



# Impact Of Urbanization On Mangroves In The Coastal Zone Of Kannur District

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## ABSTRACT

The term "mangrove ecosystem" refers to the mutual interaction and interdependence among the elements in mangrove forests. The mangrove wetland ecosystem is one of the most threatened ecosystems in the world. Mangroves are pivotal in mitigating climate change by sequestering carbon, shoreline protection, and minimizing the impact of cyclones, coastal erosion, sea level rise and tsunamis. The unique mangrove ecosystem is most favourable for the rich diversity of fishes and their related species and it offers livelihood opportunities to the locals In Kerala mangroves are extended to the coastal environment of all districts. Kannur district has the largest extent of mangrove followed by Ernakulum and Calicut. Urbanization and population explosion negatively impacted the fragile mangrove ecosystem. This paper examines the impact of urbanization, functional character and mangrove ecosystems in the coastal zone area of Kannur. There is an urgent need for sustainable urban planning and strict enforcement of environmental regulations.

**Key Words:** Mangrove ecosystem, wetland ecosystem, climate change, shoreline protection, cyclones, coastal erosion, sea level rise, tsunamis, Urbanization, functional character , sustainable urban planning

## INTRODUCTION

Mangroves play a critical role in the coastal environments they live in. Mangrove habitats are rare, extremely productive coastal wetlands that are found worldwide in tropical and subtropical climates. Salt-tolerant trees, bushes, and other species that can survive in brackish water and muddy soil are the defining features of these intertidal forests mangrove ecosystem have a high productivity rate. Productivity is the speed at which carbon is accumulated to maintain a plant and generate biomass. (Alongi, D. M. 2014). ). Duke (1992) defined a mangrove as tree, shrub, palm or ground fern, generally exceeding one and half meters in height, which grows above mean sea level in the intertidal zone of marine coastal environments,

or estuarine margins. Urbanization is the process by which a significant portion of the population settles down permanently in comparatively small regions, resulting in cities. Urban development is considered a driver for the loss and fragmentation of mangrove forests (Alongi 2002; Friess et al.2012). There is a significant increase of Urbanization rate in Kerala. Ernakulam district(68%) is the leading urbanised district , followed by Thrissur, Kozhikode and Kannur district as per 2011 census. Urbanization is one among the reasons behind the destruction of mangroves.

## STUDY AREA

Kannur is one of the 14 district along the west coast in the state of Kerala, India .The coastal zone of Kannur district lies between latitudes 11° 40'to 12° 48' North and longitudes 74°52' to 75° 56'East.Eastern part of the coastal zone lies mid land area of the district southern part bounded by Kozhikode district and Arabian sea in the west. The paper discusses the distribution of mangrove forest in the coastal zone of Kannur. There is one municipal corporation, Kannur as part of coastal zone and municipalities included in this coastal zone are Payyannur, Andoor, Thalassery. There are 21 Panchayath becomes the part of coastal zone. Kunjimangalam,Ramanthali, Madai,Cheruthazham,Ezhome, Pattuvam,Cherukunnu, Kannapuram, Mattool, Kalliassery, Azhikkode, Pappinissery,Kolachery, Munderi, Narath, Valapattanam, Chirakkal, Eranjoli, Pinarayi, Dharmadam and Muzhappilangad

**Table No: 1 Coastal Zone of Kannur-Administrative Division**

Administrative Unit	Name
Corporation	Kannur
Municipalities	Payyannur,Andoor,Thalassery
Panchayaths	Kunjimangalam,Ramanthali, Madai,Cheruthazham,Ezhome, Pattuvam,Cherukunnu, Kannapuram, Mattool, Kalliassery, Azhikkode, Pappinissery,Kolachery, Munderi, Narath, Valapattanam, Chirakkal, Eranjoli, Pinarayi, Dharmadam, Muzhappilangad.

Source: census 2011

## OBJECTIVES

This paper attempt to examine the distribution of Mangroves and urbanization in the coastal zone of Kannur district. The specific objectives include

1. To identify the impact of urbanization on mangroves in the coastal zone of Kannur
2. To analyse the functional character and distribution of mangrove in 2021

## MATERIALS AND METHODS

This paper highlights the spatial distribution of Mangrove and urbanization from 1991 to 2021. The study is based on primary and secondary data collection. Both GPS survey and field investigation is used to collect information for the study. Maps like Cadastral/village, topographical sheets of 1:25000 and 1:50000 scales covering the study area form the basic information for the preparation of base maps. The coastal zone area is demarcated on the basis of coastal zone management plan of Kannur district. Administrative divisions clipped by using Arc GIS 10.4 software. The distributional pattern is mapped by GPS survey, Arc GIS software and Google earth imageries. Census data based on administrative divisions used for analysis.

