

# **ECONOMIC IMPACT OF URBAN AGGLOMERATION IN KERALA**

*Thesis Submitted to the University of Calicut For the award of the Degree of*

**Doctor of Philosophy in Economics**

*By*

**SALINI V**

*Under the supervision of*

**Dr. K V Ramachandran**  
Professor (Retd),  
Department of Economics  
University of Calicut  
Dr. John Matthai Centre  
Aranattukara, Thrissur.

**DEPARTMENT OF ECONOMICS  
UNIVERSITY OF CALICUT  
Dr. JOHN MATTHAI CENTRE  
ARANATTUKARA, THRISSUR**

**DECEMBER 2022**

## CERTIFICATE

This is to certify that this thesis entitled, “**Economic impact of Urban Agglomeration in Kerala**” being submitted by **Salini V** for the award of the degree of Doctor of Philosophy, to the University of Calicut is a record of bona fide research work carried out by her under our guidance and supervision. The contents of this thesis, in full or in part, had not been submitted to any other institute or University for the award of any degree, diploma, fellowship or other similar title or recognition before. Plagiarism is checked and found within the permitted limits.



**Dr. K V Ramachandran**  
(Supervising Teacher)  
Professor (Retd),  
Department of Economics  
University of Calicut  
Dr. John Matthai Centre  
Aranattukara, Thrissur.



**Dr. Muneer Babu M**  
(Co-Guide)  
Assistant Professor  
Department of Economics  
University of Calicut  
Dr. John Matthai Centre  
Aranattukara, Thrissur.

Place: Thrissur,

Date: 17/12/2022



## CERTIFICATE

This is to certify that the suggestions and corrections made by the adjudicators have been incorporated in the thesis of my research scholar, **Salini V**, titled, “**Economic impact of Urban Agglomeration in Kerala**”.



**Dr. K V Ramachandran**  
(Supervising Teacher)  
Professor (Retd),  
Department of Economics  
University of Calicut  
Dr. John Matthai Centre  
Aranattukara, Thrissur.



**Dr. Muneer Babu M**  
(Co-Guide)  
Assistant Professor  
Department of Economics  
University of Calicut  
Dr. John Matthai Centre  
Aranattukara, Thrissur.

Place: Thrissur,

Date: 06/06/2023




## DECLARATION

I, Salini V, affirm that this thesis titled "Economic impact of Urban Agglomeration in Kerala" submitted to the University of Calicut for the award of the degree of Doctor of Philosophy in Economics is a bonafide record of research done by me under the guidance of Dr. K V Ramachandran, Professor of Economics (Retd.), Department of Economics, Dr. John Matthai Centre, Aranattukara, Thrissur and Dr. Muneer Babu M, Assistant Professor, Department of Economics, Dr. John Matthai Centre, Aranattukara, Thrissur. I declare that this thesis had not been submitted by me earlier for the award of any degree, diploma, fellowship or any other similar title or recognition of any University/Institution.

Place: Thrissur

Date: 17/12/2022

Salini V 

Research Scholar in Economics

Dr. John Matthai Centre

Aranattukara, Thrissur

## CONTENTS

Chapters	TITLE	PAGE NO
1	<b>Design of the Study</b>	<b>1-17</b>
	1.1 Introduction	1
	1.2 Background of the Problem	2
	1.3 Statement of the Problem	5
	1.4 Significance of the study	5
	1.5 Operational Definition	6
	1.6 Research Question	6
	1.7 Objectives	6
	1.8 Research Hypothesis	7
	1.9 Research Methodology	7
	1.10 Scope of the study	17
	1.11 Chapter Scheme	17
2	<b>The Conceptual and Theoretical Background of Urban Agglomeration</b>	<b>19-33</b>
	2.1 Review of Existing Literature	19
	2.2 Review of Theoretical Literature	25
	2.3 Regional Theories of Growth	28
	2.4 Research Gap	30
	2.5 Conceptual Framework of Urban Agglomeration	31
3	<b>Urban Agglomeration: An overview</b>	<b>34-54</b>
	3.1 Evolution of concept of Urban Agglomeration	34
	3.2 History of Urban Agglomeration in Europe	37
	3.3 History of Urban Agglomeration in India	39
	3.4 Metropolitan Cities as Engine of Growth	40
	3.5 Growth of Urbanisation due to the increase of Census Towns	45
	3.6 Urban Agglomeration in Kerala	46
	3.7 Urban Agglomeration in Thrissur	50
4	<b>The Extent of Urban Agglomeration in Kerala</b>	<b>55-84</b>
	4.1 Parameters for Measuring the Extent of Urban Agglomeration	55
	4.2 Factor Analysis of the Secondary data	72
	4.3 Principal Component Analysis (PCA)	72
	4.4 Eigen Values and Scree Plot	73
	4.5 Factors Influencing Urban Agglomeration – Sectoral or Development factors – Regression Analysis	80
	4.6 Factors Influencing Urban Agglomeration – Spatial or Agglomeration Factors – Regression Analysis	82
5	<b>Assessment of Determining Factors for Urban Agglomeration in Thrissur District</b>	<b>85-102</b>
	5.1 Socio-Economic and Demographic Profile of the Respondents	85
	5.2 Factors Determining the Urban Agglomeration Process	89

---

<b>Chapters</b>	<b>TITLE</b>	<b>PAGE NO</b>
6	<b>Direction of the Extent of Urban Agglomeration</b>	<b>103-113</b>
	6.1 Direction of the Extent of Urban Agglomeration	103
	6.2 Construction of the Direction of the Extent of Urban Agglomeration	103
	6.3 Measurement of the Direction of the Extent of Urban Agglomeration	105
	6.4 The direction of the extent of Urban Agglomeration - Adat CT	112 112
	6.5 The Direction of the Extent of Urban Agglomeration - Arimpur CT	112
	6.6 The Direction of the extent of Urban Agglomeration - Avinissery CT	112
	6.7 The direction of The Extent of Urban Agglomeration - Puthur CT	112
	6.8 The Directional Extent of Urban Agglomeration - Eriyad Out Growth	
7	<b>Summary of Findings and Implications</b>	<b>114-118</b>
	<b>Appendix</b>	
	<b>Bibliography</b>	

---

## LIST OF TABLES

Table No	Title of the Table	Page No
1.1	Urban and rural population in the world scenario	3
1.2	Urban and rural population comparison between more developed region and less developed region	3
1.3	Variables of the extent of Urban Agglomeration	11
1.4	Socio-economic attributes of the households – based on(1.9.4) Part A	12
1.5	Determinants of Urban Agglomeration – based on (1.9.4) Part B	12
1.6	Perceptive indices of economic impact of Urban Agglomeration based on (1.9.4) Part C	12
3.1	General views of the concept of Urban Agglomeration studies from 1898-2015	36
3.2	Total population and urban population (trend from 1901-2011)	40
3.3	Number of towns in India	41
3.4	Trend of urbanization in India from 1901-2011	42
3.5	Increase in number of Statutory and Census Towns in India	44
3.6	State wise share of Census Towns in Urban Growth and Decadal Change	45
3.7	Number of statutory and census towns in Kerala	47
3.8	District wise urban and rural population - Kerala	48
3.9	District wise urban content and its change	49
3.10	Urban areas in Kerala – District wise details	49
4.1	Net state domestic product (Kruskal-Wallis H test)	57
4.2	Total hospitals (Kruskal-Wallis H test)	58
4.3	Total road length (Kruskal-Wallis H test)	59
4.4	Total banks (Kruskal-Wallis H test)	60
4.5	Density (Kruskal-Wallis H test)	61
4.6	Total schools (Kruskal-Wallis H test)	62
4.7	Gross district value added at constant prices (Kruskal-Wallis H test)	63
4.8	Gross district value added at current prices (Kruskal-Wallis H test)	64
4.9	Net district value added at constant prices (Kruskal-Wallis H test)	65
4.10	Net district value added at current prices (Kruskal-Wallis H test)	66
4.11	District per capita income (GDVA) at constant prices (Kruskal-Wallis H test)	67
4.12	District per capita income (GDVA) at current prices (Kruskal-Wallis H test)	68

4.13	District per capita income (NDVA) at constant prices (Kruskal-Wallis H test)	69
4.14	District per capita income (NDVA) at current prices (Kruskal-Wallis H test)	70
4.15	Population (Kruskal-Wallis H test)	71
4.16	Rotated component matrix	75
4.17	Components of Urban Agglomeration	77
4.18	Agglomeration (spatial) factors of Thrissur district	77
4.19	Development (Sectoral) factors of Thrissur district	79
4.20	Summary of Regression result	81
4.21	Summary of Regression result	82
5.1	Distribution of sample area	85
5.2	Marital status of the respondents	86
5.3	Religion of the respondents	86
5.4	Occupational structure of the head of the family	87
5.5	Social group of the respondent	87
5.6	Social association of the respondent	88
5.7	Category of the respondent	88
5.8	Educational qualification of the respondent	89
5.9	Ownership of the house of the respondent	89
5.10	The process of relocation	90
5.11	Chi-Square Test for Association between the process of relocation and different forms of Urban Agglomeration	90
5.12	The factor of distance towards the process of relocation – One sample t' test	92
5.13	Descriptive statistics of monthly income	92
5.14	Monthly income of Out Growth, census towns and statutory town- One way ANOVA	93
5.15	Cost of living index	94
5.16	Kendall's coefficient of concordance of cost-of-living index	95
5.17	Social index	95
5.18	Kendall's coefficient of concordance of social index	96
5.19	Economic index	96
5.20	Kendall's coefficient of concordance of economic index	97
5.21	Environment index	97



5.22	Kendall's coefficient of concordance of environment index	98
5.23	Health index	98
5.24	Kendall's coefficient of concordance of health index	99
5.25	Quality of life index	99
5.26	Kendall's coefficient of concordance of quality-of-life index	100
5.27	Financial inclusion and awareness index	100
5.28	Kendall's coefficient of concordance of financial inclusion and awareness index	101
5.29	Women empowerment index	101
5.30	Kendall's coefficient of concordance of women empowerment index	102
6.1	Spatial and Sectoral parameters of Urban Agglomeration	104

## LIST OF FIGURES

<b>Figures</b>	<b>Title</b>	<b>Page No.</b>
1.1	Sampling Framework	9
2.1	Alfred Weber's theory of location	26
2.2	The model of Gunnar Myrdal's theory of cumulative causation	28
2.3	A hypothesized conceptual model for the impact of Urban Agglomeration in Kerala with respect to the extent and perceptions of the household	31
3.1	Thrissur District Map	54
4.1	Scree Plot	74
4.2	Component plot in rotated space	76
4.3	Thrissur Agglomeration (spatial) factor	78
4.4	Thrissur Development (sectoral) factor	80
5.1	Factors of relocation	91

## ACKNOWLEDGEMENT

This thesis is the result of blessings of Lord Guruvayurappa on me through various persons and resources. I am ever grateful to the blessings of Thiruvambadi Kannan for all the showers upon me.

Let me express my deep and sincere gratitude to my research supervisor, Dr.K. V Ramachandran, Professor of Economics (Retired), Department of Economics, Dr. John Matthai Centre, Aranattukara, for his scholarly guidance and untiring efforts taken for guiding the study. I am extremely indebted to him for his support at every stage of the work which gave me the confidence to undertake this study. Any word would be inadequate to describe my feelings of gratitude to him.

With deep respect I would express my heartfelt gratitude to my co-guide Dr.Muneer Babu M, Assistant Professor, Department of Economics, Dr. John Matthai Centre, Aranattukara, who delivered valuable guidance in a helpful way throughout the study.

I am sincerely thankful to Dr. Zabeena Hameed P, Assistant Professor (HOD), Department of Economics, Dr. John Matthai Centre, for her valuable guidance and encouragement to complete all the procedure to complete the process.

I express my deep sense of gratitude to Dr. D. Shyjan, Associate Professor (on Deputation), Dr. John Matthai Centre for his immense help and guidance for moulding the way of research. I extend my special thanks to Dr. Sanoop M S, Assistant Professor Dr. John Matthai Centre and Dr. Rejula Helan K P Assistant Professor Dr. John Matthai Centre for their valuable comments and support. I am also grateful to Retired professors of the Department Dr. D. Ratnaraj, Dr.K.X. Joseph, and Dr. K.P.Mani for their valuable suggestions and guidance in this thesis. I express my heartfelt gratitude to Dr.Priya S, Assistant Professor (on contract), Department of Economics, Dr. John Matthai Centre, Aranattukara, for the inspiration and enthusiasm which she has kept on me for the successful implementation of my course of PhD. I am also thankful to Mr.Ronek, Assistant Professor (on contract) of Department of Economics, Dr. John Matthai Centre, Aranattukara.

I would express my special thanks to Dr. Deepa V D and Dr.Ummaiban M M, Post-Doctoral Fellows of the Department of Economics, for their wholehearted response to the completion of my research work. A special thanks to Mrs.Twinkle Wilson, part-time research scholar, Mr. Shibhu Raghavan and Mr.Sherin , Mrs.Athira, full time research scholars of this department, for the continuous support throughout my journey.

I would like to express my special gratitude to Mr. Hashik P M, Junior librarian, Dr. John Mathai Centre and Mrs. Sreeja, Former librarian, Dr. John Matthai Centre for their help and support. I am grateful to all the non-teaching staff especially Manshad sir, Sumesh sir, Sheeja chechi, Susmitha chechi, Stanley Chetan, Ayshechi and Sanitha of the Department of Economics, Dr. John Matthai Centre, Thrissur for their support and help during my course of work.

I have no words to express my gratitude to my part time research friends of this department, especially Mrs. Jessy David, Assistant Professor, MD College, Pazhanji and Dr. Sandhya K P, Assistant Professor, Sri. C.Achutha Menon Govt. College, Thrissur for

their valuable guidance for the complete endeavour of my journey towards PhD. I remember all the Part time scholars, Dr.Dhanya K, Assistant Professor, MES College, Kodungallur, Dr. Jessy John K , Assistant Professor (Retd) , St.Aloysius College, Elthuruth, Dr. Raseena K K , Director, Open University Regional Centre, Pattambi, Dr.Rejula, Assistant Professor, Govt. College, Kasargod, Mrs. Jyothi K K, Assistant Professor, SNGS College, Pattambi, Mrs.Satyavathi, Assistant Professor, VTB College, Mannarkkad, Mrs.Sreeja Gopal, NSS College, Ottapalam and Mrs.Daisy, Assistant Professor, St.Joseph College, Irinjalakuda for their love and support for creating smooth environment of the research journey.

I would like to express my sincere thanks to Dr. Unnikrishnan T, Assistant Professor and Head of the Department of Statistics, Sri. C.Achutha Menon Govt. College, Thrissur and Dr. C Krishnan, Professor (Retd), Department of Statistics, Kerala Agricultural University for the correct guidance of my research analysis.

I would also express my words of gratitude to Dr.Vimala M, Associate Professor and Head of the Department of Economics, Vimala college, Thrissur, for her motivational guidance to complete my endeavour with wholehearted support. Many thanks to my friends in Vimala college, especially Dr.Sitara V Attokkaran, Dr. Sneha Gopeekrishna, Dr. Liji and Dr. Mary Thomas for their love and encouragement throughout my career.

I would express my thanks to Dr.Chacko Jose , Principal and Dr. Jins Varkey, Assistant Professor, St.Aloysius college, Elthuruth, for the correct guidance to complete my aim of Ph.D.

I am thankful to Dr.Simon T D, Assistant Professor and Head of the Department of Economics, Sree Kerala Varma College, Thrissur, for the successful guidance to the research journey. Many special thanks to DR Sindhu M, Assistant Professor, Department of Economics, Sree Kerala Varma College, Dr.Anila C, Assistant Professor, Department of Economics, Sree Kerala Varma College, Thrissur and Dr.Shijitha M, Assistant Professor, Department of Economics, Sree Kerala Varma College, Thrissur, for their continuous support to my research process.

Many more thanks to Dr.Ramya R, Associate Professor and Head of the department of Economics, Sri. C.Achutha Menon Govt. College, Thrissur for directing me for the correct way of completing my journey towards the aim. Sincere thanks to Dr.Soni T L, NSS Programme Coordinator, University of Calicut for her inspiring words of privilege to complete my Course of PhD. Many many thanks to Dr.Smitha R, , Assistant Professor, Sri. C.Achutha Menon Govt. College, Thrissur and Mrs. Sangeetha P G, Assistant Professor, Sri. C.Achutha Menon Govt. College, Thrissur for their lovely support and encouragement to achieve my dream.

I also express my sincere thanks to the Mrs. Geetha Teacher, Head of the Department and Dr. Madhava Menon, Professor (Retd) of NSS College, Cherthala for their love and support they have shown to me for the successful endeavour.

I am thankful to Dr. Jyothilekshmi P, Principal, NSS College, Manjeri and Dr.Sreekumar T, Principal in charge, NSS College, Nemmara for the valuable support and encouragement that I have received from them.

I express my deep sense of gratitude to Sri. Suresh Babu. P and Sri. Rajeesh P, Assistant Professors of NSS College, Nemmara for their immense help, support and guidance without which this work would not have been completed.

I am also thankful to my colleagues Mrs. Sreeja G, Dr.Suja P, Dr.Anitha P, Dr. Rajesh R, Dr.Zereena Viji, Dr.Ambili V K, Mrs.Jothilekshmi and Mrs.Jesitha Assistant Professors of NSS College, Nemmara for their valuable suggestions and care in all aspects of my life.

A special thanks to Dr.Sajitha P P , Assistant Professor, Department of Economics, NSS College, Ottapalam and Mrs. Hima Hari U, Assistant Professor, Department of Economics, Sri Krishna college, Guruvayoor, and Dr.Gini Paul, Assistant Professor, Department of Economics, St.Thomas College, Thrissur, for their continuous encouragement throughout my journey towards Ph.D.

Words can never express my lovely thanks to my students especially Sri. Ganesh Kumar Menon and Kumari. Devika Haridas for their support and help for the completion of my work. Thanks to Mr. Dinops Jose for the neat execution of the Thesis work with dedication and sincerely.

With love and gratitude, I do recall my loving parents –Mrs. Ashalatha V and Mr. M S Ramachandran for the love and care especially during the path of completion of my dream of success. My wholehearted gratitude towards my ammuma Thankam V and my uncle Mr.Krishnakumar V and Mr.Balagopal V for their love and support throughout my life. I express my words of gratitude to my father-in- law- Mr. Sudhakaran M and mother-in- law Mrs. Vijayalakshmi C, for the support and inspiration throughout my journey. The words of gratitude towards my brother Shyam Chandran and Sister – in- law Subitha Manoj, for the accomplishment would not have been possible without them.

I am very happy to express my heartfelt thanks to my husbandMr. Sudheer M. and my strength and weakness of my life, Sagar Sudheer and Sivani Sudheer for their continuous support and co-operation throughout my years of study.No word of thanks can substitute the love and concern, which they have given to me.

My deepest gratitude to my Muthachan, Sri.T Sivaraman Nair (Late) for his continuous support, love and care throughout my life. This thesis is dedicated to you my love.....Muthacha....

**SALINI V**

## **Abstract**

### **ECONOMIC IMPACT OF URBAN AGGLOMERATION IN KERALA**

There are wide variations in the development aspects of different areas especially the classified urban areas across all the districts in Kerala. There are various criteria behind the classification of the areas according to the Census of India. Based on all these criteria together, the Kerala state is known as 'rural-urban continuum'.

There are various studies showing the urbanisation pattern of the State and India. The pattern leads to urban concentration or Urban Agglomeration in due consideration of various indicators leading to agglomeration economies. It is in this context that this study has examined the economic impact of Urban Agglomeration by considering various parameters of importance.

This study is based on both primary and secondary data sources and related to the collection of primary data from Thrissur district with defined urban areas of classification i.e., Statutory Town, Census Town and Out Growth.

For the data analysis, the study has used descriptive statistics as well as parametric and non-parametric tests of analysis by using IBM SPSS 21 version software package. As per the analysis, the extent of Urban Agglomeration in terms of fifteen parameters have used for the difference in the mean rank score of fourteen districts concerned. Accordingly, the highest significant parameters have again resorted to factor analysis by way of Principal component analysis method. There is 73 per cent of sampling adequacy of the two components concerned. The extraction of the two components together showing the sign of agglomeration economies in the research study. These are termed as sectoral or development factors and agglomeration or spatial factors.

The theoretical background of the two dimensions i.e., spatial and sectoral have far reaching impact upon the regional economy is concerned. For that, regression model is run by exploring which dimension is influenced more for the economic impact of Urban Agglomeration. The two models – development and agglomeration – have predicting 9 per cent and 27 per cent respectively upon the economic impact of Urban Agglomeration.

There are other determinants concerned with Urban Agglomeration of the district is explained which are the process of relocation, distance from the main centre of the city

(Statutory Town) and various indices of measuring the perceptible behaviour of households living in three forms of urban areas as Statutory Town, Census Town and Out Growth.

The surrounding census towns of Thrissur Statutory town is analysed for examining the direction of the extent of Urban Agglomeration by using the multiplicative model of index value. These multiplicative indices are providing the extent of Urban Agglomeration is happening towards the east direction of Puthur census town of Thrissur district.

Key words: Urban Agglomeration, Statutory Town, Census Town, Out Growth.

# **CHAPTER 1**

## **INTRODUCTION**



## 1.1.INTRODUCTION

Urban revolution in the developing world had a steady start from the twenty first century and even now the tempo is upright. It is more important than the agrarian and industrial revolution in terms of its effect on humankind. This helped the developing countries to increase the economic growth through the agglomeration of economic activity in cities. “The urbanization transition will be inevitable because of the operation of ‘agglomeration economies’”<sup>1</sup> (Gottmann, 1961).

In 2021, 56.61 per cent of the world’s population is living in urban areas, a proportion of increase of 68 per cent by 2050 (UN World Urbanization Prospects, 2018). The world’s urban population has grown rapidly from 751 million in 1950 to 4.46 billion in 2021 and will grow to 6.68 billion by 2050, adding about 2.22 billion people to urban areas. The most urbanized regions include Northern America (82.75%), Latin America and the Caribbean (81.5%), Europe (75%), and Oceania (68%). The level of urbanization in Asia is now approximating 52%. In contrast, Africa remains mostly rural, with 44% of its population living in urban areas.

Urbanisation is considered to be an expected part of economic change of the country. In the study of urbanisation, it is appropriate to know how urban areas are defined. From the demographic point of view, the level of urbanisation is measured in terms of percentage of population living in urban areas (Davis 1962).

“Urbanisation is the process by which rural communities grow to form cities or urban centres and by extension, the growth, and expansion of those cities” (Mark, 2014). It is the process of developing an urban expansion of the township in a geographical area. It has been a continuous phenomenon that can be observed all over the world, which results in improvement of education, technology, health, industrialisation and modernisation of societies.

The urbanisation is concerned with the levels of spatial structure and sectoral structure is emphasised in the present study of Urban Agglomeration. As far as the state of Kerala is concerned, there is much relevance of Urbanisation which has led to the agglomeration tendencies of the economy towards the regions of all levels of development. Kerala has a unique level of settlement. “The most striking features that differentiate Kerala from the rest of the country is the spatial pattern of the settlement system characterized by dispersed but interconnected, linear but densely agglomerated stretch” (Firoz C, et. al,2014). ‘Desakota’<sup>2</sup>

type of settlement could be seen in some Asian countries like Indonesia (McGhee, 1987). It refers to close interlinking of rural-urban livelihoods, communication, transport and economic system (Moench and Gyawali, 2008). Kerala is a ruralopolitan<sup>3</sup> region with elements of a 'Desakota' (Quader M A, 2000). Isaac(1986) used the term "gragara" by combining the 'gra' from 'gramam' (rural) and 'gara' from 'nagaram' (urban) to explain the rural and urban settlement pattern as well as co-ordination of agricultural and non-agricultural activities.

In this context, urbanization in Kerala needs clarification. The urbanisation process in Kerala is quite different from the rest of the country. "Kerala is neither urban nor rural"(Srikumar, 1993).

The study identifies Urban Agglomeration depends upon size, population, occupations and economic activities.

## **1.2. BACKGROUND OF THE PROBLEM**

Urban Agglomeration is defined by urban inclusion of rural areas by way of population density, occupational structure and various economic activities. According to the Census concept of urban agglomerated areas, three different forms of urban areas including Statutory Towns, Census Towns and Urban out-growths are taken for this study. As far as the social, economic and demographic dimensions are concerned in these three forms of urban areas helps to build the urban inclusion of rural areas or Urban Agglomeration.

There are various definitions upon which Urban Agglomeration is built. One third of countries use the concept to estimate the city data, and another 12 per cent use it for their capital cities. As much as 38per cent of countries use another concept that is the 'city proper'. It is estimated that one-fifth of countries combine various definitions to estimate city and population data in their urban areas. Nearly five percent of additional countries use a different criterion to define their urban populations, which is the "metropolitan area"<sup>4</sup>.

The Urban Agglomeration concept refers to "the population contained within the contours of a contiguous territory inhabited at urban density levels without regard to administrative boundaries". In other words, it integrates the 'City Proper'<sup>5</sup> plus suburban areas<sup>6</sup> that are part of what can be considered as city boundaries; a term that in itself is controversial. (United Nations, 2020).

**Table 1.1**  
**Urban and Rural Population in the World Scenario**

	Population (In Billions)			Percentage of	
	Urban	Rural	Total	Urban population	Rural Population
1951	0.73	1.79	2.53	29.1	70.9
1961	0.99	2.03	3.03	32.9	67.1
1971	1.33	2.36	3.69	36	64
1981	1.74	2.71	4.45	39.1	60.9
1991	2.27	3.02	5.29	43	57
2001	2.85	3.27	6.12	46.6	53.4
2011	3.49	3.41	6.9	50.6	49.4

Source: Department of Town and Country Planning, Government of Kerala (2012)

From the table 1.1. it is evident that in 1951, the percentage of urban population was 29.1 while rural population was 70.9. but by 2011, i.e., around 60 years of change, the percentage of urban population has increased to 50.6 while rural population decreased to 49.4.

**Table 1.2.**

**Urban and Rural Population Comparison Between more Developed Region and Less Developed Region**

Development group	Population (In Billions)						
	1950	1965	1975	2000	2005	2011	% Increase
Total population							
More developed regions	0.81	0.96	1.04	1.19	1.21	1.23	
Less developed regions	1.72	2.37	3.02	4.92	5.29	5.67	
URBAN POPULATION							
More developed regions	0.42	0.59	0.7	0.87	0.89	0.92	119%
Less developed regions	0.3	0.56	0.81	1.98	2.26	2.56	753%
URBAN POPULATION %							
More developed regions	51.85	61.46	67.31	73.11	73.55	74.8	
Less developed regions	17.44	23.63	26.82	40.24	42.72	45.15	

Source: Department of Town and Country Planning, Government of Kerala (2012)

As per table 1.2. the percentage increase in terms of comparison between urban and rural population in more developed region was 119 per cent while it was 753 per cent in less

developed region. That means the urban population growth was highly increased in less developed region. So, urbanisation process steadily increased.

It is not the percentage increase of population that is notable as per urbanisation is concerned but its total number of townships added to urban category (State Urbanization Report, 2012). In this context, the importance of Panchayati Raj Act, and its further implementation has led to the importance of villages as the main power of the state. The reason for the increase in the townships has more relevance in the study of Urban Agglomeration in the context of Panchayati Raj system. Data on urban population shows that the urban content within the country varies from a low of 10 per cent to a high of 90 per cent between the constituent States and Union Territories. A comparison of the urban content of Kerala with the country and the world shows that Kerala also has higher level of urbanisation (State Urbanisation Report, 2012).

The census of 2011 indicated that urbanisation in India is turning at higher levels. As compared to the urban population which increased from 286 million in 2001 to 377 million in 2011. This shows that only 31 per cent of the Indian population live in urban areas as compared to 45 per cent in China, 54 per cent in Indonesia and 87 per cent in Brazil. The Urban Agglomeration is the spread effect of urbanisation. The urban feature of Kerala could be visualised in each and every corner of the economy. The concept of Urban Agglomeration is not new but it is a realised phenomenon from 1971 census onwards. India's urban population is expected to reach 600 million (40 per cent) by 2031. The urban sector's share of the country's Gross Domestic Product (GDP) is expected to increase from its present 66% to 75% by 2031 (Ahluwalia et.al,2014). More than half of the world's population now live in urban areas. Here the 'urban area' can be defined in a number of ways – taking criteria under social, physical or economic aspects. As per the census of India, urban area constitutes statutory towns, census towns and outgrowths. This study attempts to examine the role of Urban Agglomeration and the perceptive approach of individuals residing in various forms of urban agglomerated areas. The increase of statutory and census towns has far reached influence upon Kerala Economy towards Urban Agglomeration. The importance of Census Towns is one among the deterministic elements of Urban Agglomeration in the state. However, when rural communities try to adopt the city culture, infrastructure, communication, and transportation, a positive force towards the development process ejects. The concept of Urban Agglomeration areas includes various census towns, outgrowth and Statutory Towns (cities as such). In this context, an

attempt is made to analyse the economic impact of Urban Agglomeration in Census Towns, Out Growths and Statutory Towns.

### **1.3.STATEMENT OF THE PROBLEM**

The study is focused upon Kerala's agglomeration as a relevant aspect of urbanisation of the state. The 47.72 per cent of Urbanisation (Census, 2011) in the State of Kerala shows that there are various reasons for the concentration and diffused pattern of development all over the regions irrespective of all the classified urban areas under consideration, which give rise to agglomeration tendencies of the economy. Kerala has a unique level of settlement. "The most striking features that differentiate Kerala from the rest of the country is the spatial pattern of the settlement system characterized by dispersed but interconnected, linear but densely agglomerated stretch" (Firoz C, et. al,2014). In this context, the researcher identifies the spatial and sectoral dimensions associated with the urban agglomeration in Kerala. So that the study is undertaken with reference to the economic impact of Urban Agglomeration with respect to the households' perceptions in the highest number of classified census towns as per Census 2011 in Thrissur District.

There is an emerging trend in the Urban Agglomeration in Kerala which can be reflected upon the sectoral and spatial factors are concerned. Such fantastic development of the agglomerative tendencies needed to be upheld in the context of fastest development of Kerala Economy for which a detailed study is required.

### **1.4.SIGNIFICANCE OF THE STUDY**

The study is conducted between the main city (corporation) and the other urban units located in the immediate periphery and distant periphery from the main city, within the Thrissur Urban Agglomeration. In Kerala 's spatial urbanisation could be measured in terms of parameters of the economy towards concentration. The sectoral parameters are concerned with the per capita income and total income of the economy towards further development. These are known as positive effects (spread effects/trickle down effects/positive externalities) which would measure through various tools of analysis. The urban agglomerated area consists of city as such together with one or more outgrowth, and various census towns.

Kerala's Urban Agglomeration has its own relevance in the present day. If the city growth is extended to its towns, it will reflect the development of town which in turn develop the peripheries of towns. The growth can be realized through the development of economic and social overheads. So, the regional development can be attained through Urban Agglomeration.

## **1.5.OPERATIONAL DEFINITION**

The economic impact of Urban Agglomeration can be examined thoroughly by means of exploring the extent of secondary sources of data for creating agglomeration economies. The extent of Urban Agglomeration in Thrissur could be measured through Density as well as other quantifiable measures of parameters. The adequacy of supportive factors namely hospitals, schools and banks have to scaled and if not adequate the local bodies shall initiate action for the development of aforesaid parameters. This may be done within the Census Towns or may be extended to peripherals. If extended to the peripherals, the spread of Urban Agglomeration will be fast and afterwards the density of peripherals. The slowly if the peripherals also are saturate, the Out Growth automatically arise. But caution should be taken that the ecological balance is uniform, failing which flooding, water scarcity, greenery atmosphere, etc. will be a failure.

Urban Agglomeration refers to aforesaid indicator extension of city area into its nearby defined urban areas like census towns, out growth, etc. The combined effect of Urban Agglomeration areas with Outgrowth, Census Towns (Grama Panchayaths) And Statutory Town (Corporation) are taken for the present research.

## **1.6.RESEARCH QUESTION**

Actually, Urban Agglomerations are clusters of development of the area. The study attempts to answer for the following research questions as

1. What are the determinants of measuring the extent of Urban Agglomeration in Kerala?
2. Whether Urban Agglomeration has any impact upon the peripheries?
3. Is there any measurement index for Urban Agglomeration in the study area?

The methodology has been taken from the study of 'Agglomeration Index - Towards a New Measure of Urban Concentration' by Hirotsugu Uchida and Andrew Nelson. They have formulated an agglomerated index where the variables like Population density, the population of a 'large' city centre, travel time to that large city centre, have been taken for measuring the settlement concentration of particular region.

## **1.7.OBJECTIVES**

1. To analyse the extent of spatial and sectoral dimension of Urban Agglomeration in Kerala.

2. To examine the determining factors for the measurement of economic impact of Urban Agglomeration in Thrissur District.
3. To explore the direction of the extent of Urban Agglomeration in Thrissur District.

## **1.8 RESEARCH HYPOTHESIS**

The study of urban agglomeration in Kerala is mainly focusing upon the spatial and sectoral determining factors of importance. This can be measured through various parameters for the convergent and divergent elements of Urban Agglomeration. The study hypothesized that the spatial and sectoral factors lead to urban agglomeration of the area concerned.

## **1.9 RESEARCH METHODOLOGY**

“The economic impact of Urban Agglomeration in Kerala” is the title of the present study which is both descriptive and analytical. It is descriptive because, it collects descriptive data that describes the characteristics of population. The study is also analytical because hypothesis formulated and tested with the appropriate statistical tools. In order to analyze the economic impact of Urban Agglomeration, both the qualitative and quantitative methods are used.

### **1.9.1 Selection of Study Area**

The study concentrates on the economic impact of Urban Agglomeration in Kerala. Kerala’s Urban Agglomeration (UA) is divided into 19 UA as per Census 2011 (Appendix). The sample is selected from Corporation Division (as Statutory Town) in Thrissur, Grama Panchayaths (as Census Towns) in Thrissur and village (as Out Growth) in Thrissur.

Since Thrissur District in Kerala ranks highest number of Agglomerated Census Towns (Census 2011). So, Thrissur District corporation area (Statutory Town) is purposively selected for analyzing the economic impact of UA. For the sake of convenience of the study, four surrounding panchayaths (Census Towns) viz. Adat Panchayath, Avinissery Panchayath, Arimpur Panchayath, and Puthur Panchayath have been randomly selected. And for analyzing the Out Growth of Thrissur District, Eriyad Panchayath from Kodungallur Municipality has been purposively selected since there is only one Out Growth in the district.

From Thrissur Corporation (Statutory Town) and selected panchayaths (Census Towns), 5% each household are selected as sample units in terms of population, density and non-agricultural activities.

From Thrissur corporation one division (division No.1 - Punkunnam) out of total 55 divisions and one ward each have been purposively selected from each Panchayaths taken for study based on high population, density and non-agricultural activities. From the Statutory Town of Thrissur District (Corporation) the sample of 156 households are taken from Corporation division No.1 for the primary survey.

From the East direction of Thrissur District, one Block Panchayath (Ollukkara) has been selected, from the Ollukkara Block Panchayath, Puthur Grama Panchayath (Census Town) has been selected. The total number of households in Puthur Grama Panchayath is 11729 and total wards consists of 23. Out of these 23 wards, one ward has been taken purposively based on high population, density and non-agricultural activities. The sample of 56 households are selected.

From the West direction of Thrissur District, one Block Panchayath (Anthikkad) has been selected, from the Anthikkad Block Panchayath, Arimpur Grama Panchayath (Census Town) has been selected. The total number of households in Arimpur Grama Panchayath is 7959 and total wards consists of 17. Out of these 17 wards, one ward has been taken purposively based on high population, density and non-agricultural activities. The sample of 52 households has been selected.

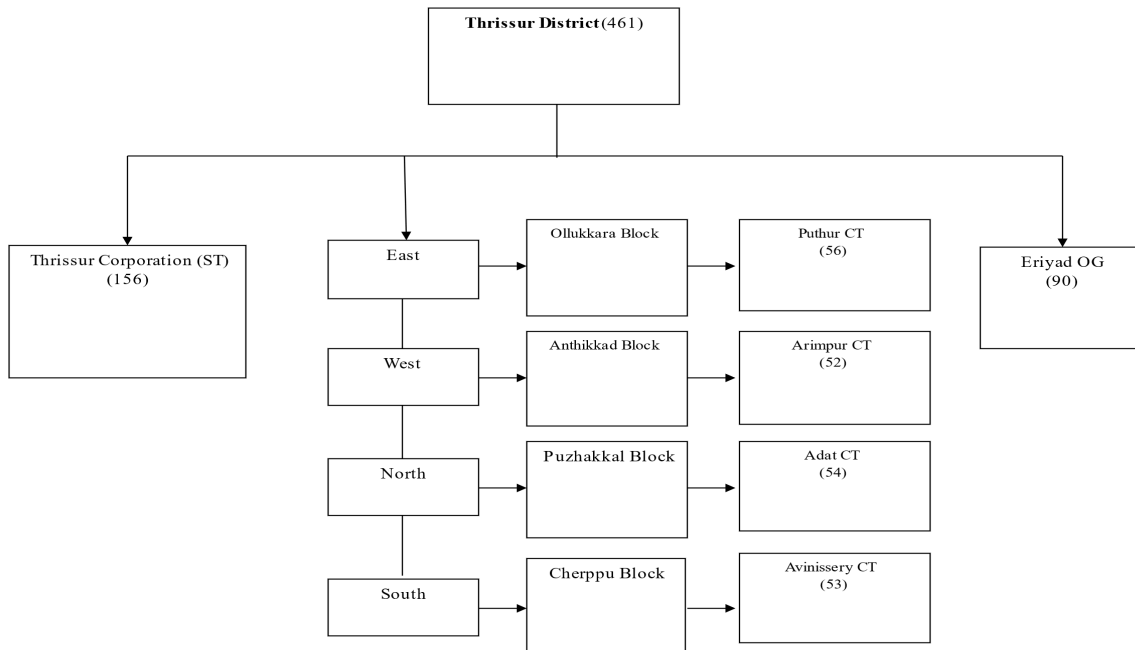
From the North direction of Thrissur District, Puzhakkal Block Panchayath has been selected, from the Block Panchayath, Adat Grama Panchayath (Census Town) has been selected. The total number of households in Adat Grama Panchayath is 7781 and total wards consists of 18. Out of these 18 wards, one ward has been taken purposively based on high population, density and non-agricultural activities. The sample of 54 households has been selected.

From the South direction of Thrissur District, Cherppu Block Panchayath has been selected. The Avinissery grama panchayath (Census Town) has been taken from Cherppu Block Panchayath. The total number of households in Avinissery Grama Panchayath is 5212 and total wards consists of 14, one ward has been taken purposively based on high population, density and non-agricultural activities. The sample of 53 households has been selected.

From the Out Growth, the sample of 90 households has been taken from the total wards of 23 and total households constituted about 10940. One ward has been selected purposively based on population, density and non-agricultural activities.



**Figure 1.1  
Sampling Framework**



### 1.9.2 Period of the study

The secondary data for a period starting from 2001 02 to 2020 21 is analyzed in the study. The study is carried out from February 2016 onwards. Interview schedule is prepared on August 2019 and data collection is completed in June 2021.

### 1.9.3 Sources of data

Both the secondary and the primary data sources are used for the study. The secondary data sources comprises of Reports and publications of Government organizations like Central Statistical Organization, Kerala State Planning Board, Urban Affairs Committee, State Urbanization Report, District Spatial Plan And Department Of Town And Country Planning, Govt of Kerala, Primary Census Abstract Of India, for Kerala, for the years 1991, 2001 and 2011, Census of India, Town Directory, for Kerala, for the years 1991, 2001 and 2011, provisional population totals and also Primary Census Abstract data for Urban Agglomeration for the years 2001 and 2011. In addition to this, related articles in reports, journals, magazines and websites are also used.

Primary data collection methods were used to study the demographic profile, household characteristics, and perception of sample households towards Urban Agglomeration.

#### **1.9.4 Interview schedule design**

Structured interview schedule for households is used for the primary data collection. The five-point Likert scale is used for the study to analyse the perceptive approach of sample households in three defined urban areas as Statutory Towns, Census Towns and Out Growth.

##### ***Part A***

This part is related to the socio-economic and demographic profile of the households in three defined urban areas as Statutory Towns, Census Towns and Out Growth.

##### ***Part B***

This part of the interview schedule depicts the determinants of Urban Agglomeration of the area concerning with the factors of relocation and distance as well as the income levels of households in three defined urban areas of consideration.

##### ***Part C***

This part is to analyse the economic impact of Urban Agglomeration by assessing the qualitative statements of perceptions of the households towards eight indices of measurement namely, Cost of Living Index, Social Index, Economic Index, Environment Index, Health Index, Quality of Life Index, Financial Inclusion and Awareness Index and finally Women Empowerment Index.

#### **1.9.5 Variables of the study**

The study deals with the objectives, components, variables and sub variables. The first objective is to find out the extent of Urban Agglomeration on Kerala. For this quantitative analysis is carried out.

**Table1.3.**  
**Variables of the extent of Urban Agglomeration**

Variable	Components of the study
<b>Extent of Urban Agglomeration</b>	<ul style="list-style-type: none"> <li>• Net state domestic product</li> <li>• Density</li> <li>• Total number of schools</li> <li>• Total number of banks</li> <li>• Total road length</li> <li>• Total hospitals</li> <li>• Gross district value added at current price</li> <li>• Gross district value added at constant price</li> <li>• Net district value added at current price</li> <li>• Net district value added at constant price</li> <li>• District per capita come (GDVA) at current prices</li> <li>• District per capita income (GDVA) at constant prices</li> <li>• District per capita income (NDVA) at current prices</li> <li>• District per capita income (NDVA) at constant prices</li> <li>• Population</li> </ul>

Source: Secondary Data

The table 1.3. shows the various determining factors for measuring the extent of urban agglomeration in Kerala. All these factors have a decisive role in the formation of Urban Agglomeration in the State.

The second objective is to assess the determining factors for the Urban Agglomeration in Thrissur District for measuring the economic impact of households residing in three different forms of Urban Agglomerated areas.

**Table 1.4.**

**Socio-Economic attributes of the households –Based on (1.9.4) Part A**

<b>Variable</b>	<b>Components of study</b>	<b>Sub - groups</b>
<b>General information and socio-economic and demographic characteristics of the households</b>	<b>age</b>	<b>Statutory Town</b>
	<b>gender</b>	
	<b>Marital status</b>	
	<b>Religion</b>	<b>Census Town</b>
	<b>Social group</b>	
	<b>Category</b>	<b>Out Growth</b>
	<b>Social Association</b>	
	<b>Educational qualification</b>	

Primary survey

The table 1.4. mention about various socio-economic and demographic attributes of households in the sample area.

**Table 1.5.**

**Determinants of Urban Agglomeration–Based on (1.9.4) Part B**

<b>Variable</b>	<b>Components of study</b>	<b>Sub - groups</b>
<b>Determinants of Urban Agglomeration</b>	<b>Sample area</b>	<b>Statutory Town</b>
	<b>Years of residence</b>	
	<b>Relocation</b>	
	<b>Year of Relocation</b>	<b>Census Town</b>
	<b>Distance from the city</b>	
	<b>Reasons for the shift</b>	<b>Out Growth</b>

**Table 1.6**

**Perceptive Indices of Economic Impact of Urban Agglomeration Based on (1.9.4) Part C**

<b>Variable</b>	<b>Components of study</b>	<b>Sub - groups</b>
<b>Perceptive Indices of Economic Impact of Urban Agglomeration</b>	<b>Cost of Living Index</b>	<b>Statutory Town</b>
	<b>Social Index</b>	
	<b>Economic Index</b>	
	<b>Environment Index</b>	<b>Census Town</b>
	<b>Health Index</b>	
	<b>Quality of Life Index</b>	<b>Out Growth</b>
	<b>Financial Inclusion and Awareness Index</b>	
	<b>Women empowerment Index</b>	

Primary survey

The table 1.5 depicts that the households have different perceptions towards living the particular area of residence towards urban agglomeration. They are ranking their mean score for assessing the economic impact of urban agglomeration of the area.

Accordingly, the third objective is to explore the directional extent of Urban Agglomeration in the study area.

### **1.9.5 Analytical Tools Used for the Study**

The data collected were analyzed by using IBM SPSS 21 version Software Package

#### **1.9.5.1 Extent of Urban Agglomeration:**

The first objective is to analyse the extent of Urban Agglomeration in Kerala. The study broadly followed the methodology of Wang Li et.al (2011) for examining the construction of a composite indicator for urban influence index and related to the measure of regional accessibility. The theoretical background of the extent can be followed in the methodology of Cristina and Blance et.al (2021) for tracing the spatial and sectoral dimensions of Urban Agglomeration. The parameters for the analysis of the extent of Urban Agglomeration is collected by the secondary sources of Economic Review (2001-2021) of State Planning Board, Government of Kerala and the Department of Economics and Statistics, Government of Kerala. The parameters of Net State Domestic Product, the number of hospitals, the length of roads, the number of banks, the density, the number of schools, gross district value added at constant prices, gross district value added at current prices, net district value added at current price, net district value added at constant price, District per capita income (GDVA) at current prices, district per capita income (GDVA) at constant prices, district per capita income (NDVA) at current prices, and district per capita income (NDVA) at constant prices and Population can be analyzed by the using the non-parametric test of Kruskal-Wallis H test statistic. In order to evaluate the sectoral and spatial dimension of urban agglomeration with regard to all the parameters concerned, the test statistic provides mean ranks of various districts where there are significant results.

Accordingly, the highly significant parameters can be put together and measure it with exploratory factor analysis by using Principal Component Analysis. The sampling adequacy of the KMO and Bartlett's test infer that there is 73 per cent of adequacy, which is highly significant for the analysis. The proportion of variance explained to show how the variance is divided among the 8 possible factors. The first principal component explains about 53.99 per

cent of the variation. Altogether, 78.98 per cent of variance is explained by the two components. Principal component factor analysis with varimax rotation assessed the underlying structure for the 8 items of the extent of Urban Agglomeration in Kerala.

There are two components where the eigen values are over one and the two groups are termed it as spatial or agglomeration factors namely, total number of hospitals, banks, density and total number of schools. Likewise, the other which is termed as sectoral or development factors namely, total road length, gross district value added at constant prices, net district value added at constant prices and district per capita income (GDVA) at constant prices.

