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Undocumented Migration in the State of Assam in Northeast India Estimates Since 1971 to 2001

¹Bhupen Kumar Nath, ¹Dilip C. Nath and ²Late Biswanath Bhattacharya

¹Department of Statistics, Gauhati University, Assam, India

²ISI, Kolkatta, West Bengal, India

Corresponding Author: Bhupen Kumar Nath, Department of Statistics Gauhati University, Guwahati, Assam, 781014, India Tel: 91-3712-252901, 8876213478 Fax: 91-361-2700311

ABSTRACT

This study especially focuses on the indirect method of estimating undocumented migration to the state of Assam in Northeast India in absence of adequate and accurate migration data. In this method the census base population of age and sex has been projected through the Leslie matrix population projection model by using estimated life table survival rates and age specific fertility rates of Sample Registration System of India. The study also investigated the affect of illegal migration in the growth of different religious and language speaking population in all districts of Assam. The result showed that population growth is unusually high in those districts of Assam bordering Bangladesh. This growth especially shows remarkable among religious groups of Muslims and among linguistic groups of Bengali speaking population. This is very much suggestive of cross border migration from Bangladesh. The volume of undocumented migration in Assam during the period 1971-2001 is being estimated by using Matrix method of population projection and is turned out to be 830755 and 534819, respectively during 1971-1991 and 1991-2001.

Key words: Undocumented migration, estimates migration, Leslie matrix, Assam

INTRODUCTION

The migration from Bangladesh to the Northeast region of India has been continuous throughout the twentieth century due to the reason of historical links, geographical and physical proximity. The better employment opportunities and availability of fertile agricultural land in Assam act as a pull factor while the poverty, subsistence living, ravages caused by floods and other natural calamities in Bangladesh act as push factors (Godbole, 2005). In post independent period during 1951-2001 the population growth of the state of Assam was 234.4% against 184.4% for all India. This high growth rate of population apparently suggests large scale migration to the state Assam. But how much of this migration are from different parts in India and how much are from neighboring country illegally, there is a total absence of an estimate volume undocumented migrants during 1971-2001 to Assam in particular based on demographic tools in the Northeastern region of India. This has led to making wild guesses about immigrants and even such guess estimate is more plentiful especially for the period 1971-1991 as the census of 1981 was not conducted in Assam (Saikia *et al.*, 2003).

The illegal migration has several social impacts on our Indian society as a whole. It exerts additional strain on the state economy and poses a serious threat to the internal security. It is also

the prime contributory factor behind the outbreak of insurgency in the State (Sinha, 1998). During 1979 to 1984 an unprecedented mass movement started by AASU (All Assam Student Union) involving people from all walk of life erupted against illegal migrants from Bangladesh. The agitation ended in 1985 following the Assam accord to which, a Memorandum of Settlement (MoS) signed between representatives of the Government of India and the leaders of the Assam Agitation on 15 August 1985. In this accord it is stated that anybody settled in Assam from Bangladesh after March 25, 1971 is not a citizen, but an illegal migrant (Goswami, 2011). The reference date of 1st April for 1971 census is, therefore, quite ideal as a benchmark for the study of the growth of population and the extent of illegal migration to Assam in particular (Bhuyan, 2006). In India, the census birth place statistics provide only direct method of estimating migration to a State. But these data are not reliable because during census enumeration respondents willfully give wrong 'birth place' information, which is usually the practice of many of the illegal migrants. The indirect methods are the only option for arriving at estimates of illegal migration.

The objective of the present article are that to measure the contribution in population growth due to illegal migration, develop suitable statistical technique and estimate the volume undocumented migration in Assam during 1971-2001.

STUDY DATA

Data used in this study are collected from two sources, Census of India and Sample Registration System (SRS) of India. The Population, Religion, Language and Migration data are taken from census publication of 1971, 1991 and 2001. In 1981 census was not conducted in Assam due to disturbed condition. The Age Specific Fertility Rates and life table survival rates are taken from the publication of "Compendium of India's Fertility and Mortality Indicators 1971-2005" based on the Sample Registration System (SRS).