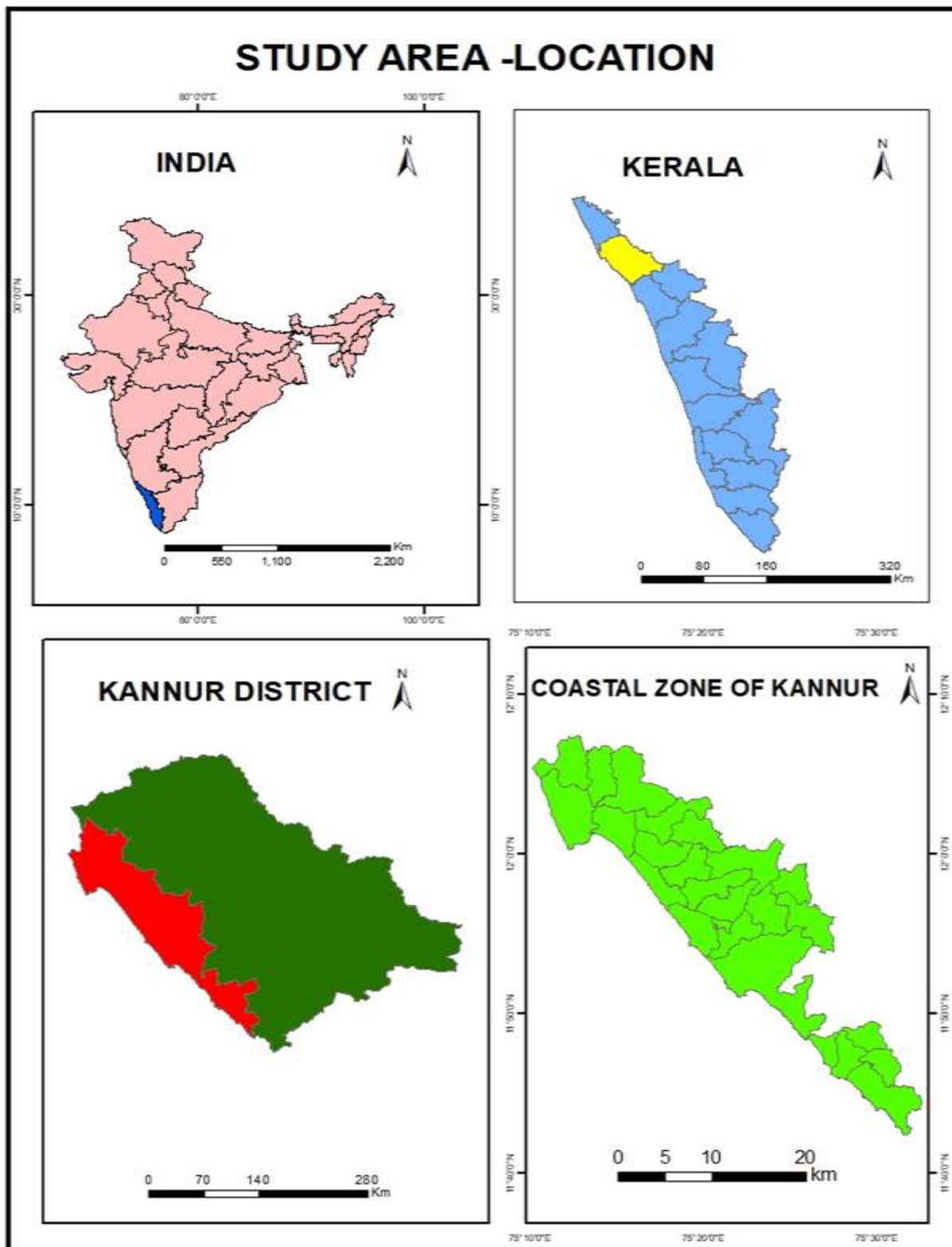
## RESULTS AND DISCUSSIONS

Table No : 2 Urbanization of Kerala and Kannur

Census Year	Kannur Urban in %	Kerala urban in %
1901	7	7
1911	8	7
1921	7	8
1931	7	10
1941	7	11
1951	7	13
1961	17	15
1971	14	16
1981	23	18
1991	51	26
2001	50.35	26
2011	65	48

