

# HEALTH AND DEMOGRAPHIC SURVEILLANCE SYSTEM – MATLAB

Volume Forty two  
Registration of Health and Demographic Events 2008

Scientific Report No. 109 – May 2010



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GLOBAL LIFESAVING SOLUTIONS



# HEALTH AND DEMOGRAPHIC SURVEILLANCE SYSTEM – MATLAB

**Volume Forty two**

**Registration of Health and Demographic Events 2008**

**Scientific Report No. 109 – May 2010**

**Health and Demographic Surveillance Unit  
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## SUMMARY

This report presents the vital registration and maternal and child health data gathered from Matlab, Bangladesh, in 2008. The data were collected by the Health and Demographic Surveillance System of ICDDR,B. The surveillance area is divided into an ICDDR,B service area and a Government service area which receives usual government health and family planning services. The ICDDR,B service area is sub-divided into four blocks, where family planning, immunization and limited curative services are provided to under-five children and women of reproductive age.

In the surveillance area, as a whole, fertility remained almost the same in 2008 compared to 2007. The crude birth rate (CBR) was 22.9 per 1,000 population and total fertility rate (TFR) was 2.7 per woman in 2008, similar to 2006-2007 rates. In the ICDDR,B service area, CBR was 23.5 and TFR was 2.7 and in the Government service area, CBR and TFR were 22.1 and 2.7 respectively.

The crude death rate was 6.4 per 1,000 population in the ICDDR,B service area, and in the Government service area it was 7.2 in 2008. The infant mortality rate was 20.6 per 1,000 live births in the ICDDR,B service area, and in the Government service area it was 36.4. The neonatal mortality fell to 15.8 from 20.3 in the ICDDR,B service area and 26.1 from 29.9 in Government service area respectively in 2008 from 2007; post-neonatal mortality decreased in the ICDDR,B service area (7.4 to 4.9) and increased in the Government service area (9.4 to 10.4). The mortality rate among children aged less than 5 years has markedly decreased from 41.0 in 2007 in the ICDDR,B service area to 32.3 in 2008, and in the Government service area, the reduction was from 50.3 in 2007 to 47.9 in 2008. The rate of natural increase in population size was 16.0 per 1,000 in 2008.

The rate of in-migration increased to 44.0 per 1,000 population in 2008 from 40.0 in 2007, and the rate of out-migration increased to 65.7 in 2008 from 63.5 in 2007. The overall annual population growth rate was -0.6%. The marriage rate was 13.4 per 1,000 population, and the divorce rate was 90.5 per 1,000 marriages.



## CHAPTER 1

### INTRODUCTION

Since 1963, the ICDDR,B, formerly Cholera Research Laboratory, has implemented a health research programme in Matlab, Bangladesh. Matlab is located about 55 km southeast of Dhaka, the capital city of Bangladesh (Figure 1.1). The Health and Demographic Surveillance System (HDSS), formerly Demographic Surveillance System (DSS), is one of the major components of this field programme. Today the Matlab HDSS is recognized worldwide by population experts and health scientists as one of the longest continuing demographic surveillance sites in a developing country.

Since 1966, the HDSS has maintained the registration of births, deaths, and migrations, in addition to carrying out periodical censuses. Registration of marital unions and dissolutions began in 1975, internal movement in 1982, and household headship as well as household dissolution in 1993. Later in 2001, the Record Keeping System (RKS) and Geographical Information System (GIS) were integrated into HDSS. The Community Health Research Workers (CHRWs) obtain vital demographic and health information by visiting each household bi-monthly in their assigned areas and fill out the event registration forms. The activities of CHRWs are supervised by Field Research Supervisors (FRSs), and quality of collected information is monitored through independent data verification in the field. A detailed description of the Matlab HDSS and its operation appears in the CRL Scientific Report No. 9 (1978)<sup>1</sup>, ICDDR,B Special Publication No. 35 (1994), and 72 (1998)<sup>2</sup>.

In October 1977, the surveillance area was reduced from 233 to 149 villages, and a Maternal and Child Health and Family Planning (ICDDR,B service) Programme was initiated in 70 villages. The remaining 79 villages were treated as a Government service area (Figure 1.1). Since the introduction of the ICDDR,B service programme, the CHRWs have collected data on child and reproductive health from female respondents, delivered maternal health care, provided information on contraception and contraceptives, and administered immunizations to mothers and children in the ICDDR,B service area. This system of collecting data on child and reproductive health is known as the Record-Keeping System (RKS), which was later on expanded to Government service area in 2001. The changes have been described in the ICDDR,B Scientific Report No. 47 (1981)<sup>3</sup> and ICDDR,B Special Publication No. 72 (1998). Due to river erosion, 7 villages disappeared from the Government service area in 1987, leaving 142 villages in the HDSS. In 2000, 3 of the 70 villages of ICDDR,B area were transferred to the Government service area.

This is the forty two volume of a series of scientific reports of the Matlab Health and Demographic Surveillance System produced by ICDDR,B. Data obtained from the Matlab HDSS area in 2008, along with brief notes and explanations of the tables, are presented in this volume.

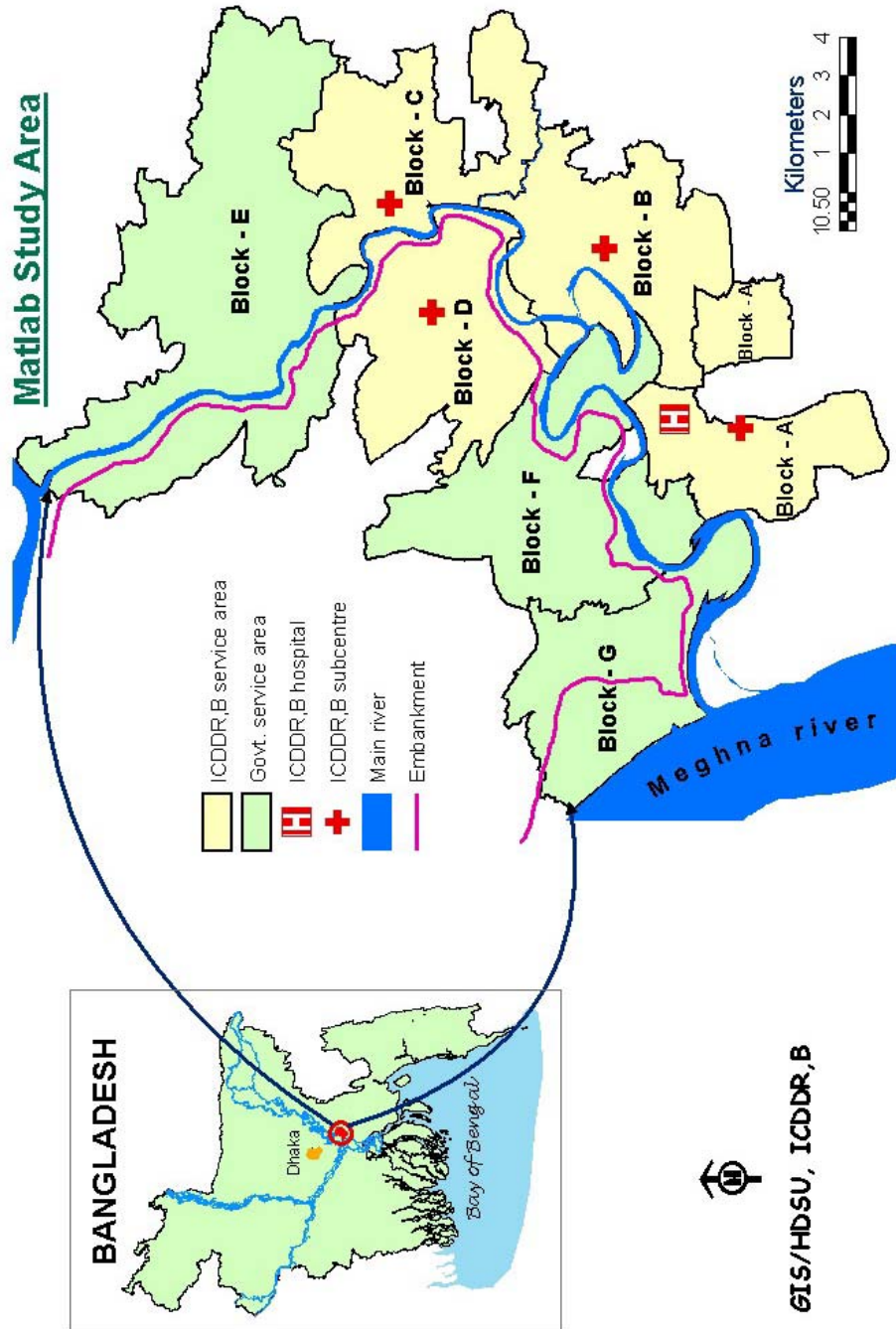
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<sup>1</sup> Available online at: <http://www.icddrb.org/publication.cfm?classificationID=64&pubID=7869>

<sup>2</sup> Available online at: <http://www.icddrb.org/publication.cfm?year=1998&classificationID=64>

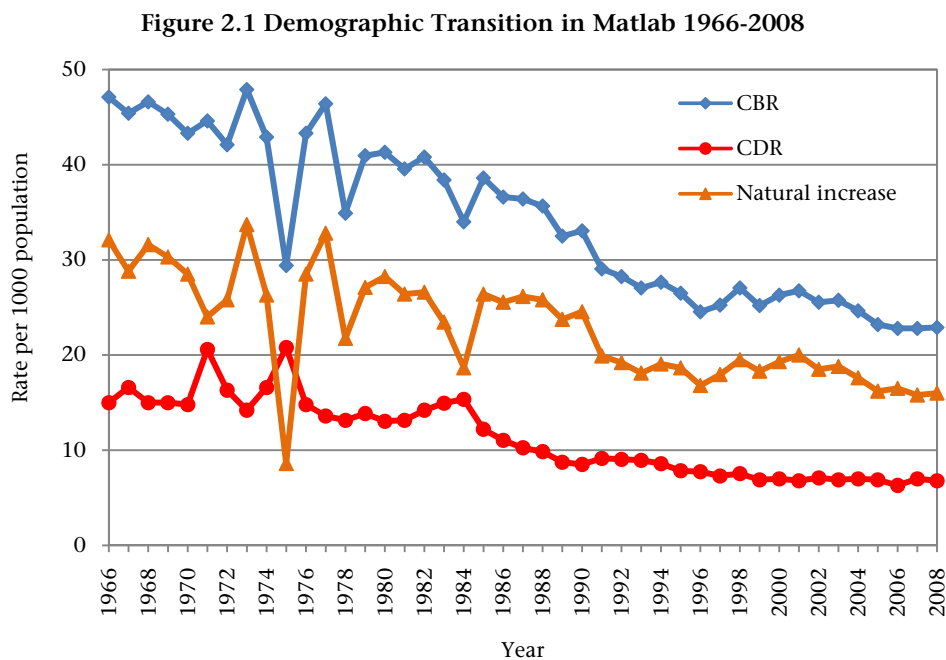
<sup>3</sup> Available online at: <http://www.icddrb.org/publication.cfm?classificationID=64&pubID=7862>

Figure 1.1 Map of Matlab study area showing ICDDR,B and Government service areas



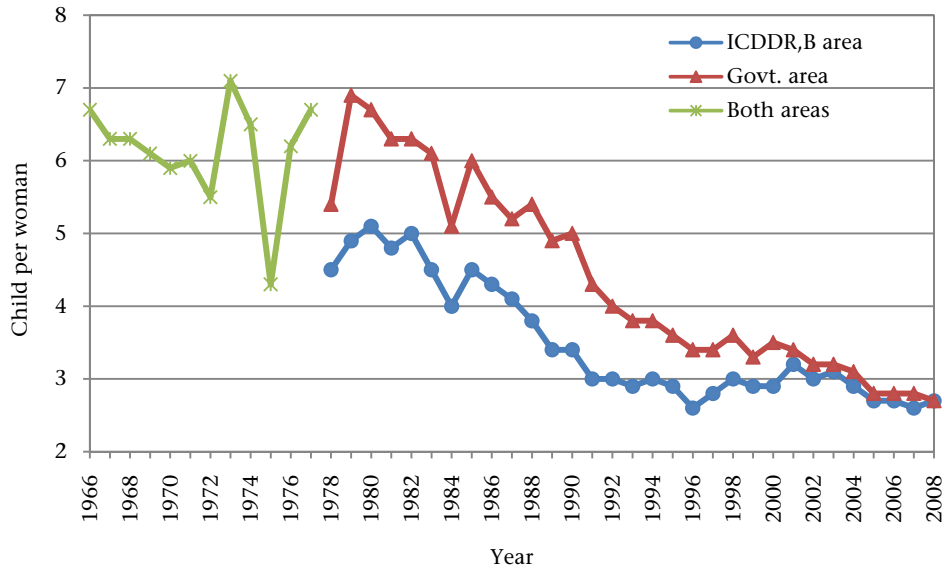
**DEMOGRAPHIC TRENDS IN MATLAB**

Long term Matlab HDSS data show the various transitions in the Matlab population over the period 1966-2008. In the early stages of demographic surveillance (1960s and 1970s), the Matlab population was characterized by high fertility, high mortality and high population growth. Apart from a shigella outbreak in 1984 following the famine in 1974 and the Liberation War in 1971, there has been steady decline in natural increase, fertility and mortality to the present. Figure 2.1 shows that over the period 1966-2008, crude birth rate (CBR) has dropped by 51%, crude death rate (CDR) by 55%, and natural increase by 50%. Fertility in Matlab has remained at a moderate level since the early 1990s, and coupled with gradual declines in mortality, it is evident that Matlab is now at the third stage of the demographic transition.



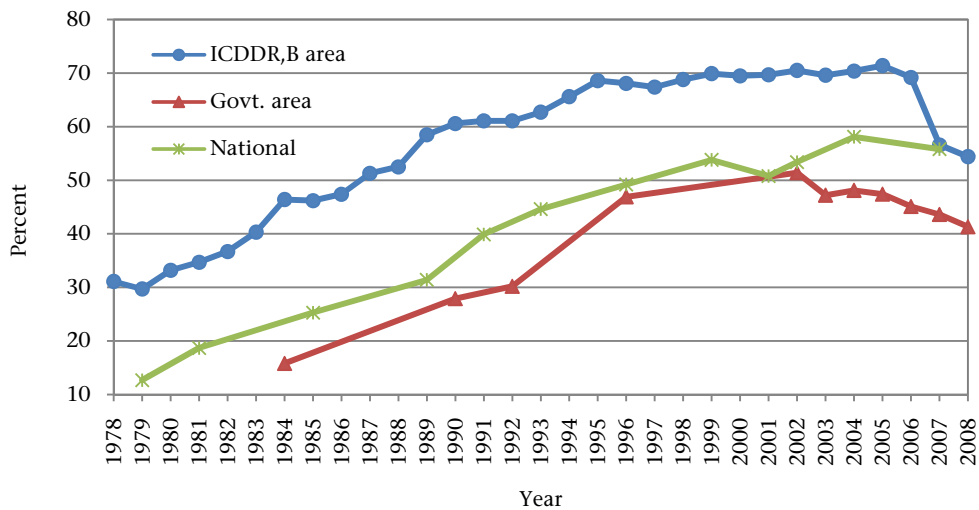
Matlab surveillance area started with a high fertility level of 6.7 children per women in 1966. After re-organization of the surveillance area into ICDDR,B and Government service areas in 1978, total fertility rate (TFR) in ICDDR,B service area remained substantially lower than the Government service area (on average 1.1 child less per woman during 1978-2000). But from 2001, TFR in both areas converged at the level just below 3 children per woman (Figure 2.2).

**Figure 2.2 Total Fertility Rate (TFR) in Matlab by area, 1966-2008**



Provision of contraceptive supply and advice has been carried out since the inception of the program by female CHRWs. They visit all households in the ICDDR,B service area on a regular basis and take this opportunity to meet with women in the household to advise and provide contraception and also to monitor the continuity of the chosen method till 2000. This method of service provision has dramatically increased access of contraceptive services to women in Matlab and is associated with a low rate of contraception discontinuation. From 2001, this home service delivery system has been switched to the fixed-site system. Contraceptive prevalence rate (CPR) increased in the ICDDR,B service area from 33.2 in 1978 to 70.5 in 2002 but has declined since 2007 to 54.4 in 2008 and it is close to the national level. In the Government service area CPR is much lower than the national level, however, CPR declined from 51.4 in 2002 to 41.3 in 2008.(Figure 2.3).

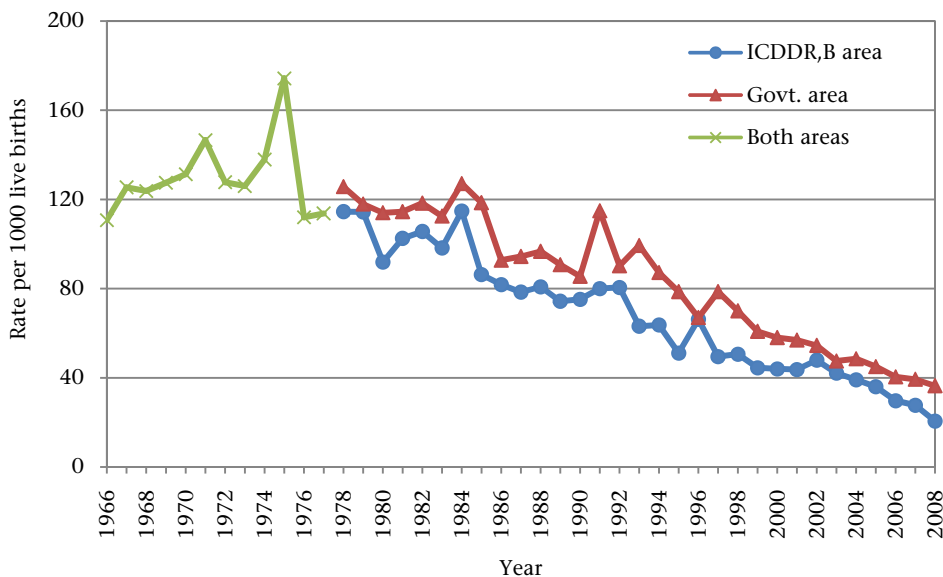
**Figure 2.3 Contraceptive Prevalence Rate (CPR) in Matlab and Bangladesh, 1978-2008**



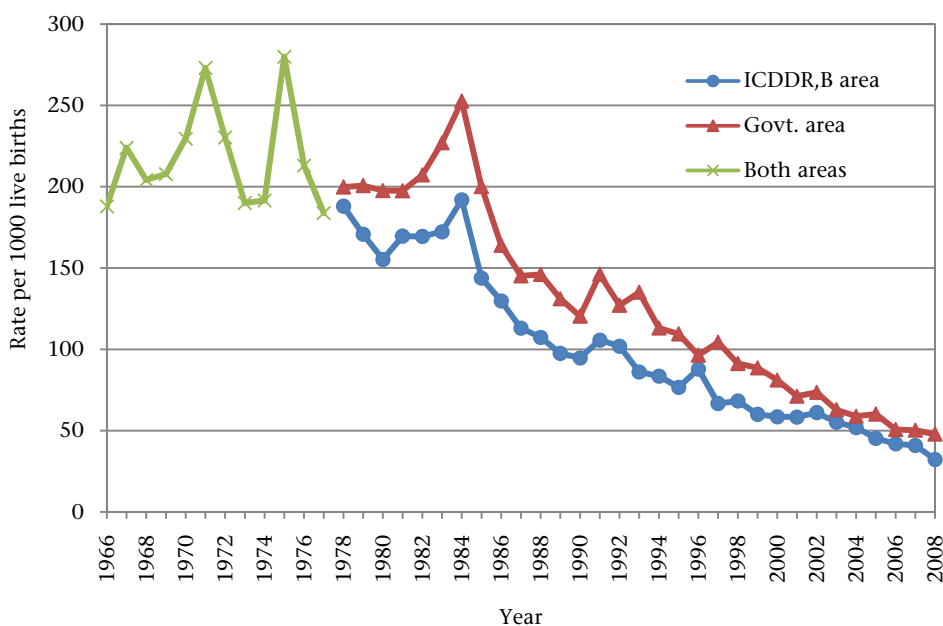


A large part of the decline in mortality in Matlab since the mid 1960s is a result of substantial reductions in infant and child mortality. Figure 2.4 shows that in the areas of Matlab receiving maternal and child health services (the ICDDR,B service area), infant mortality rate (IMR) fell by 75% over the period 1966-2008. In Government service area, IMR declined 71% over the period 1978-2008. Figure 2.5 shows that, during the same period, under-five mortality rate (U5MR) declined by 83% in ICDDR,B service area and 76% in Government service area. In both areas, the famine in 1974 had the greatest influence on the infant and child mortality followed by the shigella outbreak in 1984.

**Figure 2.4 Infant Mortality Rates (IMR) in Matlab by area, 1966-2008**

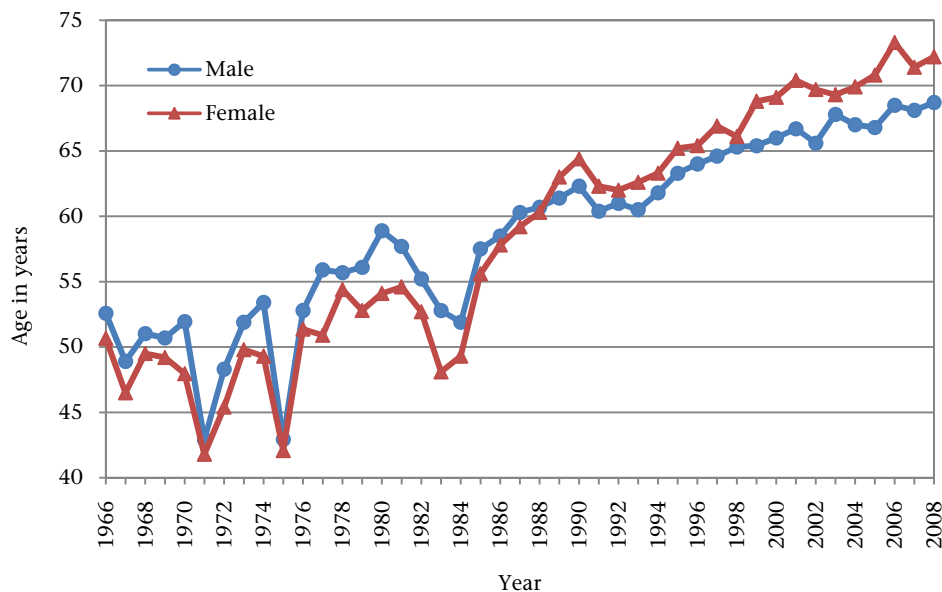


**Figure 2.5 Under-five Mortality Rates (U5MR) in Matlab by area, 1966-2008**



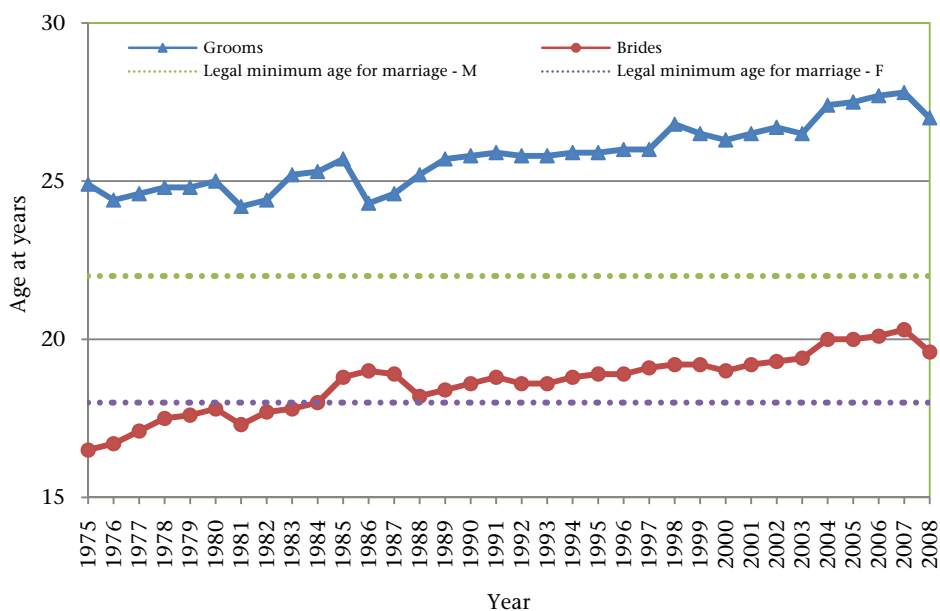
Massive reduction of infant and child mortality has resulted in remarkable improvement in life expectancy at birth during the last 40 years. The life expectancy at birth for males rose from 53 years in 1966 to 68.7 in 2008, a gain of 15.7 years and for women, the improvement is even more evident, from 51 to 72.2, a gain of nearly 21.2 years for diminishing gender difference in childhood mortality and maternal mortality (Figure 2.6).

