

**MONITORING SPATIAL AND TEMPORAL URBANIZATION
PATTERN IN THE JAFFNA PENINSULA USING REMOTE
SENSING TECHNIQUES**

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of Master of Science

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Abstract

This research examines the spatiotemporal pattern of urbanization in the Jaffna Peninsula using Remote Sensing and spatial analysis techniques. The spatial and temporal information on urbanization pattern in the Patna Peninsula is very essential for various planning and development related activities. There was no research undertaken on the pattern of urbanization in the Peninsula for the last few decades. This research has studied the urbanization pattern based on spatial data for the last 50 years compiled from satellite images and Aerial photograph. Medium resolution images of the study area were analyzed to map out the pattern through the techniques of Geographical Information System and Remote Sensing. Supervised classification techniques were used to analyze the images to recognize the spatial pattern of urbanization. The recognized pattern of land use changes were analyzed using the techniques of spatial metrics.

A dynamic spatial pattern of urbanization has been observed in the peripheral areas towns, Jaffna, Chavakachcheri, Nellyyadi, Point Pedro and Chunakam towns and ribbon development along the main transport routes in the Peninsula. Substantial changes in the urbanized area have been prevalent around the Jaffna town which is largest town in the Peninsula. Urbanization took place at a slow growth rate in the 1960s and 1970s but has grown rapidly since the 1980s. Again in 1990s, the growth rate had declined due to the intensive war centered in the Jaffna Peninsula. There has been significant urban growth in the Peninsula during the last decade as a result of the political changes in the country.

The urbanization process has developed fragmented and heterogeneous land use combinations in the fringe areas of towns in the Peninsula. However, the regeneration process in the city core during the last few years has shown a decreasing trend in the peripheries.

The study also shows that the urbanization trend in the Jaffna Peninsula has been causing numerous consequences economically and environmentally. Further research works deploying high resolution satellite images to survey the urbanization pattern are required in the future.

DECLARATION

I declare that this is my own work and this dissertation does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or Institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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CERTIFICATION

The above candidate has carried out research for the Master dissertation under my supervision.

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Signature of the Supervisor

Prof. P. K. S. Mahanama

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Table of Contents

Title Page	i
Declaration	ii
Abstract	iii
Acknowledgement	iv
Table of Contents	vi
List of Figures	ix
List of Tables	xi
List of Abbreviations	xii
1 Introduction1	
1.1 Introduction to the Research	1
1.2 Research Problem	3
1.3 Rationale for the Research	4
1.4 Objectives of the Study	7
1.4 Scope of the Study	7
1.5 Limitations	8
1.6 Structure of the Thesis	9
2 Background of Urbanization and Remote Sensing	11
2.0 Introduction	11
2.1 Background of Urbanization	11
2.1.1 Meaning of Urbanization	11
2.1.2 The Definition of Urban	12
2.1.3 Urban Population in Sri Lanka	13
2.1.4 Urbanization Pattern in Sri Lanka	16
2.2 Remote Sensing of Urban Environment	21
2.2.0 Introduction	21
2.2.1 Meaning of Remote Sensing	21

2.2.2	Characteristics of Urban Environment	21
2.2.3	Considerations of remotely sensed image for Urban Application	25
2.3.4	Mapping of Urban Land Use and Land Cover	26
3	Review of Similar Research Methodologies	30
3.0	Introduction	30
3.1	Urban Change Study in Mongolia – Methodology One	30
3.1.1	Data Sources used for the study	31
3.1.2	Analyses and Discussion	31
3.1.3	Conclusions of Methodology	33
3.2	Urban sprawl assessment Entropy approach – Methodology Two	34
3.2.1	Database and Methodology	34
3.2.2	Measuring Urban Sprawl	35
3.2.3	Results and Discussion	36
3.2.4	Conclusion	38
4	Research Methodology	40
4.0	Introduction	40
4.1	Spatial Data Used in the Study	40
4.2	Software Used in the Study	43
4.3	Data Collection	44
4.4	Data Processing	61
4.4.1	Processing of Remotely Sensed Images	61
4.4.2	Processing of Aerial Photographs	66
4.5	Image Enhancement Techniques	66
4.6	Image Classification	66
4.7	Image Analysis for Spatial Patterns	67
5	Spatial Pattern of urbanization trends in the Jaffna Peninsula	69
5.1	Urbanized Areas in the Peninsula in 1960s	69

5.2	Urbanization during 1960-1989	70
5.3	Urbanization During 1989 to 1999	72
5.4	Changes During 1999 to 2005	72
5.5	Type of Lands Transformed into Urban use	75
5.6	Spatial Patterns of Land Use	75
5.7	Spatial Patterns Changes	75
5.8	Land use Fragmentation	78
6	Conclusions and Further Work	79
6.1	Conclusions	79
6.2	Further Work	81
	List of References	82
	Appendices	84
	Appendix – A: List of Criteria in Use to define urban areas in Different Countries	84
	Appendix – B: USGS Land Use, Land Cover Classification System for Use with Remotely Sensed Data	93
	Appendix – C: Photographic Views of Urbanized Areas in the Jaffna Peninsula	98

