

## **Panchayath Wise Assessment of Rural Infrastructure Development in Kozhikode District, Kerala**

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### **Abstract**

The need to achieve a balanced regional development has been one of the key challenges for India's policy planners for a long time. Imbalances in developmental processes could also be due to the fact that only a few growing sectors dominate the progress of the economy, adding to the continuum of rural-urban differences. Agricultural sector which assumes primary importance in rural areas, has been performing relatively poorer compared to the other sectors. The panchayath wise rural infrastructure index of Kozhikode district has been calculated and the backward panchayaths identified for better future developmental plans.

### **1. Introduction**

The rural economic development of a region directly depends upon the infrastructure availability for agriculture and agro-based industries. The basic amenities are essential not only for agricultural development activities but also for the better quality of life. The basic facilities are decisive for the proper functioning of economic activities of the rural areas of India. The low returns, huge investments, long period of growth improper maintenance and even political bias are the major problem leading to rural infrastructure development in India. Providing infrastructures such as electricity, roads, markets and credit which are part of the rural environment induce farmers to take decisions about cropping practices (Barnes and Binswanger 1986).

The rural infrastructure for the present study has been identified based on the basic amenities including electricity, drinking water facility, latrine facility, and road length of each panchayath. Rural electrification provides the energy to pump sets, which helps to increase the irrigated area using groundwater; the output of crops cultivated under groundwater irrigation is always higher than those under canal or tank irrigation, because of its better reliability and controllability (Barnes and Binswanger, 1986). Rural road increases the diffusion of agricultural technology by improving access to markets, enhances more efficient allocation of resources, reduces the transaction costs as well as help the farmers to realise better input and output prices (Ahmed and Donovan, 1992). With the increase in transportation facility, each household can attain various services like healthcare, credit facility, education and market. Drinking water and sanitation facilities in rural areas reflects the health condition of rural people and it shows how far quality of their life has improved. A good health is an essential aspect for progressive agricultural activities.

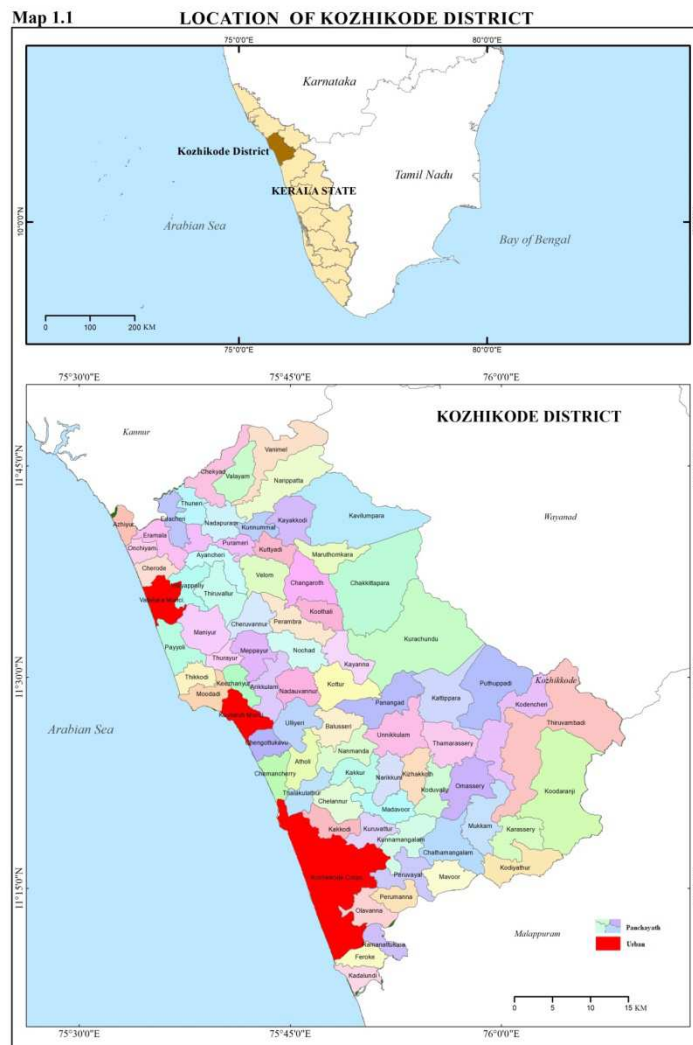
Rural infrastructure is crucial for agriculture, agro-industries and overall economic development of rural areas. It also, incidentally, provides basic facilities that improve the quality of life. However, infrastructure projects, including those in rural sector, involve huge initial investments, long gestation periods, high incremental capital output ratio, high risk and low rate of returns on investment (Satish P, 2007). The rural infrastructure index is calculated to know how far these developmental

activities are helpful to capture decreasing trend of cultivation areas at present. Antle (1983) found a strong and positive relationship between infrastructure development and aggregate agricultural productivity.

Development of infrastructure is vital especially in rural areas as they have implications on productivity gains and reduction in poverty (Fan and Thorat, 1999). The role of road and other means of transportation supplementing agricultural productivity have been emphasized in several researches (Spencer, 1994; Felloni et al, 2001.). The role of various infrastructure facilities in determining the level of economic development across Indian states has been explicated by Ghosh and De, 2004.

## 2. Study area

Kozhikode is a district of Kerala state, located on the southwest coast of India. The district is bordered by the districts of Kannur and Mahé to the north, Wayanad to the east, and Malappuram to the south. The Arabian Sea lies to the west and Western Ghats stretches towards east. It lies between latitudes  $11^{\circ} 07' 13''$  N and  $11^{\circ} 48' 15''$  N and longitudes  $75^{\circ} 33' 15''$  E and  $76^{\circ} 8' 56''$  E. As per the 2011 census, the district is divided into 12 Block panchayaths and 75 Grama panchayaths. The total geographical area of the district is  $2346.41\text{km}^2$ . The map 1.1 depicts the location of Kozhikode district.



