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Transformation of Socio-economic life of Population: A Case Study of Tomba Village, Matigara, West Bengal

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Abstract

Socio-economic study of population at village level has significance importance in micro-regional planning. It enriches the knowledge about the various aspect of that area from literacy, age-sex structure to social status of the people. The selected study area is Tomba village, which is only 5 km away from the Siliguri town. In this paper, an attempt has been made to study the socio-economic life of the study area. The study is based on the primary field survey of 97 houses and the secondary data published by Census of India, 2001, 2011.The study shows that decadal population growth (2001-2011) of the village is 173 % and male literacy rate has declined by 5%, even the area has good connectivity with Siliguri. Female marginal workers rate is high in comparison with other occupational activities. Population influx from the surrounding states and district especially Bihar and Northern district of West Bengal like Cooch Behar, Jalpaiguri etc. is quite high in this area. To study the road network connectivity different types of indices have been used to show the accessibility.

KEYWORDS: Socio-economic life, immigration, decadal growth, occupational structure

INTRODUCTION

Socio-economic characteristics and status are the foremost issues all over the world especially the developing countries. It is the measure of an individual's or family or group of people's economic and social position based on education, income, health and occupation (Ismail & Mustaquim, 2013). This kind of study tries to explain the actual situation of population in particular region and is very rare at micro-level such as village and ward level. The study area Tomba village is located in Matigara subdivision of Darjeeling district, West Bengal, India. The village is about 5 km away from the main town of Siliguri. As per the 2011 Census, a total number of 1935 families are residing here. The village has population of 9632 of which 5038 are males while 4594 are females (Census 2011). 3400 people (35.29%) out of total population are engaged in work activities among them 85.88% of workers were engaged in main work while 14.12% were involved in Marginal activity. This paper tries to find out the socio-economic profile, transport and communication status and possible measures to

overcome the problem in this village. However, at the same time there is a realization that certain parts of the rural area have been left behind in development and the authority is currently promoting rural area in order to sustain local economies and to enhance employment and growth (Ghosh & Saha, 2017).

OBJECTIVES

1.To study the socio-economic status of the people of Tombajote area, Matigara.
2.To study the transport and communication status of the study area.

METHODOLOGY

The study has been done on the basis of primary field survey based on random stratified sampling method. Secondary data related with the population, number of inhabited house have collected from the District Census Handbook of Darjeeling District, 1981, 1991, 2001 and 2011. 97 household have been selected for the study. Statistical techniques have been done to analyze the data. Decadal growth & the population statistics of Tombajote area has been presented with the help of age-sex pyramid and bar diagram. Flow map has been used to show the transport connectivity of the area. Proportional circle, bar diagram, line graph has used to represent the data. Microsoft Excel, Q-GIS version (3.14) have been used to prepared the relevant maps of the study.

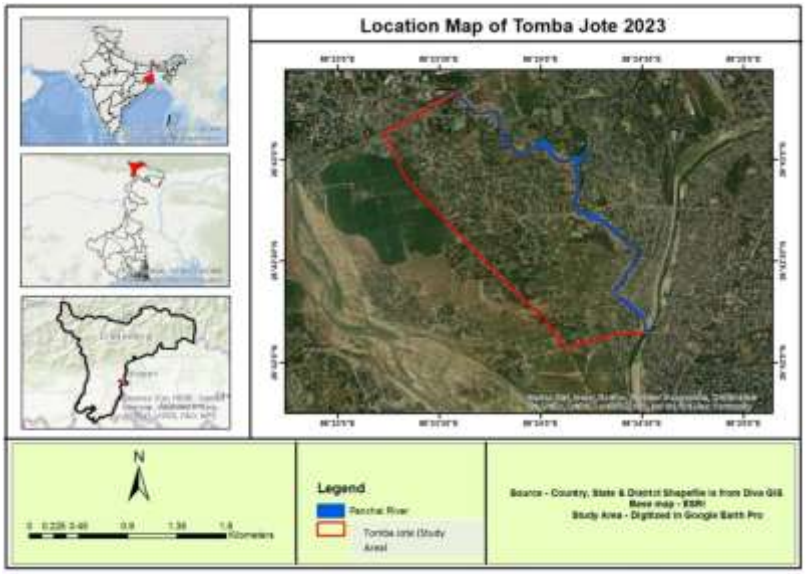

Figure 1: Location Map of the study area (TombaJote, Matigara)

LOCATION OF THE STUDY AREA

TombaJote is a large village in Matigara Community Development block (CD) of Darjeeling District, West Bengal. It is situated 127m above the mean sea level and at 26˚42̍ N to 26 ˚43̍ 10̍ N and 88˚23 10̍ to 88˚ 24 30̍ E (Figure 1). The Matigara CD block

is surrounded on the north by the Kurseong CD block, to the east by the Rajganj CD block in the Jalpaiguri district, to the south by the Phansidewa CD block, and to the west by the Naxalbari CD block. The Matigara CD block covers 143 sq. km of surface area.