Kannur (Source: District urbanization report)

Kannur's urban population grew at a rapid pace, table No : 2 illustrates urbanization of Kerala and Kannur from 1901 to 2011. From figure No:1 , it is clear that the urbanisation rate increasing year by year. The steady progress of urbanisation experienced in Kannur now reaches about 65 % of the district. Kannur district has remained the most urbanized district during two census decades 1991 (51%) and 2001 (50.35%) closely followed by Ernakulum (around 48%) although in terms of sheer numbers. The state with the largest urban population is Kerala, with the Ernakulum district at the top. However, Ernakulum district became Kerala's most urbanized district in 2011 (68%) displacing Kannur, which came in fourth position (65.04%) after Thrissur (67.17%) and Kozhikode (67.15%). With nine Statutory towns, Ernakulum district leads the list; Kannur and Trissur are next with seven each.



Map No :1

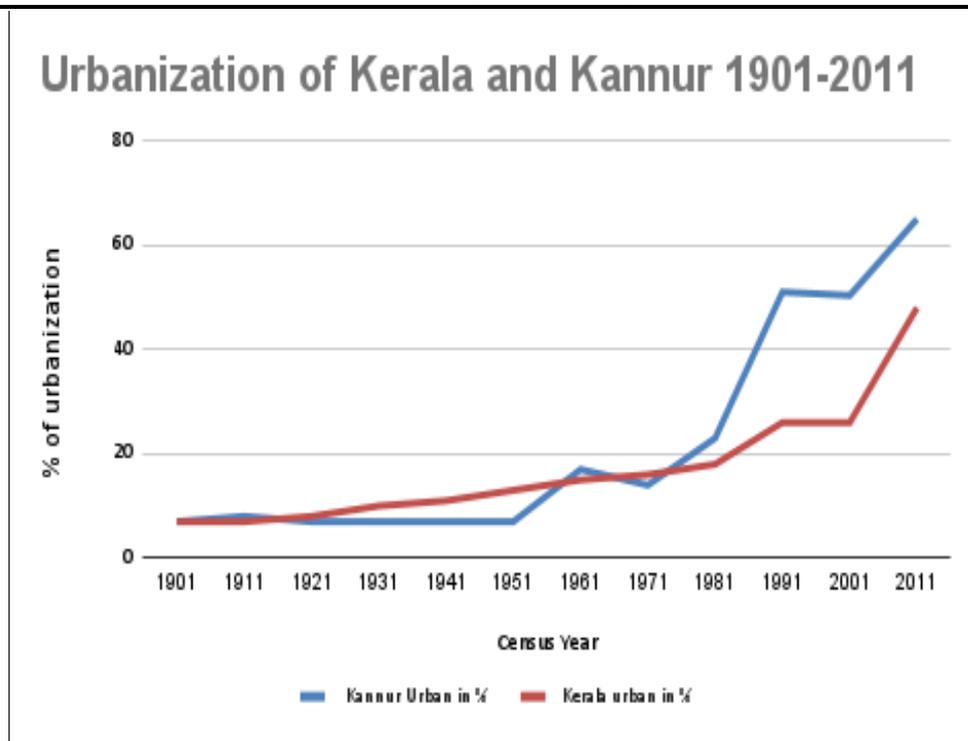


Fig No: 1 (urbanisation of Kerala and Kannur)

Kerala's urbanisation rate of 65% in 2011 was significantly higher than the national average of around 31% at the time. Urbanisation in Kerala dispersed across smaller towns and semi urban areas. Kannur's urbanisation rate during 2011 was 48% in 2011 it was 26% during 2001. Within 10 year time gap there was a rapid growth of urbanised area. The urban population growth rate in Kerala increased by 22% in the ten years between 2001 and 2011 (26% and 48%, respectively). Kannur district's level of urbanization increased to 47% in the 2011 Census from 26% in the 2001 Census.