GEOGRAPHICAL PROFILE OF INDIA, ASSAM AND BANGLADESH

India is the seventh largest country in the world, Asia's second largest nation with an area of 3, 287, 263 sq. km and second most populous country in the world (Datta, 2005). India is bordered by Pakistan on the north-west, Nepal, Bhutan and China on the north-east and Burma and Bangladesh on the east. The southern peninsula extends into the tropical waters of the Indian Ocean with the Bay of Bengal lying to the south-east and the Arabian Sea to the south-west.

Assam is located at the gateway of Northeast India with an area of 78, 438 sq. km and it is separated by Bangladesh from mainstream India. The state is bounded in the north by Arunachal Pradesh and Bhutan in the east by Nagaland, Manipur and Burma in the south by Meghalaya, Bangladesh, Tripura, Mizoram and in the west by West Bengal and Bangladesh. There were 9 districts in Assam in 1971 and the number of district went up to 23 in 1991. These new district mostly conform to the old subdivision boundaries with some minor adjustment.

Bangladesh is the most densely populated major country in the world and located in South Asia. The country has an area of 144, 000 sq. km and extends 820 km North to South and 600 km East to West. Bangladesh is bordered on the West, North and East by a 2,400 km land frontier with India and in the southeast, by a short land and water frontier (193 km) with Burma. On the South is a highly irregular deltaic coastline of about 600 km, fissured by many rivers and streams flowing into the Bay of Bengal.

ANALYSIS OF POPULATION GROWTH

The population growth of Assam is very high which is even higher than the country's average growth throughout the last century. In 1901 Assam's population was 3.29 million and has increased to 8.03 million in 1951 and 26.65 million in 2001 by experiencing an average annual exponential growth rate of 2.11% during 1901-2001 as against the country's 1.47%. The main reasons of this high population growth are sharp decline of death rates along with very slow fall of birth rates and continuous high influx of migration. The natural growth rate of Assam has marginally declined during 1971-2001 as per estimation data of Sample Registration System (SRS). During this period the decline of crude birth rate in Assam is from 38.5 to 26.95 and crude death rate from 17.8 to 9.55 as per SRS data. Therefore, there had been a decline in the natural growth rate of population from 20.7 to 17.40 during 1971 to 2001. As the natural growth rate of Assam does not deviate much during 1971 to 2001, therefore, this unnatural growth of population of Assam was due exclusively to large scale migration. Moreover, the districts of Assam which are closed to Bangladesh border showing significantly high population growth. It is observed from Table 1 that during 1971-1991 the undivided District Goalpara (31.0), Kamrup (27.0) and Darrang (28.2) are in continuation of eastern border belt showing high population growth. In the another border belt though the Cachar district growth rate was comparatively low (22.7) but other two districts in this belt NC Hills (49.1) and Karbi Anglong (37.4) show significantly high population growth. In the next decade 1991-2001 the population growth has declined but in most of border district it is still higher than the natural growth rate. Corresponding to the high growth rate of population, there has also been an increase in the density of population in the State. However, the density of population in the State continued to be lower than the all India average density up to 1961. It abruptly jumped up in 1971 and continued to rise since then (Sarma, 2004).

Religion wise growth: Large scale immigration, however affects not only the economic and security status of the state but also a strong impact is envisioned in the spheres of language and religion. Assam, being a Hindu majority state, fears that it will become Muslim-dominated due to the influx of illegal migrants. The October 2008 violence in Udalguri and Goalpara districts between the Bodos community and the Bangladeshi migrants was a flare up based on such social fears resulting in the death of nearly 36 people (Goswami, 2011). It is therefore important to

Table 1: Average annual growth (in per 1000) of population in major religious group of Assam

District/state	Total		Muslims		Christian		Other	
	1971-1991	1991-2001	1971-1991	1991-2001	1971-1991	1991-2001	1971-1991	1991-2001
ASSAM	26.6	18.9	38.7	29.3	47.7	32.5	21.8	13.9
Goalpara	31.0	18.3	39.9	29.4	48.1	40.4	22.9	5.7
Kamrup	27.0	20.8	37.8	28.3	42.3	46.7	22.4	16.7
Darrang	28.2	17.0	57.4	32.6	45.2	27.2	21.1	11.3
Lakhimpur	26.2	17.3	49.2	28.1	37.0	27.0	24.7	16.2
Nagaon	25.6	22.0	39.3	31.0	16.7	40.3	16.6	13.9
Sibsagar	21.1	15.0	36.3	25.6	62.2	15.2	19.4	14.2
Karbi anglong	37.4	22.7	55.7	73.6	86.5	42.4	32.8	18.9
North Cachar hills	49.1	24.7	205.0	39.6	61.0	36.0	44.1	20.5
Cachar	22.7	20.2	28.4	27.1	24.1	35.3	18.8	14.6

