CHAPTER 8
CONCLUSION

8.1 SIGNIFICANT FINDINGS

This study was undertaken to identify and assess the current risks, added risks expected from climate change and perceived vulnerability of the coastal stretch of Cuddalore, to draw a framework for vulnerability assessment and to develop a decision support tool. An attempt was also made to obtain HVI and habitation level CmVI along with major dimensional vulnerability indices.

The methodology adopted in this study provides a tool to conduct vulnerability analysis in an unbiased and objective way. The method suggested aims to remove the distortions which may creep in on account of personal views of the evaluator and removes complexity in assigning relative importance to the parameters reflecting and causing vulnerability for a given geographic location in the coastal region.

The composite hazard line presented in the study suggests that inundation already creates critical management challenges along the Cuddalore coast. Using this concept of hazard line delineation, the Survey of India has initiated hazard line mapping of the entire coast of mainland of India using aerial photography and very high-resolution satellite imagery. Mapping of the composite hazard line is planned for the first time over the entire coastline of India and this pilot study directly helped in determining the appropriate methodologies to be followed. This would assist in the definition of the spatial
dimensions of the coastal zone of India in the context of establishing planning boundaries of the state/local ICZM plans.

An important finding of the study is that the community, particularly the village elders, have traditional wisdom to predict, foretell about an imminent hazard and also to suggest the way for evacuation. They are able to make the forecast by observing very subtle and minute but significant changes in the common natural processes. This skill is acquired over centuries of informal but practical study of natural processes and passed on through words of mouth by the elders to next generation. The traditional knowledge might not have been put under scientific scrutiny but there is a need to further understand, refine and develop them for better understanding of the hazards by attaching scientific reasoning.

Another significant finding of the study is that a top down approach by the administrative authorities to draw up DMP does not fully serve the purpose. The local community needs to be involved at every stage from the very beginning in developing an emergency response and DMP. All the stakeholders need to have clear demarcation of their role, responsibilities, assets, skills and capabilities commensurate with the requirements need to be developed to have a holistic and implementable disaster mitigation plan.

The study suggests that for coastal communities, recurrent natural hazards are a fact of life which cannot be avoided. However, by reducing the vulnerability of the most exposed communities and regions through adequate preventive measures in accordance with the lessons learnt from earlier disasters, it is possible to mitigate the impact of natural hazards. Efficient and robust early warning systems, awareness among the community about emergency response and sensitization for disaster preparedness can substantially reduce the vulnerability of the coastal community.
Identification of vulnerable areas and land use planning play a crucial role in risk reduction. Suitable policy interventions such as zoning to regulate land use to keep population away from hazard prone locations and proper implementation of building codes by local administration and planning authorities may be very effective tools in achieving vulnerability reduction. Creation of proper awareness about risk and vulnerability whereby stakeholders are encouraged to actively participate in risk reduction, resilience enhancement and disaster management processes is a very effective approach in reducing risk exposure and mitigation.

An appropriate institutional framework with efficient delivery mechanism is a must to effectively implement risk reduction & resilience enhancement measures and the plan & policies identified to reduce vulnerability. The most desirable disaster management system would be a community participatory system in which all sectors viz. government, non government agencies and the target society come together in taking various measures to prevent and mitigate vulnerability to natural hazards. Proper sensitization, training and capacity building coupled with participatory vulnerability reduction planning and decision making provide communities with the necessary skills to make informed decisions as well as the motivation to participate in and take responsibility for disaster management.

Another very significant finding of the study is that to reduce household vulnerability in general and poor households in particular, diversification of means of livelihood, insurance and strengthening of credit systems are required. This will increase the earning capacity of households and reduce the dependence on a single productive asset or source of livelihood.
The study also suggests that vulnerability reduction is a continuous process. If a community is resilient today, it does not mean that it would also remain less vulnerable in time to come since the type of hazards, degree of risk and coping capacity of community change continuously. Therefore periodical review of risk exposure & regular sensitization, awareness creation, training and capacity enhancement of exposed community alone may be the most effective way for vulnerability reduction.

To sum up, disaster risk reduction and community capacity building processes are long-term and dynamic in nature while political processes and positions are short-term. Therefore, disaster reduction strategies and efforts need to be recognized in policies and not just as activities or programmes, but to achieve a continuation of efforts irrespective of changes in the political scene. Disaster management policies to be effective should encourage use of local resources, complete involvement of communities and voluntary organizations.

This study may have the following direct uses -

- The vulnerability indicators arrived in the study provide a broad indication of the current level of vulnerability of the study area. The study indicates a need to integrate the risk exposure into the current development policies.

- This study would provide a very valuable tool for immediate use for the Coastal Hazards Mitigation and Management Program of the Tamil Nadu State through identification, assessment and classification of the vulnerable habitations in coastal zone. The study would also help in identification and prioritization of vulnerable households within a coastal habitation by arriving at
a CmVI for the habitations to coastal storm surge flooding and erosion risks.

- Outcome of the study may help the district administration to plan for addressing the sectors and households that need immediate intervention to ensure a safe future against natural hazards. The decision makers should aim to enhance the resilience by targeting those sectors, locations and houses that are least resilient.

- The results of household vulnerability generated on ArcGIS Platform may be used for land use zoning, designing suitable capacity building strategy, creation of public awareness for increased participation in disaster preparedness & mitigation plan and for development of proper institutional framework for Integration of efforts of all stakeholders in vulnerability reduction.

- This study provides inputs and framework to develop a comprehensive disaster management action plan aimed to reduce vulnerability of coastal communities, enhance their livelihood security, preserving the coastal ecosystem and ensuring sustainable coastal development.

- The study on quantifying vulnerability to Composite Habitation and Household Index can be closely linked to respective Early Warning and Vulnerability Monitoring Systems of Disaster Preparedness Plan.
8.2 LIMITATIONS

The study faced a few challenges during research at micro level.

- Questionnaire based study has a challenge to have accurate answer for each question.

- Higher numbers of satellite imageries were available for the recent period between the years 2001 and 2011 only, whereas for the period between year 1977 to 1991 and 1999, only three imageries were available. The degree of accuracy of estimation of shoreline movement increases with more number of evenly spaced satellite imageries.

- The study suffers all those limitations that are associated with the use of indicators and indices. Numerical rating may tend to oversimplify status.

- Ratings can be subjective unless designed as a rigorous quantification tool as there is difficulty of testing or validating different results.

8.3 RECOMMENDATIONS

The household level thematic vulnerability maps presented in the study are useful to draw management action plans such as prioritization of the areas for evacuation, planning of evacuation routes, identification of safe shelters, etc. Furthermore, these maps may be very effectively used in sensitisation and building awareness among the local community and social organizations apart from the Government authorities who are responsible for disaster management. An efficient DMP should clearly lay down the details
when an advance hazard warning is issued to the local community. People should have clear idea about:

1. When should they move?
2. Where should they move?
3. Which route should they take? And
4. Which direction they have to move?

The household level thematic vulnerability maps developed in the current study may assist the developers in answering such questions in a form easily understandable through graphical representation.

The habitation level results would assist the policy makers in fixing the priority in resource allocation for risk reduction and enhancement of community resilience. The study also would help the decision makers as well as the community in selection of most appropriate interventions and agency to execute disaster management plans.