

## RESEARCH ARTICLE



Received: 14.02.2018

Accepted: 26.05.2018

Published: 06.06.2018

**Citation:** Lancelet TS, Gopika UR. (2018). Urban indicators and its correlation in the municipal wards of Neyyattinkara, Kerala. Geographical Analysis. 7(1): 33-36. <https://doi.org/10.53989/bu.ga.v7i1.7>

**Funding:** None

**Competing Interests:** None

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Published By Bangalore University, Bengaluru, Karnataka

**ISSN**

Print: 2319-5371

Electronic: XXXX-XXXX

## Urban indicators and its correlation in the municipal wards of Neyyattinkara, Kerala

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### Abstract

*The studies on urban sprawling are mainly concentrated on the growing indicators of development of a region. Housing density, Population density, Road networks are the important driving factors behind the expansion of urban land in the study area. Such rapid expansion of urban land in the municipal wards demands more quality land for road networks, housing, and other amenities. Proper identification of demanding centers(municipal wards) in the towns may help to adopt new urban policies to the growing needs of the society. The present study focuses on the urban sprawl of Neyyattinkara municipal wards and it is influencing factors such as the density of the road network, house density, and population density.*

**Keywords:** Urban sprawl; urban indicators; road density; house density; urban development

### Introduction

The state of Kerala has a huge growth of urban Population which was increased sharply during the period 2001-2019. The major reason for urban growth in the state is the tremendous rate of increase in the number of wards in the municipal towns. The rates of development in municipal towns are found to be positively correlated to the level of urban spread which demands more investment in infrastructure. Such growing centers should be identified with sprawling matrixes and it may help to meet their increasing demand. The process of urban spread may result in an increase in urbanization problems like unemployment, transportation costs and energy consumption, lack of social services, and increasing crime rate. These emerging built-up areas are facing sanitation problems including drainage problems, disposal of solid waste and sewage water, lack of safe drinking water,

housing problems, etc. Proper identification of demanding centers (municipal wards) in the towns may help to adopt new urban policies in to the growing needs of the society.

The studies on urban sprawling are mainly concentrated on the growing indicators of development of a region. The intensity of population density, population sprawl, and urban development status and further needs to be identified as a spatial weight matrix. Housing density, Population density, Road networks are the important driving factors behind the expansion of urban land in the study area. Such rapid expansion of urban land in the municipal wards demands more quality land for road networks, housing, and other amenities. The Insufficient density of roads in the towns may be led to slow settlement growth and harm urban developmental activities. These sprawling urban forms reach from

contiguous urban growth over linear patterns of strip development to scattered development (Ewing 1997, Pendall1999). So, the trend of urban expansion is an indicator of modernization, the sign of the growth of a society, and the economic progress of a state.

The present study focuses on the urban sprawl of Neyyattinkara municipal wards and its influencing factors such as the density of the road network, house density, and population density.

## Study area

Neyyattinkara means the land (shore) of the Neyyar River has an area of 28.78 sq. with a total population of 70850\*\*. Most of the urban population lives within the 44 wards of the municipality. It has an average elevation of 26 metres and it is sandwiched between the Western Ghats and the Arabian Sea. As per the specification given by the Department of soil survey and conservation, the soil type of this area is indicated as red to yellowish-red, very strongly to extremely acid, clay loam to gravelly clay type. General Land use of Neyyattinkara Municipality shows mixed crops, a settlement with mixed trees, built up and plantations. As per the 2011 census, out of 17321 workers 5397 people are employed in the tertiary or secondary sector and only 537 workers are in the agricultural field.

**Table 1.** Comparison of demographic data of Neyyattinkara municipal town with Trivandrum district and Kerala State (2011).

	Neyyattinkara town	Trivandrum District	Kerala state
Total population	70850	7,43,691	33,406,061
Male	34,513	361,994	16,027,412
Female	36,337	381,697	17,378,649
Literacy	93.52%	95.10%	94%
Male	95.51%	96.51%	96.11%
Female	91.65%	93.78%	92.07%
Sex ration	1053	1054	1084

(Source: Census of India, 2011)

The demographic characteristics are well explained in the above table and show that the study area is keeping all most equal status to district and state level. Regarding transportation, it is well-connected to the capital city of 20 km away, through regular bus services operated by KSRTC and has a rail facility in the Mangalore- Trivandrum - Kanyakumari route. The nearest airport is Trivandrum International Airport, which is 23 km from the town.

## Objective

The present study focuses on the urban sprawl of Neyyattinkara municipal wards and its influencing factors such as

the density of the road network, house density, and population density.

## Materials and Methods

The data analysis with census information overtime from some m 2001-2011 was done by using Microsoft Excel. The population data and household data are collected from 1951 to 2011 census handbooks. A road density map was generated by using the kernel density method for spatial analysis. The correlation of matrix analysis for the municipal wards is restricted to the period of 2011 -2019 by considering a jurisdictional change. The post analysis was done using Arc GIS 10.2 tools. All the output is represented in maps and tables.

## Results and Discussion

The study envisages that there is a strong relationship between urban growth, population density, house density, and road density in Neyyattinkara municipality. Analysis of the expansion of transport infrastructure is strongly correlated with population growth; spatial expansion and land-use change and house density. On the contrary, expansion of spatial land use, development of residential areas, and population growth is catalyzed by the expansion of transport infrastructure.

