (iv)Setting up /strengthening training institutions in state faculties of Disaster Management in Administrative Training Institutes	
Training of IAS/IPS, State Administrative Service Officers/State Police.	(i) Training curriculum for IAS/IPS and State Administrative Service Officers/State Police Officers to include capsules in disaster management. (ii)Training of Block/Village level staff (iii) Training of PRIs.	Administrative Training Institutes /State Institutes of Rural Development and District Institutes of Education and Training to be used.
Engineers/Architects	Curriculum for undergraduate engineering and B.Arch courses to be amended to include mitigation technologies in general and elements of earthquake engineering in particular	State Governments All India Council for Technical Education Indian Institute of Technologies Professional bodies
Health Professionals	Include crisis prevention, response and recovery and trauma management in the MBBS curriculum.	Ministry of Health and Family Welfare Medical Council of India
Youth organisation	NCC, NSS, Scouts & Guides to include disaster response, search and rescue in their orientation/training programmes.	Ministry of Youth and Sports Ministry of Defence

Masons	Mason training for safe construction	Ministry of Rural Development/ Department of Urban Development/ State Governments
School curriculum	To include disaster awareness.	Central and State Boards of Education

National mass media campaign for awareness generation	Design and develop a communication strategy for awareness campaign Use audio, visual and print medium to implement awareness campaign Development of resource materials on mitigation, preparedness and response	Ministry of Home Affairs /State Governments Ministry of Home Affairs /State Governments Ministry of Home Affairs
Non-government community-based organizations involved in awareness generation and community participation in disaster preparedness and mitigation planning	(i) Facilitate network of non-govt community based organizations at national/State/district levels (ii) Co-opted into the planning process and response mechanisms at all levels	Ministry of Home Affairs /National Institute for Disaster Management Ministry of Home Affairs /National Institute for Disaster Management
Corporate sectors involved in awareness generation and disaster preparedness and mitigation planning	Sensitisation, training and co-opting corporate sector and their nodal bodies in planning process and response mechanisms	Ministry of Home Affairs/ Federation of Indian Industries
Inter-state arrangements for sharing of resources during emergencies and lessons learnt	(i) Arrangements for inter-State sharing of resources to be incorporated in State	Ministry of Home Affairs/ State Governments

	Disaster Management Plans (ii) Inter-state exposure visits to be facilitated for learning from the experiences of other States	 Ministry of Home Affairs/ State Governments

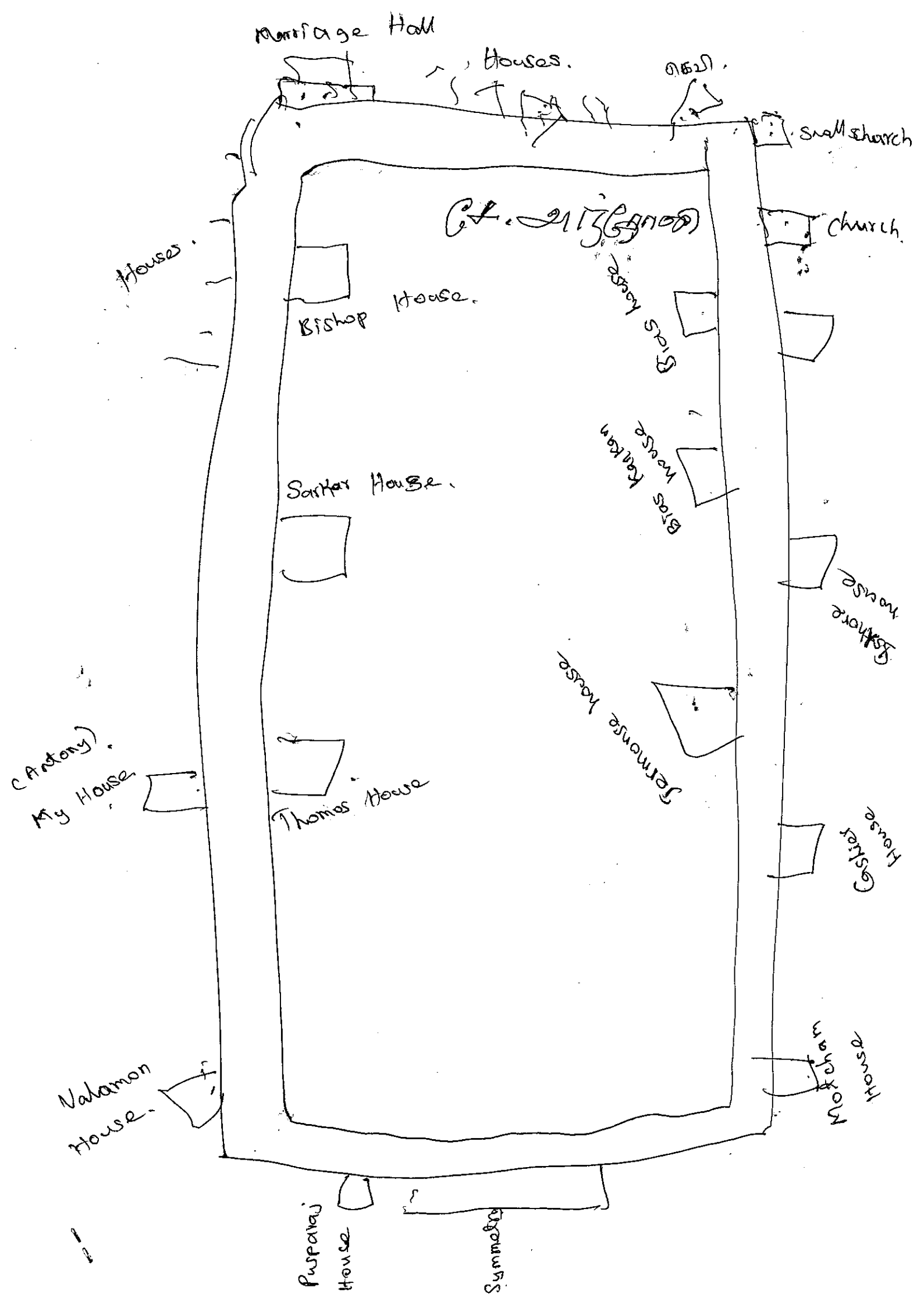
VIII. RESEARCH AND KNOWLEDGE MANAGEMENT

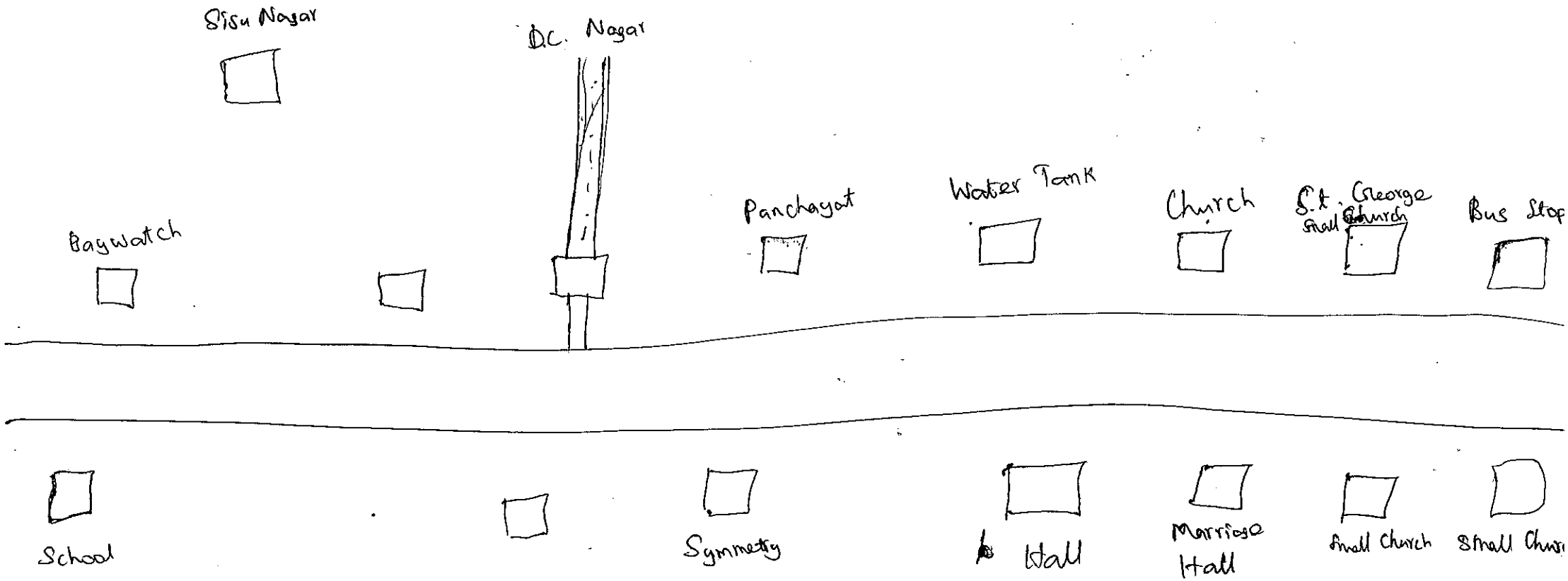
Institutionalise knowledge and lessons learnt in the process of working on the national roadmap	(i) Assessment and evaluation of ongoing programmes and activities regular documentation of key lessons (ii) Establish India Disaster Resource Network as knowledge portal to pool and exchange information and knowledge among all concerned institutions and organization	Ministry of Home Affairs State Governments / National Institute for Disaster Management Ministry of Home Affairs
Develop national disasters database	(i)Systematic inventorization of disasters (ii)Trend analysis and reporting	National Institute for Disaster Management
Promote research in national, state and regional institutions in the areas of disaster risk reduction	(i)mitigation technologies for housing, roads and bridges, water supply and sewerage systems, power utilities, (ii)cost-effective equipments for specialized rapid response and preparedness in --temporary and transition shelter in post-disaster situations	Ministries / Departments of Central Government

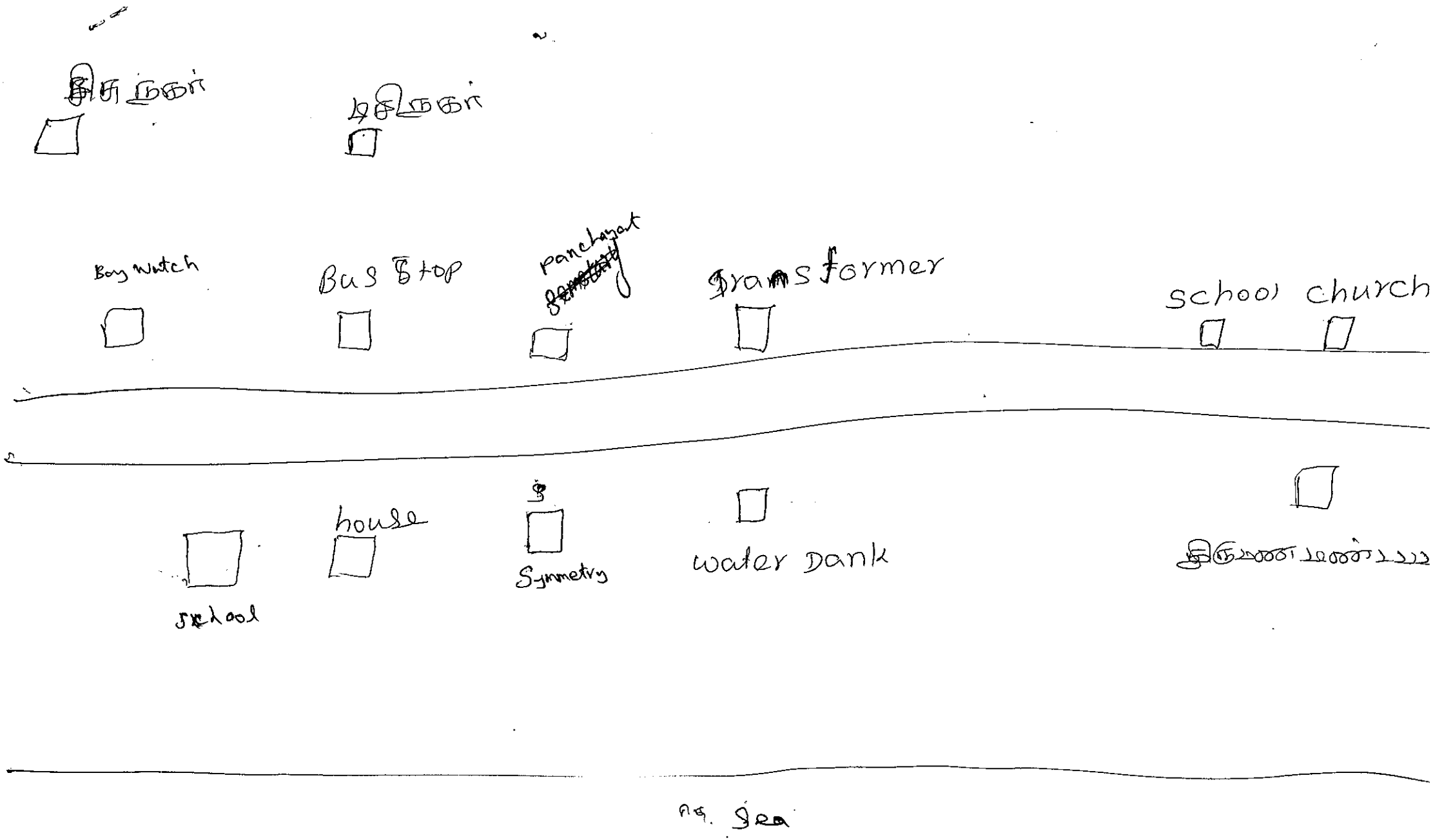
	--search and rescue equipments --provision of drinking water, emergency health and sanitation in post-disaster situations -post-trauma stress management and care (iii) promote participation of corporate sector in finding out technological solutions for disaster risk reduction	