### 3. Objective

To identify the panchayath wise rural infrastructure development of Kozhikode district.

### 4. Methodology

The panchayath level secondary data, collected from the District Statistical Office is used for analysis. The data has been converted to percentage for the analysis and represented in table as well in map. The Deprivation Index used by Srivastava S K, (Srivastava S K Et al., 2007) to identify the rural infra-structure index of different states.

The deprivation index  $I_{ij}$  is estimated as :

$$I_{ij} = (X_{ij} - X_{imin}) / (X_{imax} - X_{imin})$$

Where,

$X_{ij}$  =  $i^{\text{th}}$  Rural Infra-structure Index in the  $j^{\text{th}}$  Panchayath.

$X_{imax}$  = Rural Infra-structure Indicator with maximum value among all the Panchayath indicating the worst situation. This gets the value of 1 in Rural Infra-structure Index.

$X_{imin}$  = Rural Infra-structure Indicator with minimum value among all the Panchayath indicating the best situation. This gets the value of 0 in Rural Infra-structure Index.

In respect of road length per thousand populations, the following formula was used to get the Index of the road length.

$$I_{ij} = (X_{imax} - X_{ij}) / (X_{imax} - X_{imin})$$

$I_{RII}$  = Rural Infra-structure Index is

calculated as follows:  $I_{RII} = \{\lambda (I_{ij}) / n\} \times 100$

$i = 1$  to 4 Rural Infra-structure Indicators

$j = 1$  to 75 Panchayaths of the Kozhikode District

The composite Index is the average of all the four indices. Each index measures the distance of the state from the worst possible situation, compared to the distance between the best and worst panchayath. A composite index of possible situation, compared to the distance between the best and worst Panchayath. A Rural Infra-structure Index of 99 percentages for panchayath "X" means that Panchayath "X" has to travel 99 percentage of the distance to reach the level of Panchayath with best infrastructure.

### 5. Analysis

The Panchayath wise Rural Infrastructure Development of Kozhikode district is identified by calculating Rural Infrastructure Index. The indicators like percentage of Non-electrified households, Non-availability of drinking water facility in households, Non-availability of latrine facility in households and road density are chosen for analysis.

Table 1.1 – Indicators of Rural Infrastructure Index by panchayathwise

| Sl.No. | PANCHAYATH    | In Numbers |  |                            |                                 | In Percentage                          |                            |                                 | In km<br>Road Density |
|--------|---------------|------------|--|----------------------------|---------------------------------|--|----------------------------|---------------------------------|-----------------------|
|        |               | Households | Non-drinking water facility households | Non-Electrified households | Non-latrine facility households | Non-drinking water facility households | Non-Electrified households | Non-latrine facility households |                       |
| 1      | Koduvally     | 10374      | 1038                                   | 708                        | 378                             | 10.01                                  | 6.82                       | 3.64                            | 10.30                 |
| 2      | Azhiyur       | 6088       | 407                                    | 209                        | 49                              | 6.69                                   | 3.43                       | 0.80                            | 8.35                  |
| 3      | Purameri      | 6120       | 537                                    | 386                        | 47                              | 8.77                                   | 6.31                       | 0.77                            | 8.92                  |
| 4      | Madavoor      | 6513       | 907                                    | 440                        | 371                             | 13.93                                  | 6.76                       | 5.70                            | 10.42                 |
| 5      | Edacheri      | 5988       | 1170                                   | 123                        | 80                              | 19.54                                  | 2.05                       | 1.34                            | 8.93                  |
| 6      | Nadapuram     | 8464       | 442                                    | 281                        | 106                             | 5.22                                   | 3.32                       | 1.25                            | 6.00                  |
| 7      | Onchiyam      | 6012       | 987                                    | 40                         | 7                               | 16.42                                  | 0.67                       | 0.12                            | 7.53                  |
| 8      | Kakkodi       | 9521       | 986                                    | 356                        | 238                             | 10.36                                  | 3.74                       | 2.50                            | 7.05                  |
| 9      | Cherode       | 7819       | 810                                    | 141                        | 33                              | 10.36                                  | 1.80                       | 0.42                            | 6.17                  |
| 10     | Omassery      | 7641       | 377                                    | 342                        | 298                             | 4.93                                   | 4.48                       | 3.90                            | 6.16                  |
| 11     | Kodencheri    | 8631       | 965                                    | 697                        | 460                             | 11.18                                  | 8.08                       | 5.33                            | 8.28                  |
| 12     | Chengottukavu | 6323       | 684                                    | 307                        | 235                             | 10.82                                  | 4.86                       | 3.72                            | 7.23                  |
| 13     | Kunnamangalam | 10138      | 353                                    | 262                        | 91                              | 3.48                                   | 2.58                       | 0.90                            | 4.41                  |
| 14     | Kunnummal     | 4331       | 336                                    | 256                        | 140                             | 7.76                                   | 5.91                       | 3.23                            | 6.17                  |
| 15     | Perumanna     | 7799       | 274                                    | 193                        | 97                              | 3.51                                   | 2.47                       | 1.24                            | 4.01                  |
| 16     | Kayakkodi     | 5662       | 349                                    | 653                        | 105                             | 6.16                                   | 11.5                       | 1.85                            | 6.01                  |
| 17     | Valayam       | 4187       | 666                                    | 166                        | 123                             | 15.91                                  | 3.96                       | 2.94                            | 6.99                  |
| 18     | Thiruvallur   | 7657       | 1754                                   | 492                        | 265                             | 22.91                                  | 6.43                       | 3.46                            | 8.93                  |
| 19     | Balusseri     | 6116       | 816                                    | 521                        | 148                             | 13.34                                  | 8.52                       | 2.42                            | 6.30                  |
| 20     | Thurayur      | 3102       | 551                                    | 233                        | 129                             | 17.76                                  | 7.51                       | 4.16                            | 7.32                  |
| 21     | Villiyappally | 7422       | 1198                                   | 266                        | 108                             | 16.14                                  | 3.58                       | 1.46                            | 5.52                  |
| 22     | Olavanna      | 14587      | 1020                                   | 1706                       | 424                             | 6.99                                   | 11.7                       | 2.91                            | 5.22                  |
| 23     | Kadalundi     | 9535       | 3852                                   | 570                        | 372                             | 40.40                                  | 5.98                       | 3.90                            | 11.32                 |
| 24     | Ayancheri     | 5501       | 939                                    | 272                        | 460                             | 17.07                                  | 4.94                       | 8.36                            | 7.36                  |
| 25     | Narikkuni     | 5865       | 465                                    | 464                        | 207                             | 7.93                                   | 7.91                       | 3.53                            | 4.76                  |
| 26     | Ramanattukara | 7405       | 944                                    | 747                        | 111                             | 12.75                                  | 10.0                       | 1.50                            | 5.56                  |
| 27     | Narippatta    | 6072       | 139                                    | 850                        | 113                             | 2.29                                   | 14.0                       | 1.86                            | 3.98                  |
| 28     | Thamarassery  | 8051       | 1199                                   | 552                        | 408                             | 14.89                                  | 6.86                       | 5.07                            | 6.18                  |
| 29     | Maruthomkara  | 4832       | 657                                    | 652                        | 185                             | 13.60                                  | 13.4                       | 3.83                            | 6.65                  |
| 30     | Kuttyadi      | 4486       | 1790                                   | 236                        | 46                              | 39.90                                  | 5.26                       | 1.03                            | 9.89                  |
| 31     | Eramala       | 7631       | 827                                    | 177                        | 158                             | 10.84                                  | 2.32                       | 2.07                            | 3.75                  |
| 32     | Kakkur        | 5396       | 589                                    | 431                        | 342                             | 10.92                                  | 7.99                       | 6.34                            | 5.73                  |

