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Estimates of urbanisation pattern in Tiruchirapalli District: An economic analysis

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Abstract
Urbanisation is an index of transformation from traditional rural economy to modern industrial economy and progressive concentration of population in urban units. It mostly subsumes the rural populace attributes usurping along the agricultural land for industrial activities or for the settlement purpose. Urban conversion of agricultural land was intense and alarming in a few districts and states with high rates of economic growth. The specific objectives set forth are to evaluate the structure and pattern of urbanisation in the study area and to determine the impact perception and factors influencing on urbanisation in the study area. A multistage stratified random sampling technique was adopted in this study. The tools of analysis used are descriptive statistics, urban indices and log it model. The results revealed that the urban indices of the three sample talukas that the urbanisation has been more pronounced in the peri-urban and urban gradients than the rural gradient, as per the census 2011 and 2001 and also the study revealed that the urbanisation has both positive and negative impacts on the sample respondents.

Keywords: Urbanisation, gradients, urban indices, impact perception, log it model

1. Introduction
Urbanization is defined as the movement of people from small communities concerned chiefly or solely with agriculture to other communities generally larger, whose activities are primarily centred in government, trade, manufacture or allied interest (Thompson, 1935) [3]. Urbanization is a worldwide megatrend that has drastically changed people–environment interactions in the last decades and is expected to remain one of the main drivers of global change in the future. As the population becomes more and more urban, the adjoining rural area comes under 'urban zone of influence', which impart some distinct urban characteristics in rural populace. Over time, the urbanization mostly subsumes the rural populace attributes usurping along the agricultural land for industrial activities or for the settlement purpose. On the natural ecosystems, currently, conversion of rural areas to urban areas had a marked effect at unprecedented rate.

Urbanisation is an index of transformation from traditional rural economy to modern industrial economy and progressive concentration of population in urban units. The economic improvement and technological advancement have inspired people to move closer to urban and semi-urban areas in a country. The technological transformation of agriculture had a much larger effect on the movement of people from rural to urban areas and concluded that urbanisation had little effect on the total crop production, whereas, technological changes in agriculture had resulted in increased productivity and pushed the excess population to urban areas (Winfield, 1973) [5].

With the above background this study has been carried out, to estimate the urbanisation pattern among different gradients of Tiruchirapalli district, the specific objectives are as follows,
1. To evaluate the structure and pattern of urbanisation in the study area.
2. To determine the impact perception and factors influencing urbanisation in the study area.

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2. Design of the study
2.1 Methodology
A multistage stratified random sampling technique was adopted in this study. The nine talukas of Tiruchirapalli district have been classified as three gradients namely, Rural, Peri-urban and Urban, based on the proportion of urban population in the respective talukas (Census 2011) [1] and also by referring geographical map of Tiruchirapalli district. One taluk has been randomly selected from each of the gradients, six villages have been randomly selected from each of the selected gradient and 15 respondents have been randomly selected from each of three villages. The ultimate sample consists of 270 sample respondents, which comprised of 90 sample respondents in each of the gradients, namely, Rural, Peri-urban and Urban. The primary data has been collected from the sample respondents of Rural, Peri-urban and Urban gradients using structured interview schedule.

2.2 Tools of Analysis
2.2.1 Descriptive Analysis
Descriptive statistical analysis was undertaken using percentage, mean etc. to study the impact perception of urbanisation pattern.

2.2.2 Urban Indices
The process of urbanisation has been analysed on the basis of different urban indices, namely, level of urbanisation, decadal growth of urban population and the rate of urbanisation (Sivaramakrishnan *et al.,* 2005) [2]. In addition, the Eldridge index (Vaidyanathan, 1981) [4] was also used to investigate the pace of urbanization. Also, the pace of urban growth, contribution of growth in urban population to total growth of population and rural-urban displacement have been calculated.

(a) Level of Urbanisation
It expresses the percentage of urban population with respect to the total population at a particular time.

$$\text{Level of Urbanisation} = \frac{\text{Urban Population}}{\text{Total Population}} \times 100$$

(b) Decadal Growth of urban population, which indicates the degree of urbanisation with respect to time.

$$\text{Decadal Growth of urban population (2001- 2011)} = \frac{\text{Urban Population (2011) - Urban Population (2001)}}{\text{Urban Population (2001)}} \times 100$$

(c) Rate of Urbanisation indicates decadal change in the percentage of urban population.

$$\text{Rate of Urbanisation (2001-2011)} = \frac{\text{Per cent of Urban Population in 2011 - Per cent of Urban Population in 2001)}}{\text{Per cent of Urban Population in 2001}} \times 100$$

(d) As stated earlier, the Eldridge index (Vaidyanathan, 1981) [4] was used to measure the pace of urbanisation. Eldridge index indicates change in proportion of urban population as a ratio to the maximum possible per cent change.

$$\text{Pace of Urbanisation (2001-2011)} = \frac{\text{Per cent of Urban Population in 2011 - Per cent of Urban Population in 2001}}{\text{Per cent of Urban Population in 2001}} \times 100$$

(e) Pace of urban growth takes into consideration the absolute growth in urban population in relation to maximum possible growth during the decade.