The components of the two groups have been analyzed with respect to the economic impact of Urban Agglomeration of the districts as dependent variable in the regression model where the independent variables are specified as sectoral variables or development variables as 1) total road length ( $X_1$ ), 2) Gross district value added at constant prices ( $X_2$ ), 3) Net district value added at constant prices ( $X_3$ ), 4) District per capita income (GDVA) at constant prices ( $X_4$ ). The model summary shows the correlation is 0.30, showing a positive correlation between dependent variables and predictors. The fitted regression equation can explain the 9 per cent variation in the independent variable. Among the selected variables, the variables such as total road length ( $X_1$ ), gross district value added at constant prices ( $X_2$ ), net district value added at constant prices ( $X_3$ ) were found to be significant. So, by excluding district per capita income (GDVA) at constant prices ( $X_4$ ) and the constant term, the equation with coefficients is represented below.

$$Y_1 = -0.001 X_1 + -1.592 X_2 + 1.757 X_3 + \mu$$

The association with the economic impact of urban agglomeration of the district and significant variables varies. When the total road length increases, it will affect the various districts urban agglomeration negatively. The theory of location developed by Alfred Weber (1909) emphasise the fact that if there is development of transport system (length of roads) there is reducing the agglomeration economies (concentration) to the centre core of analysis and thereby reducing the centre core of concentration. The factors to agglomerate leads to a divergence, towards centre and periphery. When a certain size is reached, many positive elements become negative and this supports 'Williamson hypothesis' where agglomeration boosts GDP growth only up to a certain level of economic development. The gross district value added at constant prices increases, it will affect the impact of urban agglomeration of various districts negatively. While the net district value added at constant prices has positively

affected the districts urban agglomeration phenomenon. The agglomeration economies are guided by the principle of lowest cost of inputs, there will be more scope of reducing the depreciation cost involved in the production process. This leads to the net district value added at constant prices has shown an upward trend.

As regards to the spatial and agglomeration factors, namely, 1) total hospitals ( $X_1$ ), 2) bank ( $X_2$ ) 3) density ( $X_3$ ), 4) total number of schools ( $X_4$ ), the regression model summary shows the correlation is 0.52, showing a positive correlation between dependent variables and predictors. The fitted regression equation can explain the 27.9 per cent variation in the independent variable. The association with the economic impact of urban agglomeration of the district and significant variables varies.

$$Y_1 = -0.046 X_1 + -0.004 X_2 + -0.005 X_3 + 0.008 X_4 + \mu$$

When the total hospitals increase, it will affect the various districts urban agglomeration negatively. The researcher goes beyond 'the theory of cumulative causation' where the growth of tertiary sector (hospital, bank) leads to creating a growth pole which leads to invention and innovation of the like. The concentration pattern of development changes to diffused manner where the variables like hospitals and banks have reducing the effect of Urban Agglomeration in the heart of the city where there is enough employment opportunities in tertiary sector especially in fringe of the regional economy. Likewise, bank and density increases, it will affect the extent of urban agglomeration of various districts negatively. The density of population shows that there is concentration of people in the fringe of city where land is cheaper and thereby reducing the effect of urban agglomeration at the centre (Alonso, 1964) thereby the services of tertiary sectors (banks and hospitals) have moving towards the direction which will cause a reduction in urban agglomeration tendency of the centre. While the total number of schools has positively affected the districts urban agglomeration phenomenon. The knowledge spill over (Vernon, 1960) and (Marshall) emphasized the concept where there is scope for urban agglomeration.

### **1.9.5.2 Economic Impact of Urban Agglomeration**

The second objective of the study is concerned with the socio-economic and demographic factors of the sample area where there is significant importance to relocation of households towards the study areas. The descriptive statistics can be undertaken for the analysis. The process of relocation and its association of sample areas to be formulated by

means chi-square test of association. The result shows that there is significant association of sample areas and the process of relocation (Alonso, 1964). This is one of the factors determining urban agglomeration of regional economies attempted to apply the accessibility requirements (Hotelling).

The distance is regarded as significant factor towards relocation since the distance from the core city increases, there is much the process of relocation towards the regions of importance. There are various reasons behind the phenomenon of shifting towards different forms of urban areas i.e., Census Towns and Out Growth, these are employment, marriage, education, better urban facilities in study areas as well as other reasons of importance. The one sample t' test is analysed.

The monthly income of households of different forms of urban areas can be examined with the help of One-way ANOVA. There is significant difference between three regions according to the income level. The highest strata of monthly income determine in Statutory Towns, and very lowest income strata is within the Out Growth and census town shows between the two areas of urban.

For analysing the impact of urban agglomeration, there are various Liker scale statements showing the perceptions of households living in the particular area. The score of each statement varies from 5 to 1 i.e., strongly agree to strongly disagree. This analysis can be done by Kendall's W Statistic. Kendall's W Statistic (coefficient of Concordance) is a non-Parametric statistic used to assess agreement between different rates, and ranges from 0 to 1. 'Zero' is no agreement at all between rates, while 'one' is perfect agreement. These perceptions about urban agglomerations are cost of living, social, economics, environment, health, quality of life, financial inclusion and awareness and finally women empowerment. There is reliable and significant results towards all the eight indices of measurement.

### **1.9.5.3 Direction of the extent of urban agglomeration**

The third objective is to calculate the direction of the extent of urban agglomeration and thereby developing an urban agglomeration index. The methodology of this part is developed by the state urbanisation report (2012) for the primacy of an urban area. Primacy of an urban area can be assessed based on the primacy ratio. Its value ranges between 0 to infinity, if the primacy of an urban area is above 1, it indicates more than 50% of the total urban population in the region is concentrated in that particular urban area and if it is 0, the area selected is no longer an urban. The researcher is using the multiplicative model whereby the



multiplication of all the ratios related to the parameters considered for Urban Agglomeration. It will increase automatically if there is increase in the parameters considered. Puthur census towns shows the highest value of the index generated, that area has more extent of Urban Agglomeration in Thrissur District.

#### **1.10 SCOPE OF THE STUDY**

Since the urban agglomeration and agglomerative effects are the vast areas, further enquiries are need to be conducted in various indices and their dimensions. So, there is further scope for the study as far as government programs are concerned.

#### **1.11 CHAPTER SCHEME**

The first chapter covers the introduction chapter which consists of background of the problem, statement of the problem, research gap, significance of the study, and operational definition, research questions, objectives, hypothesis, source of data and methodology, scope and limitation of the study.

The second chapter is concerned with review of literature in which an attempt is made to have methodological and theoretical reviews about the available literature of studies. The second part of the chapter consists of the conceptual framework of Urban Agglomeration Model.

The third chapter explains about a general overview of Urban Agglomeration where the development of the concept in the world, urbanization and various definitions of urban areas in India and Kerala and the importance of census towns in Kerala for fostering the growth of Urbanization and thereby the tendency of Urban Agglomeration.

The fourth chapter deals with the first objective of the study in which an attempt is made to analyze the extent of Urban Agglomeration in Kerala there by bifurcate the factors leading to spatial growth of the economy and sectoral growth of the economy which together forming the Urban Agglomeration of the State.

The fifth chapter explains about the second objective of the study by which the determining factors influencing the Urban Agglomeration in the study area of Thrissur and examine the perceptions of households living in the three defined urban areas of importance for analyzing the economic impact of Urban Agglomeration.

The sixth chapter deals with exploring the directional extent of urban agglomeration in the study areas of Census Towns and Out Growth.

The last chapter is concerned with the conclusions and summary of the findings of the study.

***End Note:***

1. Agglomeration economies---Agglomeration economies are the benefits that come when firms and people locate near one another together in cities and industrial clusters.
2. Desakota ---is a term used in urban geography used to describe areas in the extended surroundings of large cities, in which urban and agricultural forms of land use and settlement coexist and are intensively intermingled.
3. Ruralopolitan – residential land forms with high density
4. Metropolitan area -- is that of a core area containing a large population nucleus, together with adjacent communities that have a high degree of economic and social integration with that core.
5. A city proper is the geographical area contained within city limits.
6. Suburban area is an area within a metropolitan area, which may include commercial and mixed-use, that is primarily a residential area.

**CHAPTER 2**

**THE CONCEPTUAL AND THEORETICAL  
BACKGROUND OF URBAN  
AGGLOMERATION**

## **INTRODUCTION**

The present study is based on economic impact of Urban Agglomeration in Kerala. The different aspects of Urban Agglomeration namely, extent of Urban Agglomeration, assessment of Urban Agglomeration, economic impact of Urban Agglomeration and directional extent of Urban Agglomeration are included in the study. This chapter has been divided into two parts: Review of existing Literature and Review of Theoretical Literature. The first part of the chapter summarises all the related review of literature to identify the research gap. Thus, the related studies made so far are divided into the following relevant themes (2.1) The concept of Urban Agglomeration (2.2) The role of urbanisation which foster to the development and growth of Urban Agglomeration (2.3) The studies on developing new small cities or new growth centres (2.4) The studies on the role of Urban Agglomeration in our regional economy. The second part gives an overview of the existing theories on the concept of Urban Agglomeration and the economic impact. The theories presented in this section are interdisciplinary and are subjected to the thoughts of some policymakers and theorists since 1893.

### **2.1 REVIEW OF EXISTING LITERATURE**

#### **2.1.1 The Concept of Urban Agglomeration**

Urban Agglomeration is a highly developed spatial form of integrated cities, in which integrated form of cities renders the agglomeration which leads to global economic development (Fang, and Yu,2017). The concept of Urban Agglomeration is termed as ‘town cluster’<sup>1</sup> (Ebenezer, 1898) in which the integrated form of spatial organisation and interrelationship between cities and their surrounding areas. The form of ‘urban cluster’<sup>2</sup> (Patrick Geddes, 1915) would be the future trend of urbanisation development. The concept of ‘organic entities’<sup>3</sup> (Saarinen, 1918) shows that the development of cities should follow the order from chaotic concentration to ordered decentralization.

The concept of urban economic zone, the economic city and planned area (Bogelade, 1920) describes the grouping of cities was similar to Urban Agglomeration. (Fawcett,1932) argued that a ‘conurbation’<sup>4</sup> (Geddes, 1915) is a place of continuous urban areas that are not separated by rural lands. The concept of ‘Aggregates of Local Authority Area’(British Census Bureau), ‘Metropolitan Regions’, ‘urban area’ and ‘population agglomere’<sup>5</sup> are the different concept related to Urban Agglomeration.

The concept of ‘spatial organization’ (Christaller, 1933) and scale of spatial distribution of Urban Agglomeration (Jefferson and Zifp, 1939) and rationales of urban clusters and agglomeration (Vinning, 1942).

The study of ‘Megalopolis’ (Gottmann, 1957) shows that the future direction of urbanisation was the development and formation of ‘megalopolises’<sup>6</sup> that gradually merged with nearby urban regions. The model based on “Rostow’s theory of economic development” (Friedman, 1964) described economic development and its corresponding spatial manifestation.

All urban areas would eventually evolve into a huge ‘ecumenopolis’<sup>7</sup> (Doxiadis, 1970) and similarly (Zhu, 1988) proposed ‘Metropolitan Inter-Locking Region’ (MIR) which was similar to the concept of ‘megalopolis’ and Lynch, 1980) constructed the concept of ‘dispersed metropolis’.

Urbanisation in the Third World has been characterised by dimensions like ‘over urbanisation’, ‘mega-urbanisation’, ‘urban primacy’ etc (Davis, 1954: Kasarda, 1991).

The concept of ‘desakota’ (McGee, 1991) related to the concept of Urban Agglomeration in Kerala. Bolter and Robey (2020) examine the literatures of Agglomeration economies and thereby divides the agglomeration economies into two – localization economies and urbanisation economies. The density of economic activity provides the urbanisation economies and reaping the impact of agglomeration in a better way. The study examines the impact of agglomeration economies to increase employment, output and knowledge spill over through sharing, matching and learning process with considering the impact to regional economies.

Priyadarshini Sen (2017) conducted a study about the expansion of Delhi Urban Agglomeration into the peripheries due to the strategy of developing new towns in the peripheries as Priority Towns. There was high development of the nearby towns by means of roads and railway line connecting to the core city.

Kadi and Nelavigi (2015) studies about the past and present tendency of urbanisation in India and growth of cities, metropolitan cities and distribution of urban population in states and Union Territories since 1991 to 2011 census periods. The volume of population concentration is concerned, it was largest in small and medium towns which makes the

importance of the concept of Urban Agglomeration. The study mentions about two ills of urbanisation namely economic ills refers to the inadequacy of urban cities to create employment in formal sector, so there is presence of urban informal sector, open urban unemployment and underemployment. Social ills refer to the inability of urban physical and social infrastructure to grow in tune with the population resulting in the deterioration of the quality of life. The study observes that up to 1951 urbanisation has been very slow, but after 1951 it starts increasing.

Kahu Charan Pradhan (2012) analysed the vast growth of census towns around the Urban Agglomeration even though it has governed by rural administrative framework, which has different demographic and economic characteristics of their own future growth. There is a wide inter-state variation of the share of new census towns in the proximity of large towns. The study analyses that there may be multiple urbanization processes and there may be large number of new census towns in Census 2011 were already part of a 'settlement agglomeration'. It is known as 'cluster of settlements.'

Sarani Khatua (2018) analysed the Kolkata Urban Agglomeration from its regional perspective. The study focussing upon the changes in the Urban Agglomeration within Kolkata Metropolitan Area and other agglomerations in West Bengal and also the effect of globalisation and challenges of urbanization. The high concentration of new census towns is not only about population change but also indicate change in livelihood to non-agricultural types.

### **2.1.2 The Role of Urbanisation which foster to the Development and Growth of Urban Agglomeration**

Sabida Das and Laya (2016) analysed the role of urbanisation and development in Kerala for the period 2001-2011. The major objective of the study is to analyse the trend and level of urbanisation in Kerala during 1961-2011 and to analyse the relation between urbanisation and development in Kerala during 2001-2011. They are used 2 measures, 'speed of urbanisation and degree of urban concentration for analyse the trend of urbanisation. They found that all districts in Kerala showed rapid increase in urban population and Malappuram showed the highest increase. The number of towns in the state also showed an increase during 2001 and 2011. The speed of urbanisation also increased in Kerala from 2001 onwards. The degree of urban concentration is highest in Kasaragod, Malappuram and Thrissur from 1991 to 2011. In 2011, the higher urban concentration is in Ernakulam and lowest in Wayanad. They

are constructed composite Index of development for analysing the development in Kerala. Among the 14 districts, 7 districts show an index value above 100 in 2001 and 2011.

Paviano and Christabell (2016) examined the trend and pattern of urbanisation in Kerala and its impact on economic development. They also analysed the district level trends and disparities in urban growth of the State. The study finds out those census towns makes urbanisation faster in Kerala. Accordingly, the districts Ernakulam, Trissur and Malappuram show an increase in the urban population. Jumafuddin and Rukhsana (2015) analysed the trend and pattern of urbanization in Nadia district, West Bengal. The study finds out the determinants and causes of urbanization.

Bhagat (2011) examined the emerging pattern as well as some unexpected results of urbanization in India according to 2001 and 2011 census. The study was based on the secondary sources of analysis that is Census of India 2001 and 2011. He found out that urbanization had increased during 2000. This is due to the urban-rural growth differential that is critical to the process of urbanization, which is based on natural increase between rural and urban, net rural urban classification and net rural to urban migration. The urban-rural natural increase growth differentials remained almost constant during 2001 and 2011 census. It was net rural-urban classification and net rural to urban migration were responsible for speeding up urbanization during 2001-2011.

### **2.1.3 The Studies on Developing New Small Cities or New Growth Centres.**

Kuruville (2014) discussed about the growth of urbanization in Kerala with a special focus upon the census towns using the Census data from 1961 to 2011 and State Urbanisation report of the development of town planning. Kerala registered a massive increase in urbanisation from 25% in 2001 to 47% in 2011. Major contribution of this increase was due to increase in the number of census towns which are not governed by urban local governments.

Giri (1995) discussed the role of small towns in the urbanisation process in North-East India. The study concentrated upon the urbanisation process which determines and gets determined by the pattern of development in the long run. The development of small urban settlements in tea growing areas, are developed as nodal point of transport and trade to cater the needs of the tea gardens, which are scattered over the areas.

Pradhan (2012) analysed the vast growth of census towns around the Urban Agglomeration even though it has governed by rural administrative framework, which has different demographic and economic characteristics of their own future growth. As far as Kerala economy is concerned these new census towns are considered as settlement agglomeration which are far away from class I cities.

Mukhopadhyay et.al (2016) examined about the increase of new census towns which have its potential implications in terms of policies aimed at supporting economic development and poverty alleviation in these small urban centres and their surrounding areas.

Kundu (2013) analysed the growth of new urban centres (census towns) which are considered as the population growth is shifted towards second tier cities.

Ghani (2012) showed that the firms in the formal sector are moving away from mega cities into lower order cities or rural locations due environmental concerns, scarcity of land.

Bhagat and Mohanty (2009) pointed out that better rural-urban linkages should be established only by developing small cities and towns.

Kundu and Samanta (2011) studies about the importance of planned urbanisation through the new growth centres in the form of small and medium towns. Bhattacharyya (1995) studied about 169 small urban centres in North-East India. These towns are acted upon the catalyst of social change. These centres are having potential growth centres which are near to villages

Satterthwaite and Tacoli (2003) have analysed various empirical studies which show the linkages between urban centres and countryside and thereby considered small towns as centres of development.

#### **2.1.4 The Studies on the Role of Urban Agglomeration in Our Regional Economy**

Sreekumar (1990) analysed the origin and causes of the unique spatial formation of the state of Kerala with the third world countries as well as the major determinants of the production of spatial forms in Kerala. The study finds out that in Kerala the extensional and decremental components have played a more significant role in urbanisation process. The emergence of new towns which contribute to the urban extension has played a very significant role in 1960s and 1970s.



Uchida and Nelson (2009) propose an alternative to the UN measure of urban concentration that we call the “agglomeration index” based upon population density, the size of the population in a ‘large’ urban centre, and travel time to that urban centre. The index focuses upon the economic significance of urban areas. The agglomeration index is designed solely to quantify the degree of settlement concentration. In the agglomeration index, population density captures the concentration and the population size of the nearest largest city distinguishes between the large cities increasing in size from the many small cities that are emerging. The impact of concentrated settlements will be greater if the population distribution is skewed towards a single point, such as the city centre. This characteristic is captured by travel time. With a globally uniform definition, the agglomeration index might lay to rest some myths about urbanization in various regions of the world.

Oommen (1994) made a study on recent trends and patterns of urbanisation in Kerala with special reference to Urban Agglomerations (UAs). This study shows that the general trend in India appears to be a slowdown in the tempo of urbanisation with concentrated growth of population in the urban agglomerations rather than dispersed urbanisation. This brings to the forefront the fact that UAs are now playing a greater role in the urbanisation process in India.

Hirsch (1975) discussed the concept of city as economies of agglomeration. Urbanization involves transformation of the population, production process and socio-political environment of a mainly rural economy. Anil Kumar Vaddiraju (2016) examined urban development which is skewed towards big cities and mega urban agglomeration and also evaluated the implementation of urban decentralization laws.

Swerts, et.al (2014) discussed upon the future of India’s Urbanisation. The study forecast India’s urban future and assumed that secular and contemporary growth of all individual urban agglomeration is the key drivers of future urbanisation trends. The study takes into account growth in existing agglomeration in 2011 and new agglomeration likely to emerge until 2050.

Annapurna Shaw (2005) highlighted the environmental dimensions associated with the spread of Urban agglomerations by focusing on the problem of increased solid wastes in India’s Peri-urban regions. It looks at two local level initiatives formed to create a sustainable solid waste management system.

Eric Denis et. al (2012) analyses the growth of settlement agglomeration which are independent and autonomous in their interactions with other settlement, local and global. The pattern of urbanisation supports the existence of such vital small settlements. The study is taken into account a different approach which uses the concept of Settlement Agglomerations rather than Urban Agglomerations

## **2.2 REVIEW OF THEORETICAL LITERATURE**

### **2.2.1 Theories on the Concept of Emergence and Principle of Urban Agglomeration**

The study of Urban Agglomeration is related to two types of spatial organisation theories as well as principle of Agglomeration which explains the concept in detail for visualising the concept of Urban Agglomeration.

#### ***2.2.1.1 Alfred Marshall 's theory of agglomeration economies***

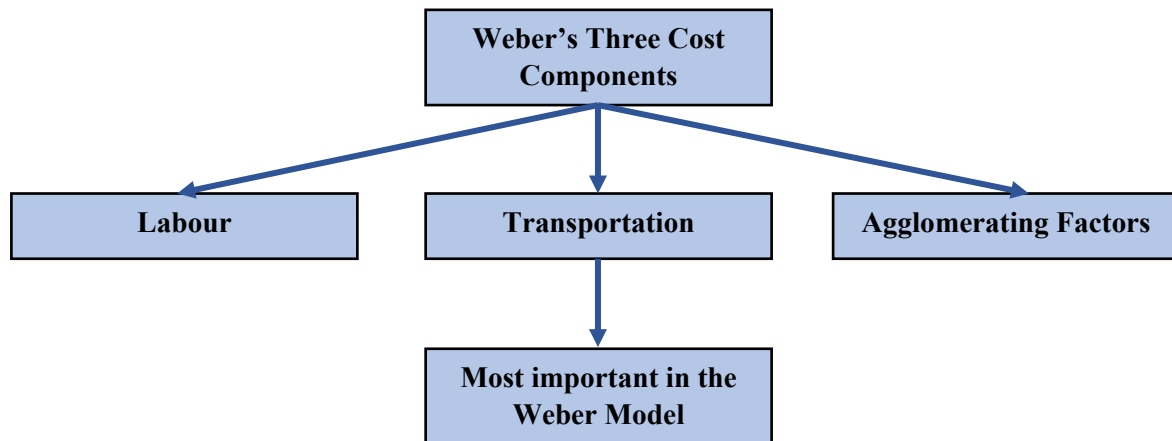
The theory of Alfred Marshall is concerned with the labour market where the firms receive increasing returns from the co-ordination of three basic elements of agglomeration economies that is the local pool of skilled labour, local supplier linkages and local knowledge spill overs. The three basic principles underlying the importance of agglomeration economies among the firms that use related technology.

#### ***2.2.1.2 Alfred Weber's theory of industrial location***

Alfred Weber (1909) in the theory of industrial location is based on finding the optimum location of industries where manufacturing costs can be minimized by means of reducing transportation cost, labour cost and create agglomeration economies. The model explains about two types of pull factors – regional factors and agglomeration factors. The regional factors are cost of land, labour cost, cost of raw material and its availability, transportation cost and cost of fuel, power and machinery etc. The agglomeration factors refer to aggregation factors like availability of technical expertise, the interconnectedness of production of different industries, availability of market leads to the same type of industries at a particular place. The focus is on increasing the profitability of the industry by reducing the manufacturing cost. So, three main factors influence the industrial location are transport costs, labour costs and agglomeration economies.

**Figure 2.1**

**Alfred Weber's Theory of Location**



Source: Weber's model of industrial location (1909)

**2.2.1.3 William Alonso's theory of location and land use**

William Alonso (1964) attempted to apply the accessibility requirements to the city centre for various types of land uses like housing structures, commercial and industrial purposes etc. The land is cheaper at the fringe of the city where the rich households locate and poor households require greater accessibility to the city centre and therefore locate near the centre. This system has created a segregated land use system. According to the model, land use, rent, intensity of land use, population and employment as regarded as a function of distance to Central Business District of the city as a solution of an economic equilibrium for the market for space.

**2.2.1.4 Walter Christaller's Central Place Theory**

Walter Christaller (1933) formulated the 'Central Place Theory' as a theory is based on the importance of 'area' or settlements which existed as "central places" for providing services for the surrounding areas. The theory is considered the provision of goods and services for the surrounding market area. The theory is related to urbanisation which makes importance to demand and supply aspects. That is supply of labour can be given from the surrounding areas and demand for goods and services can be met by central place (city).

#### ***2.2.1.5 August Losch's theory of industrial location***

The Losch model of industrial location is based on locating the optimum location of industries where the demand and price of finished goods are maximum. Due to maximum demand and price, the revenue of the industry is high.

#### ***2.2.1.6 Walter Isard***

The concept of industrial location has further developed by Isard and Moses (1950) derives the idea that if one allows for factor substitution and assumes a nonlinear production function, then the optimality of a location will depend on the characteristics of the input, the level of output, and the nature of the demand.

#### ***2.2.1.7 Gunnar Myrdal***

Gunnar Myrdal in his “cumulative causation model” explains the development of an area with the facilities like housing, services such as schools, hospitals and banks due to urbanisation and industrialisation. The theory has more emphasis upon Urban Agglomeration where the agglomeration factors and development factors have key role for increasing the Urban Agglomeration process of development.

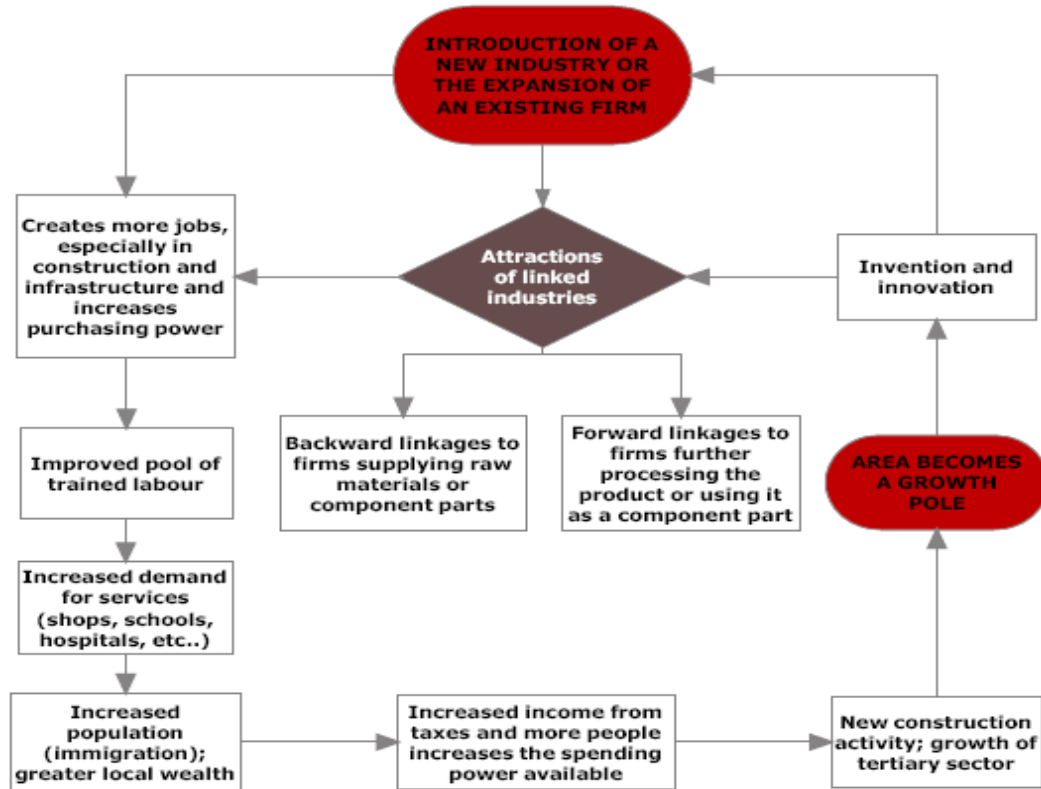
The introduction of a new industry or the expansion of an existing industry in an area also encourages growth in other industrial sectors. This is known as the multiplier effect which in its simplest form is how many times money spent circulates through a country's economy.

Money invested in an industry helps to create jobs directly in the industry, but it also creates jobs indirectly elsewhere in the economy. New industrial development, for example, requires construction workers who themselves require housing, and services such as schools and shops. An increased demand for food will benefit local farmers who may increase their spending on fertiliser.

Workers employed directly in the new industry increase the local supply of skilled labour, attracting other companies who benefit from sharing this labour pool. Other companies who supply components or use the new industry's products are attracted to the area to benefit from reduced transport costs. Spin-off effects include new inventions or innovations that may lead to further industrial development and new

linkages. Through this multiplier effect, an area which develop as a growth pole as illustrated in the below diagram.

**Figure 2.2**  
**The model of Gunnar Myrdal's theory of cumulative causation**



**Source:** Simplified diagram to show the development of an industrial region (after Gunnar Myrdal) developed by Barcelona Field Studies Centre, GeographyFieldwork.com

### 2.3 REGIONAL THEORIES OF GROWTH

Albert Hirschman explained economic growth with the help of two terms namely Trickle-down effect and Polarization effect. The 'Growth Pole' of Perroux, Boudville and Richardson, 'Spatial Diffusion' of Haggerstrand (1967) and 'growth foci' of Mizra et.al (1976) gave due recognition to spread effects of development. These theories envisaged that if metropolitan development is sustained at high level, differences between centre and periphery may be eliminated, as the economic dynamism of major cities trickle down to smaller places and ultimately into most tradition bound peripheral areas.

According to Perroux (1955), growth does not appear everywhere at the same time but it manifests itself in points or poles of growth with variable intensities and it spreads by different channels and with varying terminal effects for the economy as a whole. Once growth emerges in particular place it becomes centre of growing economic activities and in their turn induces growth interdependent regions. According to him the process of economic development is unbalanced and the centre may give birth to other centres or it may become a centre of stagnation.

There is much relevance of the regional theories with the agglomeration aspect of linking the economy with international trade and thereby making the growth everywhere without the administrative boundaries as such.

Perroux and Boudville did not mention the population concept in growth poles and growth centres. Here R P Mishra (1992) integrated the population concept of population with growth poles and growth centres. The growth poles are considered as the first rank city having more than 25 lakh population. The massive economic activities may happen in the growth poles and diffusion and spread out of these economic activities around the poles benefits the whole regions. The second level is known as growth centre whereby the second rank city having population of around 5 lakh and it acts as growth points. The third level is known as growth point where cities having around 1 lakh population and serve as the service centre around the growth point. The cities having 20000 population and serve the market village around the services centre. The service centre provides some specific types of services such as hospitals, schools and banking. The market villages are having 5000 population that serves the villages around the market village and can be involved in small non-primary activities such as food processing, craft etc.

Adam Smith explains economic growth as a result of capital accumulation and the reinvestment of profits derived from specialization, the division of labour, and the pursuit of comparative advantage. Classical growth theory was developed alongside the Industrial Revolution in Great Britain. Analysis of the process of economic growth was a central focus of classical economists. Classical economists sought to provide an account of the broad forces that influenced economic growth and of the mechanisms underlying the growth process.

The division of labour, the gains from trade, and the accumulation of capital were seen as the main driving forces of economic growth. Productive investment and the reinvestment of profits were the mechanisms that produced continuous economic growth; so, changes in the

rate of profit were a decisive reference point for an analysis of the long-term evolution of the economy.

John Friedmann (1963) developed the 'Core Periphery Model' shows spatially how economic, political, and cultural authority is dispersed in core or dominant regions and the surrounding peripheral and semi-peripheral regions. Friedmann's version of the core-periphery model includes an explanation that some inner-city areas enjoy considerable prosperity, while others show signs of urban deprivation and poverty, even as urban areas, in general, have some advantage over peripheral rural areas. The theory is based upon an unequal distribution of power in economy where the core is a dominating place and peripheries shows dependent upon the core.

## **2.4 RESEARCH GAP**

After reviewing the available literature on the similar studies made, it is apparent that only scanty studies conducted on Urban Agglomeration that too on environmental dimension associated with the spread of Urban Agglomerations by focusing on the problem of increased solid waste in India's peri-urban regions. Another study on emergence of new urban centres (Census Towns) and expansion of municipal limits and Urban Agglomeration in India. Still another study also done in this similar direction which found that emergence of new towns that contribute to the urban extension, has played a very significant role in 1960s and 1970s.

Majority of the literature reviews are on growth of urbanisation and urbanisation process, the degree of urban concentration, relation between urbanisation and development, trends and consequences of urbanisation in Kerala, rural pattern of urbanisation in Kerala, urbanisation and female work participation rate in Kerala and as such. Very limited studies are made in Kerala on Urban Agglomerations in the economic dimension, the trends as well as pattern and consequences likewise, and no studies are conducted so far on economic impact of Urban Agglomeration on Census Towns, Out Growth and formulation of Urban Agglomeration index due to Urban Agglomeration in Kerala particularly about Thrissur District. Moreover, the entire available literature on the studies is about urbanisation process exclusively based on secondary data and information. The present study is an attempt to focus upon the economic impact of Urban Agglomeration in Kerala particularly w.r.t economic impact of Urban Agglomeration of statutory towns, census towns and out growth in Thrissur District, by depending upon both primary and secondary data sources that itself becomes a deviant from other studies and so deserve a special attention in this area, being the research gap.

The parameters consisting of components like spatial and sectoral factors of Urban Agglomeration and their sub components like total road length, gross district value added at constant prices, net district value added at constant prices, district per capita income (GDVA) at constant prices and total hospitals, bank, density, total number of schools etc. are not being seen in similar directions of other studies.

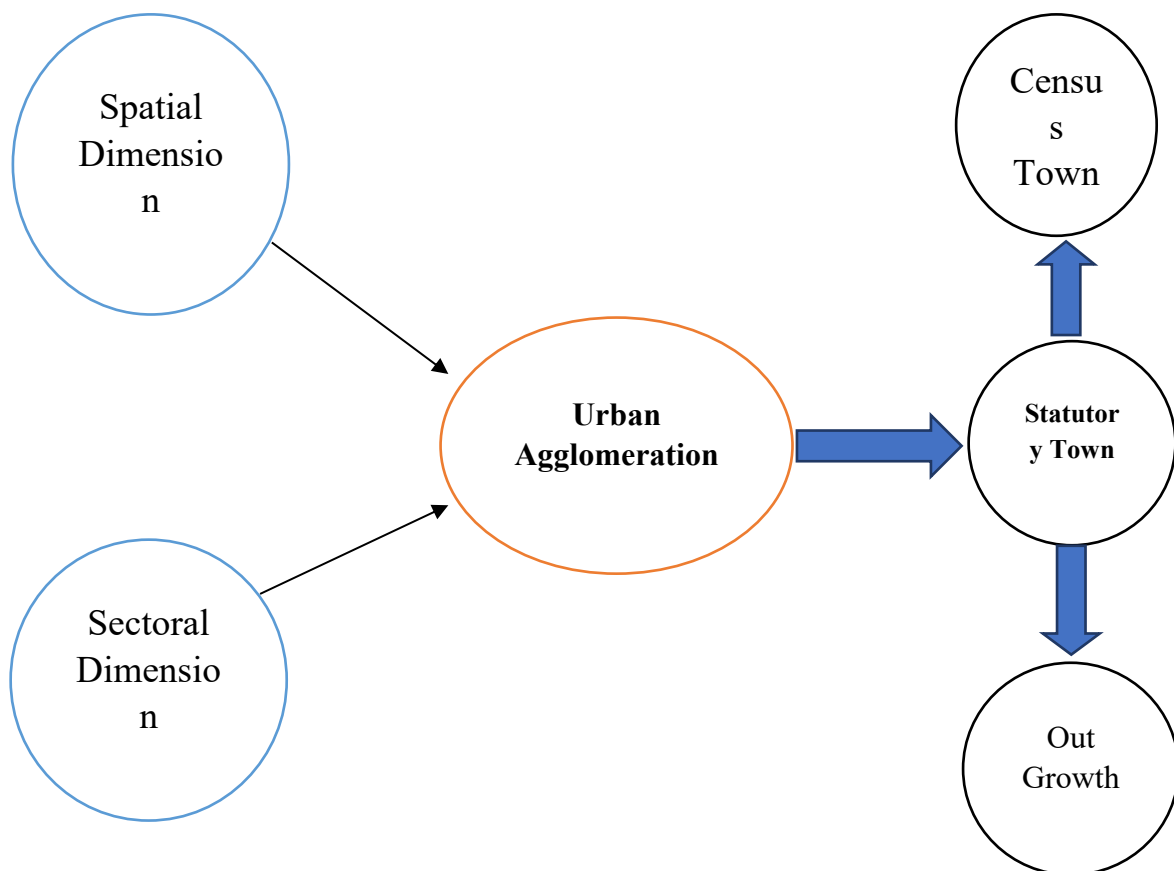
## 2.5 CONCEPTUAL FRAMEWORK OF URBAN AGGLOMERATION

The study is concerned with the economic impact of Urban Agglomeration. Here the researcher identifies Urban Agglomeration in terms of spatial development of the area as well as sectoral development. The theories related to the two aspects is covered under the theoretical framework of the study.

The following figure shows the analytical framework of the study

**Figure 2.3**

*A hypothesized conceptual model for the impact of Urban Agglomeration in Kerala with respect to extent and the perceptions of the household.*



Source: Scholar's own Calculation



The study of economic impact of Urban Agglomeration can be conceptually visualized in the figure 2.3. Accordingly, the researcher focuses upon spatial and sectoral dimensions of Urban Agglomeration by measuring the extent of parameters like Net State Domestic Product, the number of hospitals, the length of roads, the number of banks, the density, the number of schools, gross district value added at constant prices, gross district value added at current prices, net district value added at current price, net district value added at constant price, District per capita income (GDVA) at current prices, district per capita income (GDVA) at constant prices, district per capita income (NDVA) at current prices, and district per capita income (NDVA) at constant prices and Population.

The spatial structure includes the factors which determines the locational advantages of factors given by total hospitals, banks, population density and total number of schools. The theoretical background of this approach is given by Myrdal (1944), Christaller (1933).

The present research is allied with the spatial dimension associated with the Urban Agglomeration or concentration. Therefore, the extent of the parameters concerned is measured through various tools of analysis. The concentration allows the sharing production factors and infrastructure, which helps to reduce the average costs of the companies and allows for the use of the agglomeration economies that are formed in the city (Vazquez Barquero, 2005). Such convenient effects of concentration lead the factors to agglomerate and this in principle, leads to a divergence: a centre (or centres) and a periphery (Cristina, et.al, 2021).

The city or the region (where the resources are concentrated), like any other economic resource, finally arrives at a phase of diminishing returns (and even negative productivity), which, when operating, leads to convergence, producing greater economic homogeneity i.e., living standard and quality of life (Cristina, et.al, 2021). That aspect of phenomenon in the study is done by analysing the economic impact of different perceptions of households towards Urban Agglomeration.

The second dimension of the approach is given by the sectoral factors namely the length of roads, gross district value added at constant prices, net district value added at constant price and district per capita income (GDVA) at constant prices. The aspect of convergence or divergence depends upon the cities or region's own level of "development" factors measured for two decades of time, which either concentrates (agglomerates) or disperses resources or production factors (Cristina, et.al, 2021). The methodology of the aspect is taken by the researcher and emphasis must be given to identify the regional factors of importance which is

known as development factors in the present analysis. The regional growth approach of Myrdal (1957) and Kaldor (1970) makes the importance of a growth centre which diverges its path of growth to surrounding areas of regional importance. In the present analysis, the researcher identifies the regions as Statutory Town, Census Town and Out Growth. The study supports “Williamson hypothesis” as agglomeration boosts GDP growth only upto a certain level of economic development.

## **Conclusion**

The chapter concludes with the theoretical and conceptual framework for building the model of Urban Agglomeration. The present study is used both the dimensions of sectoral (development) and spatial (agglomerative) parameters of measuring the extent of Urban Agglomeration through constructing conceptual model of Urban Agglomeration.

## ***End Note:***

1. Town cluster is an urban-led approach that enhances the ability of cities to promote economic growth in an extended urban region.
2. Urban cluster is a new statistical geographic entity designated by the Census Bureau for the 2000 Census, consisting of a central core and adjacent densely settled territory that together contains between 2,500 and 49,999 people.
3. Organic entities - city as an organism composed of interdependent neighborhoods and sought to translate this concept into ways of dealing with the dislocations and problems in urban life.
4. Conurbation - an extended urban area, typically consisting of several towns merging with the suburbs of a central city.
5. Population Agglomerate - a large, densely and contiguously populated area consisting of a city and its suburbs- An urban agglomeration
6. A megalopolis or a supercity, also called a mega region, is a group of metropolitan areas which are perceived as a continuous urban area through common systems of transport, economy, resources, ecology, and also is a clustered network of big cities.
7. Ecumenopolis-a single city encompassing the whole world that is held to be a possibility of the future.

## **CHAPTER 3**

# **URBAN AGGLOMERATION: AN OVERVIEW**

## **INTRODUCTION**

Urban agglomerations display diverse country development phases and shapes. The notion of urban agglomeration and its history in various nations are broadly outlined in this chapter. Urban agglomeration is a scientific phrase that emphasises the need of cooperating various large cities, or "urban economic zones," and sharing resources like infrastructure and industry as a result.

### **3.1 EVOLUTION OF CONCEPT OF URBAN AGGLOMERATION**

In his book *Garden Cities of Tomorrow*, British urbanist Ebenezer Howard introduced the idea of the town cluster in 1898. He made an effort to organise space in an integrated way and to link cities to their surroundings. "Cities in Evolution," a book by British urban planner Patrick Geddes based on UK city study, was released in 1915. He foresaw that the future trend in urban development will take the shape of an urban cluster. In 1918 his book *The City- Its Growth, Its Decay, Its Future*, Finnish urban scientist E Saarinen introduced the Theory Of Organic Decentralization, which viewed cities as "organic organisms." He believed that cities should grow in a systematic manner, moving from chaotic concentration to systematic decentralisation.

In 1920, Soviet Union academics created a variety of terms to characterise a collection of cities that was akin to an urban agglomeration. Urban economic zones, economic cities, and planned areas are some of them. Bogelade, a Ukrainian researcher, examines the nation's urbanisation and grouping processes. A conurbation, according to Fawcett (1932), is a location with continuous urban regions that are not divided by rural lands, as proposed by Geddes (1915). Urban agglomeration was first described by the British Census Bureau, who coined the phrase "Aggregates of Local Authority Area." The idea was quite similar to "urban areas" in New Zealand, "metropolitan regions" in the US census, and "population agglomeree" in France.

German geographer W Christaller was propounded the geographical organisation and structure of urban agglomeration in 1933 who also created the Central Place Theory.

Urban agglomerations' size and spatial dispersion were researched in 1939 by M. Jefferson and G.K. Zipf and R. Vinning expanded on the justifications for urban clusters and agglomerations in 1942. In 1957, the geographer Gottmann published the study of Megalopolis: *The Urbanization of the North-eastern Seaboard of the United States*, based his work on urban

areas and their spatial expansion in the United States. He further argued that the future direction of urbanization was the development and formation of megalopolises that gradually merged with nearby urban regions. He was regarded as the primary contributor to the study of urban agglomerations.

Based on Rostow's Theory of Economic Development, Friedman created a model in 1964 that outlined economic development and its accompanying spatial manifestation. For analysing various phases and processes of urban agglomeration formation, the model was extensively developed. Hagerstrand created the Modern Spatial Expansion Theory in 1968. Greek philosopher Doxiadis prophesied that all cities would one day grow into enormous "ecumenopoli" in 1970. The term "city-region" was also introduced by Song in his Research Method on Regional Economic-Geographic Foundation of City Development published in 1980 in China. Similar to the idea of a megalopolis, Zhu (1988) proposed the Metropolitan Interlocking Region (MIR). Based on his research on the urbanisation of developing nations in south eastern Asia, McGee (1991) introduced a different notion, called "desakota." Lynch(1980) coined the term "urban agglomeration" to summarize all concepts that originated from, or were similar to, Gottmann's 'megalopolis' and noted that the development of economic globalization and information technology had greatly promoted the formation of various urban agglomerations.

The term "Urban agglomeration" refers to a variety of urban structures, including urban regions, urban clusters, urban and township clusters, township agglomerations, clustered cities, concentrated urban areas, metropolitan areas, urban economic zones, expanded metropolitan areas, urban-rural integrated regions, metropolitan regions, mega metropolitan regions, megalopolis, MIRs, new urban cluster belts, city assemblies, city-region organisations, and city communities.

**TABLE 3.1**

**General views of the concept of Urban Agglomeration studies from 1898-2015**

<b>Basic opinions of Urban Agglomeration definition</b>
Equivalent to town cluster
Equivalent to conurbation
Is an urban organism
Is an urban economic zone
Is a concentrated urban area, and aggregates of Local administrative areas
Is a city cluster
Is an aggregate of cities
Megalopolis (clusters of megacities)
Megalopolis is the newly evolved urban forms
Is urban expansion area
Equivalent to Ecumunopolis
Is a multi-economic-centre urban area
Equivalent to Metropolitan inter-Locking Region, MIR
Equivalent to Desakota (integrated urban-rural area)
Equivalent to Dispersed Metropolis
Equivalent to Metropolis Belt
Megalopolis and integrated core-peripherals
Comprehensive and integrated urban spatial organization
Fundamental spatial units for transnational companies' longitudinal division of labour
New form of integrated urban-rural (Desakota) combination
A concentrated urban area with clear systematic hierarchy
Metropolitan belt
Systematic hierarchical combination
Integrated urban cluster
Metropolitan belt
Systematic hierarchical combination
Integrated urban cluster
Metropolitan belt
A spatial manifestation of regional post-industrialization and post-modernization production and life styles
Integrated groups of cities
Integrated cluster of cities
A new regional integrated form
Concentrated city and township area
Urbanized areas that are within daily commutable radius
Global city-region
Result from rapid urbanization and mid-point to megalopolis
Highly integrated groups of cities, and a new economic unit for global division of labour
A concentrated region of population and economy
Highly integrated groups of cities that share common interest and fate

Source: C. Fang and D. Yu (2017)

The table 3.1 depicts various concepts of Urban Agglomeration studies developed by Chuanglin Fang and Danlin Yu (2017) for explaining various urban agglomeration related works from the past 120 years in an attempt to provide a theoretical and practical based definition of urban agglomeration.

### **3.2 HISTORY OF URBAN AGGLOMERATION IN EUROPE**

Urban agglomerations in Europe commonly display international organisations that expanded across national boundaries as a result of the well-balanced distribution of cities in tiny countries. Being a part of a sizable metropolis, cities' rapid growth amasses earnings through collaborating with fiercely competitive businesses. Greater London, the Dutch Randstad region in Amsterdam, The Hague, Rotterdam, the Brussels agglomeration, the German Rhine-Ruhr conurbation from Dortmund via Frankfurt to Stuttgart, the Swiss Basel-Zurich agglomeration, and finally the Milan urban region in Italy make up the "Blue Banana," the largest transnational conurbation in Europe.

Recently, two new transnational urban agglomeration axes were discovered: the "Sunbelt" from Milan to Valencia as well as the "Yellow Banana" from Warsaw to Paris. Numerous more urban enclaves and useful urban regions exist in addition to these "bananas," and the "Yellow Banana" from Paris to Warsaw was discovered as a new transnational urban agglomeration axis. In addition to these "bananas," there are a great number of functional urban areas (FUAs) and urban agglomerations in Europe, albeit they are smaller than the transnational ones. Almost every larger capital city in Europe has developed into an urban agglomeration.

Approximately 1000 years ago, Europe began to urbanise. The urban system that gave rise to so many independent cities in Europe between 1000 and 1300. In reality, the Industrial Revolution, which was established in England between 1750 and 1850 and sparked the expansion of cities and urban agglomerations, accelerated this growth. 17 percent of Europeans lived in cities in 1801, 35 percent did so in 1851, and 54 percent did so in 1891. Similar dynamics can be seen in all cities and agglomerations: moderate growth inside the Central Business Districts and extensive growth outside the city limits. The two largest agglomerations in Europe are London and Paris, which had monocentric core areas with a variety of tiny towns on the periphery that helped to establish the agglomeration as it grew.