Annexure -2

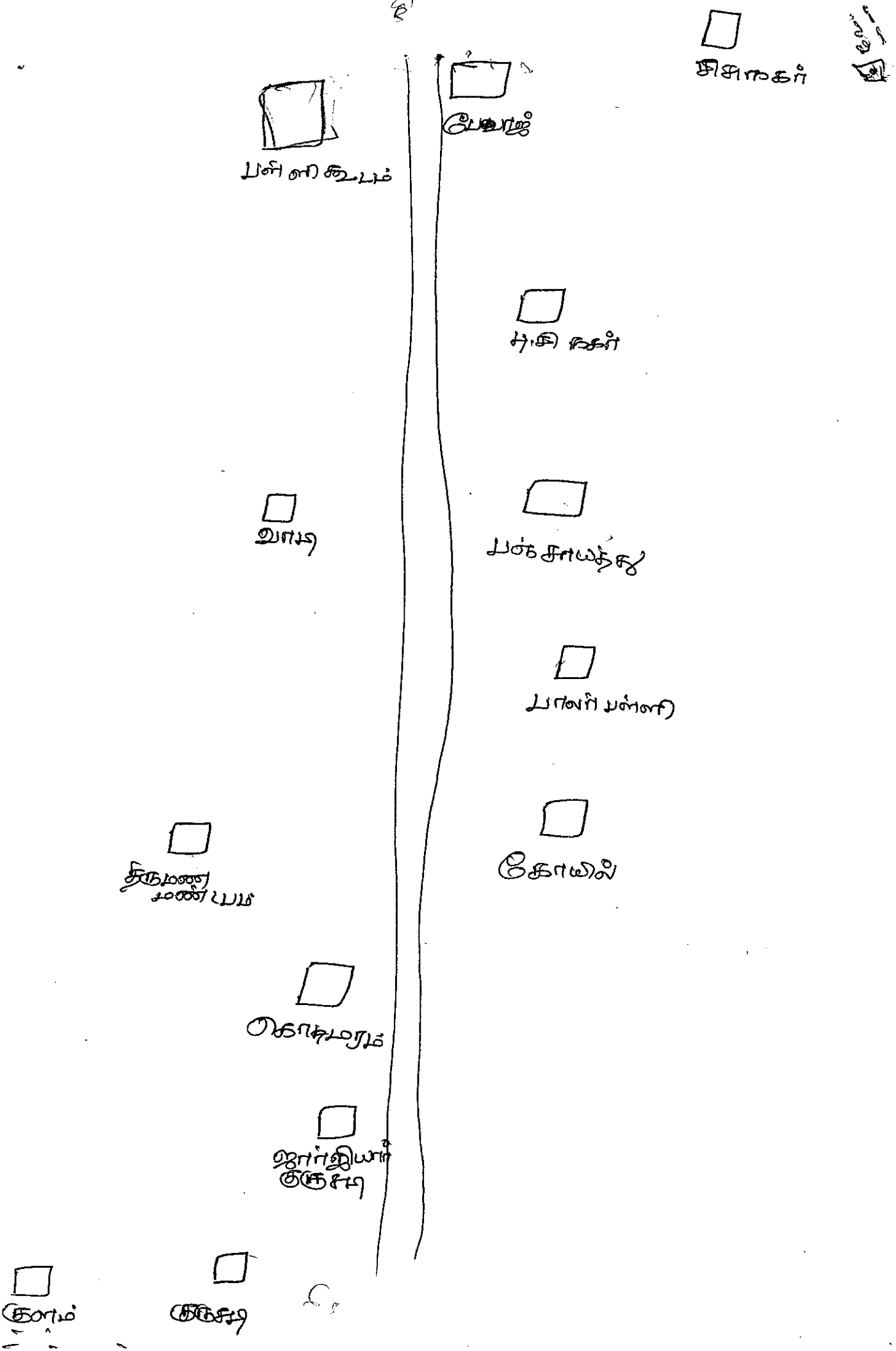
Mr. Selvaraj (Head of the family).

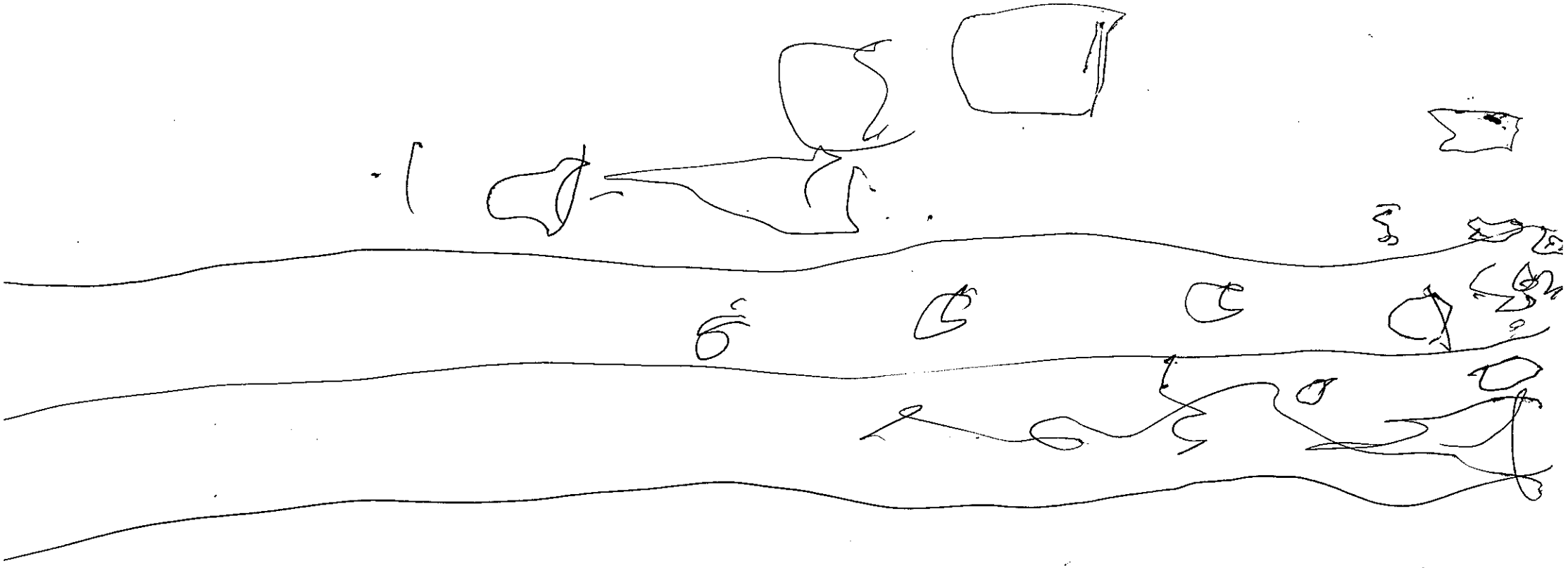

Marriage Hall
Houses.
Small church
Church.
Houses.
Bishop House.
Bias house
Bias Kankan house
Sarkar House.
Bishore house
Jermonse house
(Antony).
My House
Thomas House
Gshier House
Valamon House.
Motcham House
Pusparaj House
Summetra


Sisu Nagar
DC. Nagar
Baywatch
Panchayat
Water Tank
Church
S.t. George
Small Church
Bus Stop
School
Symmetry
Hall
Marriage
Hall
Small Church

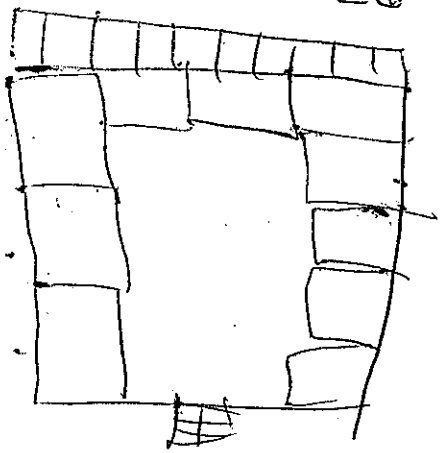

Bay watch
Bus Stop
panchayat
Transformer
school
church
house
Symmetry
water Dank
school
Sea

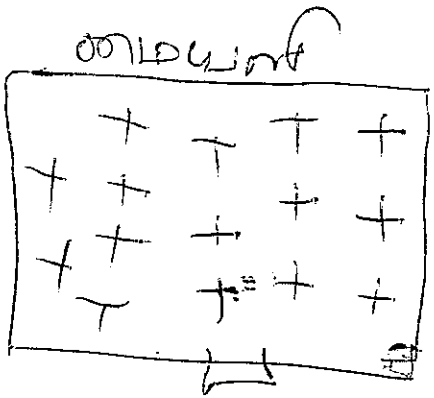
Mr. Gregory (Head of the family).

