

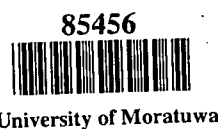
THE CONCEPT OF TROPICALITY:
It's Relationship to Culture and Corresponding City Form



The Dissertation presented to the
Department Of Architecture, University of Moratuwa, Sri Lanka
For the Final Examination in MSc (Architecture) and
For the RIBA Part 11 Examination

72"04"
72(043)

Thushari Wijesundara
Department Of Architecture
University of Moratuwa, Sri Lanka
January 2004



CONTENTS

	Page no
Declaration	i
Acknowledgements	ii
List of Figures	iii
Abstract	vi
1.0 INTRODUCTION	1
2.0 Background to the Study	2
3.0 Hypothesis	3
4.0 Intention of the Study	4
5.0 Scope and Limitations	5
6.0 Methodology	6
1.0 CHAPTER 1: ATTRIBUTES OF CITY FORM	7
1.1 The City	7
1.1.1 City and Urban Areas: A Definition	8
1.1.2 Urbanization and Urbanism: A Definition	9
1.1.3 Origin of Cities	10
1.1.4 City as a Work of Architecture	12
1.2 Form of the City and How it is Made	14
1.2.1 Normative Theory	14
1.2.2 Functional Theory	14
1.2.3 Planning Theory	14
1.3 Generators of City Form	15
1.3.1 Humans and Their Needs and Wants	15
1.3.1.1 Physiological Needs	15
1.3.1.2 Safety and Security Needs	16
1.3.1.3 Affiliation Needs	16
1.3.1.4 Esteem Needs	17
1.3.1.5 Self Actualization Needs	17
1.3.1.6 Cognitive Needs	18
1.3.1.7 Aesthetic Needs	18

1.3.2 Physical context	19
1.3.2.1 Biogenic Environment	20
1.3.2.2 Built Environment	20
1.3.3 Function of the City	21
1.3.4 Culture	22
1.4 Modifiers of City Form	24
1.4.1 Climate	24
1.4.2 Economic Situation	25
1.4.3 Technology available and the knowledge to use	26
1.5 Concluding Remarks	28
2.0 CHAPTER 2: TROPICALITY: TROPICAL CLIMATE, TROPICAL CULTURE AND THE CONTEMPORARY TROPICAL URBAN LIFE	29
2.1 Influence of Climate on Culture	29
2.2 Tropical Climate	32
2.2.1 Hot Dry Tropics	33
2.2.2 Hot Humid Tropics	35
2.2.3 Wet-Dry Tropical Climates	36
2.3 Tropical Culture	38
2.3.1 Influence of Tropical Climate on Tropical Culture	40
2.3.1.1 Culture of Hot Dry Tropics	40
2.3.1.2 Culture of Hot Humid Tropics	43
2.4 The Concept of Tropicality: A Definition	46
2.5 Contemporary Tropical Urban Life	46
2.6 Concluding Remarks	50



3.0 CHAPTER 3: TROPICALITY, TROPICAL CULTURES AND CITY FORM	51
3.1 Tropical Built environment and City Form	51
3.1.1 Built Environment	51
3.1.1.1 Built Environment of Hot Dry Tropics	52
3.1.1.2 Built Environment of Hot Humid Tropics	54
3.1.2 City Form	55
3.1.2.1 City Form of Hot Dry Tropics	55
3.1.2.2 City Form of Hot Humid Tropics	57
3.2 Contemporary Tropical City	58
3.2.1 Micro climate of the contemporary Tropical City	60
3.2.2 Design objectives of a contemporary Tropical City	61
3.3 Historical Development of Sri Lankan Cities	62
3.3.1 Factors Influenced the Development of Cities in Sri Lanka	64
3.3.2 Impact of Culture and Climate in Planning Cities in Sri Lanka	65
3.4 Manifestation of Tropicality in the Contemporary City Form in Sri Lanka	67
3.5 Case Study 1-KANDY	67
3.5.1 Historical Background of the City	67
3.5.2 City Form	70
3.5.3 Impact of Culture and Climate to the City Form	72
3.5.4 Concluding Remarks	77