1: Census of India 1991, Series-4, Table C-9, 2: Census of India 2001, Religion Table (CD)

analyze the changing demography of different religious groups and language in Assam during 1971-2001. Table 1 presents the average annual growth of population (in per 1000) by major religious groups. According to the interest of the study populations are divided in to three large groups Muslim, Christian and Others. The analysis based on district level census data of Assam from 1971 to 2001.

It is observed from Table 1 that the growths of Muslim and Christian population are far above than the growth of other religion. During 1971-91 and 1991-2001 the average annual growth of Muslim in Assam was 38.7 and 29.3, respectively. But during this period the growth of other religions was 21.8 and 13.9 only and also corresponding estimated average natural growth rate of Assam was only 19.6 and 18.7. Therefore, it is seen that the growth of Muslim population are inordinately high in Assam during 1971-2001. So far the growth of Muslim population during 1971-2001 at district level is concerned all the districts witnessing very high population growth than the growth of other religion. During 1971-1991 the highest growth in the border belt district NC hills (205.0) and lowest in Sibsagar district (36.3). If we look at the average annual growth of Muslim in per 1000 population in Bangladesh it was 31.2 during 1974-1991 and it was highest in Dhaka division 34.5 and lowest in Barisal 11.6. Similarly, in 1991-2001 the growth of Muslim in Assam was 29.3 which are higher than corresponding natural growth rates 18.7 and even above the corresponding Muslim growth rate of Bangladesh which has declined to 18.6. This higher growth rate of Muslim population in Assam is apparently suggesting the large scale immigration from neighboring Bangladesh.

As far the growth of Christian and other religion is concerned the growth of others religion data is also slightly higher than the natural increase during 1971-1991 which is may be due to migrated Hindu population during formation of Bangladesh. Sinha (1998) explained that the population movement from East Pakistan continued from the time of partition 1947, but it was initially mostly of Hindu refugees, fleeing from religious persecution. However, Hindu refugee movement from Bangladesh has continued to Tripura and West Bengal. Illegal migrants from Bangladesh into Assam are now almost exclusively Muslims. The growth of Christian population also very high in the table but it is mainly due to small population base and if we have seen the percentage increase of Christian population during 1971-2001, it is increased by only one percent. A major reason behind growth of Christian population in Assam is the intense movement of conversion towards Christianity. The high growth of the Christian population in Assam is mainly due to conversion of scheduled caste and scheduled tribe to Christianity (Ghosh, 2000).

Language wise growth: India's Northeastern state Assam is one of the most heterogeneous linguistic and cultural regions of the country. The region presents a mixed and varied population of diverse linguistic groups, each group having a distinct life-style and heritage and even aspiring for a separate political identity. There is large number of tribes in this region and each tribe speaks a different language which is not understood by its immediate neighboring tribe. Samuel (1993) explained that in Northeast India about 420 languages and dialects of different language families are used in a complex and wide-ranging ethno and socio-linguistic configuration. To examine the language wise population growth in this study the languages are divided in to five major groups which are Assamese, Bengali, Hindi, Nepali and others Language. In the group of Assamese language includes Assamese and other local tribal and tea garden language and in the group of other language contains all the remaining other language. The details of language groups are explained in Table 2. The analysis based on district level census data of Assam from 1971 to 2001. Table 3 represents the district wise percentage of language speaking population during 1971-2001.