CLIMATE

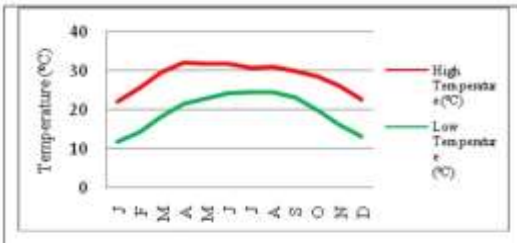

Figure 2: Average Temperature of TombaJote, Matigara

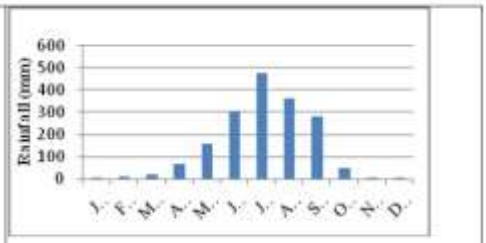

Figure 3: Average rainfall of TombaJote, Matigara

The study area experiences warm, moderate weather, with spring and autumn being the most soothing seasons. Daily data collection is done through four observatories in Darjeeling, Kalimpong, Kurseong, and Bagdogra. Annual precipitation is 3011 mm, with maximum and minimum rainfall occurring in July and November, respectively. July experiences 89.84% of the highest relative humidity, with 28 rainy days and the fewest in November. Summer begins in June and lasts through September.

Table1: Details of land use & land cover area of TombaJote, Matigara

Area in Sq. Meter									
Year	Total Area	Settlement	Change	Vacant land & Trees	Change	Drainage or *Nala*	Change	Roads (total length in Meter)	Change
2003	2254943	105805	+483%	2128289	-23%	20849	-99.5%	11298	+216%
2023	2254943	616776		1638168		102		35663	
(Source: Google Earth Image)									

DISCUSSION

Land use and land cover of the area: The study area is a fast growing settlement zone in the Matigara. There is a comparative study has done with the help of Google earth Image 2003 and 2023 (Figure 4 & 5). Supervised classification has been done to prepare the land use land cover map in the Q-GIS 3.14 platform. The remarkable change had been found in the field of Drainage. Drainage area completely vanished with the development of settlement and road which creates water logging situation during the monsoonal month. No drain has been constructed by the Pachayet for drainage purposes in the entire study area. Settlement area increase 483%,vacant area reduced 23%, drainage area reduced 99.5% and road area increase 216% from the year 2003to 2023.