**Figure 2.6 Expectation of life at birth ( $e^0$ ) in Matlab, 1966-2008**



The Figure 2.7 shows the trends in mean age at first marriage for brides and grooms in Matlab. Mean age at first marriage has increased in both areas in 1975-2008. During this period, brides' mean age at marriage increased by 3.1 years and for grooms, it increased by 2.1 years.

**Figure 2.7 Mean age at first marriage in Matlab, 1975-2008**



## CHAPTER 3

### **POPULATION CHANGES**

The principal vital statistics of the ICDDR,B and Government service areas from 1997 through 2008 are summarized in Table 3.1. The number of mid-year population and the demographic events registered in 2008 in both ICDDR,B and Government service areas are shown in Table 3.2. Appendix B shows the mid-year population, number of births, and deaths by village.

In 2008, the crude birth rate increased to 23.5 in the ICDDR,B service area and decreased to 22.1 in the Government service area from the 2007 level of 22.6 in the ICDDR,B service area and 23.0 in the Government service area respectively. In the ICDDR,B service area, the crude death rate decreased to 6.4 in 2008 compared to 6.8 in 2007, and in the Government service area it increased to 7.2 in 2008 compared to 7.1 in 2007. The TFR increased to 2.7 in 2008 from 2.6 in 2007 in ICDDR,B area and decreased to 2.7 in 2008 from 2.8 in 2007 in Government service area. The trends in the TFR in both areas are illustrated in Figure 2.2 of Chapter 2.

The rate of infant mortality markedly decreased to 20.6 in 2008 from 27.7 in 2007 in the ICDDR,B service area, and 36.4 in 2008 from 39.3 in 2007 in the Government service area. In the ICDDR,B service area, neonatal mortality also decreased to 15.8 in 2008 from 20.3 in 2007, and in the Government service area it decreased to 26.1 in 2008 from 29.9 in 2007. There was a decrease in the mortality rate of children aged 1-4 years in the ICDDR,B service area from 3.4 to 3.0, but this rate remained almost same in the Government service area (2.9 compared to 2.8 in 2007). As a result of these changes, mortality of children aged less than 5 years decreased substantially in the ICDDR,B service area from 41.0 per 1,000 live births in 2007 to 32.3 in 2008, also in the Government service area mortality of children aged less than 5 years decreased from 50.3 in 2007 to 47.9 in 2008. The trends in mortality of children aged less than 5 years are illustrated in Figures 2.4 and 2.5 in Chapter 2.

The numbers of in- and out-migrants registered in 2008 were 9,787 and 14,596 respectively, giving an in-migration rate of 44.0, out-migration rate of 65.7 and a net migration rate of 21.6 per 1,000 population leaving the area. Out-migrants continued to outnumber in-migrants, thus offsetting the rate of natural increase and keeping the overall annual population growth rate to -0.6%.

The age-sex distribution of the mid-year population of the Matlab HDSS area is shown in Tables 3.3 and 3.4. Block-wise mid-year population in the ICDDR,B service area is shown in Appendix A.1. The age-sex distribution of the mid-year population is illustrated by the population pyramid (Figure 3.1). The fertility decline in the surveillance area in the 1978-2008 period caused a change in the age structure of the population. Children aged less than 15 years constituted 43.4% of the total population in the ICDDR,B service area at the beginning of the ICDDR,B service project in 1978. By 2008, this proportion had fallen to 33.4%. In the Government service area, the change in age distribution was slightly less than that in the ICDDR,B service area – children aged less than 15 years in the Government service area decreased from 43.3% of the total population in 1978 to 34.3% in 2008. This difference in age distribution was due to the difference in fertility decline in the two areas. On the other hand, the percent of elderly

population (60 years and over) in the surveillance area has increased from 5.6% in 1978 to 9.4% in 2008 due to the decline in both fertility and mortality. The net population increase was -5.6 per 1,000 in 2008 while it was -7.7 per 1,000 in 2007, due to the increase in the number of out-migrants. A major cause for men being fewer than women in age group 20-44, as shown in the population pyramid, could be higher out-migration rate among the men in that age group.

**Table 3.1. Vital statistics of ICDDR,B and Government service areas\*, 1997-2008**

Vital rate (per 1,000)	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Crude birth rate												
ICDDR,B area	23.7	25.8	24.5	24.9	26.4	25.8	26.4	24.5	23.2	22.9	22.6	23.5
Government area	26.8	28.3	25.9	27.7	27.1	25.3	25.1	24.8	23.1	22.7	23.0	22.1
Both areas	25.2	27.0	25.2	26.3	26.8	25.6	25.7	24.7	23.2	22.8	22.8	22.9
Total fertility rate**												
ICDDR,B area	2.8	3.0	2.9	2.9	3.1	3.0	3.1	2.9	2.7	2.7	2.6	2.7
Government area	3.4	3.6	3.3	3.5	3.4	3.2	3.2	3.1	2.8	2.8	2.8	2.7
Both areas	3.1	3.3	3.1	3.2	3.3	3.1	3.1	3.0	2.8	2.7	2.7	2.7
Crude death rate												
ICDDR,B area	6.6	7.0	6.4	6.8	6.5	6.9	6.8	6.7	6.9	6.3	6.8	6.4
Government area	8.0	8.1	7.4	7.2	7.0	7.3	7.0	7.4	7.0	6.4	7.1	7.2
Both areas	7.3	7.5	6.9	7.0	6.8	7.1	6.9	7.0	6.9	6.3	7.0	6.8
Neonatal mortality***												
ICDDR,B area	33.1	36.8	25.4	32.3	26.4	34.4	31.5	29.6	26.5	23.5	20.3	15.8
Government area	50.0	44.0	38.6	43.6	42.4	36.4	33.8	35.3	35.4	30.1	29.9	26.1
Both areas	41.9	40.5	32.0	38.4	34.7	35.4	32.6	32.5	30.9	26.8	25.1	20.7
Post-neonatal mortality***												
ICDDR,B area	16.4	13.8	19.1	11.8	17.2	13.5	10.6	9.5	9.6	6.2	7.4	4.9
Government area	28.6	26.0	22.2	14.4	14.5	18.1	13.7	13.2	9.6	10.3	9.4	10.4
Both areas	22.7	20.1	20.6	13.2	15.9	15.9	12.1	11.4	9.6	8.2	8.4	7.5
Infant mortality***												
ICDDR,B area	49.5	50.6	44.5	44.0	43.7	47.9	42.1	39.1	36.0	29.7	27.7	20.6
Government area	78.6	70.0	60.8	58.0	56.9	54.5	47.5	48.5	45.0	40.4	39.3	36.4
Both areas	64.7	60.6	52.7	51.6	50.5	51.2	44.8	43.9	40.5	35.0	33.5	28.1
Child mortality (1-4yrs) #												
ICDDR,B area	4.5	4.7	4.1	3.9	3.9	3.5	3.6	3.4	2.4	3.2	3.4	3.0
Government area	7.0	5.8	7.5	6.4	3.8	5.2	4.1	2.7	4.0	2.6	2.8	2.9
Both areas	5.8	5.2	5.8	5.2	3.9	4.4	3.9	3.1	3.2	2.9	3.1	3.0
Under five mortality***												
ICDDR,B area	66.7	68.3	60.0	58.6	58.4	61.1	55.2	51.9	45.3	41.9	41.0	32.3
Government area	104.4	91.3	88.6	81.1	71.2	73.6	62.9	58.9	60.2	50.7	50.3	47.9
Both areas	86.3	80.1	74.4	70.7	65.0	67.5	59.1	55.4	52.8	46.2	45.7	39.7
Rate of natural increase												
ICDDR,B area	17.1	18.8	18.1	18.1	19.9	18.9	19.6	17.8	16.3	16.6	15.8	17.1
Government area	18.7	20.2	18.5	20.5	20.1	18.0	18.0	17.5	16.1	16.3	15.9	14.9
Both areas	17.9	19.5	18.3	19.3	20.0	18.5	18.8	17.6	16.2	16.5	15.8	16.0
In-migration	34.6	30.3	34.8	35.1	34.0	45.7	40.4	42.1	35.7	43.5	40.0	44.0
Out-migration	41.7	36.9	48.0	48.5	46.2	52.4	55.4	57.9	53.3	57.3	63.5	65.7
Growth (%)	1.1	1.3	0.5	0.6	0.8	1.2	0.4	0.2	-0.1	0.3	-0.8	-0.6
*ICDDR,B area refers to ICDDR,B service area and Government area refers to Government service area												
**Per woman												
***Per 1,000 live births												
#Per 1,000 children aged 1-4 years												

Table 3.2. Mid-year population, events registered, and population changes, 2008

Demographic indicator	Number			Rate per 1,000		
	Total	Male	Female	Total	Male	Female
Total Population (as of 30 June 2008)						
ICDDR,B service area	113186	52818	60368	-	-	-
Government service area	109032	50761	58271	-	-	-
Both areas	222218	103579	118639	-	-	-
Events registered (Jan-Dec. 2008)						
Births						
ICDDR,B service area	2665	1383	1282	23.5	-	-
Government service area	2415	1233	1182	22.1	-	-
Both areas	5080	2616	2464	22.9	-	-
Deaths						
Infants*						
ICDDR,B service area	55	34	21	20.6	24.6	16.4
Government service area	88	54	34	36.4	43.8	28.8
Both areas	143	88	55	28.1	33.6	22.3
All deaths						
ICDDR,B service area	727	374	353	6.4	7.1	5.8
Government service area	787	441	346	7.2	8.7	5.9
Both areas	1514	815	699	6.8	7.9	5.9
In-migration	9787	4649	5138	44.0	44.9	43.3
Out-migration	14596	7850	6746	65.7	75.8	56.9
Marriage	2985	-	-	13.4	-	-
Divorce**	270	-	-	90.5	-	-
Population change (Jan-Dec. 2008)						
Net migration	-4809	-3201	-1608	-21.6	-30.9	-13.6
Natural increase						
ICDDR,B service area	1938	1009	929	17.1	19.1	15.4
Government service area	1628	792	836	14.9	15.6	14.3
Both areas	3566	1801	1765	16.0	17.4	14.9
Net increase	-1243	-1400	157	-5.6	-13.5	1.3
*Rate per 1,000 live births						
**Rate per 1,000 marriages						

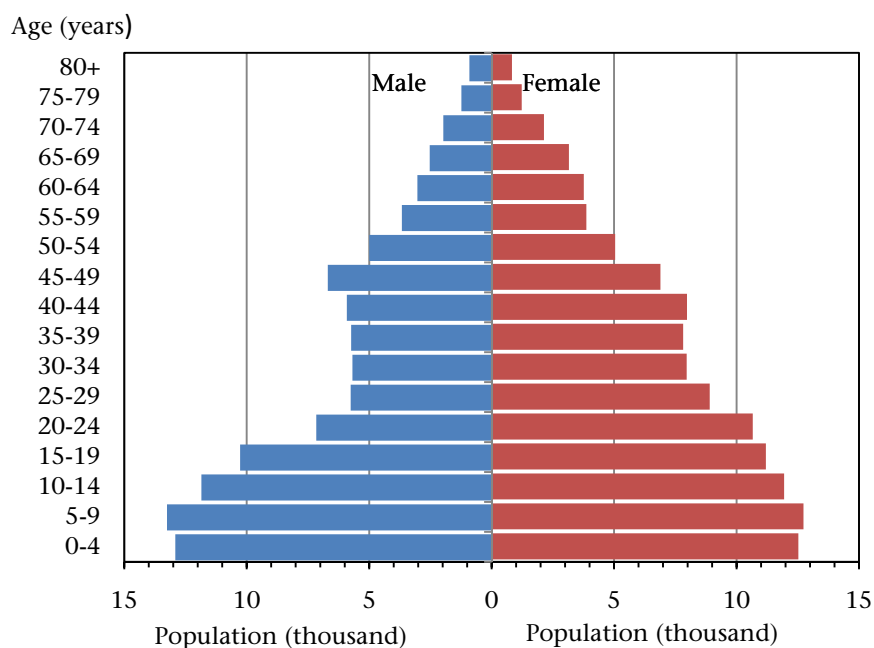
Table 3.3. Mid-year population by age and sex, 2008

Age (years)	Number			Percent		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	222218	103579	118639	100.0	100.0	100.0
<1 year	5205	2634	2571	2.3	2.5	2.2
1 – 4	20237	10285	9952	9.1	9.9	8.4
1	4934	2473	2461	2.2	2.4	2.1
2	4964	2541	2423	2.2	2.5	2.0
3	5064	2564	2500	2.3	2.5	2.1
4	5275	2707	2568	2.4	2.6	2.2
5 – 9	25989	13257	12732	11.7	12.8	10.7
10-14	23797	11854	11943	10.7	11.4	10.1
15-19	21462	10267	11195	9.7	9.9	9.4
20-24	17820	7158	10662	8.0	6.9	9.0
25-29	14660	5756	8904	6.6	5.6	7.5
30-34	13647	5684	7963	6.1	5.5	6.7
35-39	13554	5737	7817	6.1	5.5	6.6
40-44	13889	5912	7977	6.3	5.7	6.7
45-49	13586	6691	6895	6.1	6.5	5.8
50-54	10043	4998	5045	4.5	4.8	4.3
55-59	7533	3663	3870	3.4	3.5	3.3
60-64	6793	3033	3760	3.1	2.9	3.2
65-69	5686	2529	3157	2.6	2.4	2.7
70-74	4111	1974	2137	1.8	1.9	1.8
75-79	2464	1236	1228	1.1	1.2	1.0
80-84	1117	566	551	0.5	0.5	0.5
85+	625	345	280	0.3	0.3	0.2

Table 3.4. Mid-year population by age, sex, and area, 2008

Age (years)	ICDDR,B service area			Government service area		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	113186	52818	60368	109032	50761	58271
<1 year	2642	1357	1285	2563	1277	1286
1 – 4	10386	5293	5093	9851	4992	4859
1	2534	1260	1274	2400	1213	1187
2	2551	1342	1209	2413	1199	1214
3	2603	1322	1281	2461	1242	1219
4	2698	1369	1329	2577	1338	1239
5 – 9	13020	6519	6501	12969	6738	6231
10-14	11769	5835	5934	12028	6019	6009
15-19	10199	4824	5375	11263	5443	5820
20-24	9178	3633	5545	8642	3525	5117
25-29	7653	3042	4611	7007	2714	4293
30-34	7385	3148	4237	6262	2536	3726
35-39	7112	3023	4089	6442	2714	3728
40-44	7320	3150	4170	6569	2762	3807
45-49	7072	3541	3531	6514	3150	3364
50-54	5131	2595	2536	4912	2403	2509
55-59	3843	1890	1953	3690	1773	1917
60-64	3414	1526	1888	3379	1507	1872
65-69	2862	1295	1567	2824	1234	1590
70-74	2065	1032	1033	2046	942	1104
75-79	1229	628	601	1235	608	627
80-84	588	305	283	529	261	268
85+	318	182	136	307	163	144

Figure 3.1. Age pyramid of the 2008 mid-year population



## CHAPTER 4

### MORTALITY

The distribution of 1,514 deaths by age at death and sex for the Matlab HDSS area and for the ICDDR,B and Government service areas is shown in Tables 4.1 and 4.2 respectively. Of the 1,514 deaths, 9.4% were infants, 4% were of children age 1-4 years, and 65% were aged 60 years and above in 2008.

Tables 4.3 and 4.4 show the corresponding age-sex-specific mortality rates for the whole HDSS area and for the ICDDR,B and Government service areas 2008, respectively. In 2008, the overall death rates for males and females were 7.9 and 5.9 respectively. Infant mortality rate was 33.6 per 1,000 live births for males and 22.3 for females. It was lower in the ICDDR,B service area (24.6 and 16.4, respectively) than in the Government service area (43.8 and 28.8 respectively), a result of improvements in the neonatal mortality in the ICDDR,B service area. The maternal mortality ratio was 300 per 100,000 live births in ICDDR,B service area and 207 per 100,000 live births in Government service area. Block-wise deaths in the ICDDR,B service area by age and sex are shown in Appendix A.2.

Table 4.5 shows the abridged life tables for males and females derived from age-sex specific death rates, and the survival ( $l_x$ ) values are plotted in Figure 4.1 (for Life Table Equations see Appendix C). The expectation of life at birth improved substantially in 2008 compared to the 2007 level. It was 68.7 years for males and 72.2 for females in 2008 compared to 68.1 for males and 71.4 for females in 2007. The level of adult (15-59 years) mortality decreased as a whole in 2008 compared to 2007. The probability of dying for males aged 15-60 years ( ${}_{45}q_{15}$ ) was 155.3, and for females it was 91 per 1,000 population in 2008 and in 2007 it was 173 and 91.6 for males and females respectively. In most of the age-groups, expectation of life is longer for females than males.

The expectation of life at birth was higher for males in the ICDDR,B service area than the Government service area. In 2008, the gender difference in expectation of life was more pronounced in the Government service area (5.5 years) than in the ICDDR,B service area (1.6 years). Expectation of life at most of the age-groups in each area was higher for females than for males (Appendices A.3 and A.4).

Table 4.6 shows the distribution of deaths by age and month of occurrence. Deaths of those aged 5 years and above tend to peak in the winter months (November-February). Neonatal deaths were most frequent in August-September. Post-neonatal deaths were higher in January, July and October and child deaths, on the other hand, were highest in July. Figure 4.1 shows that the probability of survival for males and females started to differ from age 25 with females having a higher probability of survival in later age-groups.

Deaths by underlying causes, sex, age, and by areas are shown in Appendix A.5 – A.8. Table 4.7 gives the age-standardized mortality rates by cause of death (obtained using Verbal Autopsy) and sex and by area, using the WHO-standard world population age structure as shown in Appendix D (WHO, 2000). Deaths due to communicable diseases led by diarrhoea then respiratory infections, dysentery and septicaemia occurred more in females than males in ICDDR,B service



area whereas deaths due to tuberculosis, then respiratory infections, hepatitis and diarrhoea occurred more in males than females in Government service area. Prematurity and low birth weight were also important causes of death, particularly of neonates irrespective of sex and area. Among non-communicable diseases, death rates due to the circulatory system (stroke, ischaemic heart disease and hypertensive disease), neoplasms, asthma, diabetes, and digestive diseases were more prominent in both sexes and in both the areas. Accidents and drowning were the major causes of death in the injury category, irrespective of sex and areas. Among the miscellaneous causes, fever of unknown origin followed by senility, were most prominent in both the areas. The maternal mortality ratio in the ICDDR,B service area in 2008 was 45% higher than that of Government service area (300 vs. 207 per 100,000 live births).