Table 2: Different languages and their groups

Assamese		Bengali	Hindi	Nepali	Other Language		
Assamese	Boro	Bengali	Hindi	Nepali	Zemi	Kuki	Naga
Karbi	Santali				Rengna	Thado	Vajphei
Rabha	Dimasa				Khelma	Paite	Khasi
Lalung	Miri				Garro	Mizo	Hmar
Deori	Munda				Rangkhoh	Biete	Gangte
Mundari	Oriya				Pewi	Bishnupuria	Tripuri
Kurukh	Khariya				Halam	Reang	Adi
Bhumij					Dafala	Mishimi	Aka
					Khampti	Abor	Manipuri
					Meithei	Synteng	Mech
					Lakher	Koch	Jaintia
					Kabui	Ao	Telegu
					Punjabi	Sema	Malayalam
					Gondi	Savra	Kherwari
					Tamil	Marathi	Chinese
					English	Ho	Sindhi
					Urdu	Bhojpuri	

Table 3: District wise percentage of language in Assam during 1971-2001

State/district	Assamese			Bengali			Hindi			Nepali			Others		
	1971	1991	2001	1971	1991	2001	1971	1991	2001	1971	1991	2001	1971	1991	2001
Assam	70.10	69.4	60.8	19.7	21.7	27.5	5.4	40.6	50.9	2.4	1.9	2.1	2.4	2.5	3.8
Cachar	2.30	10.8	2.0	77.8	79.9	80.0	11.3	10.3	10.1	0.2	0.2	0.2	8.4	7.8	7.7
Goalpara	78.80	73.3	66.3	14.7	21.3	28.3	3.3	20.4	20.4	1.1	0.9	0.7	2.2	2.2	2.4
Kamrup	82.50	78.1	68.3	12.3	17.0	25.6	2.7	20.7	30.5	1.5	1.2	1.2	0.9	1.0	1.4
Darrang	73.70	75.7	55.9	13.3	13.6	24.4	6.0	40.7	10.5	5.9	4.5	5.6	1.1	1.7	4.0
Nowgong	75.60	74.5	64.4	19.3	21.2	30.5	3.5	20.6	30.4	0.7	0.5	0.5	0.9	1.2	1.2
Sibsagar	90.40	92.6	87.3	3.70	20.7	40.3	3.6	20.4	30.6	1.5	1.1	1.3	0.8	1.2	3.5
Lakhimpur	75.10	78.2	71.0	9.30	80.5	10.6	8.8	70.6	9.0	5.1	4.1	4.5	1.6	1.7	5.2
Mikir hills	69.70	66.3	62.8	9.70	11.1	11.8	7.5	90.5	10.4	6.7	5.7	5.8	6.4	7.4	9.2
NC hills	46.09	41.3	42.6	14.3	15.7	14.5	4.5	50.5	40.6	6.2	7.9	6.6	28.9	29.6	31.6

1: Census of India 1971, Table C-V, 2: Census of India 1991, Assam State and District profile, Table -30, 3: Census of India 2001, C-16

The area considers undivided 9 districts of Assam in 1971. It is observed from Table 3 that the percentage increase of Bengali speaking population is inordinately high than all the other groups of language. During 1971 to 2001 the percentage of Bengali speaking population has increased by 8% from 19.7 to 27.5 but during these periods the proportion of Assamese speaking people in Assam had declined by 9% i.e., from 70.1 to 60.8. Hindi and other language speaking people increased by only 1% and proportion of Nepali speakers is almost same during this period.

In the district wise language speaking population the undivided district of Goalpara, Kamrup, Darrang and Nagaon are in continuation of eastern border belt and showing high Bengali speakers presence and growth. The Bengali speakers in Goalpara, Kamrup, Darrang and Nowgong district has increased by 13, 13, 11 and 11%, respectively during 1971 to 2001. Another border district

Cachar was the only district of Assam to have a significant Bengali speaking population (77.8) in 1971 and proportion of Bengali speakers rose by 80% in 2001. In the rest of districts the percentage increases of Bengali speaker is comparatively low only 1 to 2%. So far as the percentage increase of other language is concerned in all the districts the proportion of Assamese language has declined during 1971-2001. It has more rapidly declined in most of the border districts from 7 to 18% where as in other districts it has declined by only 2 to 4%. There is no major change seen for Hindi, Nepali and Other language groups. So this unusual growth of Bengali speaking population in Assam also indicates the high influx of Bengali Migrants to Assam.