### Urbanization and mangrove distribution in the coastal zone of Kannur

Urban expansion and related activities severely affected the mangrove biodiversity. Increased waste water discharge, pollutants, heavy metals and chemicals from urban centres leads to water quality deterioration in mangrove wetland ecosystem. There are four major urban areas in the coastal zone of Kannur. Anthoor Municipality, Kannur Corporation, Payyannur

Table No : 2 Urbanised Area mangrove change -1991-2021

Urban Area	1991 Mangrove Area in %	2021 Mangrove Area in %
Anthoor Municipality	3.6	2.1
Kannur corporation Area	10	3.8
Payyannur Municipality	6.47	5.9
Thalassery Municipality	2.89	4.1

Source: Prepared by the investigator)

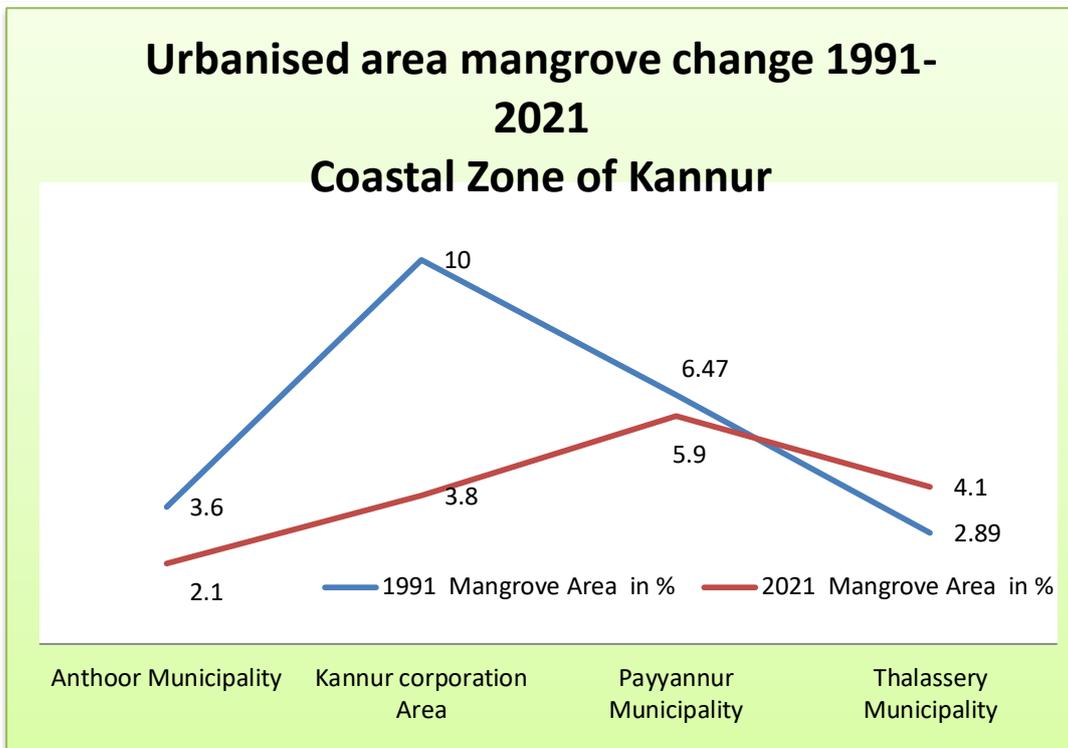


Fig No: 2

municipality and Thalasseri Municipality (Map No :2). As per the Census 2011 out of the total population of Kannur, 65.04% of people lived in urban regions. The coastal zone of Kannur shows high density and rapid growth of semi-urbanised areas portraying the rural urban transformation. This transformation reduced the mangrove cover. During 1991 mangroves were distributed densely in the urbanised areas of Payyannur, Kannur Corporation and Anthoor municipality. The decline in Mangrove cover in urbanised area of Kannur Corporation from 10 percentage to 3.8% between 1991 to 2021. Mangrove cover decreased by 6.2% representing approximately 62% of the original Mangrove area. Rapid urbanization of Kannur Corporation is likely to result in the conversion of the Mangrove area for built up area. Population considerably increases over the coastal areas of Kannur Corporation. Fig No :3 also depicts the population pressure and mangrove cover change over the coastal zone of Kannur.