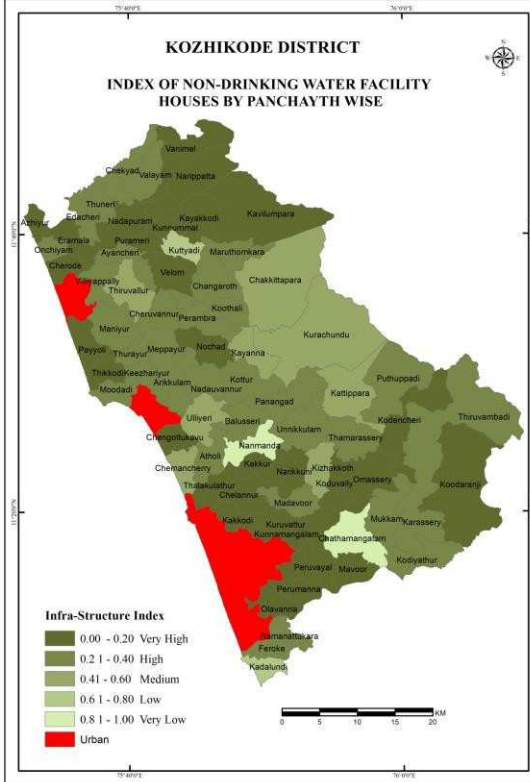
|    |                |       |      |      |      |       |      |       |      |
|----|----------------|-------|------|------|------|-------|------|-------|------|
| 33 | Thalakulathur  | 6985  | 660  | 322  | 263  | 9.45  | 4.61 | 3.77  | 4.18 |
| 34 | Karassery      | 6708  | 1073 | 437  | 194  | 16.00 | 6.51 | 2.89  | 5.49 |
| 35 | Peruvayal      | 10474 | 1314 | 510  | 243  | 12.55 | 4.87 | 2.32  | 4.32 |
| 36 | Thuneri        | 5220  | 690  | 296  | 201  | 13.22 | 5.67 | 3.85  | 4.96 |
| 37 | Thikkodi       | 6168  | 547  | 336  | 178  | 8.87  | 5.45 | 2.89  | 3.80 |
| 38 | Perambra       | 7699  | 1543 | 843  | 235  | 20.04 | 10.9 | 3.05  | 6.99 |
| 39 | Kuruvattur     | 8239  | 920  | 346  | 220  | 11.17 | 4.20 | 2.67  | 3.83 |
| 40 | Velom          | 6001  | 469  | 502  | 212  | 7.82  | 8.37 | 3.53  | 4.00 |
| 41 | Mavoor         | 6547  | 672  | 326  | 333  | 10.26 | 4.98 | 5.09  | 4.18 |
| 42 | Chekyad        | 5084  | 711  | 351  | 243  | 13.99 | 6.90 | 4.78  | 5.15 |
| 43 | Keezhariyur    | 3495  | 521  | 215  | 123  | 14.91 | 6.15 | 3.52  | 4.63 |
| 44 | Kodiyathur     | 5658  | 1217 | 225  | 5    | 21.51 | 3.98 | 0.09  | 4.65 |
| 45 | Nochad         | 6463  | 700  | 385  | 227  | 10.83 | 5.96 | 3.51  | 3.56 |
| 46 | Feroke         | 11017 | 2325 | 985  | 151  | 21.10 | 8.94 | 1.37  | 5.48 |
| 47 | Kavilumpara    | 5561  | 233  | 745  | 147  | 4.19  | 13.4 | 2.64  | 2.78 |
| 48 | Meppayur       | 6424  | 961  | 622  | 232  | 14.96 | 9.68 | 3.61  | 4.54 |
| 49 | Puthupadi      | 8884  | 1290 | 661  | 519  | 14.52 | 7.44 | 5.84  | 4.59 |
| 50 | Chelannur      | 9362  | 1105 | 458  | 375  | 11.80 | 4.89 | 4.01  | 3.12 |
| 51 | Changaroath    | 7225  | 1233 | 659  | 151  | 17.07 | 9.12 | 2.09  | 4.31 |
| 52 | Payyoli        | 10442 | 1047 | 675  | 289  | 10.03 | 6.46 | 2.77  | 2.62 |
| 53 | Moodadi        | 7114  | 1208 | 522  | 505  | 16.98 | 7.34 | 7.10  | 5.04 |
| 54 | Maniyur        | 9101  | 2041 | 642  | 366  | 22.43 | 7.05 | 4.02  | 5.24 |
| 55 | Unnikkulam     | 11313 | 1840 | 1466 | 955  | 16.26 | 12.9 | 8.44  | 5.21 |
| 56 | Cheruvannur    | 5500  | 1027 | 762  | 421  | 18.67 | 13.8 | 7.65  | 5.34 |
| 57 | Koodaranji     | 4384  | 236  | 670  | 72   | 5.38  | 15.2 | 1.64  | 1.16 |
| 58 | Ulliyeri       | 7552  | 2075 | 750  | 475  | 27.48 | 9.93 | 6.29  | 5.85 |
| 59 | Vanimel        | 5427  | 496  | 1571 | 227  | 9.14  | 28.9 | 4.18  | 4.26 |
| 60 | Mukkam         | 8712  | 1649 | 832  | 521  | 18.93 | 9.55 | 5.98  | 3.22 |
| 61 | Nadauvannur    | 6053  | 844  | 580  | 255  | 13.94 | 9.58 | 4.21  | 1.40 |
| 62 | Panangad       | 8246  | 1511 | 1141 | 617  | 18.32 | 13.8 | 7.48  | 3.67 |
| 63 | Kottur         | 7620  | 1180 | 1008 | 402  | 15.49 | 13.2 | 5.28  | 2.41 |
| 64 | Koothali       | 4007  | 839  | 305  | 283  | 20.94 | 7.61 | 7.06  | 2.70 |
| 65 | Arikkulam      | 4332  | 908  | 508  | 250  | 20.96 | 11.7 | 5.77  | 2.62 |
| 66 | Thiruvambadi   | 6676  | 927  | 523  | 1179 | 13.89 | 7.83 | 17.66 | 2.56 |
| 67 | Atholi         | 7008  | 1557 | 888  | 724  | 22.22 | 12.6 | 10.33 | 2.88 |
| 68 | Kattippara     | 5506  | 1655 | 871  | 497  | 30.06 | 15.8 | 9.03  | 4.55 |
| 69 | Kizhakkoth     | 6948  | 2212 | 348  | 1618 | 31.84 | 5.01 | 23.29 | 5.56 |
| 70 | Kayanna        | 3375  | 1022 | 558  | 326  | 30.28 | 16.5 | 9.66  | 3.36 |
| 71 | Chakkittapara  | 5164  | 1584 | 625  | 433  | 30.67 | 12.1 | 8.38  | 1.99 |
| 72 | Chemancherry   | 9113  | 2575 | 2258 | 1989 | 28.26 | 24.7 | 21.83 | 6.19 |
| 73 | Kurachundu     | 4060  | 1023 | 710  | 399  | 25.20 | 17.4 | 9.83  | 0.92 |
| 74 | Nanmanda       | 6970  | 3199 | 3092 | 980  | 45.90 | 44.3 | 14.06 | 6.02 |
| 75 | Chathamangalam | 10072 | 5166 | 6589 | 4222 | 51.29 | 65.4 | 41.92 | 3.91 |