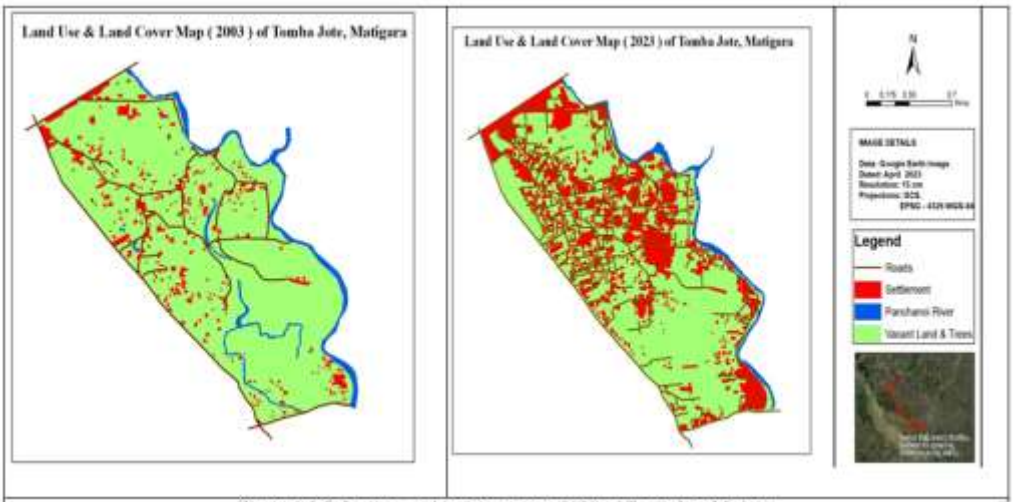

Figure 4 & 5: Land use and land cover map (2023) of TombaJote, Matigara

Population Composition and Age Sex Structure: According to the 2011 census, there are 1935 families residing in Tomba village, and the total population is 9632, of which 5038 are males and 4594 are females. The total geographical area of the village is 146.5 hectares. The total population with ages 0–6 is 1375, which is 14.28% of the total population of the village. The child-sex ratio of the village is 978, which is much higher than the West Bengal average of 956. The literacy rate of the area is 73.85% (2011 census), which was 63.31% in 2001 Census.There are 16.97% Schedule Caste (SC) people and 2.36% Schedule Tribe (ST) people (Fig.6) in the village.

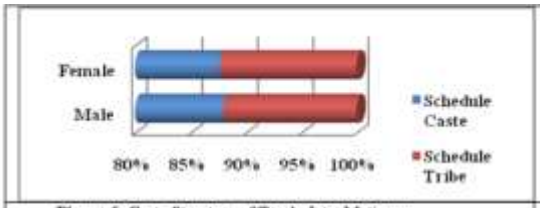

Figure 6: Caste Structure of TombaJote, Matigara

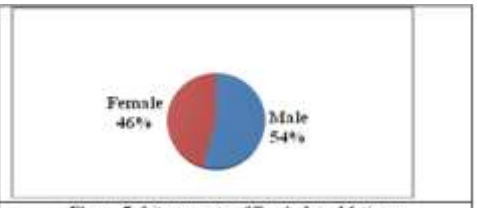

Figure 7: Literacy rate of TombaJote, Matigara (Source : Census of India, 2011)

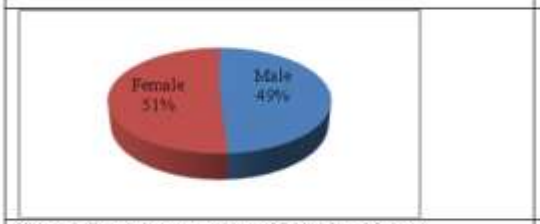

Figure 8: Population composition of TombaJote, Matigara

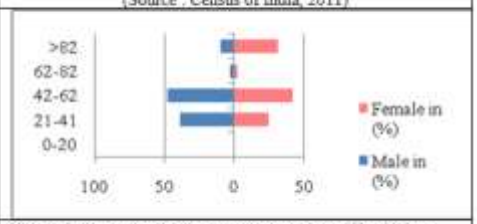

Figure 9: Age wise distribution of population of TombaJote, (Source: Primary Field Survey, 2023)

There are 91 households have been surveyed in this village. The overall male population in the surveyed households is 198 (49%), while the total female population is 209 (51%) (Fig.8).In the age group of 21–41, the percentage of men and women in the population is relatively similar. There are 48% men and 42% women in the 42–62

age range that make up the majority of the surveyed households. The percentage of women is higher than the percentage of men in the over-82 age group (Fig.9).

Occupational Structure & Income Status: The percentage of a nation's population involved in businesses and different professions determines the occupational structure of that nation. Simply put, a nation's occupational structure is made up of its various demographic groups, who work in a variety of industries such as manufacturing, transportation, and agriculture, among many others. According to the definition of the worker (given by the census of India), the census separates workers into two groups, namely, Main Workers and Marginal workers. The term "Main Workers" refers to employees who worked for the majority of the reference period, or at least six months. The term "Marginal Workers" refers to people who were unemployed for the majority of the reference period, or fewer than six months.Tomba has a workforce of 3400 people, with 79% of men and 84% of women working. The Siliguri subdivision's rural population is predominantly agricultural. TombaJote, a small area under the Matigara Community development block, has 30% P.V.T. workers, 11% drivers, 27% small businesses, and 12% labor categories. The area is well connected with Matigara-Kurseong Road, Siliguri Road, and the Siliguri Air Port. The majority of family members work in factories and mechanical shops (Fig.10 & 11).31 families have a yearly income of between 20K-50K (20,000 to 50,000). 41 families earn 50K–80K every year (50,000–80,000). Between 80K and 1 lakh (80,000 to 1 lakh) form 15 families, whereas more than 1 lakhs only represents 4 families (Fig.12).