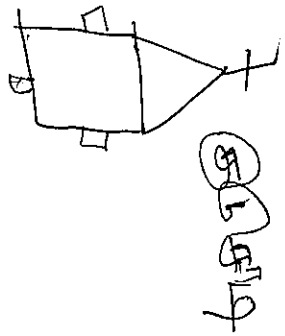


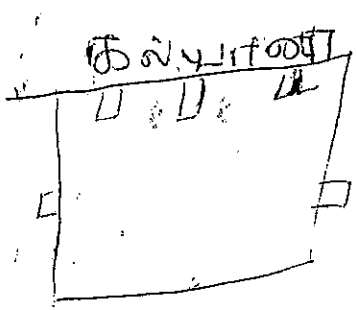


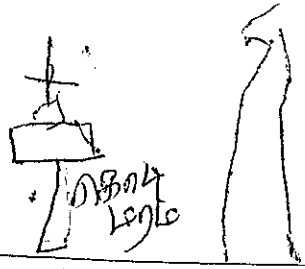
Mr. Jayakishan (Head of the family)

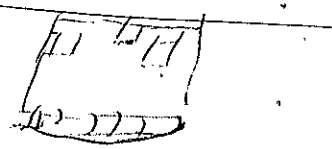


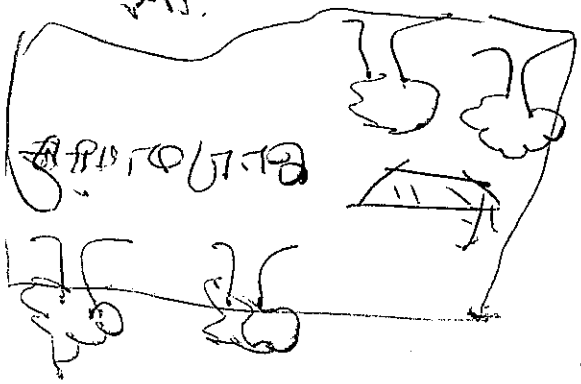


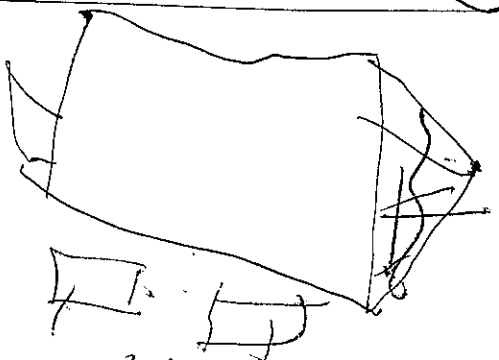


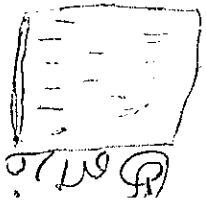


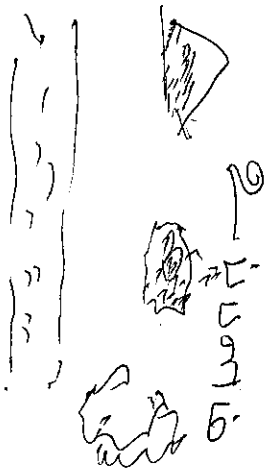












Mr. Antony Sebastian (Head of Bojanoly)

☐ சிக நகர்

☐ ஆ.ட நகர்

☐ பாலர் பள்ளி

☐ கோயில்

☐ பஞ்சாயம்

☐ Bay watch

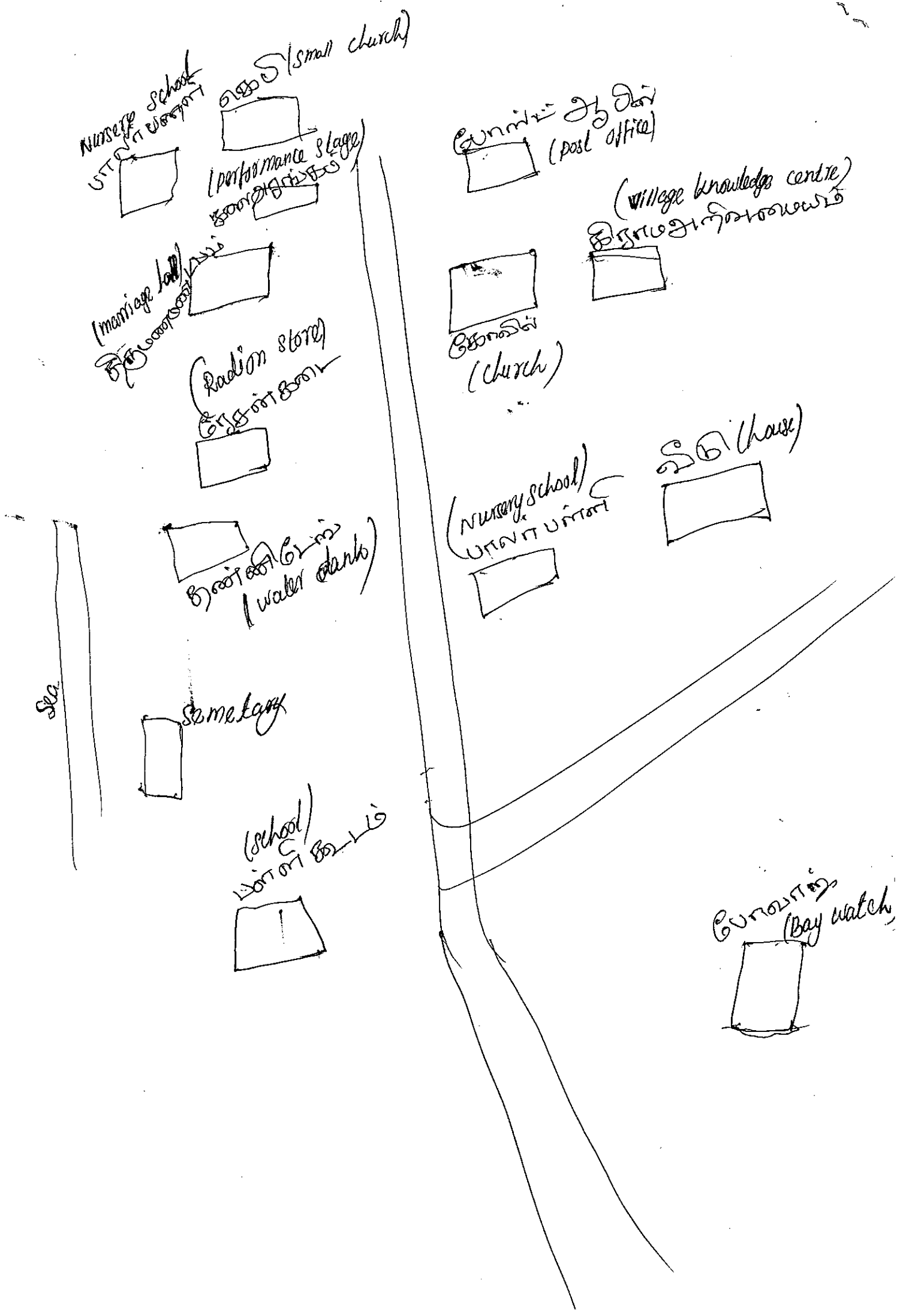
☐ [illegible]

☐ கல்யாணமண்டபம்

☐

[illegible]

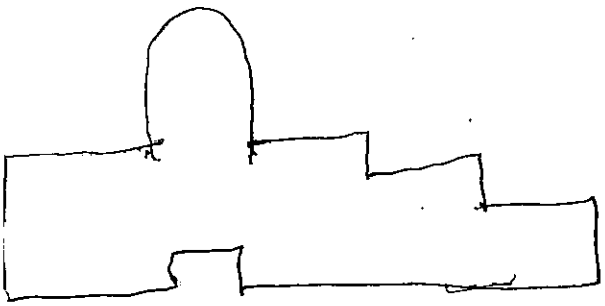
வாழ


Nursery school
(small church)
(performance stage)
(marriage hall)
(Radio station)
(village knowledge centre)
(church)
(post office)
(nursery school)
(house)
(water tank)
Sea
Cemetary
(school)
(Bay watch)

School
School
House
Sea
Radio station
Church
Church
marriage hall
post office

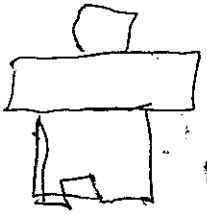
Mr. Seemon (Head of the family).

(Needed)

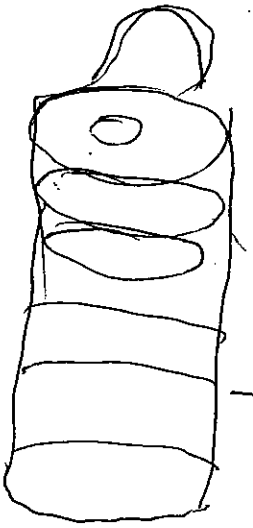


~~[illegible]~~ மருத்துவமனை.