Table 1.2- Rural Infrastructure Index of Kozhikode District by Panchayathwise

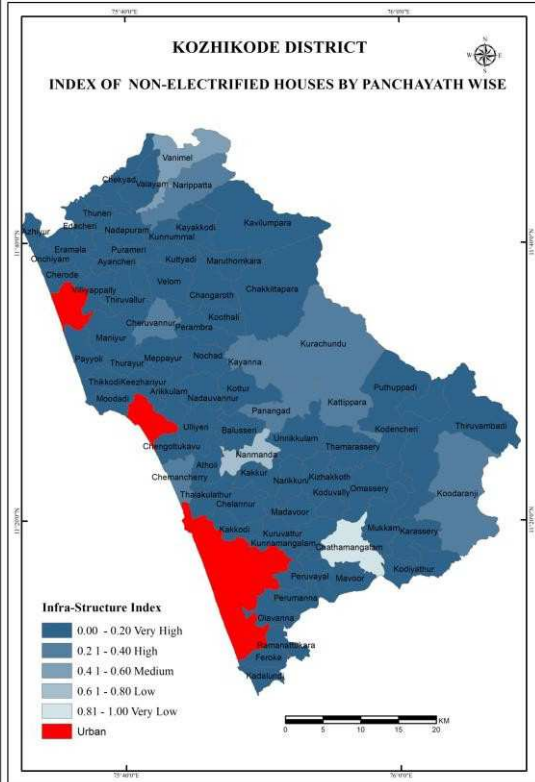
| Sl. No. | PANCHAYATH    | Index of Non-drinking water facility households | Index of Non-Electrified households | Index of Non-latrines facility households | Index of Road Network | Rural infrastructure Index | Rural infrastructure Develop in Percent |
|---------|---------------|---|-------------------------------------|---|-----------------------|----------------------------|---|
| 1       | Koduvally     | 0.15  | 0.1                                 | 0.08                                      | 0.1                   | 0.1075                     | 10.75                                   |
| 2       | Azhiyur       | 0.09  | 0.04                                | 0.02                                      | 0.29                  | 0.11                       | 11.00                                   |
| 3       | Purameri      | 0.13  | 0.09                                | 0.02                                      | 0.23                  | 0.1175                     | 11.75                                   |
| 4       | Madavoor      | 0.23  | 0.09                                | 0.13                                      | 0.09                  | 0.135                      | 13.50                                   |
| 5       | Edacheri      | 0.34  | 0.02                                | 0.03                                      | 0.23                  | 0.155                      | 15.50                                   |
| 6       | Nadapuram     | 0.06  | 0.04                                | 0.03                                      | 0.51                  | 0.16                       | 16.00                                   |
| 7       | Onchiyam      | 0.28  | 0                                   | 0   | 0.36                  | 0.16                       | 16.00                                   |
| 8       | Kakkodi       | 0.16  | 0.05                                | 0.06                                      | 0.41                  | 0.17                       | 17.00                                   |
| 9       | Cherode       | 0.16  | 0.02                                | 0.01                                      | 0.49                  | 0.17                       | 17.00                                   |
| 10      | Omassery      | 0.05  | 0.06                                | 0.09                                      | 0.5                   | 0.175                      | 17.50                                   |
| 11      | Kodencheri    | 0.17  | 0.11                                | 0.13                                      | 0.29                  | 0.175                      | 17.50                                   |
| 12      | Chengottukavu | 0.17  | 0.06                                | 0.09                                      | 0.39                  | 0.1775                     | 17.75                                   |
| 13      | Kunnamangalam | 0.02  | 0.03                                | 0.02                                      | 0.66                  | 0.1825                     | 18.25                                   |
| 14      | Kunnummal     | 0.11  | 0.08                                | 0.08                                      | 0.5                   | 0.1925                     | 19.25                                   |
| 15      | Perumanna     | 0.02  | 0.03                                | 0.03                                      | 0.7                   | 0.195                      | 19.50                                   |
| 16      | Kayakkodi     | 0.08  | 0.17                                | 0.04                                      | 0.51                  | 0.2                        | 20.00                                   |
| 17      | Valayam       | 0.27  | 0.05                                | 0.07                                      | 0.42                  | 0.2025                     | 20.25                                   |
| 18      | Thiruvallur   | 0.4   | 0.09                                | 0.08                                      | 0.23                  | 0.2                        | 20.00                                   |
| 19      | Balusseri     | 0.22  | 0.12                                | 0.06                                      | 0.48                  | 0.22                       | 22.00                                   |
| 20      | Thurayur      | 0.3   | 0.11                                | 0.1                                       | 0.38                  | 0.2225                     | 22.25                                   |
| 21      | Villiyappally | 0.27  | 0.05                                | 0.03                                      | 0.56                  | 0.2275                     | 22.75                                   |
| 22      | Olavanna      | 0.09  | 0.17                                | 0.07                                      | 0.59                  | 0.23                       | 23.00                                   |
| 23      | Kadalundi     | 0.74  | 0.08                                | 0.09                                      | 0                     | 0.2275                     | 22.75                                   |
| 24      | Ayancheri     | 0.29  | 0.07                                | 0.2                                       | 0.38                  | 0.235                      | 23.50                                   |
| 25      | Narikkuni     | 0.11  | 0.11                                | 0.08                                      | 0.63                  | 0.2325                     | 23.25                                   |
| 26      | Ramanattukara | 0.2   | 0.15                                | 0.03                                      | 0.55                  | 0.2325                     | 23.25                                   |
| 27      | Narippatta    | 0   | 0.21                                | 0.04                                      | 0.71                  | 0.24                       | 24.00                                   |
| 28      | Thamarassery  | 0.25  | 0.1                                 | 0.12                                      | 0.49                  | 0.24                       | 24.00                                   |
| 29      | Maruthomkara  | 0.22  | 0.2                                 | 0.09                                      | 0.45                  | 0.24                       | 24.00                                   |
| 30      | Kuttyadi      | 0.73  | 0.07                                | 0.02                                      | 0.14                  | 0.24                       | 24.00                                   |
| 31      | Eramala       | 0.17  | 0.03                                | 0.05                                      | 0.73                  | 0.245                      | 24.50                                   |
| 32      | Kakkur        | 0.17  | 0.11                                | 0.15                                      | 0.54                  | 0.2425                     | 24.25                                   |
| 33      | Thalakulathur | 0.14  | 0.06                                | 0.09                                      | 0.69                  | 0.245                      | 24.50                                   |