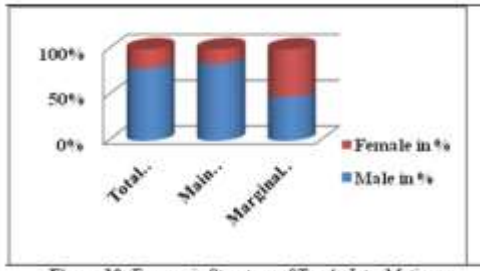

Figure 10: Economic Structure of TombaJote, Matigara
Source: Darjeeling District Census Handbook, 2011

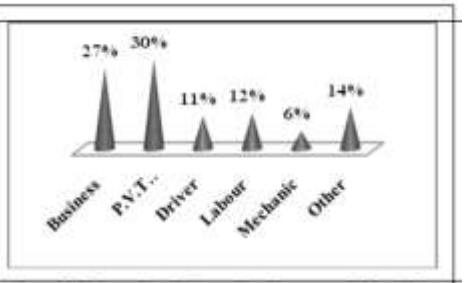

Figure 11: Categories of occupational patterns of TombaJote, Matigara
Source: Primary Field Survey, 2023

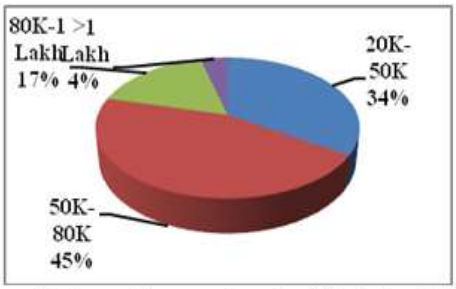

Figure 12: Income Structure of people of TombaJote, Matigara

SOCIAL STRUCTURE:

The study area is quite close to the Siliguri subdivision, which has provided additional employment opportunities and work force in many sectors in the city region, which is securing the residents' economic well-being. Decadal growth rate of population is increasing at very fast rate (Fig. 13).

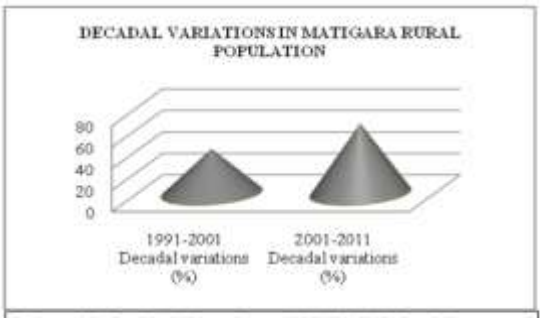

Figure 13: Decadal variations of population in TombaJote, Matigara
Source: Darjeeling District Census Handbook

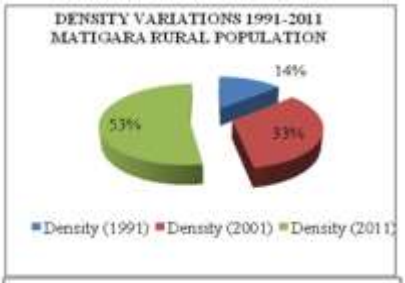

Figure 14: Density variations 1991-2011 of Matigara Rural Population
Source: Darjeeling District Census Handbook

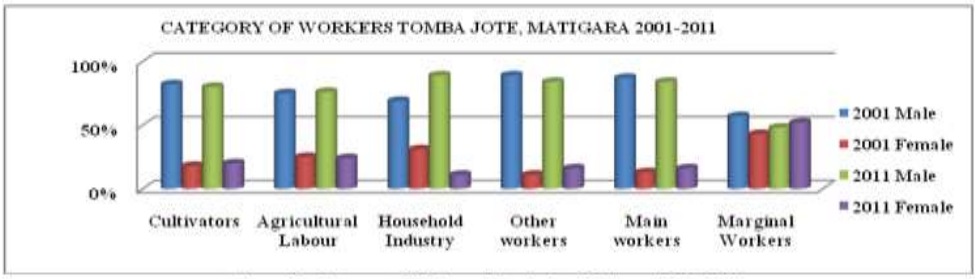

Figure 15: Category of Workers of TombaJote, Matigara (2001-2011)
Source: Darjeeling District Census Handbook 2001 and 2011

There is a significant increase in workforce from 32% in 2001 to 35% in 2011. The number of household workers and other occupations also increased, indicating a growing number of domestic industries and income-generating activities in the area. 85% men and 15% women represented the workforce in 2001, and 79% men and 21% women did so in 2011. Female workers' participation grew over time. Between 2001 and 2011, the number of cultivators and agricultural laborers decreased, but household workers increased significantly, indicating a growing number of domestic industries and occupations in the region (Fig.15).