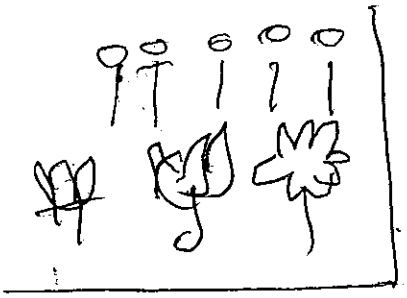
வழிப்பாதை



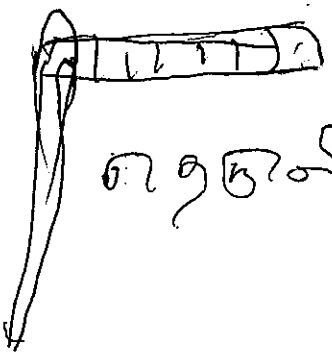
வீடு



தண்ணீர்

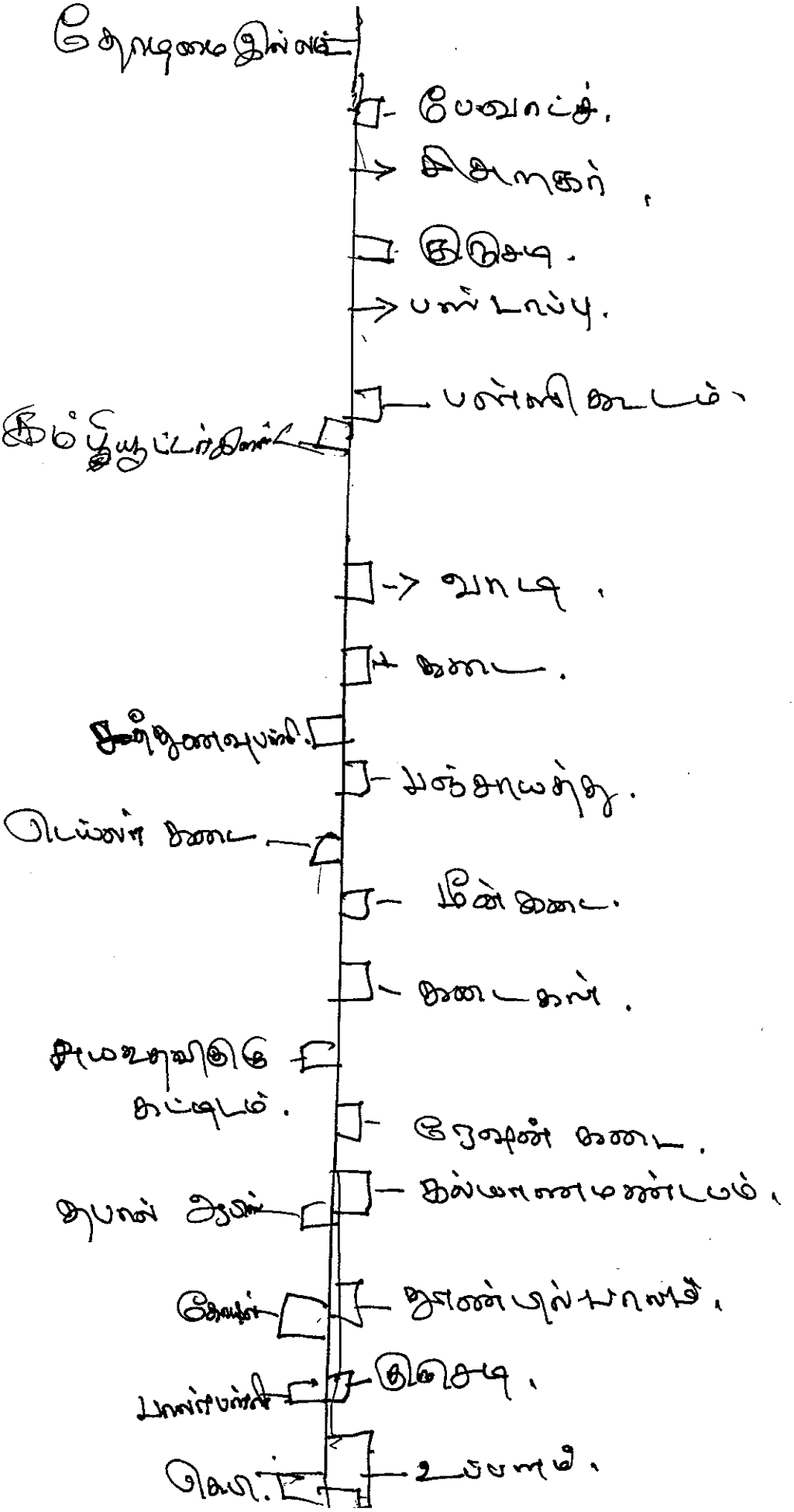


திருவாழங்கா

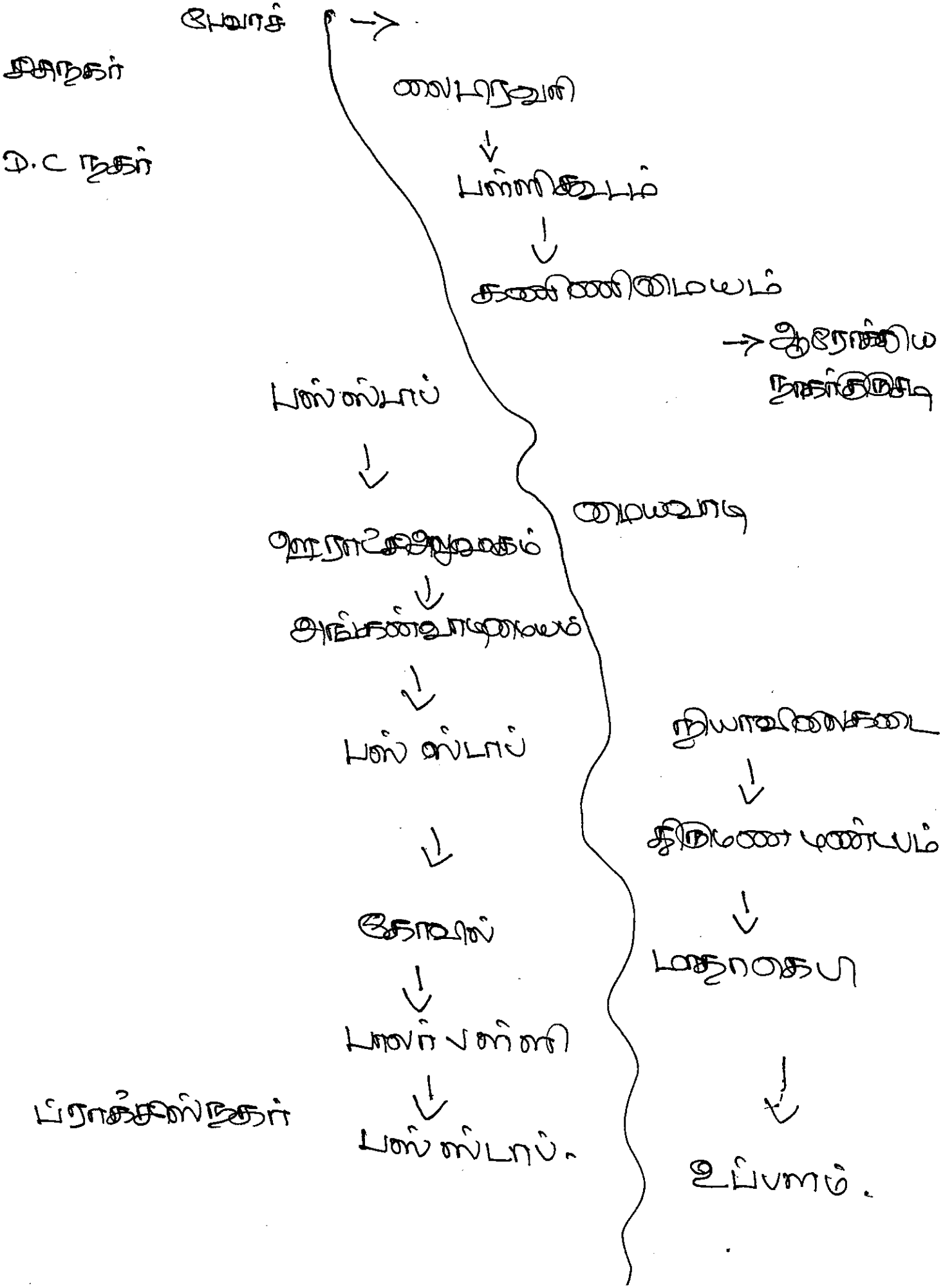


தெருவிழக்கு.

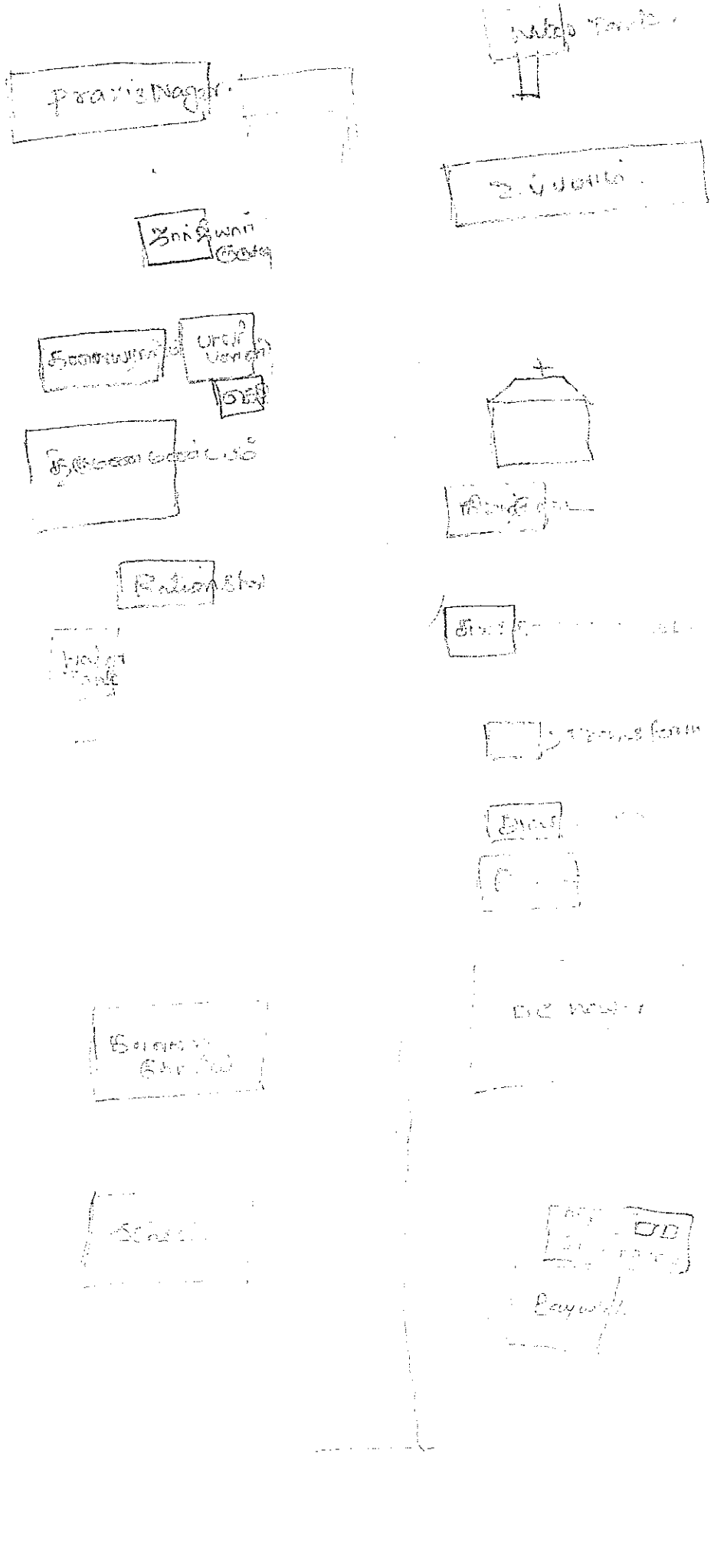
Mr. Jerald (Head of the family).

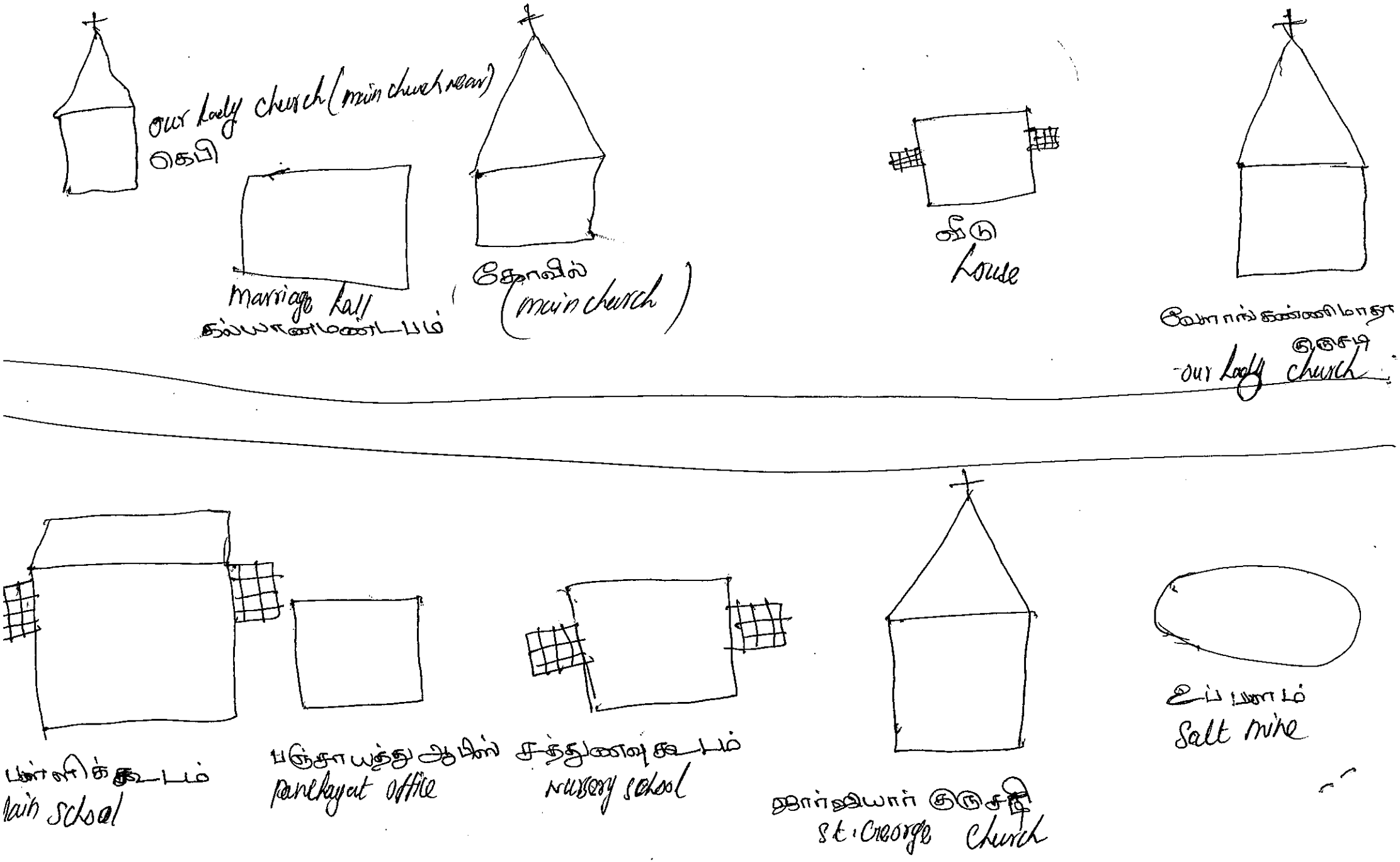


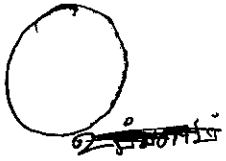
Mr. Benedict Amalraj. S. (Head of the family).

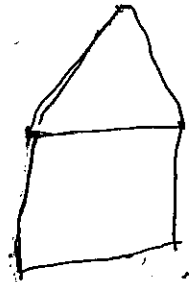


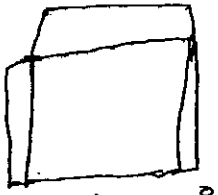
Mr. Sidurai Adimurai (Head of the family).

