Urbanisation Andits Effects On Surrounding Small Towns of Guwahati City

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Abstract: Urbanisation and development are interlinked. Urban centres, big or small affect their surrounding areas. The small towns are mostly intimately integrated with rural areas and provide services and commodities. What is not so commonly understood is the fact that the city and the countryside are mutually interdependent and this relationship covers a wide range of physical, social, and economic interactions. The paper attempts to assess the interactions between the Guwahati city and surrounding small towns of the study area based on human flow and the factors behind the flow.

In order to achieve the study's objectives, secondary sources are Census data, Statistical Handbook of Assam, Master plan and City Development Plan. For human flow, the plying of government and private vehicles from the sample towns has been considered. The study depicts that interaction decreases with increase in distance from Guwahati city, revealing the interaction lapse rate. The flow of commuters from the small town is more to the next bigger town if the infrastructural status of the town is high. The factors behind people flocking to Guwahati city are non-availability of educational, medical and entertainment facilities.

Key words: interaction, interdependent, urbanisation, surrounding, infrastructural, commuters

INTRODUCTION

Over the last decades, interactions among towns and cities in developing countries have expanded;

(1) population growth, (2) changes in the natural environment, and (3) brutal exposure to world markets occasioned a rapid increase in rural-urban interactions (Jiang 2001). Cities expand and extend their influence on the countryside, which in its turn modifies many aspects of social and economic life. The city is usually looked upon as an entity dependent on its surroundings, and less often as an independent unit. What is not so commonly understood is the fact that the city and the countryside are mutually interdependent and this relationship covers a wide range of physical, social, and economic interactions. (R. Ramchandran, 2004)

The paper deals with the interactions between the Guwahati city and surrounding small towns of the study area. The basic proposition underlying this study is that small towns are grouped on the basis of the degree of interaction to examine the study area as a functional region. The concern is thus more with flows linked to a central point rather than with the uniformity of the region as a whole. Two basic approaches to grouping the small towns as per interactions are outlined-'flow analysis' based on actual observations of what people do, and 'gravitational analysis' based on theoretical observations of what they might do (Glasson, 1974).

METHODOLOGY:

The analysis for growth of towns in the surroundings of Guwahati city is based on secondary data obtained from different sources as Census of India Reports, Statistical Handbooks of Assam, Census Town Directory, Master Plan, and City Development Plan. The Census Reports 2011 was published in 2013 and hence it couldn't be used in the present study which was carried on in the year 2011.Besides secondary data, primary data have been collected with the help of sample survey. A random sampling design is used to demarcate of the study area in order to study the pattern of linkages between small towns and the Guwahati city

Demarcation of the Study Region:-

In the present study regionalisation of Assam has been done based on urban centres, for the purpose of demarcation of the study area. The regionalisation is done by adopting population potential model.

The details of the construction and application, the versions of the basic population potential model vary in three main ways: in their interpretation; in the phenomena dealt with; and in the reasons for using them.GopalKrishan and S.C Gupta has modified population potential model and used for regionalisation of India on the basis of relative population potentials of cities. The study uses data by individual cities for the three post- Independence censuses from 1951-71 and presented a dynamic picture of regionalisation in India. The model is published in R.P. Mishra's Regional Planning: Concepts, techniques, policies and case studies (Mishra 1992) which is a Reprinted from Area, Institute of British Geographer. This objective has been achieved by computing population potential of towns upon each other by identifying dominant towns, henceforth called the regional centres, and by delimiting population potential zones of various regional centres (Gupta and Krishnan, 2002). The significance is three fold. First, a system of regional centres, along with zones of their population potential, is identified; a knowledge of which may be usefully employed in any scheme of regional or national planning. Secondly, the number, spacing and locational pattern of regional centres would reflect imbalances in urban

development. Thirdly, it would be of great academic interest to compare these zones with the physical, economic, cultural or administrative divisions.

The formula used for this purpose was:

Population potential of a town:

$$X \text{ upon } Y \text{ town} = \frac{\text{Population of town X}}{\text{Distance in kilometres between town X and town Y}}$$

Since, the demarcation of the study area in the present research is based on aforesaid model, the methods, techniques, and limitations remain same.

Following are the steps followed for demarcation of the study area:-

- For the present study, the very first step was to locate all the 126 towns of Assam on an outline map of Assam. Based on the population size, 7 towns namely, Guwahati, Nagaon, Dibrugarh, Jorhat, Silchar, Tinsukia and Dhubri have been identified as dominant towns hence forth called Regional centres. Moreover, these towns give a spatial coverage of whole of Assam, from north to south, east and west and the central part of it.
- The next step was to find out the distance between various towns with the specific regional centres. Since most of the inter –town goods and passenger traffic moves by road transport, it was deemed proper to adopt the shortest road distance which was noted from the Census Town Directory 2001.
- This stage is followed by identification of population potential zones .The population potential of all 126 small towns of Assam upon the selected 7 regional centres was calculated with the help of the aforesaid model. The towns whose population potential of a specific regional centre was the highest would come under the purview of that particular regional centre.
- The zonal boundaries were drawn by joining the mid points of two towns falling into two different regional centres (Figure 1).The boundaries of the population potential zones do not correspond with those of administrative, physical or cultural divisions of Assam.

Thus, 7 population potential zones have been created. Among seven population potential zones of Assam the Guwahati population potential zone covers total of 24 small towns. The Guwahati population potential zone i.e the study region, comprises of 24 small towns namely, Barpeta Road, Sarbhog, Barpeta, Howli, Bohari, Sarthebari, Pathsala, Rangia, Sualkuchi, BamunSualkuchi, Palasbari, Kochpara, Dharapur, North Guwahati, Chandrapur, Tihu, Nalbari, Tangla, Mangaldoi, Kharupetia, Udalguri, Jagiroad, Marigaon and Guwahati (Table 1).

Potential ofInteraction:

Gravitional analysis is concerned with the theoretical forces of attraction between centers rather than the actual flows. For the present study the model developed by Carey has been used. This model was used by Kuldip Singh in the study of ‘Small and Medium towns in Harayana (Singh, 2005).

$$ixy = \frac{P_x \times P_y}{D^2}$$

ixy = interaction between places x and y

P_x= population of the x i.eGuwahati city

P_y = population of y small towns

D = distance

The population of twenty four small towns and the distance between the towns and Guwahati city have been taken from the Town Directory, Census 2001. Following the aforesaid model, the ixy have been calculated. The results of the ixy have been arranged in descending order and ranked have been determined. Three zones have been determined and and displayed in Table 1 and Figure 1.