**Table 4.1. Deaths by age and sex in both areas, 2008**

Age (years)	Both sexes		Male		Female	
	Number	Cumulative percentage	Number	Cumulative percentage	Number	Cumulative percentage
All ages	1514	-	815	-	699	-
<1 year	143	-	88	-	55	-
<1 month	105	6.9	71	8.7	34	4.9
1- 5 months	25	8.6	9	9.8	16	7.2
6-11 months	13	9.4	8	10.8	5	7.9
1 – 4 years	60	-	32	-	28	-
1	29	11.4	13	12.4	16	10.2
2	13	12.2	9	13.5	4	10.7
3	7	12.7	4	14.0	3	11.2
4	11	13.4	6	14.7	5	11.9
5 – 9	22	14.9	11	16.1	11	13.4
10-14	9	15.5	7	16.9	2	13.7
15-19	22	16.9	9	18.0	13	15.6
20-24	19	18.2	10	19.3	9	16.9
25-29	14	19.1	6	20.0	8	18.0
30-34	12	19.9	7	20.9	5	18.7
35-39	24	21.5	13	22.5	11	20.3
40-44	28	23.3	19	24.8	9	21.6
45-49	54	26.9	30	28.5	24	25.0
50-54	62	31.0	40	33.4	22	28.2
55-59	61	35.0	41	38.4	20	31.0
60-64	120	42.9	66	46.5	54	38.8
65-69	196	55.9	101	58.9	95	52.4
70-74	218	70.3	113	72.8	105	67.4
75-79	167	81.3	86	83.3	81	79.0
80-84	144	90.8	69	91.8	75	89.7
85+	139	100.0	67	100.0	72	100.0

Table 4.2. Deaths by area, age, and sex, 2008

Age (years)	ICDDR,B service area			Government service area		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	727	374	353	787	441	346
<1 year	55	34	21	88	54	34
<1 month	42	28	14	63	43	20
1- 5 months	9	3	6	16	6	10
6-11 months	4	3	1	9	5	4
1 – 4 years	31	16	15	29	16	13
1	14	5	9	15	8	7
2	5	5	0	8	4	4
3	4	2	2	3	2	1
4	8	4	4	3	2	1
5 – 9	8	4	4	14	7	7
10-14	5	4	1	4	3	1
15-19	9	4	5	13	5	8
20-24	9	3	6	10	7	3
25-29	3	1	2	11	5	6
30-34	6	2	4	6	5	1
35-39	16	8	8	8	5	3
40-44	15	10	5	13	9	4
45-49	27	14	13	27	16	11
50-54	32	22	10	30	18	12
55-59	31	18	13	30	23	7
60-64	51	27	24	69	39	30
65-69	93	41	52	103	60	43
70-74	106	52	54	112	61	51
75-79	88	49	39	79	37	42
80-84	67	27	40	77	42	35
85+	75	38	37	64	29	35

Table 4.3. Death rates by age and sex in both areas, 2008

Age (years)	Rate per 1,000 population			Rate per 1,000 person-years		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	6.8	7.9	5.9	6.8	7.9	5.9
<1 year*	28.1	33.6	22.3	28.1	33.6	22.3
<1 month*	20.7	27.1	13.8	20.7	27.1	13.8
1- 5 months*	4.9	3.4	6.5	4.9	3.4	6.5
6-11 months*	2.6	3.1	2.0	2.6	3.1	2.0
1 – 4 years	3.0	3.1	2.8	3.0	3.1	2.8
1	5.9	5.3	6.5	5.8	5.2	6.5
2	2.6	3.5	1.7	2.6	3.6	1.7
3	1.4	1.6	1.2	1.4	1.6	1.2
4	2.1	2.2	1.9	2.1	2.2	2.0
5 – 9	0.8	0.8	0.9	0.8	0.8	0.9
10-14	0.4	0.6	0.2	0.4	0.6	0.2
15-19	1.0	0.9	1.2	1.0	0.9	1.2
20-24	1.1	1.4	0.8	1.1	1.4	0.8
25-29	1.0	1.0	0.9	1.0	1.0	0.9
30-34	0.9	1.2	0.6	0.9	1.2	0.6
35-39	1.8	2.3	1.4	1.8	2.3	1.4
40-44	2.0	3.2	1.1	2.0	3.2	1.1
45-49	4.0	4.5	3.5	4.0	4.5	3.5
50-54	6.2	8.0	4.4	6.1	7.9	4.3
55-59	8.1	11.2	5.2	8.1	11.2	5.2
60-64	17.7	21.8	14.4	17.7	21.8	14.3
65-69	34.5	39.9	30.1	34.5	40.0	30.1
70-74	53.0	57.2	49.1	52.5	56.5	48.8
75-79	67.8	69.6	66.0	67.9	69.6	66.1
80-84	128.9	121.9	136.1	126.7	119.5	134.2
85+	222.4	194.2	257.1	219.9	190.9	256.2

\*Rate per 1,000 live births

Table 4.4. Death rates by area, age, and sex, 2008  
(per 1,000 population)

Age (years)	ICDDR,B service area			Government service area		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	6.4	7.1	5.8	7.2	8.7	5.9
<1 year	20.6	24.6	16.4	36.4	43.8	28.8
<1 month*	15.8	20.2	10.9	26.1	34.9	16.9
1- 5 months*	3.4	2.2	4.7	6.6	4.9	8.5
6-11 months*	1.5	2.2	0.8	3.7	4.1	3.4
1 – 4 years	3.0	3.0	2.9	2.9	3.2	2.7
1	5.5	4.0	7.1	6.3	6.6	5.9
2	2.0	3.7	0.0	3.3	3.3	3.3
3	1.5	1.5	1.6	1.2	1.6	0.8
4	3.0	2.9	3.0	1.2	1.5	0.8
5 – 9	0.6	0.6	0.6	1.1	1.0	1.1
10-14	0.4	0.7	0.2	0.3	0.5	0.2
15-19	0.9	0.8	0.9	1.2	0.9	1.4
20-24	1.0	0.8	1.1	1.2	2.0	0.6
25-29	0.4	0.3	0.4	1.6	1.8	1.4
30-34	0.8	0.6	0.9	1.0	2.0	0.3
35-39	2.2	2.6	2.0	1.2	1.8	0.8
40-44	2.0	3.2	1.2	2.0	3.3	1.1
45-49	3.8	4.0	3.7	4.1	5.1	3.3
50-54	6.2	8.5	3.9	6.1	7.5	4.8
55-59	8.1	9.5	6.7	8.1	13.0	3.7
60-64	14.9	17.7	12.7	20.4	25.9	16.0
65-69	32.5	31.7	33.2	36.5	48.6	27.0
70-74	51.3	50.4	52.3	54.7	64.8	46.2
75-79	71.6	78.0	64.9	64.0	60.9	67.0
80-84	113.9	88.5	141.3	145.6	160.9	130.6
85+	235.8	208.8	272.1	208.5	177.9	243.1

\*Rate per 1,000 live births

Table 4.5. Abridged life table by sex, 2008

Age (years)	Male				Female			
	$nq_x$	$l_x$	$L_x$	$e0_x$	$nq_x$	$l_x$	$L_x$	$e0_x$
0	33.6	100000	97309	68.7	22.3	100000	98214	72.2
1	5.2	96636	96337	70.1	6.5	97768	97394	72.9
2	3.5	96129	95959	69.4	1.6	97134	97054	72.4
3	1.6	95790	95715	68.7	1.2	96974	96916	71.5
4	2.2	95640	95534	67.8	1.9	96858	96764	70.6
5	4.1	95428	476232	66.9	4.3	96669	482386	69.7
10	2.9	95033	474521	62.2	0.8	96253	481077	65.0
15	4.4	94753	472810	57.4	5.8	96172	479577	60.0
20	7.0	94339	470179	52.6	4.2	95615	477148	55.4
25	5.2	93682	467286	48.0	4.5	95212	475078	50.6
30	6.1	93195	464654	43.2	3.1	94785	473243	45.8
35	11.3	92622	460704	38.5	7.0	94488	470914	40.9
40	16.0	91578	454520	33.9	5.6	93826	467912	36.2
45	22.2	90118	445967	29.4	17.3	93298	462769	31.4
50	39.3	88118	432564	25.0	21.6	91687	453861	26.9
55	54.5	84656	412544	20.9	25.5	89708	443241	22.4
60	103.5	80039	380744	16.9	69.5	87417	422921	18.0
65	182.3	71753	327563	13.6	140.5	81343	379697	14.1
70	251.4	58672	257646	11.0	219.7	69917	312651	11.0
75	297.3	43923	187662	8.9	284.1	54556	234969	8.3
80	464.7	30865	117663	6.6	503.4	39057	144446	5.6
85+	1000.0	16521	85073	5.1	1000.0	19395	75426	3.9

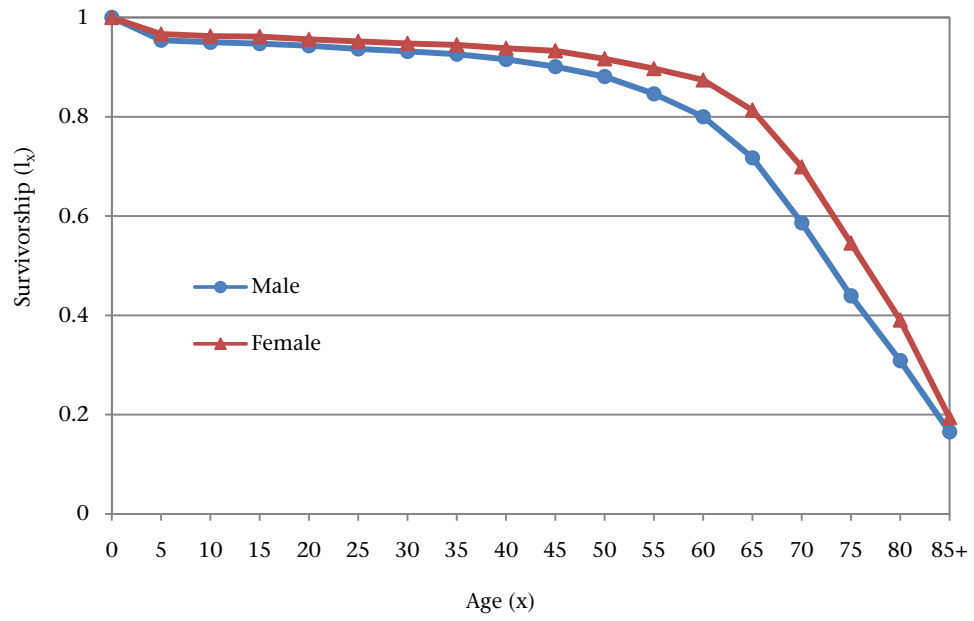
Table 4.6. Deaths by month and age, 2008

Months	All ages	Age at death			
		<1 month	1-11 months	1-4 years	5 years or above
January	165	6	6	5	148
February	131	5	2	2	122
March	117	9	2	5	101
April	111	7	3	4	97
May	118	4	2	4	108
June	90	7	4	5	74
July	135	5	6	11	113
August	136	18	1	5	112
September	109	16	3	3	87
October	116	7	5	7	97
November	146	10	2	6	128
December	140	11	2	3	124
<b>Total</b>	<b>1514</b>	<b>105</b>	<b>38</b>	<b>60</b>	<b>1311</b>

Table 4.7. Age-standardized mortality rates by cause of death, 2008  
(per 1,000 population)\*

Cause of death	Male		Female	
	ICDDR,B area	Government area	ICDDR,B area	Government area
<b>Communicable diseases</b>				
Diarrhoeal	11.43	15.25	12.57	11.90
Dysentery	(1.33)	0.00	(4.41)	0.00
Tuberculosis	(8.04)	34.48	0.00	(7.15)
EPI related death	0.00	(1.40)	0.00	0.00
Meningitis	0.00	(4.37)	(1.37)	(2.84)
Hepatitis	(5.84)	21.29	0.00	(5.95)
Chicken pox	0.00	(1.41)	0.00	0.00
Rabies	0.00	0.00	(1.96)	0.00
Septicaemia	8.49	(4.80)	(8.12)	(9.42)
Respiratory infections	(7.29)	25.55	11.39	23.95
Other communicable	(2.95)	0.00	0.00	(3.37)
<b>Maternal and neonatal conditions</b>				
Maternal death	-	-	13.18	8.35
Premature and LBW	15.92	22.55	(4.20)	12.60
Birth asphyxia	13.26	15.51	8.40	7.00
Other neonatal	(3.98)	18.32	(2.80)	(4.20)
Nutritional	15.78	(9.08)	24.08	28.67
<b>Non-communicable diseases</b>				
Neoplasm	82.04	142.94	44.58	30.17
Neoplasm in female organ	-	-	11.55	16.34
Congenital malformation	(2.65)	(5.62)	(2.78)	0.00
Diabetes	35.18	27.65	35.16	36.04
Other endocrine	9.81	0.00	(3.83)	0.00
Neuro-psychiatric	12.15	(5.03)	11.83	(3.97)
Rheumatic heart disease	(2.32)	0.00	(2.36)	0.00
Hypertensive disease	94.35	55.36	155.89	56.33
Ischaemic heart disease	84.01	80.70	39.94	35.76
Stroke	129.55	161.76	97.34	145.14
Other cardiovascular	59.31	94.07	88.76	73.84
COPD**	36.52	25.95	30.91	24.55
Asthma	22.23	31.65	30.14	27.67
Other respiratory	(4.52)	(10.79)	(9.57)	(1.89)
Digestive disease	51.04	44.36	20.61	23.01
Renal failure	19.44	18.97	12.50	14.31
Other non-communicable	(10.53)	0.00	(1.91)	(12.05)
Accident	29.38	34.68	49.63	24.56
Drowning	11.03	21.47	17.00	16.73
Suicide	(1.47)	(4.65)	8.42	(6.97)
Homicide	(7.14)	(8.84)	(1.70)	(4.90)
<b>Miscellaneous causes</b>				
Senility	16.48	(14.49)	30.92	28.36
Fever of unknown origin	(4.45)	27.74	(3.47)	13.78
Sudden infant death	0.00	0.00	0.00	(1.40)
Unknown/missing/unspecified	25.41	67.07	26.34	64.84
<b>Total</b>	<b>845.34</b>	<b>1057.82</b>	<b>829.59</b>	<b>787.97</b>
*Age distribution of standard population is given in Appendix D				
** Chronic obstructive pulmonary disease				
() Less than 5 deaths				

Figure 4.1. Probability of survival from birth to age(x) by sex, 2008



## CHAPTER 5

### **FERTILITY**

In 2008, there were 5,080 live births in the Matlab HDSS area as outcomes of 5,964 pregnancy terminations recorded. Table 5.1 shows the number of pregnancy terminations and their outcomes in 2008. In the Matlab HDSS area as a whole, 84.5% of pregnancies resulted in a live birth, a proportion that remains almost the same from year to year; pregnancies resulting in fetal wastage show no definite trend. Among the pregnancies resulting in live births, 48 were multiple births (twins and triplets).

Table 5.2 shows the distribution of pregnancies by outcome, and live births by sex by month of occurrence. The data show the usual marked seasonal variation of births, peaking in September-January. The sex ratio of live births was 106 males per 100 females; there is no definite trend over the period. Figure 5.1 shows births and deaths by month of occurrence. Seasonality of births corresponds to the peak season of natural growth of population in the area.

Table 5.3 shows the age-specific fertility rates for the study area, together with the total fertility rate, general fertility rate, and gross and net reproduction rates. Figure 5.2 shows the age-specific fertility rates for both ICDDR,B and Government service areas. In the age groups 20-34, the fertility rates were higher both in the ICDDR,B service and Government service areas. The age-specific fertility rates and related fertility measures for the ICDDR,B service area by blocks are shown in Appendix A.9.

The breakdown of age-specific fertility rate by birth order facilitates a more detailed and sensitive analysis of fertility trends and differentials. Thus the totals of the order-specific rates represent the components by birth order of the TFR. In the same way TFR represents the average number of children that would be borne by a woman if she goes through life having children at the current age-specific rates, so the total for birth order N represents the proportion of women who would have at least N children. Thus, the tables (Appendices A.10 and A.11) highlight the differences between the ICDDR,B service area and the Government service area. There used to be wider difference between the two areas for birth above order 1, but now the gap is getting narrower.

Table 5.4 shows marked variation in the distribution of live births by place of delivery and area. Institutional delivery accounts for 67% in the ICDDR,B service area and 19% in the Government service area. More commonly used places for institutional delivery in the Government service area were private clinic/nursing home (7.2%) and Upazila Health Complex (5.8%), and in ICDDR,B service area, ICDDR,B hospital (35.6%) followed by clinic/nursing home (13.7%). Table 5.5 shows the distribution of live births by birth attendants<sup>4</sup> and area. In the ICDDR,B service area, Family Welfare Visitor/Senior Health Assistant (FWV/SHA) assisted highest number (31.9%) of the live-birth deliveries as opposed to TBAs (63.0%) in the Government service area. The respective figures for trained TBAs were 8.6% and 16.8% in the ICDDR,B service area and

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<sup>4</sup> The most qualified attendant was considered if there was more than one in attendance.



Government service area, respectively. Medically trained birth attendants (doctors, nurses or midwives, lady family planning visitors or family welfare visitors) assisted 66.4% of the live birth deliveries in the ICDDR,B service area and 19.5% in the Government service area. In the ICDDR,B service area, assistance was sought more frequently from FWV (31.9%) followed by MBBS doctors (18%) whereas in the Government service area, it was from MBBS doctors (9.1%) followed by nurses (6.6%).

Table 5.6 illustrates the mode of delivery of live births by area. Normal vaginal delivery (including use of drug and saline and/or Episiotomy) accounted for 86% in the ICDDR,B service area and 91.5% in the Government service area. Instrumental deliveries, especially caesarean were 13.9% and 8.3% respectively in the ICDDR,B service area and Government service area.

Matlab HDSS recorded pre-natal care received by mothers in different stages of pregnancy in 2008. Table 5.7 shows pre-natal care received by mothers who had a live birth in 2008 in three trimesters by type of service providers. In the ICDDR,B service area, in first trimester 58.3% of the mothers did not receive any pre-natal care as oppose to 90.3% in the Government service area. The representative figures for 2<sup>nd</sup> and 3<sup>rd</sup> trimester were 10.1%-5.7% in the ICDDR,B service area and 41.2%-30.5% in the Government service area. In the ICDDR,B service area, seeking pre-natal care from skilled providers accounts for 41.7% in first trimester and 89.9%-94.3% in second and third trimesters. In this area, providers of pre-natal care are ICDDR,B sub-centres (72.6% and 69.7% in 2<sup>nd</sup> and 3<sup>rd</sup> trimesters respectively) and ICDDR,B Matlab hospital (14.0% and 19.7% in 2<sup>nd</sup> and 3<sup>rd</sup> trimesters respectively). In the Government service area, skilled providers of prenatal care are private clinics (11.3% and 24.5% in 2<sup>nd</sup> and 3<sup>rd</sup> trimesters respectively), community clinics or family welfare centres (12.2% and 14.5% in 2<sup>nd</sup> and 3<sup>rd</sup> trimesters respectively) and government hospitals (6.3% and 10% in 2<sup>nd</sup> and 3<sup>rd</sup> trimesters respectively). In this area, others (that include untrained village doctors, herbalists (*kabiraj*) and homeopaths) are most common providers of pre-natal care.

Figure 5.1. Number of births and deaths by month, 2008

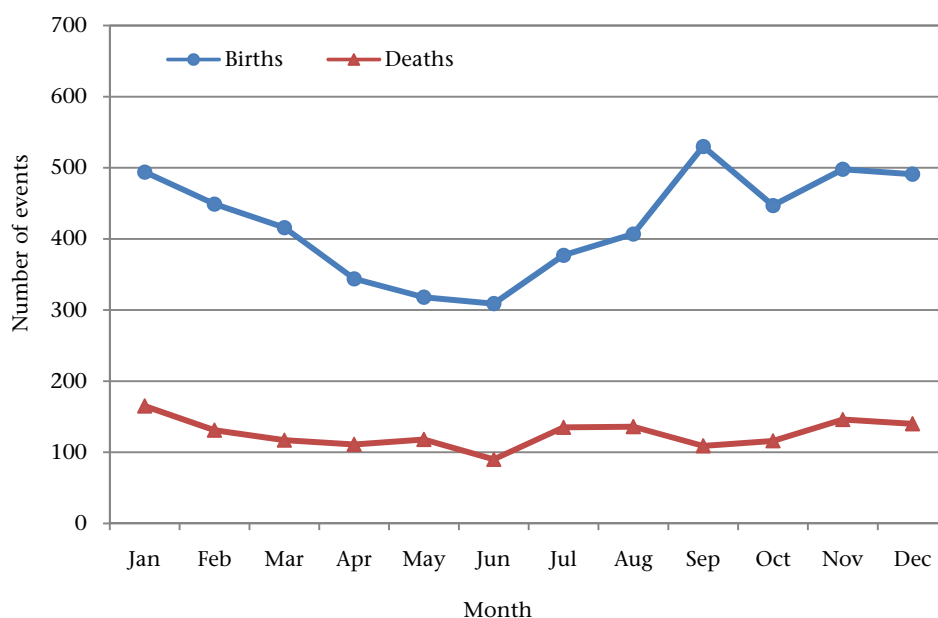


Table 5.1. Numbers and rates of pregnancy outcomes by type and area, 2008

Type of pregnancy outcome	Both areas		ICDDR,B area		Government area	
	Number	Rate	Number	Rate	Number	Rate
Total pregnancies*	5964	97.1	3172	100.5	2792	93.5
Live birth preg.**	5038	844.7	2639	832.0	2399	859.2
Fetal wastage**	926	155.3	533	168.0	393	140.8
Early(miscarriage)***	799	134.0	483	152.3	316	113.2
<i>Induced</i>	286	48.0	153	48.2	133	47.6
<i>Spontaneous</i>	513	86.0	330	104.0	183	65.5
Late (still birth)	127	21.3	50	15.8	77	27.6
Multiple birth pregnancy	49		30		19	
Multiple live birth pregnancy	48		30		18	
<i>Three live births</i>	0		0		0	
<i>Two live births</i>	42		26		16	
<i>One live birth</i>	6		4		2	
Still birth pregnancies	1		0		1	
Three still births	0		0		0	
Two still births	1		0		1	
Miscarriage pregnancies	0		0		0	

\*Rate per 1000 women of age 15-49 years (GFR)  
\*\*Rate per 1000 total pregnancies  
\*\*\*Less than 28 weeks

Table 5.2. Pregnancy outcomes by month, 2008

Months	Pregnancy outcome					No. of live born children			
	Miscarriage			Still birth	Live birth <sup>a</sup>	Both sexes	Male	Female	Ratio
	All	Induced	Spon.						
All months	5964	286	513	127	5038	5080	2616	2464	1.06
January	565	27	35	12	491	494	259	235	1.10
February	533	18	56	13	446	449	220	229	0.96
March	493	32	40	7	414	416	217	199	1.09
April	441	29	61	10	341	344	173	171	1.01
May	405	28	54	7	316	318	164	154	1.06
June	375	26	39	4	306	309	158	151	1.05
July	457	31	44	9	373	377	193	184	1.05
August	477	24	38	11	404	407	212	195	1.09
September	602	19	46	12	525	530	276	254	1.09
October	515	20	35	17	443	447	238	209	1.14
November	555	20	28	13	494	498	259	239	1.08
December	546	12	37	12	485	491	247	244	1.01

<sup>a</sup>For any multiple birth pregnancy, the outcome is recorded as live birth, if at least one of the issue is live born

Table 5.3. Age-specific fertility rates (per 1,000 women) and indices by area, 2008

Age (years)	Both areas		ICDDR,B area		Government area	
	Births	Rate	Births	Rate	Births	Rate
All ages	5080	82.7	2665	84.4	2415	80.9
15-19*	691	61.7	394	73.3	297	51.0
20-24	1674	157.0	885	159.6	789	154.2
25-29	1398	157.0	730	158.3	668	155.6
30-34	843	105.9	428	101.0	415	111.4
35-39	370	47.3	179	43.8	191	51.2
40-44	95	11.9	44	10.6	51	13.4
45-49**	9	1.3	5	1.4	4	1.2
Total fertility rate		2711		2740		2690
General fertility rate		83		84		81
Gross reproduction rate		1315		1318		1317
Net reproduction rate		1250		1263		1241
*Births to mothers under age 15 were included in this group						
**Births to mothers age 50 and above were included in this group						

Table 5.4. Distribution of live births by place of delivery by area, 2008

Place of Delivery	Both areas		ICDDR,B area		Government area	
	Number	Percent	Number	Percent	Number	Percent
Home	2830	56.2	880	33.3	1950	81.3
ICDDR,B sub-centre	325	6.5	325	12.3	0	0.0
ICDDR,B hospital	942	18.7	939	35.6	3	0.1
Upazila health complex	167	3.3	29	1.1	138	5.8
District hospital	159	3.2	89	3.4	70	2.9
Clinic/nursing home	533	10.6	361	13.7	172	7.2
UH & FWC	66	1.3	8	0.3	58	2.4
Others	16	0.3	8	0.3	8	0.3
<b>Total</b>	<b>5038</b>	<b>100.0</b>	<b>2639</b>	<b>100.0</b>	<b>2399</b>	<b>100.0</b>
Source: Birth registration form						