Figure 16: Beldangi Primary School (SSK), Tombajote, Matigara

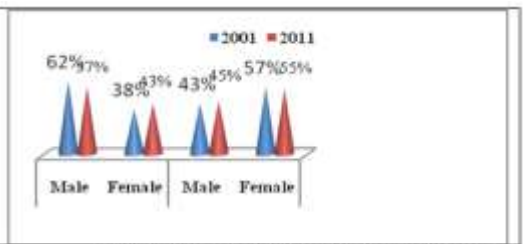

Figure 17: Literacy rate of Tombajote, Matigra 2001-2011.

Figure 18: Road structure of Tumba jote, Matigara.

Figure 19: West Point School (Private), TombaJote, Matig

ROAD NETWORK CONNECTIVITY

The connectivity of the area has measured by using the following indices given by Saxena, i.e.Alpha, beta, gamma, indices and cyclomatic number. A detailed description of these three indices is given below:

Table 2: Transport System Connectivity and Coverage Measures

Index	Formula	Notation
Alpha Index	a= e-v+/2v-5	e the number of edges v the number of vertices
Beta Index	β= e/v	e the number of edges v the number of vertices
Gamma Index	e/3(v-2)	e the number of edges v the number of vertices
Cyclomatic Index	e – v + p	e the number of edges v the number of vertices p the number of subgraphs
Grid Tree Proportion Index	e-v+1/(Vv-1)2	e the number of edges v the number of vertices
Pi Index	Total Distance of Network(L)/ Distance of Diameter(A)	L length of network A the area of district
Eta Index	Total Network Distance (L)/ Number of Edges (E)	L the length of network E the observed number of edges
Theta Index	Total Network Distance (L)/ Number of Vertices (V	
Detour Index	Actual line/ Straight Line	

Table 3: Calculation of Network Connectivity Analysis Indicates.

No. of vertices (v): 20, No. of edges (e): 24, Sub-graph (p): 01, Total length of Network: 146sq. km

Index	**Values**
Alpha Index	0.08
Betta Index	1.20
Gamma Index	0.44
Cyclomatic index	3.00
Pie Index	0.08
Eta index	0.50
Theta Index	0.60
Grid Tree Proportion Index	0.34
Detour Index	100- 275.51

Alpha Index: A more useful index of the connectivity of networks is the alpha index or "redundancy index". This consists of the ratio between the observed numbers of fundamental circuits to the maximum number of circuits that may exist in a network (Garrison&Marble, 1962). The alpha index value will be ranging from 0 to 1.0 where 0 value represents a minimum connected network and value 1 represents a maximum connected network. Here alpha index calculate value is 0.085 which indicates the connectivity is very less.

Beta Index: The beta index compares the number of links with the number of nodes in a network. The beta index calculated value is 1.0. Beta index takes 0 value when no there are no edges, 1 when the network has one circuit and more than 1 when a complicated network with several circuits is represented. In the study area, the beta index Value is more than 1 which indicates a complicated network pattern.

Gamma Index: It is the ratio of the actual number of edges to the maximum possible number of route connections or edges. The value of the index varies from 0 and 1. Zero indicates no connection in the network and 1 indicates maximum connections. The gamma value of this studied area is 0.44 which expresses moderate connectivity.

Eta Index: The Eta index is the ratio of the expressive relationship between the transportation network as a whole and its routes to the individual elements of the network. In graph theoretic measures, the Eta index is the ratio of the sum of all the edges and the vertices to the observed number of edges (Kansky 1963).The segment value is 0.50 in this study area which indicatesmoderate accessibility.

Detour Index: The detour index, the actual distance along any node of transport is compared with the straight line distance between those two points. It is found that the actual journey distance is always greater than the straight line distance. The distance from each of the places to other places is noted in the shortest road distance matrix. The lower the value of the sum, the higher the accessibility. The desire line matrix represents the distance in terms of direct distances. The straight-line distance from each vertex to other can be observed from this matrix. The directness of the road determines the speed and time of travel. After observing the shortest path matrix of the road network of TombaJote, the following conclusions are made.