Table1. Interaction of Small Towns with Guwahati City

Name of Towns	Dist. in Kms.	D^2	Pop_ 2001	$\frac{PxXPy}{D^2}$	Ixy	Rank	Interactive Zones
GUWAHATI	-	-	818809	-	-	-	High Interactive
NORTH GUWAHATI	16	256	16228	13,28,76,32,452	5,19,04,814	1	
DHARAPUR	14	196	7668	6278627412	3,20,33,813	2	
PALASBARI	23	529	5554	4547665186	85,96,721	3	
SUALKUCHI	37	1369	14133	11,57,22,27,597	84,53,052	4	
CHANDRAPUR BAGHICHA	28	784	7373	6,03,70,78,757	77,00,356	5	
RANGIA	52	2704	25151	20,59,38,65,159	76,16,074	6	
KOCHPARA	30	900	6081	4,97,91,77,529	55,32,419	7	Medium Interactive
BAMUN SUALKUCHI	35	1225	7162	586,43,10,058	47,87,192	8	
MANGALDOI	68	4624	23920	19,58,59,11,280	42,35,707	9	
NALBARI	71	5041	23183	18,98,24,49,047	37,65,612	10	
JAGIROAD	65	4225	17177	14,06,46,82,193	33,28,919	11	
MORIGAON	85	7225	20811	17,04,02,34,099	23,58,510	12	
KHARUPETIA	84	7056	17783	14,56,08,80,447	20,63,617	13	
BARPETA	140	19600	41038	33,60,22,83,742	17,14,402	14	
BARPETA ROAD	139	19321	35725	29,25,19,51,525	15,13,998	15	
TANGLA	101	10201	18228	14,92,52,50,452	14,63,116	16	Low Interactive
SARTHEBARI	84	7056	7628	6,24,58,75,052	8,85,186	17	
HOWLI	128	16384	16730	13,69,86,74,570	8,36,101	18	
BOHARI	92	8464	8086	6,62,08,89,574	7,82,241	19	
UDALGURI	126	15876	14897	12,19,77,97,673	7,68,317	20	

PATHSALA	115	13225	9974	8,16,68,00,966	6,17,527	21	
TIHU	99	9801	4303	3,52,33,35,127	3,59,487	22	
SARBHOG	144	20736	7687	6,29,41,84,783	3,03,589	23	

Data Source: Census of India, 2001Town Directory

Interaction zones

On the basis of the ixy value of the 24 towns three interactive zones are divided. The high interactive zone is between 51.9-7.6 with 6 towns they are namely North Guwahati, Dharapur, Palasbari, Sualkuchi, ChandrapurBagicha and Rangia. In the medium interactive zone 5.5-1.5 with 9 small towns they are Kochpara, BamunSualkuchi, Mangaldoi, Nalbari, Jagiroad, Marigaon, Kharupetia, Barpeta, and Barpeta Road. Finally in the low interactive zone i.e between 1.4- 0.3, with total of 8 towns namely, Tangla, Sarthebari, Howli, Bohari, Udalguri, Pathsala, Tihu and Sarbhog. The North Guwahati town with highest ixy value of 51.9 and lowest in Sarbhog town ixy value of 0.30, shows that Guwahati city has high interaction with North Guwahati town and least with Sarbhog town (Table 6.1).

- ***High interactive zone****:* From the table 6.1 it is clear that the high interaction zone falls in close vicinity of Guwahati city. The towns, which have high interaction with Guwahati, are directly related to the distance and with the population. As it has been observed that some smaller towns (in terms of population) like Palasbari, Dharapur, ChandrapurBagicha and Kochpara have high level of interaction with Guwahati city. Palasbari and Rangia towns come under the high interactive zone.
- ***Medium interactive zone***: The medium interaction zone is located at a distance away from Guwahati city. These towns are BamunSualkuchi, Mangaldoi, Nalbari, Morigaon, Barpeta, Barpeta Road, Kharupetia and Tangla. The towns have medium interaction with Guwahati city as they are located in more than 65 kilomaters from Guwahati and some of the towns are distict headquarters like Nalbari, Morigaon, and Barpeta. Other towns like BamunSualkuchi, Kharupetia and Tangla are situated close to the big towns like Udalguri, Sualkuchi and Mangaldoi.