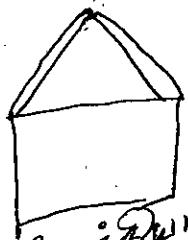


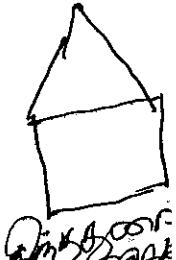

our lady church (main church near)
கெபி
Marriage hall
கல்யாணமண்டபம்
கோவில்
(main church)
வீடு
House
வேளாங்கண்ணிமாதா
குருசடி
our lady church
பள்ளிக்கூடம்
Main school
பஞ்சாயத்து ஆபிஸ்
Panchayat office
சத்துணவுகூடம்
Nursery school
ஜார்ஜியார் குருசடி
St. George Church
உப்பளம்
Salt mine



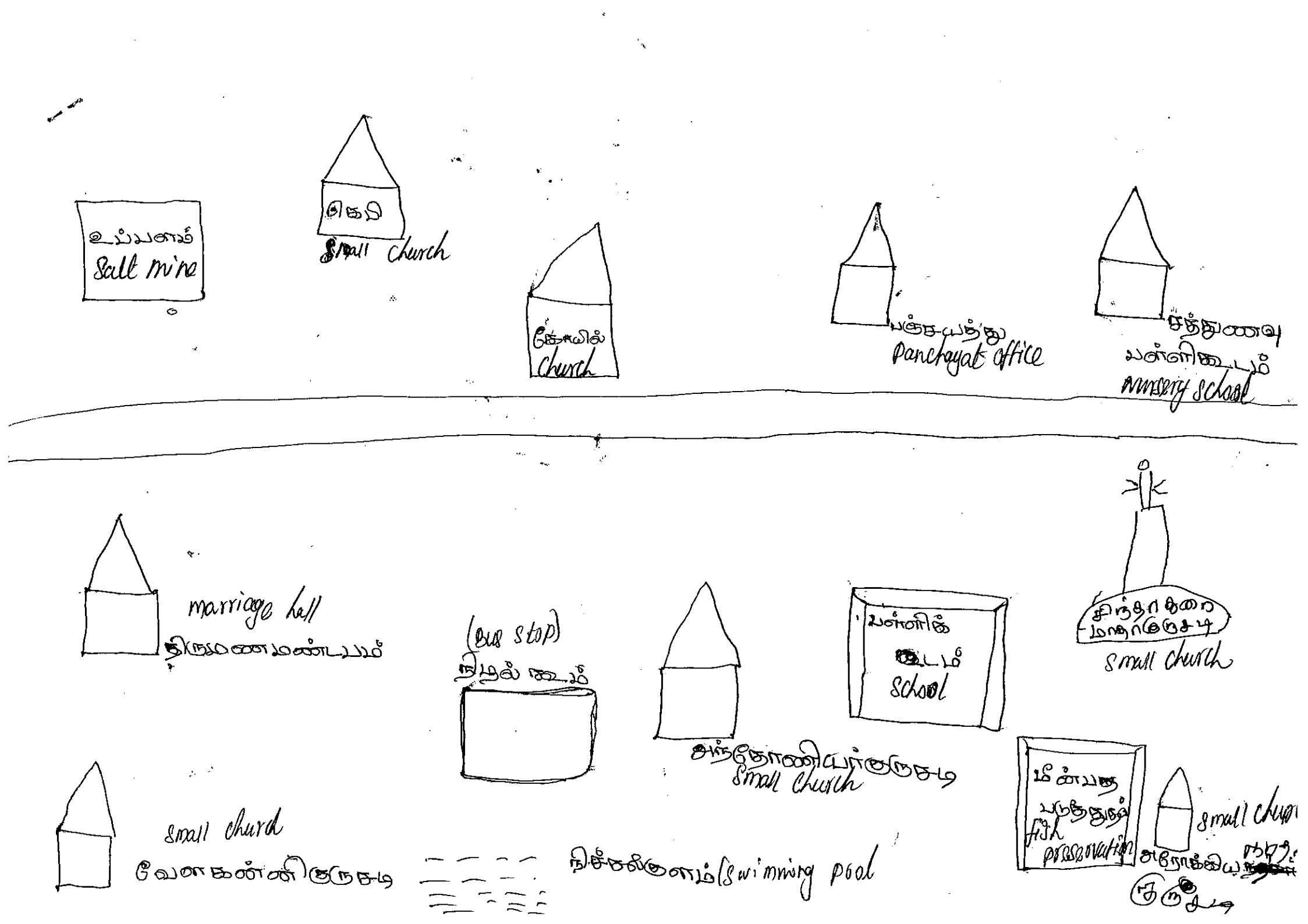


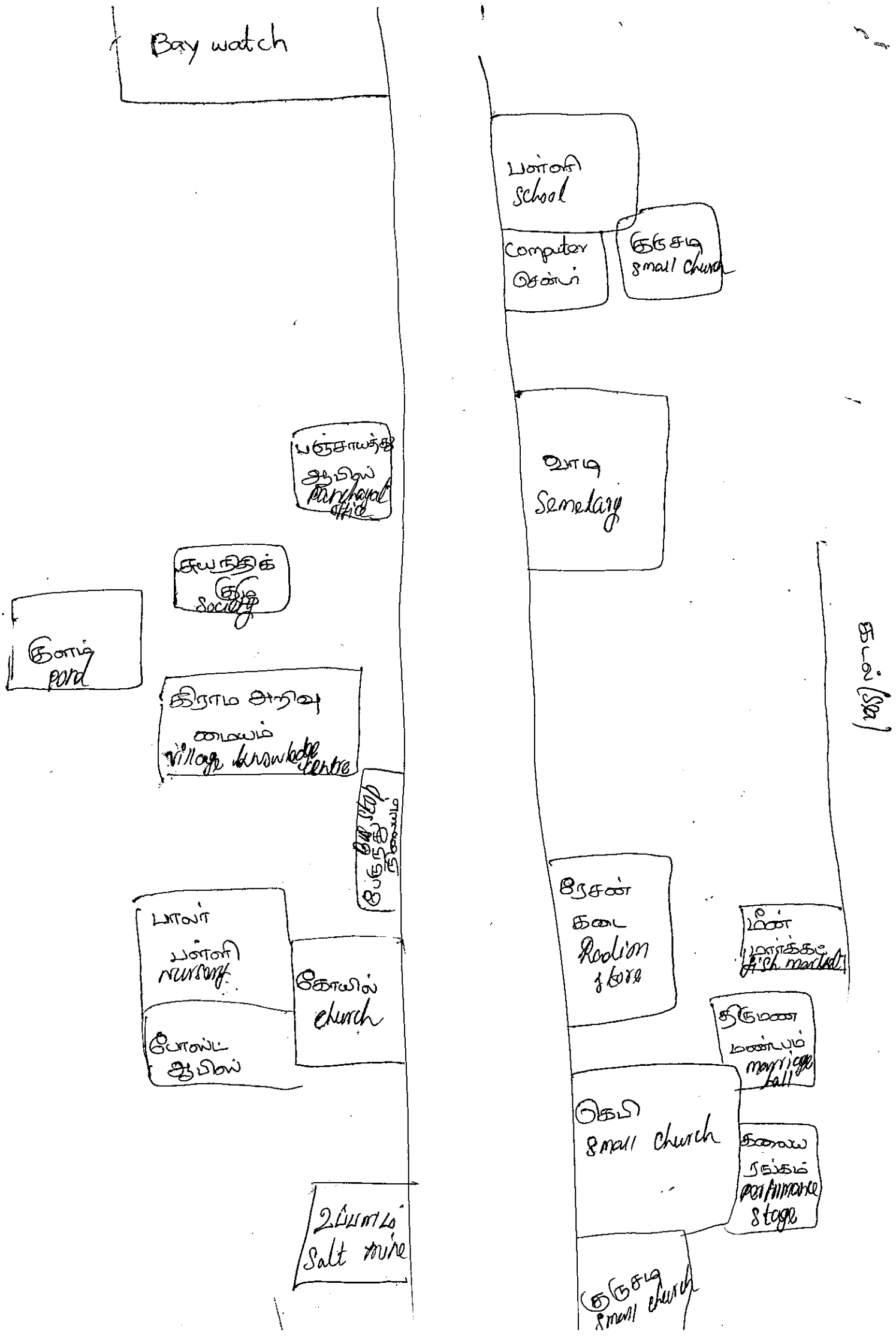


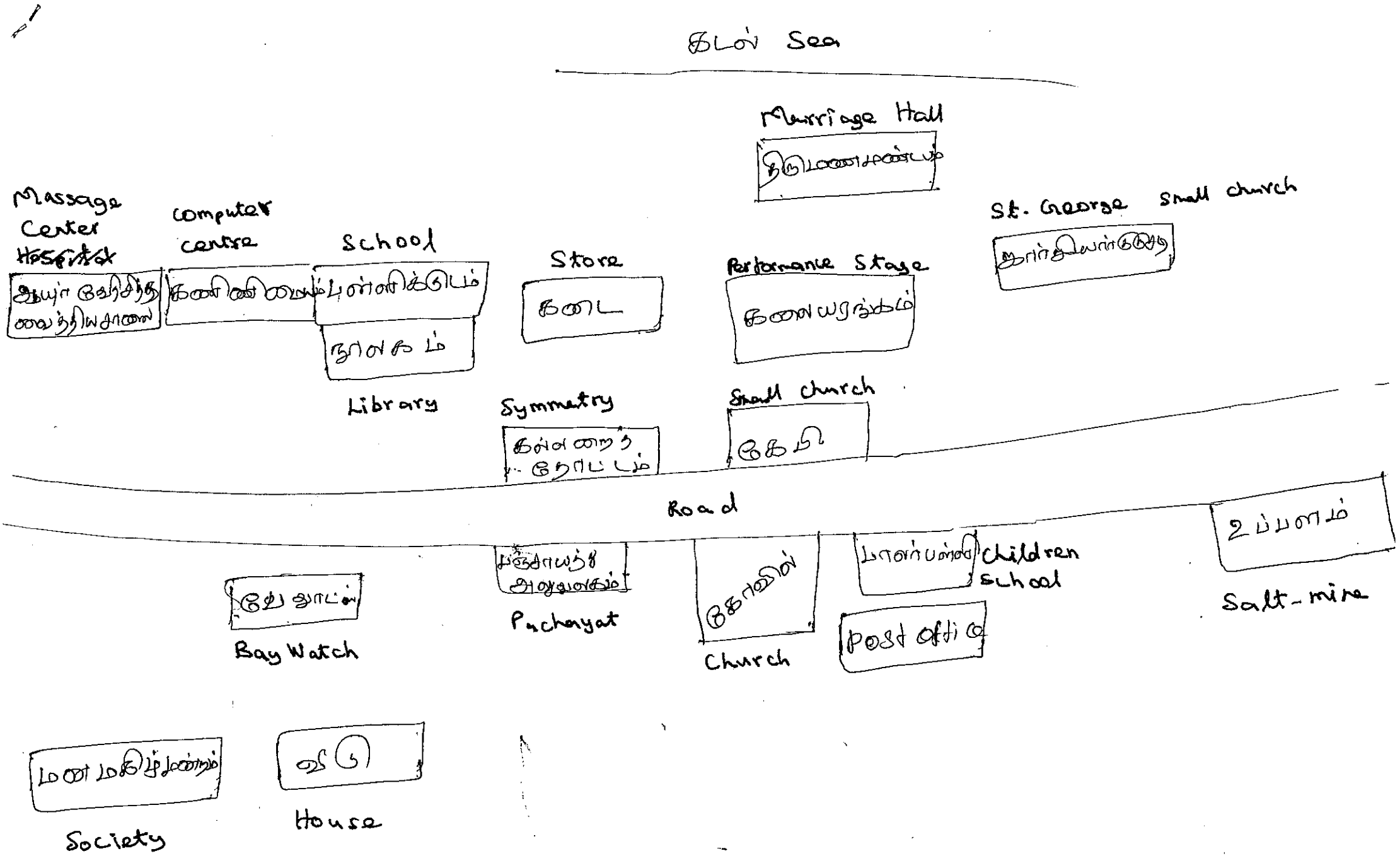