Following its installation in 1500, London quickly ascended among the commercial hubs of Europe. Trade grew outside of Western Europe, and London saw the establishment of

monopoly trade firms. Both immigrants from Britain and other countries arrived. London's population and financial prosperity were fuelled by coastal shipping. From 1530 to 1605, the population increased from 50,000 to around 2,25,000. While the low-income population continued to reside in the inner-city districts, the suburbs of Greater London expanded more quickly during the 19th century thanks to the construction of a network of railways from which middle class individuals could travel to the city centre. London became the destination for immigrants from the British colonies and Europe since it was the capital. Greater London had about 1.2 million residents in 1801, with the majority of them living outside of the city. In 1801, Greater London reached around 1.2 million inhabitants, where the outer London's share (the population living outside the London city borders) was 15%. In 1901, the city grew to a population of 6.2 million, where the outer London's share reached 22%. In 2011, Greater London accommodated 8.2 million people, where the outer London's share reached around 60%.

Similar growth dynamics are seen in Paris. Paris was the biggest city in Europe and a significant commercial hub during the Middle Ages. The Paris centre was reconstructed until 1870 under Georges-Eugène Haussmann, Prefect of the Seine, with large avenues over recreating the former street arrangement. The city's current administrative territory was added in 1860. Around 1800, there were 5,50,000 people living in Paris. After the city's borders were expanded, there were 1.7 million people living there, 2 million people lived in the Paris urban area, and 15% of the population lived outside of the city. The population of the Paris urban area was 4.5 million in 1911, with 35% of those living outside of the city. 10 million people called the Paris urban region home as of 2010, with 70% of those living outside of the city. The population of Paris is 27 times larger now.

The Rhine-Ruhr metropolitan region is one of the large polycentric metropolitan areas with several cities as nuclei with no real prime city, holding more than 11 million inhabitants and covering an area of 7.110 km<sup>2</sup>. The population dynamics history is not so well documented as the growth of the metropolitan region is based on the moderate but steady growth of many moderate sized and smaller centres.

Administrative organisations and planning directives associated with the administrations are what most influence urban agglomerations in Europe. This is especially relevant to Europe because of its small-scale system of numerous tiny nations, all of which have unique governmental structures and exhibit a variety of levels of federalism centrality.



Countries like France that have centralised administration make it simple to design regional planning policies that apply to all urban agglomerations. Even yet, city planning is quite autonomous there, and neighbouring villages adopt their own policies despite being required to adhere to the regional or national planning framework. In nations like Germany or Austria where local political units have significant influence, local decision-makers feel accountable for their own jurisdiction, which encourages more competition and discourages teamwork.

### **3.3 HISTORY OF URBAN AGGLOMERATION IN INDIA**

India has a long history of urbanisation; in addition to the country's highlands, there are three significant biological regions that have seen an increase in urban population since antiquity. These are the plains of south India, the Gangetic Plain, and northwest India. The first one has a leading position in Indian urbanisation, which includes the Harappan civilization. The Gangetic plain Urbanisation was created by the second, which had a thick monsoonal forest, using iron technology. In contrast to the earlier Neolithic pattern of practises, the third unit of southern India exploited iron technology to usher in a new era of urban growth.

India's urbanisation process involves different stages. The Indus valley civilization served as the starting point for the first phase. Around 5000 years ago, the agricultural communities in the Indus River Valley gave rise to the first set of urban centres in India. Cities flourished for around 600 years during this time. Although the two most significant cities from this era—Harappa and Mohenjo-Daro—now lie in Pakistan, additional towns from this era—Lothal, Rangpur, Rojdi, Kalibanga, Rupur, etc.—can be found in the states of Gujarat, Rajasthan, and Punjab in modern-day India. These towns were created to meet the administrative, religious, and economic demands of the residents. After this time, there was protracted historical evidence suggests that Urbanisation process is inevitable and universal. In ancient and medieval times, it was a cultural phenomenon and many times it happens due to political development, because the rise and fall of new dynasties and kingdom but in recent times, it is complementary as industrialisation and socio-economic transformation hence it becomes socio-economic phenomenon.

Urbanization is referred to as a process that manifests itself through cyclical, spatial, and sectoral shifts in the social, economic, environmental, and technical facets of life in a particular civilization. Urbanization is the gradual concentration of people in urban areas (Kingsley Davis, 1965). The beginning of the current, global process of urbanisation is a relatively recent phenomena that is directly linked to the industrial revolution and the ensuing economic growth. It is pertinent to identify the main issues which are concerned with the

process of Urbanisation in India. They are economic, demographic, political, social and cultural dimensions. The disintegration of the feudal system, the rise of modern society, and economic development have all been considered as being significantly influenced by urbanisation.

**TABLE 3.2.**  
**Total population and urban population (Trend from 1901-2011)**

<b>Years</b>	<b>Total Population(million)</b>	<b>Urban Population(million)</b>	<b>Percentage of Urban Population (million)</b>
1901	238.3	25.8	10.83
1911	252.1	25.9	10.27
1921	251.3	28.1	11.18
1931	278.9	33.5	12.01
1941	318.6	44.2	13.87
1951	361.0	62.4	17.29
1961	439.2	78.9	17.96
1971	548.1	109.1	19.91
1981	683.3	159.4	23.33
1991	846.3	217.6	25.71
2001	1027.1	285.4	27.78
2011	1210.2	377.1	31.16

Source: -Census of India (1901-2011)

The overall population and urban population from the 1901–2011 censuses are shown in table 3.2. From 238.3 million in 1901 to 1210.2 million in 2011, the population has increased. Between 1901 and 2011, the proportion of people living in urban areas climbed from 10.83% to 31.16%. This has made it clear that the population of the country's cities has increased by a factor of more than ten. Over the previous 100 years, the country's level of urbanisation has only increased by around two and a half times. According to the table, the rate of urbanisation expansion was extremely slow throughout the first half of the twentieth century, from 1901 to 1951, but it began to increase quite fast after that year.

### **3.4 METROPOLITAN CITIES AS ENGINE OF GROWTH**

The larger cities are known as metropolitan cities since their total population exceeds 1 million people. Only two locations were designated as metropolitan cities during the pre-

independence era: Bombay (Mumbai) in 1941 and Calcutta (Kolkata) in 1911. However, following independence, there were more big cities.

Everywhere in the world, the urban areas are expanding. The expanding urban areas are created in this study's insightful examination of households by extending the rising cities to the neighbouring peripheries. The centre of interest in the research side has seen a marked expansion of these surrounding areas. Infrastructure construction in cities and metropolitan areas is expanding, which has an impact on household living standards. Together, the spread effects of these components create "urban transition" with special effects. Today's centre of attraction is the expanded metropolitan areas.

**Table 3.3**  
**Number of towns in India**

Year	Number of Towns/ Urban Agglomerations
1961	2363
1971	2590
1981	3378
1991	3768
2001	5161
2011	7935

Source: Census of India, 1961-2011

The number of Towns/Urban agglomerations in India is continuously increasing (Table 3.3), the number has doubled within 50 years (1961-2011).

The urban city's agglomerating facilities actualize the path of outlying areas' partnership (Census Towns) of certain cities. The urban city's agglomerating facilities actualize the path of outlying areas' partnership (Census Towns). Some of the cities have a long history of acting as vital service hubs for marketing and education for the surrounding rural communities. It has long been believed that the number and size of towns remained substantially stable prior to the second decade of the 20th century. During this time, it was discovered that the population's size, growth rate, and movement from rural to urban areas were all quite modest (Mohan 1985, Moonis Raza et.al. 1981).

**Table 3.4**  
**Trend of Urbanisation in India from 1901-2011**

Census year	Number of towns/UA's	Total population	Urban population	Percentage of urban population
1901	1827	238396327	25851873	10.84
1911	1815	252093390	25941633	10.29
1921	1949	251321213	28086167	11.18
1931	2072	278977238	33455989	11.99
1941	2250	318660580	44153297	13.86
1951	2843	361088090	62443709	17.29
1961	2365	439234771	78936603	17.97
1971	2590	548159652	109113977	19.91
1981	3378	683329097	159462547	23.34
1991	3768	844324222	217177625	25.72
2001	5161	1027015247	285354954	27.78
2011	7935	1210193422	377105760	31.16

Source: Census 2011

Table 3.4 displays the total number of towns for each census between 1901 and 2011. Between 1921 and 2001, both the number of municipalities and the total urban population rose. The declassification of some towns and the addition of others has also resulted in some differences in the number of towns counted in the 1961 and later censuses. The 1971 census adopted the urban definition from the 1961 census with a slight modification to the term "town group" to reflect urban agglomeration created by the consolidation of several towns, following the adjustments made to the definition of urban areas and city size in the 1961 census (Bose,

1978). The number of cities designated as UAs increased, accounting for 31.16% of the urban population.

An analysis of the urban area is essential for the recent trend of urbanisation as well as forming of Urban Agglomeration of the State. The small and medium towns that constitute about half of the country's urban population have its own importance in national and local development. These are defined as by means of

1. Statutory administration: includes civic status of towns. The towns identified on the basis of statutory administration are known as statutory or municipal towns. All places under a municipal council, municipal corporation, cantonment board or notified town area committee are the Statutory Towns.
2. Economic and demographic aspects: criteria like population size, density of population and percentage of work force in non-agricultural sector. The towns defined on the basis of economic and demographic aspects are termed as census or non-municipal towns. Census of India classify an area in to urban if it has a minimum population of 5000, with a density of population of at least 400 persons per sq.km and at least 75 per cent of male working population engaged in non-agricultural pursuits.

Urban Agglomeration (UA): An urban agglomeration is a continuous urban spread constituting a town and its adjoining outgrowths (OGs), or two or more physically contiguous towns together with or without outgrowths of such towns. An Urban Agglomeration must consist of at least a statutory town and its total population (i.e., all the constituents put together) should not be less than 20,000 as per the 2001 Census.

Out Growths (OG): An Out Growth (OG) is a viable unit such as a village or a hamlet or an enumeration block made up of such village or hamlet and clearly identifiable in terms of its boundaries and location.

**TABLE 3.5**

**Increase in number of statutory and census towns in India**

INDIA/STATE/UT	1991		2001		2011	
	STs	CTs	STs	CTs	STs	CTs
<b>INDIA</b>	<b>2987</b>	<b>1702</b>	<b>3880</b>	<b>1361</b>	<b>4041</b>	<b>3894</b>
Andaman and Nicobar Islands	1	0	1	2	1	4
Andhra Pradesh	260	4	119	93	127	228
Arunachal Pradesh	0	10		17	26	1
Assam	74	19	80	45	88	126
Bihar	172	99	125	5	139	60
Chandigarh	2	3	1	0	1	5
Chhattisgarh			75	22	168	14
Dadar and Nagar Haveli	0	1	0	2	1	5
Daman and Diu	2	0	2	0	2	6
Goa	12	19	14	30	14	56
Gujarat	264	0	168	74	195	153
Haryana	84	10	84	22	80	74
Himachal Pradesh	57	1	56	1	56	3
Jammu and Kashmir			72	3	86	36
Jharkhand			44	108	40	188
Karnataka	235	71	226	44	220	127
<b>KERALA</b>	<b>66</b>	<b>131</b>	<b>60</b>	<b>99</b>	<b>63</b>	<b>461</b>
Lakshadweep	0	4	0	3	0	6
Madhya Pradesh	464	1	339	55	364	112
Maharashtra	248	88	251	127	257	279
Manipur	28	3	32	5	32	23
Meghalaya	9	3	10	6	10	12
Mizoram	22	0	22	0	23	0
Nagaland	8	1	8	1	19	7
NCT of Delhi	3	29	14	59	3	110
Odisha	102	22	107	31	107	116
Puducherry	6	5	139	0	6	4
Punjab	112	8	139	18	143	74
Rajasthan	193	29	184	38	185	112
Sikkim	8	0	8	1	8	1
Tamil Nadu	469	0	723	109	721	376
Tripura	12	6	13	10	16	26
Uttar Pradesh	710	43	638	66	648	267
Uttarakhand			74	12	75	42
West Bengal	382	148	124	252	130	780

Source: Census of India, 1991, 2001 and 2011.

The rise of census towns and statutory towns is depicted in table 3.5. Due to the high number of census towns, urbanisation in Kerala has increased significantly (Kuruvilla, 2014). A town that did not have the status of a town in the previous census due to statutory, administrative, or discretionary criteria is referred to as a "new town" in the current census (Sahu, et.al, 2019). The extraordinary expansion of census towns appears to be the result of "census activism," which the census authorities may have intentionally influenced because no predicted urban growth statistic suggested such a growth (Kundu, 2011).

### 3.5 GROWTH OF URBANISATION DUE TO THE INCREASE OF CENSUS TOWNS

Despite the county's smaller size and the census towns' urban characteristics, they have made a very significant contribution to the county's urbanisation. The growth of non-agricultural activity and the high population density can be used as indicators of the nation's development.

**Table 3.6**  
**State wise share of Census Towns in Urban Growth and Decadal Change**

States	Level of Urbanisation			Share of total Urban Population living in Census Towns (%)			Decadal change in the urban population share of CTs	
	1991	2001	2011	1991	2001	2011	2001	2011
All India	25.7	27.9	31.1	4.7	7.3	14.4	2.6	7.1
Andaman and Nicobar	26.7	32.6	37.7	0.0	14.0	24.7	14.0	10.7
Andhra Pradesh	26.9	21.7	33.4	0.2	12.0	14.6	11.8	2.6
Arunachal Pradesh	12.8	20.8	22.9	100	100	1.2	0	-98.8
Assam	11.1	12.9	14.1	9.6	12.1	22.0	2.5	10.0
Bihar	13.1	10.5	11.3	16.9	0.5	4.2	-16.5	3.7
Chandigarh	89.7	89.8	97.3	4.9	0	5.4	-4.9	5.4
Chhattisgarh		20.1	23.2		6.5	2.3	6.5	-42
Dadar and Nagar Haveli	8.5	22.9	46.7	100	100	38.8	0	-61.2
Daman and Diu	46.8	36.2	75.2	0	100	62.7	100	-37.3
Goa	41.0	49.8	62.2	33.4	38.7	52.3	5.3	13.6
Gujarat	34.5	37.4	42.4	0.0	5.3	6.9	5.3	1.6
Haryana	24.6	28.9	34.9	2.1	4.7	10.3	2.6	5.6
Himachal Pradesh	8.7	9.8	10.0	0.8	0.9	2.6	0.1	1.7
Jammu and Kashmir		23.0	27.4		0.7	7.9	07	7.3

Jharkhand		22.2	24.0		36.6	32.5	36.6	-4.1
Karnataka	30.9	34.0	38.7	7.2	2.3	5.2	-4.8	2.9
<b>KERALA</b>	<b>26.4</b>	<b>26.0</b>	<b>47.7</b>	<b>37.4</b>	<b>26.8</b>	<b>64.6</b>	<b>-10.6</b>	<b>37.8</b>
Lakshadweep	56.3	44.5	78.1	100	100	100	0	0
Madhya Pradesh	23.2	26.5	27.6	0.2	3.2	5.6	3.0	2.4
Maharashtra	38.6	42.4	45.2	4.1	4.2	7.9	0.1	3.7
Manipur	27.5	26.6	32.5	9.0	5.4	22.0	-3.6	16.6
Meghalaya	18.6	19.6	20.1	9.2	29.2	36.9	19.9	7.7
Mizoram	46.1	49.6	52.1	0	0	0	0	0
Nagaland	17.2	17.2	28.9	4.2	4.8	11.5	0.6	6.7
NCT of Delhi	89.9	99.0	97.5	10.3	19.0	30.3	8.7	11.4
Odisha	13.4	15.0	16.7	4.8	4.8	11.7	0.0	6.9
Puducherry	64.0	66.6	68.3	11.5	0.0	10.7	-11.5	10.7
Punjab	29.5	33.9	37.7	1.1	2.0	6.6	0.8	4.6
Rajasthan	22.9	23.4	24.9	3.0	3.0	7.3	0.0	4.3
Sikkim	9.1	11.1	25.2	0.0	24.0	3.8	24.0	-20.1
Tamil Nadu	34.2	44.0	48.4	0.0	5.0	14.3	5.0	9.3
Tripura	15.3	17.1	26.2	26.1	32.1	30.2	6.0	-1.9
Uttar Pradesh	19.8	20.8	22.3	2.4	3.3	8.0	0.9	4.7
Uttarakhand		25.7	30.2		6.0	16.0	6.0	10.1
West Bengal	27.5	28.0	31.9	0	13.0	23.5	13.0	10.5

Source: Census of India, 1991, 2001 and 2011, Urban Directory.

The percentage of the total urban population that resides in census towns, the level of urbanisation, and the decadal changes between the three census periods are all shown in Table 3.6. According to the 2011 Census, India has a 31.1% urbanisation rate, with Kerala recording a 47.7% urbanisation rate. By making up about two thirds of the state's urban population, the census towns are crucial to increasing the level of urbanisation in Kerala (Sahu, et.al., 2019).

### 3.7 URBAN AGGLOMERATION IN KERALA

The native States of Travancore, Cochin, and the Malabar district of the former Madras Presidency all underwent separate counts prior to the creation of Kerala state, which are geographically distinct from one another. In these three regions, different definitions for the designation of rural and urban areas were used. Before the 1891 census, there was no such thing as an urban area in the native states of Travancore and Cochin. The Madras Government's Town Improvement Act of 1865 allowed for the creation of four municipalities in the Malabar District: Calicut, Palghat, Tellicherry, and Fort Cochin in 1866, and Cannanore in 1867. Although statistics from these municipal towns were not presented in the 1871 Census, they were counted separately.



The population, density and extent of male population engaged in non-agricultural pursuits were determined with the census of 1951. In the 1971 census, the same definition was followed except with regard to the third criterion. Instead of at least three-fourths of the male working population engaged in non-agricultural pursuits, at least 75% of the male working population engaged in non-agricultural pursuits was substituted. In the 1981 census, the same definition adopted in 1971 was followed with some minor variation. In the 1991 census, the definition adopted in 1981 was followed, with the only exception of applying the third criterion for which the Primary Census Abstract of 1981 census was used, for treating places as towns. The entire village or portion of village lying outside the limits of statutory towns that satisfied the criteria was treated as Census (non-Municipal) towns. In the census 2001, the definition for an urban area adopted in 1991 census was followed. This definition of an urban area continued without any change in 2011 census also.

**Table 3.7**  
**Number of Statutory and Census Towns in Kerala**

State/District	2001			2011		
	ST	CT	TOTAL	ST	CT	TOTAL
<b>KERALA</b>	<b>60</b>	<b>99</b>	<b>159</b>	<b>59</b>	<b>461</b>	<b>520</b>
Kasaragod	2	5	7	2	25	27
Kannur	7	38	45	7	60	67
Wayanad	1	---	1	1	--	1
Kozhikode	3	10	13	3	48	51
Malappuram	5	---	5	5	39	44
Palakkad	4	1	5	4	17	21
<b>Thrissur</b>	<b>7</b>	<b>21</b>	<b>28</b>	<b>7</b>	<b>128</b>	<b>135</b>
Ernakulam	9	16	25	9	47	56
Idukki	2	--	2	1	--	1
Kottayam	4	2	6	4	13	17
Alappuzha	5	6	11	5	33	38
Pathanamthitta	3	--	3	3	1	4
Kollam	3	--	3	3	24	27
Thiruvananthapuram	5	--	5	5	26	31

Source: Provisional Population Totals

The table 3.7 depicts that the state of Kerala had 60 STs and 99 CTs thus giving a total of 159 towns in 2001. The highest number of STs was in Ernakulam district (9), followed by

Kannur and Thrissur districts with 7 each. In the case CTs, Kannur district predominated with 38 per cent of the towns i.e., about 76 per cent of the census towns were located in Kannur, Thrissur and Ernakulam districts.

The study focused upon the impact of urbanisation led to the growth of urban agglomerated areas and thereby creating new urban centres. The creation of new urban centres has far reached impact upon social, economic and demographic aspects of households living in the three forms of urban agglomerated areas like Statutory Towns, Census Towns and Out Growths.

**Table 3.8**  
**District wise Urban and Rural Population – Kerala**

Sl. No	District	Population 2011			
		Total	Rural	Urban	% Of Urban Population
	KERALA	33387677	17455506	15932171	47.7
1.	Ernakulam	3279860	1047296	2232564	68.1
2.	Thrissur	3110327	1020537	2089790	67.2
3.	Kozhikode	3089543	1014765	2074778	67.2
4.	Kannur	2525637	882745	1642892	65.0
5.	Alappuzha	2121943	974916	1147027	54.1
6.	Thiruvananthapuram	3307284	1528030	1779254	53.8
7.	Kollam	2629703	1443363	1186340	45.1
8.	Malappuram	4110956	2294473	1816483	44.2
9.	Kasaragod	1302600	797424	505176	38.8
10.	Kottayam	1979384	1413773	565611	28.6
11.	Palakkad	2810892	2133699	677193	24.1
12.	Pathanamthitta	1195537	1064076	131461	11.0
13.	Idukki	1107453	1055428	52025	4.7
14.	Wayanad	816558	784981	31577	3.9

Source: Census 2011

In percentage growth of urban population of Kerala during the year 2011, Ernakulam ranks first (68.1%) followed by Thrissur and Kozhikode (67.2%). The least per centage urban populated districts are Idukki (4.7%) and Wayanad (3.9%).

**Table 3.9**  
**District wise urban content and its change**

District	Urban content 2001	Urban content 2011	Change urban content
Alappuzha	29.46	54.06	24.6
Ernakulam	47.56	68.07	20.51
Idukki	5.1	4.7	-0.4
Kannur	50.35	65.05	14.7
Kasaragod	19.41	38.25	18.84
Kollam	18.02	45.11	27.09
Kottayam	15.35	25.58	13.23
Kozhikode	38.25	67.15	28.9
Malappuram	9.82	44.19	34.37
Palakkad	13.62	24.09	10.47
Pathanamthitta	10.03	11	0.97
Thiruvananthapuram	33.75	53.8	20.05
Thrissur	28.22	67.19	38.97
Wayanad	3.79	3.87	0.08

**Source: Census 2001 & 2011**

In the case of urban content, Kannur district stands first with 50.35 % in 2001 and 65.5% in 2011. While the least urban content during the same period is by Wayanad district with 3.79 % in 2001 and 3.87 % in 2011. But in the urban content change, Thrissur has the highest with 38.97 %.

The state scenario shows that, the number of towns (consisting of municipal councils/municipal corporations) in Kerala has increased from 28 to 59 within a period of 50 years (census 2011). But the increase in total number of urban areas (including the census towns) is from 93 to 536 during the same period i.e., a 6-fold increase.

**Table 3.10**  
**Urban areas in Kerala – District wise details**

DISTRICT	Corporation	municipality	C.T.	O.G.	CB	TS
Alappuzha		5	38	4		
Ernakulam	1	8	59	2		
Idukki		1				1
Kannur		6	67		1	
Kasaragod		2	20	2		
Kollam	1	2	27	2		
Kottayam		4	14	0		
Kozhikode	1	2	52	4		
Malappuram		5	38	1		
Palakkad		4	18	0		
Pathanamthitta		3				
Thiruvananthapuram	1	4	30	2		
<b>Thrissur</b>	<b>1</b>	<b>6</b>	<b>122</b>	<b>1</b>		
Wayanad		1				

Source: Census 2011

The category wise breakup of the urban areas of Kerala shows that the increase in the number of statutory towns is nominal whereas the increase in number of census towns and outgrowths are high which throws light into the kind of urbanisation (spreading rather concentration) happening in the State. The presence of large number of census towns in Thrissur, Kannur, Ernakulam and Kozhikode districts is an indication of the extent of spreading of urban areas within these district (State Urbanisation Report, Department of Town and Country planning – Government of Kerala, 2012).

Further in the case of number of municipalities in Kerala, Ernakulam Stands first (8 Nos.), followed by Thrissur and Kannur (6Nos.) each, Alappuzha and Malappuram (5nos.) each. But in the process of Out Growth (OG) Alappuzha and Kozhikode ranks first with (4nos.). it is evident from the table that Ernakulam with largest number of municipalities has only 2 Out Growths, Thrissur with 6 municipalities have only 1 Out Growth while Alappuzha with 5 municipalities has 4 Out Growths. Just contrary to this, Kozhikode with 2 Municipalities have 4 Out Growths. This means that the increase in the number of municipalities is not a decisive factor of determining Out Growth. The extent of urban spread and availability of amenities in out skirts of municipalities also contribute the outgrowth.

### **3.7 URBAN AGGLOMERATION IN THRISSUR**

Thrissur with its rich history, cultural legacy and archaeological wealth is called the cultural capital of Kerala. From ancient times, this district has played a significant role in the political history of South India. Many rulers and dynasties beginning with the Zamorins of Kozhikode, Tipu Sultan of Mysore and Europeans including the Dutch and the British have had a hand in moulding the destiny of this region. Raja Rama Varma, popularly known as SakthanThampuran was the architect of the present Thrissur Town. The word 'TRICHUR' is the anglicised version of Thrissur which again is the abbreviated form of 'Thrissivaperur' meaning the abode of Lord Siva. The district got its name from the headquarters town. It has recently shed its anglicised name and is now known as 'Thrissur'.

#### **3.7.1 Description of Study Area**

The study represents the economic impact of urban agglomeration with due aspect of density and other parameters for measuring it. So that the most urbanised with highest numbered census town in the Thrissur district with its defined urban areas have selected for the present study. Accordingly, the study is confined only the Thrissur STs, four directional wise CTs and the only OG (see Appendix).

Thrissur District has played a significant role in the history of South India from the pre-historic period to the modern times. Thrissur district is the central region of Kerala state, straddling an area of about 3,032 sq. km, Thrissur district is home to over 9% of Kerala's population bounded on the north by Malappuram and Palakkad district, south by Idukki and Ernakulam districts, east by Palakkad district and Coimbatore district of Tamil Nādu and west by Lakshadweep Sea. Thrissur district is divided into seven taluks which are Chavakkad, Kodungallur, Mukundapuram, Thalappally, Thrissur, Chalakkudy and Kunnankulam taluks. There are total of 16 block panchayath in Thrissur district which are Anthikkad, Chalakkudy, Chavakkad, Cherpu, Chowannur, Irinjalkkuda, Kodakara, Mala, Mathilaam, Mullassery, Ollukkara, Pazhayannur, Puzhakkal, Thalikkulam, Vellangallur and Wadakkanchery.

Thrissur Corporation (Statutory Town) is considered as the only first order settlement in the district based on the facilities available, its multifunctional character (seat of specialized and regional level facilities, status as administrative headquarters, trade and commercial centre of the district and Art and Cultural Centre) and its spatial location within the district. The city of Thrissur is located almost in the geographic centre of the district and reflects the character of activities of the whole district. The core area of Municipal Corporation is as dense as Kochi Municipal Corporation but the fringe area is free to hold more population. Thrissur township was coming into existence on 1942 July 1 and which had upgraded to corporation on 2000 October 2. The total area of the corporation is 101.42 sq.km and it has the total population of 317474 (census, 2011). There are 55 divisions in the corporation.

Adat is a census town in Thrissur taluk of Thrissur district with an area of 6.91 sq.km, located 9 km from the Thrissur city. The total population in Adat Census Town is 31973 and consists of 7781 households. The total wards in Adat Census Town are 18. The density is 1376.96.

Arimpur is another Census Town in Thrissur district which is one of the sample areas in the present study. The total area in the census town is 22.65 sq.km. the total population is 32292 and consists of 7959 households. The total wards in Arimpur Census Towns are 17. The density of population is 1425.7.

Avinissery is a census town in Thrissur district, it belongs to Cherpu block panchayath in south direction. The total area is 7.82 sq.km and density is 2775.83. The total population is 21707 and there is total of 5212 households 14 wards of Avinissery Census Town.

Puthur is one the sample areas in the study of economic impact of Urban Agglomeration in Kerala. It belongs to Ollukkara Block Panchayath in east direction. The total area of 79.07

sq.km and total population is 49284 and there is 11729 number of households in 23 wards. The density of the area is 961.

Out Growth of Thrissur district is belonging to Eriyad grama panchayath where there are 23 wards of 10940 households and the total population is 46213.

UA is deemed to be a stepwise procedure from the basic stage of OG to the higher order stage of STs with a convergence to the ultimate census towns. The Thrissur district is constituted of the centred Thrissur town (formerly Thrissur Municipality) with 122 surrounded Panchayaths. The Out Growth being nominal only. The enactment of Panchayath Raj was a long run chapter dating back to 1951 though then Union Govt. was inquisitive enough to implement the three-tier system to reservation from many partners it was a shelved idea. A part of the shelved idea was again pulled out at the state level by 1958's by the then Chief Minister Balwant Rai Mehta of Gujarat. So, the basic structure of the Panchayath Raj Act was at least drawn mirage with the grama panchayath becomes very active in the state. Initially it was a political structure but a gender bias. The idea was really fruitful and extremely poor conditioned villages could wriggle out for their number and push towards an urban structure. But the extent of success through such grama sabhas was limited as illiteracy still prevail with child labour taking its own course. Kerala is having a different structure with this so-called literacy rate is very high but lacking poor development due to over politicization of the local bodies ending up to a state assembly.

The urban agglomeration act was coming into existence in 1981 census. Accordingly, the urban development authority came in existence with all the municipalities and the urban development authority could a great extent succeed in developing the roads with interconnectivity with different parts of the city and decongesting traffic loads. In many cities the ring roads came, the roads are widened, in certain cities, the widening the existing roads have a setback due to the resistance from the locals. In the northern states and even in other states like Kerala, the resistance impact is less positively due to the poor literacy as also the greater extent of the states in area than Kerala.

Kerala is having a very good coastal belt. But even now the cheaper mode of transport is very poor even in the coastal belt as also inland. The poor harbour facility as also water hayncth is a barrier for the speedy water transport. However, the different govts. have rolled out good budget for urban development. Urban development is definitely an indicator of an upcoming civilized population as years' advance, the number of corporations increased as also

number of municipalities. The inflation may be an indicator of poor economic development but the acquisition of four wheelers and two wheelers has shown an upward trend with many multi nationals producing four wheelers and two wheelers as each and every villager acquires at least a two-wheeler. The bicycle era has gone. But a stage come back in an advanced version as a physical fitness vehicle. The number of four wheelers is an indication of a resident of the town shifting away from the flat system to a village atmosphere. With a farm house but with more retention in farm house rather in flat. Thus, newly constructed houses with widened access to each and every corner adds a vigour to the urbanization with the township stretching in all directions with a jump off with an urban outlook. The congestion in the township leads to the traffic jam and the narrowed parking facilities has forced all the multinationals especially supermarket and hypermarket giants to stretch the border of the township with a wider parking facility.

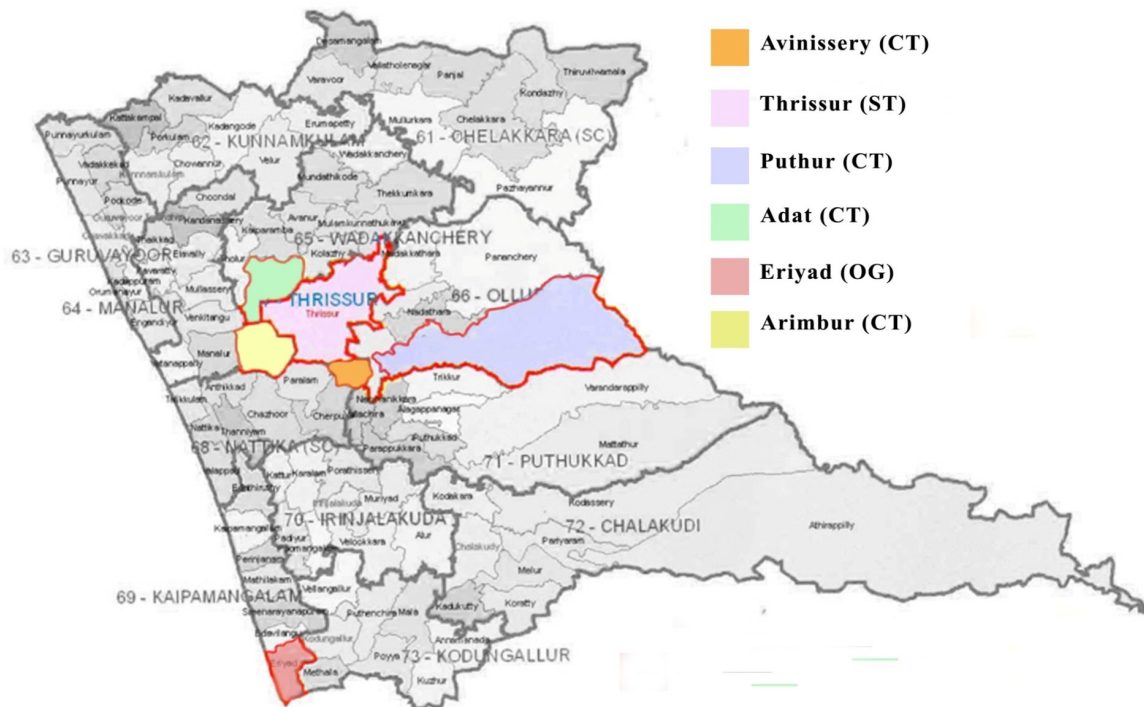
The cellular connection has also increased with every individual in a district at least possessing a cell phone and the marketing facility shifting away from the retailer to a giant network provider. So, sitting at one end, one can have access to any produce or product at the other end of the world.

The Lakshman Rekha within the town and village has been wiped out especially in Kerala. The electronic mode of transaction is now the rule of payment. And individual going to a bank or even an ATM has drastically reduced. The electronic era has reduced the number of staffs in most of the counters in general. This itself may not be an indication of urban but a transformation towards an urbanization which may ultimately leads to Urban agglomeration.

Usually all the major townships are developed around a temple, this is very specifically evident in Tamil Nadu when centred with a temple; the land mark being the Gopuram being all direction, the chariot parts are developed an 'vidhis' then for the development of commerce, the bigger size of 'vidhis' are developed with interconnectivity of vidhis through by lanes which are narrow in structure and the intermittent space developed as housing colonies crescent as 'gramas', still less important commercial activities essential for construction, maintenance the largest circle of 'vidhis' is developed wherein all sorts of industries like goldsmith, blacksmith, carpenters, small workshops and houses. This conceptual idea is very much relevant in Thrissur is concerned. No doubt the Vadakumnathan temple assumes important because of ancient as also the traditional rituals of "Thrissur pooram".

Another salient feature of Thrissur is the highly colonial and greenery area surrounding the temple – the world famous Thenkinkadu; as of now, no teakwood trees would be spotted – but certain banyan trees are well protected; an idea of poor conceptualization of protection of the environment. This myth is energetically carried out as a green revolution. Thenkinkadu Maidan could be spotted as one of the most eco-friendly areas; not even in a simple urban agglomeration could be spotted so eco-friendly.

**Figure 3.1**  
**Thrissur District Map**





**CHAPTER 4**

**THE EXTENT OF URBAN AGGLOMERATION**

**IN KERALA**

## **INTRODUCTION**

The extent of Urban Agglomeration indicates the degree to which the available parameters exist or happens at the present situation in the state of Kerala for measuring the extent or magnitude of Urban Agglomeration. A fully advanced spatial type of interrelated cities is called as Urban Agglomeration.

The study of "Research on Urban Spheres of influence based on improved field model in Central China" (Wang Li et.al 2011) examines the construction of a composite indicator for urban influence index and related to the measure of regional accessibility. The composite urban influence index should be full measure of economic strength, and can reflect the relationship between center and its hinterland. They formulated measure aspects namely the overall economic strength which includes the specific indicators like gross regional product, per capita gross regional product, per unit area of gross regional product, value added of primary industry, value added of secondary industry, value added of tertiary industry and gross industrial output value. The other measure aspects included basic education and medical services.

The degree to which the parameters necessary for measuring the scope or size of urban agglomeration are present or are happening at the moment in Kerala is indicated by the extent of urban agglomeration. Urban agglomeration is a fully developed spatial kind of connected cities.

According to Wang Li et al. (2011), "Research on Urban Spheres of Influence based on Improved Field Model in Central China" looks at the creation of a composite indicator for the urban influence index and how it relates to the measure of regional accessibility. The composite urban influence index can represent the connection between the centre and its hinterland and should be a comprehensive indicator of economic strength. They developed metrics for several areas, including general economic strength, which includes particular measures like gross regional product.

### **4.1 PARAMETERS FOR MEASURING THE EXTENT OF URBAN AGGLOMERATION**

The researcher used the methodology followed by Wang Li et.al. (2011). Major factors are Net State Domestic Product, the number of hospitals, the length of roads, the number of banks, the density, the number of schools, gross district value added at constant prices, gross district value added at current prices, net district value added at current price, net district value

added at constant price, District per capita income (GDVA) at current prices, district per capita income (GDVA) at constant prices, district per capita income (NDVA) at current prices, and district per capita income (NDVA) at constant prices and Population are the measures of the district as 01 to 14 served as the multivariate foundation for the assessment of the magnitude of the problem, commencing from Trivandrum to Kasaragod, was chronologically structured and in accordance with the nomenclature of Kerala state for administrative convenience. These factors were noted from the secondary source for the years 2001 to 2021 from the Department of Economics and Statistics, Government of Kerala, Trivandrum and Economic Review, State Planning Board, Government of Kerala.

The Kruskal-Wallis test was used to assess the districts based on all of the factors taken into account. In order to evaluate the spatial and sectoral fluctuations of the districts with regard to these criteria, which may serve as indicators of Urban Agglomeration, this was done to relatively rank the districts on the different parameters. Tables 4.1 to 4.15 exhibit the test's results. With the exception of District Per Capita Income (GDVA) at Current Prices, District Per Capita Income (NDVA) at Constant Prices, and District Per Capita Income(NDVA) at Current prices, the Chi-Square test using Kruskal-Wallis test statistic proved that all the parameters were significant.

The following are the various urban agglomerative factors which has leading role in forming Urban Agglomeration.

#### **4.1.1 Net State Domestic Product<sup>1</sup>**

The state's version of a country's net domestic product is known as net state domestic product (NSDP). The economic production of a country is measured annually using its net domestic product, which is then depreciation-adjusted. Depreciation is subtracted from the Gross Domestic Product (GDP) to compute it. The sum of the economic value of all the goods and services produced within the state's limits over a given time period is known as the state domestic product. It is used as a gauge for assessing the state's economic health and for researching how the economy is changing structurally. The net state domestic product (NSDP) is determined by subtracting the consumption of fixed capital (CFC) from the gross domestic product (GDP).By discounting depreciation from the gross domestic product, the net state domestic product is a yearly indicator of a country's economic output. One of the main indices of economic growth is the net state domestic product, which is also known as GDP, GNI,

disposable income, and personal income. An increase in Net Domestic Product would signal that the country's economy is doing well.

**Table 4.1**  
**Net State Domestic Product (Kruskal-Wallis H test)**

<b>District Name</b>	<b>Mean Rank</b>
Trivandrum	192.67
Kollam	167.86
Pathanamthitta	98.95
Alappuzha	146.86
Kottayam	146.10
Idukki	106.33
Ernakulam	209.33
Thrissur	184.95
Palakkad	155.14
Malappuram	169.81
Kozhikode	172.62
Wayanad	63.29
Kannur	153.00
Kasaragod	98.10
$\chi^2$	65.331
Degree of freedom	13
<i>p</i> value	.000

Secondary Data Analysis

A Kruskal-Wallis H test showed that there is statistically significant difference between the different districts towards Net State Domestic Product,  $H(13)=65.331$ ,  $p=0.000$ , with mean rank score of 192.67 for Trivandrum, with a mean rank score of 167.86 for Kollam, with a mean rank score of 98.95 for Pathanamthitta, with a mean rank score of 146.86 for Alappuzha, with a mean rank score of 146.10 for Kottayam, with a mean rank score of 106.33 for Idukki, with a mean rank score of 209.33 for Ernakulam, with a mean rank score of 184.95 for Thrissur, with a mean rank score of 155.14 for Palakkad, with a mean rank score of 169.81 for Malappuram, with a mean rank score of 172.62 for Kozhikode, with a mean rank score of 63.29 for Wayanad, with a mean rank score of 153.00 for Kannur, with a mean rank score of 98.10 for Kasaragod. As regards the Net State Domestic Product, Ernakulam, Trivandrum and Thrissur could be aligned in numerical order as per their mean ranks.

#### 4.1.2. Total Hospitals<sup>2</sup>

Urban expansion is significantly influenced by the health infrastructure. Compared to rural areas, urban areas typically have more health facilities and higher health indices. Access to hospitals, clinics, and health services in general is facilitated by urbanisation. Hospital availability and accessibility are thus two elements that affect urban agglomeration. A healthcare centre is specifically a location where a person in need can go to receive basic medical care and some first aid in an emergency. A district really needs these healthcare facilities to handle emergency scenarios.

**Table4.2**

**Total Hospitals (Kruskal-Wallis H test)**

<b>District Name</b>	<b>Mean Rank</b>
Trivandrum	240.93
Kollam	136.17
Pathanamthitta	68.95
Alappuzha	114.38
Kottayam	120.95
Idukki	54.19
Ernakulam	203.17
Thrissur	255.10
Palakkad	207.21
Malappuram	239.62
Kozhikode	159.48
Wayanad	12.71
Kannur	214.76
Kasaragod	37.38
$X^2$	253.694
Degree of freedom	13
<i>p</i> value	.000

Secondary Data Analysis

A Kruskal-Wallis H test showed that there is statistically significant difference between the different districts towards Total Hospitals which is expressed as numbers where only public hospitals in the district is concerned,  $H(13)=253.694, p=0.000$ , with mean rank score of 240.93 for Trivandrum, with a mean rank score of 136.17 for Kollam, with a mean rank score of 68.95 for Pathanamthitta, with a mean rank score of 114.38 for Alappuzha, with a mean rank score of 120.95 for Kottayam, with a mean rank score of 54.19 for Idukki, with a mean rank score of 203.17 for Ernakulam, with a mean rank score of 255.10 for Thrissur, with a mean rank score

of 207.21 for Palakkad, with a mean rank score of 239.62 for Malappuram, with a mean rank score of 159.48 for Kozhikode, with a mean rank score of 12.71 for Wayanad, with a mean rank score of 214.76 for Kannur, with a mean rank score of 37.38 for Kasaragod. Thrissur, Trivandrum and Malappuram could align in order as regards the total number of public hospitals were concerned.

#### 4.1.3 Total Road Length<sup>3</sup>

Transportation expansion is one of the factors that contributes to urbanisation and urban agglomeration. The improvement of traffic conditions is boosted by the construction of transportation facilities, which influences the growth of metropolitan areas. Urban expansion is supported by expanding road length and promoting effective transportation options.

**Table 4.3**

**Total Road Length (Kruskal-Wallis H test)**

<b>District Name</b>	<b>Mean Rank</b>
Trivandrum	191.90
Kollam	142.38
Pathanamthitta	104.81
Alappuzha	60.81
Kottayam	260.05
Idukki	219.90
Ernakulam	222.71
Thrissur	128.19
Palakkad	138.62
Malappuram	203.90
Kozhikode	160.71
Wayanad	15.33
Kannur	170.19
Kasaragod	45.48
$X^2$	194.998
Degree of freedom	13
<i>p</i> value	.000

Secondary Data Analysis

A Kruskal-Wallis H test showed that there is statistically significant difference between the different districts towards Total Road Length in Km where only length of PWD roads in the district is concerned,  $H(13) = 194.998$   $p = 0.000$ , with mean rank score of 191.90 for Trivandrum, with a mean rank score of 142.38 for Kollam, with a mean rank score of 104.81 for Pathanamthitta, with a mean rank score of 60.81 for Alappuzha, with a mean rank score of 260.05 for Kottayam, with a mean rank score of 219.90 for Idukki, with a mean rank score of 222.71 for Ernakulam, with a mean rank score of 128.19 for Thrissur, with a mean rank score

of 138.62 for Palakkad, with a mean rank score of 203.90 for Malappuram, with a mean rank score of 160.71 for Kozhikode, with a mean rank score of 15.33 for Wayanad, with a mean rank score of 170.19 for Kannur, with a mean rank score of 45.48 for Kasaragod. The districts Kottayam, Ernakulam and Idukki showing the order of highest road length in the state of Kerala.

#### 4.1.4 Total banks<sup>4</sup>

Banks are comparatively linked to enterprises of all kinds, geographic importance, and density. The total number of commercial banks have been taken for each district for analysing the extent of Urban Agglomeration in Kerala.

**Table 4.4**

**Total Banks (Kruskal-Wallis H test)**

<b>District Name</b>	<b>Mean Rank</b>
Trivandrum	249.33
Kollam	97.74
Pathanamthitta	121.12
Alappuzha	107.98
Kottayam	213.86
Idukki	32.71
Ernakulam	284.00
Thrissur	255.67
Palakkad	154.45
Malappuram	178.93
Kozhikode	180.33
Wayanad	11.00
Kannur	125.60
Kasaragod	52.29
$\chi^2$	271.270
Degree of freedom	13
<i>p</i> value	.000

#### Secondary Data Analysis

A Kruskal-Wallis H test showed that there is statistically significant difference between the different districts towards total number of commercial banks in each district is concerned,  $H(13) = 271.270$   $p = 0.000$ , with mean rank score of 249.33 for Trivandrum, with a mean rank score of 97.74 for Kollam, with a mean rank score of 121.12 for Pathanamthitta, with a mean rank score of 107.98 for Alappuzha, with a mean rank score of 213.86 for Kottayam, with a mean rank score of 32.71 for Idukki, with a mean rank score of 284.00 for Ernakulam, with a mean rank score of 255.67 for Thrissur, with a mean rank score of 154.45 for Palakkad, with a

mean rank score of 178.93 for Malappuram, with a mean rank score of 180.33 for Kozhikode, with a mean rank score of 11.00 for Wayanad, with a mean rank score of 125.60 for Kannur, with a mean rank score of 52.29 for Kasaragod. The districts Ernakulam, Thrissur and Trivandrum showing the order of highest number of commercial banks in the state of Kerala.

#### 4.1.5. Density<sup>5</sup>

An important element whose local and regional scale effects on the spatial distribution of human settlements in urban regions and rural districts have received much discussion is density dependent processes governing population increase. Because of the intrinsic complexity of the background context and the abundance of socioeconomic factors and constraints determining settlement density, investigation of density-dependent mechanisms of demographic dynamics for human populations is significantly more challenging (Ciommi et.al, 2020). Due to its tight ties to rigid demand, the urban market, and agglomeration potential, population density is a key element in urban expansion (Liu et., 2005). Another distinct phenomenon is density. The size of the family and religion are also very significant influences, even if the spatial and temporal pattern dominates.