ESTIMATION OF UNDOCUMENTED MIGRATION

The Indirect method of estimation is used in this study to estimating the volume of illegal migrants. In this method the census base population of age and sex has been projected by using life table survival rates and age specific fertility rates. The Leslie matrix model is used to projecting the population. The model was developed by P.H. Leslie in 1945 (Leslie, 1945). The heart of his technique is based on the Leslie matrix, which uses mortality and fecundity rates to give a projection of a population distribution based on initial population distribution of age groups. Rogers (1969) and Bruce and Shernock (2002) explained the application of Leslie matrix model in population growth of demography and Biology. The material on matrix population models in this study is extracted from the different books (Keyfitz and Caswell, 2005; Smith, 1992; Carey, 1993). The method of estimating undocumented migration is explained in the following:

- Step 1:** The census base population of age and sex has been projected by using life table survival rates and age specific fertility rates and the projection are made by using Leslie matrix population model
- Step 2:** After completion of population projection the projected population is compared with the respective years of census population and the difference is attributed to total net migration during the period
- Step 3:** The volume of net migrants calculated from census place of last residence is subtracted from the volume of total net migrants estimated in steps-II and the difference is attributed to undocumented migration of respective periods

Projection model: Projection in demography is calculating survivors down cohort lines of those living at a given point in time, calculating births in each successive period and adding a suitable allowance for migration. In this study Migration is handled by adding or subtracting individuals after the projection is completed. On the various ways of looking at population dynamics, the most convenient for the present purpose is the Leslie matrix model. In the Leslie matrix model the vector of the number of individuals of each age group at time t , N_t , is related to the vector of the initial number of individuals of each age group, N_0 , by the equation:

$$N_t = M^t N_0$$

where, M is the population projection matrix:

$$M = \begin{bmatrix} B_0 & B_1 & B_2 & \dots & B_{n-1} & B_n \\ P_0 & 0 & 0 & \dots & 0 & 0 \\ 0 & P_1 & 0 & & 0 & 0 \\ 0 & 0 & 0 & & 0 & 0 \\ \vdots & \vdots & \vdots & & \vdots & \vdots \\ 0 & 0 & 0 & \dots & P_{v-1} & Z_v \end{bmatrix}$$

B_x = Per head birth rate in age group x to $x+n$

P_x = Survival probability of individual of age x at time t to age $x+n$ at time $t+n$

V = Maximum number of age group attain

Z_v = Survival probability in the oldest age cohort

Survivorship and reproduction: In population life table, the ratio of successive ${}_nL_x$ terms will normally serve to estimate survival in the real population. If ${}_nN_x^{(t)}$ ($x = 0, 5, 10, \dots$) represent the population at age x to $x+n$ at time t then population n years older at time $t+n$ can be approximated as:

$${}_nN_{x+n}^{(t+n)} = {}_nN_x^{(t)} \times \left(\frac{{}_nL_{x+n}}{{}_nL_x} \right) \quad (1)$$

To estimate the birth of girl children in each 5 year age interval we need to set average age specific birth rates of female children say F_x , for age x to $x+4$ at last birthday. In the first time period we begin with ${}_5N_x^{(0)}$ women aged x to $x+4$ at last birthday and end with ${}_5N_{x+5}^{(0)}$ (${}_5L_x / {}_5L_{x+5}$) [Eq. 1] women in this age class. Within the age class, an estimate of mean surviving women (or average exposure per year during the 5 years) is the average of these two numbers. Multiplying this average by 5 yields the total female exposure to conception during the 5 years. Multiplication of the total exposure by F_x yields the expected births to women age x to $x+4$:

$$\frac{5}{2} [{}_5N_x^{(0)} + {}_5N_{x+5}^{(0)}] \left(\frac{{}_5L_x}{{}_5L_{x+5}} \right) F_x \quad (2)$$

where, $X = 15, 20, \dots, 40$.