|    |                |      |      |      |      |        |       |
|----|----------------|------|------|------|------|--------|-------|
| 34 | Karassery      | 0.27 | 0.09 | 0.07 | 0.56 | 0.2475 | 24.75 |
| 35 | Peruvayal      | 0.2  | 0.06 | 0.05 | 0.67 | 0.245  | 24.5  |
| 36 | Thuneri        | 0.21 | 0.08 | 0.09 | 0.61 | 0.2475 | 24.75 |
| 37 | Thikkodi       | 0.13 | 0.07 | 0.07 | 0.72 | 0.2475 | 24.75 |
| 38 | Perambra       | 0.35 | 0.16 | 0.07 | 0.42 | 0.25   | 25.00 |
| 39 | Kuruvattur     | 0.17 | 0.05 | 0.06 | 0.72 | 0.25   | 25.00 |
| 40 | Velom          | 0.11 | 0.12 | 0.08 | 0.7  | 0.2525 | 25.25 |
| 41 | Mavoor         | 0.16 | 0.07 | 0.12 | 0.69 | 0.26   | 26.00 |
| 42 | Chekyad        | 0.23 | 0.1  | 0.11 | 0.59 | 0.2575 | 25.75 |
| 43 | Keezhariyur    | 0.25 | 0.08 | 0.08 | 0.64 | 0.2625 | 26.25 |
| 44 | Kodiyathur     | 0.37 | 0.05 | 0    | 0.64 | 0.265  | 26.50 |
| 45 | Nochad         | 0.17 | 0.08 | 0.08 | 0.75 | 0.27   | 27.00 |
| 46 | Feroke         | 0.37 | 0.13 | 0.03 | 0.56 | 0.2725 | 27.25 |
| 47 | Kavilumpara    | 0.04 | 0.2  | 0.06 | 0.82 | 0.28   | 28.00 |
| 48 | Meppayur       | 0.25 | 0.14 | 0.08 | 0.65 | 0.28   | 28.00 |
| 49 | Puthupadi      | 0.24 | 0.1  | 0.14 | 0.65 | 0.2825 | 28.25 |
| 50 | Chelannur      | 0.19 | 0.07 | 0.09 | 0.79 | 0.285  | 28.50 |
| 51 | Changaroth     | 0.29 | 0.13 | 0.05 | 0.67 | 0.285  | 28.50 |
| 52 | Payyoli        | 0.15 | 0.09 | 0.06 | 0.84 | 0.285  | 28.50 |
| 53 | Moodadi        | 0.29 | 0.1  | 0.17 | 0.6  | 0.29   | 29.00 |
| 54 | Maniyur        | 0.39 | 0.1  | 0.09 | 0.58 | 0.29   | 29.00 |
| 55 | Unnikkulam     | 0.27 | 0.19 | 0.2  | 0.59 | 0.3125 | 31.25 |
| 56 | Cheruvannur    | 0.32 | 0.2  | 0.18 | 0.57 | 0.3175 | 31.75 |
| 57 | Koodaranji     | 0.06 | 0.23 | 0.04 | 0.98 | 0.3275 | 32.75 |
| 58 | Uliyeri        | 0.49 | 0.14 | 0.15 | 0.53 | 0.3275 | 32.75 |
| 59 | Vanimel        | 0.13 | 0.44 | 0.1  | 0.68 | 0.3375 | 33.75 |
| 60 | Mukkam         | 0.32 | 0.14 | 0.14 | 0.78 | 0.345  | 34.50 |
| 61 | Nadauvannur    | 0.23 | 0.14 | 0.1  | 0.95 | 0.355  | 35.50 |
| 62 | Panangad       | 0.31 | 0.2  | 0.18 | 0.74 | 0.3575 | 35.75 |
| 63 | Kottur         | 0.26 | 0.19 | 0.12 | 0.86 | 0.3575 | 35.75 |
| 64 | Koothali       | 0.36 | 0.11 | 0.17 | 0.83 | 0.3675 | 36.75 |
| 65 | Arikkulam      | 0.36 | 0.17 | 0.14 | 0.84 | 0.3775 | 37.75 |
| 66 | Thiruvambadi   | 0.23 | 0.11 | 0.42 | 0.84 | 0.4    | 40.00 |
| 67 | Atholi         | 0.39 | 0.19 | 0.24 | 0.81 | 0.4075 | 40.75 |
| 68 | Kattippara     | 0.54 | 0.23 | 0.21 | 0.65 | 0.4075 | 40.75 |
| 69 | Kizhakkoth     | 0.58 | 0.07 | 0.55 | 0.55 | 0.4375 | 43.75 |
| 70 | Kayanna        | 0.55 | 0.25 | 0.23 | 0.77 | 0.45   | 45.00 |
| 71 | Chakkittapara  | 0.55 | 0.18 | 0.2  | 0.9  | 0.4575 | 45.75 |
| 72 | Chemancherry   | 0.51 | 0.37 | 0.52 | 0.49 | 0.4725 | 47.25 |
| 73 | Kurachundu     | 0.45 | 0.26 | 0.23 | 1    | 0.485  | 48.50 |
| 74 | Nanmanda       | 0.85 | 0.67 | 0.33 | 0.51 | 0.59   | 59.00 |
| 75 | Chathamangalam | 0.96 | 1    | 1    | 0.71 | 0.9175 | 91.75 |

