

LITERACY RATE IN SOME PURA VILLAGES – A FUZZY APPROACH

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ABSTRACT

The physical connectivity of villages with the national highways is having an impact on the literacy rate of the villages. The fuzzy inference value is applied to study the impact.

KEYWORDS: Fuzzy Inference; Physical Connectivity; Literacy Rate; CETD Matrix.

Majority of the rural people facing trials and tribulations to run their business and day today life economically. Most of the organizations and government sectors involving themselves to urbanize the rural hubs by providing commodities and services for developing their status i.e., living conditions.

The very first reason for the lack of development in those villages is insufficient road facilities and transport facilities to the school and college students. Most of the school and college students are finding it difficult to reach their institution on time. Their mode of transportation leads them to lose their energy, attentiveness in classrooms and also their passion of learning. So it results in lot of drop-outs. To improve the literacy rate of the rural students, we are in need to provide them with proper transportation facilities like the ring roads to connect with the National Highways.

This research spotlights the literacy rate of PURA (Providing Urban facilities to Rural Areas) villages, by analyzing the impact of distances from National Highways (NH).

METHOD OF ANALZING THE PROBLEM

1. Investigation of literacy rate of the village people and the corresponding data are collected.
2. The distances of villages with NH roads are calculated.
3. Basic matrix operations on entries of initial raw data matrix are discussed.
4. Raw Time Data (RTD) matrix is also derived.
5. The Combined RTD (CETD) matrix which shows the effective entries of RTD matrix is estimated.

FUZZY MATRIX

“A fuzzy matrix is a matrix with elements having values in the fuzzy interval”. In this article, the unit interval [0, 1] and the interval [.1, 1] are called fuzzy intervals [3].

In order to discuss the relation between Literacy Rate(LR) of people and Distance(D) from National highways to their villages year wise . The PURA villages

are divided into four blocks as shown in the figure. The initial raw data matrix is considered as villages from each of the blocks.

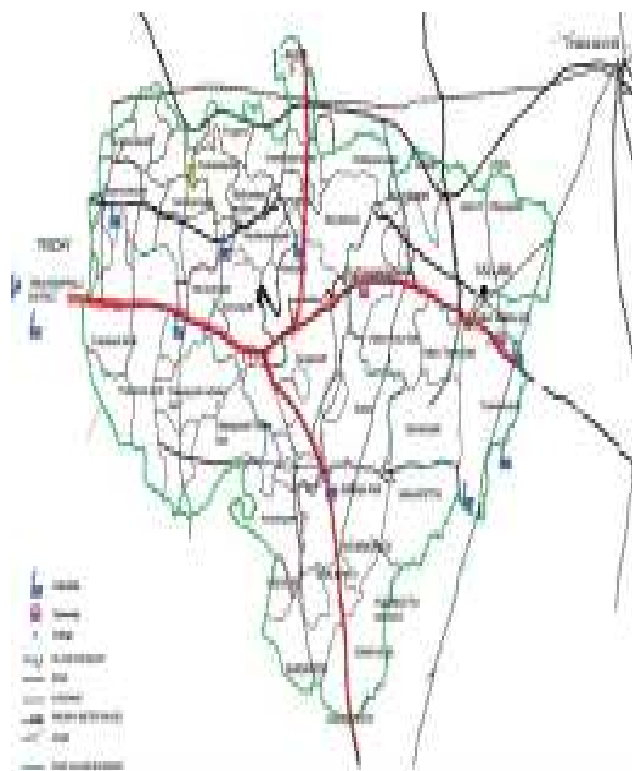


Figure 1: The Part of PURA villages only as shown in the PURA map

Table 1: Initial Raw data Matrix of order 3X4

LR \ D / Km	High (75-100)	Average (60-75)	Below Average (45-59)	Low (Below 45)
Short (0-2.99)	3	8	3	1
Medium (3-5.99)	0	3	3	0
Long (6-15)	1	1	0	0

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Table 2: Average Time dependent matrix of order 3X4