Figure 5.2. Age-specific fertility rates by area, 2008

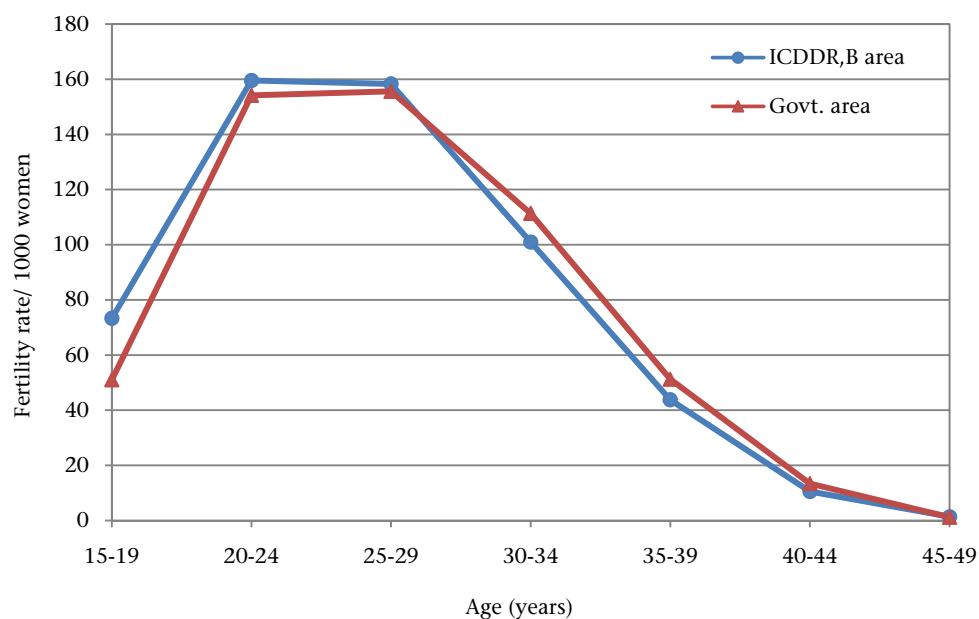


Table 5.5. Distribution of live birth attendant by area, 2008

Birth attendant	Both areas		ICDDR,B area		Government area	
	Number	Percent	Number	Percent	Number	Percent
TBA	2132	42.3	620	23.5	1512	63.0
Trained TBA	631	12.5	228	8.6	403	16.8
FWV	934	18.5	843	31.9	91	3.8
Nurse	592	11.8	433	16.4	159	6.6
MBBS doctor	695	13.8	476	18.0	219	9.1
Others	54	1.1	39	1.5	15	0.6
None	0	0.0	0	0.0	0	0.0
<b>Total</b>	<b>5038</b>	<b>100.0</b>	<b>2639</b>	<b>100.0</b>	<b>2399</b>	<b>100.0</b>

TBA=Traditional birth attendant  
FWV= Family welfare visitor  
SHA=Senior Health Assistant

Table 5.6. Distribution of mode of delivery by area, 2008

Mode of Delivery	Both areas		ICDDR,B area		Government area	
	Number	Percent	Number	Percent	Number	Percent
Normal vaginal	4463	88.6	2269	86.0	2194	91.5
Operation (C/S)	567	11.3	367	13.9	200	8.3
Instrumental*	8	0.2	3	0.1	5	0.2
<b>Total</b>	<b>5038</b>	<b>100.0</b>	<b>2639</b>	<b>100.0</b>	<b>2399</b>	<b>100.0</b>

\*Using forceps/ventose

Table 5.7. Percentage of prenatal care in different trimester and area, 2008

Source	ICDDR,B area			Government service area		
	1 <sup>st</sup> trimester	2 <sup>nd</sup> trimester	3 <sup>rd</sup> trimester	1 <sup>st</sup> trimester	2 <sup>nd</sup> trimester	3 <sup>rd</sup> trimester
Trained TBA	0.00	0.00	0.00	0.04	0.50	0.58
CC/FWC/Sat. Clinic	0.08	0.15	0.19	1.83	12.21	14.51
ICDDR,B Sub-centre	36.64	72.57	69.69	0.08	0.38	0.29
Govt. Hospital/UHC	0.15	0.49	0.72	0.75	6.34	10.00
ICDDR,B Hospital	3.33	14.02	19.67	0.33	0.13	0.25
Chandpur MCWC	0.00	0.08	0.15	0.04	0.17	0.38
Private Clinic	1.48	2.50	3.83	3.50	11.34	24.51
Others	0.00	0.08	0.08	3.08	27.72	19.01
No care	58.32	10.12	5.68	90.33	41.23	30.47
<b>No. of live birth</b>	<b>2639</b>	<b>2639</b>	<b>2639</b>	<b>2399</b>	<b>2399</b>	<b>2399</b>

## CHAPTER 6

### **MARRIAGE AND DIVORCE**

The procedures adopted by the HDSS specify that if either partner in a marriage is resident in the HDSS area, the marriage should be registered. The number of marriages registered in 2008 was 2,985, giving a crude marriage rate of 13.4 per 1,000 population. This rate is slightly decreased than that of 2007, which was 14.6 per 1,000 population.. The state law requires legal registration of marriage and divorce of Muslims and Christians (no such law exists for Hindus in Bangladesh). Table 6.7 shows the increased trend of the percentages of the registration of Muslim marriages registered with Kazi (marriage register) from 2000-2007 that was 85-94% but the trend slightly decreased in 2008, which is 92.6%, which usually took place in the brides' home.

Tables 6.1, 6.1a, 6.2 and 6.2a show the distribution of grooms and brides by age at marriage and previous marital status in the ICDDR,B and Government service areas. The mean ages at marriage in the ICDDR,B service area were 28.0 and 20.3 years for all grooms and brides respectively; 26.9 and 19.6 years for those marrying for the first time—are almost the same as those of 2007. The mean ages at marriage of ICDDR,B service area are almost similar to those in the Government service area. In general there has been a long-term gradual rise in age at marriage of female in Matlab: the mean age for females has been over 18 years for every year since 1985, while prior to that date it was consistently below that age (Tables 6.2 and 6.2a).

Table 6.3 shows the marriage rates by age and sex. Among males, the marriage rate was 38.6 per 1,000 males aged 10 years and above, and for females the rate was 32.0 per 1,000 females aged 10 years and above. For females, the highest rate was 183.3 per 1,000 at the age of 18 years, while for males the highest rate was 204.7 per 1,000 in the age group of 25-29 years. The age group for highest rate of marriage for both male and female in 2008 remained almost unchanged as those of 2007. Table 6.4 shows distribution of current marital status of the study population by age and sex in 2008. Of the total population 45.8% were currently married and it was higher for females than males (47.8% vs 43.5%). Widows also constituted higher for females (9.5%) than males (1.1%)- this difference, along with age-difference at marriage and life expectancy, may be due to remarriage, which is more common for men than for women.

Table 6.6 shows distribution of marriages by type of gifts received from father-in-law at the time of marriage in 2004-2008. Groom's party received marriage gifts from the bride's father in two-thirds of all marriages. Gifts were received under two different contracts: there was a clear negotiation with the bridal party about the gift prior to the marriage or there was no such negotiation, but gift was given for daughter's happiness. The first contract can be regarded as dowry and its incidence was 57.9% in 2008 whereas it was 61.3% in 2007. Incidence of giving dowry shows a declining trend over time from 2005-2008 which indicates the improvements of social awareness. Dowry was paid in full at the time of marriage for one-sixth of the marriages and partially for one-third of all marriages.

The number of divorces was more than 500 each year during 1978-1981. Since 1981, this figure has been less than 500. In general, the incidence of divorce in Matlab has fallen. HDSS recorded 270 divorces in 2008 (Appendix A.12) and of them, 83.2% were registered with Kazi (meaning marriage register) which is the same as in 2007. Table 6.5 shows the mean and median durations in months of marriage at divorce by age and sex. The average duration of marriage of all divorcing husbands at the time of divorce was 36.5 months. Figure 6.1 shows the distribution of marriages and divorces by month. There has been no strong seasonal pattern for marriages or divorces in 2008 but marriages were high in March, October and December and low in September.

Figure 6.1. Marriages and divorces by month, 2008

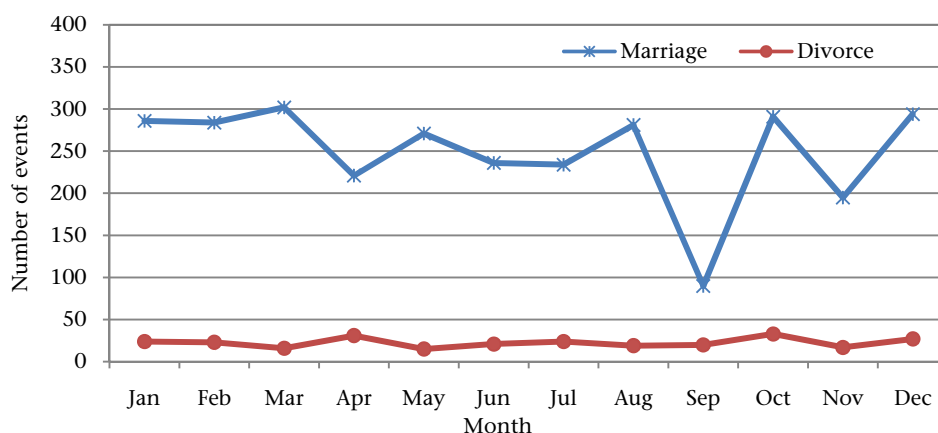


Table 6.1 Groom's age at marriage by previous marital status in ICDDR,B area, 2008

Age (years)	All grooms	Previous marital status (%)			
		Single	Married	Divorced	Widowed
All ages	100 (n=1517)	86.9 (n=1318)	2.6 (n=40)	8.0 (n=121)	2.5 (n=38)
10-14	0.0	0.0	0.0	0.0	0.0
15-19	4.6	5.0	0.0	3.3	0.0
20-24	26.2	28.1	7.5	19.0	2.6
25-29	37.5	40.0	20.0	27.3	2.6
30-34	20.5	20.6	17.5	20.7	18.4
35-39	6.2	5.0	15.0	13.2	15.8
40-44	2.0	0.9	10.0	9.1	7.9
45-49	1.3	0.2	22.5	3.3	10.5
50-54	0.5	0.0	2.5	0.8	15.8
55-59	0.3	0.0	0.00	0.8	7.9
60-64	0.3	0.0	0.00	0.0	10.5
65+	0.7	0.2	5.0	2.5	7.9
Median age*	27.0	27.0	37.5	30.0	48.5
Mean age*	28.0	26.9	37.9	31.4	46.6
Standard deviation*	7.1	5.1	10.6	9.3	13.3

\*Mean and median ages and standard deviation were calculated from ungrouped age data

Table 6.1a Groom's age at marriage by previous marital status in Government service area, 2008

Age (years)	All grooms	Previous marital status (%)			
		Single	Married	Divorced	Widowed
All ages	100 (n=1468)	87.9 (n=1291)	1.8 (n=26)	8.0 (n=117)	2.3 (n=34)
10-14	0.1	0.2	0.0	0.0	0.0
15-19	4.0	4.3	0.0	1.7	0.0
20-24	22.8	24.1	11.5	17.1	0.0
25-29	41.5	44.4	15.4	23.9	11.8
30-34	21.0	21.4	11.5	21.4	14.7
35-39	5.9	4.6	15.4	17.1	8.8
40-44	2.0	0.5	15.4	12.0	14.7
45-49	1.2	0.2	15.4	5.1	17.6
50-54	0.3	0.0	15.4	0.9	0.0
55-59	0.3	0.0	0.0	0.9	11.8
60-64	0.2	0.0	0.0	0.0	8.8
65+	0.5	0.3	0.0	0.0	11.8
Median age*	28.0	27.0	38.5	31.0	44.0
Mean age*	28.1	27.1	38.0	31.9	46.1
Standard deviation*	6.8	5.2	10.2	7.9	14.9

\*Mean and median ages and standard deviation were calculated from ungrouped age data

Table 6.2 Bride's age at marriage by previous marital status in ICDDR,B area, 2008

Age (years)	All brides	Previous marital status (%)			
		Single	Married	Divorced	Widowed
All ages	100 (n=1517)	91.2 (n=1383)	-	8.2 (n=124)	0.7 (n=10)
10-14	3.3	3.5	-	0.8	0.0
15-19	49.6	53.0	-	15.3	0.0
20-24	34.6	34.6	-	36.3	10.0
25-29	7.2	6.1	-	19.4	10.0
30-34	2.7	2.0	-	9.7	10.0
35-39	1.7	0.6	-	12.9	20.0
40-44	0.6	0.1	-	3.2	40.0
45-49	0.0	0.0	-	0.0	0.0
50-54	0.1	0.0	-	0.8	10.0
55-59	0.1	0.0	-	0.8	0.0
60-64	0.1	0.0	-	0.8	0.0
65+	0.0	0.0	-	0.0	0.0
Unknown	0.1	0.1	-	0.0	0.0
Median age*	19.0	19.0	-	24.0	39.0
Mean age*	20.3	19.6	-	26.4	37.4
Standard deviation*	5.0	3.8	-	8.3	9.5

\*Mean and median ages and standard deviation were calculated from ungrouped age data



Table 6.2a Bride's age at marriage by previous marital status in Government service area, 2008

Age (years)	All brides	Previous marital status (%)			
		Single	Married	Divorced	Widowed
All ages	100 (n=1468)	91.3 (n=1341)	-	7.6 (n=111)	1.1 (n=16)
10-14	3.5	3.7	-	0.9	0
15-19	47.7	50.8	-	17.1	0.0
20-24	35.9	36.4	-	33.3	12.5
25-29	9.5	7.5	-	30.6	31.3
30-34	1.8	1.3	-	6.3	12.5
35-39	0.4	0.1	-	3.6	0.0
40-44	0.7	0.1	-	6.3	12.5
45-49	0.5	0.1	-	1.8	25.0
50-54	0.0	0.0	-	0.0	0.0
55-59	0.1	0.0	-	0.0	6.25
60-64	0.0	0.0	-	0.0	0.0
65+	0.0	0.0	-	0.9	0
Unknown	0.0	0.0	-	0	0
Median age*	19.0	19.0	-	24.0	30.5
Mean age*	20.3	19.6	-	25.5	35.2
Standard deviation*	4.7	3.6	-	7.0	11.1

\*Mean and median ages and standard deviation were calculated from ungrouped age data

Table 6.3 Marriage rates by age and sex, 2008

Age (years)	Male			Female		
	Marriages	Population	Rate*	Marriages	Population	Rate*
All ages(10+ yrs)	2985	77403	38.6	2985	93384	32.0
10-14	2	11854	0.2	101	11943	8.5
15	2	2303	0.9	135	2261	59.7
16	5	1968	2.5	219	2032	107.8
17	17	2203	7.7	337	2249	149.8
18	46	1956	23.5	411	2242	183.3
19	58	1837	31.6	350	2411	145.2
20-24	732	7158	102.3	1052	10662	98.7
25-29	1178	5756	204.7	248	8904	27.9
30-34	620	5684	109.1	68	7963	8.5
35-39	181	5737	31.5	32	7817	4.1
40-44	60	5912	10.1	19	7977	2.4
45+	84	25035	3.4	12	26923	0.4
Unknown	0	-	-	1	-	-

\* Rates per 1000 population irrespective of previous marital status

**Table 6.4. Distribution of current marital status (%) by age and sex, 2008**

Age (years)	Male					Female				
	NM	PM	WID	DIV	Total	NM	PM	WID	DIV	Total
0-4	100.0	0.0	0.0	0.0	12919	100.0	0.0	0.0	0.0	12523
5-9	100.0	0.0	0.0	0.0	13257	100.0	0.0	0.0	0.0	12732
10-14	100.0	0.0	0.0	0.0	11854	99.6	0.4	0.0	0.0	11943
15-19	98.1	1.9	0.0	0.1	10267	77.3	22.0	0.0	0.7	11195
20-24	79.1	20.5	0.0	0.4	7158	27.9	70.7	0.1	1.3	10662
25-29	40.3	58.9	0.1	0.7	5756	7.0	91.4	0.5	1.2	8904
30-34	13.0	86.2	0.1	0.7	5684	1.8	95.9	1.2	1.0	7963
35-39	3.6	95.4	0.1	0.9	5737	0.8	95.9	2.4	0.9	7817
40-44	1.0	98.3	0.2	0.5	5912	0.5	92.5	5.6	1.5	7977
45-49	0.6	98.6	0.5	0.4	6691	0.4	87.3	10.5	1.9	6895
50-54	0.5	98.2	1.1	0.3	4998	0.1	78.4	19.7	1.8	5045
55-59	0.2	97.7	1.9	0.3	3663	0.1	64.3	34.1	1.6	3870
60-64	0.2	96.1	3.4	0.2	3033	0.1	50.9	47.7	1.3	3760
65-69	0.2	94.0	5.7	0.2	2529	0.1	34.8	64.3	0.9	3157
70-74	0.1	89.8	9.8	0.3	1974	0.0	20.1	79.2	0.7	2137
75-79	0.2	83.5	16.1	0.2	1236	0.1	9.0	90.4	0.5	1228
80+	0.2	69.9	29.6	0.2	911	0.0	4.8	94.6	0.6	831
All (%)	55.2	43.5	1.1	0.3	100.0	41.9	47.8	9.5	0.8	100.0
<b>Total</b>	<b>57163</b>	<b>45047</b>	<b>1094</b>	<b>275</b>	<b>103579</b>	<b>49673</b>	<b>56757</b>	<b>11240</b>	<b>969</b>	<b>118639</b>

NM=Never married, PM=Presently married, WID=Widowed, DIV=Divorced

**Table 6.5. Duration (months) of all marriages at divorce by age and sex, 2008**

Age at divorce (years)	Male				Female			
	No.	Mean	Median	SD	No.	Mean	Median	SD
< 20	8	9.5	8.0	5.5	69	15.0	12.0	12.5
20 - 24	52	19.4	17.0	16.1	112	30.0	22.5	25.5
25 - 29	63	28.2	21.0	24.9	39	49.3	46.0	33.1
30 - 34	56	38.2	29.5	36.9	26	74.7	56.0	59.4
35 - 39	48	46.3	33.0	45.7	7	101.1	111.0	55.3
40 - 49	33	75.7	64.0	62.6	15	101.8	67.0	93.6
50+	10	103.2	97.5	88.1	2	124.5	124.5	53.0
<b>All ages</b>	<b>270</b>	<b>36.5</b>	<b>24.0</b>	<b>38.1</b>	<b>270</b>	<b>36.5</b>	<b>24.0</b>	<b>38.1</b>

**Table 6.6. Marriages by type of gifts received from bridal party (father-in-law) 2004-2008**

Type of gift received	Year				
	2004	2005	2006	2007	2008
None	35.0	32.7	33.5	37.7	40.9
Gift without prior negotiation	1.5	0.8	0.5	1.0	1.3
Gift after prior negotiation	63.5	66.5	66.0	61.3	57.9
Gift payment					
Full	20.2	19.5	18.6	17.1	15.8
Partial	39.7	39.9	40.4	37.3	34.6
Not yet paid*	3.6	7.1	7.0	7.8	7.5

NA=Not available  
\*Was agreed at the time of marriage but did not pay as yet

**Table 6.7. Registration status of Muslim marriages, 2000-2008.**

Year	Registered with kazi		Not registered	
	Number	Percent	Number	Percent
2000	2457	85.0	434	15.0
2001	2486	87.7	348	12.3
2002	2620	87.4	376	12.6
2003	2469	87.3	359	12.7
2004	2483	91.7	224	8.3
2005	2563	91.1	251	8.9
2006	2521	92.5	205	7.5
2007	2726	94.0	175	6.0
2008	2442	92.6	196	7.4

**Table 6.8. Registration status of divorces of Muslim marriages, 2000-2008.**

Year	Registered with kazi		Not registered	
	Number	Percent	Number	Percent
2000	195	67.2	95	32.8
2001	179	67.8	85	32.2
2002	243	74.8	82	25.2
2003	239	76.1	75	23.9
2004	230	82.4	49	17.6
2005	243	80.7	58	19.3
2006	270	88.2	36	11.8
2007	278	83.2	56	16.8
2008	223	83.2	45	16.8

## CHAPTER 7

### **MIGRATION**

An out-migrant is defined as a person originally listed on a Matlab HDSS census as a resident, or a person who became a resident by birth or immigration, who subsequently moved out of the Matlab surveillance area permanently. Likewise, an in-migrant is an individual neither recorded in the last census nor born or lived in the Matlab HDSS area after the census who has permanently moved into the surveillance area. Those who stay in the area continuously for at least 6 months in a year, or come home at least once a month to stay overnight, are treated as permanent residents. These definitions are used in the surveillance area as a whole.

During 2008, the total of 9,787 persons (4,649 males and 5,138 females) moved into the HDSS area, which represented an annual average in-migration of 4.4% for both males and females of the mid-year population (Tables 7.1 and 7.2). On the other hand, 14,596 persons (7,850 males and 6,746 females) left the HDSS area or on an average 6.6% for both males and females of the mid-year population (Appendix A.13), giving a crude rate of in-migration of 44.0 per 1,000 population, and out-migration rate of 65.7 per 1,000 population. The highest incidence of in-migration for males was 10.8% in the age group 25-29 and for females was 10.5% in the age group 20-24. More males and females out-migrated in the age group 20-24 (19.8% and 13.8%, respectively). More males out-migrated than females in the age group (20-64). The consequence of the out migration of more males than females, particularly to urban areas is that the sex ratio of the population of the area has decreased from 103 in 1982 to 87 males per 100 females in 2008. More out-migration of working age (15-59) group males to females caused a decline in the sex ratio over the period.

Both in-migration and out-migration rate in 2008 increased over those of 2007, The net loss of migrants was 21.7 per 1,000 in 2008, whereas it was 23.5 per 1,000 in 2007. Table 7.1 presents the age-specific migration rates, which are illustrated in Figure 7.1. The tables and figures show the bi-modal distribution of age commonly found for migrant populations, with a primary peak of young adults and a secondary peak of young children moving with their parents. Male out-migrants were rather younger than male in-migrants, while for females the pattern of age distribution was more similar. Table 7.2 and Figure 7.2 show the numbers moving in and out by month. January is the preferred month for migration for both men and women and September is the month of few marriages and migration for women. Numbers of in- and out-migration by age, sex, and cause of movement are shown in Appendix A.16 through A.19. Roughly, an equal number of men and women move into and out of rural areas, females predominantly for marriage and males predominantly for seeking jobs. There is a net loss of both men and women to urban Dhaka, primarily of young adults. Migration to the Middle East and other Asian locations is heavily concentrated among out-migrating males aged 15-44 years (Appendices A.20 and A.21).