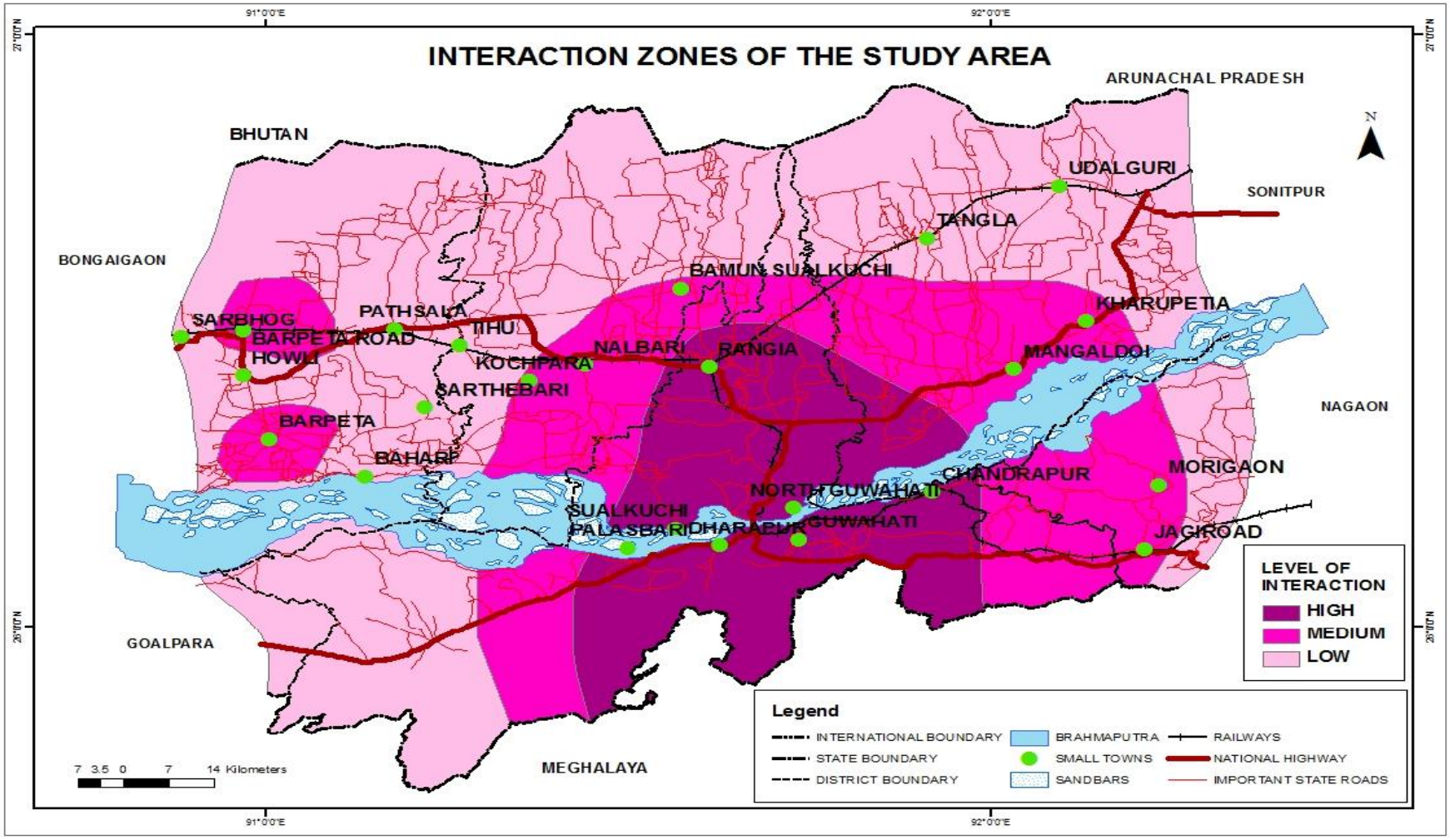


Figure: 1 Interaction zones of the Study Areas

- ***Low interactive zone***: This low category has most of those towns, which are located away from the Guwahati city, it is clear that most of the small towns are having a distance of 80 or more than 80kms. These towns are Sarthebari, Howli, Pathsala, Bohari, Udalguri, Tihu and Sarbhog. These towns are situated away from Guwahati and have low interaction with the primate city Guwahati but have high interaction with other nearest big towns like Barpeta, Barpeta Road, and Nalbari.

An overall understanding may be drawn that interaction decreases with increase in distance from Guwahati city. Although three zones are clear as per level of interaction between the towns and Guwahati city the interaction is more prominent towards the eastern side as compared to its west (Figure 6.1).

1.1COMMUTERS FLOW PATTERN AND ASSOCIATED FACTORS

The study of flows is a theme recurrent across different academic disciplines – whether flows of raw materials, manufactured goods or capital in economics, or flows of particles in physics. Within Demography and Human Geography, flows of people and flows associated with people have been the focus of much research. Taking the former, flows of people have been the central theme for the understanding of population dynamics and the evolution of the structure and composition of cities, regions and the societies inhabiting them. These flows of people may be conceptualised along time/distance axes (Johnson 1984) with short distance, shorter duration flows often described in terms of the daily commute to work, and longer duration, longer distance flows characterised as migration phenomena. Interaction development via commuters and migrants may result from the motivations of purchasing and/ or selling commodities, services or from other type's occupational and social motivators like marriage.

1.1.1 Flow of Commuters

The gravity interaction model has been used to find out the interaction on the basis of flow of commuters from the sample towns to Guwahati city. For calculating ixy value commuters have been considered in place of population.

***1.1.2 Interaction lapse rate*:** The interaction field of towns though influenced by many factors is mainly influenced by frictional effects of distance. The distance restricts the movement of people and goods. Near the market centres, the interaction will be highest and as the distance increases, the interaction falls. This is known as the lapse rate (Zipf, 1949).

Table2 Flow of commuters from the Small Towns to Guwahati city

From The Towns	Types of vehicles plying to Guwahati per day				Total (nos.)	Percent
	ASTC	Private				
	Bus in Nos.	Canter(nos.)	Tracker (nos.)	Others(nos.)		
North Guwahati	03 (6.3)	25 (13.8)	38 (18.00)	18 (13.0)	84	14.2
Rangia	06 (12.0)	15 (8.2)	18 (8.5)	08 (5.0)	47	8.2
Howli	02 (4.2)	10 (5.5)	08 (3.7)	06 (4.0)	26	4.5
Sualkuchi	05 (10.0)	20 (11.0)	36 (17.1)	07 (5.0)	68	11.4
Barpeta	06	19	12 (5.6)	16	53	9.1

	(17.0)	(10.0)		(11.0)		
Pathsala	02 (4.2)	06 (3.3)	12 (5.6)	04 (2.0)	24	4.1
Nalbari	04 (8.5)	13 (7.1)	24 (11.4)	15 (11.0)	56	9.5
Palashbari	04 (8.5)	15 (8.2)	28 (13.3)	07 (5.0)	54	9.3
Sarthebari	03 (6.3)	11 (6.0)	08 (3.7)	06 (4.0)	28	4.8
Mangaldoi	04 (8.5)	21 (11.0)	03 (1.4)	15 (11.0)	43	7.5
Morigaon	03 (6.3)	17 (9.3)	08 (3.7)	21 (15.0)	49	8.5
Jagiroad	04 (8.5)	12 (6.6)	17 (8.0)	19 (14.0)	52	8.9
Total nos. & total percent	**47 (8.10)**	**181 (31.2)**	**210 (36.2)**	**134 (23.1)**	**580**	**100**

Data Source: Field survey (Figures in the parenthesis indicate percentage)

Economic activities are clearly influential in promoting the flow of people to larger towns and cities. The interactions had increased over the last ten to 20 years. The main reasons for this were easier transportation to and from the cities and greater economic opportunities opening up in the urban areas. An important factor has been the emergence of the ‘night flight’; luxurious, commercial bus services that link major urban centres all over the state.

In the present study the flow of vehicles from the twelve sample towns to Guwahati city has been measured with the help of number of vehicles plying per day to Guwahati. It is seen that (Table 2) the vehicles buses run by ASTC (Assam State Transport Corporation) government undertaking and private vehicles like tracker, canters and other vehicles which are recorded in the private transport office, private vehicles are not included for the study because of non-availability of records. Data have been collected for a period of 7 days randomlyand than the average of it has been considered as ply of vehicles per day.