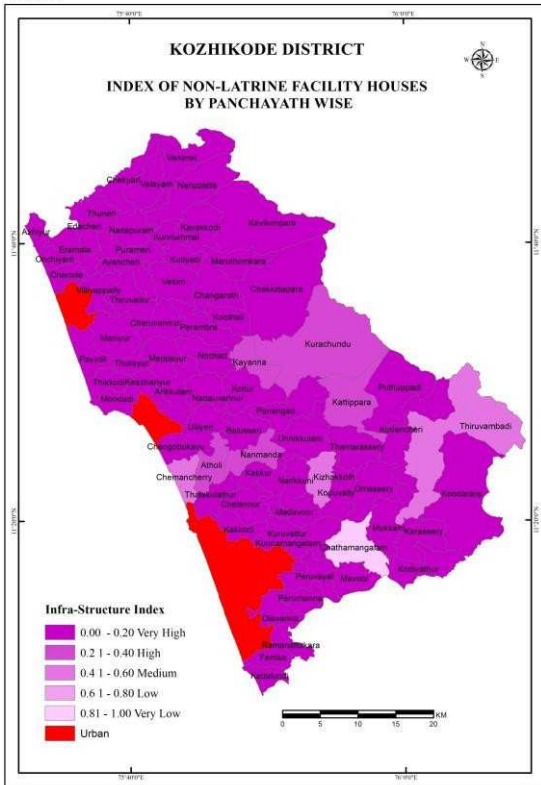
Map 1.2



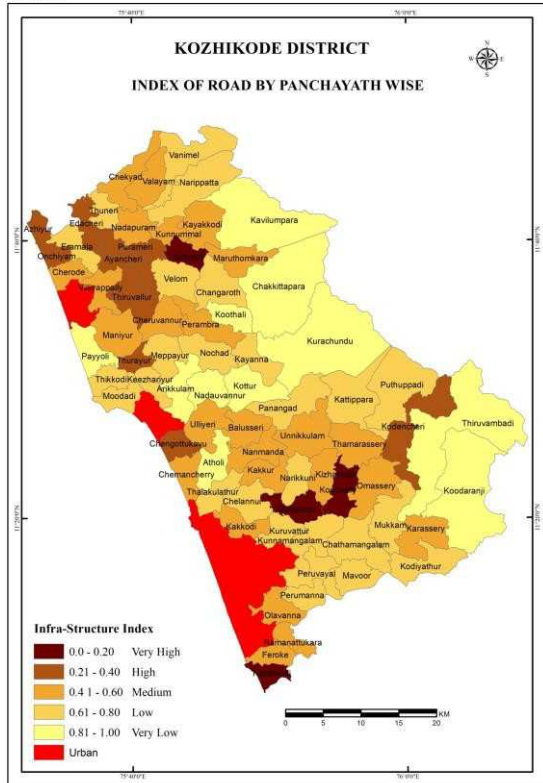
Map 1.3



Map 1.4



Map 1.5





The table no. 1 shows panchayath wise indicators and related data of Kozhikkode district. In Chathamangalam Panchayath there are 51.29 % households had no facility for drinking water. Nanmanda and Kadalundi are the other panchayaths which has 45.90 % and 40.40% of households with no facility for drinking water. Only 2.29 % households in Narippatta Panchayath receive proper drinking water facility. The Map 1.2 shows the panchayath wise index of non-availability of drinking water facility in the households of Kozhikkode district.

There are 65.42 % and 44.36% of non-electrified households in Chathamangalam and Nanmanda panchayath respectively. Whereas in Onchiyam panchayath, the total non-electrified households is only 0.67 percent. The Map 1.3 show the panchayath wise index of non- electrified households of Kozhikkode district.