**Table 7.1 Age and sex-specific migration rates (per 1,000 population) by direction, 2008**

Age (years)	Both sexes		Male		Female	
	In	Out	In	Out	In	Out
All ages	44.0	65.7	44.9	75.8	43.3	56.9
0 - 4	64.7	64.8	64.1	67.9	65.4	61.6
5 - 9	33.6	44.1	32.7	42.8	34.6	45.5
10-14	25.3	48.4	24.1	53.6	26.5	43.3
15-19	61.6	119.8	32.3	115.8	88.5	123.4
20-24	91.5	162.0	71.0	198.4	105.2	137.6
25-29	84.3	120.0	107.9	170.1	69.1	87.6
30-34	62.1	85.4	94.5	134.2	38.9	50.6
35-39	42.6	58.8	74.3	99.9	19.4	28.7
40-44	25.1	38.9	41.8	60.2	12.8	23.1
45-49	18.9	23.6	28.2	33.9	9.9	13.6
50-54	13.6	17.4	17.2	18.6	10.1	16.3
55-59	13.0	13.9	19.9	15.8	6.5	12.1
60-64	9.3	14.1	9.9	14.5	8.8	13.8
65+	25.9	40.8	21.0	26.9	29.8	51.9

**Table 7.2 In- and out-migration by sex and month, 2008**

Months	In-migration			Out-migration		
	Both sexes	Male	Female	Both sexes	Male	Female
All months	9787	4649	5138	14596	7850	6746
January	1106	551	555	1686	916	770
February	905	430	475	1530	807	723
March	732	331	401	1292	707	585
April	803	393	410	1262	694	568
May	718	317	401	1291	706	585
June	880	425	455	1322	751	571
July	725	333	392	1294	725	569
August	902	409	493	1282	650	632
September	655	343	312	742	428	314
October	864	401	463	1205	615	590
November	570	274	296	726	387	339
December	927	442	485	964	464	500

Figure 7.1. Rates of in- and out-migration by sex and age in Matlab, 2008

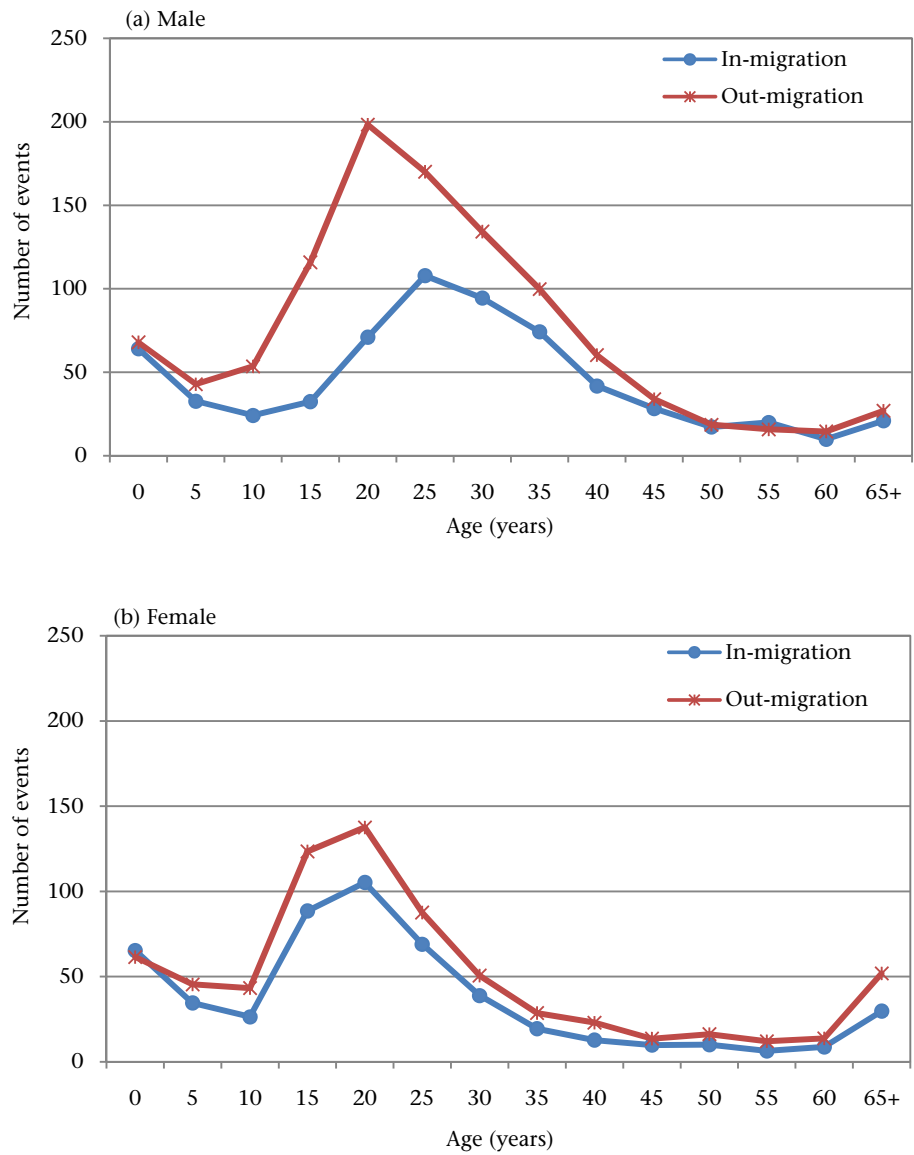
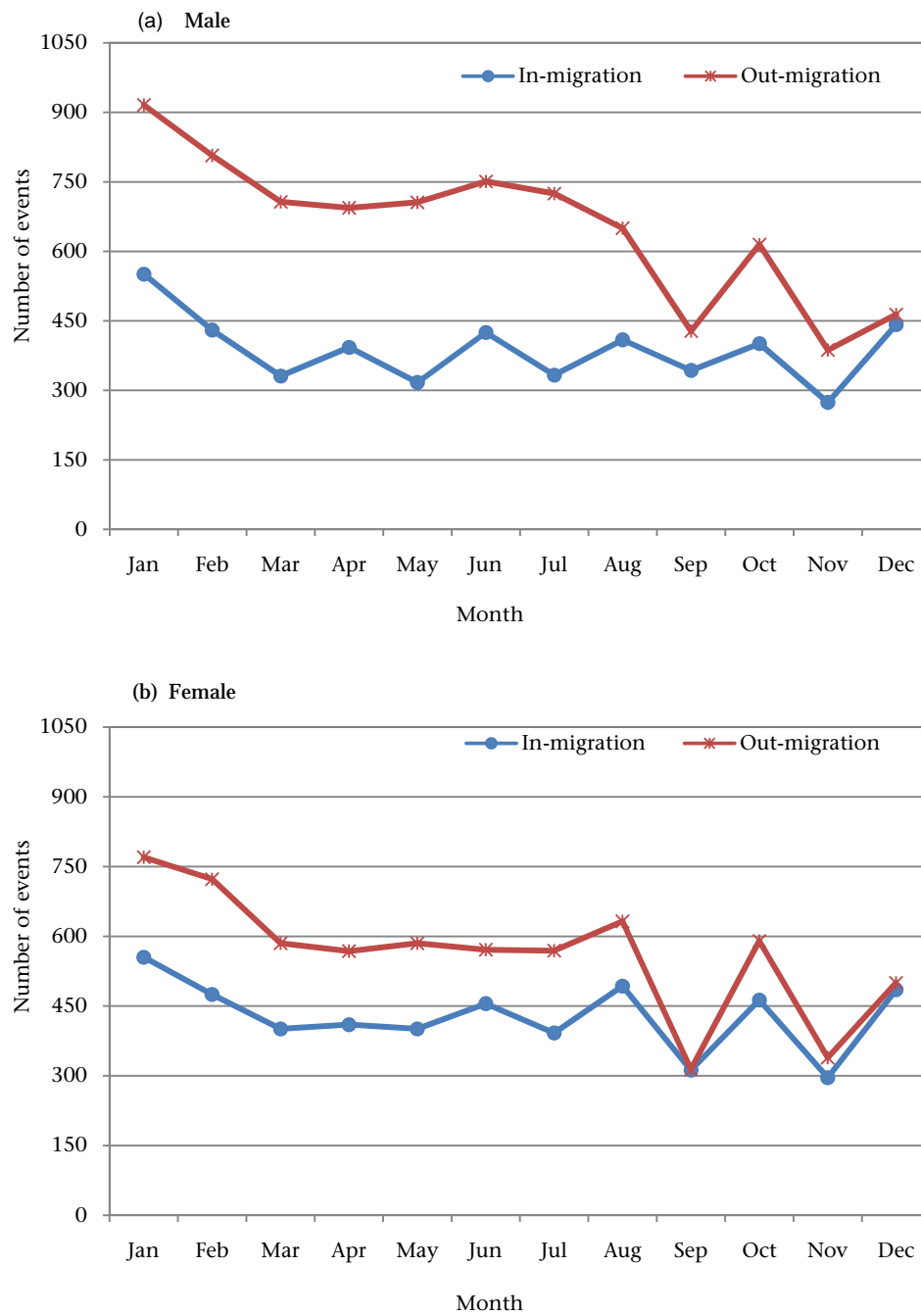


Figure 7.2. Number of in- and out-migrations by sex and month in Matlab, 2008



## CHAPTER 8

### **FERTILITY REGULATION**

In the ICDDR,B service area, only service CHRWs have been providing maternal and child health and family planning (MCH-FP) services including EPI and maintain records of MCH-FP services they provide since 2007. In case of any complications they also refer the patients to ICDDR,B sub-centres. They also motivate couples for adopting family planning; advise pregnant women for antenatal care, safe delivery, and use of safe-delivery kit; advise parents for immunization of children; make them aware of symptoms of common childhood morbidity; and advise them to treat sick children by formally trained providers. The motivation activities are carried out in the ICDDR,B service area only. In the Government service area, services are provided from the Union Health and Family Welfare Centre and 8 Satellite Clinics monthly, and from 24 EPI Centres for vaccinations of children, adolescents, and women of reproductive ages.

The surveillance CHRWs in both ICDDR,B and Government service areas record family planning methods used by couples in the previous month by asking eligible women about family planning during their bimonthly home visits. They during home visits advise sometimes oral pill users to procure pills timely, pregnant women to seek antenatal care and have safe delivery; and parents to immunize children and treat sick children by formally trained providers. In 2008 contraceptive use rate was 54.4% in the ICDDR,B service area and 41.3% in the Government service area (Table 8.1). Contraceptive use rate in the Government service area is close to the use rate of 43.9 recorded in Chittagong division in 2007. Table 8.2 shows the difference in contraceptive method-mix between the ICDDR,B and Government service areas in 2008 and the national-level estimates for selected years. At the national level and in the Government service area, the pill is the most widely-used method, followed by injectables and tubectomy, while in the ICDDR,B service area, injectables are the most widely-used method, followed by pill, condom, and tubectomy. Changes in the method-mix in the ICDDR,B service area during 1994-2008 are shown in Table 8.3. The use of injectables and condom has increased with decreases in use of pill and tubectomy over the years. The contraceptive-use rate increases with the increase in women's age in the ICDDR,B service area (Table 8.4). In the ICDDR,B service area, women aged 20 years and over are more likely to use injectables, pill, undergo tubectomy or their husbands to use vasectomy, and adopt traditional methods than women aged less than 20 years, whereas in the Government service area (Table 8.5), the pill, then injectable, tubectomy are the most popular method in all age groups except age group 45 years and over. Tubectomy and pill are more popular in the age group 40 years and over.



Table 8.1. Contraceptive use rate (%) of currently married women aged 15-49 years by area, 1982-2008

Year	Matlab		National**
	ICDDR,B area	Government area*	
1982	36.7	-	-
1983	40.3	-	19.1
1984	46.4	15.8	-
1985	46.2	-	-
1986	47.4	-	25.3
1987	51.3	-	-
1988	52.5	-	-
1989	58.8	-	31.4
1990	60.6	27.9	-
1991	61.1	-	39.9
1992	61.1	30.2	-
1993	62.7	-	44.6
1994	65.6	-	-
1995	68.6	-	-
1996	68.1	46.9	49.2
1997	67.4	-	-
1998	68.8	-	-
1999	69.9	-	53.8
2000	69.5	-	-
2001	69.7	-	50.8
2002	70.5	51.4	53.4
2003	69.6	47.2	-
2004	70.4	48.1	58.1
2005	71.4	47.4	-
2006	69.2	45.1	-
2007	56.6	43.6	55.8
2008	54.4	41.3	-

\*Sources: In-depth and KAP surveys, 1984 & 1990; MDHS 1992; HDSS census 1996 and HDSS 2002-2008.  
\*\*Sources: Contraceptive prevalence survey, Bangladesh fertility survey 1989; Bangladesh demographic and health survey 1993-94, 1996-97, 1999-2000, 2004, 2007; Bangladesh maternal health services and maternal mortality survey 2001, Bangladesh Bureau of Statistics

Table 8.2. Contraceptive method mix (%) in different surveys and areas

Method	Matlab		National	
	ICDDR,B area, 2008	Government area, 2008	BMMS 2001	BDHS 2007
Pill	29.8	45.4	51.2	51.1
Condom	8.7	5.3	6.4	8.1
Injectables	46.2	24.5	15.7	12.5
IUD	1.7	1.2	1.6	1.6
Tubectomy	8.8	12.2	10.6	9.0
Vasectomy	1.7	0.5	1.0	1.2
Norplant	0.5	2.1	1.0	1.2
Others*	2.6	8.8	12.5	14.9
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

BDHS=Bangladesh demographic and health survey  
BMMS=Bangladesh maternal health services and maternal mortality survey  
\*Others include periodic abstinence, withdrawal, and other traditional methods

**Table 8.3. Contraceptive method mix\* (%) in the ICDDR,B area, 1994-2008**

Method	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Pill	25.7	25.8	25.4	26.0	29.7	28.7	30.6	31.9	33.3	33.9	32.6	34.1	35.8	34.6	30.6
Condom	3.9	4.7	6.2	7.7	7.1	7.7	9.5	10.8	11.1	11.0	10.9	11.2	10.8	8.6	9.0
Injectables	52.9	54.3	54.4	53.1	50.0	50.4	47.8	45.7	44.5	44.4	45.2	42.7	41.3	43.6	47.4
IUD	3.1	2.7	2.2	1.8	2.3	3.3	2.4	1.9	1.8	1.9	2.4	2.6	2.4	1.9	1.8
Tubectomy	14.0	12.2	11.5	11.1	10.6	9.8	9.1	8.6	7.7	7.2	7.4	7.6	7.9	9.2	9.0
Vasectomy	0.4	0.3	0.3	0.3	0.3	0.1	0.6	1.1	1.5	1.5	1.4	1.4	1.5	1.6	1.7
Foam	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Norplant	-	-	-	-	-	-	-	-	-	0.0	0.1	0.3	0.3	0.5	0.5
<b>All</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

\*Currently married women using any modern method.

**Table 8.4. Method specific contraceptive use rate among currently married women by age in ICDDR,B area, 2008**

Age (years)	Not using	Any method used	Method used								No. of eligible women
			Pill	IUD	Injectables	Condom	Tubectomy	Vasectomy	Others*	Norplant	
<20	74.6	25.4	8.8	0.6	13.1	2.6	0.0	0.0	0.1	0.1	1187
20 - 24	60.1	39.9	14.9	1.4	20.2	3.2	0.0	0.0	0.2	0.1	3885
25 - 29	51.8	48.2	17.9	1.2	23.6	4.0	0.6	0.1	0.5	0.2	4186
30 - 34	43.5	56.5	18.1	0.8	27.5	4.6	3.6	0.5	0.9	0.4	4034
35 - 39	34.8	65.2	18.4	0.7	30.3	5.7	7.4	1.1	1.2	0.3	3826
40 - 44	31.4	68.6	16.4	0.8	29.5	6.2	9.8	2.3	3.1	0.4	3715
45 - 49	38.9	61.1	11.8	0.5	22.5	5.9	12.9	2.5	4.6	0.3	2195
<b>Total</b>	<b>45.6</b>	<b>54.4</b>	<b>16.2</b>	<b>0.9</b>	<b>25.1</b>	<b>4.7</b>	<b>4.8</b>	<b>0.9</b>	<b>1.4</b>	<b>0.3</b>	<b>23028</b>

\*Others include periodic abstinence, withdrawal, and other traditional methods.

**Table 8.5. Method specific contraceptive use rate among currently married women by age in Government service area, 2008**

Age (years)	Not using	Any method used	Method used								No. of eligible women
			Pill	IUD	Injectables	Condom	Tubectomy	Vasectomy	Others*	Norplant	
<20	79.7	20.3	12.0	0.0	2.5	4.7	0.0	0.0	1.0	0.0	918
20 - 24	73.1	26.9	16.2	0.3	6.5	2.6	0.1	0.0	0.9	0.0	3502
25 - 29	64.8	35.2	20.4	0.4	9.5	1.9	0.9	0.1	1.0	0.0	3903
30 - 34	54.6	45.4	22.8	0.6	13.1	2.3	3.6	0.1	1.9	0.0	3582
35 - 39	48.4	51.6	22.4	0.7	13.5	2.0	6.8	0.3	4.4	0.0	3480
40 - 44	47.4	52.6	17.8	0.7	12.2	2.1	10.5	0.3	7.9	0.0	3273
45 - 49	55.9	44.1	10.8	0.2	6.2	1.4	14.8	0.6	9.7	0.0	1946
<b>Total</b>	<b>58.7</b>	<b>41.3</b>	<b>18.7</b>	<b>0.5</b>	<b>10.1</b>	<b>2.2</b>	<b>5.0</b>	<b>0.2</b>	<b>3.6</b>	<b>0.0</b>	<b>20604</b>

\*Others include periodic abstinence, withdrawal, and other traditional methods.

### **GEOGRAPHICAL INFORMATION SYSTEM (GIS)**

Geographic Information System (GIS) component was established in 1994 under the Public Health Sciences Division (former Community Health Division) to provide cartographic, thematic and analytic maps to the investigators of ICDDR,B according to their requirements. Initially, the GIS activities were limited to the Matlab HDSS area, later gradually expanded its activities to other areas in Bangladesh. In 1998, the GIS and RKS joined with DSS under the Health and Demographic Surveillance Unit (HDSU). In Matlab surveillance area, GIS collects spatial data through Global Positioning System (GPS) surveyors and Field Research Supervisors (FRS). The FRSs are trained in using handheld GPS device and collect geo-coordinates of new *baris* (cluster of a group of households sharing common yard) and locations of landmarks. Whenever a member gets his/her DSS identification, (s)he is automatically linked to the geo-reference objects of the Matlab spatial database. The spatially related objects are village and *bari*, and the object types are area and point. Continuous updating is done into the spatial database whenever a new *bari*, new road or health and educational facility is created. The locations of tube-wells, ditches, ponds, health facilities, educational institutes, mosques, etc. are included in the spatial database.

New development of GIS software and satellite images has expanded scope to GIS activities in different fields. Currently GIS generates thematic maps, creates spatial variables and performs spatial and temporal analysis with geo-referenced data. Any kind of spatial information can be extracted from high-resolution imagery. Spatial and temporal analyses generate surfaces and time to see the spatial and temporal relationships with morbidity, mortality and risk factors of morbidity and mortality. This facilitates targeting interventions to the high risk areas and efficient use of scarce resources.

A few examples of thematic maps produced by GIS in recent year are given with brief illustration. Villages selected for rotavirus vaccination trial are shown in Figure 9.1. There was a flood in 2004. Figure 9.2 shows percent of *baris* affected in each village by the flood. More than of half of the *baris* were flooded in most villages inside the embankment. Distribution of schools (primary and secondary), colleges, and madrasa and bazaars is shown in the Figure9.3. Distribution appears to be non-uniform. The GIS recorded linear distances from household to the nearest physician-run health facility, paramedic-run health facility and distance to the pave road. Figure 9.4 shows that short distance to the physician-run health complex, but not to the paramedic-run clinic increased use of doctors in both areas for treating children sick with fever/cough and pneumonia. Short distance also decreased use of untrained village doctors and homecare.

Figure 9.1. Villages covered by rotavirus vaccine trial in Matlab HDSS area, 2008