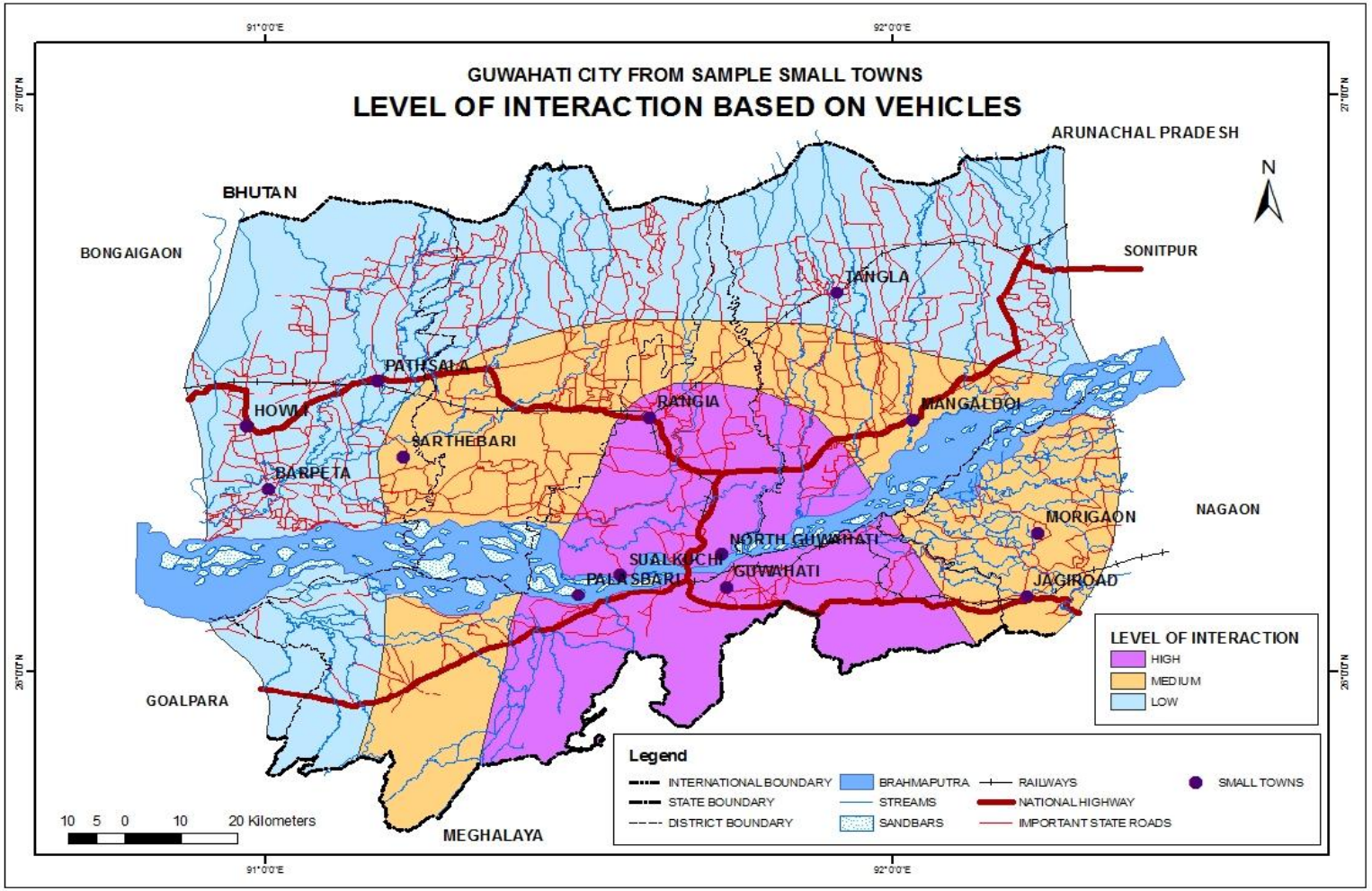


Figure: 2 Level of Interaction based on vehicles

Flow of commuters in the vehicles has been assessed in terms of their capacity. A bus carries 30 persons followed by 20 and 10 in canter and trackers. Trackers are more prevalent in the close vicinity of Guwahati city, or in the high interaction zone. North Guwahati which is located at the distance of 16 kms has a high volume of vehicles, mainly trackers with 18.0 percent followed by canters 13.8 percent, ASTC 6.3 percent and others 13.0 percent. As compared to Howli situated at the distance of 128 kms, uses trackers 3.7 percent, canters 11.0 percent, ASTC 4.2 percent and other means of vehicle by 4.0 percent. In the present study 36.2 percent uses trackers to move to Guwahati city for a of distance of not more than 40 kms, 31.2 percent uses Canter and 23.1 percent use other vehicles like Winger or Magic only 8.1 percent commuters prefer to move by ASTC bus to a distance of more than 50 kms.The situation gives enough scope to examine the interaction lapse rate (Figure 2).

Table 3 Level of Interaction based on vehicles

Name of Towns	Dist. in Kms.	D^2	Flow of vehicles	$\frac{CxXCy}{D2}$	Ixy		LEVEL OF FLOW
GUWAHATI	-	-	580	-	-	-	HIGH FLOW
NORTH GUWAHAT	16	196	84	48048	248.5	1	
PALASBARI	23	529	54	30888	59.2	2	
SUALKUCHI	37	1369	64	36608	27.1	3	
RANGIA	52	2704	47	26884	10.0	4	
JAGIROAD	65	4225	52	29744	7.1	5	MEDIUM FLOW
NALBARI	71	5041	56	32032	6.4	6	
MANGALDOI	68	4624	41	23452	5.1	7	
MORIGAON	85	7225	49	28028	3.9	8	
SARTHEBARI	84	7056	27	15444	2.2	9	LOW FLOW
BARPETA	140	19600	48	27456	1.4	10	
PATHSALA	115	13225	24	13728	1.0	11	
HOWLI	128	16384	26	14872	0.9	12	

Data Source: Field survey

The Table 3 show a consistent and very similar pattern in which units closer to a town or a city gain more population than from units more distant from a town or a city. Visits to Guwahati mainly start early in the morning and terminate in the evening. Analysis on the table 6.3 gives a clear picture of level of flow of commuters. In the high flow of level four towns namely, North Guwahati with the ixy value of 245.1, Palasbari (58.3), Sualkuchi (26.7) and Rangia (9.9). The towns located at close vicinity of Guwahati city have an advantage availability of frequently plying of small vehicles like tracker, magic, and winger. North Guwahati is located on National Highway No 31 is a Class IV town and it is under town committee falls under high level of flow of commuters, 84 commuters move daily to city for various purposes like for job, students for attending school and colleges, for medical check up, to visit relatives and shopping. Palasbari with 54 commuters is the next high interactive town with Municipality Board is 23 kms

from Guwahati is a trade center for carrying agriculturalproductsto Guwahati city and different places in the state.Sualkuchi town or Silk town' with 64 commuters has high has high interaction with Guwahati city is 37 kms. Rangia situated 52 kms from Guwahati citry has high interaction with 47 commuters.
Nalbari, Mangaldoi and Marigaon towns has medium interaction with Guwahati city as they are situated at the distance of more than 60 kilometers. Jagiroad town famous for paper mill and dry fish market has medium interaction with Guwahati is situated at the distance of 65 kms.ThoughBarpeta is a trade' town has low interaction with Guwahati city as it is located 140 kms from Guwahati. Other towns like Sarthebari, PathsalaHowli has low interaction with Guwahati city as they are located far away from Guwahati.
Interaction declines with increasing distance revealing the interaction lapse rate.

1.2FACTORS ASSOCIATED WITH FLOW PATTERN

A holistic approach is necessary in understanding the relationship of surrounding towns with cities. The ranges of economic and social purposes for which commuters go to cities are education, medical services, entertainment. The daily movement is not necessarily motivated by any specific purpose except that of spending sometime in the city and meeting friends. Among purposeful trips the most frequent movements occur for the purchase of consumer goods and services and for medical, educational and entertainment purposes. Some of the movements, such as for farm inputs or sale of farm products are seasonal in character and others are fact of very infrequent occurrence. Visits to pilgrimage for example, may take place only a few times in an individuals life.

- **Economic Factors**

Scope for diversification of economic activities other than the agricultural works and expectations to find jobs continue to draw people to the city. Someone aspiring to get employment, some come looking for any kind of urban based economic activity. Earnings and standard of living may be unsatisfactory but due to the large 'expected positive urban prosperity' people continue to commute from the small towns.