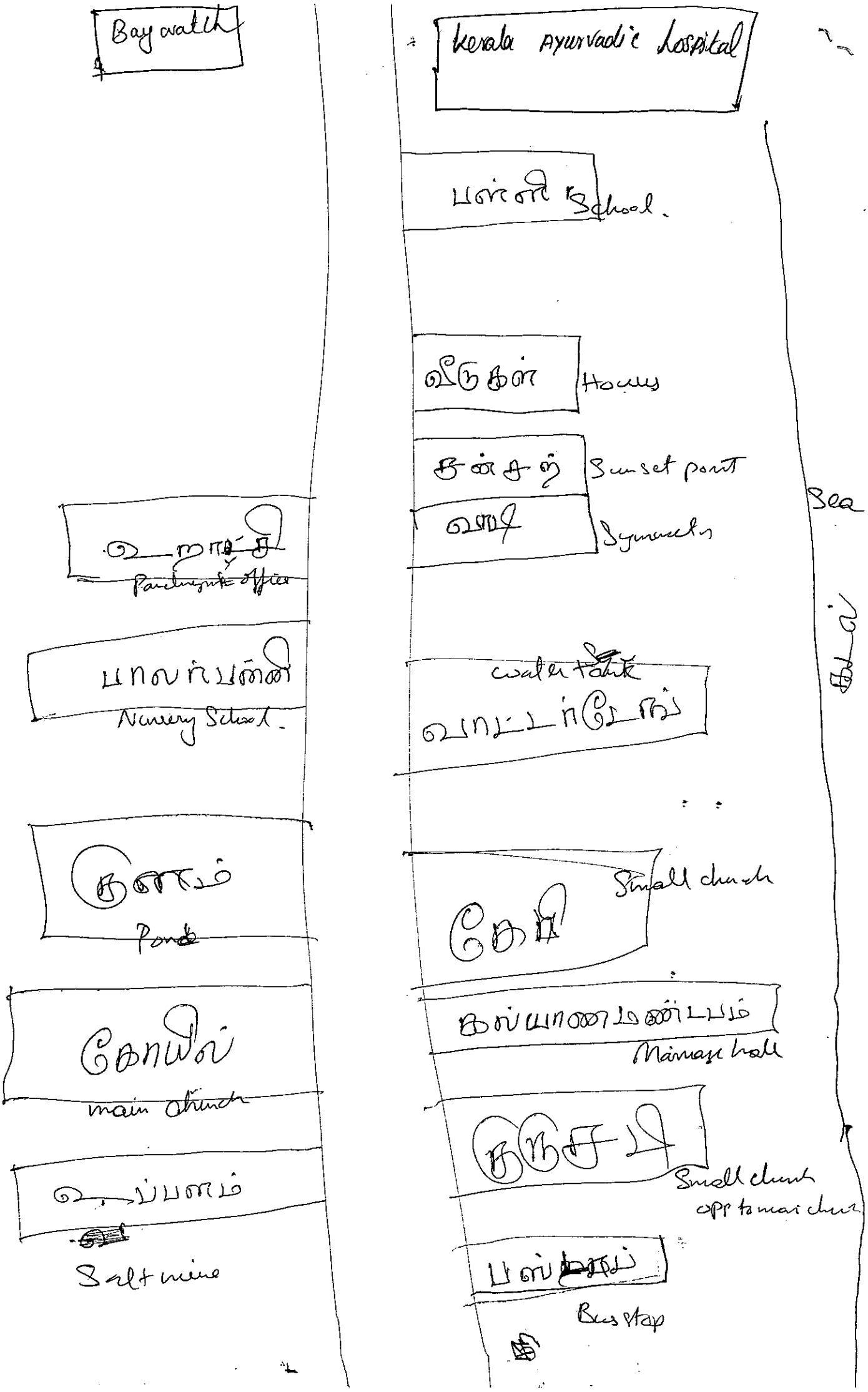


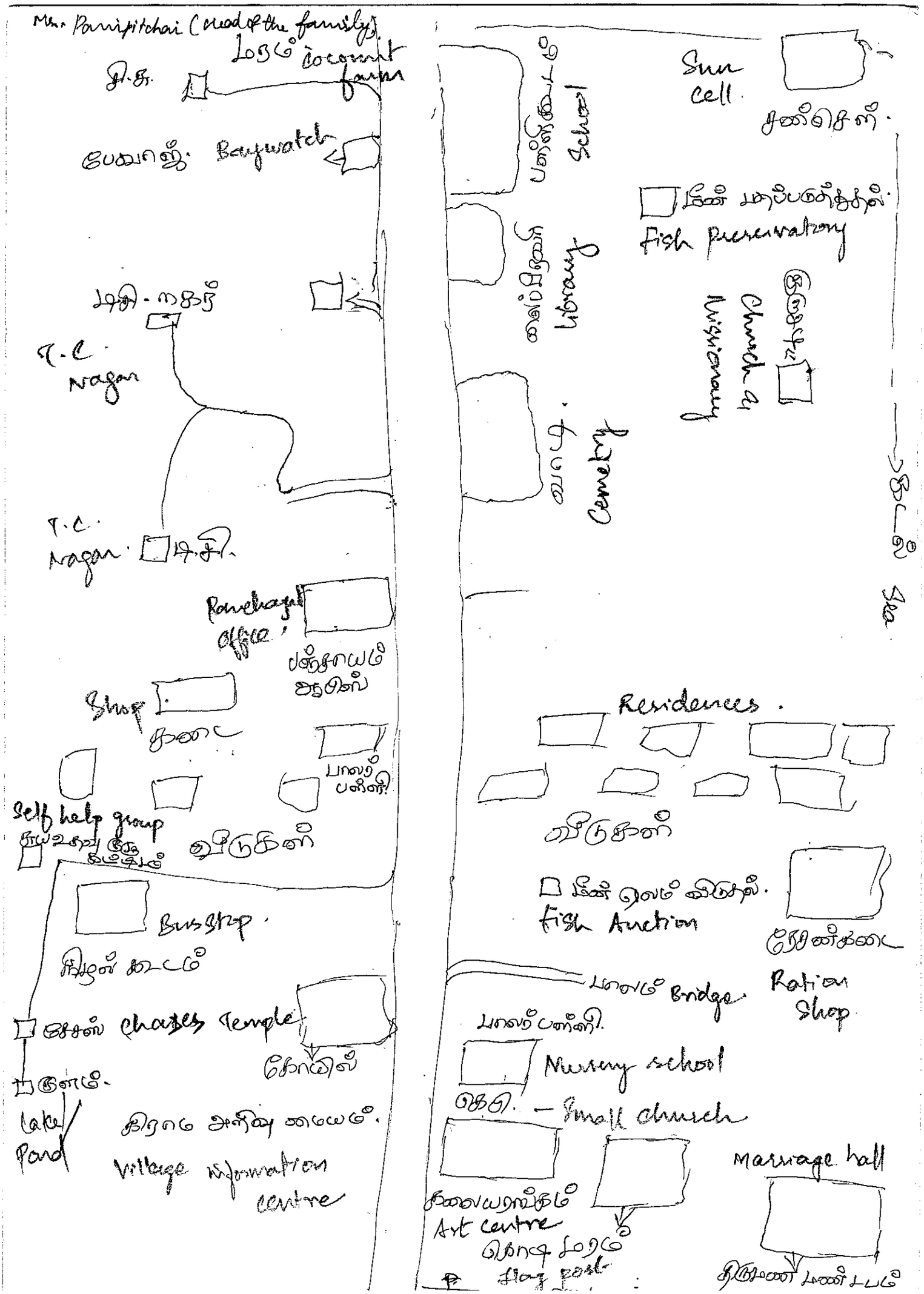
நீச்சல்குளம் (Swimming pool)

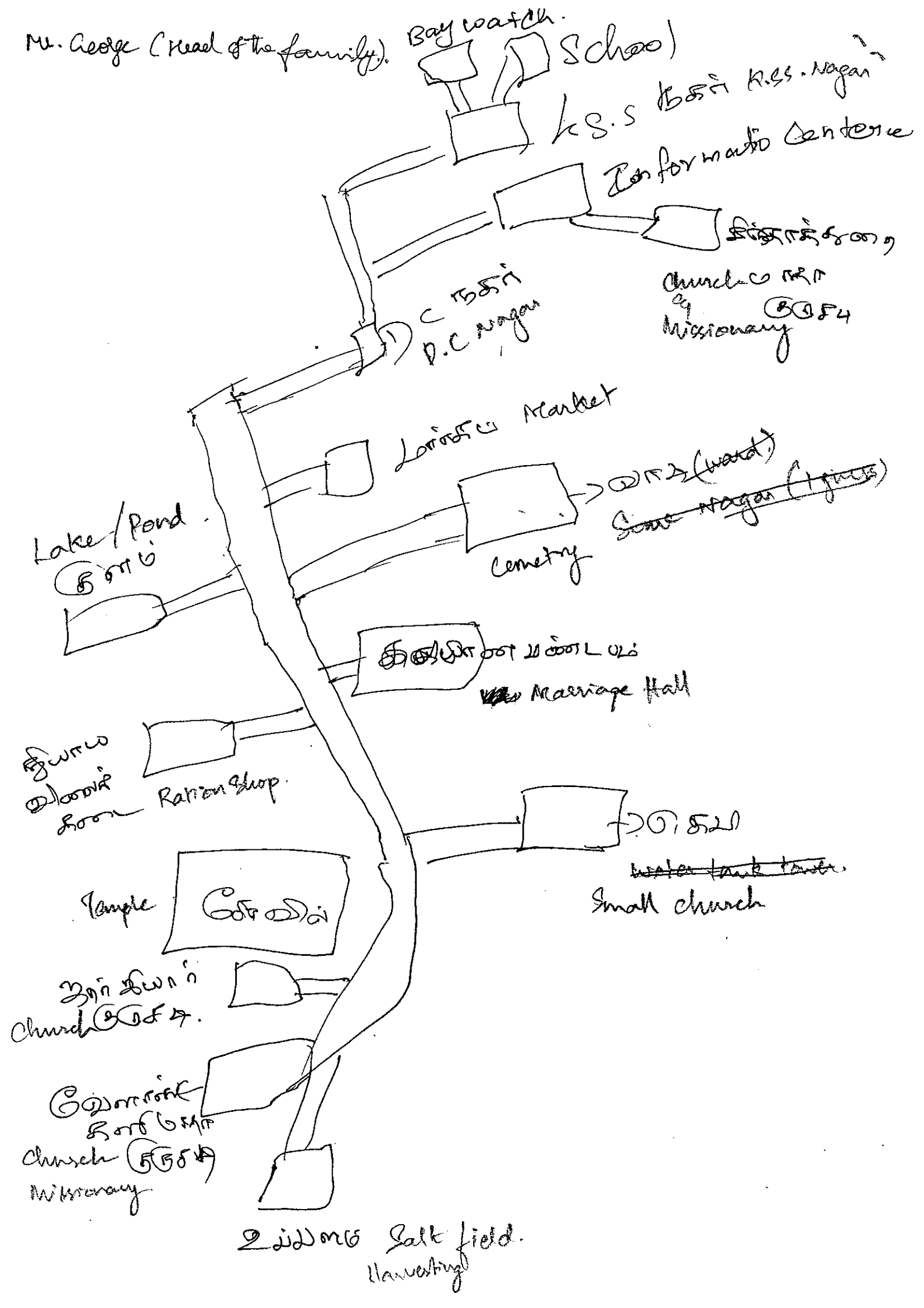

உப்பளம்
Salt mine
சிகபி
Small church
கோயில்
Church
பஞ்சயத்து
Panchayat office
சத்துணவு
பள்ளிகூடம்
nursery school
marriage hall
திருமணமண்டபம்
(Bus stop)
நிழல் கூடம்
பள்ளிக்
கூடம்
School
சிந்தாதரை
மாதாகுருசடி
Small church
அந்தோணியர்குருசடி
Small church
மீன்பத
படுத்துதல்
fish
preservation
small church
அரோக்கிய
ஆரு
small church
வேளகன்னிகுருசடி
நிச்சல்குளம் (swimming pool