**Table 4.5**  
**Density (Kruskal-Wallis H test)**

<b>District Name</b>	<b>Mean Rank</b>
Trivandrum	274.00
Kollam	199.00
Pathanamthitta	53.00
Alappuzha	273.00
Kottayam	137.00
Idukki	11.00
Ernakulam	190.00
Thrissur	168.48
Palakkad	79.24
Malappuram	200.52
Kozhikode	242.00
Wayanad	32.00
Kannur	116.00
Kasaragod	89.76
$X^2$	286.133
Degree of freedom	13
<i>p</i> value	.000

Secondary Data Analysis



A Kruskal-Wallis H test showed that there is statistically significant difference between the different districts towards Density (number of persons per square km.) in each district is concerned,  $H(13) = 286.133$ ,  $p = 0.000$ , with mean rank score of 274.00 for Trivandrum, with a mean rank score of 199.00 for Kollam, with a mean rank score of 53.00 for Pathanamthitta, with a mean rank score of 273.00 for Alappuzha, with a mean rank score of 137.00 for Kottayam, with a mean rank score of 11.00 for Idukki, with a mean rank score of 190.00 for Ernakulam, with a mean rank score of 168.48 for Thrissur, with a mean rank score of 79.24 for Palakkad, with a mean rank score of 200.52 for Malappuram, with a mean rank score of 242.00 for Kozhikode, with a mean rank score of 32.00 for Wayanad, with a mean rank score of 116.00 for Kannur, with a mean rank score of 89.76 for Kasaragod. The districts Trivandrum, Alappuzha and Kozhikode have showed the order of highest number of commercial banks in the state of Kerala.

#### 4.1.6 Total Schools<sup>6</sup>

Density and the number of schools are generally related for measuring the extent of Urban Agglomeration in the State of Kerala. As a result, Kozhikode, Kannur, and Malappuram were arranged depending on the number of Government High schools. Hasan, (2017) investigates the impact of urban agglomeration in India on salaries, a dependent variable linked to a variety of indices, including educational institutions.

**Table 4.6**  
**Total Schools (Kruskal-Wallis H test)**

District Name	Mean Rank
Trivandrum	173.52
Kollam	133.50
Pathanamthitta	75.00
Alappuzha	96.00
Kottayam	119.19
Idukki	32.00
Ernakulam	203.38
Thrissur	209.38
Palakkad	170.02
Malappuram	284.00
Kozhikode	243.62
Wayanad	11.00
Kannur	261.38
Kasaragod	53.00
$X^2$	287.069
Degree of freedom	13
$p$ value	.000

Secondary Data Analysis

A Kruskal-Wallis H test showed that there is statistically significant difference between the different districts towards total number of schools in each district is concerned,  $H(13) = 287.069$ ,  $p = 0.000$ , with mean rank score of 173.52 for Trivandrum, with a mean rank score of 133.50 for Kollam, with a mean rank score of 75.00 for Pathanamthitta, with a mean rank score of 96.00 for Alappuzha, with a mean rank score of 119.19 for Kottayam, with a mean rank score of 32.00 for Idukki, with a mean rank score of 203.38 for Ernakulam, with a mean rank score of 209.38 for Thrissur, with a mean rank score of 170.02 for Palakkad, with a mean rank score of 284.00 for Malappuram, with a mean rank score of 243.62 for Kozhikode, with a mean rank score of 11.00 for Wayanad, with a mean rank score of 261.38 for Kannur, with a mean rank score of 53.00 for Kasaragod. The districts Malappuram, Kannur and Kozhikode have shown the order of highest number of high schools in the state of Kerala.

#### 4.1.7. Gross District Value Added At Constant Prices<sup>7</sup>

Real gross domestic product (real GDP), also known as constant-price GDP, inflation-corrected GDP, or constant dollar GDP, is an inflation-adjusted metric that measures the value of all goods and services generated by an economy in a given year (expressed in base-year prices). The prices from a base year that are used to calculate real GDP in subsequent years; utilising constant prices cancels out any differences in price level between years, allowing for a more accurate measurement of how a country's actual output evolves over time.

**Table 4.7**  
**Gross District Value Added at Constant Prices (Kruskal-Wallis H test)**

District Name	Mean Rank
Trivandrum	200.86
Kollam	170.95
Pathanamthitta	88.38
Alappuzha	146.95
Kottayam	145.00
Idukki	97.33
Ernakulam	221.57
Thrissur	192.43
Palakkad	156.67
Malappuram	177.57
Kozhikode	176.90
Wayanad	49.71
Kannur	151.62
Kasaragod	89.05
$\chi^2$	92.307
Degree of freedom	13
$p$ value	.000

Secondary Data Analysis

A Kruskal-Wallis H test showed that there is statistically significant difference between the different districts towards Gross District Value Added at Constant Prices in each district is

concerned,  $H(13) = 92.307$ ,  $p = 0.000$ , with mean rank score of 200.86 for Trivandrum, with a mean rank score of 170.95 for Kollam, with a mean rank score of 88.38 for Pathanamthitta, with a mean rank score of 146.95 for Alappuzha, with a mean rank score of 145.00 for Kottayam, with a mean rank score of 97.33 for Idukki, with a mean rank score of 221.57 for Ernakulam, with a mean rank score of 192.43 for Thrissur, with a mean rank score of 156.67 for Palakkad, with a mean rank score of 177.57 for Malappuram, with a mean rank score of 176.90 for Kozhikode, with a mean rank score of 49.71 for Wayanad, with a mean rank score of 151.62 for Kannur, with a mean rank score of 89.05 for Kasaragod. The districts Ernakulam, Trivandrum and Thrissur have shown the order of highest number of Gross District Value Added at Constant Prices.

#### 4.1.8. Gross District Value Added at Current Prices<sup>8</sup>

Even when the flow of goods and services in the economy remains unchanged but prices rise, GDP at current prices can rise. Contrarily, the GDP at constant prices will rise only when the economy's flow of goods and services increases.

**Table 4.8**

**Gross District Value Added at Current Prices (Kruskal-Wallis H test)**

<b>District Name</b>	<b>Mean Rank</b>
Trivandrum	194.38
Kollam	169.52
Pathanamthitta	91.48
Alappuzha	152.48
Kottayam	148.43
Idukki	99.00
Ernakulam	213.95
Thrissur	185.57
Palakkad	160.00
Malappuram	174.14
Kozhikode	173.86
Wayanad	56.10
Kannur	154.90
Kasaragod	91.19
$X^2$	79.049
Degree of freedom	13
$p$ value	.000

Secondary Data

A Kruskal-Wallis H test showed that there is statistically significant difference between the different districts towards Gross District Value Added at Current Prices in each district is concerned,  $H(13) = 79.049$ ,  $p = 0.000$ , with mean rank score of 194.38 for Trivandrum, with a mean rank score of 169.52 for Kollam, with a mean rank score of 91.48 for Pathanamthitta,

with a mean rank score of 152.48 for Alappuzha, with a mean rank score of 148.43 for Kottayam, with a mean rank score of 99.00 for Idukki, with a mean rank score of 213.95 for Ernakulam, with a mean rank score of 185.57 for Thrissur, with a mean rank score of 160.00 for Palakkad, with a mean rank score of 174.14 for Malappuram, with a mean rank score of 173.86 for Kozhikode, with a mean rank score of 56.10 for Wayanad, with a mean rank score of 154.90 for Kannur, with a mean rank score of 91.19 for Kasaragod. The districts Ernakulam, Trivandrum and Thrissur have shown the order of highest number of Gross District Value Added at Current Prices.

#### 4.1.9. Net District Value Added At Constant Prices<sup>9</sup>

The economic output of a country is measured annually using its Net Domestic Product (NDP), which is depreciation-adjusted. Depreciation is subtracted from the Gross Domestic Product to compute it.

**Table 4.9**  
**Net District Value Added at Constant Prices (Kruskal-Wallis H test)**

<b>District Name</b>	<b>Mean Rank</b>
Trivandrum	199.62
Kollam	170.52
Pathanamthitta	89.71
Alappuzha	148.10
Kottayam	144.57
Idukki	94.76
Ernakulam	220.43
Thrissur	192.38
Palakkad	155.57
Malappuram	178.29
Kozhikode	178.24
Wayanad	49.76
Kannur	153.05
Kasaragod	90.00
$X^2$	91.689
Degree of freedom	13
<i>p</i> value	.000

Secondary Data

A Kruskal-Wallis H test showed that there is statistically significant difference between the different districts towards Net District Value Added at Constant Prices in each district is concerned,  $H(13) = 91.689$ ,  $p = 0.000$ , with mean rank score of 199.62 for Trivandrum, with a mean rank score of 170.52 for Kollam, with a mean rank score of 89.71 for Pathanamthitta, with a mean rank score of 148.10 for Alappuzha, with a mean rank score of 144.57 for Kottayam, with a mean rank score of 94.76 for Idukki, with a mean rank score of 220.43 for

Ernakulam, with a mean rank score of 192.38 for Thrissur, with a mean rank score of 155.57 for Palakkad, with a mean rank score of 178.29 for Malappuram, with a mean rank score of 178.24 for Kozhikode, with a mean rank score of 49.76 for Wayanad, with a mean rank score of 153.05 for Kannur, with a mean rank score of 90.00 for Kasaragod. The districts Ernakulam, Trivandrum and Thrissur have shown the order of highest number of Net District Value Added at Constant Prices.

#### 4.1.10 Net District Value Added at Current Prices<sup>10</sup>

Value added is calculated as the value of output less the value of intermediary consumption and indicates the value created by manufacturing goods and services. Value added also refers to the earnings made possible by the labour and financial investments made throughout the production process. Activity-based value addition demonstrates the value added produced by the various industries (such as agriculture, industry, utilities, and other service activities). The indicator shows the value added for a certain activity as a share of overall value added.

**Table 4.10**  
**Net District Value Added At Current Prices (Kruskal-Wallis H test)**

District Name	Mean Rank
Trivandrum	192.86
Kollam	169.62
Pathanamthitta	91.81
Alappuzha	153.05
Kottayam	147.90
Idukki	96.57
Ernakulam	213.43
Thrissur	186.05
Palakkad	159.43
Malappuram	175.38
Kozhikode	175.10
Wayanad	56.19
Kannur	156.29
Kasaragod	91.33
$\chi^2$	79.483
Degree of freedom	13
<i>p</i> value	.000

Secondary Data Analysis

A Kruskal-Wallis H test showed that there is statistically significant difference between the different districts towards Net District Value Added at Current Prices in each district is concerned,  $H(13) = 79.483$ ,  $p = 0.000$ , with mean rank score of 192.86 for Trivandrum, with a mean rank score of 169.62 for Kollam, with a mean rank score of 91.81 for Pathanamthitta, with a mean rank score of 153.05 for Alappuzha, with a mean rank score of 147.90 for

Kottayam, with a mean rank score of 96.57 for Idukki, with a mean rank score of 213.43 for Ernakulam, with a mean rank score of 186.05 for Thrissur, with a mean rank score of 159.43 for Palakkad, with a mean rank score of 175.38 for Malappuram, with a mean rank score of 175.10 for Kozhikode, with a mean rank score of 56.19 for Wayanad, with a mean rank score of 156.29 for Kannur, with a mean rank score of 91.33 for Kasaragod. The districts Ernakulam, Trivandrum and Thrissur have shown the order of highest number of Net District Value Added at Current Prices.

#### 4.1.11 District per Capita Income (GDVA) at Constant Prices<sup>11</sup>

The per capita income of the district shows that there are variations in the district wise per capita income calculated at constant prices which can be analysed by Kruskal-Wallis H test Statistic.

**Table 4.11**  
**District Per Capita Income (GDVA) At Constant Prices(Kruskal-Wallis H test)**

District Name	Mean Rank
Trivandrum	163.10
Kollam	160.76
Pathanamthitta	138.62
Alappuzha	165.43
Kottayam	172.43
Idukki	166.05
Ernakulam	195.95
Thrissur	160.14
Palakkad	126.95
Malappuram	99.24
Kozhikode	138.81
Wayanad	114.14
Kannur	141.19
Kasaragod	122.19
$X^2$	25.895
Degree of freedom	13
$p$ value	.018

#### Secondary Data

A Kruskal-Wallis H test showed that there is statistically significant difference between the different districts towards district Per Capita Income (GDVA) At Constant Prices in each district is concerned,  $H(13) = 25.895$ ,  $p = 0.018$ , with mean rank score of 163.10 for Trivandrum, with a mean rank score of 160.76 for Kollam, with a mean rank score of 138.62 for Pathanamthitta, with a mean rank score of 165.43 for Alappuzha, with a mean rank score of 172.43 for Kottayam, with a mean rank score of 166.05 for Idukki, with a mean rank score of 195.95 for Ernakulam, with a mean rank score of 160.14 for Thrissur, with a mean rank score of 126.95 for Palakkad, with a mean rank score of 99.24 for Malappuram, with a mean

rank score of 138.81 for Kozhikode, with a mean rank score of 114.14 for Wayanad, with a mean rank score of 141.19 for Kannur, with a mean rank score of 122.19 for Kasaragod. The districts Ernakulam, Kottayam and Alappuzha have shown the order of highest number of district Per Capita Income (GDVA) At Constant Prices.

#### 4.1.12 District per Capita Income (GDVA) at Current Prices<sup>12</sup>

As far as per capita income in terms of current prices is concerned the Kruskal Wallis H test statistic shows that there are no significant variations in the per capita income levels between various districts. The test result is shown in the below table.

**Table 4.12**  
**District Per Capita Income (GDVA) At Current Prices (Kruskal-Wallis H test)**

District Name	Mean Rank
Trivandrum	159.14
Kollam	156.52
Pathanamthitta	141.90
Alappuzha	159.10
Kottayam	161.43
Idukki	161.43
Ernakulam	184.38
Thrissur	155.38
Palakkad	135.14
Malappuram	112.00
Kozhikode	141.81
Wayanad	126.29
Kannur	142.48
Kasaragod	128.00
$X^2$	13.057
Degree of freedom	13
$p$ value	.443

Secondary Data

A Kruskal-Wallis H test showed that there is no statistically significant difference between the different districts towards district per capita income (GDVA) at current prices in each district is concerned,  $H(13) = 13.057$   $p = 0.443$ , with mean rank score of 159.14 for Trivandrum, with a mean rank score of 156.52 for Kollam, with a mean rank score of 141.90 for Pathanamthitta, with a mean rank score of 159.10 for Alappuzha, with a mean rank score of 161.43 for Kottayam, with a mean rank score of 161.43 for Idukki, with a mean rank score of 184.38 for Ernakulam, with a mean rank score of 155.38 for Thrissur, with a mean rank score of 135.14 for Palakkad, with a mean rank score of 112.00 for Malappuram, with a mean rank score of 141.81 for Kozhikode, with a mean rank score of 126.29 for Wayanad, with a mean rank score of 142.48 for Kannur, with a mean rank score of 128.00 for Kasaragod. The

Kruskal-Wallis H test statistic is not significant as the Chi-square (13.057) with p value 0.443 is more than 0.05. Thus, there is no significant association of the extent of Urban agglomeration and the measure of district per capita income (GDVA) at current prices in the state of Kerala with respect to fourteen districts.

#### 4.1.13. District Per Capita Income (NDVA) At Constant Prices<sup>13</sup>

The district per capita income (NDVA) at constant prices is concerned with the calculation of district per capita income with reference to net value-added method. The Kruskal-Wallis H test statistic is used to differentiate the variations upon different districts towards district per capita income at constant prices.

**Table 4.13**  
**District Per Capita Income (NDVA) At Constant Prices (Kruskal-Wallis H test)**

District Name	Mean Rank
Trivandrum	160.57
Kollam	157.43
Pathanamthitta	140.90
Alappuzha	163.57
Kottayam	168.33
Idukki	160.38
Ernakulam	190.24
Thrissur	159.38
Palakkad	129.76
Malappuram	106.43
Kozhikode	141.95
Wayanad	118.81
Kannur	143.67
Kasaragod	123.57
$X^2$	19.123
Degree of freedom	13
<i>p</i> value	.119

Secondary Data

A Kruskal-Wallis H test showed that there is no statistically significant difference between the different districts towards district per capita income (NDVA) at constant prices in each district is concerned,  $H(13) = 19.123$   $p = 0.119$ , with mean rank score of 160.57 for Trivandrum, with a mean rank score of 157.43 for Kollam, with a mean rank score of 140.90 for Pathanamthitta, with a mean rank score of 163.57 for Alappuzha, with a mean rank score of 168.33 for Kottayam, with a mean rank score of 160.38 for Idukki, with a mean rank score of 190.24 for Ernakulam, with a mean rank score of 159.38 for Thrissur, with a mean rank score of 129.76 for Palakkad, with a mean rank score of 106.43 for Malappuram, with a mean rank score of 141.95 for Kozhikode, with a mean rank score of 118.81 for Wayanad, with a mean rank score of 143.67 for Kannur, with a mean rank score of 123.57 for Kasaragod. The



Kruskal-Wallis H test statistic is not significant as the Chi-square (19.123) with p value 0.119 is more than 0.05. Thus, there is no significant association of the extent of Urban agglomeration and the measure of district per capita income (NDVA) at constant prices in the state of Kerala with respect to fourteen districts.

#### 4.1.14 District per Capita Income (NDVA) At Current Prices<sup>14</sup>

The district per capita income (NDVA) at current prices is concerned with the calculation of district per capita income with reference to net value-added method. The Kruskal-Wallis H test statistic is used to differentiate the variations upon different districts towards district per capita income at current prices. The Kruskal Wallis H test statistic shows that there are no significant variations in the per capita income levels between various districts. The test result is shown in the below table.

**Table 4.14**  
**District Per Capita Income (NDVA) At Current Prices (Kruskal-Wallis H test)**

District Name	Mean Rank
Trivandrum	157.38
Kollam	157.71
Pathanamthitta	142.05
Alappuzha	160.38
Kottayam	161.48
Idukki	157.71
Ernakulam	184.00
Thrissur	156.33
Palakkad	134.33
Malappuram	113.29
Kozhikode	143.57
Wayanad	125.95
Kannur	143.81
Kasaragod	127.00
$X^2$	12.683
Degree of freedom	13
<i>p</i> value	.473

#### Secondary Data

A Kruskal-Wallis H test showed that there is no statistically significant difference between the different districts towards district per capita income (NDVA) at constant prices in each district is concerned,  $H(13) = 12.683$   $p = 0.473$ , with mean rank score of 157.38 for Trivandrum, with a mean rank score of 157.71 for Kollam, with a mean rank score of 142.05 for Pathanamthitta, with a mean rank score of 160.38 for Alappuzha, with a mean rank score of 161.48 for Kottayam, with a mean rank score of 157.71 for Idukki, with a mean rank score of 184.00 for Ernakulam, with a mean rank score of 156.33 for Thrissur, with a mean rank score of 134.33 for Palakkad, with a mean rank score of 113.29 for Malappuram, with a mean

rank score of 143.57 for Kozhikode, with a mean rank score of 125.95 for Wayanad, with a mean rank score of 143.81 for Kannur, with a mean rank score of 127.00 for Kasaragod. The Kruskal-Wallis H test statistic is not significant as the Chi-square (12.683) with p value 0.473 is more than 0.05. Thus, there is no significant association of the extent of Urban agglomeration and the measure of district per capita income (NDVA) at current prices in the state of Kerala with respect to fourteen districts.

#### 4.1.15 Population<sup>15</sup>

Population is also linked in general with various factors like job opportunities, religion, location of the district etc. the Kruskal-Wallis test is turned to be significant and it could be observed that as per the general criteria spoken above Malappuram, Trivandrum and Ernakulam were in order.

**Table 4.15**  
**Population (Kruskal-Wallis H test)**

District Name	Mean Rank
Trivandrum	201.00
Kollam	154.38
Pathanamthitta	102.93
Alappuzha	131.71
Kottayam	121.19
Idukki	90.14
Ernakulam	198.45
Thrissur	181.26
Palakkad	161.67
Malappuram	215.90
Kozhikode	177.67
Wayanad	79.62
Kannur	142.24
Kasaragod	106.83
$\chi^2$	72.473
Degree of freedom	13
<i>p</i> value	.000

#### Secondary Data

A Kruskal-Wallis H test showed that there is no statistically significant difference between the different districts towards district per capita income (NDVA) at constant prices in each district is concerned,  $H(13) = 72.473$   $p = 0.000$ , with mean rank score of 201.00 for Trivandrum, with a mean rank score of 154.38 for Kollam, with a mean rank score of 102.93 for Pathanamthitta, with a mean rank score of 131.71 for Alappuzha, with a mean rank score of 121.19 for Kottayam, with a mean rank score of 90.14 for Idukki, with a mean rank score of 198.45 for Ernakulam, with a mean rank score of 181.26 for Thrissur, with a mean rank score

of 161.67 for Palakkad, with a mean rank score of 215.90 for Malappuram, with a mean rank score of 177.67 for Kozhikode, with a mean rank score of 79.62 for Wayanad, with a mean rank score of 142.24 for Kannur, with a mean rank score of 106.83 for Kasaragod. The Kruskal-Wallis H test statistic is significant as the Chi-square (72.473) with p value 0.000 is less than 0.05. Thus, there is significant association of the extent of Urban agglomeration and the parameter of population in the state of Kerala.

As regards the Per Capita Income Gross District Domestic Product (FC) Current Prices, Per Capita Income Net District Domestic Product (FC) Constant Prices and Per Capita Income Net District Domestic Product (FC) Current Prices, the K-W test was found to be non-significant clearly bringing about the fact that all the districts have uniform pattern of distribution. This is a phenomenon that reassures these parameters are totally dependent on state/National set up and district wise.

#### **4.2. FACTOR ANALYSIS OF THE SECONDARY DATA**

Initially the study identified fifteen parameters reflecting the extent of Urban Agglomeration in Kerala. In order to compact the data according to Kruskal-Wallis H test statistic, highly significant parameters are taken for further analysis. The variables Total Hospitals, Total Road length, Bank, Density, Total number of schools, gross district value added at constant prices, net district value added at constant prices, district per capita income (GDVA) at constant prices and district per capita income (NDVA) at constant prices were considered to be highly significant and selected.

#### **4.3. PRINCIPAL COMPONENT ANALYSIS (PCA)**

Principal Components Analysis (PCA) is a variable reduction method that maximises the amount of variance accounted for by the observed variables by a smaller group of variables called components. The PCA process allows us to reduce the number of questions or variables down to their principal components. The usual factor analysis model expresses each variable as a function of factors common to several variables and unique to the variable.

$$Y_j = a_{j1}X_1 + a_{j2}X_2 + \dots + a_{jm}X_m + Z_j;$$

Where:

$Y_j$  = the  $j^{\text{th}}$  standardized variable

$X_1$  = the common factors

$m$  = the number of factors common to all the variables

$Z_j$  = the factor unique to variable  $z_j$

$a_{j1}$  = the factor loading

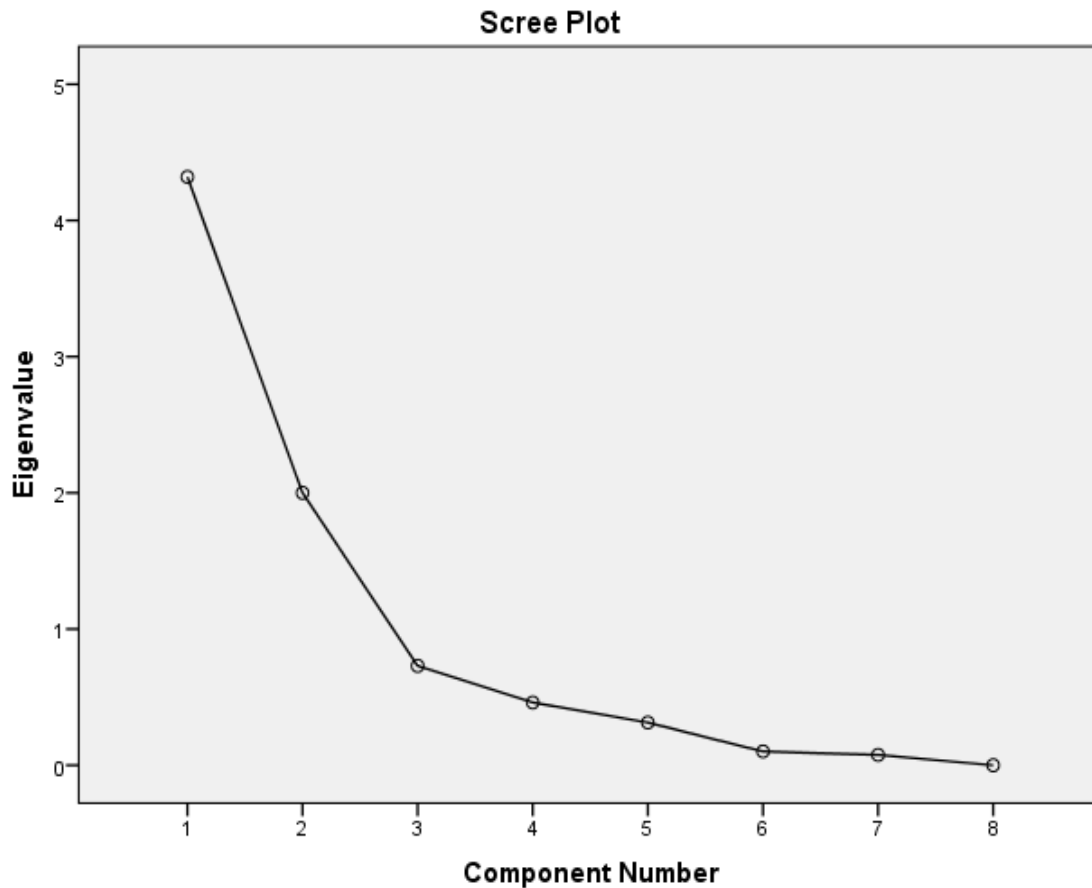
The rotated factor loadings represent how the variables are weighted for each factor and the correlation between the variables and the factor whose possible values range from -1 to +1. Thus, the cluster of low correlations (<0.5) that are probably not meaningful is removed in the output table. The columns under the heading factor loading are the rotated factors that have been extracted. These are the eight factors identified after the rotation has been done. The results of factor analysis from the factor loadings are also minimum data set of the variables.

In order to test the compatibility of the data for Factor Analysis, KMO and Bartlett's sphericity tests are used. The Kaiser-Meyer-Olkin (KMO) measure must be greater than 0.70, if it is good and it is inadequate if less than 0.50. The KMO test tells us whether each factor predicts enough items. Here it is '0.733' and; hence, it is good. The Bartlett test should have a significance value of less than 0.05. The significance level in this study shows that the variables are correlated highly enough to provide a reasonable basis for factor analysis. Therefore, the variables significantly associated with extent of Urban Agglomeration were used to run factor analysis and estimate factor loading.

#### **4.4 EIGEN VALUES AND SCREE PLOT**

The factors with a load value greater than 0.5 were considered as component factors affecting the study of Urban Agglomeration. The analysis identified two factors whose Eigenvalue was greater than one as the extent of Urban Agglomeration principal factors. The scree plot (Diagram 4.2) graphs the Eigenvalue against the factor number. The scree plot orders the Eigenvalues from largest to smallest, plots the differences between the ordered values, and looks for a break or a sharp drop. The component matrix was acquired, but transparency rotation was done to load factor loading as it was not adequate systematically.

**Figure 4.1**



A sharp drop is noticeable up to the second component. Based on this, one might select only two components that explained 78 per cent of the variation. The third factor is almost flat, meaning each successive factor is accounting for smaller and smaller amounts of the total variance. The two components have marked on the component plot in rotated space and have analysed in details with the extent of Urban Agglomeration in Kerala.

The proportion of variance explained to show how the variance is divided among the 8 possible factors. The first principal component explains about 53.99 per cent of the variation. Altogether, 78.98 per cent of variance is explained by the two components. Principal component factor analysis with varimax rotation assessed the underlying structure for the 8 items of the extent of Urban Agglomeration in Kerala.

**Table 4.16**  
**Rotated Component Matrix**

<b>Sl.No.</b>	<b>Factor</b>	<b>Component 1</b>	<b>Component 2</b>
1	Total Hospitals		<b>.953</b>
2	Total Road Length	<b>.641</b>	
3	Bank		<b>.693</b>
4	Density		<b>.733</b>
5	Total Number of Schools		<b>.862</b>
6	Gross District Value added at Constant Prices	<b>.933</b>	
7	Net District Value added at Constant Prices	<b>.931</b>	
8	District per capita income (GDVA) at constant prices	<b>.955</b>	
<b>Eigen Value</b>		<b>4.319</b>	<b>2.000</b>
<b>Proportion of Variance Explained</b>		<b>53.993</b>	<b>24.994</b>
<b>Cumulative Variance Explained</b>		<b>53.993</b>	<b>78.988</b>
<b>KMO: Measure of Sampling Adequacy</b>		<b>0.733</b>	<b>0.000 (sig)</b>
<b>Bartlett's Test of Sphericity Approx. Chi-Square</b>		<b>3964.702</b>	
		<b>Degree of freedom (28)</b>	

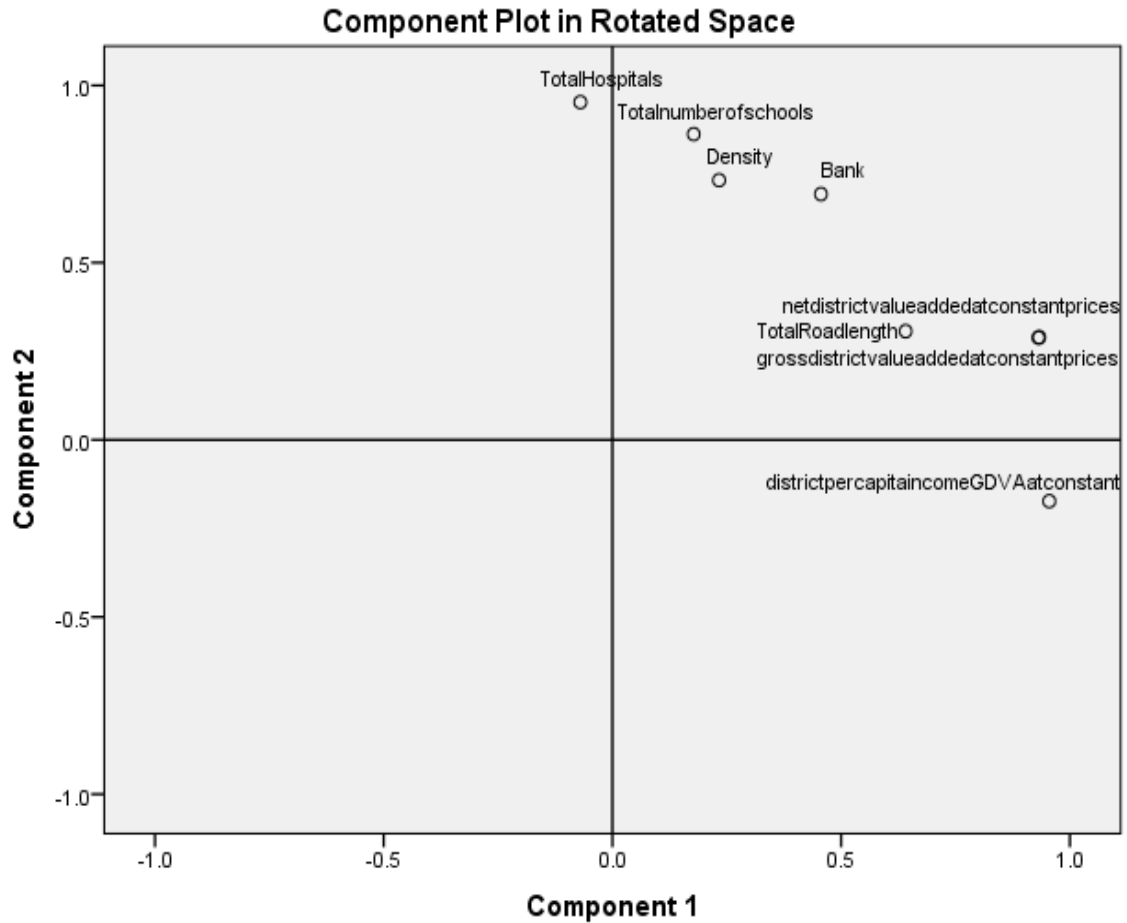
Secondary data Analysis

Table 4.16 displays the items and factor loadings for the rotated factors, with loadings less than 0.50 omitted to improve clarity. Eight factors were requested. After rotation, the first factor accounted for 53.993 per cent of the variance, the second factor accounted for 24.994 per cent. The total variance explained by the two factors accounted for 78.988 per cent.

The Varimax Factors values which are greater than 0.75 ( $> 0.75$ ) is considered as “strong”, the values range from 0.50-0.75 ( $0.50 \geq \text{factor loading} \geq 0.75$ ) is considered as “moderate”, and the values range from 0.30-0.49 ( $0.30\text{-factor loading} \geq 0.49$ ) is considered as “weak” factor loadings. In the rotated factors, high positive loadings on each factor are presented. The variables, two, six, seven and eight explain the development factors of Urban Agglomeration. The factor loading values varied from 0.955 to 0.641. The proportion of variance explained by this factor was 53.993 per cent. The variables one,three, four and five

fall under Agglomeration factors for the study of Urban Agglomeration, and their factor loading values ranged between 0.693 and 0.953. Thus, the proportion of variance explained by this factor was 24.994 per cent. Therefore, these eight factors (two components) are important parameters affecting the extent of Urban Agglomeration.

**Figure 4.2**



The figure 4.2 shows the two components of factors of urban agglomeration process where the development factors forming the total road length, gross district value added at constant prices, net district value added at constant prices and district per capita income (NDVA) together forming one component. On the other side, the agglomeration factor or spatial factors together forming other group.

**Table 4.17**  
**Components of Urban Agglomeration**

<b>(Sectoral) Development Factor</b>	<b>(Spatial) Agglomeration Factor</b>
1. Total Road Length	1. Total Hospitals
2. Gross district value added at constant prices	2. Bank
3. Net district value added at constant prices	3. Density
4. District per capita income (GDVA) at constant prices	4. Total Number of Schools

Secondary data Analysis

The development of a Statutory Towns as also the surrounding Census Towns to amalgamate and spread further to impart a unique feature for an urban township – the extent of Urban Agglomeration could be read out from the factual of these variables as regards each and every Urban Agglomerated Area is concerned.

The indicators of Urban Agglomeration are given as spatial factors (Cristina, et. al, 2021) or Agglomeration Factor in general. The development factors or sectoral factors can be increased further which will add as a boost to the agglomeration factor.

**Table 4.18**  
**Agglomeration (spatial) factors of Thrissur District**

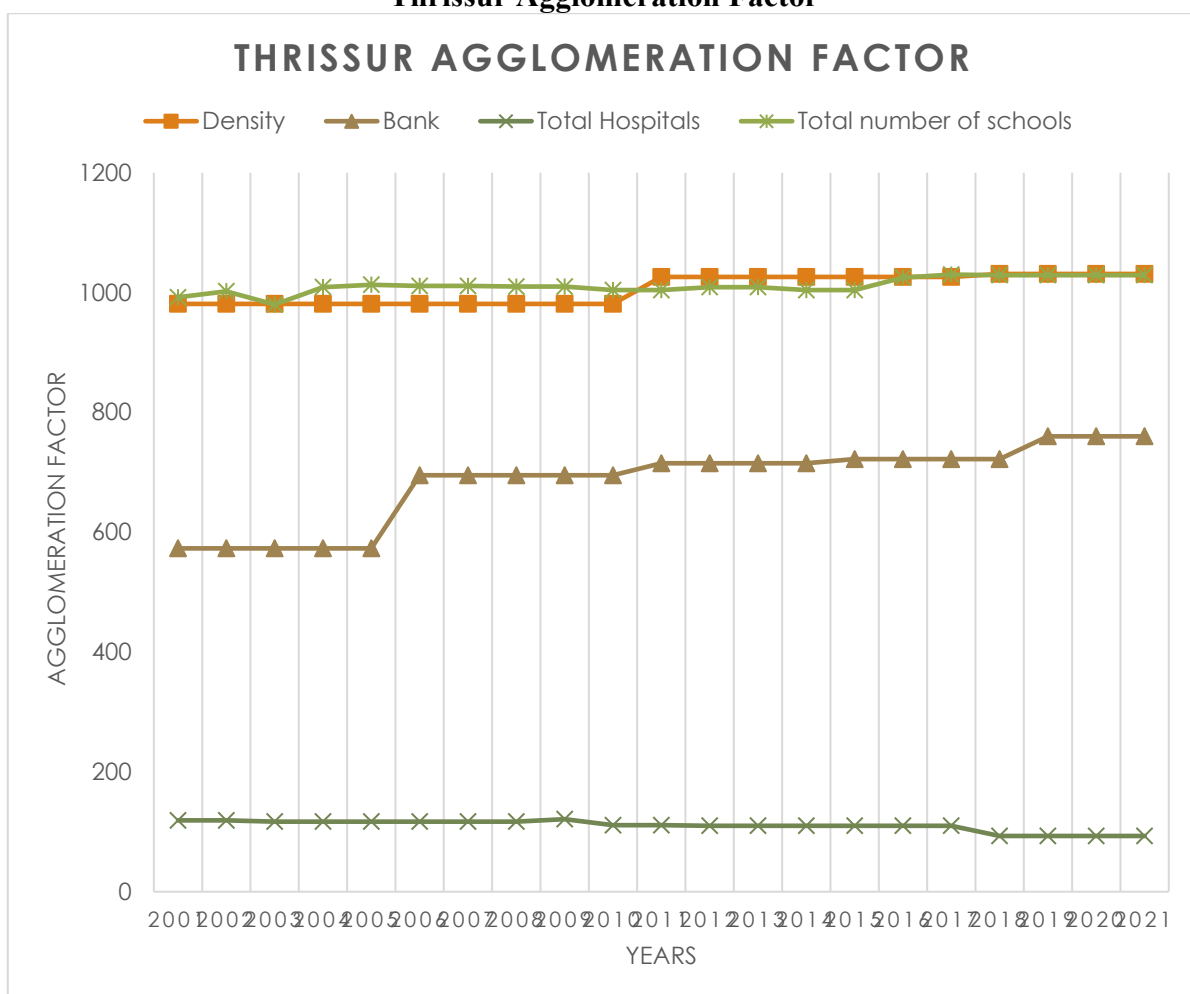
Year	Density	Bank	Total Hospitals	Total number of schools
2001	981	573	119	992
2002	981	573	119	1002
2003	981	573	117	980
2004	981	573	117	1009
2005	981	573	117	1013
2006	981	695	117	1011
2007	981	695	117	1011
2008	981	695	117	1010
2009	981	695	121	1010
2010	981	695	111	1004
2011	1026	715	111	1004
2012	1026	715	110	1009
2013	1026	715	110	1009
2014	1026	715	110	1004
2015	1026	722	110	1004
2016	1026	722	110	1025
2017	1026	722	110	1030
2018	1031	722	93	1029
2019	1031	760	93	1029
2020	1031	760	93	1029
2021	1031	760	93	1029

Source: Economic Review 2001-2021



The table 4.18 shows that Thrissur district's agglomeration or spatial factors concerning with the steady growth in terms of total number of schools, density and banks. The number of hospitals shows a decreasing trend towards forming urban agglomeration.

**Figure 4.3**  
**Thrissur Agglomeration Factor**



Source: Economic Review:2001 to 2021.

The figure 4.3 shows the graphical illustration of agglomeration factors in Thrissur district of 2 decades of time periods where there is increase in the number of banks shows that the steady rate of increase in financial activities of the people which create agglomeration tendencies of the economy.

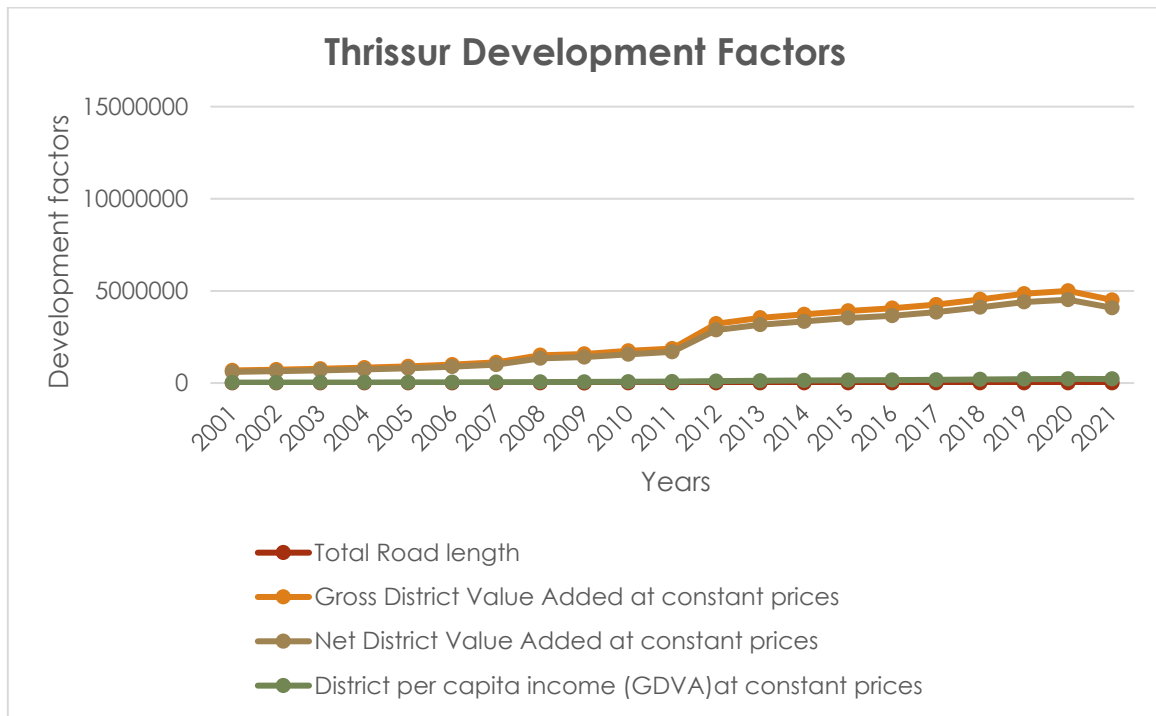
**Table 4.19**  
**Development (Sectoral) factors of Thrissur District**

<b>Year</b>	<b>Total Road length</b>	<b>Gross District Value Added at constant prices</b>	<b>Net District Value Added at constant prices</b>	<b>District per capita income (GDVA)at constant prices</b>
2001	1586	683828	606041	23555
2002	1586	724871	641168	25387
2003	1586	771137	688593	27881
2004	1586	831480	737202	30818
2005	1799	903502	797164	34559
2006	1778	998760	888235	39064
2007	1778	1120711	999510	45012
2008	1778	1505032	1339972	53887
2009	1259	1574749	1407069	61189
2010	1666	1745153	1556704	70699
2011	1666	1865294	1691398	78164
2012	2056	3216090	2880458	102751
2013	2056	3539517	3166507	122726
2014	2056	3724008	3345232	136117
2015	2056	3911989	3529173	150441
2016	2064	4058604	3653860	159480
2017	2064	4256953	3849315	173761
2018	2064	4540164	4111278	194114
2019	2064	4848143	4399454	212872
2020	2064	5000589	4522543	224855
2021	2064	4507892	4082910	219490

Source: Economic Review:2001 to 2021.

The table 4.19 depicts the values of development factors in Thrissur district which is considered as one of the important factors of urban agglomeration. The data shows a peculiar difference in the values between the development factors.

**Figure 4.4**  
**Thrissur Development (Sectoral) Factor**



Source: Economic Review:2001 to 2021.

The figure 4.4 shows the graphical representation of development factors in Thrissur district.

#### **4.5 FACTORS INFLUENCING URBAN AGGLOMERATION – SECTORAL OR DEVELOPMENT FACTORS – REGRESSION ANALYSIS**

The economic impact of urban agglomeration of the districts ( $Y_1$ ), regression analysis, has been conducted. For the analysis, independent variables were obtained through the factor analysis discussed in the previous section. The factors we call it as development factors are 1) total road length ( $X_1$ ), 2) Gross district value added at constant prices ( $X_2$ ), 3) Net district value added at constant prices ( $X_3$ ), 4) District per capita income (GDVA) at constant prices ( $X_4$ ).

The results of the regression are summarised in

**Table 4.20****Summary of Regression results**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin - Watson
1	0.300	0.090	0.078	3.878	0.126

**ANOVA**

Model	Sum of Square	Df	Mean Square	F	Sig.
1 Regression	431.084	4	107.771	7.166	0.000
residual	4346.416	289	15.040		
total	4777.500	293			

**Coefficients of the regression equation**

Model	Unstandardized coefficients			t	Sig
	B	Std. Error	Beta		
(constant)	10.795	0.759		14.228	0.000
Total road length	-0.001	0.000	-0.227	-3.114	0.002
Gross district value added at constant prices	-1.592	0.000	-5.828	-2.096	0.037
Net district value added at constant prices	1.757	0.000	5.848	2.120	0.035
District per capita income (GDVA) at constant prices	-3.585	0.000	-0.042	-0.416	0.678

Source: secondary data analysis

The model summary shows the correlation is 0.30, showing a positive correlation between dependent variables and predictors. The fitted regression equation can explain the 9 per cent variation in the independent variable. The ANOVA table reveals that the significance level is less than 0.05 ( $p=0.000$ ), and it can be concluded that the model fits the data well.

Table coefficients of the regression equation give the values of the predictors.

$$Y_1 = -0.001 X_1 + -1.592 X_2 + 1.757 X_3 + -3.585 X_4 + \mu$$

The association with the economic impact of urban agglomeration of the district and significant variables varies. When the total road length increases, it will affect the various districts urban agglomeration negatively. The theory of location developed by Alfred Weber(1909) emphasise the fact that if there is development of transport system (length of roads) there is reducing the agglomeration economies to the centre core of analysis. The factors

to agglomerate leads to a divergence, towards centre and periphery. When a certain size is reached, many positive elements become negative and this supports ‘Williamson hypothesis’ where agglomeration boosts GDP growth only up to a certain level of economic development. The gross district value added at constant prices increases, it will affect the impact of urban agglomeration of various districts negatively. While the net district value added at constant prices has positively affected the districts urban agglomeration phenomenon. The agglomeration economies are guided by the principle of lowest cost of inputs, there will be more scope of reducing the depreciation cost involved in the production process. This leads to the net district value added at constant prices has shown an upward trend.

#### 4.6 FACTORS INFLUENCING URBAN AGGLOMERATION – SPATIAL OR AGGLOMERATION FACTORS – REGRESSION ANALYSIS

The economic impact of urban agglomeration of the districts ( $Y_1$ ), regression analysis, has been conducted. For the analysis, independent variables were obtained through the factor analysis discussed in the previous section. The factors we call it as agglomeration factors are 1) total hospitals ( $X_1$ ), 2) bank ( $X_2$ )3) density ( $X_3$ ), 4) total number of schools ( $X_4$ ). The dependent variable is district in Kerala.