To adjust Eq. 2 from annual birth to children in the age group 0-5 at the end of the period, we may use the life table ratio of persons 0-5 to births (${}_5L_0 / 5l_0$). Now from Eq. 2 we get:

$$\frac{{}_5L_0}{2l_0} [{}_5N_x^{(0)} + {}_5N_{x+5}^{(0)}] \left(\frac{{}_5L_x}{{}_5L_{x+5}} \right) F_x \quad (3)$$

where, $X = 15, 20, \dots, 40$

Component of projection matrix: Putting above expressions in the projection matrix we get

$$B_1 = {}_5L_0 / 2l_0 [{}_5N_x^{(0)} + {}_5N_{x+5}^{(0)}] \left(\frac{{}_5L_x}{{}_5L_{x+5}} \right) F_x$$

where, $I = 3, 4, 5, \dots, 8$ and $x = 5i$.

$$P_i = {}_5L_{x+5} / {}_5L_x$$

where, $I = 0, 1, 2, 3, \dots, v-1$ and $x = 5i$.

$$Z_v = T_{70} / T_{65}$$

where, T_x = the number of person-years lived after exact age x .

Technique of projection: The projected population of 1991 is made from the census population of 1971 by using following four steps:

$$\begin{aligned} P_{1971} \times M_1 &= P_{1976} \\ P_{1976} \times M_2 &= P_{1981} \\ P_{1981} \times M_3 &= P_{1986} \\ P_{1986} \times M_4 &= P_{1991} \end{aligned}$$

The projection matrix M is already defined in the above and for each matrix M_i the corresponding age specific fertility rates F_x and life table function L_x are used. Similarly the population projected for 2001 from the census population of 1991 by using following two steps:

$$\begin{aligned} P_{1991} \times M_4 &= P_{1996} \\ P_{1996} \times M_5 &= P_{2001} \end{aligned}$$

Assumptions:

- The age specific fertility rates for male and female birth are equal
- The population used for projection is closed against migration
- The net migrants estimated from census data are legal migrants

Projection for both sexes: A complete population projection includes both sexes and all age groups. For male populations beyond the reproductive ages substituting ${}_5L_x$ by ${}_5L_x^*$ (where ${}_5L_x^*$ refers to the male life table, ${}_5L_x$ to the female) in Eq. 1 and used to project from one period to the next. To include male births in the projection model similar to that for females, by substituting F_x by F_x^* (age specific fertility rates for male) and ${}_5L_x$ by ${}_5L_x^*$ in Eq. 2. Here according the assumption apply in this study $F_x = F_x^*$ and double population projection are made for male and female to estimate the total population size.

RESULTS

By applying the above mentioned method the projection was made by using FORTRAN program and the estimated projected population for Assam is furnished in Table 4. The total projected population of Assam during 1971-1991 is estimated to be 2, 14, 27882 and for the period 1991-2001, it is 2, 62, 46389. These projected populations are compared with the corresponding

Table 4: Comparison of census and projected population of Assam in 1991 and 2001

Year	Census (I)			Projected (II)			Total net migrants (III) = (II)-(I)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
1991	11611829	10718603	22330432	10988788	10439094	21427882	623041	279509	902550
2001	13759829	12866725	26626554	13493712	12752677	26246389	266117	114048	380165

Table 5: Estimation of Undocumented Migration in Assam during 1971-1991, 1991-2001

Duration	Total estimated net migrants (I)			Net migration from census data (II)			Estimated undocumented migration (III) = (II)-(I)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
1971-1991	623041	279509	902550	53927	17868	71795	569114	261641	830755
1991-2001	266117	114048	380165	-59619	-95035	-154654	325736	209083	534819

years of census population and the difference is attributed to estimated net migrants of respective periods which are presented in column 3 of Table 4. The estimated net migrants in Assam during 1971-1991 and 1991-2001 turned out to be 9, 02550 and 3, 80165, respectively. According to the assumption mentioned above it is assume that the net migrants calculated from census data are not illegal and respondent provide correct information about their place of last residence with duration. Then as per the methodology of step 3 mentioned above the approximate value of undocumented migrants are calculated from the difference of estimated and census net migrants. The census net migrants are calculated by using census statistics of place of last residence with duration which are presented in column 2 of Table 5. The corresponding result for state Assam is furnished in Table 5. From the table it is seen that the undocumented or illegal migrants of Assam during 1971-1991 and 1991-2001 are 8, 30, 755 and 5, 34, 819, respectively.