In Chathamangalam panchayath 41.92% of households have no latrine facility. Kizhakothe panchayath comes next in lack of proper latrine facility with 23.29percent households have no latrine facility. Kodyathur panchayath ranks first in latrine facilitated households with only 0.09% households left to have proper latrine facility. The Map 1.4 shows the panchayath wise index of households with no latrine facility.

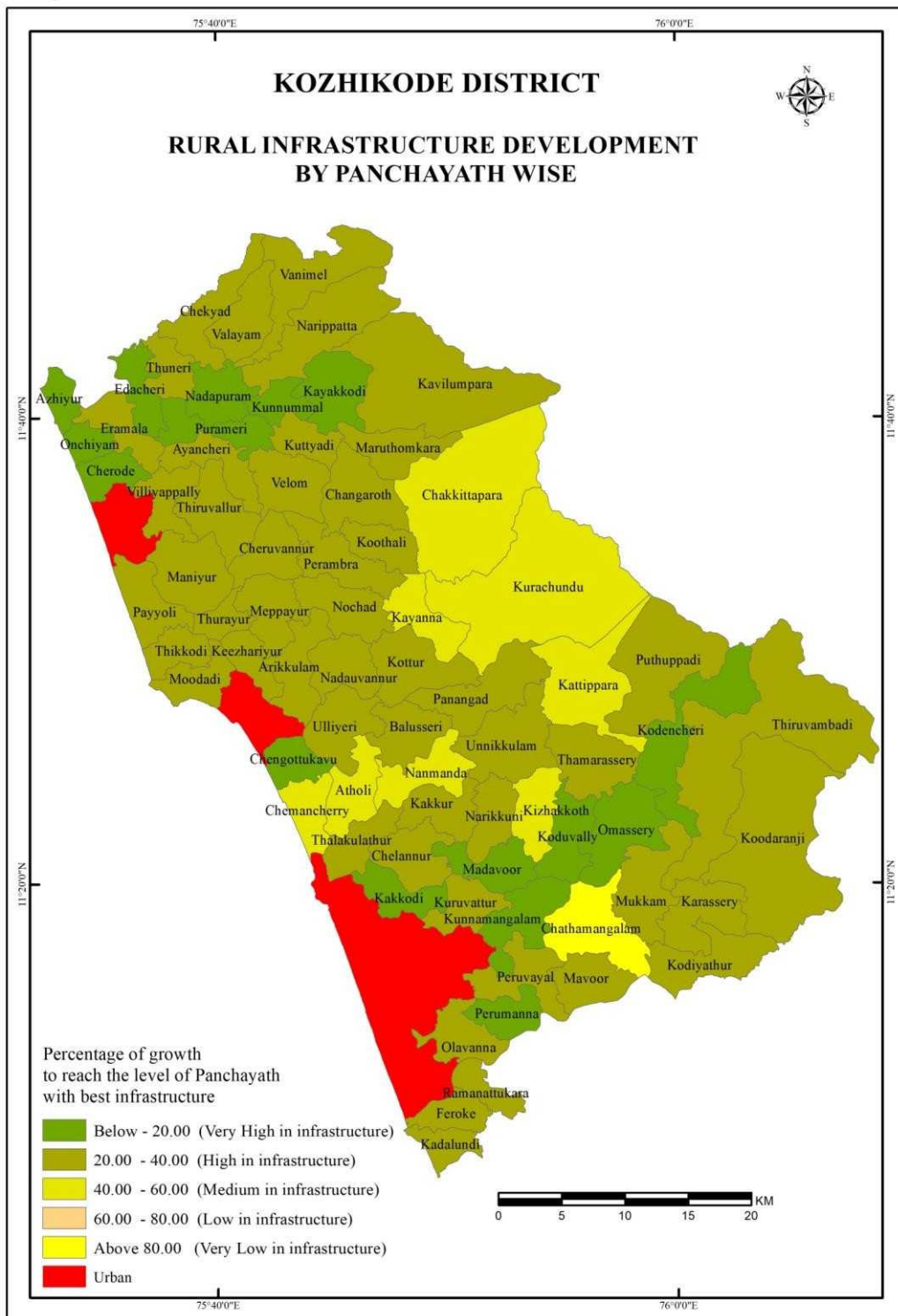
In the case of road network Kadalundi panchayath have well connected road network. The road density of Kadalundi panchayath is 11.32 km per sq.km. Madavoor and Koduvally are the other panchayaths which have high density of road network with 10.42 and 10.30km per sq.km respectively. Kurachundu is the largest panchayath of Kozhikkode district which lack in road density with 0.92 km per sq.km. It is due its highly rugged topography and large concentration of forest area. The Map 1.5 shows the panchayathwise index of road network in Kozhikkode district.