**Table 4.21**  
**Summary of Regression results**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin - Watson
1	0.528	0.279	0.269	3.452	0.123

#### ANOVA

Model	Sum of Square	Df	Mean Square	F	Sig.
1 Regression	1333.903	4	333.476	27.987	0.000
residual	3443.597	289	11.916		
total	4777.500	293			

### Coefficients of the regression equation

Model	Unstandardized coefficients			t	Sig
	B	Std. Error	Beta		
(constant)	9.482	0.711		13.335	0.000
Total hospitals	-0.046	0.015	-0.282	-3.066	0.002
Bank	-0.004	0.001	-0.197	-2.902	0.004
Density	-0.005	0.001	-0.424	-6.486	0.000
Total number of schools	0.008	0.001	0.632	7.515	0.000

Source: secondary data analysis

The model summary shows the correlation is 0.52, showing a positive correlation between dependent variables and predictors. The fitted regression equation can explain the 27.9 per cent variation in the independent variable. The ANOVA table reveals that the significance level is less than 0.05 ( $p=0.000$ ), and it can be concluded that the model fits the data well.

Table coefficients of the regression equation give the values of the predictors. Among the selected variables, the variables such as total hospitals ( $X_1$ ), bank ( $X_2$ ), density ( $X_3$ ) and total number of schools ( $X_4$ ) were found to be significant. So, by excluding the constant term, the equation with coefficients is represented below.

$$Y_1 = -0.046 X_1 + -0.004 X_2 + -0.005 X_3 + 0.008 X_4 + \mu$$

The association with the economic impact of urban agglomeration of the district and significant variables varies. When the total hospitals increase, it will affect the various districts urban agglomeration negatively. The researcher goes beyond 'the theory of cumulative causation' where the growth of tertiary sector (hospital, bank) leads to creating a growth pole which leads to invention and innovation of the like. The concentration pattern of development changes to diffused manner where the variables like hospitals and banks have reducing the effect of Urban Agglomeration. Likewise, bank and density increases, it will affect the extent of urban agglomeration of various districts negatively. The density of population shows that there is concentration of people in the fringe of city where land is cheaper and thereby reducing the effect of urban agglomeration at the centre (Alonso, 1964) thereby the services of tertiary sectors (banks and hospitals) have moving towards the direction which will cause a reduction

in urban agglomeration tendency of the centre. While the total number of schools has positively affected the districts urban agglomeration phenomenon. The knowledge spill over (Vernon, 1960) and (Marshall) emphasized the concept where there is scope for urban agglomeration.

## **Conclusion**

The chapter deals with the role of spatial and sectoral factors for the effect of urban agglomeration. The effect of urban agglomeration is increased due to the influence of spatial factors like density, number of hospitals, bank and total number of schools. The development of these parameters depicts the trend of urban expansion which will move to the peripheries for its further growth. The growth of development (sectored) factors are moving on the same pace of growth.

1. NSDP Rs. In Lakhs
2. Total hospitals numbers
3. Total road length (length of pwd roads in KM)
4. Total banks (number of commercial banks)
5. Density ( number per sq.km)
6. Total number of schools ( number of high schools)
7. Gross district value added at constant prices (Rs.in Lakhs)
8. Gross district value added at current prices(Rs.in Lakhs)
9. Net district value added at constant prices (Rs.in Lakhs)
10. Net district value added at current prices(Rs.in Lakhs)
11. District per capita income (GDVA) at constant prices (Rs.in Lakhs)
12. District per capita income (GDVA) at current prices (Rs.in Lakhs)
13. District per capita income (NDVA) at current prices (Rs.in Lakhs)
14. District per capita income (NDVA) at current price (Rs.in Lakhs)
15. Population ( No. in lakhs)

**CHAPTER 5**

**ASSESSMENT OF DETERMINING FACTORS  
FOR URBAN AGGLOMERATION IN  
THRISSUR DISTRICT**



## INTRODUCTION

For the assessment of determining factors of Thrissur district's urban agglomeration phenomenon, the primary survey from the households in various selected Census Towns, Statutory Town and Out Growth have collected for the analysis. This chapter deals with the analysis of data regarding the socio- economic and demographic profile, of different forms of Urban Agglomeration.

**Table 5.1.**  
**Distribution of Sample Area**

<b>Sample Area</b>	<b>Frequency</b>	<b>Percent</b>
Adat Census Town	54	11.7
Arimpur Census Town	52	11.3
Avinissery Census Town	53	11.5
Puthur Census Town	56	12.1
Thrissur Corporation (Statutory Town)	156	33.8
Eriyad Out Growth	90	19.5
<b>Total</b>	<b>461</b>	<b>100.0</b>

Source: Primary Data

The table 5.1 depicts the sample distribution of households in Adat Census Town, Arimpur Census Town, Avinissery Census Town, Puthur Census Town, Thrissur Statutory Town and Eriyad Out Growth. The total number of respondents is 461 accordingly 54 respondents from Adat Census Town, 52 respondents from Arimpur Census Town, 53 respondents from Avinissery Census Town, 56 respondents from Puthur Census Town, 156 respondents from Thrissur Statutory Town and 90 respondents from Eriyad Out Growth.

### **5.1 SOCIO-ECONOMIC AND DEMOGRAPHIC PROFILE OF THE RESPONDENTS**

This part of the chapter analyses the socio-economic and demographic profile namely, gender, age, marital status, religion, educational qualification, number of family members, monthly family income.

**Table 5.2.**  
**Marital Status of the respondents**

Source: Primary Data

Marital Status	Adat CT	Arimpur CT	Avinissery CT	Puthur CT	Thrissur ST	OG
married	53(98.1)	50(96.2)	51(96.2)	54(96.4)	128(82.1)	47(52.2)
unmarried	1(1.9)	2(3.8)	2(3.8)	2(3.6)	28(17.9)	33(36.7)
Divorcee	0	0	0	0	0	10(11.1)

Table 5.2 depicts the Marital Status of the respondents in different forms of urban agglomeration. The married respondents consist of 53 respondents from Adat Census Town, 50 respondents from Arimpur Census Town, 51 respondents from Avinissery Census Town, 54 respondents from Puthur Census Town, 128 respondents from Thrissur Statutory Town and 47 respondents from Eriyad Out Growth. The unmarried respondents consist of 1 respondent from Adat Census Town, 2 respondents from Arimpur Census Town, Avinissery Census Town and Puthur Census Town. There are 28 unmarried respondents from Thrissur Statutory Town and 33 unmarried and 10 divorcee respondents from Eriyad Out Growth.

**Table 5.3.**  
**Religion of the respondents**

Religion	Adat CT	Arimpur CT	Avinissery CT	Puthur CT	Thrissur ST	OG
Hindu	36(66.7)	35(67.3)	35(66.0)	38(67.9)	52(33.3)	64(71.1)
Muslim	1(1.9)	1(1.9)	1(1.9)	1(1.8)	55(35.3)	14(15.6)
Christian	17(31.5)	16(30.8)	17(32.1)	17(30.4)	49(31.4)	12(13.3)

*Source: Primary Data*

*Figures in Parentheses represent the percentage*

The table 5.3 shows that majority of the respondents are belonging to Hindu religion except Thrissur Statutory Town, where 33.3 per cent of respondents are belonging to Hindu religion, 35.3 per cent of respondents are belonging to Muslim religion and 31.4 per cent respondents are belonging to Christian religion.

**Table 5.4**  
**Occupational Structure of the Head of the family**

<b>Occupational Structure</b>	<b>Adat CT</b>	<b>Arimpur CT</b>	<b>Avinissery CT</b>	<b>Puthur CT</b>	<b>Corporation ST</b>	<b>Out Growth</b>
Agricultural Labour	6(11.1)	4(7.7)	5(9.4)	6(10.7)	1(0.6)	2(2.2)
Unskilled Non-Agricultural Labour	1(1.9)	2(3.8)	2(3.8)	2(3.6)	1(0.6)	4(4.4)
Employment In Govt./Semi.Govt. Service	15(27.8)	16(30.8)	14(26.4)	1(1.8)	30(19.2)	3(3.3)
Private Sector	28(51.9)	27(51.9)	27(50.9)	15(26.8)	4(2.6)	19(21.1)
Urban Shop Service	2(3.7)	2(3.8)	2(3.8)	29(51.8)	3(1.9)	29(32.2)
Business In Urban Area	1(1.9)	1(1.9)	2(3.8)	2(3.6)	48(30.8)	28(31.1)
Others	1(1.9)	0	1(1.9)	1(1.8)	1(0.6)	3(3.3)

Source: Primary Data

*Figures in Parentheses represent the percentage*

As per table 5.4, the occupational Structure of the family head consists of variations in the occupation of different categories. The Agricultural Labour is highest in Adat census town and lowest in Thrissur Statutory Town. In the case of unskilled non-agricultural labour is highest in Out Growth and lowest in Thrissur Statutory Town. The highest per cent of 30.8 is in Arimpur Census Town and lowest per cent of 1.8 is in Puthur Census Town. The private sector occupation is highest in both Adat CT and Arimpur CT whereby only 2.6 per cent are in Thrissur Statutory Town. In urban shop service, the majority of the respondents are belonging to Puthur CT and 32.2 per cent of respondents are settled in Out Growth.

**Table 5.5**  
**Social Group of the respondent**

<b>Social Group</b>	<b>Adat CT</b>	<b>Arimpur CT</b>	<b>Avinissery CT</b>	<b>Puthur CT</b>	<b>Corporation ST</b>	<b>Out Growth</b>
SC	1(1.9)	2(3.8)	2(3.8)	2(3.6)	0	22(24.4)
OBC	29(53.7)	29(55.8)	28(52.8)	30(53.6)	52(33.3)	30(33.3)
General	24(44.4)	21(40.4)	23(43.4)	24(42.9)	104(66.7)	26(28.9)
ST	0	0	0	0	0	10(11.1)
Others	0	0	0	0	0	2(2.2)

Source: Primary Data

*Figures in Parentheses represent the percentage*

According to the table 5.5 OBC category of the social group in the four census towns constitutes about 53.7, 55.8, 52.8, 53.6, 33.3 and 33.3 respectively. The general category of social group includes the per cent of 44.4, 40.4, 43.4, 42.9, 66.7 and 28.9 respectively. In the Out Growth the Scheduled tribes constituted about 11.1 per cent.

**Table 5.6**  
**Social Association of the respondent**

<b>Social Associations</b>	<b>Adat CT</b>	<b>Arimpur CT</b>	<b>Avinissery CT</b>	<b>Puthur CT</b>	<b>Corporation ST</b>	<b>Out Growth</b>
Nil	33(61.1)	31(59.6)	32(60.4)	34(60.7)	55(35.3)	11(12.2)
Self Help Group	4(7.4)	3(5.8)	3(5.7)	4(7.1)	0	10(11.1)
Political Association	1(1.9)	1(1.9)	1(1.9)	1(1.8)	49(31.4)	13(14.4)
Youth Club	1(1.9)	1(1.9)	1(1.9)	1(1.8)	21(13.5)	31(34.4)
Resident Association	14(25.9)	14(26.9)	14(26.4)	14(25.0)	3(1.9)	8(8.9)
Religious Association	0	0	0	0	28(17.9)	15(16.7)
Others	1(1.9)	2(3.8)	2(3.8)	2(3.6)	0	2(2.2)

Source: Primary Data

The table 5.6 depicts about the various associations of the respondents included. In the Statutory Town, 35.3 per cent have not included in any of the associations and 17.9 per cent included in religious association. In the four census towns, a greaternumber of respondents are included in resident associations.

**Table 5.7**  
**Category of the respondent**

<b>Category</b>	<b>Adat CT</b>	<b>Arimpur CT</b>	<b>Avinissery CT</b>	<b>Puthur CT</b>	<b>Corporation ST</b>	<b>Out Growth</b>
APL	47(87.0)	46(88.5)	46(86.8)	48(85.7)	156(100)	58(64.4)
BPL	7(13.0)	6(11.5)	7(13.2)	8(14.3)	0	32(35.6)

Source: Primary Data

*Figures in Parentheses represent the percentage*

In the table 5.7 shows that the APL families constituted the majority of the sample respondents.

**Table 5.8**  
**Educational qualification of the respondent**

Category	Adat CT	Arimpur CT	Avinissery CT	Puthur CT	Corporation ST	Out Growth
Primary	0	0	0	0	0	5(5.6)
SSLC	2(3.7)	4(7.7)	4(7.5)	4(7.1)	3(1.9)	4(4.4)
degree	22(40.7)	18(34.6)	20(37.7)	21(37.5)	55(35.3)	18(20.0)
PG	1(1.9)	1(1.9)	1(1.9)	1(1.8)	77(49.4)	49(54.4)
Professional	29(53.7)	29(55.8)	28(52.8)	30(53.6)	21(13.5)	9(10.0)
others	0	5.6	5.6	0	0	0

Source: Primary Data

The table 5.8 depicts the educational qualification of respondents in the given sample areas and shows that 53.7, 55.8, 52.8, 53.6, 13.5 and 10 per cent are included in Professional educational qualification in Adat CT, Arimpur CT, Avinissery CT and Puthur CT as well as the Corporation and Out Growth respectively. The degree qualified respondents constituted about 40.7, 34.6, 37.7, 37.5, 35.3 and 20 per cent respectively.

**Table 5.9**  
**Ownership of the house of the respondent**

Category	Adat CT	Arimpur CT	Avinissery CT	Puthur CT	Corporation ST	Out Growth
Rent	2(3.7)	2(3.8)	2(3.8)	2(3.6)	77(49.4)	12(13.3)
Owned	31(57.4)	33(63.5)	32(60.4)	34(60.7)	79(50.6)	49(54.4)
Family Ownership	21(38.9)	17(32.7)	19(35.8)	20(35.7)	0	29(32.2)

Source: Primary Data

The table 5.9 depicts about the ownership of the house whereby in Statutory Town, rented families consists of 49.4 per cent. In the four census towns, there is about 57.4, 63.5, 60.4, and 60.7 per cent have their own house respectively.

## **5.2 FACTORS DETERMINING THE URBAN AGGLOMERATION PROCESS**

The factors determining the process of urban agglomeration are numerous out of which some decisive factors are enumerated as follows:

### 5.2.1 The Relocation Process

The important factor of Urban Agglomeration process can be determined by way of shifting of population towards census towns since these areas are developed very faster. With regard to this phenomenon, we have concluded that the Sample Census Towns have more urbanised facilities and the households from Statutory Towns have shifted to these places for permanent settlement. The peripheries needed more attention towards the urban agglomeration process.

**Table 5.10**  
**The process of Relocation**

Category	Adat CT	Arimpur CT	Avinissery CT	Puthur CT	Corporation ST	Out Growth
No Relocation	35(64.8)	31(59.6)	32(60.4)	35(62.5)	28(17.9)	53(58.9)
Within 20 Km	3(5.6)	4(7.7)	3(5.7)	4(7.1)	46(29.5)	2(2.2)
Within 10 Km	2(3.7)	2(3.8)	1(1.9)	2(3.6)	23(14.7)	7(7.8)
From The City Area	9(16.7)	11(21.2)	12(22.6)	11(19.6)	0	22(24.4)
From Another District	5(9.3)	4(7.7)	5(9.4)	4(7.1)	56(35.9)	6(6.7)
From other state	0	0	0	0	3(1.9)	0

Source: Primary Data

*Figures in Parentheses represent the percentage*

The table 5.10. explains that from Adat Census Towns, the number of households not relocated are 35, Arimpur Census Towns 31, Avinissery Census Towns 32 and Puthur Census Towns 35, Corporation 28 and Out Growth it is 53. From the city area the number of households shifted to Adat Census Towns are 9 to Arimpur Census Towns it is 11 to Avinissery Census Towns 12 to Puthur Census Towns it is 11 to Corporation it is 0, to Out Growth it is 22 households.

**Table 5.11**  
**Chi Square Test for Association between the process of Re-location and the different form of Urban agglomeration**

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	190.320 <sup>a</sup>	25	.000
Likelihood Ratio	214.131	25	.000
Linear-by-Linear Association	10.099	1	.001
N of Valid Cases	461		

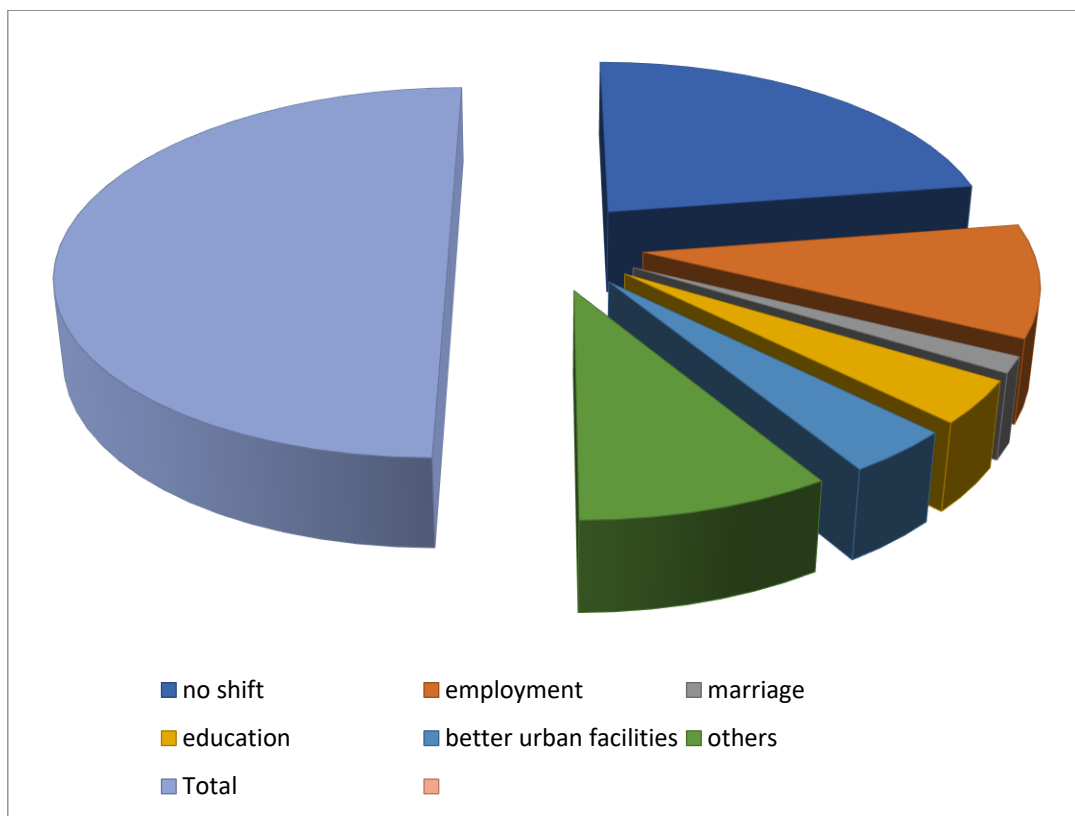
*Chi square test of independence is used to test whether two variables are independent of each other. In the present study the test is used to analyse the significance of association between sample areas and the areas of relocation happened.*

H0: there is no association between sample areas and shifting factor. The p value is 0.000 which is less than 0.05, hence the H0 is rejected at 5% level of significance. The Phi coefficient have the value 0.643 which infer that there is high association between the process of relocation and the new census towns which is imperative factor for contributing the process of urban agglomeration. Census towns are the areas where there are enough urbanised facilities so that shift occurs due to so many reasons. More households are shifting to Out Growth due to the reason of highly urbanised facilities.

**5.2.1.1 The reasons for the shift of households towards the census towns and out growth**

The shift of households towards the census towns and out growth shows that there are various reasons for the shift. These are employment, marriage, education, better urban facilities and others.

**Figure 5.1**  
**Factors of Relocation**



Source: primary data

### 5.2.2 The distance from the Statutory Town

**H0: The distance from the core city is not significant for the analysis of urban agglomeration**

In order to analyse the significance of distance from the core city for the urban agglomeration, one sample t' test is conducted. The result is given in the following table:

**Table 5.12**  
**The factor of Distance towards the Process of relocation- One Sample t' test**

Label	Observations N	Mean	SD	Degree of freedom	t stat	P value
The distance from the core city	461	12.5976	13.05045	460	12.500	0.000***

**Source: Primary Data** \*\*\* significant at 5% level

The table explains that the distance from the city heart to the place of residence is a significant factor in determining permanent settlement or the process of Urban Agglomeration. The above table reveals the result of One Sample 't-Test: conducted to analyse whether the distance from the core city will significantly contribute to the urban agglomeration of the areas. The p value is 0.000 which is less than 0.05, hence the H0 is rejected at 5% level of significance. Therefore, it is evident that there is significant of distance from the core city for contributing to the process of relocation towards different forms of Urban areas.

So, there is a question behind the process of urban agglomeration that the distance is a significant factor for relocation so that what is reason for shifting households towards the census towns and out growth areas.

### 5.2.3 Different Levels of Income Between Different Areas

One way ANOVA has been calculated by bifurcating the difference in the income of three defined urban areas.

**Table 5.13**  
**Descriptive Statistics of Monthly income**

Sample Area	N	Mean	Std. Deviation	Minimum	Maximum
Census towns	215	45326.51	23987.606	3000	205000
Statutory town	156	88105.77	47980.137	12000	205000
Out Growth	90	34711.11	20246.928	8000	100000
Total	461	57730.37	40139.706	3000	205000

Source: Primary Data

The table 5.13 depicts the descriptive statistics of monthly income of respondents in the three defined urban areas of classification. Accordingly, there is difference in the mean score of income of three defined urban areas as census towns, statutory town and out growth.



The H0: there is no significance difference between monthly income of three defined urban areas of consideration. Likewise, the ‘F’ statistic is 99.637, the significance level is less than 0.05 (P=0.000) and H0 is rejected at 5 per cent level of significance. There it is concluded that there is significant difference between monthly income of three defined urban area.

**Table 5.14**

**Monthly income of Out Growth, Census Towns and Statutory Town- One way ANOVA**

<b>Sample Areas</b>	<b>N</b>	<b>1</b>	<b>2</b>	<b>3</b>
<b>Out Growth</b>	90	<b>34711.11</b>		
<b>Census towns</b>	215		<b>45326.51</b>	
<b>Statutory town</b>	156			<b>88105.77</b>
<i>Sig.</i>		<i>1.000</i>	<i>1.000</i>	<i>1.000</i>

Source: Primary Data

The table 5.14 depicts the fact that as per Duncan test is analysed, there is significant difference of monthly income of three urban areas. The lowest income is belonging to Out Growth area and highest income is belonging to Statutory town area. This is inferred from the table by analysing one way ANOVA with Duncan test of difference between the different groups of sample areas of classification.

#### **5.2.4. Perceptions of Households towards the Urban Agglomeration process**

The study of human perception gained momentum in the post 1970’s in geographical studies. The study of perception was a part of the Humanistic approaches which has more relevance in the behavioural economics which combines the elements of Economics and Psychology to understand how and why people behave the way in which studies the effects of psychological, cognitive, emotional, cultural and social factors on the decisions of individual. The knowledge of our surroundings was perceived through the senses and regulated by the process of the human mind (Kirk, 1963) and (Bookfield, 1969 and Searinen, 1974). It was the behavioural and not the objective environment that provided the basis for human behaviour and decision making (Kirk, 1963).

The present study endeavours to analyse the cognitive pattern of the residents on some eight indices of measurement of urban agglomeration of Thrissur district’s Statutory town, Census Town and Out Growth. Perception patterns are analysed through the basic understanding of the behavioural pattern of residents in respect to their opinions of 461 respondents each belonging to different income groups through structured questionnaires covering all the sample areas concerned. Finally, the study is statistically justified by the measuring the economic impact of urban agglomeration.

The respondents have grouped into various strata namely, Statutory Towns, Census Towns and Outgrowth of Thrissur district. Here the researcher focuses upon various amenities of their area according to education, health, transport, communication, investment climate and miscellaneous facilities.

For analysing the impact of urban agglomeration, there are various Liker scale statements showing the perceptions of households living in the particular area. The score of each statement varies from 5 to 1 i.e., strongly agree to strongly disagree. This analysis can be done by Kendall’s W Statistic. Kendall’s W Statistic (coefficient of Concordance) is a non-Parametric statistic used to assess agreement between different rates, and ranges from 0 to 1. ‘Zero’ is no agreement at all between rates, while ‘one’ is perfect agreement. These perceptions about urban agglomerations are cost of living, social, economics, environment, health, quality of life, financial inclusion and awareness and finally women empowerment.

#### 5.2.4.1. Cost Of Living Index

The index of measurement is cost of living in three different sample areas concerned. The statements showing different perceptions of households towards ranking their attitudes towards urban agglomeration concerned. The statements are given according to the five point Likert scaling technique.

**Table 5. 15**  
**Cost Of Living Index**

<b>COST OF LIVING INDEX</b>	<b>Mean Rank</b>
The construction of houses requires high cost of materials	4.71
There is enough space for housing structures	2.96
The location of housing is influenced by urban agglomeration	6.03
<b>The price of land is increased due to the level of urban agglomeration</b>	<b>7.21</b>
<b>People prefer to live in a locality of high level of development of urbanised facilities</b>	<b>6.80</b>
The cost of living varies from locality to locality	4.10
<b>The regional development is related positively with urban agglomeration</b>	<b>6.79</b>
The farther away from the city reduces the effect of urban agglomeration	3.84
There is enough accessibility of transportation facilities	6.03
Density of a place is related to the degree of urban agglomeration	6.53

Source: Primary Data Analysis

In the case of cost-of-living index, the highest mean score is attained in the case of price of land is increased due to the level of urban agglomeration, the second highest mean score goes to the development of regions and density increases due to urban agglomeration.

**Table 5.16**  
**Kendall's Coefficient of Concordance of Cost-of-Living index**

N	461
Kendall's W <sup>a</sup>	.323
Chi-Square	1339.712
Df	9
Asymp. Sig.	.000

Source: Primary Data Analysis

According to the analysis given by Kendall's Coefficient of concordance, the K value is reliable and significant and differential ranking is possible in this situation.

#### 5.2.4.2. Social Index

Social factors also contributing towards urban agglomeration. The researcher goes to each respondents' perception towards the living in their areas where there enough availability of social factors.

**Table 5.17**  
**Social Index**

SOCIAL INDEX	Mean Rank
The accessibility of social services varies from region to region	4.35
<b>High development of roads leads to better economic development of the region</b>	<b>6.60</b>
The urban life is very useful in participating in the social gatherings	5.95
<b>There are always better accessibilities of good communication network</b>	<b>6.68</b>
The increase in the number of buildings influencing the higher land rents of particular locality	4.62
Educational attainment involves gender equality	4.09
<b>There are better consumption varieties of food</b>	<b>7.79</b>
There is rise in the growth of private educational institutions providing good quality education	5.00
Modernisation leads to high life style	5.35
The fees of educational attainment are highest in the city area	4.57

Source: Primary Data Analysis

There are better consumption varieties of food and there is better communication network for accessing all the technique of modern life style. The next highest mean score is given to the high development of roads leads to better economic development of the region.

**Table 5.18**

**Kendall's Coefficient of Concordance of Social Index**

N	461
Kendall's W <sup>a</sup>	.225
Chi-Square	934.372
df	9
Asymp. Sig.	.000

Source: Primary Data Analysis

In the social index, Kendall's value is significant and reliable and there is differential ranking is possible in all the circumstances under consideration in all the different forms of Urban Agglomeration

**5.2.4.3. Economic Index**

Economic index should be considered as one of the important indicators for economic impact of urban agglomeration. Here the highest mean rank goes to highly adequate investment opportunities in the area concerned. This will also further capital formation and stimulus to economic growth.

**Table 5.19**

**Economic Index**

<b>ECONOMIC INDEX</b>	<b>Mean Rank</b>
<b>High development of roads leads to balanced regional development</b>	<b>4.31</b>
Increase the wage rate of daily workers	3.96
<b>Highly diversified economic activities</b>	<b>4.28</b>
High tax rate in urban areas	2.78
Increase the quality level of technological advancements	3.84
High physical infrastructure	3.81
<b>Adequate investment opportunities</b>	<b>5.02</b>

Source: Primary Data Analysis

There are adequate investment opportunities which in turn reflects the development of the area and thereby all the benefits of Urban Agglomeration can be utilised. The high development of roads leads to balanced regional development as well as highly diversified economic activities. The connectivity channel of Urban Agglomeration is density, population

and economic activities thereby fulfilling all the perceptions about households towards the economic index.

**Table 5.20**  
**Kendall's Coefficient of Concordance of Economic Index**

N	461
Kendall's W <sup>a</sup>	.145
Chi-Square	401.662
df	6
Asymp. Sig.	.000

Source: Primary Data Analysis

Kendall's value is significant and reliable thereby differential ranking is possible in the perceptions about economic living of the households.

#### 5.2.4.4. Environment Index

In recent days, environment motives can raise the world, so that the indicators are also equally important.

**Table 5.21**  
**Environment Index**

Environment Index	Mean Rank
Air pollution is high due to the increase of vehicles	5.92
There are adequate methods of waste disposal	4.65
<b>Environmental sustainability is the vision of our future</b>	<b>6.11</b>
Green economy initiative is reachable at all levels	4.99
Environmental quality is adequate	5.40
<b>Hygienic environment leads to healthy living</b>	<b>6.49</b>
Proper disposal of e-waste	5.02
Proper sewerage disposal	5.47
Availability of pure drinking water	5.03
<b>Availability of fertile land for cultivation purposes</b>	<b>5.93</b>

Source: Primary Data Analysis

The table 5.22 infer that the highest mean score is given to the hygienic environment of the urban area is concerned, where the second highest rank is given to the sustainability of the environment.

**Table 5.22**  
**Kendall's Coefficient of Concordance of environment index**

<b>Environment Index</b>	
N	461
Kendall's W <sup>a</sup>	0.051
Chi-Square	209.975
Df	9
Asymp. Sig.	.000

Kendall's value is significant and reliable thereby differential ranking is possible in the perceptions about environment living of the households.

#### **5.2.4.5. Health Index**

Kerala stands highest in health efficiency. The study also put emphasis upon creating a healthy atmosphere where there is high advancement of medical facilities.

**Table 5.23**  
**Health Index**

<b>HEALTH INDEX</b>	<b>Mean Rank</b>
<b>High advancement of medical facilities</b>	<b>5.84</b>
<b>The medical expenditure of the family decreases due to the adequate medical facilities in government sector</b>	<b>5.56</b>
<b>Life style diseases are increasing</b>	<b>5.24</b>
High awareness about the regular medical check up	5.07
Environment and health indices are related each other	3.97
Adequate number of multi-speciality hospitals	2.94
Strengthening the health scenario	4.19
High investment of old age homes in the private sector	3.18

Source: Primary Data

The highest mean rank is related to the high advancement of medical facilities and second highest mean rank is the medical expenditure of the families have decreased due to high development of medical facilities especially in Government Sector and life style diseases are increasing due to the awareness of work outs and proper diet management system.

Kendall's value is significant and reliable thereby differential ranking is possible in the perceptions about healthy living of the households.

**Table 5.24**

**Kendall's Coefficient of Concordance of Health Index**

N	461
Kendall's W <sup>a</sup>	.242
Chi-Square	781.002
Df	7
Asymp. Sig.	.000

**5.2.4.6. Quality Of Life Index**

One of the agenda of development goals is to create quality atmosphere for its citizens. The study is also taken seriously for achieving its goal.

**Table 5.25**

**Quality Of Life Index**

<b>QUALITY OF LIFE INDEX</b>	<b>Mean Rank</b>
Urbanised life gives the opportunity for people to use their personal space	2.97
Urbanised life gives more physical safety and security	3.90
<b>Urbanised life gives more participation in voluntary organisations (clubs and other social gatherings)</b>	<b>5.47</b>
<b>Urbanised life promotes good relationships and daily interaction between people by providing civic buildings and public gathering places</b>	<b>4.89</b>
Urbanised life increases my financial knowledge and skills, access to safe and affordable financial products and economic resources	3.90
Urbanised life gives me more exposure to develop myself and my profession	4.61
Preserve resources and minimize energy demand by taking energy saving technologies	4.54
<b>Urbanised life allows participation opportunities for recreation/leisure activities in parks, malls etc.</b>	<b>5.72</b>

Source: Primary Data Analysis

The urban life allows participation in the opportunities for recreation/leisure activities in parks, malls etc. the second highest mean rank goes to urban life gives me more participation in voluntary organisations and also urban life gives more exposure to develop myself and my profession.

Kendall's value is significant and reliable thereby differential ranking is possible in the perceptions about quality of life of the households.

**Table 5.26**

**Kendall's Coefficient of Concordance of Quality Of Life Index**

N	461
Kendall's W <sup>a</sup>	.190
Chi-Square	611.872
df	7
Asymp. Sig.	.000

**5.2.4.7. Financial Inclusion And Awareness Index**

The study of urban agglomeration is not effective if there is no motive for financially included and awareness of the people belongs to each category of area. Accordingly, they are given highest mean rank to the statement showing that banking procedures are easily handled by the respondents.

**Table 5.27**

**Financial Inclusion and Awareness Index**

<b>FINANCIAL INCLUSION AND AWARENESS INDEX</b>	<b>Mean Rank</b>
The households avail adequate banking services	5.64
<b>Banking procedures are easily handled by the households</b>	<b>6.80</b>
<b>Investment avenues are fully utilised</b>	<b>6.40</b>
There is most modern way of mobilising funds	4.77
Most modern technique of financial services is utilised	4.53
Better investment climate needs better awareness	4.53
Decrease in the overall saving rate of the household	3.87
Financial inclusion and financial instruments are well practiced in urban areas	6.13
There is efficiency of banking awareness among households	5.95
<b>The online financial services could be fully reached</b>	<b>6.36</b>

Source: Primary Data Analysis

The banking procedures are easily handled by the households and second highest mean rank is investment avenues are fully utilised. The third highest mean rank is given to the online financial services could be fully reached.



**Table 5.28**

**Kendall's coefficient of concordance Financial Inclusion and Awareness Index**

<b>FIAI</b>	
N	461
Kendall's W <sup>a</sup>	.160
Chi-Square	661.900
df	9
Asymp. Sig.	.000

Kendall's value is significant and reliable thereby differential ranking is possible in the perceptions about financial inclusion and awareness of the households.

**5.2.4.8. Women Empowerment Index**

The final index of measuring impact of urban agglomeration is relying upon women empowerment which is one of the important objectives of modern era. The highest rank goes to high involvement of women in new investment avenues.

**Table 5.29**

**Women Empowerment Index**

<b>WOMEN EMPOWERMENT INDEX</b>	<b>Mean Rank</b>
There is increase in the proportion of employed women to total employment	4.26
Women participation to economic activities is high	4.49
The deposit mobilisation of unskilled women workers contributes more	3.97
Availability of adequate resources (money and materials) within the purview of women	4.32
<b>The women membership to social groups increases largely</b>	<b>5.21</b>
All the female members are fully aware about banking procedures.	3.83
<b>High involvement of women in new investment avenues.</b>	<b>4.97</b>
<b>Women participation to online shopping shows an increasing trend.</b>	<b>4.95</b>

Source: Primary Data Analysis

The highest mean score is that the women membership to social groups increases and there is high involvement of women in new investment avenues and the women participation to online shopping shows and increasing trend.

**Table 5.30**

**Kendall's coefficient of concordance Women Empowerment Index**

<b>WOMEN EMPOWERMENT INDEX</b>	
Kendall's W <sup>a</sup>	.054
Chi-Square	175.746
df	7
Asymp. Sig.	.000

Source: Primary Data Analysis

The K value is significant and reliable. We have to go for differential ranking for the perceptions of households living in the three forms of urban agglomeration.

**Conclusion**

The chapter consists of assessing the determining factors of urban agglomeration in Thrissur District. For assessing the factors related to Urban Agglomeration, there are so many reasons for the households to shift from the main city area to nearby Census Towns. The description of monthly income between the three forms of Census Towns, Statutory Towns and Out Growth shows that there are variations in the three forms. So, the study investigates into the various perceptions of households towards the living in their own area with regard to the cost of living, social conditions, economic viability, health scenario, environmental sustainability, quality of life, financial inclusion as well as women empowerment in all the participations.

**CHAPTER 6**

**DIRECTION OF THE EXTENT OF URBAN  
AGGLOMERATION**

## **INTRODUCTION**

The study of urban agglomeration is relying upon the direction of the extent of urban agglomeration towards the sample areas concerned. It shows how the spatial and sectoral parameters of importance have influenced the directions to which the extent of urban agglomeration is happening in the study areas.

### **6.1 DIRECTION OF THE EXTENT OF URBAN AGGLOMERATION**

The third objective is concerned with the direction of the extent of urban agglomeration on the basis of indicators namely, number of banks, number of schools, number of hospitals, density of the area, the total road length, total income of the area and per capita income. After assessing the determining factors of Urban Agglomeration in Thrissur District, the researcher is constructing the direction of the extent of Urban Agglomeration for measuring the direction towards the spatial and sectoral parameters are moving on towards further development of the area concerned.

The methodology to develop the index of Urban Agglomeration is referred with the degree of Urban Primacy in the State Urbanisation Report (2012) of Department of Town and Country Planning, Kerala. Primacy of an urban area can be assessed based on the primacy ratio. Its value ranges between 0 to infinity, if the primacy of an urban area is above 1, it indicates more than 50% of the total urban population in the region is concentrated in that particular urban area and if it is 0, the area selected is no longer an urban (zero urban population there). The primacy ratio of an urban area =  $(\text{population of the urban area}) / (\text{total urban population of the region} - \text{population of the urban area})$ .

### **6.2 CONSTRUCTION OF THE DIRECTION OF THE EXTENT OF URBAN AGGLOMERATION**

The researcher is using multiplicative model where by the base of these values are considered the values in the Thrissur Corporation (Statutory Town) as mentioned in earlier section. The major parameters considered is the number of banks, number of schools, number of hospitals and density in the sample area as spatial or agglomeration factors of urban agglomeration.

On the other side, the major sectoral or development factors of urban agglomeration is concerned with total road length, total income and per capita income in the study areas concerned. In the study of urban agglomeration, both the factors together determining the economic impact and extent of urban agglomeration.

**Table 6.1**  
**Spatial and Sectoral parameters of Urban Agglomeration**

Sl.No.	Sample Area	Bank (No's)	School(No's)	Density(Per Sq.Km)	Hospital(No's)	Road Length(Km)	Total Income(Rs. In	Percapita Income
1	Adat	12	5	1376.96	1	23.22	20808571	93436
2	Arimpur	5	3	1425.7	0	22.65	42370174	90816
3	Avinissery	3	3	2775.83	0	7.82	28929272	64629
4	Puthur	6	5	961	0	79.07	66250898	60536
5	Eriyad	12	3	2758.99	1	16.75	5939845	70451
6	Thrissur Statutory Town	36	16	3100	39	101.42	66300000	213799

Secondary Data

From the table 6.1., it is cleared that the parameters mentioned above shows that the researcher makes use of it and construct the direction of the extent of urban agglomeration.

### 6.3 MEASUREMENT OF THE DIRECTION OF THE EXTENT OF URBAN AGGLOMERATION

The value of each of the parameter is given and accordingly, the overall (spatial and sectoral) dimension is measured on the basis of each of the census towns and one out growth in Thrissur District. The maximum value for this index should be one. So, actually the higher the value, greater is the extent of urban agglomeration towards that area and so ranked it. Based on that value can tell that to which direction urban agglomeration has occur. The ranking order is based on the direction of the extent of urban agglomeration.

#### 6.3.1 Adat Census Town

Adat is a census town in Thrissur district with an area of 6.91 sq.km, located 9 km from the Thrissur city. The total population in Adat Census Town is 31973 and consists of 7781 households. The total wards in Adat Census Town are 18. The density is 1376.96. The total income of Adat CT is Rs. 20808571 and per capita income is Rs. 93436. So here, the Adat Census Town is ranked according to the given model of parameters as base of the value is given by the Thrissur Statutory Towns (Thrissur Corporation).

#### Multiplicative Model of Adat Census Town

$$\frac{\text{Adat CT Bank}}{\text{Thrissur ST Bank}} \times \frac{\text{Adat CT school}}{\text{Thrissur ST school}} \times \frac{\text{Adat CT hospital}}{\text{Thrissur ST hospital}} \times \frac{\text{Adat density}}{\text{Thrissur ST density}} \\ \times \frac{\text{Adat road length}}{\text{Thrissur ST road length}} \times \frac{\text{Adat total income}}{\text{Thrissur ST total income}} \\ \times \frac{\text{Adat per capita income}}{\text{Thrissur ST per capita income}}$$

$$\frac{12}{36} \times \frac{5}{16} \times \frac{1}{39} \times \frac{1376.96}{3100} \times \frac{23.22}{101.42} \times \frac{20808571}{66300000} \times \frac{93436}{213799} =$$

$0.33 \times 0.3125 \times 0.0256 \times 0.44418 \times 0.2289 \times 0.31385 \times 0.4370 = \mathbf{0.00003681}$
--

Source: Scholar's own Calculation

The multiplicative model signifies the fact that the combined effect of both the agglomeration factor (Spatial) and Development (Sectoral) factors have contributed towards the construction of the index concerning with the direction of extent of Urban Agglomeration

in Adat Census Town. The value of **0.00003681** depicts that there is not much extent of Urban Agglomeration towards the north direction of Thrissur district. The extent of development towards the north direction is calculated with respect to the presence of indicators constructed by the researcher for analysing the convergence of urban agglomeration to the Adat CT and with the divergence of its effect upon all the areas of Adat Census Towns are concerned.

### 6.3.2 Arimpur Census Town

Arimpur is one of the Census Towns in Thrissur districts which is another sample areas in the present study. It represents the Anthikkad Block of west direction of Thrissur district. The total area in the census town is 22.65 sq.km. and the total population is 32292 and consists of 7959 households. The total wards in Arimpur Census Towns are 17. The density of population is 1425.7. The total income of the Arimpur CT is Rs. 42370174 and the per capita income is Rs. 90816.

#### Multiplicative Model of Arimpur Census Town

$$\begin{aligned} & \frac{\text{Arimpur CT Bank}}{\text{Thrissur ST Bank}} \times \frac{\text{Arimpur CT school}}{\text{Thrissur ST school}} \times \frac{\text{Arimpur CT hospital}}{\text{Thrissur ST hospital}} \times \frac{\text{Arimpur density}}{\text{Thrissur ST density}} \\ & \times \frac{\text{Arimpur road length}}{\text{Thrissur ST road length}} \times \frac{\text{Arimpur total income}}{\text{Thrissur ST total income}} \\ & \times \frac{\text{Arimpur per capita income}}{\text{Thrissur ST per capita income}} \\ & = \frac{5}{36} \times \frac{3}{16} \times \frac{0}{39} \times \frac{1425.7}{3100} \times \frac{22.65}{101.42} \times \frac{42370174}{66300000} \times \frac{90816}{213799} \end{aligned}$$

0.1388 × 0.1875 × 0 × 0.45990 × 0.223328 × 0.63906 × 0.42477 = 0
--

Source: Author's own Calculation

The table 6.3 shows that the parameters of influence including the number of hospitals together determining the construction of the direction of the extent of urban agglomeration as zero, which infer that as one of the spatial factors of urban agglomeration is absent, the combined effect of the extent (Convergence) do not influence the development of the area. Rather, the model is opted for exclusion principle of the particular factor concerned. So here the researcher is excluding its influence upon the construction of Multiplicative model and reconstruct it with excluding the number of hospitals in the Census Town. The new model will become more effective for concerning the combined influence of both spatial and

sectoral factors influencing the convergence and divergence of urban agglomeration of the study area.

### **Reconstruction of Multiplicative Model of Arimpur Census Town**

$$\begin{aligned} & \frac{\text{Arimpur CT Bank}}{\text{Thrissur ST Bank}} \times \frac{\text{Arimpur CT school}}{\text{Thrissur ST school}} \times \frac{\text{Arimpur density}}{\text{Thrissur ST density}} \\ & \times \frac{\text{Arimpur road length}}{\text{Thrissur ST road length}} \times \frac{\text{Arimpur total income}}{\text{Thrissur ST total income}} \\ & \times \frac{\text{Arimpur per capita income}}{\text{Thrissur ST per capita income}} \end{aligned}$$

Source: Author's own Calculation

Which is equal to

$$= \frac{5}{36} \times \frac{3}{16} \times \frac{1425.7}{3100} \times \frac{22.65}{101.42} \times \frac{42370174}{66300000} \times \frac{90816}{213799}$$

$$0.1389 \times 0.1875 \times 0.45990 \times 0.223328 \times 0.63906 \times 0.42477 = \mathbf{0.00143804}$$

The table 6.3.1 depicts the calculation of the indices of measurement of the direction of the extent of urban agglomeration on the basis of the parameters of influence with excluding the spatial factor of influence i.e., hospitals in the present analysis. The value of the index is 0.00143804 which signifies a lesser extent of urban agglomeration towards the west direction. Here the researcher is analysing only the given parameters of influence especially the agglomeration and development factors towards achieving the goal of convergence and divergence.

### **6.3.3 Avinissery Census Town**

Avinissery is a census town in Thrissur district, it belongs to Cherpu block panchayath in southward direction. The total area is 7.82 sq.km and density is 2775.83. The total population is 21707 and there is a total of 5212 households in the 14 wards of Avinissery Census Town. The total income is Rs. 28929272 and per capita income is 64629. The researcher is constructing the multiplicative model showing the direction of extent of urban agglomeration towards the southward direction. The result is depicting the in table 6.4.



### **Multiplicative Model of Avinissery Census Town**

$$\begin{aligned} & \frac{\text{Avinissery CT Bank}}{\text{Thrissur ST Bank}} \times \frac{\text{Avinissery CT school}}{\text{Thrissur ST school}} \times \frac{\text{Avinissery CT hospital}}{\text{Thrissur ST hospital}} \\ & \times \frac{\text{Avinissery density}}{\text{Thrissur ST density}} \times \frac{\text{Avinissery road length}}{\text{Thrissur ST road length}} \\ & \times \frac{\text{Avinissery total income}}{\text{Thrissur ST total income}} \times \frac{\text{Avinissery per capita income}}{\text{Thrissur ST per capita income}} \end{aligned}$$

Source: Author's own Calculation

Which is equal to

$$\frac{3}{36} \times \frac{3}{16} \times \frac{0}{39} \times \frac{2775.83}{3100} \times \frac{7.82}{101.42} \times \frac{28929272}{66300000} \times \frac{64629}{213799}$$

$= 0.08333 \times 0.1875 \times 0 \times 0.45990 \times 0.2233 \times 0.63906748 \times 0.4247728 = 0$
--

The table 6.4 shows that the parameters of influence including the number of hospitals together determining the construction of the direction of the extent of urban agglomeration as zero, which infer that as one of the spatial factors of urban agglomeration is absent, the combined effect of the extent (Convergence) do not influence the development of the area. Rather, the model is opted for exclusion principle of the particular factor concerned. So here the researcher is excluding its influence upon the construction of Multiplicative model and reconstruct it with excluding the number of hospitals in the Census Town. The new model will become more effective for concerning the combined influence of both spatial and sectoral factors influencing the convergence and divergence of urban agglomeration of the study area towards its southward level of development.