Limitation of the study: The limitation of the study is the limitation of the data. The present study based on census data and we assume that census data are flawless. But these data may sometimes over and under enumeration and this may affect the result. Moreover, there was no census conducted in Assam during 1981, therefore the projection period and all the growth rates present in this study for the periods 1971-1991 for Assam. It would have been more accurate had the data of 1981 been used. Another limitation is that there is no separate Age Specific Fertility Rates available for male and female and therefore in this study it is assumed that the Age Specific Fertility Rates for male and female are equal. Other limitations of this study are non availability of religion wise estimated natural increase rate and census records of out migrants to other country from Assam. Though this other country out migrant number is small, nevertheless, it would affect the accuracy of actual net migrants calculated from census data.

CONCLUSION

The empirical analysis based on census data and estimated rates of Sample Registration System shows that the state of Assam in Northeast India had very higher population growth rates than estimated natural increase. Certainly, migration played a dominant role towards unusual high population growth. Moreover, from the analysis of religion and language data it is reflects that the growth of Muslim and Bengali speaking population are inordinately high during 1971-2001 than the other religion and language. It is also seen from the Analytical report (Oct, 2007) of Bangladesh

census that the growth of Muslim population has declined during 1974-2001 in Bangladesh and this growth of Muslim population is lower than the growth of Muslim population in Assam. Further, the growth of Muslim population in Assam has been far higher than the growth of Muslim in All India (Saikia, 2006). These results suggest that unusual high growth of Muslim and Bengali population in Assam may be due to cross border illegal Muslim migrants from Bangladesh to Assam. The illegal migrants of Assam finally estimated through matrix method of population projection and it is turned out to be 8, 30755 and 5, 34819 for the period 1971-91 and 1991-2001, respectively. Therefore in both the period a total volume of 13,65564 estimated illegal migration has occurred in Assam.

REFERENCES

- Bhuyan, J.C., 2006. Illegal migration from Bangladesh and the demographic change in the Northeast region. In: *Illegal migration from Bangladesh*, Kumar, B.B. (Ed.). Concept Publication, New Delhi, India, pp: 79-89.
- Bruce, M. and E. Shernock, 2002. Stage based population projection matrices and their biological applications. <http://online.redwoods.cc.ca.us/instruct/darnold/laproj/Fall 2002/MikeEm/paper.pdf>
- Carey, J.R., 1993. *Applied demography for biologists with special emphasis on insects*. 1st Edn., Oxford University Press, Oxford.
- Datta, P., 2005. Feminization of Nepali migration to India. *Proceedings of the IUSSP 25th International Conference Tours*, July 28-23, 2005, France.
- Ghosh, K., 2000. Religion, linguistics and separatism in North-East India. *The Organiser*, source: <http://www.hvk.org/articles/0700/95.html>
- Godbole, M., 2005. Foreword. In: *Illegal migration from Bangladesh*, Kumar, B.B. (Ed.). Concept Publication, New Delhi, pp: 105-106.
- Goswami, N., 2011. Bangladeshi illegal migration into Assam. *Issues and concerns from the Field*, IDSA.
- Keyfitz, N. and H. Caswell, 2005. *Applied mathematical demography*. 3rd Edn., Springer, New York.
- Leslie, P.H., 1945. On the use of matrices in certain population mathematics. *Biometrika*, 33: 183-212.
- Rogers, A., 1969. On perfect aggregation in the matrix cohort-survival model of interregional population growth. *J. Regional Sci.*, 9: 417-424.
- Saikia, A., 2006. Global process and local concerns Bangladeshi migrants in Assam foreword. In: *illegal migration from Bangladesh*, Kumar, B.B. (Ed.). Concept Publication, New Delhi, pp: 187-211.
- Saikia, A., H. Goswami and A. Goswami, 2003. *Population growth in Assam 1951-1991 with focus on migration*. 1st Edn., Akansha Publishing House, New Delhi.
- Samuel, J., 1993. Language and nationality in north-east India. *Econ. Polit. Weekly*, 28: 91-92.
- Sarma, A., 2004. A situational analysis of women and girls in Assam, national commission for women. <http://ncw.nic.in/pdfReports/Gender%20Profile-Assam.pdf>.
- Sinha, S.K., 1998. *Illegal migration into Assam*, Government of Assam, Dispur, Guwahati. http://www.satp.org/satporgtp/countries/india/states/assam/documents/papers/illegal_migration_in_assam.htm
- Smith, D.P., 1992. *Formal demography*. Springer, New York.