**Table 2.** The result of correlation indicators in detail

	Name of Municipal Wards
High correlated wards / high concentration zone	Koottapana and Parts of Thavaravila
Secondary correlated wards / secondary concentration zone.	Thavaravila, Alumood, Fort, Oorutukala, Maruthathoor, parts of Kollavamvila, Irumpil, Kalathuvila, Punnakadu, Permpazhuthoor, Thozhukkal, Krishnapuram, aralumood, Vazhimukk and Town ward
Tertiary correlated wards / tertiary concentration zone	Manaloor, Kavalakulam, Punna-gattukari, Nilamel, Pallivilakam, Chaikottukonam, Narayanapuram, Vazhuthoor, Irumpil, Manaloor, Vlangamuri, Thozhukkal, Elavanikkara, Mullaravila, Alam-potta, Vadakod, Athiyannor, some parts of Muttakadu, Punnakadu, Permpazhuthoor, and Kalathuvila.

The highest population density occurs in the wards koottapana ward due to the availability of the intense road network, besides it is having high road density and house density. House density status is also high in two wards of Koottapana and Thavaravila, due to the availability of urban amenities,



road connectivity, and religious and pilgrim centers. The highest road density is identified in the central part of the municipality of Koottapana, Town, Alumood and parts of Thavaravila and Aralummoodu. Here the road density ranges from 0-26.15 sq.km. The study also highlights the major effect of transport networks on the spatial expansion of land-use change. Highways and main roads are found to have a greater effect on spatial expansion with secondary roads. Statistical and cartographic analyzes have provided considerable details on the spatial-temporal relationship between urban growth and population density, house density, and transport.

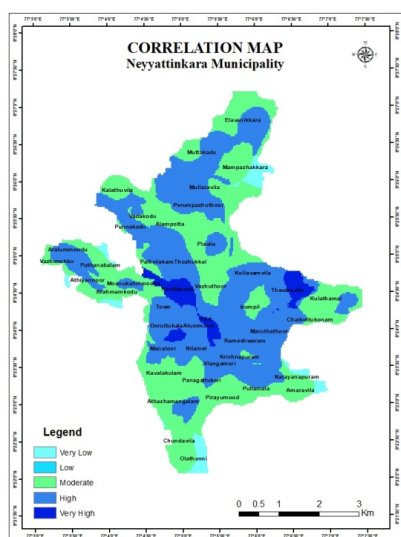


Fig. 1. Correlation between house density and road density

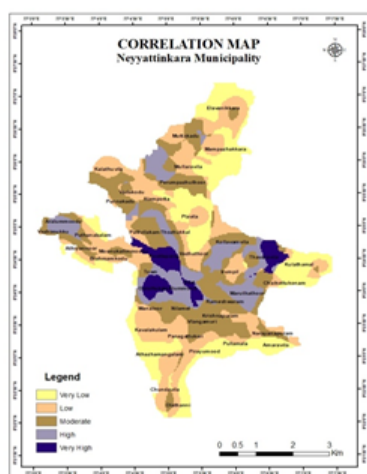


Fig. 2. Correlation between population density and road density

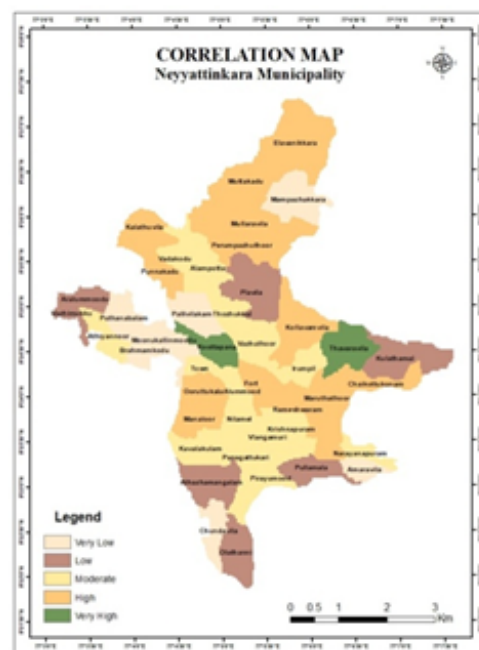


Fig. 3. Correlation between population density and house density

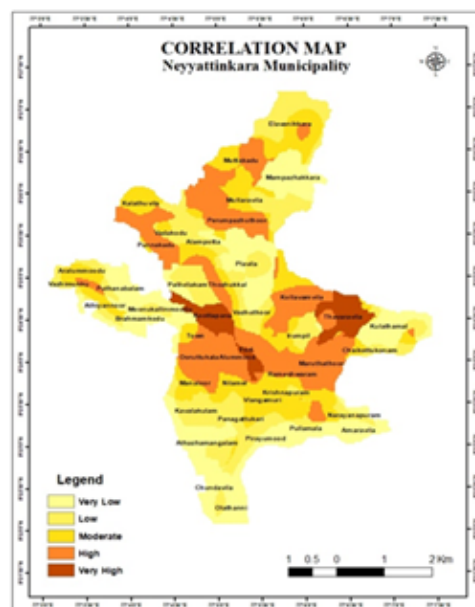


Fig. 4. Correlation of all metrics

## Conclusion

The study envisages that there is a strong relationship between urban growth, population density, house density, and road density in Neyyattinkara municipality. The highest population density occurs in the wards koottapana ward due to the availability of the intense road network, besides it is having high road density and house density. The study also highlights the major effect of transport networks on the spatial expansion of land-use change.

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