3.6 Case Study 2-COLOMBO	78
3.6.1 Historical Background of the City	78
3.6.2 City Form	81
3.6.3 Impact of Culture and Climate to the City Form	81
3.6.4 Concluding Remarks	86
3.7 Case Study 3-GALLE	87
3.7.1 Historical Background of the City	87
3.7.2 City Form	90
3.7.3 Impact of Culture and Climate to the City Form	92
3.7.4 Concluding Remarks	94
Conclusion	95
List of References	



DECLARATION

I declare that this dissertation represents my own work, except where due acknowledgement is made, and that it has not been previously included in a thesis, dissertation or report submitted to this university or any other institution for a degree, diploma or other qualification.

Signed:... ***UOM Verified Signature*** Moratuwa, Sri Lanka.
theses & Dissertations
ac.lk

Thushari Wijesundara

ACKNOWLEDGEMENTS.

It is with overwhelming pleasure, that I wish to extend my profound gratitude and thanks to several persons for the guidance and assistance given by them in connection with the preparation and successful completion of this Dissertation.

First of all my greatest thanks especially extend to Mr. Madura Prematilleke, who guided me throughout my dissertation and for providing me with valuable comments and advise which immensely build up my confidence.

A warm thank you to Mr. Vidura Sri Nammuni , for all the guidance through the initial part of the dissertation and for taking trouble to read and comment on all my initial writings and drafts, and for providing valuable advise whenever my spirits were at low ebb.

Mr Prasanna Kulathilake for providing me with valuable advise and suggestions and making the path of my dissertation clear at the initial stages of the study.

My parents, sister and lakshika who have supported me immensely throughout the period of writing.



University of Moratuwa, Sri Lanka
www.lib.mrt.ac.lk

Finally Thilan for his moral support and for putting up with my various moods during the later period of the dissertation.

LIST OF ILLUSTRATIONS

	Page
1. A contemporary city: The city of Lisbon	7
2. A nomadic tribe	10
3. An Indian village in Florida (1590 A.D)	10
4. The First cities in Khorsabad	11
5. The Nile valley civilization – In Egypt	11
6. Designed urban spaces- Paris and St Paul's square	13
7. Urban Public space	17
8. A village In Soudi Arabia	19
9. A village In Sri Lanka	19
10. Village of Masai tribe in Africa	19
11. A village in Portugal	19
12. Indian men worshipping sun	22
13. The sun determined circular habitations and Orientation of buildings, such as the roman town In Bram in France founded in 333 AD.37	22
14. Igloo houses	24
15. Houses of Arabia	24
16. A house at Asir in Soudi Arabia	27
17. A house at Rajastan India	27
18. Iberian Village houses at Portugal	27
19. Climatic zones of the world	32
20. Tropical climatic zone	32
21. The hot dry Tropical zone- A Desert	34
22. Mean monthly temperature and precipitation values for Darwin, Australia.	34
23. The hot humid Tropical zone- Rain forest	35
24. Mean monthly temperature and precipitation values for Andagoya Columbia.	36
25. Wet-Dry Tropical Climates (Aw) savanna	37
26. Mean monthly temperature and precipitation values for Calcutta, India	37
27. Evening bazaar in a Islamic city	40
28. Women wearing Burka dress in Arab	40
29. An African tribes women	43



University of Moratuwa, Sri Lanka.
Electronic Theses & Dissertations
www.lib.mrt.ac.lk