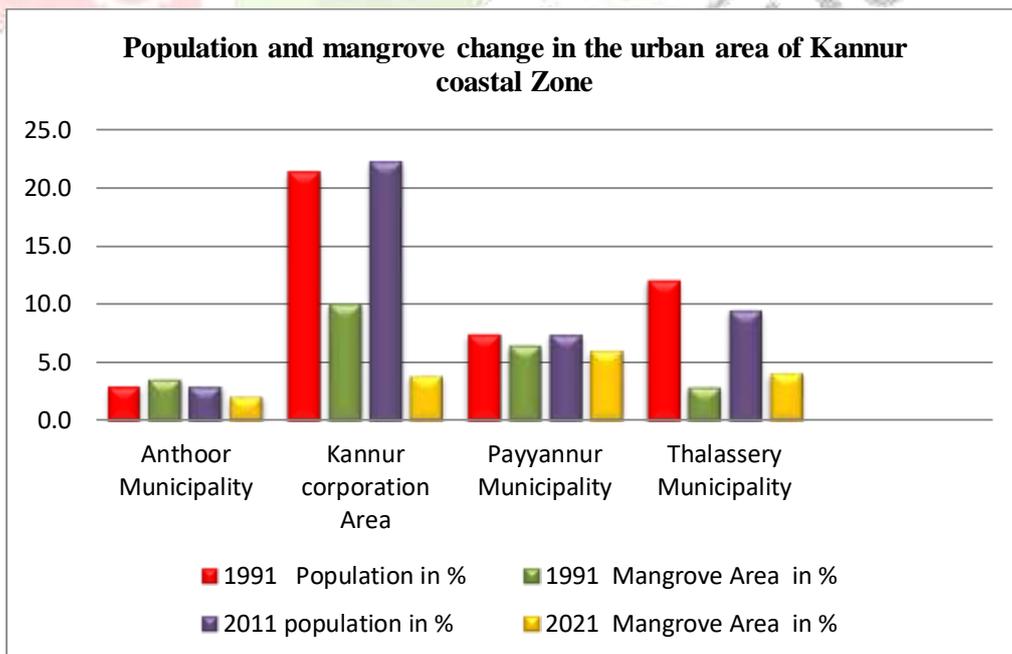


Fig No: 3

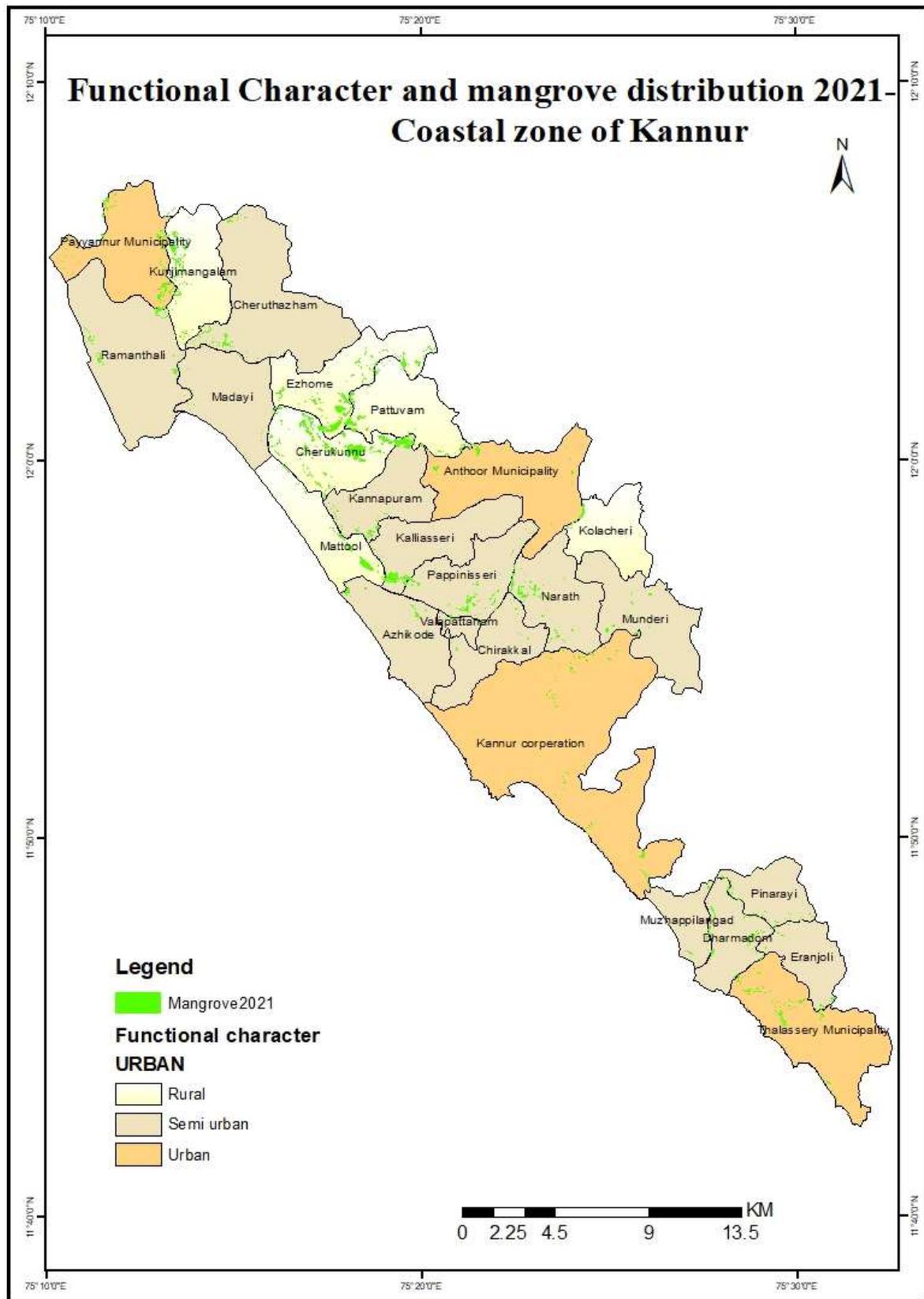
Anthoor municipality located in the Eastern part of the coastal zone of Kannur 3.6% of the mangrove identified during 1991 it was reduced about 2.1% during 2021. Payyanur municipality located in Northern part of the coastal zone having diverse and dense mangrove cover. During 1991, 6.47 % of mangrove cover identified it was 5.9% during 2021. Built up area increase, large scale agricultural land conversion identified in Payyannur municipality. One of the interesting facts is that despite of high population density and urbanization mangrove area increases about 1.2% in Thalassery municipality, mainly due to several conservation efforts and its location near to sea, tidal and riverine influence are another factors.