### **Reconstruction of Multiplicative Model of Avinissery Census Town**

$$\begin{aligned} & \frac{\text{Avinissery CT Bank}}{\text{Thrissur ST Bank}} \times \frac{\text{Avinissery CT school}}{\text{Thrissur ST school}} \times \frac{\text{Avinissery density}}{\text{Thrissur ST density}} \\ & \times \frac{\text{Avinissery road length}}{\text{Thrissur ST road length}} \times \frac{\text{Avinissery total income}}{\text{Thrissur ST total income}} \\ & \times \frac{\text{Avinissery per capita income}}{\text{Thrissur ST per capita income}} \end{aligned}$$

Source: Author's own Calculation

Which is equal to

$$\frac{3}{36} \times \frac{3}{16} \times \frac{2775.83}{3100} \times \frac{7.82}{101.42} \times \frac{28929272}{66300000} \times \frac{64629}{213799}$$

$0.08333 \times 0.1875 \times 0.45990 \times 0.2233 \times 0.63906748 \times 0.4247728 = \mathbf{0.0004}$
---

The table 6.4.1 depicts the calculation of the indices of measurement of the direction of the extent of urban agglomeration on the basis of the parameters of influence with excluding the spatial factor of influence i.e., hospitals in the present analysis. The value of the index is 0.0004 which signifies a lesser extent of urban agglomeration towards the south direction. Here the researcher is analysing only the given parameters of influence especially the agglomeration and development factors towards achieving the goal of convergence and divergence.

### 6.3.4 Puthur Census Town

Puthur is one the sample areas in the study of economic impact of Urban Agglomeration in Kerala. It belongs to Ollukkara Block Panchayath in east direction. The total area of 79.07 sq.km and total population is 49284 and there is 11729 number of households in 23 wards. The density of the area is 961. The total income is Rs. 66250898 and its per capita income is 60536.

#### Multiplicative Model of Puthur Census Town

$$\begin{aligned} & \frac{\text{Puthur CT Bank}}{\text{Thrissur ST Bank}} \times \frac{\text{Puthur CT school}}{\text{Thrissur ST school}} \times \frac{\text{Puthur CT hospital}}{\text{Thrissur ST hospital}} \\ & \times \frac{\text{Puthur CT density}}{\text{Thrissur ST density}} \times \frac{\text{Puthur CT road length}}{\text{Thrissur ST road length}} \\ & \times \frac{\text{Puthur total income}}{\text{Thrissur ST total income}} \times \frac{\text{Puthur per capita income}}{\text{Thrissur ST per capita income}} \end{aligned}$$

Source: Author's own calculation

$$\frac{6}{36} \times \frac{5}{16} \times \frac{0}{39} \times \frac{961}{3100} \times \frac{79.07}{101.42} \times \frac{66250898}{66300000} \times \frac{60536}{213799} =$$

$0.1666 \quad .3125 \times 0 \times 0.31 \times 0.7796 \times 0.9992594 \times 0.28314 = \mathbf{0}$
--

The table 6.5 shows that the parameters of influence including the number of hospitals together determining the construction of the direction of the extent of urban agglomeration as zero, which infer that as one of the spatial factors of urban agglomeration is absent, the

combined effect of the extent (Convergence) do not influence the development of the area. Rather, the model is opted for exclusion principle of the particular factor concerned. So here the researcher is excluding its influence upon the construction of Multiplicative model and reconstruct it with excluding the number of hospitals in the Census Town. The new model will become more effective for concerning the combined influence of both spatial and sectoral factors influencing the convergence and divergence of urban agglomeration of the study area towards its southward level of development.

### **Reconstruction of Multiplicative Model of Puthur Census Town**

$$\frac{\text{Puthur CT Bank}}{\text{Thrissur ST Bank}} \times \frac{\text{Puthur CT school}}{\text{Thrissur ST school}} \times \frac{\text{Puthur CT density}}{\text{Thrissur ST density}} \\ \times \frac{\text{Puthur CT road length}}{\text{Thrissur ST road length}} \times \frac{\text{Puthur total income}}{\text{Thrissur ST total income}} \\ \times \frac{\text{Puthur per capita income}}{\text{Thrissur ST per capita income}}$$

Source: Author's own calculation

$$\frac{6}{36} \times \frac{5}{16} \times \frac{961}{3100} \times \frac{79.07}{101.42} \times \frac{66250898}{66300000} \times \frac{60536}{213799} =$$

$0.1667 \times 0.3125 \times 0.31 \times 0.7796 \times 0.9992594 \times 0.28314 = \mathbf{0.0035599}$
---

The table 6.5.1 shows there is very high level of the extent of urban agglomeration towards the eastward direction. There is more scope for the Puthur Census Town to develop very effectively regarding the availability of more development factors. The calculated index is 0.0035599 is the highest among the four census towns analysed in this chapter.

### **6.3.5 Eriyad Out Growth**

The only Out Growth in Thrissur district is belonging to Eriyad grama panchayath where there are 23 wards of 10940 households and the total population is 46213. The total road length of OG is 16.75 and total income is Rs. 5939845. The per capita income of the Out Growth is Rs. 70451.

## Multiplicative Model of Eriyad Out Growth

$$\frac{\text{Eriyad OG Bank}}{\text{Thrissur ST Bank}} \times \frac{\text{Eriyad OG school}}{\text{Thrissur ST school}} \times \frac{\text{Eriyad OG hospital}}{\text{Thrissur ST hospital}} \times \frac{\text{Eriyad OG density}}{\text{Thrissur ST density}} \\ \times \frac{\text{Eriyad OG road length}}{\text{Thrissur ST road length}} \times \frac{\text{Eriyad OG total income}}{\text{Thrissur ST total income}} \\ \times \frac{\text{Eriyad OG per capita income}}{\text{Thrissur ST per capita income}}$$

Source: Author's own calculation

$$= \frac{12}{36} \times \frac{3}{16} \times \frac{1}{39} \times \frac{2758.99}{3100} \times \frac{16.75}{101.42} \times \frac{5939845}{66300000} \times \frac{70451}{213799}$$

$0.333 \times 0.1875 \times 0.0256 \times 0.88999 \times 0.16515 \times 0.089590 \times 0.3295 = \mathbf{0.00027091}$
---

In considering the development factors and agglomeration factors together (inclusive of hospitals) the directional extent of Urban Agglomeration varies between Adat Census Town and Eriyad Out Growth only. The researcher goes to the level that the parameter of hospital (spatial factor) to be excluded from framing the directional extent of Urban Agglomeration. The spatial factor of hospital should be considered as one of the factors of Urban Agglomeration, its absence should be noted the fact that there is development of the area is only due to the development (Sectoral) parameters only. The directional extent of Urban Agglomeration varies from Adat CT, Arimpur CT, Avinissery CT, Puthur CT to Eriyad Out Growth.

### 6.4 THE DIRECTION OF THE EXTENT OF URBAN AGGLOMERATION - ADAT CT

The census town of Adat shows the value 0.00143804 which includes the parameters of Bank, school, density, road length, total income and per capita income. Adat CT shows the second highest score which means that the area is developing and afterwards the extent of Urban Agglomeration is increased towards this direction.

### 6.5 THE DIRECTION OF THE EXTENT OF URBAN AGGLOMERATION - ARIMPUR CT

The census town of Arimpur shows the value 0.00072559 which includes the parameters of Bank, school, density, road length, total income and per capita income Arimpur CT shows the third highest score which means that the area is developing and afterwards the extent of Urban Agglomeration is increased towards this direction.

## **6.6 THE DIRECTION OF THE EXTENT OF URBAN AGGLOMERATION - AVINISSERY CT**

The census town of Avinissery shows the value 0.0004 which includes the parameters of Bank, school, density, road length, total income and per capita income. Avinissery CT shows the fourth highest score which means that the area is developing and afterwards the extent of Urban Agglomeration is increased towards this direction.

## **6.7 THE DIRECTION OF THE EXTENT OF URBAN AGGLOMERATION - PUTHUR CT**

The census town of Puthur shows the value 0.0035599 which includes the parameters of Bank, school, density, road length, total income and per capita income. Puthur census towns shows the highest value of the index generated, that area has more extent of Urban Agglomeration in Thrissur District.

## **6.8 THE DIRECTIONAL EXTENT OF URBAN AGGLOMERATION - ERIYAD OUT GROWTH**

The Out Growth of Eriyad shows the value 0.00027091 which includes the parameters of Bank, school, density, road length, total income and per capita income. Eriyad Out Growth shows a slightly different picture i.e., the area shows only very least score which infer the fact that there is more facilities to be generated for its extent and growth of the area concerned.

### **Conclusion**

Based on the inferences, can come to the conclusion that the highest rank is given to Puthur census town in the Ollukkara Block in the east ward direction, as the zoological park is established in this area and so it has very much urbanised. Around the park, there is definitely townships developed and semi-forest areas have been converted into semi urban set up. So, surrounding the buildings and quarters have been developed and the commerce will all definitely stretch towards the direction. Towards the direction of Puthur Census Town, more flats and schools are there and even hospitals are also taken it as positive factor for development which will definitely increase the extent of urban agglomeration towards this area. More than that the development projects of Puthur Census Towns shows that there are higher developments in infrastructural facilities especially the canal tourism in the area which is known as 'Manasarovaram' project. The combined effect of both spatial and sectoral

development activities leading towards achieving the goal of highly urbanised area of Puthur Census Town where the perceptions of households reaching at its own higher levels. There is relocation of people towards this direction and similarly more spread effects of area concerned should be met.

**CHAPTER 7**

**SUMMARY OF FINDINGS AND**

**IMPLICATIONS**

The present study is an attempt to examine the economic impact of urban agglomeration through the extent of spatial and sectoral dimensions of the concept as well as the perceptive attitude of households in Thrissur district. The study had taken 20 years of secondary data as parameters under consideration for analysing the extent of urban agglomeration in Kerala. The primary survey covers 461 sample households from Thrissur Statutory Town, Census Town and Out Growth in Thrissur District. As far as the defined urban areas are concerned, there is vast growth of urbanisation since 2011 census primarily due to the urban nature of rural areas. So, the interview schedule is prepared to collect information regarding the perceptive attitude of sample households in these areas.

The study broadly followed the methodology of Wang Li et.al (2011) for examining the construction of a composite indicator for urban influence index and related to the measure of regional accessibility. The theoretical background of the extent can be followed in the methodology of Cristina and Blance et.al (2021) for tracing the spatial and sectoral dimensions of Urban Agglomeration. Major factors identified here are Net State Domestic Product, the number of hospitals, the length of roads, the number of banks, the density, the number of schools, gross district value added at constant prices, gross district value added at current prices, net district value added at current price, net district value added at constant price, District per capita income (GDVA) at current prices, district per capita income (GDVA) at constant prices, district per capita income (NDVA) at current prices, and district per capita income (NDVA) at constant prices and Population are the measures of the district as 01 to 14 served as the multivariate foundation for the assessment of the magnitude of the problem, commencing from Trivandrum to Kasaragod.

The Kruskal-Wallis's test was used to assess the districts based on all of the factors taken into account. In order to evaluate the spatial and sectoral fluctuations of the districts with regard to these criteria, which may serve as focal indicators of Urban Agglomeration, the relative rank of the districts was done on the different parameters.

Accordingly, the district Ernakulam shows highest mean rank in NSDP, total number of banks, gross value added at constant prices, gross value added at current prices, net district value added at constant prices, net district value added at current prices, district per capita income (GDVA) at constant prices, district per capita income (GDVA) at current prices, district per capita income (NDVA) at constant prices, district per capita income (NDVA) at current prices, second highest mean rank in the total road length of the district and third highest mean rank in population.



Trivandrum shows second highest mean rank in terms of NSDP, Total Number of hospitals, gross valued added at constant price, gross valued added at current prices, net district value added at constant prices, net district value added at current prices, and population. Third highest mean rank in total number of banks, district per capita income (GDVA) at current prices, district per capita income (NDVA) at constant prices, first highest in the density which is one of the crucial factors that drives urban expansion.

Thrissur district shows the highest mean rank in the distribution of hospital and second highest mean rank goes to total number of banks concerned. Health infrastructure plays a major role in urban spread as well as the expansion of Urban Agglomeration towards the surrounding peripheries which is one of the forward linkages of urban agglomeration. The financial institution is considered as highest non-agricultural economic activity performed in the district. There are clear cut variations in the extent of urban agglomeration among all the fourteen districts are concerned. Kottayam district shows the highest length of roads which is one of the driving forces of urban agglomeration for achieving the urban expansion towards its peripheries.

The researcher selects Thrissur district as one of the highest numbers of census towns which signifies a boost towards urbanisation and stimulus to urban agglomeration towards its peripheries. The various levels of perception can be analysed through the Kendall's coefficient of concordance. The mean ranks of various indices towards urban agglomeration can be summed up for measuring the economic impact of Urban Agglomeration. Accordingly, ranked the impact of urban agglomeration in terms of cost of living as the highest mean rank is given to increase in the price of land. In terms of social factors, they have opined that the highest mean rank is given to better consumption varieties of food if there is increase in urban expansion. The area is highly concentrating upon the demand factors which is one of the driving forces of urban agglomeration. As far as economic factors are concerned, the households ranked these variables as highest in investment climate increases of the regions.

The environment consideration is also rising nowadays. The respondents have given highest rank to the hygienic environment where waste management system have given more priority. In the case of Health indicators, there is high advancement of medical facilities and even it is visible in government hospitals.

There is maximum participation of respondents in recreation and leisure activities due to the impact of urban agglomeration in the quality-of-life indicator. The financial inclusion and awareness index is concerned, the households have opined that there are banking

procedures which are easily handled by the households. As far as the index of women empowerment is concerned, the highest mean rank is given to the high involvement of women in new investment avenues.

The directional extent of urban agglomeration has shown that the census town of Puthur have highest extent of urban agglomeration which indicated the fact that the spatial hierarchy as well as sectoral growth is moving towards this direction, which impetus to further growth in terms of infrastructural, service oriented and development or sectoral oriented growth. Further the development of agglomerative element towards the direction have led to the township and related facilities around the Puthur CT. The census town of Puthur CT shows the value 0.0035599 which includes the parameters of Bank, school, density, road length, total income and per capita income. Puthur census towns shows the highest value of the index generated, that area has more extent of Urban Agglomeration in Thrissur District.

The census town of Adat shows the value 0.00143804 which includes the parameters of Bank, school, density, road length, total income and per capita income. Adat CT shows the second highest score which means that the area is developing and afterwards the extent of Urban Agglomeration is increased towards this direction. The census town of Arimpur CT shows the value 0.00072559 which includes the parameters of Bank, school, density, road length, total income and per capita income. Arimpur CT shows the third highest score which means that the area is developing and afterwards the extent of Urban Agglomeration is increased towards this direction.

The census town of Avinissery CT shows the value 0.0004 which includes the parameters of Bank, school, density, road length, total income and per capita income. Avinissery CT shows the fourth highest score which means that the area is developing and afterwards the extent of Urban Agglomeration is increased towards this direction.

The census town of Eriyad OG shows the value 0.00027091 which includes the parameters of Bank, school, density, road length, total income and per capita income. Eriyad Out Growth shows a slightly different picture that is the area shows only least score which infer that there are more facilities to be generated for its extent and growth of the area concerned.

## 7.1 VALIDATING HYPOTHESIS

The study makes us to accept the hypothesis that the spatial and sectoral factors together contributing towards urban agglomeration of the area concerned thereby facilitating more effect upon the growth of the regional economy towards achieving its full potential to develop via., the spatial or agglomerative factors of density, schools, banks and hospitals. The higher the agglomerative or spatial parameters present in the area will further develop the surrounding areas in its original form of divergence. So, the pattern of growth can stimulated through the combined effect of spatial and sectoral parameters contributing to urban agglomeration of the area.

## 7.2 POLICY IMPLICATIONS

- ✚ The study is based upon the impact of urban agglomeration especially from households of three defined urban areas. The government have taken action to facilitate more facilities in Out Growth which are considered as focal impetus to the development of tertiary sector and thereby contributing to development factor (Per capita income) of the economy.
- ✚ The census towns in nearby cities are upgraded to the level of Statutory town which further creates more infrastructural facilities both from State government and Central government. The Census Towns are urban areas in all aspects of population, density and non-economic activities, so it is the responsibility of government to upgrade its level to higher order.
- ✚ The study is inferring that spatial factors are influencing more towards urban agglomeration. So governmental action should be taken in this regard for creating more schools, hospitals, banks etc.
- ✚ The directional index should be covering all the aspects of spatial and sectoral factors together in an area. So, need must be given for developing the areas of four directions simultaneously.
- ✚ The study of urban agglomeration is concerned with the major aspect of density. So, action must be taken by proper authorities that density should be uniformly distributed throughout the areas, which further diffuse the objective of urban agglomeration of the area.

### **7.3 LIMITATIONS OF THE STUDY**

- ✚ The primary survey has covered only one district. So, the inter district variations in the economic impact of urban agglomeration is not covered under the study. Likewise the area jurisdiction of district (boundary wise) shows variations, that also not covered under this study.
- ✚ The study of economic impact of urban agglomeration should be included some major specific aspects of knowledge spill over, employment generation and migration aspects etc. That also not included in the present study.

### **7.4 SCOPE FOR FURTHER RESEARCH**

- ✚ The study has taken responses from the respondents up to the age of 70. It may be effective if the information from respondents in the age group of above 70 are collected for analysing intergenerational impact of urban agglomeration concerned.
- ✚ The study has taken fifteen parameters regarding the extent of urban agglomeration in the State. Hence studies should be more effective if it will include more parameters.
- ✚ Studies should be conducted by comparing the economic impact of Census Towns with Statutory town or with Out Growth.
- ✚ The impact of urban agglomeration should be included in the migration aspects. So, studies should be conducted in this aspect too.

### **Conclusion**

The study concludes that the index of Urban Agglomeration is applicable in all the spheres of areas where the concentration or the diffusion exists. The efforts should be taken by the authorities for the effective implementation of policies towards the development of area where the directional extent is high.

## **APPENDIX**

## APPENDIX –I

### List of Urban Agglomerations of 2011 Census

Sl.No.	Name of Urban Agglomeration and its constituent units	City/Town/Outgrowth	Location Code
1	2	3	4
1	<b>Kasaragod (UA)</b>		
	Kasaragod	M	7001
	Koipady	CT	8008
	Mogral	CT	8009
	Puthur	CT	8010
	Shiribagilu	CT	8011
	Madhur	CT	8012
	Kudulu	CT	8013
	Chengala	CT	8014
	Chemnad	CT	8015
	Bare	CT	8016
	Udma	CT	8017
2	<b>Kanhangad (UA)</b>		
	Kanhangad	M	7002
	Nileshwar	OG	7002 0041
	Cheruvathur	OG	7002 0042
	Ajanur	CT	8020
	Perole	CT	8021
	Pilicode	CT	8022
	Maniyat	CT	8023
	North -Thrikkaripur	CT	8024
	South - Thrikkaripur	CT	8025
3	<b>Kannur</b>	<b>(UA)</b>	
	Payyannur	M	7003
	Taliparamba	M	7004
	Kannur	M	7005
	Kannur Cantonment Board	CB	7006
	Mattannur	M	7007
	Koothuparamba	M	7008
	Thalassery	M	7009
	Karivellur	CT	8026
	Pariyaram	CT	8027
	Kurumathur	CT	8028
	Irikkur	CT	8029

	Kuttiattoor	CT	8030
	Mayyil	CT	8031
	Kolacherry	CT	8032
	Cheleri	CT	8033
	Maniyoor	CT	8034
	Kunhimangalam	CT	8035
	Cheruthazham	CT	8036
	Kadannappalli	CT	8037
	Ezhome	CT	8038
	Madayi	CT	8039
	Cherukunnu	CT	8040
	Kannapuram	CT	8041
	Narath	CT	8042
	Pappinisseri	CT	8043
	Kalliasseri	CT	8044
	Azhikode North	CT	8045
	Azhikode South	CT	8046
	Valapattanam	CT	8047
	Chirakkal	CT	8048
	Kannadiparamba	CT	8049
	Munderi	CT	8050
	Kanhirode	CT	8051
	Varam	CT	8052
	Puzhathi	CT	8053
	Pallikkunnu	CT	8054
	Elayavoor	CT	8055
	Chelora	CT	8056
	Ancharakandy	CT	8057
	Iriveri	CT	8058
	Chala	CT	8059
	Thottada	CT	8060
	Kadachira	CT	8061
	Mavilayi	CT	8062
	Peralassery	CT	8063
	Muzhappilangad	CT	8064
	Koodali	CT	8065
	Keezhallur	CT	8066
	Paduvilayi	CT	8067

	Pathiriyad	CT	8068
	Mangattidam	CT	8069
	Kandamkunnu	CT	8070
	Manantheri	CT	8071
	Kottayam - Malabar	CT	8072
	Eruvatti	CT	8073
	Pinarayi	CT	8074
	Dharmadom	CT	8075
	Eranholi	CT	8076
	Kadirur	CT	8077
	Pattiom	CT	8078
	Mokeri	CT	8079
	Kolavelloor	CT	8080
	Panoor	CT	8081
	Panniyannur	CT	8082
	New - Mahe	CT	8083
	Chockli	CT	8084
	Peringathur	CT	8085
4	<b>Kozhikode</b>	<b>(UA)</b>	
	Vadakara	M	7011
	Quilandy	M	7012
	Kozhikode	M.Corp	7013
	Koduvally	OG	7013 0056
	Elathur	OG	7013 0057
	Kadalundi	OG	7013 0058
	Puthiyangadi	OG	7013 0059
	Valayam	CT	8086
	Chekkiad	CT	8087
	Thuneri	CT	8088
	Kunnummal	CT	8089
	Nadapuram	CT	8090
	Edacheri	CT	8091
	Eramala	CT	8092
	Azhiyur	CT	8093
	Chorode	CT	8094
	Ayancheri	CT	8095
	Kottappally	CT	8096
	Villiappally	CT	8097



	Palayad	CT	8098
	Maniyur	CT	8099
	Iringal	CT	8100
	Meppayyur	CT	8104
	Kozhukkallur	CT	8105
	Thurayur	CT	8106
	Thikkody	CT	8107
	Keezhariyur	CT	8108
	Naduvannur	CT	8109
	Panangad	CT	8110
	Balusseri	CT	8111
	Ulliyeri	CT	8112
	Chemancheri	CT	8113
	Atholi	CT	8114
	Nanmanda	CT	8115
	Chelannur	CT	8116
	Thalakkulathur	CT	8117
	Kakkodi	CT	8118
	Kuruvattur	CT	8119
	Kunnamangalam	CT	8120
	Poolacode	CT	8121
	Thazhecode	CT	8122
	Mavoor	CT	8123
	Peruvayal	CT	8124
	Kuttikkattoor	CT	8125
	Olavanna	CT	8126
	Pantheeramkavu	CT	8127
	Perumanna	CT	8128
	Ramanattukara	CT	8129
	Cheruvannur	CT	8130
	Beypore	CT	8131
	Karuvanthuruthy	CT	8132
	Feroke	CT	8133
5	<b>Malappuram</b>	<b>(UA)</b>	
	Manjeri	M	7014
	Malappuram	M	7015
	Anakkayam	OG	7015 0038
	Tirur	M	7017

Ponnani	M	7018
Vazhayur	CT	8135
Cherukavu	CT	8136
Kondotty	CT	8137
Koottilangadi	CT	8139
Kodur	CT	8140
Kottakkal	CT	8141
Perumanna	CT	8142
Ponmundam	CT	8143
Tanalur	CT	8144
Cheriyamundam	CT	8145
Kattipparuthi	CT	8146
Talakkad	CT	8147
Triprangode	CT	8148
Thirunavaya	CT	8149
Naduvattom	CT	8150
Kuttippuram	CT	8151
Irimbilyam	CT	8152
Chelambra	CT	8153
Pallikkal	CT	8154
Thenhippalam	CT	8155
Ariyallur	CT	8156
Moonniyur	CT	8157
Peruvallur	CT	8158
Kannamangalam	CT	8159
Urakam	CT	8160
Othukkungal	CT	8161
Parappur	CT	8162
Vengara	CT	8163
Abdu Rahiman Nagar	CT	8164
Tirurangadi	CT	8165
Neduva	CT	8166
Nannambra	CT	8167
Thennala	CT	8168
Kalady	CT	8169
Edappal	CT	8170
Alamcode	CT	8171
Marancheri	CT	8172

6	<b>Ottappalam</b>	<b>(UA)</b>	
	Shoranur	M	7019
	Ottappalam	M	7020
	Ongallur- II	CT	8173
	Ongallur- I	CT	8174
	Pattambi	CT	8175
	Muthuthala	CT	8176
	Thrithala	CT	8177
	Vaniyamkulam-II	CT	8178
7	<b>Palakkad</b>	<b>(UA)</b>	
	Palakkad	M	7021
	Puthuppariyaram	CT	8181
	Hemambikanagar	CT	8182
	Pudussery Central	CT	8183
	Pudussery West	CT	8184
	Marutharode	CT	8185
	Pirayiri	CT	8186
8	<b>Chittur-Thathamangalam</b>	<b>(UA)</b>	
	Chittur-Thathamangalam	M	7022
	Koduvayur	CT	8187
	Puthunagaram	CT	8188
9	<b>Thrissur</b>	<b>(UA)</b>	
	Thrissur	M.Corp.	7026
	Kunnamkulam	M	7023
	Guruvayoor	M	7024
	Chavakkad	M	7025
	Kodungallur	M	7027
	Eriyad	OG	7027 0028
	Irinjalakuda	M	7028
	Kadavallur	CT	8194
	Kattakampal	CT	8195
	Pazhanji	CT	8196
	Karikkad	CT	8197
	Eyyal	CT	8206
	Chiramanangad	CT	8207
	Akathiyoor	CT	8208
	Porkulam	CT	8209
	Choondal	CT	8210

Chiranelur	CT	8211
Velur	CT	8212
Mundathikode	CT	8213
Peringandoor	CT	8214
Minalur	CT	8215
Eranellur	CT	8216
Alur	CT	8217
Kandanassery	CT	8218
Kadikkad	CT	8219
Punnayurkulam	CT	8220
Vadakkkad	CT	8221
Punnayur	CT	8222
Edakkazhiyur	CT	8223
Vylathur	CT	8224
Pookode	CT	8225
Iringaprom	CT	8226
Perakam	CT	8227
Orumanayur	CT	8228
Paluvai	CT	8229
Thaikkad	CT	8230
Brahmakulam	CT	8231
Elavally	CT	8232
Pavaratty	CT	8233
Venmanad	CT	8234
Mullassery	CT	8235
Venkitangu	CT	8236
Vadanappally	CT	8237
Talikkulam	CT	8238
Killannur	CT	8239
Thangalur	CT	8240
Avanur	CT	8241
Anjur	CT	8242
Kaiparamba	CT	8243
Tholur	CT	8244
Edakkalathur	CT	8245
Peramangalam	CT	8246
Choolissery	CT	8247
Pottore	CT	8248

	Kolazhy	CT	8249
	Kurichikkara	CT	8250
	Vellanikkara	CT	8251
	Kuttoor	CT	8252
	Puzhakkal	CT	8253
	Puranattukara	CT	8254
	Chittilappilly	CT	8255
	Adat	CT	8256
	Kozhukkully	CT	8257
	Kainoor	CT	8258
	Nadathara	CT	8259
	Parakkad	CT	8260
	Karamuck	CT	8261
	Manalur	CT	8262
	Eravu	CT	8263
	Veluthur	CT	8264
	Manakkody	CT	8265
	Marathakkara	CT	8266
	Puthur	CT	8267
	Avinissery	CT	8268
	Palissery	CT	8269
	Venginissery	CT	8270
	Kodannur	CT	8271
	Anthicad	CT	8272
	Padiyam	CT	8273
	Vadakkummuri	CT	8274
	Kizhakkumuri	CT	8275
	Cherpu	CT	8276
	Paralam	CT	8277
	Chevvoor	CT	8278
	Vallachira	CT	8279
	Oorakam	CT	8280

	Kurumpilavu	CT	8281
	Kizhuppillikkara	CT	8282
	Thanniyam	CT	8283
	Edathiruthy	CT	8284
	Chendrappini	CT	8285
	Kaipamangalam	CT	8286
	Perinjanam	CT	8287
	Pappinivattom	CT	8288
	Panangad	CT	8289
	Edavilangu	CT	8290
	Ala	CT	8291
	Pallippuram	CT	8292
	Methala	CT	8293
	Poyya	CT	8294
	Madathumpady	CT	8295
	Trikkur	CT	8296
	Nenmenikkara	CT	8297
	Amballur	CT	8298
	Puthukkad	CT	8299
	Parappukkara	CT	8300
	Kattur	CT	8301
	Porathissery	CT	8302
	Madayikonam	CT	8303
	Pullur	CT	8305
	Manavalassery	CT	8306
	Edathirinji	CT	8307
	Vellookkara	CT	8308
	Vadakkumkara	CT	8309
	Poomangalam	CT	8310
	Padiyur	CT	8311

	Thekkumkara	CT	8312
	Vadama	CT	8316
	<b>Chalakydy</b>	<b>(UA)</b>	
	Chalakydy	M	7029
	Muringur Vadakkummuri	CT	8313
	Koratty	CT	8314
	Kallur Vadakkummuri	CT	8315
	Kallur- Thekkummuri	CT	8317
II	<b>Kochi</b>	<b>(UA)</b>	
	Kochi	M.Corp.	7035 & 7037
	Kedamangalam	OG	7034 0072
	Cheriyakadavu	OG	7035 0073
	Perumbavoor	M	7030
	Angamaly	M	7031
	Aluva	M	7032
	Paravur	M	7033
	Kalamassery	M	7036
	Thrippunithura	M	7038
	Koovappady	CT	8318
	Chelamattom	CT	8319
	Marampilly	CT	8320
	Vazhakulam	CT	8321
	Vengola	CT	8322
	Perumbavoor	CT	8323
	Kunnathunad	CT	8324
	Puthencruz	CT	8325
	Kalady	CT	8326
	Mattoor	CT	8327
	Vadakkumbhagom	CT	8328
	Chowwara	CT	8329
	Nedumbassery	CT	8330
	Chengamanad	CT	8331

	Kizhakkumbhagam	CT	8332
	Choornikkara	CT	8335
	Thekkumbhagam	CT	8333
	Edathala	CT	8334
	Puthenvelikkara	CT	8336
	Chendamangalam	CT	8337
	Moothakunnam	CT	8338
	Vadakkera	CT	8339
	Karumalloor	CT	8340
	Kadungalloor	CT	8341
	Alangad	CT	8342
	Kottuvally	CT	8343
	Varappuzha	CT	8344
	Eloor	CT	8345
	Njarackal	CT	8346
	Elamkunnappuzha	CT	8347
	Puthuvype	CT	8348
	Kumbalangy	CT	8349
	Kakkanad	CT	8350
	Vazhakkala	CT	8351
	Cheranallur	CT	8352
	Kadamakkudy	CT	8353
	Mulavukad	CT	8354
	Thiruvankulam	CT	8355
	Kanayannur	CT	8356
	Kureekkad	CT	8357
	Maradu	CT	8358
	Kumbalam	CT	8359
	Manakunnam	CT	8360
	Mulamthuruthy	CT	8361
	Amballur	CT	8362
12	<b>Kothamangalam</b>	<b>(UA)</b>	
	Muvattupuzha	M	7039
	Kothamangalam	M	7040
	Velloorkunnam	CT	8363
	Eramalloor	CT	8364
13	<b>Kottayam</b>	<b>(UA)</b>	
	Kottayam	M	7044



	Ettumanoor	CT	8366
	Athirampuzha	CT	8367
	Aimanam	CT	8368
	Perumbaikad	CT	8369
	Vijayapuram	CT	8370
	Chengalam South	CT	8371
	Nattakam	CT	8372
	Panachikkad	CT	8373
	Puthuppally	CT	8374
14	<b>Changanassery</b>	<b>(UA)</b>	
	Changanassery	M	7045
	Chethipuzha	CT	8375
	Thrikkodithanam	CT	8376
	Paippad	CT	8377
15	<b>Cherthala</b>	<b>(UA)</b>	
	Cherthala	M	7046
	Arookutty	CT	8378
	Aroor	CT	8379
	Ezhupunna	CT	8380
	Kodamthuruth	CT	8381
	Thaikattussery	CT	8382
	Kuthiathode	CT	8383
	Vayalar	CT	8384
	Pallipuram	CT	8385
	Thanneermukkam	CT	8386
	Kokkothamangalam	CT	8387
	Kanjikkuzhi	CT	8388
	Muhamma	CT	8389
	Mannanchery	CT	8390
	Pathirappally	CT	8391
	Komalapuram	CT 8392	
16	<b>Alappuzha</b>	<b>(UA)</b>	
	Alappuzha	M	7047
	Punnapra	OG	7047 0051
	Kalarkode	OG	7047 0052
17	<b>Kayamkulam</b>	<b>(UA)</b>	
	Kayamkulam	M	7048
	Mavelikkara	M	7050

	Haripad	CT	8393
	Kumarapuram	CT	8394
	Karthikappally	CT	8395
	Chingoli	CT	8396
	Cheppad	CT	8397
	Pathiyoor	CT	8398
	Keerikkad	CT	8399
	Muthukulam	CT	8400
	Kandalloor	CT	8401
	Puthuppally	CT	8402
	Krishnapuram	CT	8403
	Mannar	CT	8404
	Kurattissery	CT	8405
	Kannamangalam	CT	8406
	Chennithala	CT	8407
	Thazhakara	CT	8408
	Bharanikkavu	CT	8409
	Kattanam	CT	8410
	<b>18 Kollam</b>	<b>(UA)</b>	
	Kollam	M.Corp.	7056
	Neendakara	OG	7054 0053
	Eravipuram	OG	7056 0054
	Paravoor	M	7057
	Oachira	CT	8412
	Kulasekharapuram	CT	8413
	Adinad	CT	8414
	Thodiyoor	CT	8415
	Kallelibhagam	CT	8416
	Karunagappally	CT	8417
	Ayanivelikulangara	CT	8418
	Vadakkumthala	CT	8419
	Panmana	CT	8420
	Chavara	CT	8421
	Thrikkaruva	CT	8423
	Panayam	CT	8424
	Perinad	CT	8425
	Elampalloor	CT	8426
	Nedumpana	CT	8427

	Kottamkara	CT	8428
	Thrikkadavoor	CT	8429
	Thrikkovilvattom	CT	8430
	Adichanalloor	CT	8431
	Thazhuthala	CT	8432
	Mayyanad	CT	8433
	Meenad	CT	8434
	Poothakkulam	CT	8435
19	<b>Thiruvananthapuram</b>	<b>(UA)</b>	
	Thiruvananthapuram	M.Corp.	7061
	Kazhakkootam	OG	7061 0087
	Kovalam	OG	7062 0088
	Attingal	M	7059
	Nedumangad	M	7060
	Neyyattinkara	M	7063
	Alamcode	CT	8436
	Keezhattingal	CT	8437
	Vakkom	CT	8438
	Kizhuvalam-Koonthalloor	CT	8439
	Edakkode	CT	8440
	Azhoor	CT	8441
	Vattappara	CT	8442
	Karakulam	CT	8443
	Veiloor	CT	8444
	Pallippuram	CT	8445
	Iroopara	CT	8446
	Uliyazhathura	CT	8447
	Sreekaryam	CT	8448
	Kudappanakkunnu	CT	8449
	Vattiyoorkavu	CT	8450
	Kalliyoor	CT	8451
	Venganoor	CT	8452
	Vilappil	CT	8453
	Kulathummal	CT	8454
	Malayinkeezhu	CT	8455
	Vilavoorkkal	CT	8456
	Pallichal	CT	8457
	Athiyannur	CT	8458
	Kanjiramkulam	CT	8459

CT - Census Town M - Municipality M. Corp - Municipal Corporation  
C.B - Cantonment Board OG - Out Growth

## APPENDIX-II

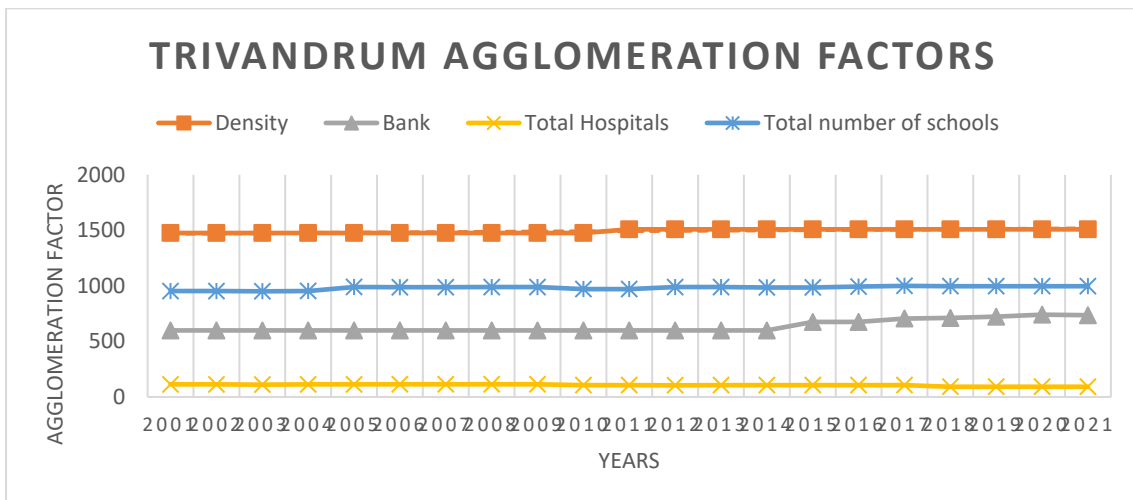
The development factors as also agglomeration factors based on the secondary data collected as the year 2001 to 2021 are given in tables (Appendix)

**Table 1 Trivandrum Agglomeration Factors**

<b>Year</b>	<b>Density</b>	<b>Bank</b>	<b>Total Hospitals</b>	<b>Total number of schools</b>
2001	1476	599	113	953
2002	1476	599	113	953
2003	1476	599	111	951
2004	1476	599	113	954
2005	1476	599	113	990
2006	1476	599	114	988
2007	1476	599	114	988
2008	1476	599	114	989
2009	1476	599	114	989
2010	1476	599	107	971
2011	1509	599	107	971
2012	1509	599	105	989
2013	1509	599	107	989
2014	1509	599	107	986
2015	1509	675	107	986
2016	1509	675	107	994
2017	1509	706	107	1000
2018	1509	711	92	997
2019	1509	723	92	997
2020	1509	741	92	997
2021	1509	736	92	997

Economic Review 2001-2021

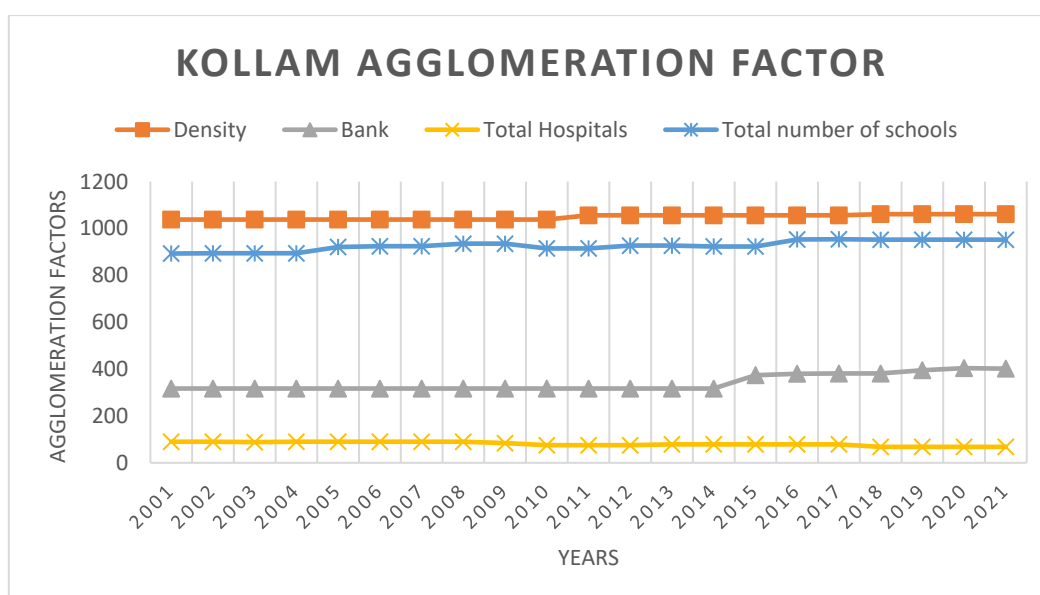
**Figure 1 Trivandrum Agglomeration Factors**



**Table 2 Kollam Agglomeration Factor**

Year	Density	Bank	Total Hospitals	Total number of schools
2001	1038	317	90	893
2002	1038	317	90	894
2003	1038	317	88	894
2004	1038	317	90	894
2005	1038	317	90	921
2006	1038	317	90	924
2007	1038	317	90	924
2008	1038	317	90	935
2009	1038	317	84	935
2010	1038	317	75	915
2011	1056	317	75	915
2012	1056	317	75	927
2013	1056	317	79	927
2014	1056	317	79	923
2015	1056	374	79	923
2016	1056	380	79	953
2017	1056	381	79	954
2018	1061	381	68	952
2019	1061	395	68	952
2020	1061	404	68	952
2021	1061	402	68	952

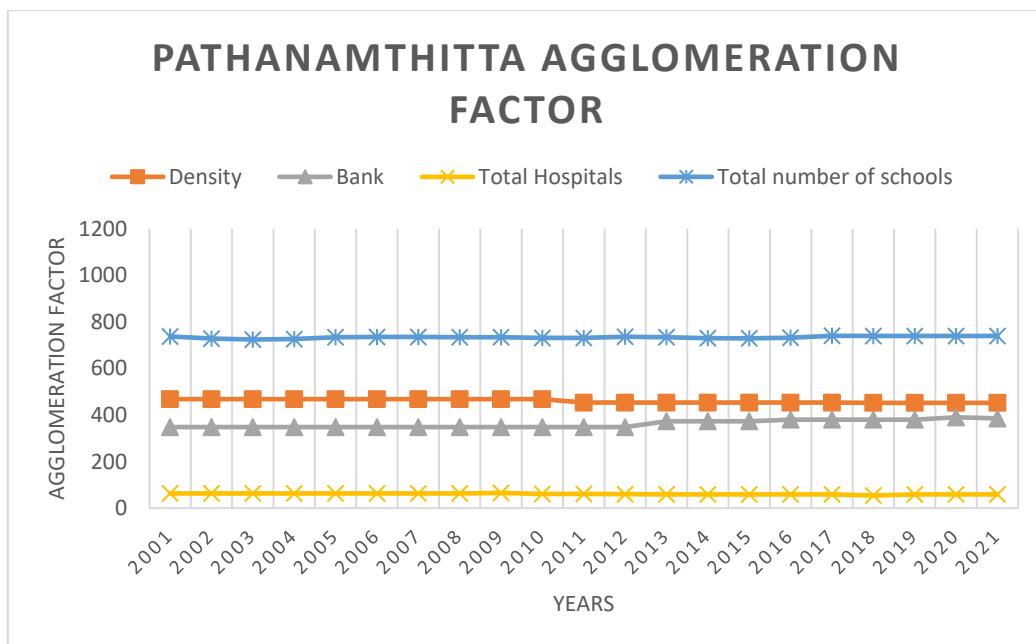
**Figure 2 Kollam Agglomeration Factor**



**Table 3 Pathanamthitta Agglomeration Factor**

Year	Density	Bank	Total Hospitals	Total number of schools
2001	468	348	63	737
2002	468	348	63	728
2003	468	348	63	724
2004	468	348	63	726
2005	468	348	63	734
2006	468	348	63	735
2007	468	348	63	735
2008	468	348	63	734
2009	468	348	65	734
2010	468	348	61	731
2011	453	348	61	731
2012	453	348	60	736
2013	453	373	59	734
2014	453	373	59	730
2015	453	373	59	729
2016	453	380	59	732
2017	453	380	59	740
2018	452	380	54	739
2019	452	380	59	739
2020	452	390	59	739
2021	452	385	59	739

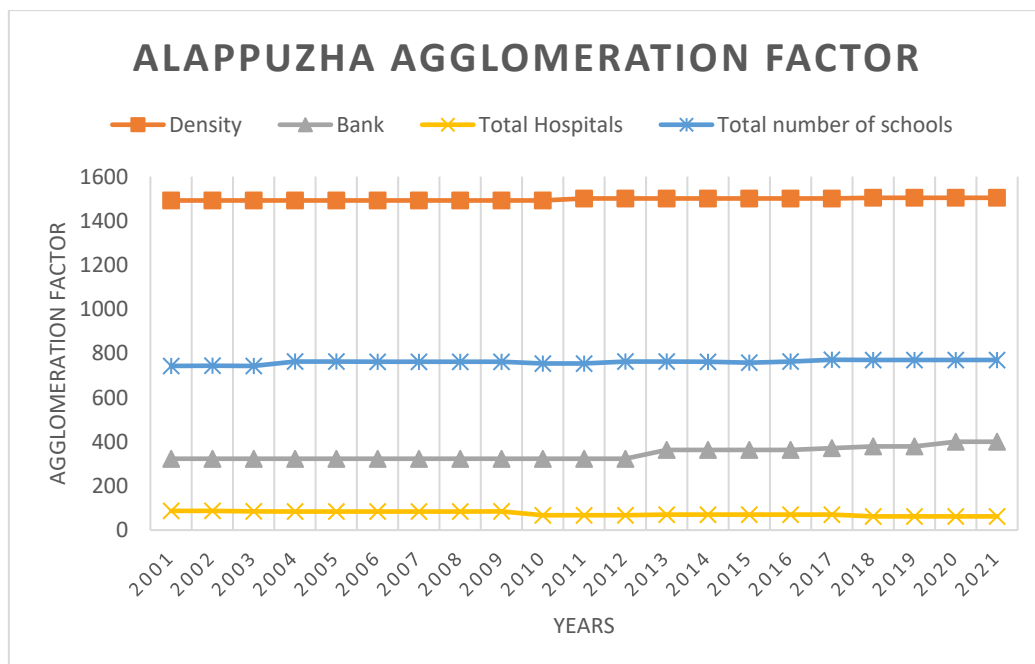
**Figure 3 Pathanamthitta Agglomeration Factor**



**Table 4 Alappuzha Agglomeration Factor**

Year	Density	Bank	Total Hospitals	Total number of schools
2001	1492	323	87	743
2002	1492	323	87	744
2003	1492	323	85	743
2004	1492	323	84	763
2005	1492	323	84	763
2006	1492	323	84	762
2007	1492	323	84	762
2008	1492	323	84	762
2009	1492	323	85	762
2010	1492	323	67	754
2011	1501	323	67	754
2012	1501	323	67	763
2013	1501	363	70	763
2014	1501	363	70	762
2015	1501	363	70	758
2016	1501	363	70	763
2017	1501	371	70	771
2018	1504	379	62	770
2019	1504	379	62	770
2020	1504	400	62	770
2021	1504	400	62	770