30. Indian women dancing	44
31. Indian men worshipping sun	44
32. Domestic activities happening outside the dwelling	45
33. Poverty remains a persistent feature of urban life	47
34. Slum dwellers of India	48
35. Squatters	48
36. The cities of Asir in Arab	52
37. Internal courtyards between dwellings Of Asir in Arab	52
38. Internal courtyards between dwellings	53
39. A village house at Rajastan India	54
40. A village houses in Indonesia	54
41. A city at Asir of Soudi Arabia	55
42. A Bazaar	56
43. The city of Dhaka	58
44. City of Jakarta	58
45. City of Singapore	59
46. City of Bombay	59
47. City of Bangkok	59
48. City of Hong Kong	59
49. Shading provided for pedestrians	61
50. Providing water bodies	61
51. Location of the first settlements of Sri Lanka	63
52. The city of Sigiriya	64
53. The city plan of Anuradhapura	65
54. The city plan of Polonnaruwa	65
55. Town of Kandy	67
56. Town of Kandy in 1800's	68
57. Town plan of Kandy In 1815	69
58. Temple of tooth relic	70
59. D.S Senanayake veediya	70
60. Low scale narrow façade buildings of different architectural styles	70
61. Town plan of Kandy	71
62. Lankathilake Dewala Gama	72
63. Dalada veediya	73
64. Dalada perahara	73



65. The George .E de Silva park	75
66. Dalada Maluwa	75
67. Kandy Lake and surrounding area	76
68. Arcade of the Queens Hotel	76
69. Shading of the Dalada Veediya	76
70. The city of Colombo	78
71. Colombo at the time of British occupation	79
72. British influenced Buildings in Fort	79
73. Plan of Colombo at the Portuguese time	80
74. Fort	82
75. Pettah	82
76. Fort today	82
77. Bazaar area of Pettah	82
78. Plan of Colombo	83
79. Galle face green	84
80. Beira Lake and surroundings	85
81. Tree covered avenues	85
82. Galle road today	85
83. City of Galle	87
84. Galle in historic times	87
85. Church at Galle fort	88
86. Old Dutch building	88
87. Historic city Plan of Galle	89
88. Galle Fort	90
89. Galle Fort now	90
90. City Plan of Galle	91
91. City of Galle to day	93
92. Resting places	93



University of Moratuwa, Sri Lanka
 Electronic Theses & Dissertations
www.lib.mrt.ac.lk

ABSTRACT

Architecture expresses itself through a language; the expression thus created reflects the attitudes of a particular social group. If in a tropical region if the buildings and city forms not reflect topicality they would not strengthen the identity of that society. If that happens, architecture would cause to loose the identity of that society.

This study identifies the culture of tropical region and the manner they have been manifested in built environment and city forms. A study has been done to find whether the climate and the culture of a particular region have a relationship with each other. The correlation between the tropical climate to the tropical culture and the collective effect of the human behaviour and the social organization of the tropics, in this study is identified as the concept of Tropicality.

The manifestation of Tropicality in selected tropical cultures will be studied in terms of the human behaviour of each climatic condition, built environment and the city form. It analyses the cultural imperatives which underpinned the ways of thinking of tropical region and thus identifies the corresponding city form came from these attitudes by analyzing selected sub climatic conditions of the tropical region and their built environment and city form. The manifestation of Tropicality in the Sri Lankan context will be studied by analysing three contemporary city forms of Sri Lanka and their historical development.



University of Moratuwa, Sri Lanka.
Electronic Theses & Dissertations
www.lib.mrt.ac.lk

INTRODUCTION

1.0 INTRODUCTION

The first cities of the human civilization arose in the river valleys of Euphrates-Tigris, the Nile and the Indus valley between 4000 and 3500 B.C. The formation of the cities marked a sudden alteration in the human society: with it came the invention of writing, the specialization of labor, the acceleration of the technology and the beginning of science.

The early cities began to evolve a social organization immensely more complex than that found in Neolithic village. It was a social revolution. Therefore urbanization was far more than a basic change in society, Cities came about because of the need to transact ideas, goods and services. Therefore the natural emphasis is on communication of ideas. Settled agriculture changed everything by allowing population growth, limited economic specialization, and a more complex social organization. Evolution of cities therefore made it possible for development of an urban culture emphasizing trade, manufacturing and services.