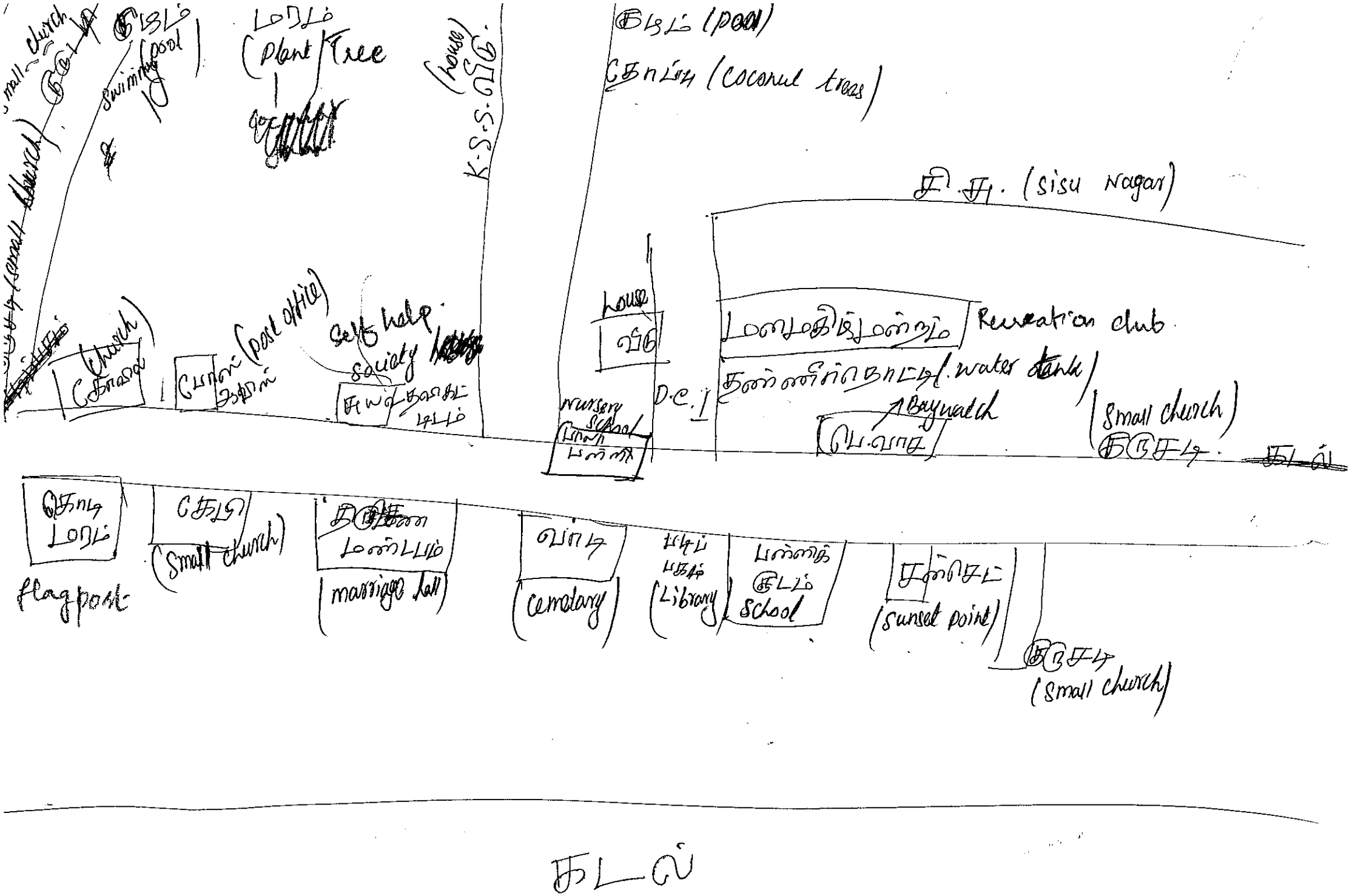

Bay watch
பள்ளி
School
Computer
சென்டர்
குருசடி
small church
பஞ்சாயத்து
ஆபிஸ்
Panchayat office
வாடி
Semetary
சுயநிதிக்
குடி
Society
குளம்
pond
கிராம அறிவு
மையம்
village knowledge centre
Bay stop
பேருந்து
நிலையம்
ரேசன்
கடை
Radion
store
மீன்
மார்க்கட்
fish market
பாலர்
பள்ளி
nursery
கோயில்
church
போஸ்ட்
ஆபிஸ்
திருமண
மண்டபம்
marriage hall
கெபி
small church
கலைய
ரங்கம்
performance
stage
உப்பளம்
Salt mine
குருசடி
small church
கடல் (sea)


கடல் Sea
Marriage Hall
திருமணமண்டபம்
Massage Center
Hospital
ஆயுர் வேரிசித்த வைத்தியசாலை
Computer centre
கணிணிமையம்
School
பள்ளிக்குடம்
நூலகம்
Library
Store
கடை
Performance Stage
கலையரங்கம்
St. George Small church
ஆர்ஜியர்குடுசிறு
Symmetry
கல்லறைத் தோட்டம்
Small church
கேபி
Road
பஞ்சாயத்து அலுவலகம்
Pachayat
கோவில்
Church
பாலர்பள்ளி
Children School
Post office
உப்பளம்
Salt-mine
வேலூட்ல்
Bay Watch
மனமகிழ்மன்றம்
Society
வீடு
House

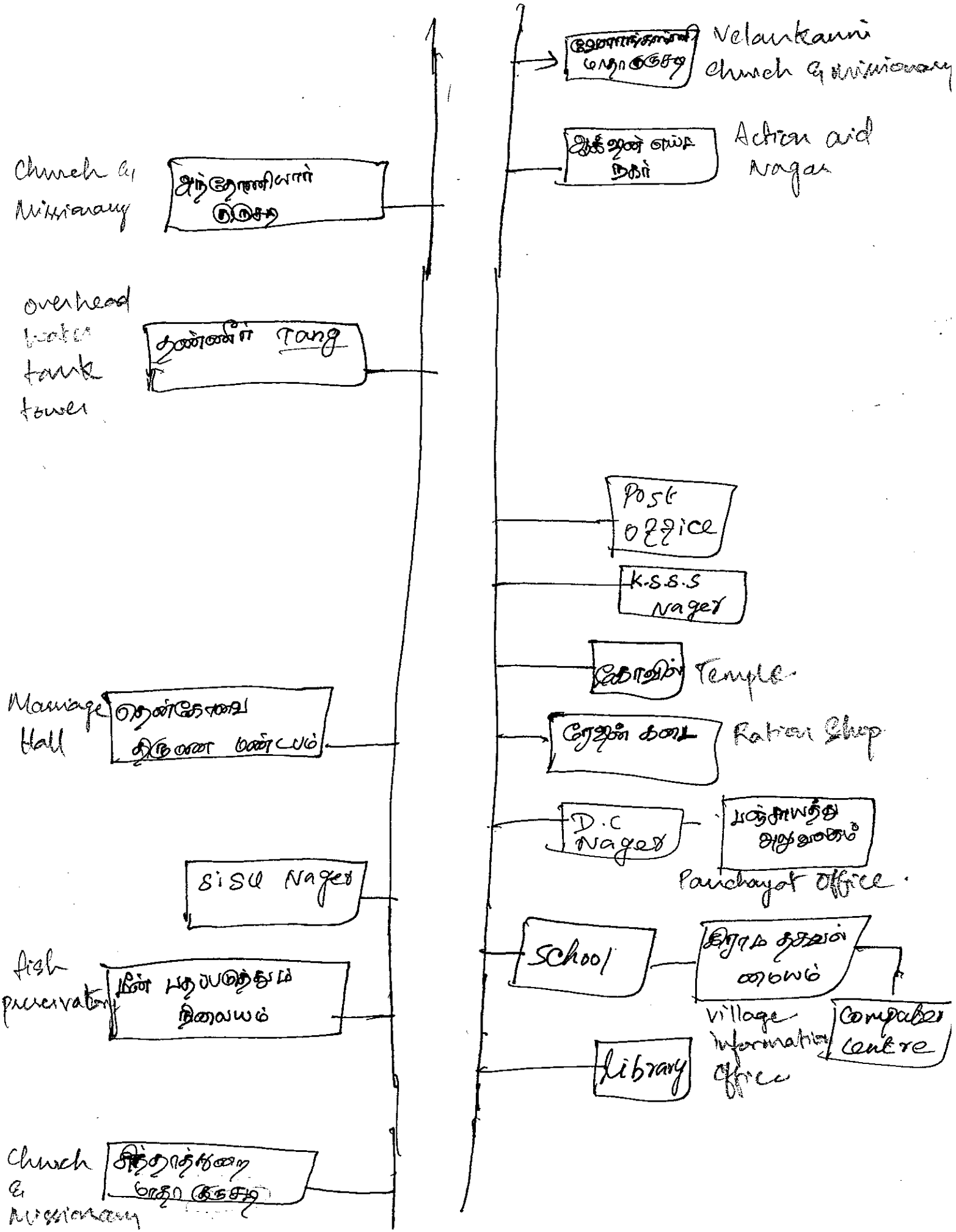

Bay watch
Kerala Ayurvadic hospital
பள்ளி School.
வீடுகள் Houses
சன்சன் Sunset point
வாடி Symmetry
Sea
கடல்
பாலர்பள்ளி
Nursery School.
water tank
வாட்டர்டேங்
குளம்
Pond
கோயில்
main church
கோயில்
Small church
கல்யாணமண்டபம்
Marriage hall
குருசடி
Small church
opp to main church
உப்பளம்
Salt mine
பஸ்நாப்
Bus stop

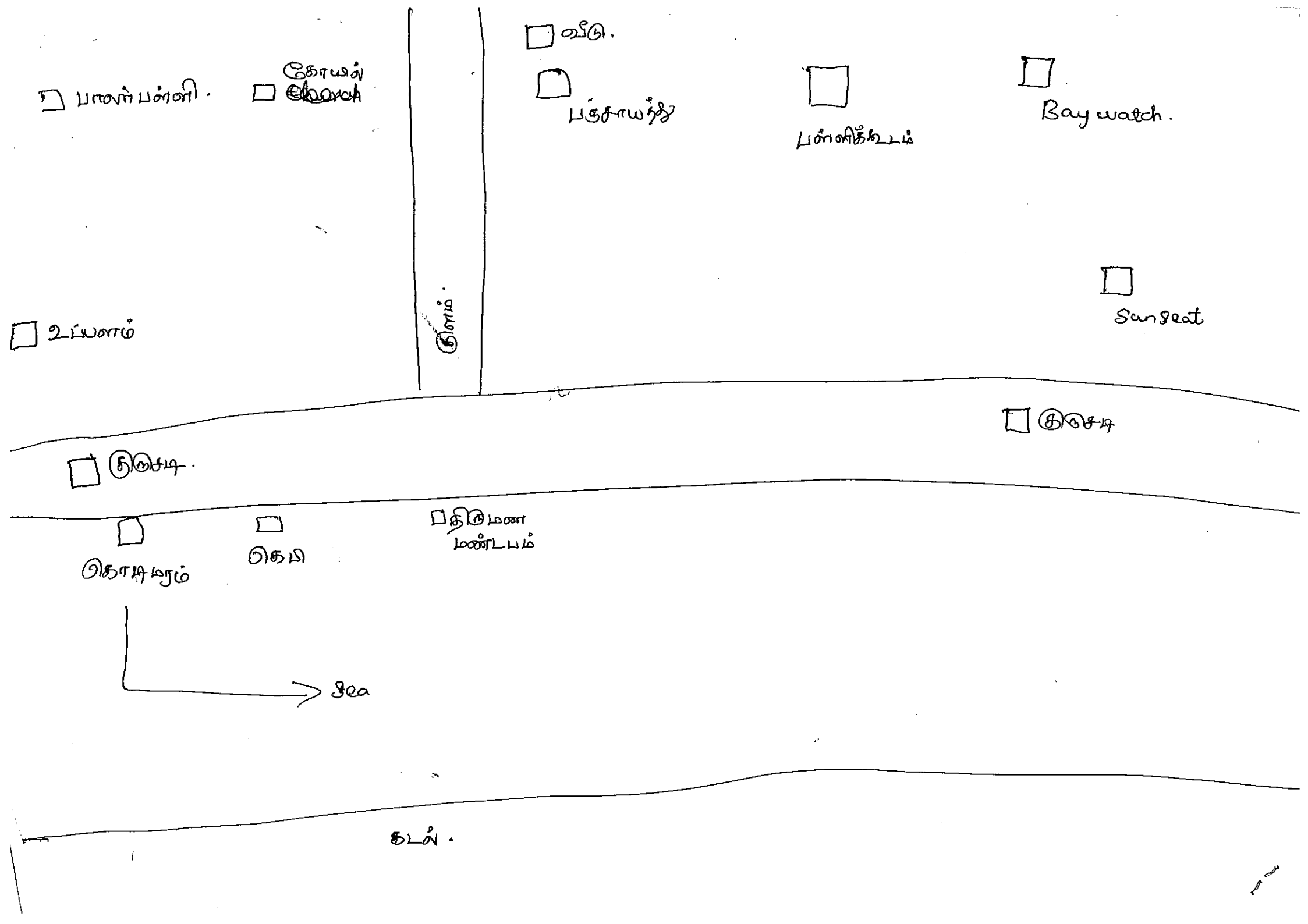

Mr. Panipitchai (Head of the family)
Coconut farm
Bay watch
T.C. Nagar
T.C. Nagar
Panchayat office
Shop
Self help group
Bus stop
Chases Temple
Lake/Pond
Village information centre
School
Library
Cemetery
Sun cell
Fish preservatory
Church & Missionary
Residences
Fish Auction
Bridge
Ration Shop
Nursery school
Small church
Art centre
Flag post
Marriage hall