## 6. Conclusion

The map 1.6 shows the Panchayath wise rural infrastructure development of Kozhikkode district. There are 16 panchayaths which have to travel 20 percentage of the distance more to reach the level of panchayath with best infrastructure. It shows that there are 16 panchayaths that achieved very high development in terms of rural infrastructure when compared to others. There are 50 panchayaths categorised in highly developed panchayaths which has to develop their infrastructure 20% to 40% more to reach the level of Panchayath with best infrastructure.

Out of 75 panchayaths, 66 panchayaths possess a well-built rural infrastructure. Eight panchayaths categorized as medium infrastructure developed panchayaths have to improve their infrastructure facilities 40% to 60% more to reach the level of Panchayaths with best infrastructure. Chathamangalam is the one and only panchayath which has to increase its infrastructure growth to 91.75% in order to reach the level of Panchayaths with best infrastructure facilities.

Map 1.6



## 6. References

1. Ahmed, R and C, Donovan (1992) Issues of Infrastructural Development: A Synthesis of the Literature, International Food Policy Research Institute, Washington, D.C., U.S.A
2. Ashok and Balasubramanian (2009) Role of Infrastructure in Productivity and diversification of Agriculture. SANEI, Pakistan Institute of Development Economics, Islamabad, Pakistan.
3. Antle, J. M. (1983), "Infrastructure and Aggregate Agricultural Productivity: International Evidence", Economic Development and Cultural Change, Vol. 31, No. 3, pp.609-619.
4. Barnes, D. F. and Binswanger H. P. (1986) "Impact of Rural Electrification and Infrastructure on Agricultural Changes", Economic and Political Weekly, Vol. 21, No. 1, pp.26-34.
5. Binswanger, H. P, Khandker S. R. and Rosenzweig M. R. (1993) How Infrastructure and Financial Institutions Affect Agricultural Output and Investment in India, Journal of Development Economics, Vol. 41, No. 2, pp.337-366.
6. Deshpande, R (2006) Karnataka's Agricultural Policy 2006. Bangalore: Department of Agriculture and Horticulture, Government of Karnataka.
7. Fan S, Hazell P and Thorat S (1999). Linkages between Government Spending, Growth, Poverty in Rural India. International Food Policy Research Institute, Washington D.C.
8. Felloni F, Wahl T, Wand Schneider P and Gilbert, J (2001) Infrastructure and Agricultural Production: Cross- Country Evidence and Implications for China. Washington State University.
9. Ghosh, B, and De, P (2004) How Do Different Categories of Infrastructure Affect Development? Evidence from Indian States. Economic and Political Weekly, 39 (42): 4645-4657.
10. Panchayath level Statistics – 2011, Kozhikode District, Department of Economics and Statistics, Thiruvananthapuram, Kerala, India
11. Satish.P (2007), Rural Infrastructure and Growth: An Overview, Ind. Jn. of Agri. Econ. Vol. 62, No.1, Jan.-March 2007
12. Soumya Manjunath and Elumalai Kannan (2015) Effect of Rural Infrastructure on Agricultural Development: District Level analysis in Karnataka, Institute For Social And Economic Change, Bangalore, India
13. Spencer D (1994) Infrastructure and Technology Constraints to Agricultural Development in the Humid and Sub Humid Tropics of Africa. IFPRI, Environment and Production Technology Division, EPTD Discussion Paper No.3.
14. Srivastava SK, Dutt CBS, Nagaraja R, Meena Rani HC, Badyopadhyay S and Hegde VS and Jayaramn V (2007) Geoinformatics in support of food security and poverty alleviation: A perspective based on national wasteland mapping project, In Geoinformatics applications in Agriculture, AK Sing and UK Chopra (Eds.), New India Publishing Agency, and New Delhi, India.