“The city is seen as a “Dramatic event in the environment” and a “gathering surplus of enjoyment” and a gathering of buildings that can collectively give visual pleasure.”

(Cullen, 1971:7-8)

Therefore the City can be also seen as a collection of Artifacts: buildings and our material possessions. The space of the city constantly reshapes to changing needs of people. The current character of the city is therefore created by this historical evolution.

Thus the city can be seen as Architectural as well as Artistic creation. According to Hugh Barton a good city has many people staying and enjoying life. If people stop walking sits down and spend time in public spaces that are a sign of quality. A good townscape can be achieved only by responding to the individual characteristics of the site itself: that is to say, its geographical position, its townscape role within a particular location, and the value of its fabric. Planning of cities of the cities in future should provide scope for a wide range of human transactions which enhances the city as a multytransactional, information and ideas centre.

2.0 BACKGROUND TO THE STUDY

Sri Lankan cities in the present situation lack these qualities. Sri Lankan towns have developed their character as a product of their history, and their geographical location. But the present appearance of the cities of Sri Lanka lacks the qualities of a tropical city. They lack the sense of Tropicality. People do not stay and enjoy the urban spaces. City is merely a space they pass through in their day today life.

This results in the loss of character in the urban space and the city as a whole. The absence of people in the urban space will increase the potential of vandalism and urban crimes.

The possible causes may be the lack of response of the urban space to the Tropical climate. Characteristic of the tropical climatic region is the intense heat, solar radiation and humidity. To avoid discomfort cities need lot of shading from trees, water bodies and a city form which facilitate the circulation of air which would increase the ventilation potential of the city. The problem is the lack of urban public spaces which is suitable for tropical weather conditions. Though people from temperate countries enjoy sun and open spaces the inherent nature of the people of the tropics is to seek shelter from the sun. Sri Lankan urban spaces lack these qualities, for people to enjoy the urbanity and urban spaces.

To day from the new technology people have found ways and means of overcoming the restraints of the climate which are put upon them. In a tropical climatic condition, a building needs lot of openings to facilitate cross ventilation, and means of avoiding solar penetration and shading. Because it is possible to overcome the problem of heating and ventilation by putting up Air conditioning , most of the buildings designed in the cities to day are fully enclosed and do not respond to the climate of the tropics, Which results in the lack of user friendly urban spaces and streetscapes which are suitable for the tropical city.

There has not been research done in the field of the tropical urban space. Therefore the problem face by the cities in the tropics to day is that they don't have set of urban design principles to refer which suit the tropical climatic region. And therefore the urban design principles adopted by the Architects are from the cold climatic temperate western countries which may not be suitable for hot humid and sunny weather conditions of the tropics.

The absence of people in the urban spaces will be related also to the life struggle they are facing to day. With the poverty and related problems they may not have time to enjoy urban space other than thinking means of providing next meal.

The possible remedy for the above problem and to enhance the Tropicality of the city is to, design urban spaces which suits to the tropical climates. The environment must therefore be designed to be rich in texture and should stimulate mind and senses, shading for pedestrians and for the urban public spaces are also needed. Clean and sterile enclosed buildings and spaces separated from nature and form human activity which are not suitable for tropical climate should be avoided. Built environment should be designed to facilitate ventilation potential and water bodies should be also included in the city to facilitate evaporative cooling.

3.0 HYPOTHESIS

The study is based on the hypothesis that there is a correlation between the climate of a region and the culture formed in that particular climatic region. And the city form of a particular area is affected by the culture the region. Therefore in the tropical climatic region there can be a culture which is indigenous to the tropical region and the city forms of the tropical climate region will be a reflection of this culture. This can be referred to as the concept of Tropicality.

4.0 INTENTION OF THE STUDY

The intention of this study is to examine the concept of Tropicality, and find whether there is a relationship of culture to the city form created. In achieving that it is also tried to find whether there is a relationship between the climate and culture, and whether climate has a determining effect on the culture.