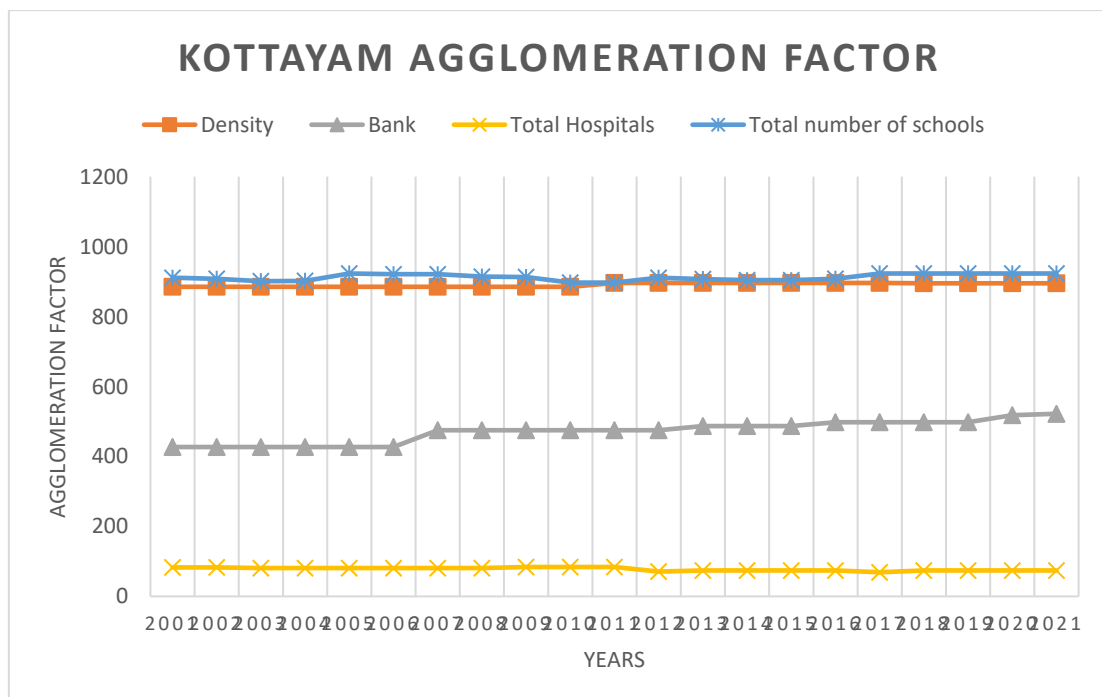
**Figure 4 Alappuzha Agglomeration Factor**



**Table 5 Kottayam Agglomeration Factor**

Year	Density	Bank	Total Hospitals	Total number of schools
2001	885	427	83	911
2002	885	427	83	908
2003	885	427	81	901
2004	885	427	81	902
2005	885	427	81	923
2006	885	427	81	921
2007	885	475	81	921
2008	885	475	81	914
2009	885	475	84	913
2010	885	475	84	897
2011	896	475	84	897
2012	896	475	71	911
2013	896	487	74	907
2014	896	487	74	904
2015	896	487	74	904
2016	896	498	74	908
2017	896	498	69	923
2018	895	498	74	923
2019	895	498	74	923
2020	895	518	74	923
2021	895	522	74	923

**Figure 5 Kottayam Agglomeration Factor**

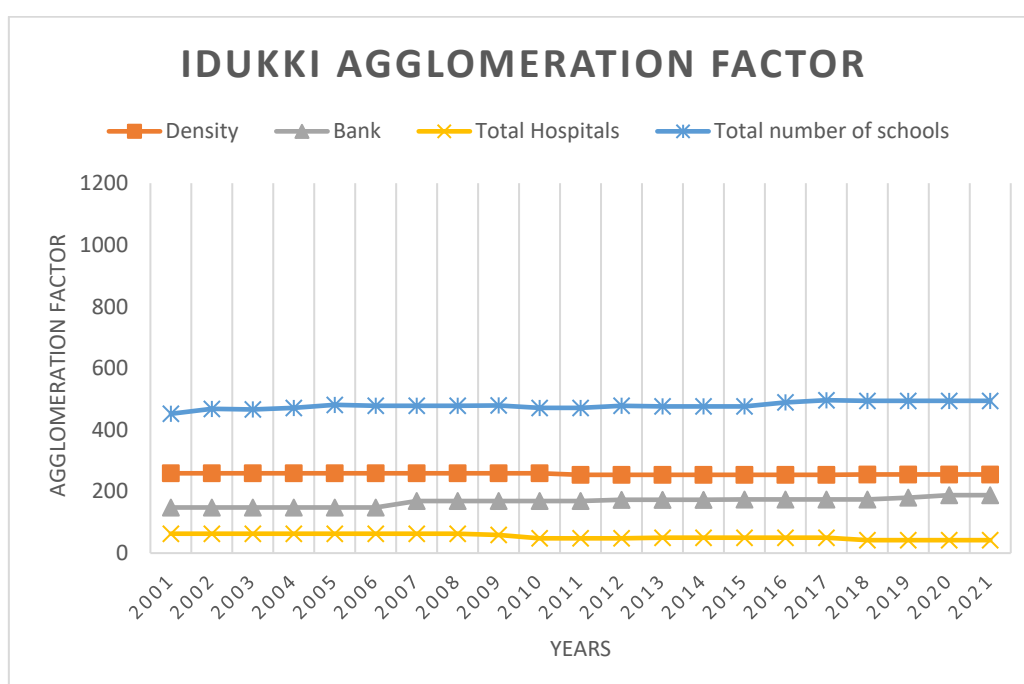




**Table 6 Idukki Agglomeration Factor**

Year	Density	Bank	Total Hospitals	Total number of schools
2001	259	148	63	452
2002	259	148	63	468
2003	259	148	63	466
2004	259	148	63	471
2005	259	148	63	481
2006	259	148	63	478
2007	259	169	63	478
2008	259	169	63	478
2009	259	169	59	479
2010	259	169	48	471
2011	254	169	48	471
2012	254	173	48	478
2013	254	173	50	476
2014	254	173	50	476
2015	254	174	50	476
2016	254	174	50	489
2017	254	174	50	496
2018	255	174	42	494
2019	255	180	42	494
2020	255	188	42	494
2021	255	188	42	494

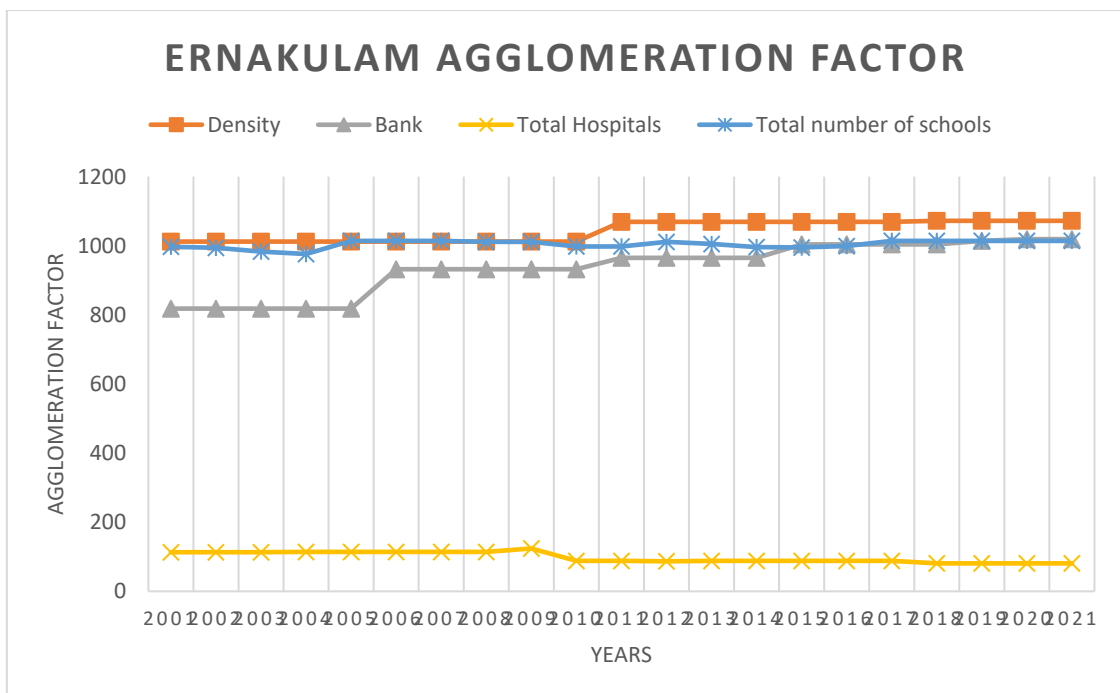
**Figure 6 Idukki Agglomeration Factor**



**Table 7 Ernakulam Agglomeration Factor**

Year	Density	Bank	Total Hospitals	Total number of schools
2001	1012	818	113	997
2002	1012	818	113	994
2003	1012	818	113	983
2004	1012	818	114	976
2005	1012	818	114	1014
2006	1012	932	114	1014
2007	1012	932	114	1014
2008	1012	932	114	1011
2009	1012	932	124	1011
2010	1012	932	88	998
2011	1069	965	88	998
2012	1069	965	87	1011
2013	1069	965	88	1005
2014	1069	965	88	996
2015	1069	1004	88	995
2016	1069	1004	88	999
2017	1069	1004	88	1014
2018	1072	1004	81	1014
2019	1072	1014	81	1014
2020	1072	1019	81	1014
2021	1072	1019	81	1014

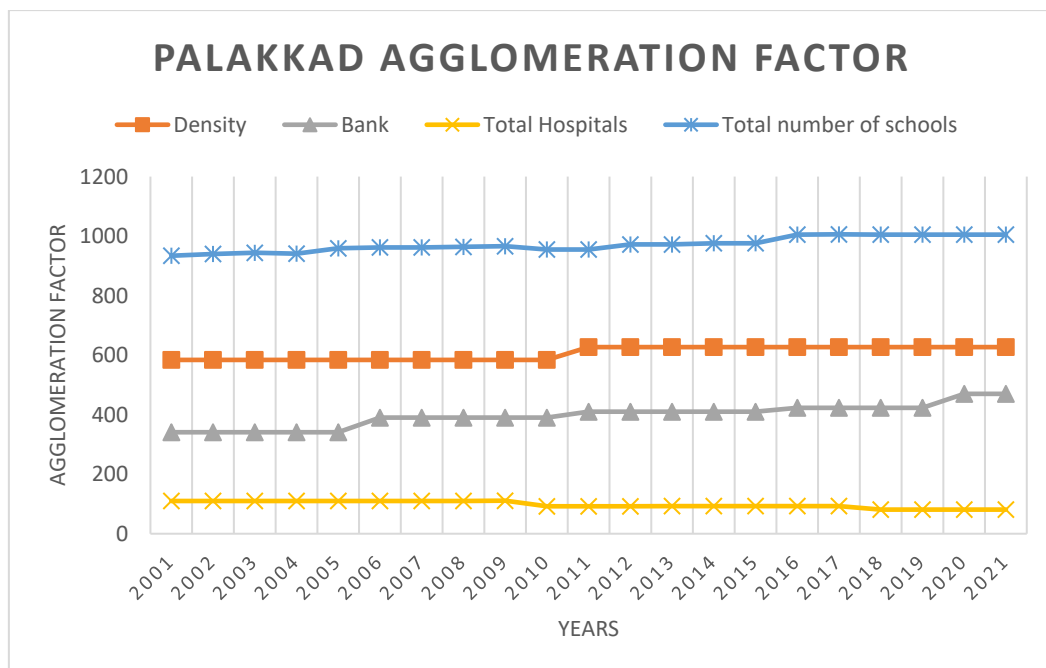
**Figure 7 Ernakulam Agglomeration Factor**



**Table 8 Palakkad Agglomeration Factors**

Year	Density	Bank	Total Hospitals	Total number of schools
2001	584	341	110	934
2002	584	341	110	940
2003	584	341	110	944
2004	584	341	110	941
2005	584	341	110	959
2006	584	390	110	962
2007	584	390	110	962
2008	584	390	110	964
2009	584	390	111	966
2010	584	390	92	955
2011	627	410	92	955
2012	627	410	92	972
2013	627	410	93	972
2014	627	410	93	976
2015	627	410	93	976
2016	627	423	93	1005
2017	627	423	93	1006
2018	627	423	81	1005
2019	627	423	81	1005
2020	627	470	81	1005
2021	627	470	81	1005

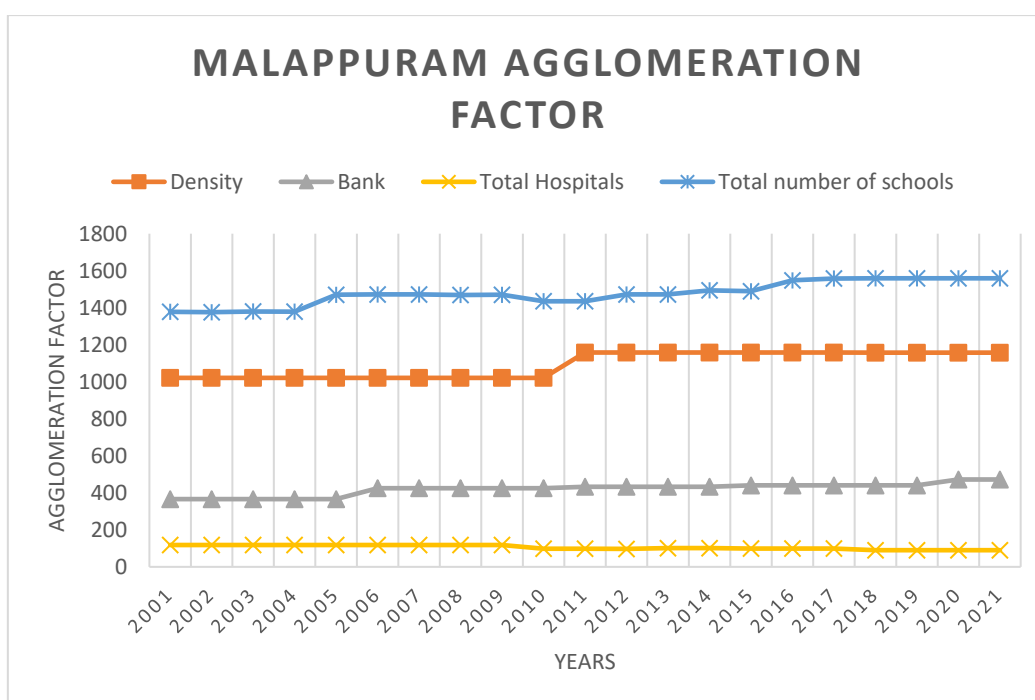
**Figure 8 Palakkad Agglomeration Factors**



**Table 9 Malappuram Agglomeration Factor**

Year	Density	Bank	Total Hospitals	Total number of schools
2001	1021	366	118	1378
2002	1021	366	118	1376
2003	1021	366	118	1380
2004	1021	366	118	1379
2005	1021	366	118	1470
2006	1021	425	118	1472
2007	1021	425	118	1472
2008	1021	425	118	1469
2009	1021	425	118	1470
2010	1021	425	98	1435
2011	1158	433	98	1435
2012	1158	433	97	1472
2013	1158	433	101	1472
2014	1158	433	101	1494
2015	1158	440	99	1489
2016	1158	440	99	1548
2017	1158	440	99	1558
2018	1157	440	90	1559
2019	1157	440	90	1559
2020	1157	472	90	1559
2021	1157	472	90	1559

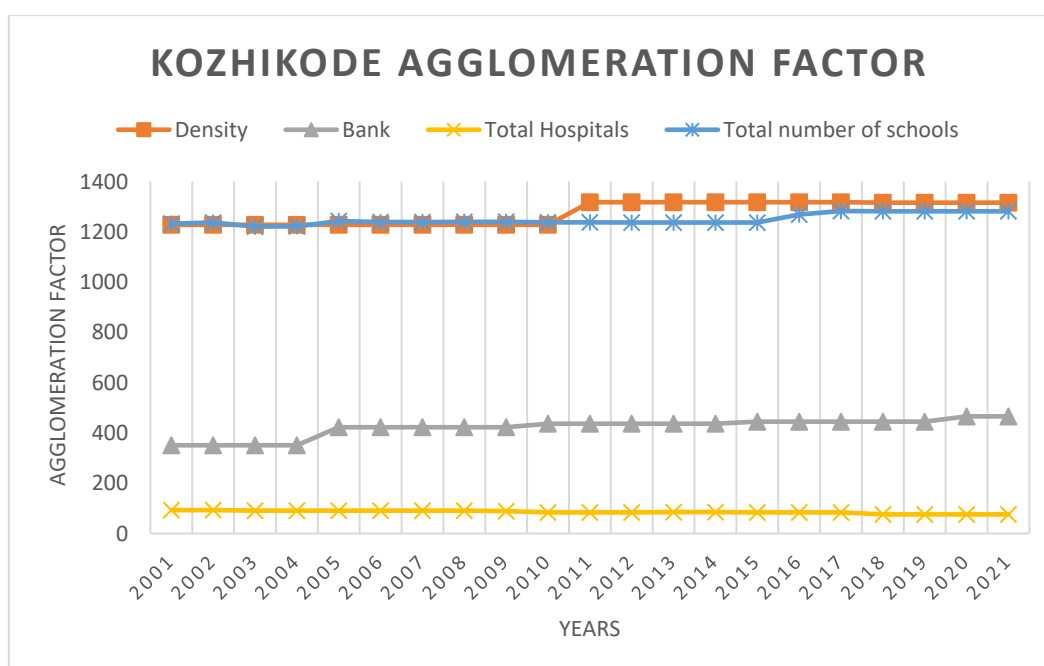
**Figure 9 Malappuram Agglomeration Factor**



**Table 10 Kozhikode Agglomeration Factor**

Year	Density	Bank	Total Hospitals	Total number of schools
2001	1228	351	93	1233
2002	1228	351	93	1237
2003	1228	351	91	1221
2004	1228	351	91	1222
2005	1228	423	91	1243
2006	1228	423	91	1239
2007	1228	423	91	1239
2008	1228	423	91	1240
2009	1228	423	89	1240
2010	1228	437	84	1238
2011	1318	437	84	1238
2012	1318	437	84	1237
2013	1318	437	85	1237
2014	1318	437	85	1237
2015	1318	445	84	1237
2016	1318	445	84	1269
2017	1318	445	84	1283
2018	1316	445	76	1282
2019	1316	445	76	1282
2020	1316	466	76	1282
2021	1316	466	76	1282

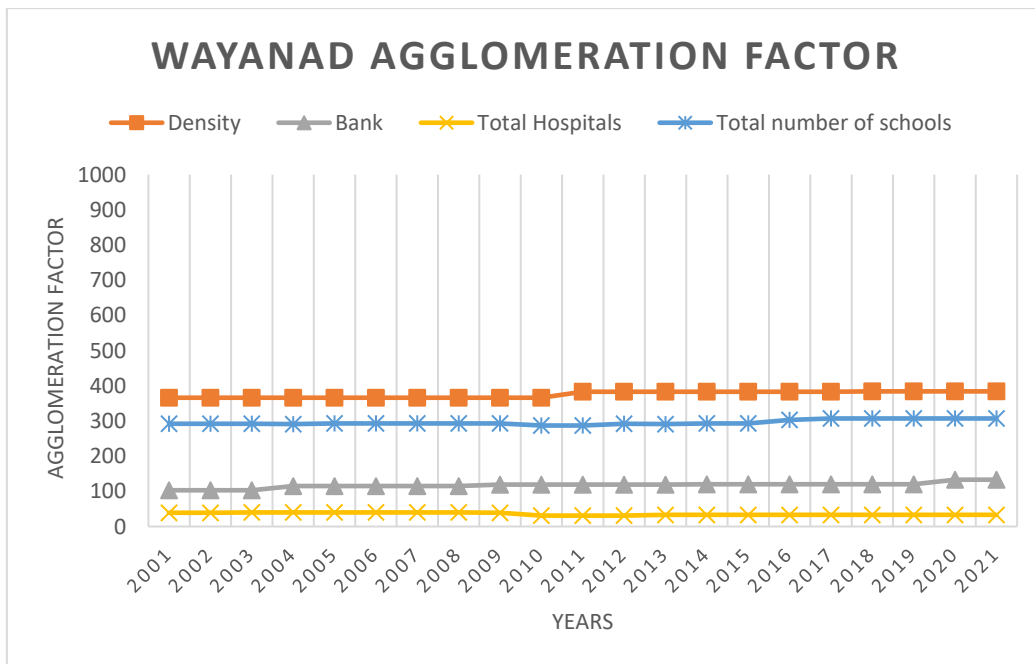
**Figure 10 Kozhikode Agglomeration Factor**



**Table 11 Wayanad Agglomeration Factor**

Year	Density	Bank	Total Hospitals	Total number of schools
2001	366	103	39	292
2002	366	103	39	292
2003	366	103	40	292
2004	366	115	40	291
2005	366	115	40	293
2006	366	115	40	293
2007	366	115	40	293
2008	366	115	40	293
2009	366	119	39	293
2010	366	119	31	287
2011	383	119	31	287
2012	383	119	31	292
2013	383	119	33	291
2014	383	120	33	293
2015	383	120	33	293
2016	383	120	33	303
2017	383	120	33	307
2018	384	120	33	307
2019	384	120	33	307
2020	384	133	33	307
2021	384	133	33	307

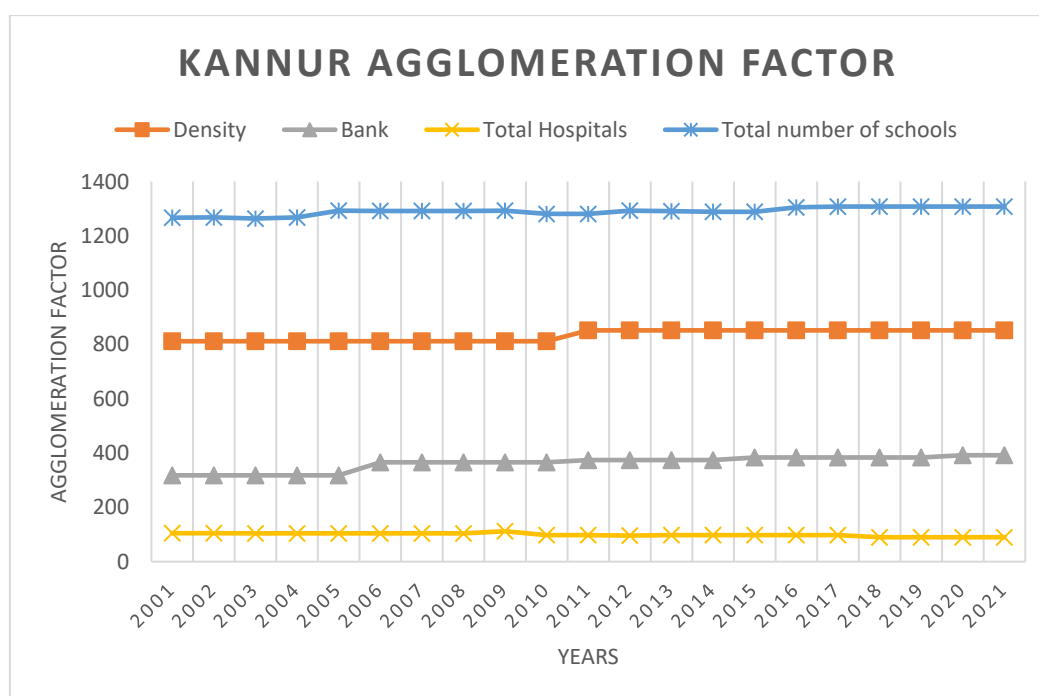
**Figure 11 Wayanad Agglomeration Factor**



**Table 12 Kannur Agglomeration Factor**

Year	Density	Bank	Total Hospitals	Total number of schools
2001	812	318	105	1267
2002	812	318	105	1268
2003	812	318	104	1264
2004	812	318	104	1268
2005	812	318	104	1293
2006	812	366	104	1292
2007	812	366	104	1292
2008	812	366	104	1292
2009	812	366	112	1293
2010	812	366	98	1281
2011	852	374	98	1281
2012	852	374	96	1293
2013	852	374	98	1291
2014	852	374	98	1289
2015	852	384	98	1289
2016	852	384	98	1305
2017	852	384	98	1308
2018	852	384	90	1308
2019	852	384	90	1308
2020	852	392	90	1308
2021	852	392	90	1308

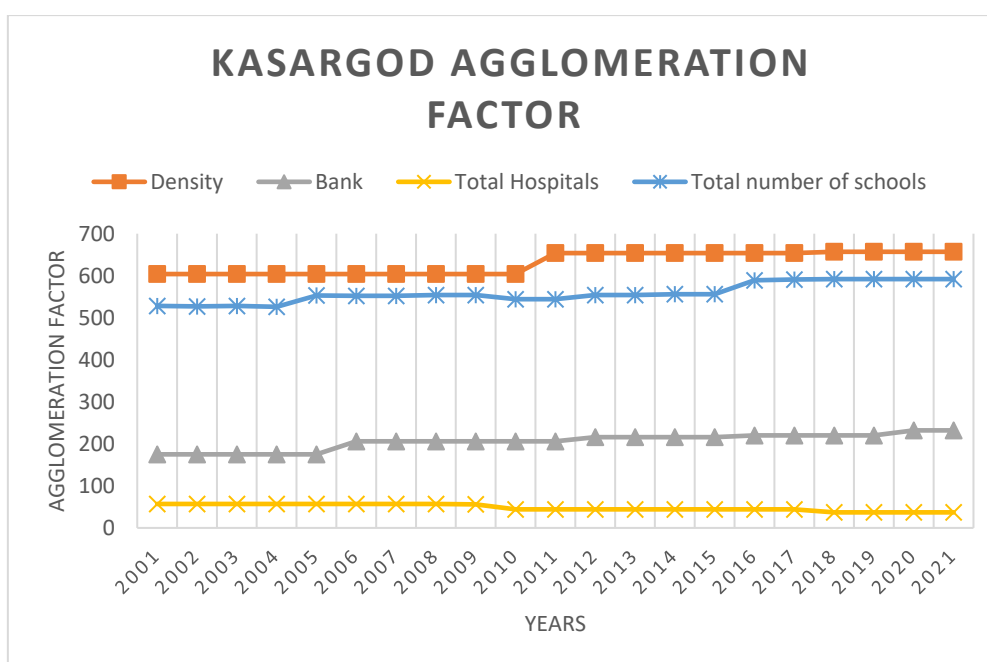
**Figure 12 Kannur Agglomeration Factor**



**Table 13 Kasargod Agglomeration Factor**

Year	Density	Bank	Total Hospitals	Total number of schools
2001	604	175	57	528
2002	604	175	57	527
2003	604	175	57	528
2004	604	175	57	526
2005	604	175	57	553
2006	604	206	57	552
2007	604	206	57	552
2008	604	206	57	554
2009	604	206	56	554
2010	604	206	44	544
2011	654	206	44	544
2012	654	216	44	554
2013	654	216	44	554
2014	654	216	44	556
2015	654	216	44	556
2016	654	220	44	589
2017	654	220	44	591
2018	657	220	37	592
2019	657	220	37	592
2020	657	232	37	592
2021	657	232	37	592

**Figure 13 Kasargod Agglomeration Factor**

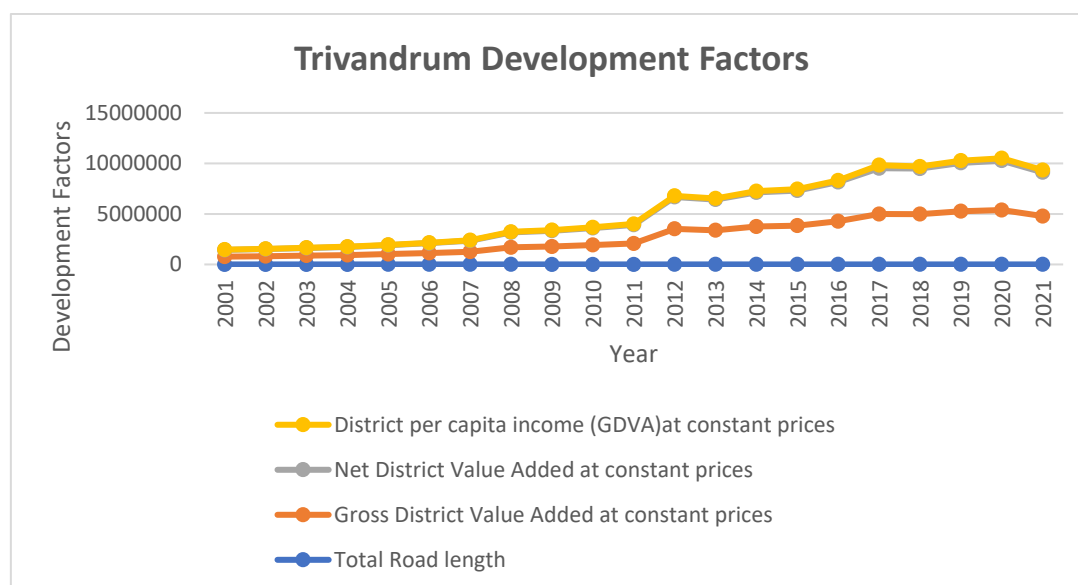




**Table 14 Trivandrum Development Factors**

Year	Total Road length	Gross District Value Added at constant prices	Net District Value Added at constant prices	District per capita income (GDVA)at constant prices
2001	1864	770284	667258	24422
2002	1864	814223	704308	26086
2003	1853	872333	751557	28654
2004	1853	923672	801956	31472
2005	2009	1024451	878233	35997
2006	2437	1125120	979573	40239
2007	2437	1255008	1095574	46161
2008	2437	1693891	1475875	55683
2009	1634	1774042	1556552	63240
2010	1652	1918802	1684765	71132
2011	1652	2073140	1847688	80344
2012	2601	3521306	3153490	106532
2013	2601	3380520	3039504	110078
2014	2601	3753230	3370160	130944
2015	2601	3840013	3469577	141304
2016	2558	4274279	3878573	159673
2017	2558	4990072	4528567	307961
2018	2558	4974826	4512571	205024
2019	2558	5263173	4782489	223980
2020	2558	5384318	4884897	235521
2021	2377	4777314	4335345	223573

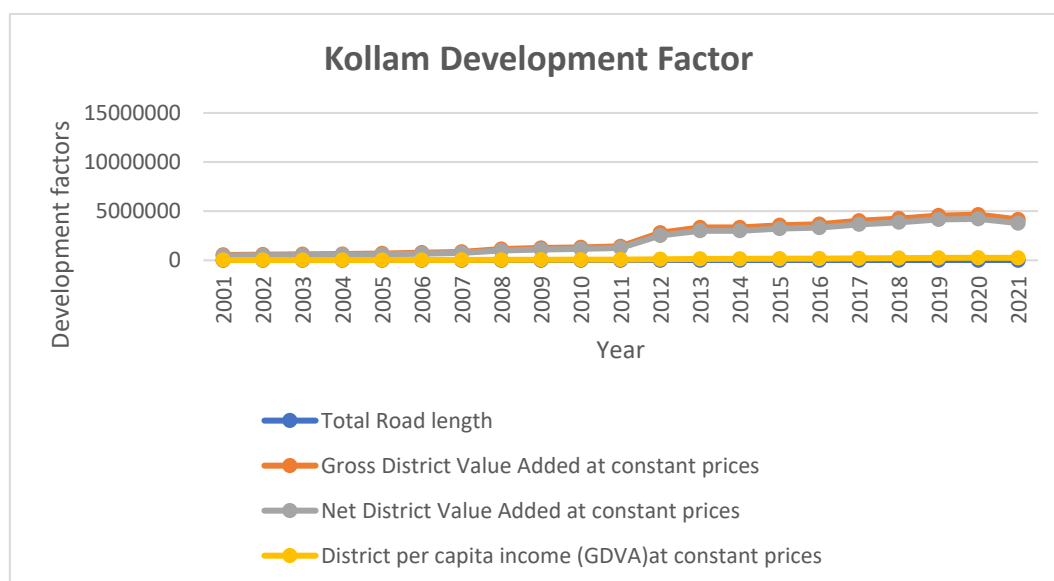
**Figure 14 Trivandrum Development Factors**



**Table 15 Kollam Development Factors**

Year	Total Road length	Gross District Value Added at constant prices	Net District Value Added at constant prices	District per capita income (GDVA)at constant prices
2001	1552	543115	474553	21331
2002	1552	579200	504713	22972
2003	1487	608983	528457	24776
2004	1487	638561	558520	27191
2005	1670	695763	604263	30706
2006	1777	775614	680378	35492
2007	1777	852578	748778	40496
2008	1777	1141063	997238	48785
2009	1782	1254641	1102424	58736
2010	1873	1314179	1155840	63678
2011	1873	1414120	1259004	72861
2012	2179	2801682	2525678	106190
2013	2179	3338205	3003461	136387
2014	2179	3338108	3003652	147425
2015	2179	3557136	3226437	164553
2016	2203	3670131	3324621	173918
2017	2203	4027393	3658004	199299
2018	2203	4246310	3869893	222755
2019	2203	4556947	4150499	247165
2020	2203	4644758	4217949	259715
2021	1924	4156843	3782420	248292

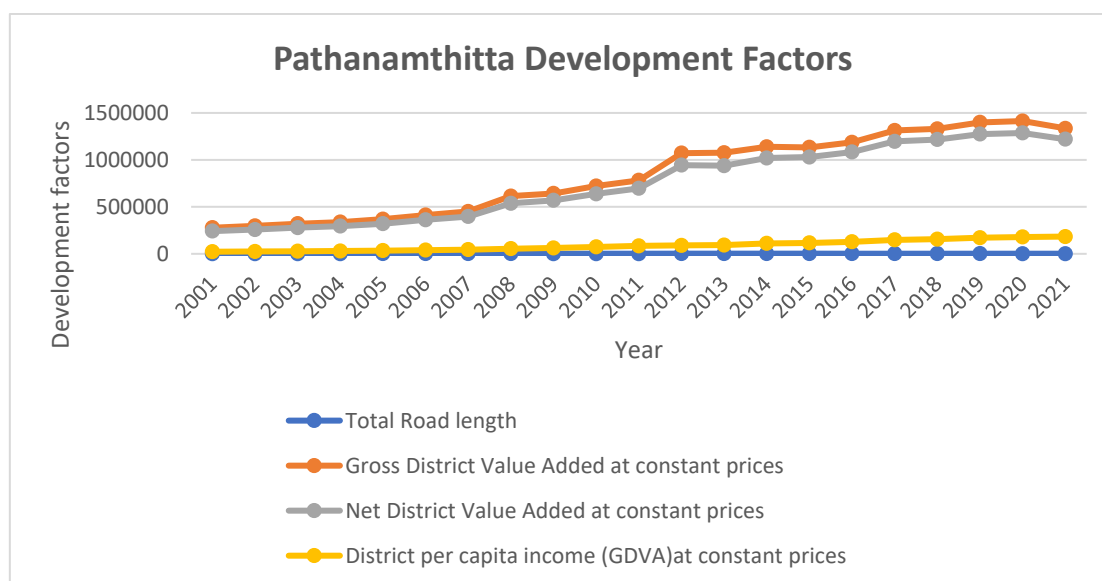
**Figure 15 Kollam Development Factors**



**Table 16 Pathanamthitta Development Factors**

Year	Total Road length	Gross District Value Added at constant prices	Net District Value Added at constant prices	District per capita income (GDVA)at constant prices
2001	1456	277863	241741	22579
2002	1408	297255	258357	24638
2003	1408	320243	278647	27535
2004	1408	337824	294549	30418
2005	1596	368740	320593	34110
2006	1876	412321	362141	38986
2007	1876	450563	397161	44682
2008	1876	614188	537398	54994
2009	1252	642093	569428	62411
2010	1294	721769	637943	73158
2011	1294	782308	696740	84946
2012	2040	1071909	944393	89675
2013	2040	1075818	937965	92987
2014	2040	1139125	1019595	110768
2015	2040	1133399	1030138	116402
2016	2031	1186690	1083975	128139
2017	2031	1313215	1197415	148663
2018	2031	1330192	1216300	156301
2019	2031	1398676	1274935	171053
2020	1472	1413528	1286162	179201
2021	1472	1335007	1219982	183652

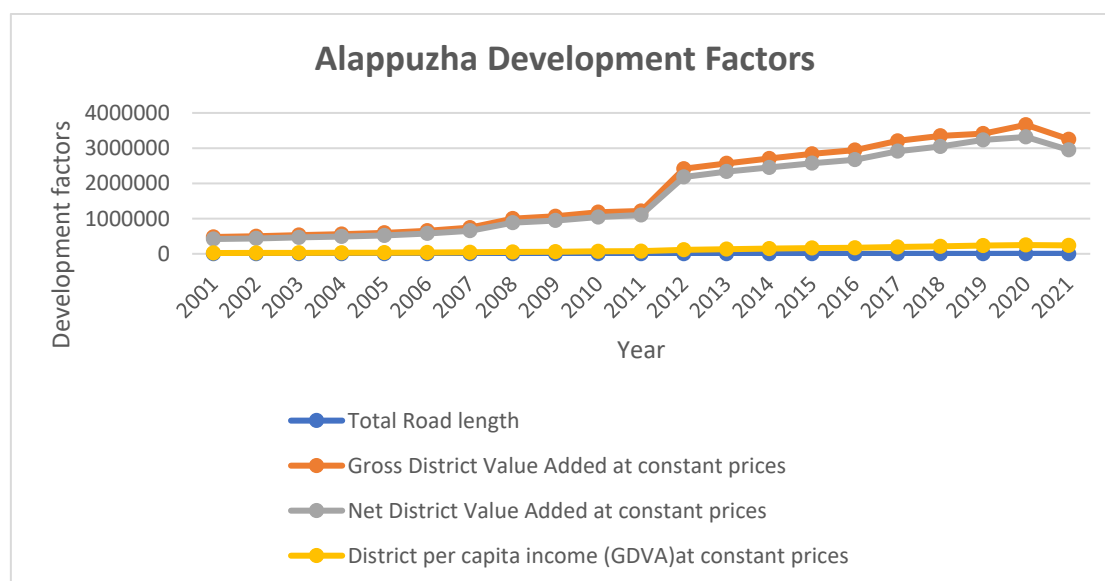
**Figure 16 Pathanamthitta Development Factors**



**Table 17 Alappuzha Development Factors**

Year	Total Road length	Gross District Value Added at constant prices	Net District Value Added at constant prices	District per capita income (GDVA)at constant prices
2001	1128	478685	420582	23183
2002	1128	496968	435999	24600
2003	1136	532902	466909	26940
2004	1136	559456	492099	29428
2005	1310	596187	520757	32719
2006	1265	654113	576650	37203
2007	1265	742685	654627	43497
2008	1265	1000434	883646	51991
2009	819	1066300	944654	60624
2010	1203	1181141	1043510	70149
2011	1203	1216821	1101741	75075
2012	1474	2415715	2180809	113473
2013	1474	2568443	2336179	131972
2014	1474	2705114	2450953	148161
2015	1474	2836652	2572952	164160
2016	1472	2945003	2672742	171102
2017	1472	3205431	2913066	194410
2018	1472	3349152	3046840	212774
2019	1472	3413396	3232089	235278
2020	2031	3662996	3316768	249346
2021	2031	3251811	2949826	238321

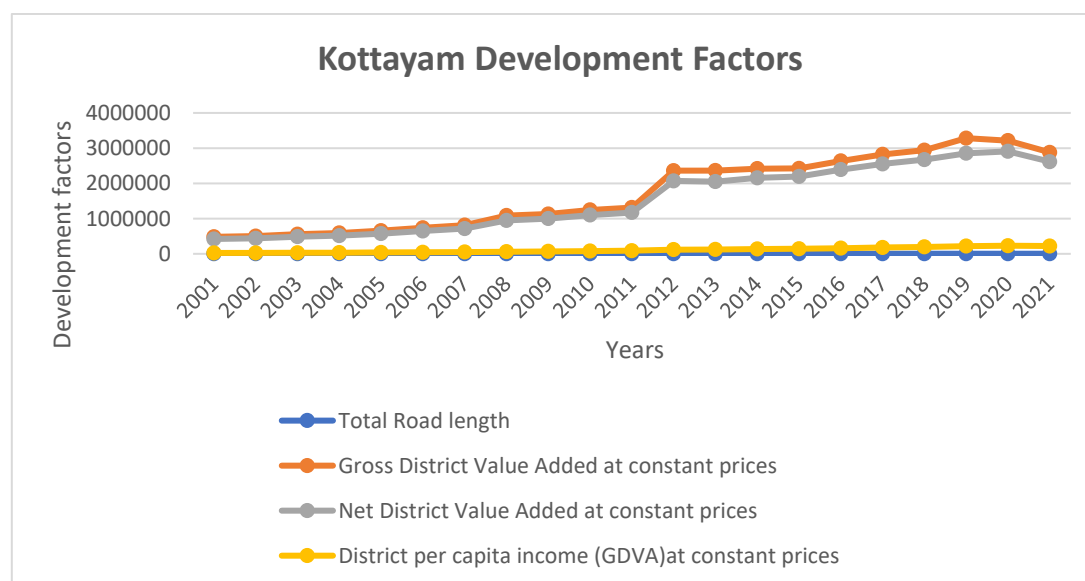
**Figure 17 Alappuzha Development Factors**



**Table 18 Kottayam Development Factors**

Year	Total Road length	Gross District Value Added at constant prices	Net District Value Added at constant prices	District per capita income (GDVA)at constant prices
2001	2225	483608	421883	24883
2002	2167	503409	439291	26376
2003	2173	556495	485755	30102
2004	2173	590844	516875	33418
2005	2591	657826	572560	38058
2006	2830	738471	648589	43677
2007	2830	813181	716681	50435
2008	2830	1085466	948396	60630
2009	3087	1130535	999701	68518
2010	3017	1245262	1099252	78889
2011	3017	1313728	1173633	89583
2012	3449	2361357	2071033	119515
2013	3449	2363100	2050213	122429
2014	3449	2417923	2155614	137524
2015	3449	2425059	2195479	144278
2016	3456	2635984	2390969	159128
2017	3456	2822080	2552373	178977
2018	3456	2942908	2673829	196966
2019	3456	3283445	2853752	217917
2020	3456	3213111	2907636	230584
2021	3456	2879484	2616183	219766

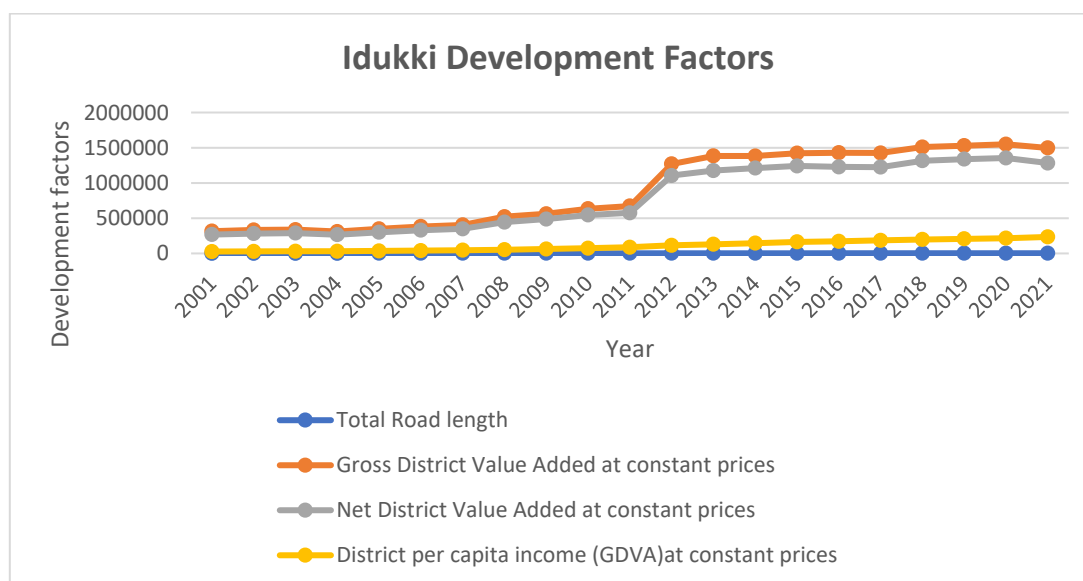
**Figure 18 Kottayam Development Factors**



**Table 19 Idukki Development Factors**

Year	Total Road length	Gross District Value Added at constant prices	Net District Value Added at constant prices	District per capita income (GDVA)at constant prices
2001	1678	316501	268050	26935
2002	1621	333472	282257	28635
2003	1671	338054	288597	30900
2004	1671	310716	265635	30466
2005	2245	349504	299924	34907
2006	2494	381433	329154	39622
2007	2494	404059	349444	45232
2008	2494	521322	444497	52552
2009	2279	561925	487087	62682
2010	2401	633856	545316	73847
2011	2401	672698	576400	88253
2012	2852	1269744	1105526	114618
2013	2852	1383244	1175494	129303
2014	2852	1382600	1211539	146096
2015	2852	1421999	1241730	164229
2016	2867	1429447	1227593	171975
2017	2867	1425237	1224354	185159
2018	2867	1510195	1315802	197503
2019	2867	1529441	1338542	206761
2020	2867	1548996	1354141	216339
2021	2867	1497504	1282879	233890

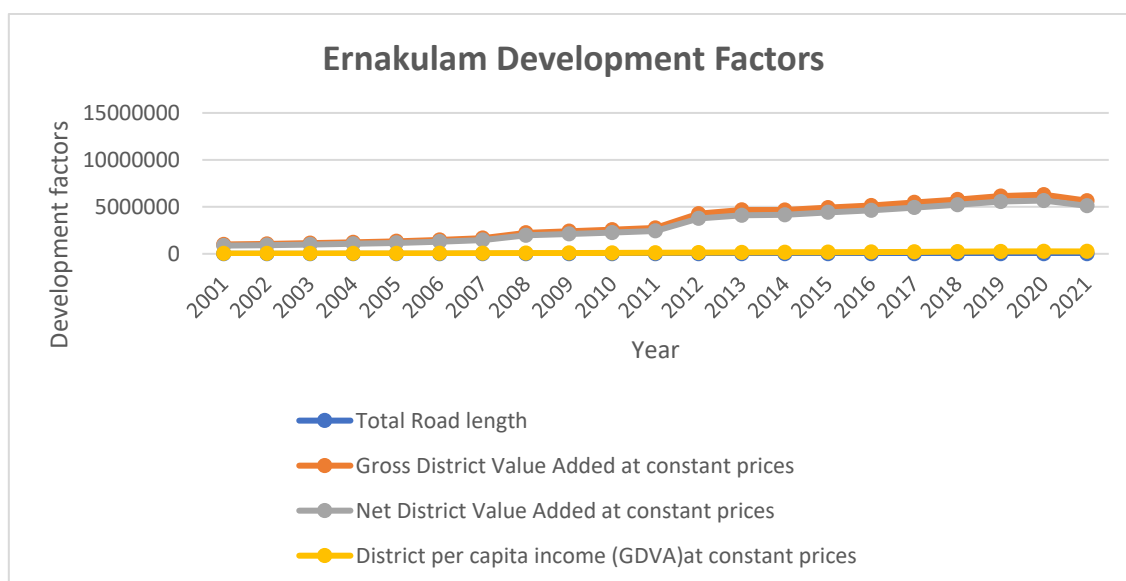
**Figure 19 Idukki Development Factors**