Table 4: Actual, Straight line in Kilometer and Detour Index

Vertex Name		Actual Line		Straight Line		Detour Index
		In cm	In km	In cm	In km	
	B	5	0.75	4	0.60	125
	C	5	0.60	4	0.60	100
	D	10	1.50	7.7	1.16	129.31
	E	12	1.80	8.2	1.23	146.34
	F	5	0.75	4	0.60	125
	G	4	0.60	4	0.60	100

A	H	10	1.50	10	1.50	100
	I	12	1.80	10	1.50	120
	J	15	2.25	8.5	1.28	175.78
	K	18	2.70	6.5	0.98	275.51
	L	4	0.60	3	0.45	133.33
	M	5	0.75	4	0.60	125
	N	4	0.60	4	0.60	100
	O	17	2.55	10	1.50	170
	P	10	1.50	8.5	1.28	117.19
	Q	4	0.60	2.5	0.38	157.89
	R	4	0.60	2.5	0.38	157.89
	S	4	0.60	3	0.45	133.33
	T	4	0.60	0.53	0.53	113.21

In the above table which indicates the detour matrix which is computed on the basis of actual road distance and desire line distance revealed the order of efficiency of nodes having efficient road network to save the journey time and transport cost from one node to another. The total vertex has been computed for 20 nodes. It shows that there has been a significant variation in the degree of directness of the nodes in the present study. It is noted that the detour index value ranged between 100 and 275.51. Out of all the nodes, C, G, H, N have the least detour index value of 100, which indicates the higher nodal efficiency in saving journey time compared with all the other nodes in the district. In contrast, J (matigara hat), K (near panchanoi river),O (Ramghat), have high detour index values indicating low nodal efficiency.But in the case of map to show the proper accessibility by Detour Index, it is not possible to take all the nodes at the time of zonation so, we have taken some selected nodes for easily computation of map.

Figure 20

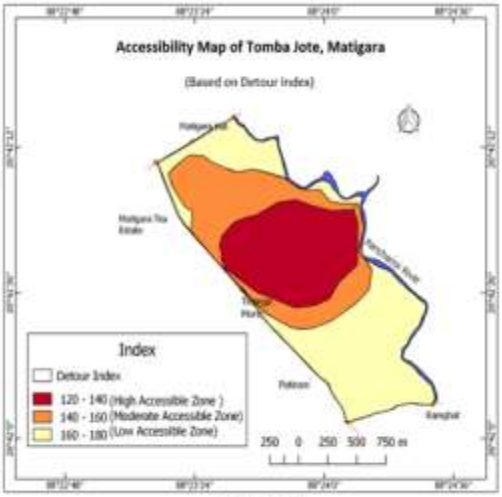

Figure 21

Communication Status: Communication is a major factors and driving thrust of rural development. It incorporates print media, electronic media, new media (IT), and folk media. The print media such as facilities of newspaper, magazine, poster, hoarding etc have the power to change the thought process and development in any rural area. There are few families' uses the facilities of daily newspaper. Development is a multidimensional exercise that seeks to transform society by addressing the entire complex of interwoven strand, living impulses (Haqqani, 2003). Siliguri is nearest town to Tombajote for all major activities, which is only 5 km away. Althogh administratively it comes under Matigara gram Panchayet, but almost all facilities of Siliguri urban area are available in the area.

Table 5: Connectivity of TombaJote, Matigara

Type	Status
Public Bus Service	Available within <5 km distance
Private Bus Service	
Railway Station	Available within 10+ km distance
Toto Service	Available within 1 km distance
Private Car service	Available within 5km

CONCLUSIONS

After analysis all the data and fieldsurvey on the socio economic life of Tombajote Village, it has noted that administratively it is a village area, but it enjoy most of urban facilities. Although civic amenities facilities like purified water facilities, proper drainage system, road light, is not so good. The connecting road Matigara- Siliguri is fall under the study area, but its condition is very poor. Several potholes on the road made creates problems to the daily commuters of the places. Decadal growth of population, from 2001 to 2011 is 173%. Literacy rate of population increase by 221.29% from 2001 to 2011. Population growth rate is very high due to huge immigration from surrounding states especially Bihar. Road light is absent in most of the area. Frequent loadshedding is a common problem. There is lack of proper drinking water supply among the resident of the village. Although area is a village, but the life style of the people is equivalent to urban life. Developed housing structure, pucca road connectivity, and good income source of the people make the area as urban village. Keeping in view its overall growth rate, it can be saythat in the coming future, it might be added with the Siliguri municipal corporation, or Matigara might be converted as a municipality.

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