Mr. George (Head of the family).
Bay watch.
School
K.S.S
K.S.S. Nagar
Conformation Centre
Church
Missionary
D.C
D.C nagar
Market
Cemetry
Lake / Pond
Marriage Hall
Ration Shop
Temple
Small church
Church
Missionary
Salt field.
Harvesting

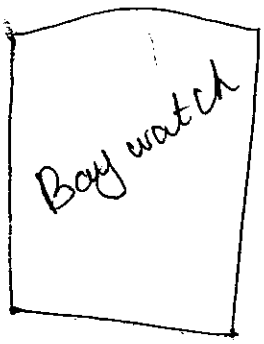

small church
Swimming pool
(Plant) Tree
(house)
K.S.S.
(pool)
(coconut trees)
(sisu Nagar)
(church)
(post office)
Self help society
house
D.C.
Recreation club
(water tank)
Baywatch
(Small church)
Nursery School
(Small church)
(marriage hall)
(cemetary)
(Library)
School
(sunset point)
(Small church)
flagpost

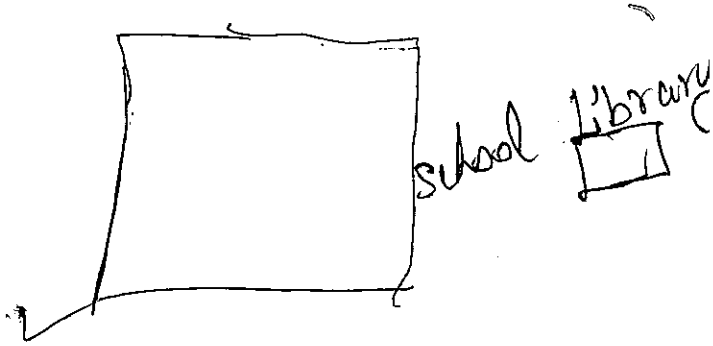
Mrs. Maria Rajeswari.

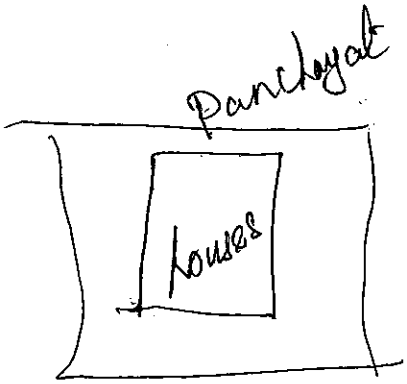


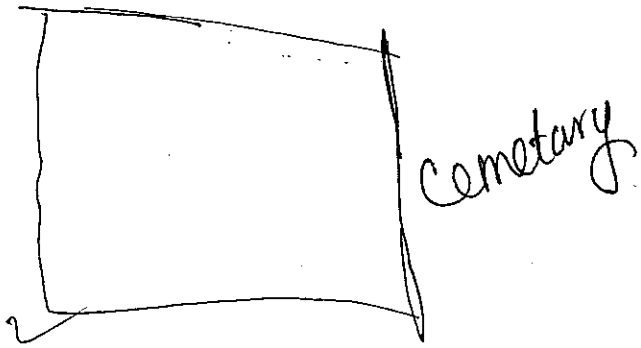


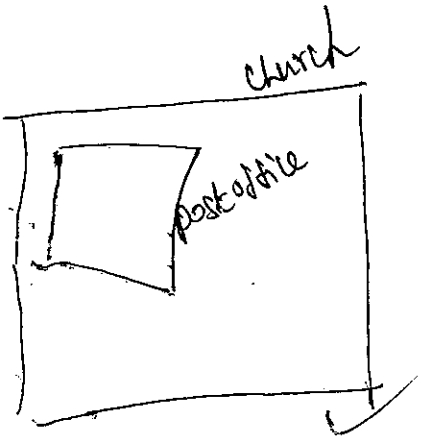
வீடு.
பாலர்பள்ளி.
கோயில்
பக்தாயத்து
பள்ளிக்கூடம்
Bay watch.
Sunseat
உப்பளம்
குளம்.
குடிசடி
குடிசடி.
திருமண மண்டபம்
கொடிமரம்
கெபி
Sea
கடல்.

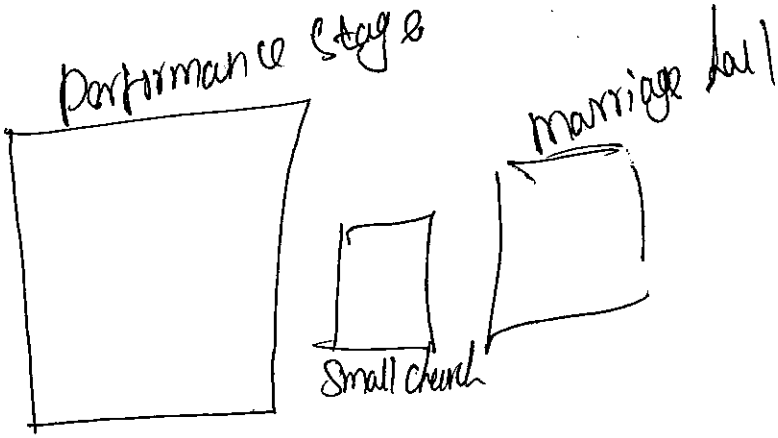

Bay watch

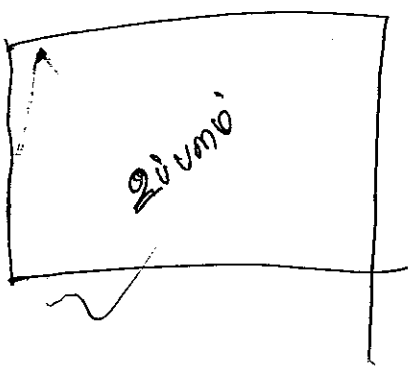

school
library

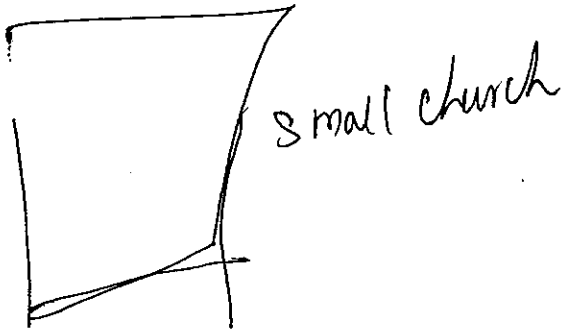

Panchayat
houses


cemetary


church
post office


Performance stage
marriage hall
Small church


Qiumò


small church

Mr. Jeyabalan (Head of the family)

Mr. Antony Sebastian (Head of the family)

□ சிசு நகர்

□ ௨.௮ நகர்

□ பாலர் பள்ளி

□ கோயில்

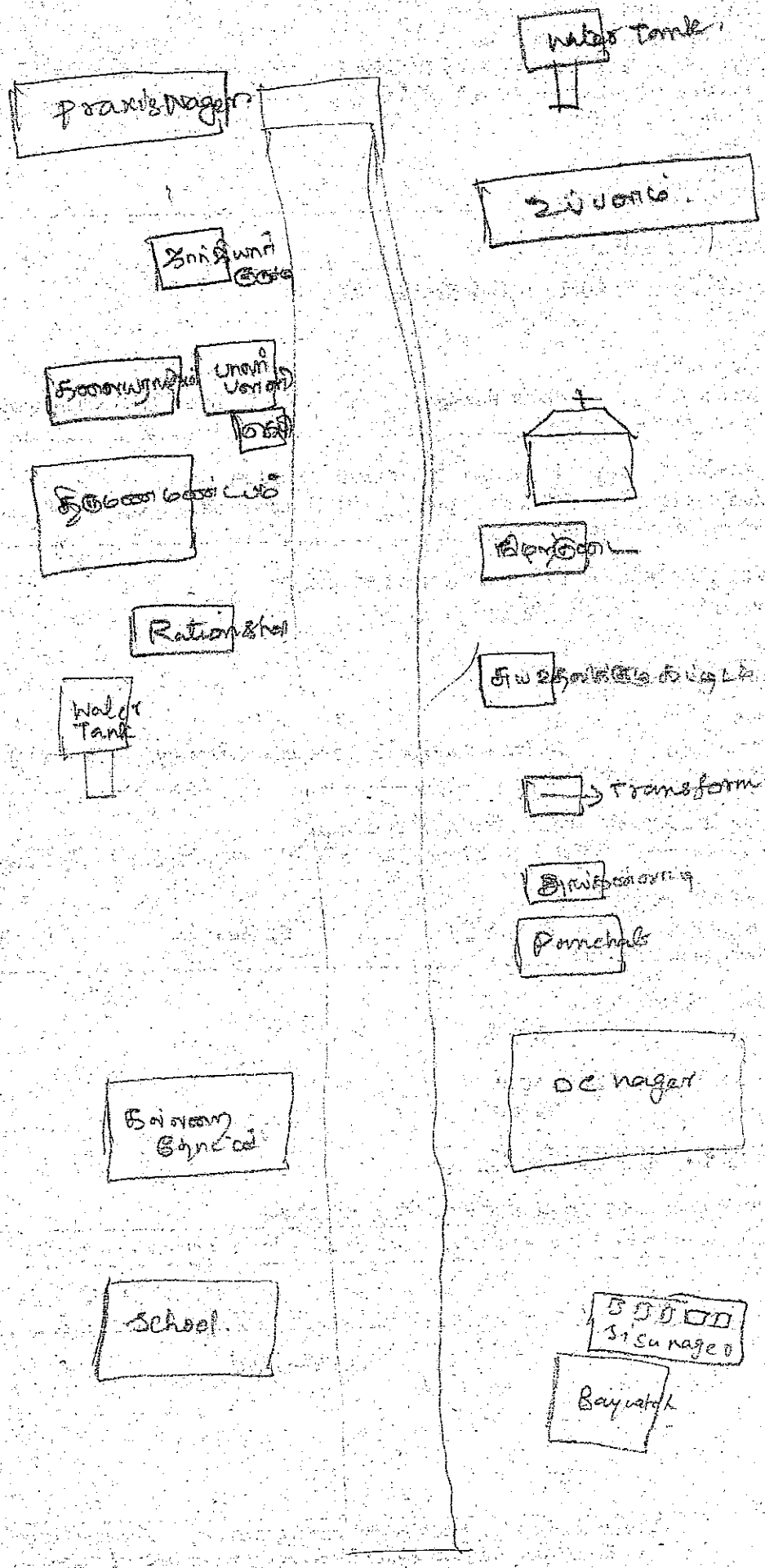
□ பஞ்சாயம்

□ Bay watch

□ குடுக்கு

□ கல்யாணமண்டபம்

□ வாடி

□ பள்ளிக்கூடம்

Mr. Sivarni Adimai (Head of the family).