LR D / K. m	High (75-100)	Average (60-75)	Below Average (45-59)	Low (Below 45)
Short (0-2.99)	1	2.67	1	0.33
Medium (3-5.99)	0	1	1	0
Long (6-15)	0.33	0.33	0	0

Table 3: Average and Standard deviation of Table 2

AVG	0.44333	1.33333	0.66667	0.11
SD	0.50954	1.205086	0.57735	0.190526

LR – Literacy Rate, D – Distance, AVG – Average, SD – Standard Deviation

The Refined Time Dependent (RTD) matrix was formed with the entries e_{ij} , where e_{ij} belongs to the set $\{-1, 0, 1\}$ by using the following formula:

“If $a_{ij} \leq (\mu_j - \alpha * \sigma_j)$ then $e_{ij} = -1$

else if

$a_{ij} \in (\mu_j - \alpha * \sigma_j, \mu_j + \alpha * \sigma_j)$ then $e_{ij} = 0$

else if

$a_{ij} \geq (\mu_j + \alpha * \sigma_j)$ then $e_{ij} = 1,$

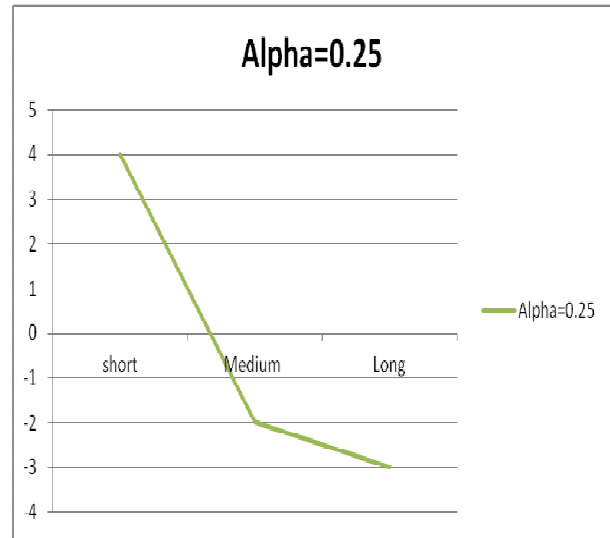
where a_{ij} ’s are entries of Average Time Dependent Matrix”.

Different parameters(α ’s) are taken from $[0, 1]$ into the matrices such as 0.25, 0.5 and 0.75. Each parameter provides the RTD matrix with their row sum which shows the effects of literacy rate in the following manner.

RTD MATRIX I. $\alpha = 0.25$

Row Sum

$$\begin{bmatrix} 1 & 1 & 1 & 1 \\ -1 & 0 & 1 & -1 \\ 0 & -1 & -1 & -1 \end{bmatrix} \quad \begin{bmatrix} 4 \\ -1 \\ -3 \end{bmatrix}$$

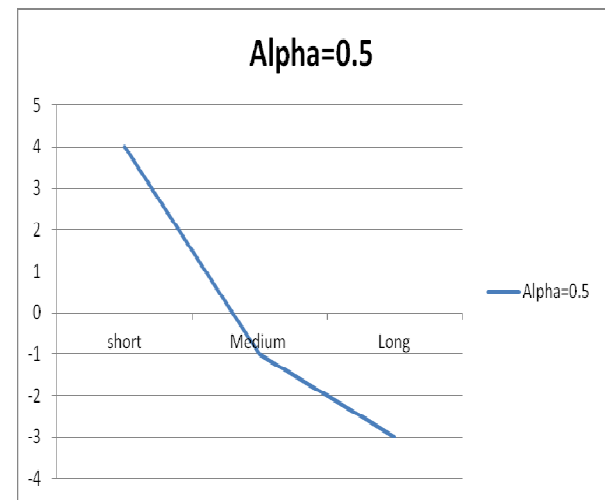


Graph 1: RTD

RTD MATRIX II. $\alpha = 0.5$

Row Sum

$$\begin{bmatrix} 1 & 1 & 1 & 1 \\ -1 & 0 & 1 & -1 \\ 0 & -1 & -1 & -1 \end{bmatrix} \quad \begin{bmatrix} 4 \\ -1 \\ -3 \end{bmatrix}$$