List of Figures

1.1	Jaffna Peninsula / Case Study Area	4
2.1	Total and Percentage of Urban Population in Sri Lanka in 1981 and 2001	15
2.1-A	Urban Hierarchy in the Jaffna District	18
2.1-B	Population Distribution in the Jaffna District in 1981	18
2.1-C	Population Distribution in the Jaffna District in 2003	19
2.2	Characteristics of Built Environment, Fort Area in the City of Colombo	22
2.3	Characteristics of Built Environment, Lower Manhattan, New York	23
2.4	Characteristics of Rural Environment, Oddusuddan, Mullaitivu District	23
2.5	Reflectance Characteristics of Common Urban Materials	24
2.6	Radarsat Image of an Airport (10 meter resolution)	27
2.7	IRS IC Images of an Airport (23.5 meter resolution)	27
2.8	SPOT Pan Image of an Airport (15 meter resolution)	27
2.9	Areal Photo of an Airport	27
2.10	Quickbird Image of Yokohama Stadium, Japan	28
2.11	Quickbird Image of Boston, USA	28
2.12	Satellite Image of Urbanized Areas at Global Level	29
4.0	Methodology of Remotely Sensed Image Analysis	41
4.1	Landsat MSS Imagery	46
4.2	FCC Image of Landsat TM	46
4.3	Green Band Image of Landsat TM	47
4.4	Blue Band Image of Landsat TM	47
4.5	Infrared Image of Landsat TM	48
4.6	Red Band Image of Landsat TM	48
4.7	FCC Image of IRS IC LISS III	49
4.8	Red Band Image of IRS IC LISS III	49
4.9	Green Band Image of IRS IC LISS III	50

4.10	Blue Band Image of IRS IC LISS III	50
4.11	Aerial Photograph of Point Pedro Town	51
4.12	Aerial Photograph of Chunakam Town	51
4.13	Aerial Photograph of Chavakachcheri Town	51
4.14	Aerial Photograph of Kodikamam Town	51
4.15	Aerial Photograph of Achchuvely Town	52
4.16	Aerial Photograph of Jaffna Town	52
4.17	Quickbird Images of Jaffna Municipal Council Area	53
4.18	Quickbird Images of Central Area of Jaffna Town	53
4.19	Quickbird Images of Jaffna Teaching Hospital and its Surroundings	54
4.20	Quickbird Images of Jaffna University and its Surroundings	54
4.21	Quickbird Images of Kurunagar – Paasaiyoor Area s in the Jaffna Town	55
4.22	Quickbird Images of Thirunelvely Area, Periphery of Jaffna Town	55
4.23	Quickbird Images of Innuvil Area, Periphery of Jaffna Town	56
4.24	Quickbird Images of Chunnakam Town	56
4.25	Quickbird Images of Kokuvil Area in the Periphery of Jaffna Town	57
4.26	Quickbird Images of Manipay Town	57
4.27	Quickbird Images of Nellyyady Town	58
4.28	Quickbird Images of Point Pedro Town	58
4.29	Quickbird Images of Valvettithurai Town	59
4.30	Quickbird Images of Chavakachcheri Town Centre	59
4.31	Quickbird Images of Chavakachcheri Urban Council Area	60
5.1	Urbanized Areas in 1960s	69
5.2	Urbanized Areas in 1989	71
5.3	Urbanized Areas in 1999	73
5.4	Urbanized Areas in 2005	74
5.5	Land Use Changes From 1960 to 2005	77

List of Tables

Table 2.1	Urban Population and its Percentage in 1981 and 2001	14
Table 2.2	Changes of Urban Areas and Urban Population in Sri Lanka	16
Table 4.1	Lists of Data Used in the Research	42
Table 4.2	Data Formats Used in the Study	43
Table 4.3	Software Used in the Research	44
Table 4.4	Details of the Satellites	62
Table 4.5	Spectral Bands of MSS Image and its wavelengths	63
Table 4.6	Spectral Bands of Landsat TM Used in this Study	64
Table 4.7	Summary of IRS 1A through 1D Satellites	65



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List of Abbreviation

Abbreviation	Description
ArcView	GIS Software
ArcGIS	GIS Software
AVHRR	Advanced Very High Resolution Radiometer
dpi	Dot Per Inch
ED	Edge Density
ERDAS	Image Processing Software
FCC	False Color Composite
Fragstat	Fragmentation Analysis Software
Ft	Feet
GIS	Geographical Information System
GeoEye	One of the Very High Resolution Satellite
GPS	Global Positioning System
HRV	High resolution Visible (Imaging System)
IKONOS	One of the High Resolution Satellites of United State of America
ILWIS	Integrated Land and Water Information System (GIS and Image Processing Software)
IR	Infrared
IRS	Indian Remote Sensing Satellite
Jpeg	Joint Photographic Expert Group
KKS	Kankesanthurai
Landsat	Series of Earth Resources Satellites of United States of America
LB	Local Board
LiDAR	Laser Induced Detection and Ranging LISS Line Spectral Scanner (Sensor Used in the Indian Remote Sensing Satellite 1C)
MAUP	Modifiable Area Unit Problem
MC	Municipal Council

MIR	Middle Infrared
MODIS	Moderate-Resolution Imaging Spectroradiometer
μm	Micrometer
MSS	Multi Spectral Scanner
MX	Multi Spectral
NIR	Near Infrared
Pan	Panchromatic
PD	Patch Density
Pixel	Picture elements
ppi	Pixel Per Inch
PMC	Pune Municipal Council
PS	Pradeshiasaba
Quickbird	One of the High Resolution Satellites of Japan
RADAR	Radio detection and Ranging
RMSE	Root Mean Square Error
RS	Remote sensing
SPOT	French Satellite
TM	Thematic Mapper
UC	Urban Council
USGS	United States Geological Survey
USA	United States of America
UTM	Universal Transverse Mercator
WiFS	Wide Field Sensor
WGS 1984	World Geodetic System 1984
XS	Multi Spectral