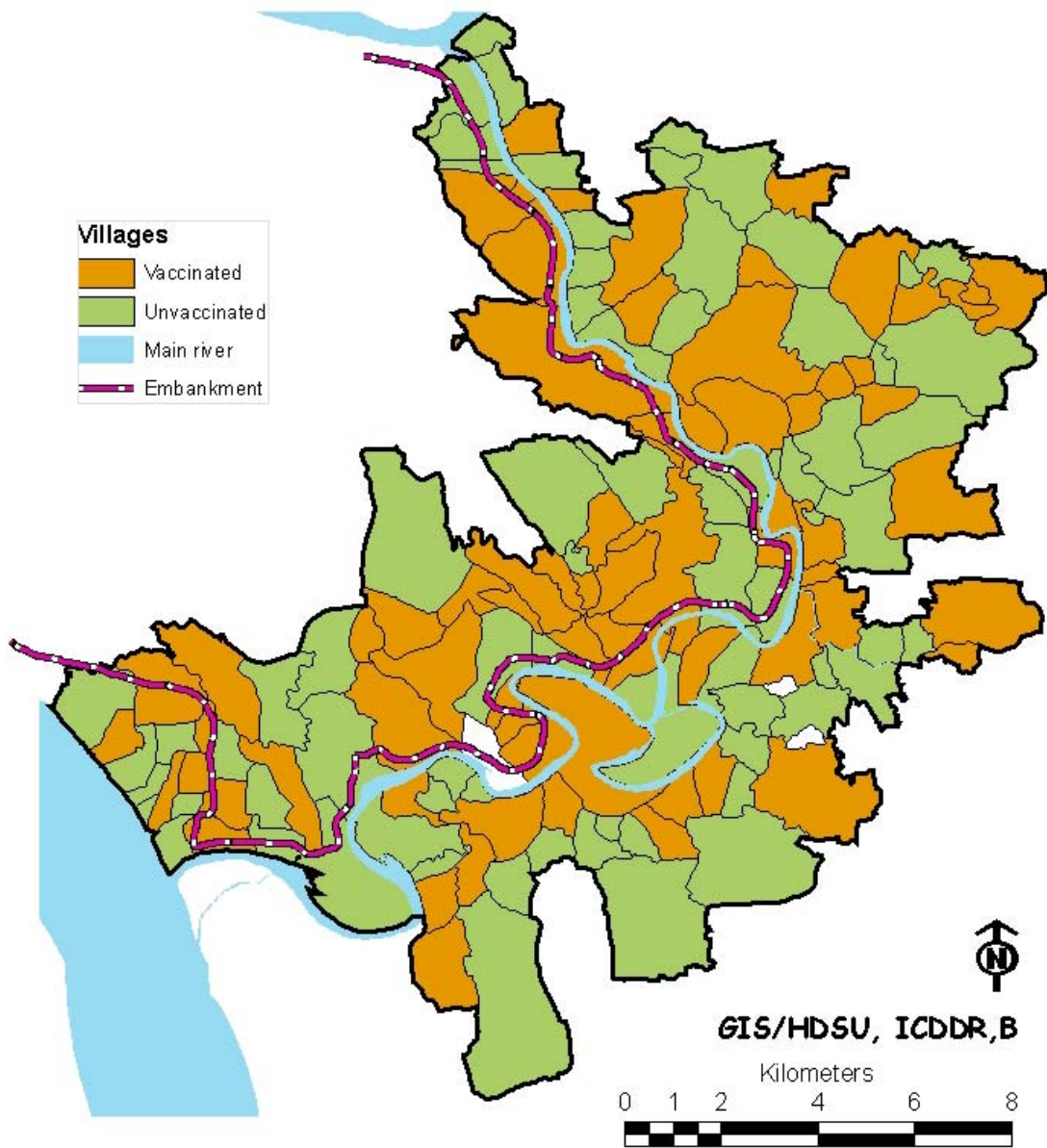


Figure 9.2. Villages with percent of baris flooded in Matlab HDSS area, 2004

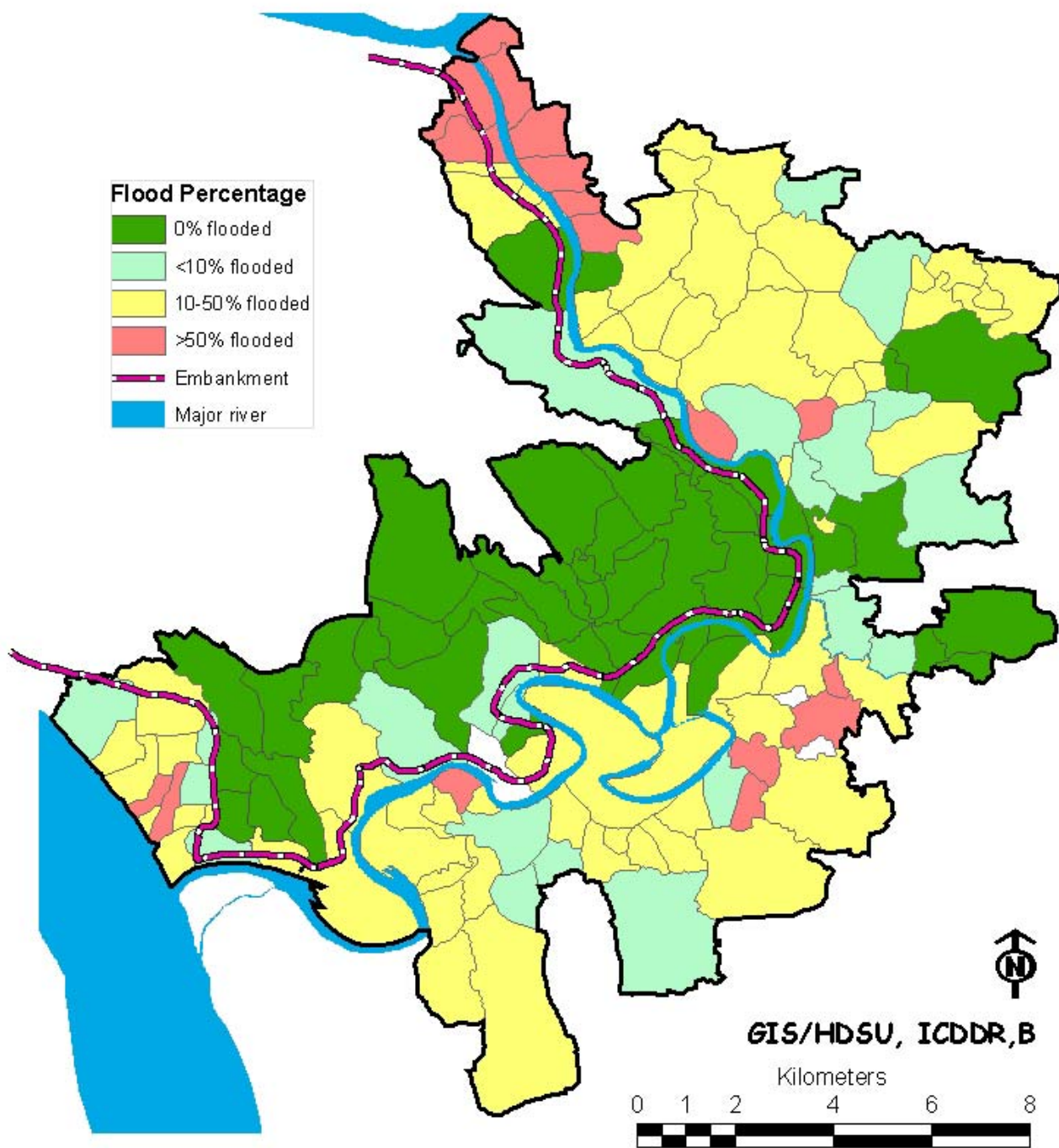


Figure 9.3. Locations of educational institutions by type and bazaars in Matlab HDSS area, 2007 update

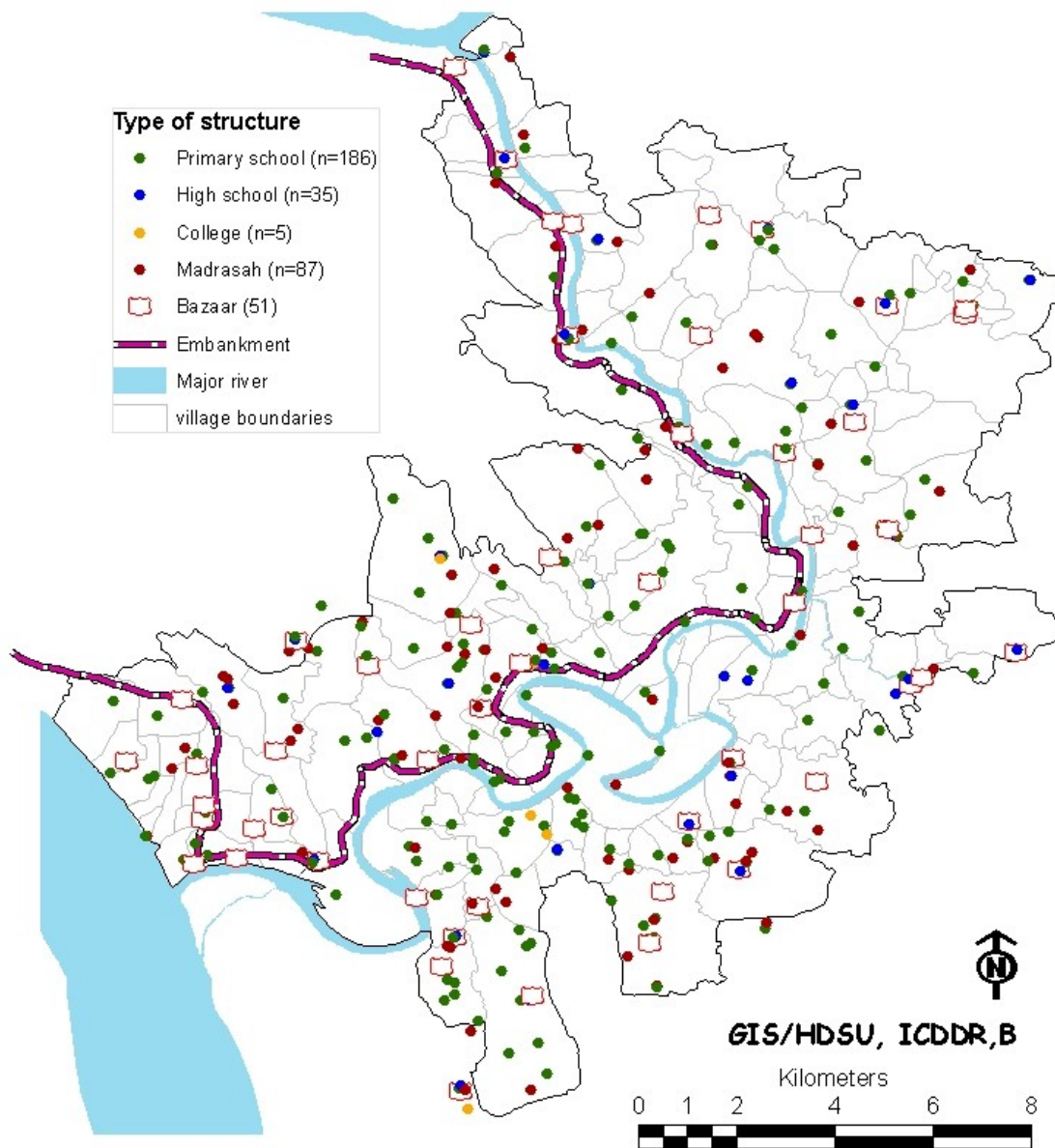
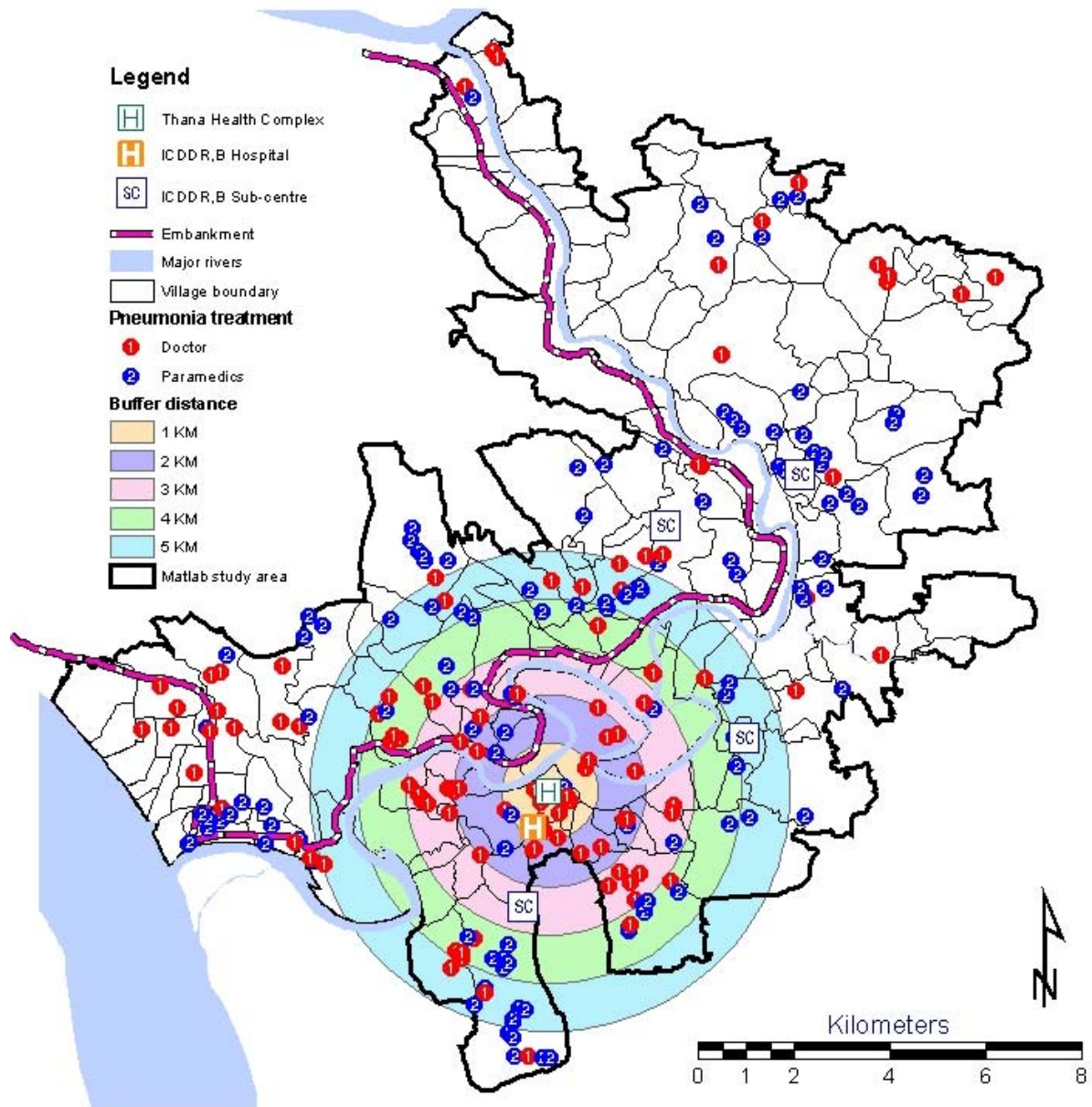


Figure 9.4. Village-level clustering of seeking treatment from doctors for pneumonia in Matlab HDSS area 2008.



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## *APPENDIX A*

Appendix A-1 Mid-year population in ICDDR,B area by age, sex, and block, 2008

Age	Block A			Block B			Block C			Block D		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	35374	16328	19046	31170	14414	16756	24542	11702	12840	22100	10374	11726
Under 1	838	447	391	771	412	359	548	257	291	485	241	244
1 - 4	3282	1714	1568	2944	1510	1434	2167	1065	1102	1993	1004	989
1	768	391	377	728	373	355	566	266	300	472	230	242
2	836	463	373	688	349	339	536	288	248	491	242	249
3	806	407	399	746	389	357	542	263	279	509	263	246
4	872	453	419	782	399	383	523	248	275	521	269	252
5 - 9	4155	2066	2089	3700	1830	1870	2660	1364	1296	2505	1259	1246
10-14	3760	1825	1935	3365	1643	1722	2443	1237	1206	2201	1130	1071
15-19	3096	1369	1727	2842	1349	1493	2255	1099	1156	2006	1007	999
20-24	2805	989	1816	2516	1032	1484	2195	965	1230	1662	647	1015
25-29	2429	966	1463	2121	812	1309	1685	725	960	1418	539	879
30-34	2389	980	1409	1964	805	1159	1654	760	894	1378	603	775
35-39	2276	974	1302	1909	801	1108	1592	688	904	1335	560	775
40-44	2368	1032	1336	1940	814	1126	1526	659	867	1486	645	841
45-49	2165	1087	1078	1856	923	933	1531	793	738	1520	738	782
50-54	1581	793	788	1328	668	660	1172	581	591	1050	553	497
55-59	1169	592	577	1043	493	550	839	418	421	792	387	405
60-64	1069	483	586	910	382	528	746	348	398	689	313	376
65-69	800	384	416	766	328	438	647	306	341	649	277	372
70-74	585	321	264	570	278	292	438	211	227	472	222	250
75-79	333	153	180	361	194	167	257	138	119	278	143	135
80-84	179	101	78	179	90	89	116	56	60	114	58	56
85+	95	52	43	85	50	35	71	32	39	67	48	19

Appendix A-2 Deaths in ICDDR,B area by age, sex, and block, 2008

Age	Block A			Block B			Block C			Block D		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	198	91	107	220	115	105	146	76	70	163	92	71
Under 1	18	10	8	17	11	6	13	10	3	7	3	4
<1 month	12	8	4	13	9	4	12	9	3	5	2	3
1- 5 months	4	1	3	3	1	2	0	0	0	2	1	1
6-11 months	2	1	1	1	1	0	1	1	0	0	0	0
1 - 4	8	6	2	11	5	6	7	4	3	5	1	4
1	3	1	2	5	3	2	4	1	3	2	0	2
2	3	3	0	0	0	0	2	2	0	0	0	0
3	1	1	0	1	0	1	1	1	0	1	0	1
4	1	1	0	5	2	3	0	0	0	2	1	1
5 - 9	3	0	3	1	1	0	1	1	0	3	2	1
10-14	1	1	0	0	0	0	1	0	1	3	3	0
15-19	4	2	2	2	1	1	3	1	2	0	0	0
20-24	4	1	3	3	1	2	0	0	0	2	1	1
25-29	0	0	0	3	1	2	0	0	0	0	0	0
30-34	3	1	2	1	0	1	1	0	1	1	1	0
35-39	4	2	2	6	3	3	3	1	2	3	2	1
40-44	2	1	1	4	2	2	6	5	1	3	2	1
45-49	4	2	2	8	4	4	8	4	4	7	4	3
50-54	7	4	3	6	5	1	12	7	5	7	6	1
55-59	11	7	4	7	3	4	7	3	4	6	5	1
60-64	13	7	6	14	7	7	10	5	5	14	8	6
65-69	17	7	10	41	18	23	12	5	7	23	11	12
70-74	29	13	16	29	15	14	20	7	13	28	17	11
75-79	26	10	16	27	18	9	12	7	5	23	14	9
80-84	16	7	9	22	9	13	10	2	8	19	9	10
85+	28	10	18	18	11	7	20	14	6	9	3	6

Appendix A-3 Abridged life table for ICDDR,B area by sex, 2008

Age (years)	Male				Female			
	nq <sub>x</sub>	l <sub>x</sub>	L <sub>x</sub>	e0 <sub>x</sub>	nq <sub>x</sub>	l <sub>x</sub>	L <sub>x</sub>	e0 <sub>x</sub>
0	24.6	100000	98033	70.8	16.4	100000	98690	72.4
1	4.0	97542	97314	71.5	7.0	98362	97953	72.6
2	3.7	97155	96975	70.8	0.0	97669	97669	72.1
3	1.5	96794	96721	70.1	1.6	97669	97593	71.1
4	2.9	96648	96507	69.2	3.0	97517	97371	70.2
5	3.1	96366	481148	68.4	3.1	97224	485432	69.4
10	3.4	96070	479595	63.6	0.8	96925	484439	64.6
15	4.1	95742	477795	58.8	4.6	96844	483183	59.7
20	4.1	95345	475822	54.0	5.4	96394	480772	54.9
25	1.6	94953	474404	49.3	2.2	95874	478892	50.2
30	3.2	94797	473290	44.3	4.7	95666	477293	45.3
35	13.2	94496	469612	39.5	9.7	95216	473940	40.5
40	15.8	93253	462873	35.0	6.0	94288	470143	35.9
45	19.6	91784	454764	30.5	18.3	93725	464672	31.1
50	41.6	89986	441251	26.0	19.5	92014	455916	26.6
55	46.6	86245	421895	22.0	32.8	90216	444233	22.1
60	85.0	82227	394796	18.0	61.7	87259	423753	17.7
65	147.3	75242	349970	14.4	153.8	81873	379501	13.7
70	224.7	64161	286106	11.4	232.1	69279	307624	10.8
75	327.2	49745	208610	9.0	280.2	53198	229666	8.2
80	362.8	33468	137152	7.1	517.0	38295	140067	5.4
85+	1000.0	21327	102145	4.8	1000.0	18497	67989	3.7

Appendix A-4 Abridged life table for Government service area by sex, 2008

Age (years)	Male				Female			
	nq <sub>x</sub>	l <sub>x</sub>	L <sub>x</sub>	e0 <sub>x</sub>	nq <sub>x</sub>	l <sub>x</sub>	L <sub>x</sub>	e0 <sub>x</sub>
0	43.8	100000	96496	66.6	28.8	100000	97699	72.1
1	6.6	95620	95250	68.6	5.9	97124	96787	73.2
2	3.3	94992	94834	68.1	3.3	96552	96394	72.7
3	1.6	94675	94599	67.3	0.8	96235	96195	71.9
4	1.5	94523	94453	66.4	0.8	96156	96117	71.0
5	5.2	94382	470783	65.5	5.6	96078	479151	70.0
10	2.5	93893	468926	60.8	0.8	95540	477517	65.4
15	4.6	93659	467307	56.0	6.9	95461	475795	60.4
20	9.9	93230	464024	51.2	2.9	94807	473393	55.8
25	9.2	92308	459590	46.7	7.0	94529	471127	51.0
30	9.8	91462	455238	42.1	1.3	93871	469063	46.3
35	9.2	90564	450905	37.5	4.0	93745	467856	41.4
40	16.2	89733	445317	32.8	5.2	93368	465713	36.6
45	25.1	88282	436287	28.3	16.2	92879	460914	31.7
50	36.8	86066	422988	24.0	23.7	91372	451862	27.2
55	63.0	82898	402333	19.8	18.1	89211	442322	22.8
60	122.0	77679	366073	15.9	77.2	87595	422176	18.2
65	217.7	68205	305343	12.8	127.1	80830	379917	14.5
70	279.6	53358	230428	10.6	207.9	70555	317590	11.2
75	265.1	38437	167436	8.7	287.8	55884	240143	8.5
80	564.9	28248	99156	6.0	488.7	39798	148924	5.8
85+	1000.0	12291	69086	5.6	1000.0	20349	83721	4.1



**Appendix A-6 Female deaths by cause and age, 2008**

Causes	All ages	Age at death																		
		<1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
<b>Communicable diseases</b>																				
Diarrhoeal	12	3	0	0	0	1	0	0	0	0	0	0	0	0	0	2	2	3	1	0
Dysentery	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Tuberculosis	3	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
EPI related death	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Meningitis	3	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hepatitis	3	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
Chicken pox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rabies	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Septicaemia	7	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	1	1	0	2
Respiratory infections	19	8	3	1	0	0	0	0	0	0	0	1	0	0	2	2	0	0	0	2
Other communicable	2	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
<b>Maternal and neonatal conditions</b>																				
Maternal death	13	0	0	0	0	1	5	4	1	2	0	0	0	0	0	0	0	0	0	0
Neonatal condition																				
-Premature and LBW	12	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Birth asphyxia	11	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Other neonatal	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Nutritional</b>																				
	17	0	0	0	0	0	0	0	0	0	0	0	1	0	1	4	1	5	5	
<b>Non-communicable diseases</b>																				
Malignant neoplasm																				
-Neoplasm	37	0	2	0	0	2	0	0	1	1	1	4	1	3	6	6	7	2	0	1
-Neoplasm in female organ	14	0	0	0	0	0	0	0	1	1	1	2	2	3	1	1	2	0	0	0
Congenital malformation	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Endocrine disorder																				
-Diabetes	29	0	0	0	0	0	0	0	0	0	1	1	2	0	3	6	6	3	3	4
-Other endocrine	2	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
Neuro-psychiatric	8	0	0	0	0	0	0	0	0	0	1	1	0	0	3	0	2	1	0	0
Diseases of circulatory system																				
-Rheumatic heart disease	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
-Hypertensive disease	88	0	0	0	0	0	0	0	0	1	0	2	4	5	8	19	20	12	9	8
-Ischaemic heart disease	34	0	0	0	0	0	0	0	0	0	0	1	1	1	3	12	7	5	3	1
-Stroke	98	0	1	1	0	1	0	1	1	0	1	1	1	1	12	10	22	22	13	10
-Other cardiovascular	61	0	0	0	0	0	1	0	0	0	2	3	1	0	3	8	14	7	11	11
Respiratory disease																				
-COPD	22	0	0	0	0	0	0	0	0	0	0	1	1	0	1	6	3	4	3	3
-Asthma	25	0	0	1	0	0	0	0	0	0	0	3	1	1	1	8	3	2	3	2
-Other respiratory	5	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1	0	0
Digestive disease	21	1	0	0	0	1	1	0	0	1	1	1	1	1	6	2	2	1	1	1
Gentio-urinary disease																				
-Renal failure	13	1	0	0	0	0	1	1	0	1	0	1	1	1	2	0	1	2	1	0
-Nephritic syndrome	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Other urinary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other non-communicable	5	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	3	0
<b>Injuries</b>																				
Unintentional injuries																				
-Accident	30	1	2	3	2	1	0	0	0	0	0	0	0	1	0	1	4	2	3	5
-Drowning	21	0	16	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0
Intentional injuries																				
-Suicide	9	0	0	0	0	3	0	1	1	2	1	1	0	0	0	0	0	0	0	0
-Homicide	4	0	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0
<b>Miscellaneous</b>																				
-Senility	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	11
-Fever of unknown origin	7	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	1
-Edema of unspecified origin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Sudden infant death	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unknown/missing	38	10	0	0	0	0	0	0	0	0	0	0	1	0	1	4	3	8	7	4
<b>Total</b>	<b>699</b>	<b>55</b>	<b>28</b>	<b>11</b>	<b>2</b>	<b>13</b>	<b>9</b>	<b>8</b>	<b>5</b>	<b>11</b>	<b>9</b>	<b>24</b>	<b>22</b>	<b>20</b>	<b>54</b>	<b>95</b>	<b>105</b>	<b>81</b>	<b>75</b>	<b>72</b>
COPD=Chronic obstructive pulmonary disease																				