The causes of human flow lie in a combination of "urban adversity factor" or push factor' drive people to move out their place of origin and "urban prosperity factor" attracting people into a place of destination.
a place of destination. Push factors include demographic growth, low living standards, lack of economic opportunities (Castles and Miller, 2009). Some experts argue that, historically, pull factors have predominated- urban environment provides better employment and income opportunities. But recently, it seems that push factors seem to be increasingly powerful. In other words people move to other places due to compelling circumstances pushed them out of the place of origin or they lured by the attractive conditions in the new place.

The economic push factors that motivated people to commute to Guwahati city are lack of employment opportunity, struggle for livelihood, economic insecurity, and lack of industrialization. As mentioned in S. Mukherjee's studies, there is a decrease in non-farm employment in the smaller centers- as such the migrants approach the large cities in search of livelihood (Mukherjee, 1966). Rapid urbanisation process in the Guwahati city is one of the reasons of increase in built up land. Guwahati city is not growing by population but also by changes in spatial dimensions. With the growth of population the city is improving

related requirements of the urban life such as development of transport and communication and other infrastructural facilities which is adding more fuel to ‘urban prosperity ‘or pull factors for the small towns

- **Social Factors**

Social factor often causes people to move from place of origin to place of destination. In terms of social factors, it includes the effectiveness of educational system, number of touristic and recreational sites, as well as, quality and amount of health care service. To find out the social factors with respect to education, health and entertainment the respective educational departments, hospitals and different centres for entertainment were visited and the required data collected.

- **Educational factors:**

In terms of educational facilities, most of the towns are not well equipped with number of schools and colleges. Between 1991 and 2001, the increase has been limited only to a number of primary and high schools, while increase in other higher educational institutes was very less in the study region. It gives a very poor scenario of educational facilities in the small towns of the study region. Most of the commuters from the sample towns move to Guwahati city for education in government school/colleges only in towns like Palasbari, Mangaldoi, Marigaon and Jagiroad the percentage of students in private sector is seem to be more, most of them are engaged in short term courses namely, doll making, beautician courses, computer courses etc. as these short term courses helps in getting jobs easily and quickly.

Lack of educational institutes for higher education, technical education and short term courses in the small towns stand as push factor for flow of commuters to Guwahati city.

The Pearsonian correlation coefficient between total commuters and Composite Index of a town is found to be -0.675 which is significant at 5 percent level i.e flow of commuters for education increases if an infrastructural facility for education of a town is low. As it is expected most of the higher level educational facilities are concentrated in Guwahati city (Table 4).

Table 4 Flow of commuters for Education
Data Source: Field Survey (Figures in parenthesis indicate percentage)

From the Towns	HS Education		Higher Education		Technical Education			Short term courses/ Beautician/Doll Making/computer course				
	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Med.	Govt.	Pvt.	Total	Govt. %	Pvt. %
Rangia	03(3.4)	05(5.6)	07(7.9)	03(3.4)	20(22.7)	25(28.4)	09(10.2)	11(12.5)	05(5.6)	88	56.7	43.0
N.Ghy	06(5.2)	07(6.0)	18(15.6)	13(11.3)	23(20.0)	19(16.5)	11(9.5)	10(8.6)	08(6.9)	115	58.9	40.7
Howli	02(2.6)	03(4.0)	13(17.3)	07(9.3)	14(18.6)	13(17.3)	11(14.6)	07(9.3)	05(6.6)	75	62.4	46.5
Sualkuchi	14(11.9)	12(10.2)	16(13.6)	08(6.8)	22(18.8)	20(17.0)	12(10.2)	07(5.9)	06(5.1)	117	60.4	39.1
Barpeta	02(2.9)	03(4.4)	11(16.1)	06(8.8)	16(23.5)	17(25.0)	06(8.8)	05(7.3)	02(2.9)	68	58.6	41.1
Pathsala	05(6.6)	08(10.6)	14(18.6)	06(8.0)	14(18.6)	16(21.3)	05(6.6)	04(5.3)	03(4.0)	75	55.7	43.9
Nalbari	02(2.6)	02(2.6)	11(14.4)	08(10.5)	17(23.3)	16(21.0)	08(10.5)	07(9.2)	05(6.5)	76	60.0	40.6
Palasbari	10(8.3)	11(9.1)	13(10.8)	09(7.5)	23(19.1)	44(36.6)	06(5.0)	05(4.1)	11(9.1)	120	40.0	60.0
Sarthebari	04(5.0)	06(7.5)	11(13.9)	08(10.1)	14(17.7)	17(21.5)	07(8.8)	04(5.0)	08(10.1)	79	50.4	49.2
Mangaldoi	02(3.2)	03(4.9)	07(11.4)	06(9.8)	11(18.0)	17(27.8)	05(8.1)	04(6.5)	06(9.8)	61	47.2	52.3
Marigoan	02(2.2)	03(3.4)	12(13.7)	13(14.9)	15(17.2)	21(24.1)	07(8.0)	06(6.8)	08(9.1)	87	47.9	51.5
Jagiroad	02(2.3)	03(3.4)	12(13.9)	14(16.2)	11(12.7)	25(29.0)	06(6.9)	05(5.8)	08(9.3)	86	41.6	57.9

- **Health Factors**

Guwahati city has improved in infrastructural facilities which can be observed in increase of Composite Index of 1012.57 in 2001 Census; it was 787.43 CI in 1991 Census. In terms of medical facilities Guwahati city is well equipped with total 4 numbers of government hospitals besides many private nursing homes and clinics. The Guwahati Medical college hospital has more than 2587 patients daily, Mahendra Mohan hospital (MMC) 1350. In private hospitals like International Hospital the flow of patients is less it is 490 patients and Down Town Hospital with 200 patients per month which is also low as compared to government hospitals (Table 5). In the small towns though some improvement has increased in medical facilities has not been commensurate with population growth. The small towns like Howli, Palasbari, and Jagiroad have few clinics, dispensaries, TB clinics and health centres without any hospitals and nursing homes except in Mangaldoi town with 3 nursing homes and one TB clinic (Town Directory, 2001).

Table 5 Flow of commuters (Patients) for health

From the Towns	**Flow of patients to different hospitals of Guwahati city per month**		
	Total Patients		
	Private.	Government	Total Number of Patients
Rangia	54(40.5)	79(60.1)	133
Barpeta	33(15.4)	180(84.4)	213
Palasbari	47(19.3)	195(80.5)	242
Nalbari	23(11.2)	181(88.6)	204
N. Guwahati	28(16.9)	137(82.8)	165
Sualkuchi	25(13.0)	165(86.8)	190
Howli	15(11.2)	117(88.6)	132
Pathsala	15(10.2)	130(89.5)	145
Sarthebari	19(12.3)	134(87.5)	153
Mangaldoi	16(8.6)	167(91.2)	183
Marigoan	16(12.3)	104(80.5)	129
Jagiroad	17(14.1)	103(85.9)	120

Data Source: Field Survey (Figures in parenthesis indicate percentage)