### **Functional Character and Distribution of Mangrove in the coastal zone of Kannur**

Fig No: 4 and Map No: 2 depicts the functional character and mangrove distribution over the coastal zone of Kannur. There are four major urban administrative divisions covered in the coastal zone of Kannur. As per the Census 2011 out of the total population of Kannur, 65.04% of people lived in urban regions. The total population of Kannur, Edakkad, and Thalassery are categorised as urban population as per the 2011 census. Map No:2 shows the administrative divisions of coastal zone areas classified into rural, semi-urban and urban according to the urbanisation report of Kannur.

More than half of the mangroves of Kannur are centred over the rural administrative divisions of the coastal zone area. Kunhimangalam, Ezhom, Pattuvam, Cherukunnu represent 52% of the total mangrove cover of Kannur. These areas share 16% of the total mangrove cover. Kerala is one of the states with high population densities. The coastal zone of Kannur shows high density and rapid growth of semi-urbanised areas portraying the rural urban transformation. This transformation reduced the mangrove cover. During 1991 mangroves were distributed densely in the urbanised areas of Payyannur, Kannur Corporation and Anthoor municipality. There is no doubt during 2021 the mangroves of Kannur concentrated in rural areas





Map No :2

### Coastal zone of Kannur -Functional Character and Mangrove Distribution 2021

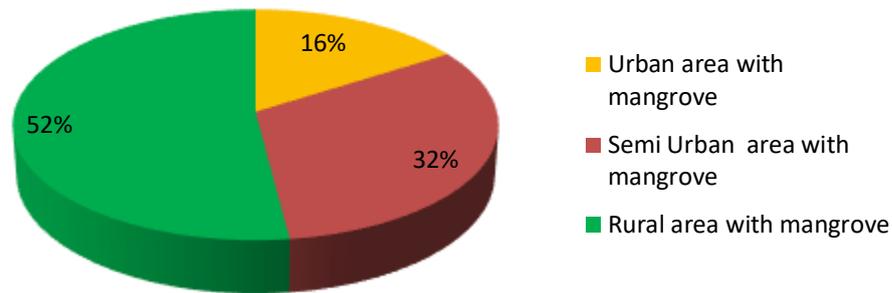


Fig No: 4

## Conclusion

Urban areas are the hub of economic and social activities mangroves are invaluable ecosystems that provide numerous benefits. Severe damage and loss of mangroves identified in Kannur Corporation, Payyannur, due to urbanisation and population explosion. Despite of high population density and urbanization, mangrove area increases about 1.2% in Thalassery municipality, mainly due to several conservation efforts. So Policy makers ,urban planners , and communities must work together to achieve sustainable interdependence and existence of ecosystem.

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