$$\text{Pace of Urban Growth (2001-2011)} = \frac{\text{Urban Population in 2011 – Urban Population in 2001}}{\text{Total Population in 2011 - Urban Population in 2001}} \times 100$$

(f) Contribution of Growth in Urban Population to Total Growth of Population is an important measure for analysing the process of urbanisation as well.

$$\text{Contribution of Growth in Urban Population to Total Growth of population (2001-2011)} = \frac{\text{Urban Population in 2011- Urban Population in 2001}}{\text{Total Population in 2011 - Total Population in 2001}} \times 100$$

(g) Lastly, a measure of Rural-Urban Displacement has also been considered.

$$\text{Rural-Urban Displacement (2001-2011)} = \frac{\text{Urban Population in 2011 - Total Population in 2011}}{\text{Urban Population in 2011}} \times 100$$

2.2.3 Logit Estimates on Urbanisation Impact Perception
The logit model was also used to find out the determinants for factors influencing respondents' perception on impact of urbanisation over farming (binary). The index variable L_i indicates that whether respondents perception if yes to taken the value one and otherwise, it takes the value zero, is the function of some independent variables and is expressed as.

$$L_i = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \mu$$

Where,
α = Constant
X_1 = Size of the land holding (acres)
X_2 = Ratio of non-farm to farm income (Rs.)
X_3 = Migrants in the family (binary)
X_4 = Occupational shift of the respondents (binary)
X_5 = Land loss in the households (binary)
β_i's = Parameters to be estimated
μ = error term

3. Results and Discussion
3.1 Trends and Pattern of Urbanisation in the Sample Taluks
The pattern of urbanisation has also been analysed on the basis of urban indices for the three sample gradients, *viz.,* rural, peri-urban and urban. The results are presented as trends and pattern of urbanisation in Table 1.

Table 1: Trends and Pattern of Urbanisation in the Sample Taluks

S. No	Urban Indices	Rural	Peri-urban	Urban
	Level of Urbanisation			
1.	2001	19.13	20.94	69.96
	2011	19.59	29.97	75.76
2.	Decadal growth	4.20	68.99	38.35
3.	Rate of urbanisation	-2.40	39.32	8.29
4.	Pace of urbanisation	-1959.49	-2093.74	-6995.81
5.	Pace of urban growth	0.94	14.39	46.42
6.	Contribution of growth in urban population to total growth of population	12.17	67.84	96.67
7.	Rural-Urban displacement	-8285.99	-5083.77	-2238.07

It could be seen from Table 1 that the level of urbanisation was higher in the urban gradient (75.76 per cent) than the peri-urban gradient (29.97 per cent) and rural gradient (19.59 per cent) in 2011 census. The decadal growth between census 2001 and 2011 were 4.20 per cent in the rural and 38.35 per cent in the urban gradients, whereas the peri-urban gradient had the highest decadal growth of 68.99 per cent.

It is also seen that the rate of urbanisation was positive in the peri-urban and the urban gradient (39.32 per cent and 8.29 per cent, respectively). Whereas, rural gradient had a negative rate of urbanisation (-2.40 per cent), might be due to lesser percentage of urban population.

The pace of urban growth in the three gradients have recorded a positive growth of 0.94 per cent, 14.39 per cent and 46.42 per cent in the rural, peri-urban and urban gradient. However, the pace of urbanisation showed a negative pattern in all the three gradients, which might be due to the positive growth in urban population in the decades with respect to previous decade. The contribution of urban population growth to the total population growth was measured as 96.67 per cent in the urban gradient, which was the highest, followed by 67.84 per cent in the peri-urban and 12.17 per cent in the rural gradient, respectively. And the rural-urban displacement was negative in rural (-8285.99), peri-urban (-5083.77) and urban (-2238.07) gradients, which indicates that the people had been displaced from rural areas to urban areas during the decades.

It could be concluded from the urban indices of the three sample taluks that the urbanisation has been more pronounced in the peri-urban and urban gradients than the rural gradient, as per the census 2011 and 2001. This might be due to the formation of urban fringes along the urban area, due to population pressure and industrialisation.

3.2 Impact perception of urbanisation
The process of urbanisation is bound to have socio-economic implications on the populations. The impact of urbanisation both positive and negative, as perceived by the sample respondents was studied and are presented in Table 2.

Table 2: Impact Perception on urbanisation by the sample respondents

S. No	Dimensions	Improved / Yes	No Change
I.	**Positive Impact**		
1.	Household income	182 (67.41)	88 (32.59)
2.	Education of family members	192 (71.11)	78 (28.89)
3.	Chances of employment for family members	205 (75.93)	65 (24.07)
4.	Overcoming financial problems	163 (60.37)	107 (39.63)
5.	Standard of living of the family	198 (73.33)	72 (26.67)
6.	Social and family status	143 (52.96)	127 (47.03)
7.	Infrastructure development	188 (69.63)	82 (30.37)
8.	Increase in land values	192 (71.11)	78 (28.89)
9.	Medical facilities	164 (60.74)	106 (39.36)
	Overall	190 (70.37)	80 (29.63)
II	**Negative Impact**		
1.	Increases in agricultural prices	187 (69.26)	83 (30.74)
2.	Land losses	215 (79.63)	55 (20.37)
3.	Pollution related health conditions	145 (53.70)	125 (46.30)
4.	High energy consumption	167 (61.85)	103 (38.15)
5.	Housing problems	149 (55.19)	121 (44.81)
6.	Attraction to urban social fabric	72 (26.67)	198 (73.33)
	Overall	196 (72.60)	44 (16.30)