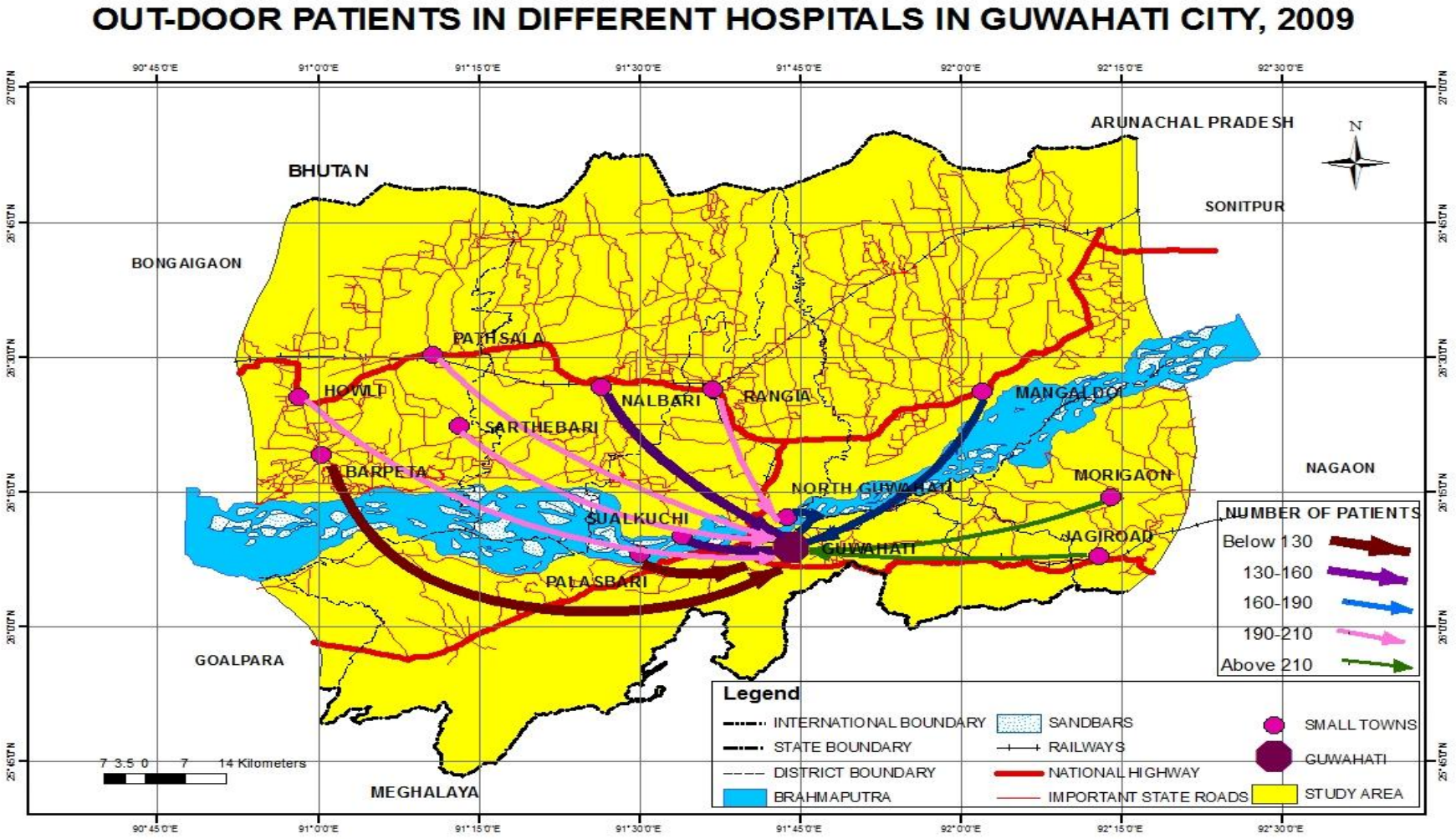
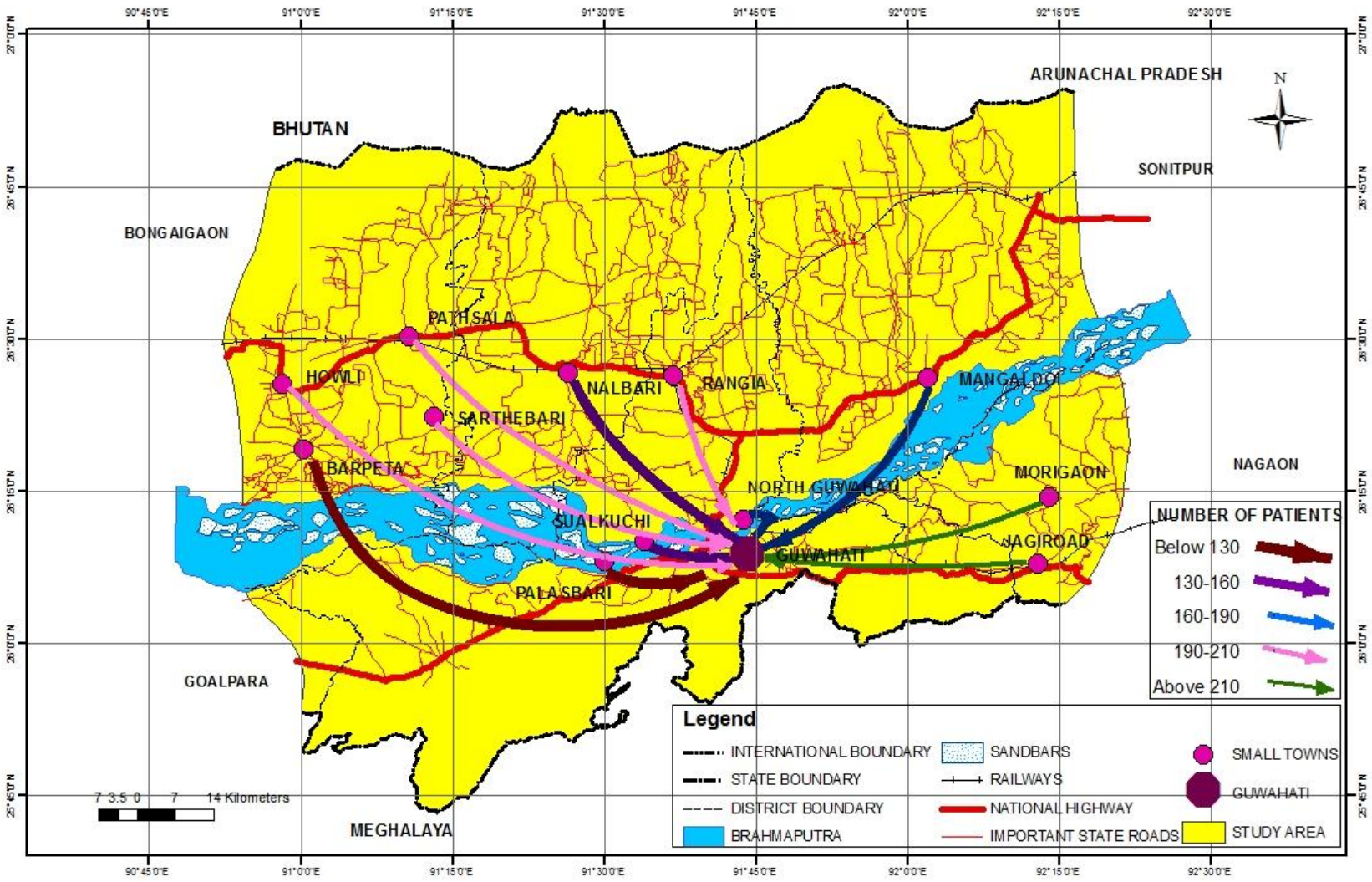


Figure: 3 Flow of Commuters (patients) for health

OUT-DOOR PATIENTS IN DIFFERENT HOSPITALS IN GUWAHATI CITY, 2009



The poor health scenario and lack of medical facilities like hospitals, nursing homes, health centres, clinics etc. in the sample small towns, act as 'push' factor and leads to the flow of patients to Guwahati city for treatment (Figure 3).