Appendix A-7 Male deaths by cause, age, and area, 2008

Causes	All ages		<1		1-4		5-14		15-44		45-64		65-84		85+	
	ICDDR,B	Government	ICDDR,B	Government	ICDDR,B	Government	ICDDR,B	Government	ICDDR,B	Government	ICDDR,B	Government	ICDDR,B	Government	ICDDR,B	Government
	<b>Communicable diseases</b>															
Diarrhoeal	5	5	0	0	0	0	0	0	0	0	0	0	5	4	0	1
Dysentery	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Tuberculosis	4	14	0	0	0	0	0	0	0	1	2	5	2	7	0	1
EPI related death	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Meningitis	0	3	0	1	0	1	0	0	0	1	0	0	0	0	0	0
Hepatitis	3	9	0	0	0	1	0	0	2	1	1	5	0	2	0	0
Chicken pox	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Rabies	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Septicaemia	5	2	2	0	1	0	0	0	0	0	2	0	0	2	0	0
Respiratory infections	4	12	0	6	1	0	1	0	0	0	0	1	2	3	0	2
Other communicable	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
<b>Maternal and neonatal conditions</b>																
Maternal death	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neonatal condition																
-premature and LBW	12	16	12	16	0	0	0	0	0	0	0	0	0	0	0	0
-birth asphyxia	10	11	10	11	0	0	0	0	0	0	0	0	0	0	0	0
-other neonatal	3	13	3	13	0	0	0	0	0	0	0	0	0	0	0	0
<b>Nutritional</b>	6	4	0	0	1	0	0	1	1	0	0	1	2	2	2	0
<b>Non-communicable diseases</b>																
Malignant neoplasm																
-neoplasm	38	58	0	0	1	1	2	0	1	7	21	23	13	26	0	1
-neoplasm in female organ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Congenital malformation	2	4	2	1	0	3	0	0	0	0	0	0	0	0	0	0
Endocrine disorder																
-diabetes	15	10	0	0	0	0	0	0	2	2	3	1	9	6	1	1
-other endocrine	5	0	1	0	1	0	1	0	0	0	0	0	1	0	1	0
Neuro-psychiatric	6	2	0	0	1	0	0	0	2	0	1	1	2	1	0	0
Diseases of circulatory system																
-rheumatic heart disease	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
-hypertensive disease	38	21	0	0	0	0	0	0	1	1	7	6	26	11	4	3
-ischaemic heart disease	35	33	0	0	0	0	0	0	2	2	12	9	18	21	3	1
-stroke	51	60	0	0	0	0	0	1	1	3	10	7	31	45	9	4
-other cardiovascular	24	34	0	0	0	0	0	0	3	2	7	8	9	20	5	4
Respiratory disease																
-COPD	15	10	0	0	0	0	0	0	1	0	0	3	12	6	2	1
-Asthma	9	12	0	0	0	0	0	0	0	0	2	4	7	7	0	1
-Other respiratory	2	4	0	0	0	0	0	0	0	0	0	2	2	2	0	0
Digestive disease	22	18	1	0	0	0	0	2	6	2	5	6	9	5	1	3
Gentio-urinary disease																
-Renal failure	8	8	0	0	1	0	0	1	1	2	2	2	2	3	2	0
-Nephritic syndrome	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Other urinary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other non-communicable	4	0	0	0	0	0	0	0	0	0	2	0	1	0	1	0
<b>Injuries</b>																
Unintentional injuries																
-accident	13	15	1	0	1	0	0	1	2	6	2	3	5	5	2	0
-drowning	8	14	0	0	6	7	1	4	1	1	0	1	0	1	0	0
Intentional injuries																
-suicide	1	2	0	0	0	0	1	0	0	2	0	0	0	0	0	0
-homicide	4	4	1	1	0	0	1	0	1	2	1	1	0	0	0	0
<b>Miscellaneous</b>																
-senility	5	4	0	0	0	0	0	0	0	0	0	0	0	1	5	3
-fever of unknown origin	2	10	0	0	0	0	0	0	0	0	0	1	2	7	0	2
-sudden infant death	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Unknown/missing</b>	12	27	1	4	2	2	0	0	1	1	1	6	7	13	0	1
<b>Total</b>	<b>374</b>	<b>441</b>	<b>34</b>	<b>54</b>	<b>16</b>	<b>16</b>	<b>8</b>	<b>10</b>	<b>28</b>	<b>36</b>	<b>81</b>	<b>96</b>	<b>169</b>	<b>200</b>	<b>38</b>	<b>29</b>

Appendix A-8 Female deaths by cause, age, and area, 2008

Causes	All ages		<1		1-4		5-14		15-44		45-64		65-84		85+	
	ICDDR,B	Government	ICDDR,B	Government	ICDDR,B	Government	ICDDR,B	Government	ICDDR,B	Government	ICDDR,B	Government	ICDDR,B	Government	ICDDR,B	Government
	<b>Communicable diseases</b>															
Diarrhoeal	6	6	1	2	0	0	0	0	0	1	0	1	5	3	0	0
Dysentery	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Tuberculosis	0	3	0	0	0	0	0	1	0	0	0	0	0	1	0	0
Meningitis	1	2	0	0	1	1	0	1	0	0	0	0	0	0	0	0
Hepatitis	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Chicken pox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rabies	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Septicaemia	3	4	0	0	0	0	0	1	1	1	1	1	1	1	1	1
Respiratory infections	6	13	4	4	1	2	0	1	0	0	0	0	4	1	1	1
Other communicable	0	2	0	0	0	1	0	0	0	1	0	1	0	0	0	0
<b>Maternal and neonatal conditions</b>																
Maternal death	8	5	0	0	0	0	0	0	8	5	0	0	0	0	0	0
Neonatal condition																
-premature and LBW	3	9	3	9	0	0	0	0	0	0	0	0	0	0	0	0
-birth asphyxia	6	5	6	5	0	0	0	0	0	0	0	0	0	0	0	0
-other neonatal	2	3	2	3	0	0	0	0	0	0	0	0	0	0	0	0
<b>Nutritional</b>	7	10	0	0	0	0	0	0	0	0	1	0	3	8	3	2
<b>Non-communicable diseases</b>																
Malignant neoplasm																
-neoplasm	22	15	0	0	2	0	0	0	2	3	7	7	10	5	1	0
-neoplasm in female organ	6	8	0	0	0	0	0	0	3	0	3	5	0	3	0	0
Congenital malformation	2	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
Endocrine disorder																
-diabetes	15	14	0	0	0	0	0	0	1	0	5	1	8	10	1	3
-other endocrine	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Neuro-psychiatric	6	2	0	0	0	0	0	0	1	0	3	1	2	1	0	0
Diseases of circulatory system																
-rheumatic heart disease	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
-hypertensive disease	63	25	0	0	0	0	0	0	1	0	15	4	41	19	6	2
-ischaemic heart disease	18	16	0	0	0	0	0	0	0	0	4	2	13	14	1	0
-stroke	39	59	0	0	0	1	0	1	2	2	2	13	32	35	3	7
-other cardiovascular	32	29	0	0	0	0	0	0	2	1	2	5	21	19	7	4
Respiratory disease																
-COPD	12	10	0	0	0	0	0	0	0	0	2	1	9	7	1	2
-asthma	13	12	0	0	0	0	1	0	0	0	1	5	10	6	1	1
-other respiratory	4	1	0	0	0	0	0	0	1	0	0	0	3	1	0	0
Digestive disease	10	11	0	1	0	0	0	0	2	2	4	5	4	2	0	1
Gentio-urinary disease																
-renal failure	6	7	1	0	0	0	0	0	1	2	3	2	1	3	0	0
-Nephritic syndrome	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-other urinary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other non-communicable	1	4	0	0	0	0	0	0	0	0	0	1	1	3	0	0
<b>Injuries</b>																
Unintentional injuries																
-accident	19	11	0	1	1	1	3	2	1	0	0	2	10	4	4	1
-drowning	11	10	0	0	9	7	0	1	0	0	0	0	2	2	0	0
Intentional injuries																
-suicide	5	4	0	0	0	0	0	0	4	4	1	0	0	0	0	0
-homicide	1	3	0	0	0	0	0	0	0	3	1	0	0	0	0	0
<b>Miscellaneous</b>																
-senility	8	7	0	0	0	0	0	0	0	0	0	0	3	1	5	6
-fever of unknown origin	2	5	0	0	0	0	1	0	0	0	1	1	0	3	0	1
-sudden infant death	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
<b>Unknown/missing</b>	11	27	3	7	0	0	0	0	0	0	1	1	6	16	1	3
<b>Total</b>	<b>353</b>	<b>346</b>	<b>21</b>	<b>34</b>	<b>15</b>	<b>13</b>	<b>5</b>	<b>8</b>	<b>30</b>	<b>25</b>	<b>60</b>	<b>60</b>	<b>185</b>	<b>171</b>	<b>37</b>	<b>35</b>



Appendix A-9 Age-specific fertility rate and indices for ICDDR,B area by block, 2008

Age (years)	Block A		Block B		Block C		Block D	
	Births	Rate	Births	Rate	Births	Rate	Births	Rate
All ages	822	81.1	791	91.8	617	91.4	435	71.7
15-19*	123	71.2	104	69.7	97	83.9	70	70.1
20-24	275	151.4	274	184.6	203	165.0	133	131.0
25-29	218	149.0	234	178.8	155	161.5	123	139.9
30-34	130	92.3	121	104.4	101	113.0	76	98.1
35-39	59	45.3	48	43.3	50	55.3	22	28.4
40-44	15	11.2	9	8.0	9	10.4	11	13.1
45-49**	2	1.9	1	1.1	2	2.7	0	0.0
Total fertility rate		2612		2949		2959		2403
General fertility rate		81		92		91		72
Gross reproduction rate		1191		1413		1511		1177
*Births to mothers under aged <15 were included in this group								
**Births to mothers aged 50 and above were included in this group								

Appendix A-10 Births by mothers' age, live birth order and area, 2008

Age (years)	Total women	Total birth	Live birth order									
			1	2	3	4	5	6	7	8	9	10+
<b>Both areas</b>												
<15	11943	3	3	0	0	0	0	0	0	0	0	0
15-19	11195	688	637	49	1	0	0	0	1	0	0	0
20-24	10662	1674	893	681	92	6	1	0	0	0	0	1
25-29	8904	1398	237	578	436	121	19	5	1	1	0	0
30-34	7963	843	50	158	340	191	68	31	5	0	0	0
35-39	7817	370	8	27	94	105	75	37	15	7	1	1
40-44	7977	95	2	3	12	28	19	15	10	4	1	1
45-49	6895	9	1	1	1	2	0	4	0	0	0	0
<b>Total</b>		<b>5080</b>	<b>1831</b>	<b>1497</b>	<b>976</b>	<b>453</b>	<b>182</b>	<b>92</b>	<b>32</b>	<b>12</b>	<b>2</b>	<b>3</b>
<b>ICDDR,B service area</b>												
<15	5934	3	3	0	0	0	0	0	0	0	0	0
15-19	5375	391	365	24	1	0	0	0	1	0	0	0
20-24	5545	885	469	377	37	2	0	0	0	0	0	0
25-29	4611	730	131	313	225	50	7	3	1	0	0	0
30-34	4237	428	27	94	186	88	24	8	1	0	0	0
35-39	4089	179	3	11	54	56	31	14	6	3	1	0
40-44	4170	44	1	1	7	17	8	4	4	1	1	0
45-49	3531	5	1	0	1	1	0	2	0	0	0	0
<b>Total</b>		<b>2665</b>	<b>1000</b>	<b>820</b>	<b>511</b>	<b>214</b>	<b>70</b>	<b>31</b>	<b>13</b>	<b>4</b>	<b>2</b>	<b>0</b>
<b>Government service area</b>												
<15	6009	0	0	0	0	0	0	0	0	0	0	0
15-19	5820	297	272	25	0	0	0	0	0	0	0	0
20-24	5117	789	424	304	55	4	1	0	0	0	0	1
25-29	4293	668	106	265	211	71	12	2	0	1	0	0
30-34	3726	415	23	64	154	103	44	23	4	0	0	0
35-39	3728	191	5	16	40	49	44	23	9	4	0	1
40-44	3807	51	1	2	5	11	11	11	6	3	0	1
45-49	3364	4	0	1	0	1	0	2	0	0	0	0
<b>Total</b>		<b>2415</b>	<b>831</b>	<b>677</b>	<b>465</b>	<b>239</b>	<b>112</b>	<b>61</b>	<b>19</b>	<b>8</b>	<b>0</b>	<b>3</b>

Appendix A-11 Age-order-specific fertility rates by area, 2008

Age (years)	Total	Live birth order										
		1	2	3	4	5	6	7	8	9	10+	
<b>Both areas</b>												
<15	0.0003	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
15-19	0.0615	0.0569	0.0044	0.0001	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000
20-24	0.1570	0.0838	0.0639	0.0086	0.0006	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
25-29	0.1570	0.0266	0.0649	0.0490	0.0136	0.0021	0.0006	0.0001	0.0001	0.0000	0.0000	0.0000
30-34	0.1059	0.0063	0.0198	0.0427	0.0240	0.0085	0.0039	0.0006	0.0000	0.0000	0.0000	0.0000
35-39	0.0473	0.0010	0.0035	0.0120	0.0134	0.0096	0.0047	0.0019	0.0009	0.0001	0.0001	0.0001
40-44	0.0119	0.0003	0.0004	0.0015	0.0035	0.0024	0.0019	0.0013	0.0005	0.0001	0.0001	0.0001
45-49	0.0013	0.0001	0.0001	0.0001	0.0003	0.0000	0.0006	0.0000	0.0000	0.0000	0.0000	0.0000
<b>Total</b>	<b>2.7107</b>	<b>0.8761</b>	<b>0.7849</b>	<b>0.5703</b>	<b>0.2769</b>	<b>0.1137</b>	<b>0.0582</b>	<b>0.0200</b>	<b>0.0075</b>	<b>0.0013</b>	<b>0.0017</b>	
<b>ICDDR,B service area</b>												
<15	0.0005	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
15-19	0.0727	0.0679	0.0045	0.0002	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000
20-24	0.1596	0.0846	0.0680	0.0067	0.0004	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000
25-29	0.1583	0.0284	0.0679	0.0488	0.0108	0.0015	0.0007	0.0002	0.0000	0.0000	0.0000	0.0000
30-34	0.1010	0.0064	0.0222	0.0439	0.0208	0.0057	0.0019	0.0002	0.0000	0.0000	0.0000	0.0000
35-39	0.0438	0.0007	0.0027	0.0132	0.0137	0.0076	0.0034	0.0015	0.0007	0.0002	0.0000	0.0000
40-44	0.0106	0.0002	0.0002	0.0017	0.0041	0.0019	0.0010	0.0010	0.0002	0.0002	0.0000	0.0000
45-49	0.0014	0.0003	0.0000	0.0003	0.0003	0.0000	0.0006	0.0000	0.0000	0.0000	0.0000	0.0000
<b>Total</b>	<b>2.7396</b>	<b>0.9452</b>	<b>0.8273</b>	<b>0.5736</b>	<b>0.2501</b>	<b>0.0834</b>	<b>0.0374</b>	<b>0.0162</b>	<b>0.0049</b>	<b>0.0024</b>	<b>0.0000</b>	
<b>Government service area</b>												
<15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
15-19	0.0510	0.0467	0.0043	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20-24	0.1542	0.0829	0.0594	0.0107	0.0008	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002
25-29	0.1556	0.0247	0.0617	0.0491	0.0165	0.0028	0.0005	0.0000	0.0002	0.0000	0.0000	0.0000
30-34	0.1114	0.0062	0.0172	0.0413	0.0276	0.0118	0.0062	0.0011	0.0000	0.0000	0.0000	0.0000
35-39	0.0512	0.0013	0.0043	0.0107	0.0131	0.0118	0.0062	0.0024	0.0011	0.0000	0.0003	0.0003
40-44	0.0134	0.0003	0.0005	0.0013	0.0029	0.0029	0.0029	0.0016	0.0008	0.0000	0.0003	0.0003
45-49	0.0012	0.0000	0.0003	0.0000	0.0003	0.0000	0.0006	0.0000	0.0000	0.0000	0.0000	0.0000
<b>Total</b>	<b>2.6901</b>	<b>0.8103</b>	<b>0.7386</b>	<b>0.5664</b>	<b>0.3065</b>	<b>0.1475</b>	<b>0.0815</b>	<b>0.0253</b>	<b>0.0105</b>	<b>0.0000</b>	<b>0.0036</b>	

Appendix A-12. Marriages and divorces by month, 2008

Month	Marriage		Divorce	
	Number	Percent	Number	Percent
January	286	9.6	24	8.9
February	284	9.5	23	8.5
March	302	10.1	16	5.9
April	221	7.4	31	11.5
May	271	9.1	15	5.6
June	236	7.9	21	7.8
July	234	7.8	24	8.9
August	281	9.4	19	7.0
September	90	3.0	20	7.4
October	291	9.7	33	12.2
November	195	6.5	17	6.3
December	294	9.8	27	10.0
<b>Total</b>	<b>2985</b>	<b>100.0</b>	<b>270</b>	<b>100.0</b>

Appendix A-13. In- and out-migrations by age and sex, 2008

Age (years)	In-migration			Out-migration		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	9787	4649	5138	14596	7850	6746
0-4	1647	828	819	1648	877	771
5 - 9	873	433	440	1147	568	579
10-14	602	286	316	1152	635	517
15-19	1323	332	991	2571	1189	1382
20-24	1630	508	1122	2887	1420	1467
25-29	1236	621	615	1759	979	780
30-34	847	537	310	1166	763	403
35-39	578	426	152	797	573	224
40-44	349	247	102	540	356	184
45-49	257	189	68	321	227	94
50-54	137	86	51	175	93	82
55-59	98	73	25	105	58	47
60-64	63	30	33	96	44	52
65+	147	53	94	232	68	164

Appendix A-14. In-migrations by age, sex, and area, 2008

Age (years)	ICDDR,B service area			Government service area		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	5157	2333	2824	4630	2316	2314
0-4	877	426	451	770	402	368
5 - 9	453	213	240	420	220	200
10-14	314	153	161	288	133	155
15-19	777	158	619	546	174	372
20-24	800	226	574	830	282	548
25-29	633	312	321	603	309	294
30-34	450	283	167	397	254	143
35-39	301	218	83	277	208	69
40-44	184	117	67	165	130	35
45-49	145	102	43	112	87	25
50-54	68	44	24	69	42	27
55-59	46	34	12	52	39	13
60-64	35	14	21	28	16	12
65+	74	33	41	73	20	53

Appendix A-15. Out-migrations by age, sex, and area, 2008

Age (years)	ICDDR,B service area			Government service area		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	7276	3851	3425	7320	3999	3321
0-4	847	475	372	801	402	399
5 - 9	563	285	278	584	283	301
10-14	586	311	275	566	324	242
15-19	1214	504	710	1357	685	672
20-24	1402	648	754	1485	772	713
25-29	906	506	400	853	473	380
30-34	604	395	209	562	368	194
35-39	414	297	117	383	276	107
40-44	273	180	93	267	176	91
45-49	161	119	42	160	108	52
50-54	86	45	41	89	48	41
55-59	53	26	27	52	32	20
60-64	44	23	21	52	21	31
65+	123	37	86	109	31	78

Appendix A.16. Male out-migration by cause of movement and age, 2008

Cause of movement	Total	Age (years)													
		<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
All migrants	7850	877	568	635	1189	1420	979	763	573	356	227	93	58	44	68
<b>Work/economic/educational</b>															
Acquired/seeking job	4651	1	4	156	769	1182	833	647	493	286	163	61	27	17	12
Job completion/retirement	14	0	0	0	1	3	0	4	1	2	0	1	0	1	1
To acquire education	580	5	74	144	227	100	26	2	1	0	1	0	0	0	0
Educ. completed/interrupted	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Student lodging	4	0	0	0	3	0	0	1	0	0	0	0	0	0	0
<b>Housing/environmental</b>															
Acquired/seeking new land/house	164	0	0	0	1	10	22	29	21	23	15	12	10	9	12
River erosion	9	0	0	0	0	1	1	3	0	0	1	0	1	0	2
<b>Move as dependent</b>															
Join with/ follow spouse	27	0	0	0	0	2	4	5	4	3	4	2	2	0	1
Join with/follow parents	1817	824	445	282	145	62	30	17	7	5	0	0	0	0	0
Join with child/sibling	176	31	25	24	20	18	3	7	3	1	3	3	6	8	24
Join with other relatives	115	11	18	14	5	8	8	5	8	11	15	8	1	1	2
<b>Marriage / familial</b>															
Marriage	3	0	0	0	0	1	2	0	0	0	0	0	0	0	0
Separation/divorce/widow	11	0	0	0	1	5	1	1	1	0	1	0	1	0	0
Adoption	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0
Family friction/breakdown	92	0	0	0	7	18	30	14	8	6	3	0	1	5	0
Health or old age care	23	0	1	2	0	0	1	2	2	0	4	1	2	0	8
<b>Legal problems</b>	81	0	0	0	2	3	9	13	16	13	13	4	3	3	2
<b>Other and not stated</b>															
Others n.e.c.*	67	3	0	9	4	6	6	13	8	5	4	1	4	0	4
Unknown or not stated	12	0	0	3	4	1	3	0	0	1	0	0	0	0	0

\*n.e.c.=Not elsewhere classified

Appendix A.17. Female out-migration by cause of movement and age, 2008

Cause of movement	Age (years)														
	Total	<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
<b>All migrants</b>	<b>6746</b>	<b>771</b>	<b>579</b>	<b>517</b>	<b>1382</b>	<b>1467</b>	<b>780</b>	<b>403</b>	<b>224</b>	<b>184</b>	<b>94</b>	<b>82</b>	<b>47</b>	<b>52</b>	<b>164</b>
<b>Work/economic/educational</b>															
Acquired/seeking job	702	3	8	81	288	146	71	45	27	18	7	4	2	0	2
Job completion/retirement	10	0	0	4	0	0	3	1	0	1	0	0	1	0	0
To acquire education	280	3	60	80	82	43	9	2	1	0	0	0	0	0	0
Educ. completed/interrupted	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Student lodging	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Housing/environmental</b>															
Acquired/seeking new land/house	56	0	0	0	2	7	11	9	5	7	4	1	1	3	6
River erosion	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
<b>Move as dependent</b>															
Join with/ follow spouse	1697	0	0	9	208	509	378	212	136	116	47	39	20	10	13
Join with/follow parents	1908	715	453	263	191	159	87	20	8	6	3	0	0	0	3
Join with child/sibling	427	20	37	31	50	53	26	9	3	8	18	26	18	26	102
Join with other relatives	219	20	17	8	19	30	42	41	18	11	4	3	1	2	3
<b>Marriage / familial</b>															
Marriage	1007	0	0	31	455	383	95	29	6	6	1	1	0	0	0
Separation/divorce/widow	109	0	0	2	37	38	10	7	7	4	1	0	1	1	1
Adoption	10	9	1	0	0	0	0	0	0	0	0	0	0	0	0
Family friction/breakdown	138	0	1	0	24	53	27	16	7	3	2	3	0	0	2
Health or old age care	70	0	0	0	6	10	6	3	2	0	3	1	2	7	30
<b>Legal problems</b>	14	0	0	0	0	2	0	4	0	1	2	2	1	2	0
<b>Other and not stated</b>															
Others n.e.c.*	97	1	2	7	20	34	15	5	4	3	2	2	0	1	1
Unknown or not stated	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