And to study whether there is a common socio cultural pattern in the tropical region and city form created by that inherent nature of climate, activities and culture of the tropics and whether there is a common solution for the problem faced by the tropical cities today.

And the idea is to seek whether the city can use the sun and the rain as positive and poetic elements in design, Can the city be considered as one complex eco system and be designed as such. The tropical city concept would be an attempt to re-conceptualize the relationship between culture and city planning. It is an attempt to find the critical link between the culture, city planning and architecture. In achieving that it is tried,



University of Moratuwa, Sri Lanka.
Electronic Theses & Dissertations
www.lib.mrt.ac.lk

- To explore the general determinants of urban form
- To examine the climatic effect on the culture and to study the culture of the tropical region
- Find whether there is a relationship between tropical climate and the tropical culture
- To take an idea of the contemporary tropical urbanity and urban life
- To examine the tropical built form and the cityscape
- To review and examine the current factors that influence Tropical urban form
- To study the historical evolution of the city form of Sri Lanka and to find the impact of culture and the climate to the form of the city
- To find the manifestation of the concept of Tropicality in the contemporary urban form of Sri Lanka.

5.0 SCOPE AND LIMITATIONS

The city is a result of continuous evolution and historical, cultural, economic, political forces and climatic forces. There will be generative and modifying forces for the city form. The generators of the city form are taken as humans and their needs and wants, physical context, function of the city and the culture of the region. The modifiers are taken as the climate economy and the technology available and the knowledge to use them. In this study the generative force of culture and the modifying force of climate are taken to examine the city form. Therefore other generative and modifying forces of city form will not be examined in detail.

The concept of Tropicality will be defined as a term which includes the Tropical climate and the tropical culture. It is taken that Climate of a particular region has a determining effect on the culture of that particular climatic region. Therefore it is taken the Tropical culture also has defined the culture of the tropical region. This correlation is taken as the concept of Tropicality.

The tropical climatic region has been taken as the region between Tropic of Cancer, and the Tropic of Capricorn. The zone between the two Tropic lines has been defined as the Tropical Zone. To study this correlation of tropical climate and tropical culture, two sub-climatic conditions of the tropical region are studied namely the Hot humid tropical climate and the Hot dry tropical climate. An out line study of the climatic conditions of the tropical region is done but detail analysis of its effects to the city form will not be done in the scope of the dissertation. The dissertation is limited to the anthropological aspect of the city forms.

Culture of a particular group can be studied in terms of human behavior, food they eat, the cloths they wear, the various cultural festivals they perform etc. In this study it is assumed that aspect which affects the city form is the human behavior and his needs and wants. And also an extensive analysis of the culture of the tropical region cannot be done within the scope of this dissertation therefore the climate and its relationship to the human behavior is examined. Therefore the other aspects of culture won't be studied in detail.

6.0 METHODOLOGY

A case study method has been adopted.

First chapter deals with the defining of the city, the origin of the cities and the concepts of urbanity and urban form where the city has been identified as a work of Architecture. The intention of the first chapter is to identify the attributes of city form, which will be discussed in terms of Generators and modifiers of the form of the city.

The second chapter identifies the concept "Tropicality", the tropical climatic conditions and its relationship to the Tropical culture. An examination will be done to find the correlation between the climate and the culture and finally the contemporary urban life of tropics will be discussed in terms of human behavior and the effects of economy on the contemporary urban life.

In the third chapter the correlation between the Tropicality and the corresponding city form is studied using Sri Lankan tropical cities as case studies. The built environment and the city form of the tropical region will be discussed using the hot humid region and the hot dry region. Then the city form of the Sri Lanka, its historical development, Factors influenced the development of Cities in Sri Lanka, Impact of Culture and climate in planning cities in Sri Lanka is studied. Manifestation of Tropicality in the contemporary city form In Sri Lanka is studied using three cities namely Kandy, Colombo, and Galle.