- **Entertainment factors:**

The increases in number of cinema halls have been considerable, especially as all the small towns have more than 2 to 3 cinema halls since 2001 Census. The number of stadium, auditorium and public library was very low among other recreational facilities in 1991 which has increased to 1 to 2 in 2001 Census in the small towns. Guwahati city has attracted many entertainment facilities in the recent decade, in 1991 there were handful of cinema halls, stadium, park etc. There was tremendous increase of entertainment facilities in Guwahati city since 2001. The cinema halls are converted to multiplexes, new parks in the city has risen and due to the conduct of 'National Games' in 2007 many stadiums and auditoriums were constructed. Due to these attractions the people from the small towns flock to Guwahati city to avail the facilities.

Table 6 Flow of Commuters for Entertainment

From the Towns	Flow of commuters from sample towns to Guwahati for Entertainment					
	Cinema	Stadium	Zoo	Park	Others	Total
Rangia	22(27.5)	04(5.0)	12(15.0)	19(23.7)	23(28.7)	80
N.Ghy	31(31.6)	09(9.1)	11(11.2)	18(18.3)	29(29.5)	98
Howli	27(26.7)	08(7.9)	22(21.7)	24(23.7)	20(19.8)	101
Palasbari	32(29.0)	06(5.4)	25(22.7)	26(23.6)	21(19.0)	110
Barpeta	19(23.4)	08(9.8)	21(25.9)	23(28.3)	10(12.3)	81
Pathsala	17(18.6)	07(7.6)	20(21.9)	22(24.1)	25(27.4)	91
Nalbari	14(21.2)	05(7.5)	13(19.6)	18(27.2)	16(24.2)	66
Sualkuchi	23(23.2)	09(9.0)	20(20.2)	22(22.2)	25(25.2)	99
Sarthebari	17(21.5)	08(10.1)	16(20.2)	18(22.7)	20(25.3)	79
Marigaon	09(10.8)	07(8.4)	23(27.7)	19(22.8)	25(30.1)	83
Mangaldoi	07(9.3)	06(8.0)	21(28.0)	18(24.0)	23(30.6)	75
Jagiroad	11(12.6)	05(5.7)	19(21.8)	19(21.8)	33(37.9)	87

Data Source: Field Survey

Other reasons of visit to Guwahati city is to attend marriage ceremonies of relatives, social functions etc. The factors that helping the people to flock to Guwahati city are non-availability of cinema hall, zoo, stadium, park etc. Although overall scenario for education, health and entertainment is improving in the small towns but its performance in education and health is abysmally low.

1.3PATTERN OF INTERACTION AMONG THE SAMPLE TOWNS

The people from medium and small towns are likely to move to cities for better opportunities. The commuters from small towns have little choice but to flow only to short distances with small and medium towns as their destinations. The cost of living in cities as well as metros has also risen enormously along with saturation of informal sector and decline in jobs in organized sectors (Kundu 1997; Planning Commission 2001). The flow of commuters to and from the small towns and to Guwahati city is shown in a matrix form (Table 7). The total receipts of commuters for each town has been found out, based on the towns or the nodes are arranged in hierarchy of interaction relationship level. The towns with high interaction i.e more than 80 commuters are placed in primary interaction relationship level, the towns with medium flow of commutersi.e in between 70-80 commuters are in the level of secondary interaction relationship level and lastly the towns with the commuters less than 70 are placed in minor interaction relationship level (Figure 4). It has given a clear picture that the medium or size Class –III towns, namely, Barpeta, Nalbari, Rangia, Mangaldoi and Marigaonrecieves more commuters and commute less with other sample towns of the study area. The rest of the small towns those belong to Class Size of IV and V, namely North Guwahati, Sualkuchi, Sarthebari, Pathsala, Jagiroad and Palasbari, receives less commuters and sends more commuters to the bigger Class Size of towns.

Table 7 Interaction Relationships among the sample small towns

FROM THE TOWNS	**N.Ghy Class-IV**	**Barpeta Class-III.**	**Sualk. Class-IV**	**Howly Class-IV.**	**Sarth Class-V.**	**Nalbari Class-III**	**Path. Class V**	**Rang. Class-III**	**Mari. Class-III**	**Mang. Class-III**	**Jagiroad Class-IV**	**Palas. Class-V**	**Total**	**Ghy. Class-I**
North Guwahati	X	10	09	07	08	14	06	18	06	08	05	04	**95**	**97**
Barpeta	06	X	05	06	04	12	05	08	08	07	05	05	**71**	**53**
Sualkuchi	12	09	X	07	06	08	06	11	05	09	04	06	**83**	**116**
Howli	06	22	08	X	11	15	10	09	03	08	05	05	**102**	**32**
Sarthebari	06	24	07	06	X	10	05	04	05	11	05	04	**87**	**46**
Nalbari	08	10	09	07	08	X	04	10	04	09	03	05	**77**	**55**
Pathsala	07	12	05	06	07	12	X	08	06	10	04	04	**81**	**31**
Rangia	09	07	08	06	06	10	06	X	05	07	03	05	**72**	**146**
Marigaon	04	05	05	06	04	07	03	07	X	12	13	04	**70**	**76**
Mangaldoi	03	05	03	06	05	06	06	05	03	X	08	05	**55**	**38**
Jagiroad	04	09	05	03	03	05	05	09	34	07	X	06	**90**	**101**
Palasbari	09	08	07	06	03	06	03	07	06	11	04	X	**78**	**118**
Total Receipts	**74**	**121**	**71**	**66**	**65**	**105**	**59**	**96**	**85**	**99**	**62**	**55**	**961**	**909**