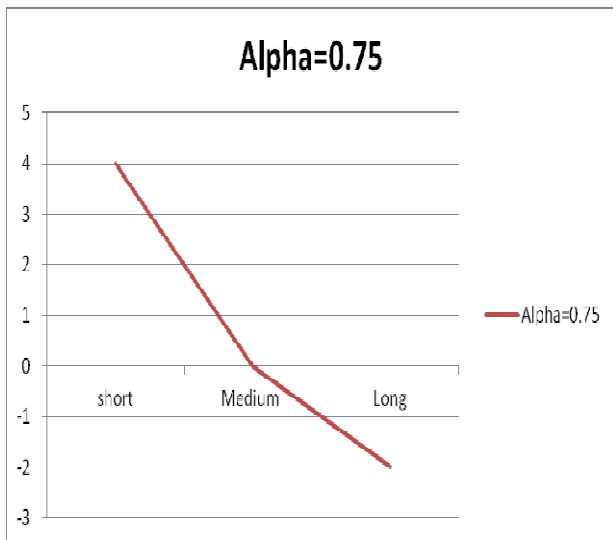


Graph 2: RTD

RTD Matrix III. $\alpha = 0.75$

Row Sum

$$\begin{bmatrix} 1 & 1 & 1 & 1 \\ -1 & 0 & 1 & 0 \\ 0 & -1 & -1 & 0 \end{bmatrix} \quad \begin{bmatrix} 4 \\ 0 \\ -2 \end{bmatrix}$$



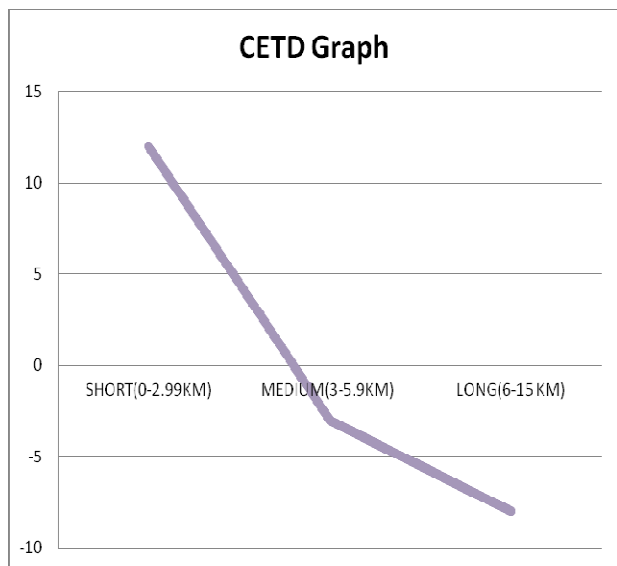
Graph 3: RTD

The Combined Effect Time dependent Data (CETD) Matrix

Row Sum

$$\begin{bmatrix} 3 & 3 & 3 & 3 \\ -3 & -1 & 3 & -2 \\ 0 & -3 & -3 & -2 \end{bmatrix} \quad \begin{bmatrix} 12 \\ -3 \\ -8 \end{bmatrix}$$

Finally the CETD graph can be drawn by combining all the above graphs.



Graph 1: CETD

CONCLUSION

Villages which are more distant from NH road compared to villages which are less distant have the literacy difference of around 40%. The NH 44 starts from Vallam (East) ends with Pudukkudi North horizontally in the map of PURA villages. Vertically Budalur to Vadugappatti has also been connected with a small connective road i.e. NH 99. We propose to extend this small road in order to connect NH 99 to Budalur .These two roads Split (like '+') four blocks(quadrants) in the above PURA map. Each quadrant contains minimum four to maximum six villages. It has some interior roads. The main conclusion of this problem is that by knowing the interior roads at which the long distance villages from NH 44 is affected from the above CETD , the government can take forward steps to provide physical connectivity.

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PPT on "PURA -A Template in PPP for Sustainable and Inclusive Growth of Rural India".