Note: Figures in the parentheses indicate the percentage to the respective total

To study the indirect benefits accruing from urbanization, eight dimensions were identified, *viz.,* household income, education of the family members, chances of employment for family members, overcoming financial problems, standard of living of the family, social and family status, infrastructure development, increase in land values and medical facilities and the responses were collected from the respondents. In the process of urbanisation, the people and the society has to bear some losses too. The negative impacts in terms of increase in agricultural prices, land losses, pollution related health conditions, high energy consumption, housing problems, attraction to urban social fabric were also identified. The results on the perception of respondents are presented as a whole in Table 2, since there were no significant differences in the perception of sample respondents across the gradients.

It could be observed from the table that majority of the respondents (70.37 per cent) opined that the various dimensions identified in the study had positive impact of urbanisation. Whereas, only 29.63 per cent were of the view that urbanisation has not done good to them. Out of the nine positive dimensions, almost all the dimensions except social and family status, received more than 60 per cent of positive

responses of these, chances of employment for family members had the highest positive responses, followed by standard of living of the family, educational level of family members and increase in land values.

A further look at the table indicated that 72.60 per cent of respondents opined that there were negative implications of urbanisation and the rest of 16.30 per cent of respondents felt it was not so. Among the negative dimensions, the loss of land and increase in the price of agricultural commodities received more yes responses. The dimension 'attraction to urban social fabric' received the least percentage of yes responses. More than 50 per cent of respondents were opined that urbanization would result in pollution related health conditions and housing problems. Hence, it could be concluded that the urbanisation has both positive and negative impacts on the sample respondents.

3.3 Logit Estimates on Urbanisation Impact Perception
The logit model was employed to study the degree and direction of the factors influencing respondents' perception on the impact of urbanisation over farming (binary), i.e., it takes the value one, if the respondent's perception is yes and takes the value zero, otherwise) and the results are presented in Table 3.

Table 3: Logit Estimates of urbanisation impact perception

S. No	Variable	Coefficient	Odds ratio	P value
1.	Constant	2.375	1.113	0.074
2.	Size of the land holding (acres)	-0.739***	1.027	0.007
3.	Ratio of non-farm income to farm income (Rs.)	1.007	0.319	0.091
4.	Migrants in the family (binary)	1.512**	0.127	0.026
5.	Occupational shift of the respondents (binary)	0.912**	0.270	0.019
6.	Land loss in the households (binary)	1.323**	0.061	0.003
	-2 log likelihood	35.78		
	R^2	81		
	Nagelkerke R^2	88		

** and *** indicate significance at 5 per cent and 1 per cent levels, respectively

It could be seen from Table 3 that the estimated model predicted 81 per cent of the reasons for the respondents' perception on the impact of urbanisation over farming. The coefficient for the variable, size of land holding was negatively significant and revealed that the odds of being perceived as impactful would decrease by 1.027 times, for every one-acre increase in the land holding.

The variables, migrants in the family, occupational shift of the respondents and land loss in the households were positively significant, indicating the influence of these variables on the respondents' perception on the impact of urbanisation on farming. With regard to migrants in the family, the results revealed that for every one positive response on urbanisation, the odds of being perceived as impactful would increase by 0.127 times. Also, the odds of being perceived as impactful would increase by 0.270 times and 0.061 times, respectively, with the occupational shift of the respondents and land loss in the households.

4. Conclusion
The study concludes that the urbanisation has been more pronounced in the peri-urban and urban gradients than the rural gradient, as per the census 2011 and 2001. In the same way, the results also revealed that the urbanisation has both positive and negative impacts on the sample respondents. The size of land holding was negatively influenced and the other variables, migrants in the family, occupational shift and land loss among the households were positively influenced factors on impact of urbanisation perception over farming. This might be due to the formation of urban fringes along the urban area, due to population pressure and industrialisation. From the results it is suggested to develop a balanced rural-urban policy which is the need of the hour for a smooth rural-urban transformation.

5. Acknowledgement

6. References
1. Census of India. ORGCCI, Government of India; c2011.
2. Sivaramakrishnan KC, Kundu A, Singh BN. Handbook of Urbanisation in India - An Analysis of Trends and Processes, Oxford University Press; c2005. p. 177.
3. Thompson WS. Urbanization in Encyclopedia of Social Sciences, Macmillan. 1935;15:189.
4. Vaidyanathan KE. Rural -Urban Distribution of Population in West Asia, Population Geography. 1981;3(1-2):96-113.
5. Winfield GF. The Impact of Urbanization on Agricultural Processes, The Annals of the American Academy of Political and Social Science. 1973;405(1):65-74.