\*n.e.c.=Not elsewhere classified

Appendix A.18. Male in-migration by cause of movement and age, 2008

Cause of movement	Age (years)														
	Total	<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
<b>All migrants</b>	<b>4649</b>	<b>828</b>	<b>433</b>	<b>286</b>	<b>332</b>	<b>508</b>	<b>621</b>	<b>537</b>	<b>426</b>	<b>247</b>	<b>189</b>	<b>86</b>	<b>73</b>	<b>30</b>	<b>53</b>
<b>Work/economic/educational</b>															
Acquired/seeking job	697	0	0	12	40	101	160	146	112	49	46	12	11	5	3
Job completion/retirement	835	0	0	4	42	114	167	152	136	86	65	26	23	14	6
To acquire education	172	8	43	70	35	11	4	0	0	0	0	0	1	0	0
Educ. completed/interrupted	4	0	0	0	1	2	1	0	0	0	0	0	0	0	0
Student lodging	14	0	0	0	3	8	0	1	1	0	0	0	0	1	0
<b>Housing/environmental</b>															
Acquired/seeking new land/house	391	0	0	0	21	61	87	76	46	27	24	17	13	5	14
River erosion	5	0	0	0	0	1	0	1	2	0	0	0	0	0	1
<b>Move as dependent</b>															
Join with/ follow spouse	221	0	0	0	0	21	48	38	30	32	18	12	13	2	7
Join with/follow parents	1403	721	336	155	94	45	29	12	5	4	1	1	0	0	0
Join with child/sibling	124	46	28	22	9	4	3	4	1	0	0	0	0	0	7
Join with other relatives	272	47	24	7	11	33	51	41	29	15	8	1	3	1	1
<b>Marriage / familial</b>															
Marriage	2	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Separation/divorce/widow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Adoption	6	5	1	0	0	0	0	0	0	0	0	0	0	0	0
Family friction/breakdown	61	0	0	0	3	17	14	14	7	3	2	0	0	1	0
Health or old age care	167	0	0	1	16	31	23	18	28	12	15	11	5	0	7
<b>Legal problems</b>	70	0	0	1	1	11	13	13	15	8	4	2	2	0	0
<b>Other and not stated</b>															
Others n.e.c.*	205	1	1	14	56	48	21	20	14	10	6	4	2	1	7
Unknown or not stated	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

\*n.e.c.=Not elsewhere classified

Appendix A.19. Female in-migration by cause of movement and age, 2008

Cause of movement	Age (years)														
	Total	<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
All migrants	5138	819	440	316	991	1122	615	310	152	102	68	51	25	33	94
<b>Work/economic/educational</b>															
Acquired/seeking job	193	0	0	27	20	43	33	33	14	9	4	5	0	4	1
Job completion/retirement	92	0	0	3	24	25	18	8	5	3	2	3	0	1	0
To acquire education	155	5	56	55	30	7	2	0	0	0	0	0	0	0	0
Educ. completed/interrupted	2	0	1	0	0	1	0	0	0	0	0	0	0	0	0
Student lodging	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
<b>Housing/environmental</b>															
Acquired/seeking new land/house	149	0	0	0	6	21	23	14	13	13	8	13	8	8	22
River erosion	6	0	0	0	0	1	1	2	0	1	0	0	1	0	0
<b>Move as dependent</b>															
Join with/ follow spouse	1195	0	0	7	224	401	244	130	69	48	31	23	9	4	5
Join with/follow parents	1886	691	321	176	243	254	133	45	15	5	0	1	0	0	2
Join with child/sibling	199	38	41	8	21	20	9	2	2	2	1	1	2	10	42
Join with other relatives	266	60	19	11	35	52	39	20	13	5	8	0	2	0	2
<b>Marriage / familial</b>															
Marriage	481	0	0	5	298	134	28	7	6	1	0	1	0	1	0
Separation/divorce/widow	127	0	0	0	34	42	19	14	4	5	6	2	0	1	0
Adoption	21	21	0	0	0	0	0	0	0	0	0	0	0	0	0
Family friction/breakdown	98	0	0	0	12	37	23	15	5	3	1	1	1	0	0
Health or old age care	71	0	0	2	12	19	9	6	4	3	3	1	1	2	9
<b>Legal problems</b>	2	0	0	1	0	1	0	0	0	0	0	0	0	0	0
<b>Other and not stated</b>															
Others n.e.c.*	194	4	2	21	32	63	34	14	2	4	4	0	1	2	11
Unknown or not stated	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

\*n.e.c.=Not elsewhere classified



Appendix A.20. Male migration by destination or origin, 2008

Destination/Origin	Rural/urban	Out-migration						In-migration					
		Age (years)						Age (years)					
		0-14	15-24	25-34	35-44	45+	Total	0-14	15-24	25-34	35-44	45+	Total
Dhaka	Rural	168	143	72	42	33	458	108	50	63	23	21	265
	Urban	899	1119	443	256	196	2913	554	436	487	222	175	1874
Chittagong	Rural	767	229	198	122	112	1428	664	157	206	96	55	1178
	Urban	162	122	86	37	22	429	125	79	87	51	32	374
Sylhet	Rural	6	1	6	1	0	14	7	3	3	3	5	21
	Urban	29	34	16	10	6	95	41	23	21	16	14	115
Khulna	Rural	3	3	1	1	1	9	8	3	3	2	2	18
	Urban	9	6	3	0	1	19	3	4	6	2	5	20
Rajshahi	Rural	0	4	1	0	0	5	4	1	4	2	1	12
	Urban	4	3	4	1	2	14	4	4	6	2	3	19
Barisal	Rural	8	1	3	0	1	13	12	7	5	4	2	30
	Urban	7	7	0	2	1	17	9	6	1	1	2	19
India		7	7	9	4	5	32	2	3	4	5	1	15
Asia		0	323	305	158	37	823	1	29	76	79	29	214
Middle-east		4	595	582	293	66	1540	5	34	186	165	84	474
Others		2	6	10	2	1	21	0	0	0	0	0	0
Unknown		5	6	3	0	6	20	0	1	0	0	0	1
<b>Total</b>		<b>2080</b>	<b>2609</b>	<b>1742</b>	<b>929</b>	<b>490</b>	<b>7850</b>	<b>1547</b>	<b>840</b>	<b>1158</b>	<b>673</b>	<b>431</b>	<b>4649</b>

Appendix A.21. Female migration by destination or origin, 2008

Destination	Rural/urban	Out-migration						In-migration					
		Age (years)						Age (years)					
		0-14	15-24	25-34	35-44	45+	Total	0-14	15-24	25-34	35-44	45+	Total
Dhaka	Rural	151	238	90	33	45	557	95	118	58	16	21	308
	Urban	754	1083	471	199	233	2740	571	572	342	107	128	1720
Chittagong	Rural	717	1220	481	127	107	2652	652	1179	392	77	72	2372
	Urban	152	214	83	30	27	506	146	156	77	25	18	422
Sylhet	Rural	3	8	3	1	1	16	5	11	2	1	5	24
	Urban	27	24	14	1	13	79	40	20	17	9	9	95
Khulna	Rural	5	4	1	1	1	12	8	6	4	1	3	22
	Urban	12	10	7	2	2	33	4	5	2	3	4	18
Rajshahi	Rural	2	4	3	0	0	9	9	4	4	1	1	19
	Urban	7	8	5	1	3	24	5	6	4	0	3	18
Barisal	Rural	6	9	1	3	0	19	15	9	6	3	1	34
	Urban	10	5	6	1	1	23	9	11	1	2	0	23
India		9	6	4	1	3	23	3	1	2	0	3	9
Asia		0	2	0	0	0	2	5	1	1	1	0	8
Middle-east		8	8	10	6	1	33	8	14	13	8	3	46
Others		3	3	4	1	1	12	0	0	0	0	0	0
Unknown		0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>		<b>1866</b>	<b>2846</b>	<b>1183</b>	<b>407</b>	<b>438</b>	<b>6740</b>	<b>1575</b>	<b>2113</b>	<b>925</b>	<b>254</b>	<b>271</b>	<b>5138</b>

## APPENDIX B

### POPULATION, BIRTHS, AND DEATHS BY VILLAGE, 2008

Village code	Village name	Population (mid-year)	Live births	Deaths	Birth rate	Death rate
<b>ICDDR,B SERVICE AREA</b>						
D00	Charmukundi	2381	49	18	20.6	7.6
W00	Kaladi	6822	143	23	21.0	3.4
V10	Dhakirgaon	1834	43	11	23.4	6.0
V11	Nabakalash	2806	76	6	27.1	2.1
V31	Dighaldi	9410	210	59	22.3	6.3
V32	Mobarakdi	3287	91	20	27.7	6.1
V60	Suvankardi	947	25	5	26.4	5.3
V61	Munsabdi	689	10	6	14.5	8.7
V62	Shilmondi	989	22	13	22.2	13.1
V72	Upadi	6209	153	37	24.6	6.0
<b>Block A Total</b>		<b>35374</b>	<b>822</b>	<b>198</b>	<b>23.2</b>	<b>5.6</b>
H00	Lamchari	1238	25	15	20.2	12.1
V12	Bhangerpar	665	18	4	27.1	6.0
V13	Baburpara	709	12	6	16.9	8.5
V19	Lakshmipur	2931	66	19	22.5	6.5
V20	Dagorpur	1345	43	4	32.0	3.0
V21	Khadergaon	549	11	3	20.0	5.5
V22	Beloti	607	19	5	31.3	8.2
V23	Baluchar	665	18	8	27.1	12.0
V24	Machuakhal	2990	73	20	24.4	6.7
V26	Narayanpur	3135	58	19	18.5	6.1
V56	Pailpara	1501	42	9	28.0	6.0
V59	Doshpara	1827	51	12	27.9	6.6
V82	Dhanarpar	1731	50	16	28.9	9.2
V83	Padmapal	633	14	1	22.1	1.6
V85	Bhanurpara	493	14	2	28.4	4.1
V87	Hurmaisha	677	17	7	25.1	10.3
VBB	Nagda	4640	123	30	26.5	6.5
VBC	Naogaon	4834	137	40	28.3	8.3
<b>Block B Total</b>		<b>31170</b>	<b>791</b>	<b>220</b>	<b>25.4</b>	<b>7.1</b>
K00	Shahpur	937	23	2	24.5	2.1
L00	Tatkhana	577	11	3	19.1	5.2
M00	Char Nayergaon	205	4	2	19.5	9.8
N00	Aswinpur	2216	56	10	25.3	4.5
O00	Nayergaon	1977	68	13	34.4	6.6
P00	Titerkandi	2117	48	11	22.7	5.2
Q00	Char Shibpur	255	5	2	19.6	7.8
V27	Panchghoria	938	34	12	36.2	12.8
V28	Khidirpur	1522	38	9	25.0	5.9
V30	Harion	567	9	2	15.9	3.5
V39	Gobindapur	317	8	2	25.2	6.3
V40	Masunda	831	19	9	22.9	10.8
V41	Paton	1842	40	8	21.7	4.3
V42	Adhara (South)	741	14	5	18.9	6.7
V44	Panchdona	647	13	6	20.1	9.3
V86	Adhara	928	25	5	26.9	5.4
V88	Datikara	542	11	4	20.3	7.4
VBA	Mehron	2332	50	12	21.4	5.1

Village code	Village name	Population (mid-year)	Live births	Deaths	Birth rate	Death rate
DX0	Barogaon	3633	103	14	28.4	3.9
DX1	Naojan	1418	38	15	26.8	10.6
<b>Block C Total</b>		<b>24542</b>	<b>617</b>	<b>146</b>	<b>25.1</b>	<b>5.9</b>
R00	Nandalalpur	1450	29	15	20.0	10.3
S00	Tatua	950	16	10	16.8	10.5
T00	Amuakanda	1634	32	13	19.6	8.0
V15	Bhati Rasulpur	766	16	7	20.9	9.1
V16	Binandapur	856	17	8	19.9	9.3
V17	Hatighata	1068	26	4	24.3	3.7
V18	Torkey	3832	78	21	20.4	5.5
V25	Char Pathalia	1289	22	12	17.1	9.3
V29	Shibpur (South)	513	4	8	7.8	15.6
V33	Shibpur (North)	458	9	6	19.7	13.1
V34	Satparia	841	23	4	27.3	4.8
V52	Nayakandi	219	4	1	18.3	4.6
V54	Balairkandi	565	4	3	7.1	5.3
V55	Induria	535	9	4	16.8	7.5
V63	Islamabad (East)	2054	43	16	20.9	7.8
V67	Majlishpur	620	9	3	14.5	4.8
V81	Sonaterkandi	688	10	1	14.5	1.5
V84	Shahbajkandi	2301	52	15	22.6	6.5
V89	Islamabad (Middle)	1461	32	12	21.9	8.2
<b>Block D Total</b>		<b>22100</b>	<b>435</b>	<b>163</b>	<b>19.7</b>	<b>7.4</b>
<b>ICDDR,B Service Area Total</b>		<b>113186</b>	<b>2665</b>	<b>727</b>	<b>23.5</b>	<b>6.4</b>
<b>GOVERNMENT SERVICE AREA:</b>						
V35	Durgapur	3502	83	22	23.7	6.3
V37**	Charputia	-	-	-	-	-
V38	Galimkha	1520	34	17	22.4	11.2
V43	Kanachak	1094	35	8	32.0	7.3
V45	Bakchar	1049	21	7	20.0	6.7
V46	Silinda	422	6	4	14.2	9.5
V47	Tulatali	1839	35	10	19.0	5.4
V48	Gangkanda	504	10	4	19.8	7.9
V49	Harina Bhabanipur	1211	27	10	22.3	8.3
V57	Baluchar	1073	29	6	27.0	5.6
V58**	Mohishmari	-	-	-	-	-
V64	Kawadi	4630	118	38	25.5	8.2
V65	Nayachar	782	19	2	24.3	2.6
V66	Thatalia	824	11	3	13.3	3.6
V68	Sobahan	998	25	10	25.1	10.0
V69**	Naobangha	-	-	-	-	-
V70**	South Joypur	-	-	-	-	-
V71	Khamarpara	494	12	4	24.3	8.1
V73	Sadardia	802	20	8	24.9	10.0
V74	Ketundi	1425	30	14	21.1	9.8
V75	Mukundi	325	7	3	21.5	9.2
V76	Chosoi	1873	39	9	20.8	4.8
V78	Soladana	257	11	4	42.8	15.6
V79	Pitambordi	363	8	0	22.0	0.0
V80	Daribond	1253	39	10	31.1	8.0
V90	Narinda	1270	34	11	26.8	8.7
V97	Dhanagoda	306	5	3	16.3	9.8
V98	Santoshpur	110	1	0	9.1	0.0
V99	Baluakandi	473	8	7	16.9	14.8
VB1	Taltoli	1007	19	11	18.9	10.9
VB2	Sree Rayerchar	1087	19	8	17.5	7.4

Village code	Village name	Population (mid-year)	Live births	Deaths	Birth rate	Death rate
VB3	Rayerkandi	2880	65	17	22.6	5.9
D28	Bazarkhola	1137	30	9	26.4	7.9
D29	Kirtonkhola	213	5	0	23.5	0.0
D30	Banuakandi	740	16	3	21.6	4.1
D31	Harina Bazarkhola	1071	23	12	21.5	11.2
D32	Khalisha	759	17	2	22.4	2.6
D33	Nayanagar	1007	12	8	11.9	7.9
D34	Saidkharkandi	1257	19	8	15.1	6.4
D35	Mollah Kandi	584	12	3	20.5	5.1
<b>Block E Total</b>		<b>40141</b>	<b>904</b>	<b>295</b>	<b>22.5</b>	<b>7.3</b>
A00	Uddamdi	3201	75	17	23.4	5.3
F00	Sepoykandi	1460	30	10	20.5	6.8
G00	Thatalia	2954	78	17	26.4	5.8
J00	Char Harigope	744	15	3	20.2	4.0
U00	Baispur	8903	183	62	20.6	7.0
V01	Kadamtali	367	8	1	21.8	2.7
V02	Nilokhi	471	10	4	21.2	8.5
V03	Char Nilokhi	620	15	7	24.2	11.3
V04	Char Pathalia	355	7	2	19.7	5.6
V05	Gazipur	3307	74	23	22.4	7.0
V06	Fatepur	2467	58	21	23.5	8.5
V07	Nayakandi	278	5	2	18.0	7.2
V08	Goalbhar	1156	29	8	25.1	6.9
V09	Naburkandi	1128	24	11	21.3	9.8
V14	Enayetnagar	722	11	6	15.2	8.3
V36	Ludhua	5521	112	43	20.3	7.8
D99	Mandertoli	1978	42	18	21.2	9.1
<b>Block F Total</b>		<b>35632</b>	<b>776</b>	<b>255</b>	<b>21.8</b>	<b>7.2</b>
B00	Charmasua	1907	49	14	25.7	7.3
C00	Sarderkandi	3888	91	22	23.4	5.7
V50	Bakharpur	52	3	0	57.7	0.0
V51	Induriakandi	481	13	5	27.0	10.4
V53	Chhoto Haldia	3053	76	20	24.9	6.6
V95	Baluchar	2265	57	15	25.2	6.6
V96	Rampur	540	12	3	22.2	5.6
VB4	Ramdaspur	3584	82	30	22.9	8.4
VB5	Thakurpara	833	15	4	18.0	4.8
VB6	Sarkerpara	541	8	8	14.8	14.8
VB7	Mirpur	332	3	2	9.0	6.0
VB8	Farazikandi	1329	26	7	19.6	5.3
VB9**	Ramanathgonj	-	-	-	-	-
VB0	South Rampur	2527	62	18	24.5	7.1
D88	Sankibhanga	1482	24	10	16.2	6.7
D89	Sankibhanga Namapara	1068	23	9	21.5	8.4
D90	Zahirabad	893	18	6	20.2	6.7
D91**	North Joypur	-	-	-	-	-
D92**	West Joypur	-	-	-	-	-
D93	Maizkandi	1302	21	7	16.1	5.4
D94	Hazipur	1501	38	14	25.3	9.3
D95	Tapaderpara	559	13	4	23.3	7.2
D96	Sakharipara	1154	28	7	24.3	6.1
D97	Nayakandi	706	10	5	14.2	7.1
D98	Bara Haldia	3262	63	27	19.3	8.3
<b>Block G Total</b>		<b>33259</b>	<b>735</b>	<b>237</b>	<b>22.1</b>	<b>7.1</b>
<b>Government Service Area Total</b>		<b>109032</b>	<b>2415</b>	<b>787</b>	<b>22.1</b>	<b>7.2</b>

\*\*Lost due to river erosion in 1987

## APPENDIX C

### LIFE TABLE EQUATIONS

$$1. \quad {}_nq_x = \frac{{}_n m_x}{1/n + {}_n m_x [1/2 + n/12 + ({}_n m_x - \ln C)]} \quad \text{if } X > 0$$

$q_0$  = Infant death rate per 1,000 live births.

$$2. \quad l_0 = 100,000$$

$$l_x = (1 - {}_nq_{x-n})l_{x-n}$$

$$3. \quad L_0 = 0.20 l_0 + 0.80 l_1$$

$$L_1 = 0.410 l_1 + 0.590 l_2$$

$$L_i = \frac{1}{2}(l_i + l_{i+1}), \text{ for } i=2, 3, 4$$

$${}_nL_x = \frac{{}_n d_x}{{}_n m_x}, \text{ for } 5 \leq x \leq 80$$

$${}_{\infty}L_{85} = \frac{l_{85}}{{}_{\infty}m_{85}}, \text{ for the last age group } 85+$$

$$4. \quad e_x = \frac{T_x}{l_x}, \text{ where } T_x = \sum_{y=x}^{\infty} L_y$$

NOTE: Computed using Greville's method, as suggested in: Shryock HS, Seigel JS, et al. (1975).

NOTE:  $\ln C$  assumed to be 0.095; separation factors in equation 3 correspond to an infant mortality rate of 50 per 1,000 live births.

## APPENDIX D

### WHO STANDARD WORLD POPULATION

Age group (years)	World population	Percentage
0	1800	1.8
1-4	7000	7.0
5-9	8700	8.7
10-14	8600	8.6
15-19	8500	8.5
20-24	8200	8.2
25-29	7900	7.9
30-34	7600	7.6
35-39	7200	7.2
40-44	6600	6.6
45-49	6000	6.0
50-54	5400	5.4
55-59	4600	4.6
60-64	3700	3.7
65-69	3000	3.0
70-74	2200	2.2
75-79	1500	1.5
80-84	900	0.9
85+	600	0.6
<b>Total</b>	<b>100000</b>	<b>100</b>

NOTE: Source: Ahmed OB, Boschi-Pinto, Lopez AD et al. (2000)

Available online at: <http://www.who.int/healthinfo/papaer31.pdf>

## APPENDIX E

### **HEALTH INTERVENTIONS IN ICDDR,B SERVICE AREA**

Date	Activity	Blocks			
		A	B	C	D
Oct 1977	Family planning	X	X	X	X
Mar 1978	Tetanus toxoid to pregnant women	X	X	X	X
Jan 1979	ORT	X	X	X	X
Dec 1981	Tetanus toxoid to all women	X		X	
Dec 1985		X	X	X	X
Mar 1982	Measles vaccine	X		X	
Dec 1985		X	X	X	X
Sep 1982	Antenatal care	X		X	
Jan 1986		X	X	X	X
Jan 1985	Iron/folic acid to pregnant women	X		X	
Jan 1986		X	X	X	X
Mar 1986	EPI immunizations (BCG, DPT, Polio)	X	X	X	X
Sep 1988	Nutritional rehabilitation	X	X	X	X
Jan 1986	Vitamin A distribution	X	X	X	X
Mar 1987	Maternity care			X	X
Apr 1988	ARI treatment to children		X		X
Jul 1991		X	X	X	X
Apr-Dec 1989	Dysentery treatment		X		X
1991	Dysentery treatment stopped	-	-	-	-
1997	Sub-centre delivery			X	
1998					X
2000			X		
2001		X			
2000	Fixed Site Clinic			X	X
2001		X	X		
2001	Maternal and infant Nutrition intervention (MINIMAT)	X	X	X	X
2002	Arsenic in Tubwell water and mitigation (AS-MAT)	X	X	X	X
2006	Vitamin E and Selenium trial	X	X	X	X
2007	Maternal, Newborn and child health intervention	X	X	X	X
2007	Rota Teq vaccine trial to infant	X	X	X	X
2008	Rota Rix vaccine trial to infant	X	X	X	X



## APPENDIX F

### STAFF OF HDSU, 2008

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Head, Health & Demographic Surveillance Unit

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NOTE: 38 Community Health Research Workers (CHRWs) collect routine HDSS data and 5 CHRWs collect data for special surveys.

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**icddr,b**

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