Data Source: Field Survey

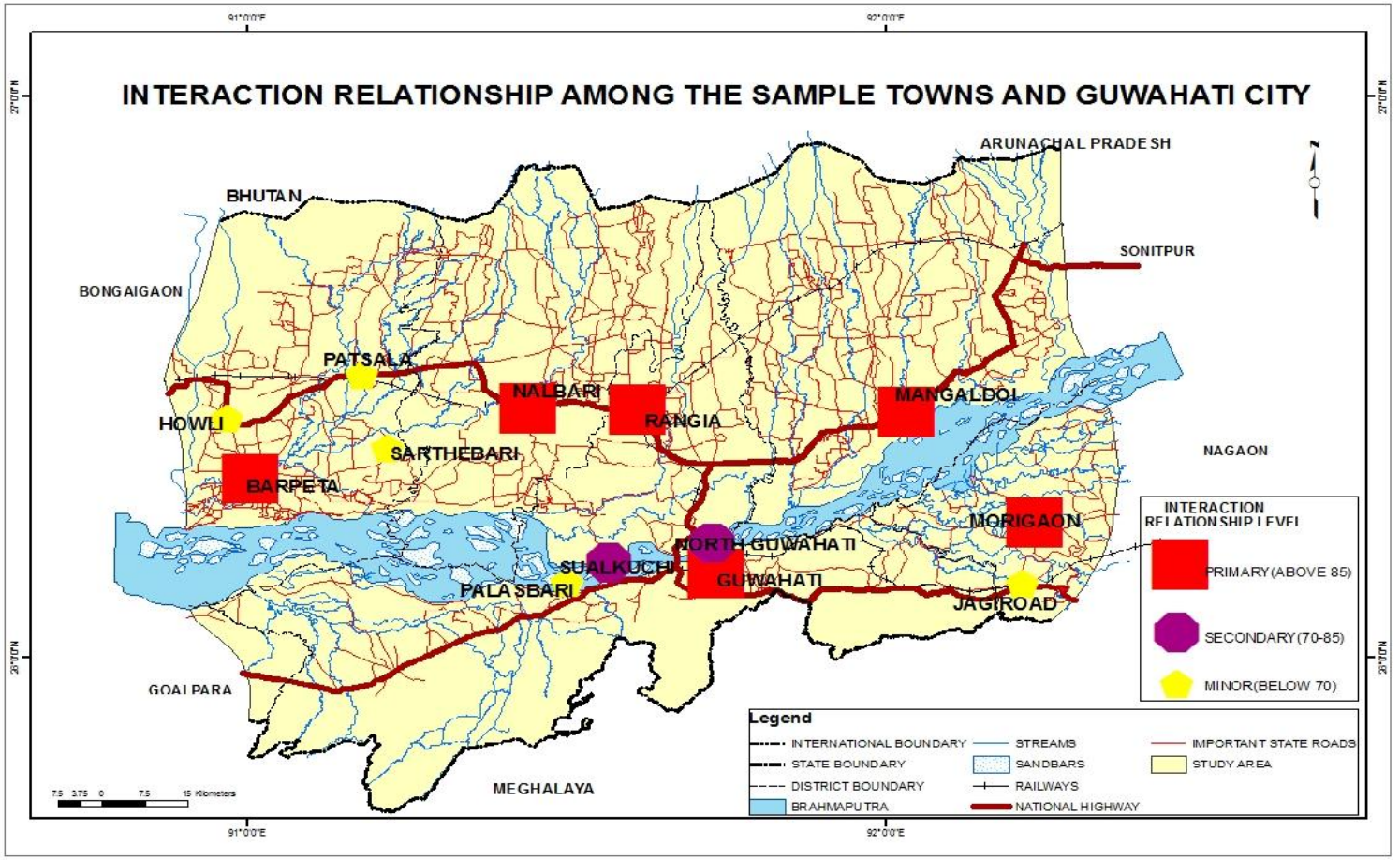


Figure: 4 Interaction Relationships among the Sample Small Towns

The Class-III towns like Barpeta town with 121 commuters, Nalbari 105, Rangia 96 commuters, Marigaon 85 and Mangaldoi 99 based on the number of commuters the town receives (Figure 4). In the present study it has been pointed out that the growth of Class-I and Class-III have been higher than the smaller towns of Class Size of IV, V and V (Census 2001). The growth rate of Class-III towns has been highest between 1991-2001 (Census 2001).Guwahati is still playing the dominating role in receiving highest commuters from small towns i.e 1049 commuters daily, but the Class-III towns like Barpeta, Nalbari, Mangaldoi, Marigaon and Rangia are receiving high commuters daily than the other Class of towns.

'The town with large size tend to have more intense interlinkages than the towns with small size'. Hence the correlation thus confirms the research question that bigger the size of the town larger is the flow commuters a town receives. In other words it is often assumed that the flow of commuters from the small town is more to the next bigger town if the infrastructural status of the town is high and vice versa.

CONCLUSION:

- The flow of commuters from the small town is more to the next bigger town if the infrastructural status of the town is high. The correlation between the two variables, flow of commuters to a town and status of infrastructural facilities of that town found to be 0.71 which is significant at 5 per cent level of significance. It confirms the research question that higher is the status of infrastructural facilities higher the flow of commuters the town receives.

- It also proved that due to poor educational infrastructural facilities in the sample small towns the students flock to Guwahati city for better educational facilities. The flow of commuters to Guwahati city for educational purpose is related to availability of educational facilities of that town.

- The poor health scenario in the small towns also leads to the flow of patients moving to Guwahati city thus flow of patients' increases if facilities for medical are poor in the towns.

- The towns are identified according to nodes. The towns with high interaction i.e more than 80 commuters are placed in primary interaction relationship level, 5 towns falls in this category, the towns with medium commuters i.e in between 70-80 commuters are in the level of secondary interaction relationship level, 2 towns comes under this level and lastly the towns with the commuters less than 70 are placed in minor interaction relationship level with 5 towns.

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REFERENCES:

[1] A.Kundu(1990) "Trends and Structure of Employment in the: Implication for Urban Growth ", Economic and Political Weekly, 32 (4): 1399-1405, 1997
[2] Castles & Miller (2007) *Migración y Desarrollo: Perspectivasdesde el Sur*, Mexico City: Miguel Angel Porrúa.
[3] Census, Town Directory Assam, 2001
[4] Glasson. J. (1974), An Introduction to Regional Planning: Concepts, Theory and Practice, Huchinson: London
[5] Gupta& Krishnan (2002) Geography of India. Jawahar Pub. & Dist., New Delhi
[6] Singh. K. (2005) Small and Medium Towns -A Geographical Perspective, Rajat Publications, New Delhi
[7] Johnson. J. H. (1984). Inter-urban migration in Britain: a geographical perspective. In A. J. Boyce (Ed.), Migration and mobility: biosocial aspects of human movement: Taylor & Francis.
[8] Mishra. R.P, (1992) Regional Planning Concepts, Techniques, Policies and Case Studies, Concept Publishing Company New Delhi- 59
[9] Mukherjee. S. (1996) Low Quality Migration In India: The Phenomena of Distressed Migration and Acute Urban Decay, paper presented at the 24thIussp Conference, Salvador, Brazil.
[10] Ramachandran.R. (2004) Urbanization and Urban System in India, New Delhi, Oxford University Press.
[11] Jiang. D. (2001). The impact of Rural-Urban Migration on the Health of the left behind parents. Discussion paper no. 9350