**Table 20. Ernakulam Development Factors**

Year	Total Road length	Gross District Value Added at constant prices	Net District Value Added at constant prices	District per capita income (GDVA)at constant prices
2001	2164	1001011	878234	33273
2002	2164	1051519	919150	35290
2003	2183	1134562	991305	38893
2004	2183	1221189	1068822	43228
2005	2433	1328620	1158090	48454
2006	1778	1474238	1293056	54661
2007	1778	1670295	1468261	63699
2008	2655	2234396	1968640	76076
2009	1936	2402003	2114169	89000
2010	2070	2569816	2261351	98250
2011	2070	2749763	2434249	110524
2012	3141	4268111	3766862	129612
2013	3141	4667331	4097327	147834
2014	3141	4662530	4152903	160305
2015	3141	4919102	4416912	175952
2016	3085	5138293	4625569	187187
2017	3085	5471517	4928730	207037
2018	3085	5779281	5220526	228797
2019	3085	6146692	5561485	249834
2020	3085	6289123	5670569	262211
2021	3085	5650813	5110094	254320

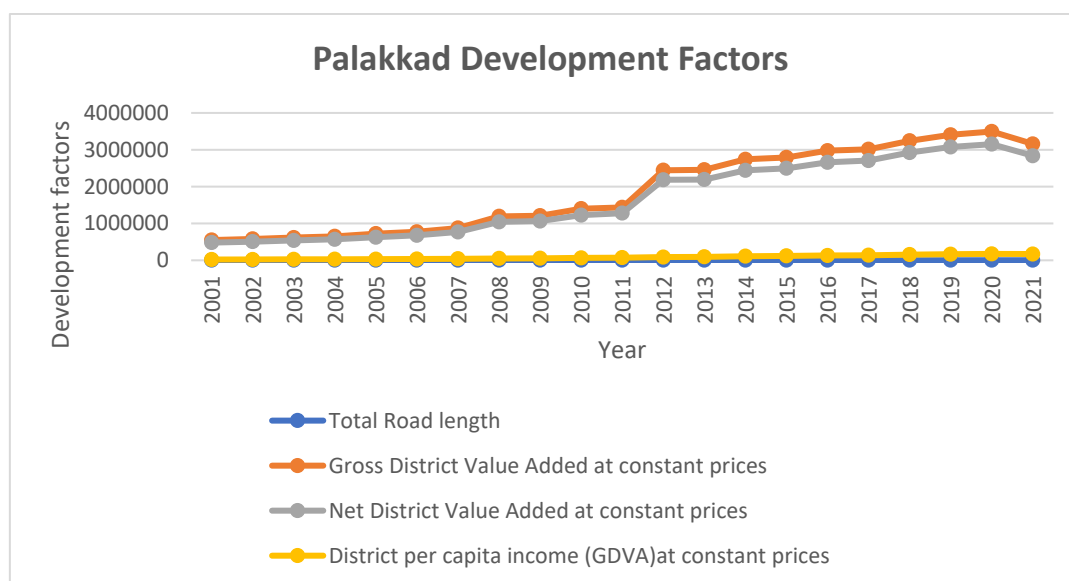
**Figure 20 Ernakulam Development Factors**



**Table 21 Palakkad Development Factors**

Year	Total Road length	Gross District Value Added at constant prices	Net District Value Added at constant prices	District per capita income (GDVA)at constant prices
2001	1646	549322	480439	21283
2002	1646	580725	506378	22782
2003	1646	617122	539231	25221
2004	1646	650082	568128	27425
2005	1938	722748	626387	31382
2006	1727	773666	677431	34355
2007	1727	876441	769289	40538
2008	1727	1192371	1042196	49325
2009	1530	1210962	1065425	54440
2010	1584	1401036	1225430	66199
2011	1584	1434817	1278344	71509
2012	2173	2443360	2185255	86595
2013	2173	2456872	2191654	93459
2014	2173	2740470	2441362	111822
2015	2173	2790858	2495950	120041
2016	2185	2976313	2659602	131092
2017	2185	3011954	2706767	137715
2018	2185	3242354	2923739	153940
2019	2185	3405965	3076395	165277
2020	2185	3495343	3150697	173685
2021	2185	3158861	2837434	169183

**Figure 21 Palakkad Development Factors**

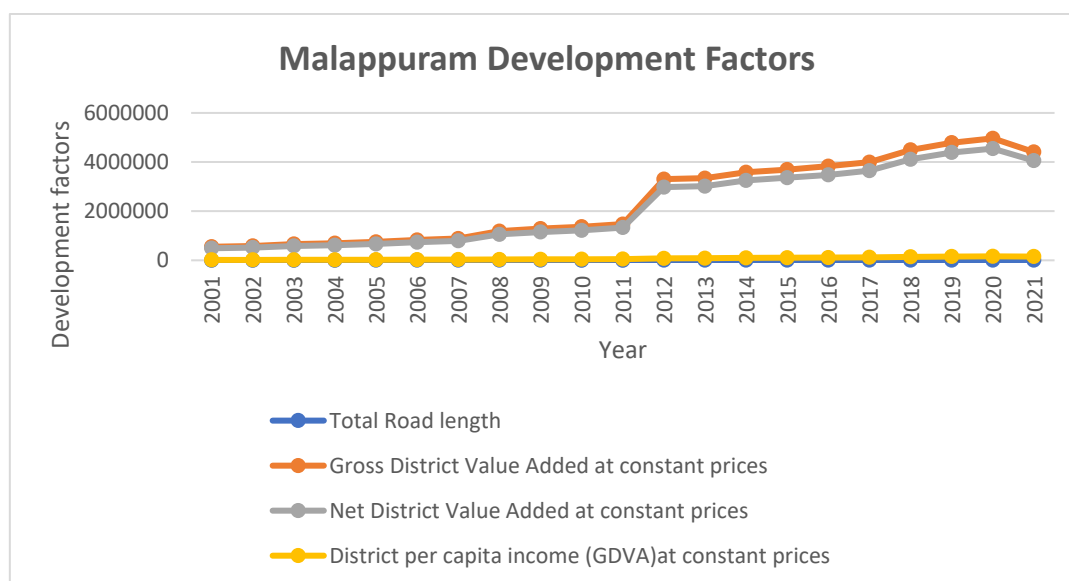




**Table 22 Malappuram Development Factors**

Year	Total Road length	Gross District Value Added at constant prices	Net District Value Added at constant prices	District per capita income (GDVA)at constant prices
2001	1760	551443	490913	15540
2002	1770	583042	517815	16575
2003	1828	660902	582044	18973
2004	1828	693126	613455	20651
2005	2307	749629	663305	22798
2006	2424	826160	736374	25660
2007	2424	884966	792529	28379
2008	2424	1187667	1054607	34007
2009	1875	1291241	1149734	40428
2010	1796	1365236	1219160	44082
2011	1796	1474058	1332342	50452
2012	2676	3302779	2976381	79713
2013	2676	3342457	3016635	86344
2014	2676	3583136	3252364	97373
2015	2676	3690413	3361490	104643
2016	2680	3832819	3476485	111455
2017	2680	3994939	3647864	120500
2018	2680	4492097	4111777	140383
2019	2680	4785111	4388226	152235
2020	2680	4964505	4546322	160407
2021	2680	4406779	4056425	152758

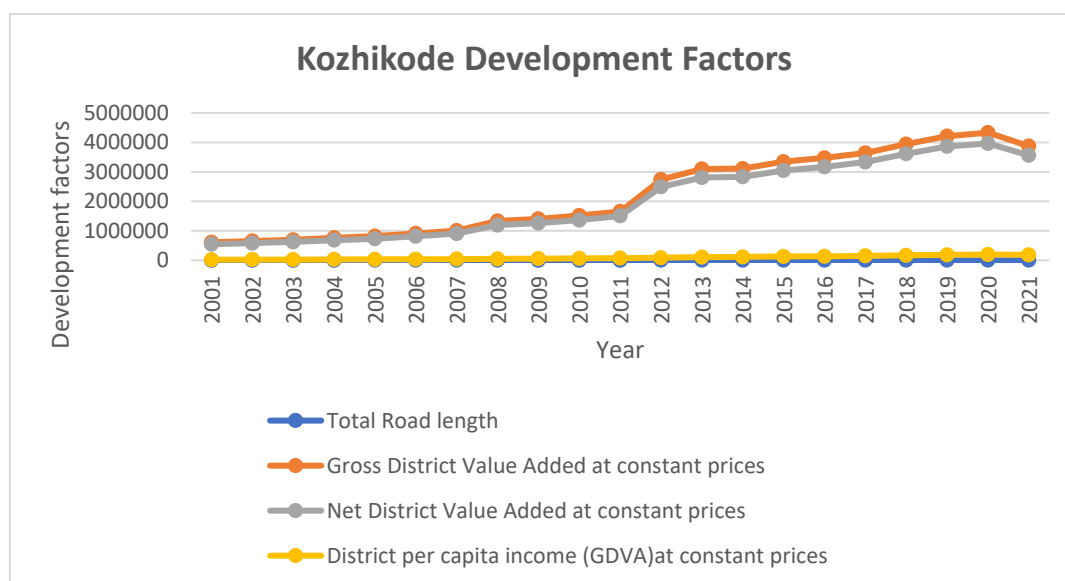
**Figure 23 Malappuram Development Factors**



**Table 24 Kozhikode Development Factors**

Year	Total Road length	Gross District Value Added at constant prices	Net District Value Added at constant prices	District per capita income (GDVA)at constant prices
2001	1299	610512	545364	21848
2002	1363	653521	582422	23591
2003	1362	696405	623501	25904
2004	1362	763199	680876	29198
2005	2044	821056	730360	32375
2006	2208	908448	815313	36817
2007	2208	1007020	906341	41834
2008	2208	1336066	1194330	49707
2009	1328	1404107	1259972	56789
2010	1306	1519779	1363644	64028
2011	1306	1654207	1505876	72622
2012	2441	2738358	2489989	88367
2013	2441	3098110	2807848	107957
2014	2441	3111808	2832537	114369
2015	2441	3343676	3045522	129963
2016	2455	3475481	3167253	137291
2017	2455	3640132	3334265	148528
2018	2455	3940903	3612621	168624
2019	2455	4211260	3864800	184806
2020	2455	4330693	3963434	194107
2021	2455	3873880	3558411	186159

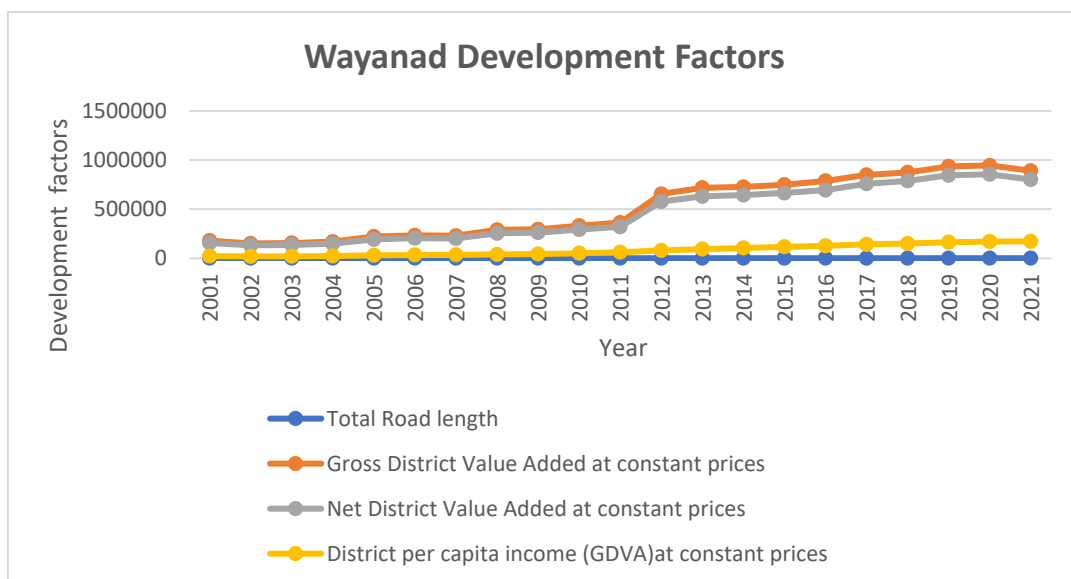
**Figure 24 Kozhikode Development Factors**



**Table 25 Wayanad Development Factors**

Year	Total Road length	Gross District Value Added at constant prices	Net District Value Added at constant prices	District per capita income (GDVA)at constant prices
2001	515	180117	155618	22214
2002	515	151067	132078	19379
2003	516	155504	136411	20606
2004	516	169756	148519	23395
2005	803	221273	192628	30521
2006	970	233307	204621	33259
2007	970	229510	202443	34913
2008	970	290080	253795	39318
2009	700	294576	261430	43260
2010	766	331620	292779	51216
2011	766	362929	320638	60858
2012	1029	654767	577523	79886
2013	1029	717770	630290	93559
2014	1029	726768	643604	105407
2015	1029	748210	664549	116434
2016	1029	787630	693997	127013
2017	1029	848814	758198	142155
2018	1029	873924	787501	150115
2019	1029	935533	845806	164060
2020	1029	944915	854178	169886
2021	1029	891346	801418	172577

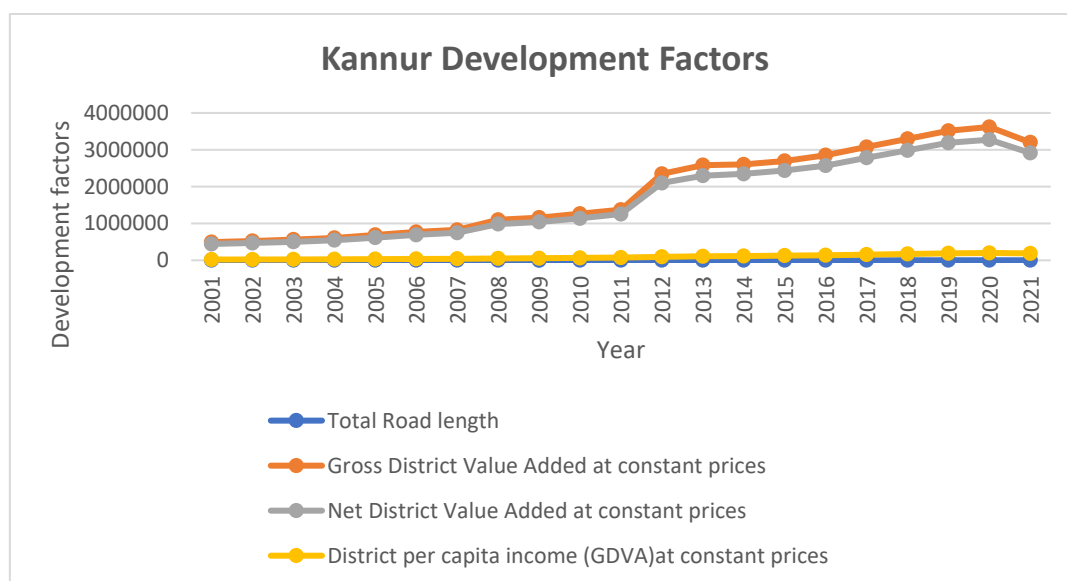
**Figure 25 Wayanad Development Factors**



**Table 26 Kannur Development Factors**

Year	Total Road length	Gross District Value Added at constant prices	Net District Value Added at constant prices	District per capita income (GDVA)at constant prices
2001	1763	494542	444226	21042
2002	1698	523293	469459	22471
2003	1753	562089	502039	24900
2004	1753	606669	544675	28085
2005	2264	688337	614883	32603
2006	2343	768600	691871	37339
2007	2343	826513	747735	41580
2008	2343	1098900	984550	49683
2009	1051	1157035	1040885	57155
2010	1698	1264340	1137309	64966
2011	1698	1373869	1255520	74020
2012	2258	2346776	2098192	92763
2013	2258	2582041	2294940	107888
2014	2258	2602399	2345661	116310
2015	2258	2696563	2436982	127844
2016	2265	2851401	2569396	137249
2017	2265	3075880	2783340	153540
2018	2265	3294009	2983640	172490
2019	2265	3515132	3189093	188932
2020	2265	3619255	3272902	198717
2021	2265	3198448	2912810	187296

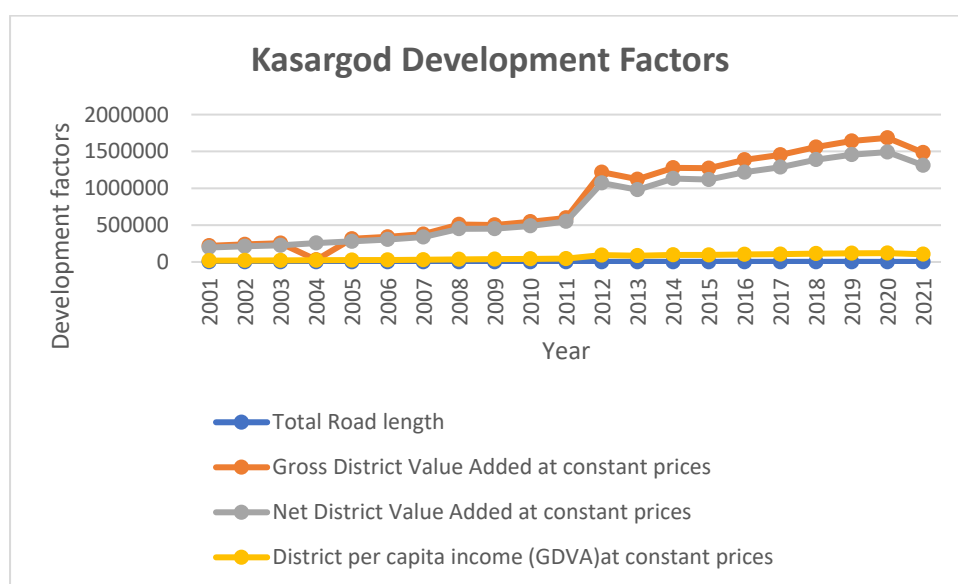
**Figure 26 Kannur Development Factors**



**Table 27 Kasargod Development Factors**

Year	Total Road length	Gross District Value Added at constant prices	Net District Value Added at constant prices	District per capita income (GDVA)at constant prices
2001	872	220054	195961	18338
2002	863	238334	211808	19730
2003	863	254177	225471	20715
2004	863	28925	256594	23290
2005	1260	314429	279810	25034
2006	1419	340175	305026	26785
2007	1419	376809	338553	29369
2008	1419	508392	449606	34692
2009	1046	501711	450862	38357
2010	916	545147	489268	41362
2011	916	597319	550117	44979
2012	1443	1217357	1071044	92668
2013	1443	1122046	979690	84711
2014	1443	1277929	1132519	95757
2015	1443	1271893	1117942	94523
2016	1461	1385932	1217384	102154
2017	1461	1453490	1286225	106256
2018	1461	1559085	1388285	113041
2019	1461	1641303	1455108	118026
2020	1461	1683937	1491310	120100
2021	1461	1483636	1310707	104947

**Figure 27 Kasargod Development Factors**



## APPENDIX -III

### ECONOMIC IMPACT OF URBAN AGGLOMERATION IN KERALA

#### INTERVIEW SCHEDULE

##### PART A

##### I. Information about the respondent

1. Belongs to	1. Adat (CT) 2. Arimpur (CT) 3. Avinissery (CT) 4. Puthur (CT) 5. Thrissur Corporation (ST) 6. Eriyad (OG)
2. Age	
3. Gender:	1. Male 2. Female
4. Marital status	1. Married 2. Unmarried 3. Widow/widower 4. Divorcee
5. Religion of the family	1. Hindu 2. Muslim 3. Christian
6. Social group	1. Scheduled Caste 2. Scheduled Tribe 3. OBC 4. General 5. Others
7. Category	1. APL 2. BPL
8. Are you member of any Social Association	0. Nil 1. SHG 2. Political associations 3. Youth clubs 4. Residents' associations 5. Religious associations 6. Others specify.....
9. Highest Educational qualification	1. primary 2. SSLC 3. Pre-degree 4. Degree 5. PG 6. Professional 7. others
10. Occupational structure of the head of the family	1. agricultural labour 2. unskilled non-agricultural labour 3. skilled non-agricultural labour 4. employment in govt./semi.govt. services 5. private sector 6. industrial worker 7. urban shop service 8. rural shop service 9. business in urban areas 10. business in rural areas 11. others
11. Ownership of house	1. Rent 2. Owned 3. Family Ownership
<b>PART B</b>	
<b>II. Determinants of Urban Agglomeration of the Area</b>	
12. Number of years the family	

resides in the particular locality	
13. Whether relocation happened	0.No 1. Yes
14. If yes, the year in which relocation occurs	
15. from where the relocation happened	0.No relocation 1. within 20 km 2. Within 10 km 3. from the city area 4. From another district 5. From other state
16. What is the reason for the relocation	0.No shift 1. Employment 2. Marriage 3. Education 4. Better urban facilities 5. Others specify.....
17.Distance from the core city	
18.Monthly income from occupation	

### PART C

#### III. Perceptionsof respondents

kindly tick the appropriate columns corresponding to the statements; Strongly agree (5), agree (4),Neither agree nor disagree (3), disagree (2), Strongly disagree (1).

COST OF LIVING INDEX					
	1	2	3	4	5
CLI1. The construction of houses requires high cost of materials					
CLI2. There is enough space for housing structures					
CLI3. The location of housing is influenced by urban agglomeration					
CLI4. The price of land is increased due to the level of urban agglomeration					
CLI5. People prefer to live in a locality of high level of development of urbanised facilities					
CLI6. The cost of living varies from locality to locality					
CLI7. The regional development is related positively with urban agglomeration					
CLI8. The farther away from the city reduces the effect of urban agglomeration.					
CLI9. There is enough accessibility of transportation facilities					
CLI10.Density of the place related to the degree of urban agglomeration					
<b>SOCIAL INDEX</b>					
SI1. The accessibility of social services varies					

from region to region					
<b>SI2.</b> High development of roads leads to better economic development of the region					
<b>SI3.</b> The urban life is very useful in participating in the social gatherings					
<b>SI4.</b> There are always better accessibilities of good communication network.					
<b>SI5.</b> The increase in the number of buildings influencing the higher land rents of particular locality					
<b>SI6.</b> Educational attainment involves gender equality					
<b>SI7.</b> There are better consumption varieties of food					
<b>SI8.</b> There is rise in the growth of private educational institutions providing good quality education					
<b>SI9.</b> Modernisation leads to high life style					
<b>SI10.</b> The fees of educational attainment are highest in the city area					
<b>ECONOMIC INDEX</b>					
<b>ECI1.</b> High development of roads leads to balanced regional development.					
<b>ECI2.</b> Increase the wage rate of daily workers					
<b>ECI3.</b> Highly diversified economic activities					
<b>ECI4.</b> High tax rate in urban areas					
<b>ECI5.</b> Increase the quality level of technological advancements					
<b>ECI6.</b> High physical infrastructure					
<b>ECI7.</b> Adequate investment opportunities					
<b>ENVIRONMENT INDEX</b>					
<b>ENI1.</b> Air pollution is high due to the increase of vehicles					
<b>ENI2.</b> There are adequate methods of waste disposal.					
<b>ENI3.</b> Environmental sustainability is the vision of our future.					
<b>ENI4.</b> Green economy initiative is reachable at all levels.					
<b>ENI5.</b> Environmental quality is adequate.					
<b>ENI6.</b> Hygienic environment leads to healthy living.					
<b>ENI7.</b> Proper disposal of e-waste					
<b>ENI8.</b> Proper sewerage disposal					



ENI9. Availability of pure drinking water					
ENI10. Availability of fertile land for cultivation purposes.					
<b>HEALTH INDEX</b>					
HI1. High advancement of medical facilities					
HI2. The medical expenditure of the family decreases due to the adequate medical facilities in the govt. sector.					
HI3. Life style diseases are increasing.					
HI4. High awareness about the regular medical check-upis.					
HI5. Environment and health indices are related each other.					
HI6. Adequate number of multi-speciality hospitals.					
HI7. Strengthening the health scenario.					
HI8. High investment of old age homes in the private sector.					
<b>QUALITY OF LIFE INDEX</b>					
QLI1. Urbanised life gives the opportunity for people to use their personal space.					
QLI2. Urbanised life gives more physical safety and security.					
QLI3. Urbanised life gives more participation in voluntary organisations (clubs and other social gatherings)					
QLI4. Urbanised life promotes good relationships and daily interaction between people by providing civic buildings and public gathering places.					
QLI5. Urbanised life increases my financial knowledge and skills, access to safe and affordable financial products and economic resources.					
QLI6. Urbanised life gives me more exposure to develop myself and my profession					
QLI7. Preserve resources and minimize energy demand by taking energy saving technologies.					
QLI8. Urbanised life allows participation opportunities for recreation/leisure activities in Parks, Malls etc.					
<b>FINANCIAL INCLUSION AND AWARENESS INDEX</b>					
FIAI1. The Households avail adequate banking services					
FIAI2. Banking procedures are easily handled by					

the households.					
<b>FIAI3.</b> Investment avenues are fully utilised					
<b>FIAI4.</b> There is most modern way of mobilising funds.					
<b>FIAI5.</b> Most modern technique of financial services is utilised.					
<b>FIAI6.</b> Better investment climate needs better awareness					
<b>FIAI7.</b> Decrease in the overall saving rate of the household.					
<b>FIAI8.</b> Financial inclusion and financial instruments are well practiced in urban areas.					
<b>FIAI9.</b> There is inefficiency of banking awareness among households.					
<b>FIAI10.</b> The online financial services could be fully reached.					
<b>WOMEN EMPOWERMENT INDEX</b>					
<b>WEI1.</b> There is increase in the proportion of employed women to total employment					
<b>WEI2.</b> Women participation to economic activities is high.					
<b>WEI3.</b> The deposit mobilisation of unskilled women workers contributes more.					
<b>WEI4.</b> The availability of adequate resources (money and materials) within the purview of women.					
<b>WEI5.</b> The women membership to social groups increases largely.					
<b>WEI6.</b> All the female members are fully aware about banking procedures.					
<b>WEI7.</b> High involvement of women in new investment avenues.					
<b>WEI8.</b> Women participation to online shopping shows an increasing trend.					



## Bibliography

- Adamson, D. W., Clark, D. E., & Partridge, M. D. (2004). Do Urban Agglomeration Effects and Household Amenities have a Skill Bias?\*. *Journal of Regional Science*, 44(2), 201–224. doi:10.1111/j.0022-4146.2004.00334.x
- Amitabh Kundu (1993), “Urbanisation and Alternate Policy Perspectives”, *Economic and Political Weekly*, pp 1351-1352.
- Amitabh Kundu and Niranjana Sarangi (2007), “Migration, Employment Status and Poverty – An analysis across urban centres” – *Economic and Political Weekly* pp 299-306
- Annapurna Shaw (2005), Peri-Urban Interface of Indian cities, Growth, Governance and Local Initiatives – *Economic and Political Weekly*, pp 129-136.
- Avishekbhunia and Pritirekhaspattanayak(2018), Quality of Life In Urban West Bengal : A Study with Reference to Basic Amenities, *Indian Journal of Regional Science*, vol.L(1),pp.112-120
- Avishekbhunia And Pritirekhaspattanayak (2018), Quality Of Life In Urban West Bengal : A Study With Reference To Basic Amenities, *Indian Journal Of Regional Science*, Vol.L(1),Pp.112-120
- Balchin, P. N., Bull, G. H., & Kieve, J. L. (1995). *Urban land economics and public policy*. Macmillan International Higher Education.
- Balchin, P. N., Bull, G. H., & Kieve, J. L. (1995). *Urban land economics and public policy*. Macmillan International Higher Education.
- Bhagat, R. B. (2011). Emerging pattern of urbanisation in India. *Economic and political weekly*, 10-12.
- Bhagat, R. B. (2011). Emerging pattern of urbanisation in India. *Economic and political weekly*, 10-12.
- Bhagat, R. B. (2018). *Urbanization in India: Trend, pattern and policy issues*. International Institute for Population Sciences.
- Biplab Dasgupta (2000), Contrasting Urban Patterns: West Bengal, Punjab and Kerala, Centre for Urban Economic Studies, pp 1-37
- Bolter, K., & Robey, J. (2020). Agglomeration Economies: A Literature Review.

- Chakraborty, S., Chatterjee, S., Das, K., & Roy, U. (2015). Changing pattern of urbanization in West Bengal: An analysis of 2011 census of India data. *Asian Journal of Research in Social Sciences and Humanities*, 5(5), 169-181.
- Chandramouli, C., & General, R. (2011). Census of India 2011. Provisional Population Totals. New Delhi: Government of India, 409-413.
- ChinmoyeeMallik(2014),”Dynamics of work in the rural peripheries of mega-cities: An exploratory Enquiry”, *The Indian Journal of Labour Economics*, vol.57,no.3,2014,pp 185-202.
- Chinmoykundu and Uma sankarmalik (2016), role of census towns on urbanization in west Bengal, *Indian journal of regional science* vol.XLVIII, No.1, 2016 pp 101-113
- Ciommi, M., Egidi, G., Salvia, R., Cividino, S., Rontos, K., & Salvati, L. (2020). Population Dynamics and Agglomeration Factors: A Non-Linear Threshold Estimation of Density Effects. *Sustainability*, 12(6), 2257.
- Dahiya, B. (2012, June). Asian cities in the 21st century. In *East Asia Forum*.
- Dasgupta, B. (1987). Urbanisation and rural change in West Bengal. *Economic and Political Weekly*, 276-287.
- Davis, K. (1965). The Urbanization of the Human Population. *Scientific American*, 213(3), 40–53. <http://www.jstor.org/stable/24931110>
- Du, Y., Sun, T., Peng, J., Fang, K., Liu, Y., Yang, Y., & Wang, Y. (2018). Direct and spillover effects of urbanization on PM2. 5 concentrations in China's top three urban agglomerations. *Journal of Cleaner Production*, 190, 72-83.
- Elfie Swerts (2014), The future of India’s Urbanisation 56, pp 43-52.
- Eric Denis and Marie Helene Zerah, “Rural-Urban linkages – India case study” – Working Paper series, No.124, Chile
- Eric Denis,ParthaMukhopadhyay and Marie Helene Zereh (2012), “Sub-altern Urbanisation in India”, *Economic and Political Weekly*, Vol.XLVII No..30 pp (52-62)
- Fang, C., & Yu, D. (2017). Urban agglomeration: An evolving concept of an emerging phenomenon. *Landscape and urban planning*, 162, 126-136.
- Fang, C., Cui, X., Li, G., Bao, C., Wang, Z., Ma, H., ... & Ren, Y. (2019). Modeling regional sustainable development scenarios using the Urbanization and Eco-environment Coupler: Case study of Beijing-Tianjin-Hebei urban agglomeration, China. *Science of the Total Environment*, 689, 820-830.

- Fearon, D. (2006). Alfred weber: theory of the location of industries, 1909. *Center for Spatially Integrated Social Science*.
- Figueras, A. J., Cristina, A. D., Blanco, V. J., & Iturralde, I. M. (2021). The influence of agglomeration on growth: A study of Argentina. *Investigaciones Regionales-Journal of Regional Research*, (51), 33-61.
- Gabaix, X. (1999). Zipf's Law for Cities: An Explanation. *The Quarterly Journal of Economics*, 114(3), 739–767. <http://www.jstor.org/stable/2586883>
- Ginsburg, N. S., Koppel, B., & McGee, T. G. (Eds.). (1991). *The extended metropolis: Settlement transition in Asia*. University of Hawaii Press.
- Glazer, A., Gradstein, M., & Ranjan, P. (2003). Consumption variety and urban agglomeration. *Regional Science and Urban Economics*, 33(6), 653–661. doi:10.1016/s0166-0462(03)00022-x
- Gottman, J. (1961). *Megalopolis: The Urbanized Northeastern Seaboard of the United States*.
- Guin, D. (2018). From large villages to small towns: A study of rural transformation in new census towns, India. *International Journal of Rural Management*, 14(2), 87-109.
- Habitat, U. N. (2013). *State of the world's cities 2012/2013: Prosperity of cities*. Routledge. *World Urbanization Prospects: The 2018 Revision*. (2019). Kenya: UN. <http://www.geohive.com/entry/asia.aspx> source population data: United Nations, Department of Economic and Social Affairs, Population Division (2013). *World Population Prospects: The 2012 Revision*.
- Han, F., Xie, R., Fang, J., & Liu, Y. (2018). The effects of urban agglomeration economies on carbon emissions: Evidence from Chinese cities. *Journal of Cleaner Production*, 172, 1096-1110.
- Higgins, B., & Savoie, D. J. (Eds.). (2017). *Regional economic development: essays in honour of François Perroux*. Routledge.
- Himahari u (2015) urbanization in Kerala – trends and consequences, *Indian Journal of Applied Research*, vol.5, pp – 455-457
- Howard, E. (1946). *Garden cities of tomorrow* (pp. 9-28). London: Faber.
- Human Development Report. (2003). United States: Oxford University Press.
- Jumafuddin Sheikh and Rukhsana (2015) Trend and Pattern of Urbanization In Nadia District, West Bengal, *Indian Journal of Regional Science* vol. XLVII, No. 2, 2015 pp 133-139

- Kadi and Nelavigi(2015), Growth of Urbanisation in India, *The International Journal of Science and Technoledge*, vol.3(7), pp 30-38
- Kadi, A. S., &Nelavigi, K. P. (2015). Growth of Urbanisation in India. *The International Journal of Science and Technoledge*, 3(7), 30.
- Kanemoto, Y. (2013). Second-best cost–benefit analysis in monopolistic competition models of urban agglomeration. *Journal of Urban Economics*, 76, 83–92. doi:10.1016/j.jue.2013.03.006
- KanhuCharanPradhan (2012) Unacknowledged Urbanisation – The new census towns of India, Centre for Policy Research, urban working paper – august 2012.
- Kawashima, T. (2005). URBAN AGGLOMERATION ECONOMIES IN MANUFACTURING INDUSTRIES. *Papers in Regional Science*, 34(1), 157–172. doi:10.1111/j.1435-5597.1975.tb00941.x
- Khan, Z. U., & Awan, M. S. (2017). Impact of Urban Agglomeration on Economic Growth of Cities. *Review of Economics and Development Studies*, 3(2), 167-181.
- Kim, S. (2005). DIVERSITY IN URBAN LABOR MARKETS AND AGGLOMERATION ECONOMIES. *Papers in Regional Science*, 62(1), 57–70. doi:10.1111/j.1435-5597.1987.tb01053.x
- Krashinsky, H. (2011). Urban agglomeration, wages and selection: Evidence from samples of siblings. *Labour Economics*, 18(1), 79–92. doi:10.1016/j.labeco.2010.08.006
- Kundu, A. (2011). Trends and processes of urbanisation in India.
- Kundu, D. (2014). Urban development programmes in India: A critique of JNNURM. *Social Change*, 44(4), 615-632.
- Kundu, D., &Samanta, D. (2011). Redefining the inclusive urban agenda in India. *Economic and Political Weekly*, 55-63.
- Kundu, D., &Samanta, D. (2011). Redefining the inclusive urban agenda in India. *Economic and Political Weekly*, 55-63.
- Kuruvilla, K. (2014). Census towns in Kerala: Challenges of urban transformation. *Research notebooks, School of Habitat Studies*, 1-12.
- Li, C., Huang, Y., & Wang, Q. (1998). Comparative study on Chinese urban agglomeration districts. *Chinese Geographical Science*, 8(2), 136–143. doi:10.1007/s11769-997-0027-8
- Li, X., Huang, B., Li, R., & Zhang, Y. (2016). Exploring the impact of high speed railways on the spatial redistribution of economic activities - Yangtze River Delta urban

agglomeration as a case study. *Journal of Transport Geography*, 57, 194–206.  
doi:10.1016/j.jtrangeo.2016.10.011

- M RaviBabu and V PhaniSree – “Public Transport for Indian Urban Agglomeration – A Strong case for Surface Rail” – *Economic and Political Weekly*, Vol.XLIX ,No.23,pp 105-116
- M S Deshmukh (2015), *Emerging Trends of Urbanisation in India*, “*International Journal of Economic and Business Review*” Vol.3 (12) 2015.pp
- Mahalayachatterjee (2011) *Regional Variation In Urbanisation in India and The Emergence of New Towns*, Centre For Urban Economic Studies pp 1-19
- McGee, T. (1989) *Urbanisasi or Kotadesasi? Evolving Pattern of Urbanization in Asia*. In: Cost, F.J., Dutt, A.K., Ma. L.J.C. and Nobel, A.G., Eds., *Urbanization in Asia: Spatial Dimension and Policy Issues*, University of Hawai Press, Honalulu, 93-108.
- McGee, T. (2015). 9 *The Emergence of Desakota Regions in Asia: Expanding a Hypothesis*. In N. Brenner (Ed.), *Implosions /Explosions* (pp. 121-137). Berlin, Boston: JOVIS Verlag GmbH. <https://doi.org/10.1515/9783868598933-010>
- McGee, T. G. (1971). *The urbanization process in the third world*. London: G. Bell and Sons, Ltd.
- McGee, T. G. (1987). *Urbanisasi Or Kotadesasi? The Emergence of New Regions of Economic Interaction in Asia*. United States: East-West Environment and Policy Institute.
- McGranahan, G., & Satterthwaite, D. (2014). *Urbanisation concepts and trends* (Vol. 220). International Institute for Environment and Development.
- Meardon, S. J. (2001). *Modeling agglomeration and dispersion in city and country: Gunnar Myrdal, Francois Perroux, and the New Economic Geography*. *American Journal of Economics and Sociology*, 60(1), 25-57.
- Mera, K. (1973). *On the urban agglomeration and economic efficiency*. *Economic Development and Cultural Change*, 21(2), 309-324.
- Mohammed Firoz c (2014) *A methodology to define the typology of rural-urban continuum settlements in Kerala – “Journal of Regional Development and Planning”* Vo. 3, No.1, pp 49-60.
- Mukhopadhyay, P., Zérah, M. H., & Denis, E. (2020). *Subaltern Urbanization: Indian Insights for Urban Theory*. *International Journal of Urban and Regional Research*, 44(4), 582-598.



- Mukhopadhyay, P., Zerah, M. H., Samanta, G., & Maria, A. (2016). *Understanding India's urban frontier: what is behind the emergence of census towns in India?*. The World Bank.
- Mukhopadhyay, P., Zerah, M. H., Samanta, G., & Maria, A. (2016). *Understanding India's urban frontier: what is behind the emergence of census towns in India?*. The World Bank.
- N N Bhattacharyya (1995) Role of small and Medium sized towns in the Development of North-East India, "Urban Development in North-East India – Potentiality and Problems" Reliance Publishing House , New Delhi ISBN 817510094-X
- Nagarlok (2017 ) A Study on Urbanisation of Kerala with reference to the cities and the slum population, Vol. XLIX, Part 4
- Narayana, M. R. (2008). Globalization and Urban Growth: Evidence for Bangalore (India). *CIRJE F-544, CIRJE, Faculty of Economics, University of Tokyo, Tokyo.*
- Narayana, M. R. (2011). Globalization and urban economic growth: evidence for Bangalore, India. *International Journal of Urban and Regional Research*, 35(6), 1284-1301.
- PabitraGiri (1995) Role of small and Medium sized towns in the Development of North-East India, "Urban Development in North-East India – Potentiality and Problems" Reliance Publishing House , New Delhi ISBN 817510094-X
- ParthaMukhopadhyay et.al (2016) understanding India's urban frontier "what is behind the emergence of Census Towns in India"? policy research working paper 7923, pp 1-35
- Partridge, M. D., Rickman, D. S., Ali, K., & Olfert, M. R. (2009). Agglomeration spillovers and wage and housing cost gradients across the urban hierarchy. *Journal of International Economics*, 78(1), 126–140. doi:10.1016/j.jinteco.2009.02.004
- Pavianose, S., & Christabell, P. J. TREND AND PATTERNS OF URBANISATION IN KERALA: AN OVERVIEW. *ISDA JOURNAL*, 971, 355.
- Pethe, A. B. H. A. Y., & Sharma, R. A. S. H. M. I. (2020). Urbanisation, slums and incidence of Covid-19: Undertaking reforms. *Nagarlok*, 3, 1-16.
- Phelps, N. A. (1992). External economies, agglomeration and flexible accumulation. *Transactions of the Institute of British Geographers*, 35-46.
- Pradhan, K. C. (2017). Unacknowledged urbanisation: The new census towns in India. In *Subaltern urbanisation in India* (pp. 39-66). Springer, New Delhi.

- Prakasam, C. P., & Ramani, P. Growth and future perspectives of Urban Agglomerations and cities in Andhra Pradesh: Census Data Analysis.
- PriyadarshiniSen (2017) Expansion of Delhi Urban Area into its Suburbs – A study, The Indian Journal of Regional Science, vol.XLIX, No. 2, pp 42-47 Kolkata
- R.B. Bhagat, (2011), Emerging Pattern Of Urbanisation In India, Economic And Political Weekly, vol.XLVI No.34,pp 10-12
- RishabhMisra (2016), Urbanomics in India (Detailed analysis of trends and patterns of urbanization in India), IOSR journal of economics and finance, vol.7(4), ISSN 2321-5925, pp 40-60
- Ronald D Hill (1994), The impact of Urbanisation on Rural-Urban linkages in Thailand and Malaysia –pp 149-164
- Roshanshetty (2012) urban infrastructure development in India – an overview , international conference on civil,electrical and electronics engineering (2012) pp 226-229
- SabidaDas And Laya K S (2016), Urbanization and Development in Kerala,International Journal of Applied Research,2(8): pp 586-590
- Saranikhatua (2018), Kolkata: A Study of Contemporary Urban Form from Regional Perspective, Indian Journal OfRegional Science, Vol.L(1), pp.150-156
- SaraniKhatua (2018), Kolkata: A Study Of Contemporary Urban Form From Regional Perspective, Indian Journal of Regional Science, vol.L(1),pp.150-156
- SatabdiBiswas and AnupamDebsarkar (2017), Supportive Urban Water Management – A case study of Barasat Municipality, West Bengal, pp 72-78
- Schofield, J. (1987). Cost-Benefit Analysis in Urban & Regional Planning (1st ed.). Routledge. <https://doi.org/10.4324/9781351026024>
- SEKHAR, C. (1971). Census of India 1971. Paper I of 1971.
- Sethi, M. (2015). Smart cities in India: challenges and possibilities to attain sustainable urbanisation. *Nagarlok*, 47(3), 20-37.
- Sharma, K. (2012). Rejuvenating India's Small Towns. Economic and political weekly, 63-68.
- Sharma, K. (2012). Rejuvenating India's Small Towns. *Economic and political weekly*, 63-68.
- Sheshagiri B (2014), Economics of Urbanisation in India:An Economic Analysis, Journal of economic & Social Development, Vol.X, No.1, pp.62-72

- Sheshagiri B (2014), Economics of Urbanisation in India: An Economic Analysis, Journal of economic & Social Development, vol.X, No.1, pp.62-72
- Smithapavianose and christabellp.j. (2016) trend and patterns of urbanisation in kerala: an overview, ISDA Journal, july-september 2016 pp 354-370
- Sreekumar, T. T. (1990). Neither rural nor urban: Spatial formation and development process. *Economic and Political Weekly*, 1981-1990.
- Sreekumar, T. T. (1990). Neither rural nor urban: Spatial formation and development process. *Economic and Political Weekly*, 1981-1990.
- Sujatadeori (2016) Unequal Growth Of Cities In North-East Indian States, Indian Journal Of Regional Science, vol.XLVIII, No.2, pp 104-110
- Sun, G.-Z., & Yang, X. (2002). Agglomeration Economies, Division of Labour and the Urban Land-rent Escalation: A General Equilibrium Analysis of Urbanisation. *Australian Economic Papers*, 41(2), 164–184. doi:10.1111/1467-8454.00157
- Surendra Singh (1995) Role of small and Medium sized towns in the Development of North-East India, “Urban Development in North-East India – Potentiality and Problems” Reliance Publishing House, New Delhi ISBN 817510094-X
- Tabuchi, T., & Yoshida, A. (2000). Separating Urban Agglomeration Economies in Consumption and Production. *Journal of Urban Economics*, 48(1), 70–84. doi:10.1006/juec.1999.2157
- Tan, R., Liu, Y., Liu, Y., He, Q., Ming, L., & Tang, S. (2014). Urban growth and its determinants across the Wuhan urban agglomeration, central China. *Habitat International*, 44, 268–281. doi:10.1016/j.habitatint.2014.07.005
- Tan, R., Liu, Y., Liu, Y., He, Q., Ming, L., & Tang, S. (2014). Urban growth and its determinants across the Wuhan urban agglomeration, central China. *Habitat International*, 44, 268-281.
- Tripathi, S. (2013). An overview of India’s urbanization, urban economic growth and urban equity.
- Uchida, H., & Nelson, A. (2009). Agglomeration index: Towards a new measure of urban concentration.
- Uchida, H., & Nelson, A. (2009). Agglomeration index: Towards a new measure of urban concentration.
- UN-Habitat. (2004). The challenge of slums: global report on human settlements 2003. *Management of Environmental Quality: An International Journal*, 15(3), 337-338.

- Wang, L., Deng, Y., Liu, S., & Wang, J. (2011). Research on urban spheres of influence based on improved field model in central China. *Journal of Geographical Sciences*, 21(3), 489-502.
- World Urbanization Prospects: The 2018 Revision. (2019). Kenya: UN.
- Yadav, V., & Bhagat, R. B. (2015). Spatial dynamics of population in Kolkata urban agglomeration. In *Urban development challenges, risks and resilience in asian mega cities* (pp. 157-173). Springer, Tokyo.
- Yali, X., Dahe, J., & Dan, W. (2007). On Index System and Quantitative Assessment of Eco-cities: A Case Study on Urban Agglomeration of the Yangtze Delta. *Chinese Journal of Population Resources and Environment*, 5(3), 51–56. doi:10.1080/10042857.2007.10677518
- Ye, C., Zhu, J., Li, S., Yang, S., & Chen, M. (2019). Assessment and analysis of regional economic collaborative development within an urban agglomeration: Yangtze River Delta as a case study. *Habitat International*, 83, 20-29.
- Zenou, Y. (2000). Urban unemployment, agglomeration and transportation policies. *Journal of Public Economics*, 77(1), 97–133. doi:10.1016/s0047-2727(99)00083-3

## **BOOK**

- Satterthwaite, D., & Tacoli, C. (2003). *The urban part of rural development: the role of small and intermediate urban centres in rural and regional development and poverty reduction* (No. 9). Iied.
- State Urbanisation Report, Kerala (2012), Department of Town and Country Planning, Government of Kerala.
- District Spatial Plan, Thrissur (2011), Department of Town and Country Planning, Government of Kerala.