CHAPTER 6

CONCLUSION

6.1 SUMMARY OF CONCLUSION

Across the globe an enormous research has been carried on in the area of thermal comfort study of buildings, in particular thermal comfort studies are more relevant for ‘residential’ buildings.

In this research, two distinct studies and analyses have been carried out to assess the climate responsive architecture of the traditional houses in Chettinadu region of Tamilnadu, India. The two distinct studies are the qualitative study and the quantitative study and their analysis respectively.

The modern buildings are poorly designed for the prevailing climate, leading to extreme use of electrical equipment and energy to maintain desired indoor conditions. These buildings are without enough insulation, un-shaded, over-glazed and tight-skinned use vast amounts of energy to provide thermal comfort, especially when the weather conditions are harsh and extreme. Development in many warm climate countries, including India, is badly affected by energy crisis. People will not be able to stay in many buildings if the electricity fails particularly during the day. In hot and warm humid climates if the air-conditioning goes off, buildings very quickly becomes unoccupiable.

In contrast to modern buildings, traditional houses in these regions are more adaptable to the environment in many ways. Traditional builders used knowledge passed on from generation to generation to ensure that their
buildings could modify the impact of a hostile outdoor environment. According to principles evolved over many generations, traditional buildings are equipped with thick high walls and courtyards. These principles include physical functionality, low-energy use, comfort, durability and affordability. Such buildings use local construction materials, passive cooling and heating and renewable energies. Vernacular resources, technologies and forms are generally seen to be well adapted to local climatic conditions and are often considered as an appropriate base for environmental design. In spite of its importance, traditional architecture and its methods and strategies, especially those of the warm humid climates of India are undervalued and unused in new constructions. Many architects are less experienced in the traditional architecture of warm and dry climates, and most of the limited research in this field is not engaged in the utilization and the revival of traditional solutions and techniques in new constructions and modern buildings.

From the theories on various traditional buildings by researchers, it is found that the traditional settlements preach numerous techniques and methods through which the principles of traditional architecture could be revived for the future society so as to have a green society in the future. This research helps to re-explore the possibilities of bridging the gap of the traditional sustainable principles to today’s construction methods.

To suffice this in the Indian context, traditional houses from Chettinadu region of Tamilnadu have been selected for the study and a comparative analysis has been made with the modern houses from the same location and was found that the traditional buildings showcased a better thermal comfort in comparison with the modern houses; the modern houses in warm humid climatic zone exhibit a poor thermal comfort for the occupants and the occupants of the modern houses depend only on artificial means of
thermal comfort. So it is understood that the modern buildings need to depend upon the artificial cooling.

From the investigation results, it is apparent that the traditional houses retain the temperature nearest to the comfort range as indicated in the ASHRAE standards as well as the bio-climatic chart constructed by Koniesberger.

On investigating the two buildings for two consecutive years, it is found that the mean radiant temperature of the traditional building is very low when compared to that of a modern house. This is because of the cooler surfaces in the interiors of the traditional buildings. As described in chapter 4 and as explained in chapter 5, the coolness is because of the traditional materials and the traditional planning and design techniques that they have adopted. The air movement in traditional buildings is continuous, which is because of the presence of the courtyards and it is maintained throughout the building whereas in modern buildings the air movement is not continuous.

In addition, the study evidenced that the reason for significant temperature difference between inside and outside temperatures of the traditional building in summer is because of the evaporative cooling phenomena that takes place in lime mortar based masonry wall of the traditional houses. Low thermal conductivity, less thickness of roofing and walls of concrete based modern building depict the higher mean radiant temperatures and higher temperature variations of modern building compared to traditional building. On the other hand, the modern residential buildings lack the above aspects and are therefore uncomfortable to stay in summer.

Therefore, from this research of exploring the climate responsive architecture of the traditional houses it can be concluded that, the traditional houses in Chettinadu are closer to the thermal comfort range as indicated in
the ASHRAE standards as well as the bio-climatic chart constructed by Koniesberger.

6.1 SCOPE FOR FUTURE RESEARCH

There is enormous scope for future research in the area of thermal comfort studies in particular, with respect to the traditional materials or the research can be extended to a settlement level. In today’s context, the computer simulation based thermal comfort study models are emerging as a new area of research, this traditional house of Chettinadu shall be made to undergo such research to derive the possible best thermal comfort models for warm humid climatic zone.

The research can also be extended to study the thermal comfort levels of similar other traditional courtyard houses like Agraharams which spread across the state of Tamilnadu, India.

There is enough scope to continue this research in other climate zones likes hot and composite climate zones.