HEALTH AND DEMOGRAPHIC SURVEILLANCE SYSTEM – MATLAB

Volume Forty Seven
Registration of Health and Demographic Events 2013

Scientific Report No. 126 – April 2015

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Cover page:
People living in the newly raised land (Char) on Meghna river; this area was eroded in1987, under Health and Demographic Surveillance area, Matlab.

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List of abbreviation

DFAT	Department of Foreign Affairs and Trade Australia
BCG	Bacillus Calmette–Guérin
BDHS	Bangladesh Demographic and Health Survey
BMI	Body Mass Index
CBR	Crude Birth Rate
CDR	Crude Death Rate
CHRW	Community Health Research Worker
DFATD	Department of Foreign Affairs, Trade and Development Canada
COPD	Chronic Obstructive Pulmonary Disease
CPR	Contraceptive Prevalence Rate
CRL	Cholera Research Laboratory
DFID	Department of International Development, UK
DPT	Diphtheria, Pertussis and Tetanus
DSS	Demographic Surveillance System
FAO	Food and Agriculture Organization
FI	Food Insecurity
FRS	Field Research Supervisor
FWV	Family Welfare Visitor
GIS	Geographical Information System
GPS	Global Positioning System
HDSS	Health and Demographic Surveillance System
HDSU	Health and Demographic Surveillance Unit
icddr,b	International Centre for Diarrhoeal Disease Research, Bangladesh
HDDS	Household Dietary Diversity Score
IMR	Infant Mortality Rate
INDEPTH	International Network of field sites with continuous Demographic Evaluation of Population and Their Health in developing countries
IUD	Intra-uterine Device
MCH-FP	Maternal and Child Health and Family Planning
MDG	Millennium Development Goal
NGO	Non-government Organization
RKS	Record Keeping System
Sida	Swedish International Development Cooperation
TBA	Traditional Birth Attendant
TFR	Total Fertility Rate
U5MR	Under-five Mortality Rate
UESD	Utilization of Essential Service Delivery Survey
VA	Verbal Autopsy
VGD	Vulnerable Group Development
VGF	Vulnerable Group Feeding
WHO	World Health Organization

SUMMARY

This report presents the vital registration and maternal and child health data gathered from Matlab, Bangladesh, in 2013. 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 slightly decreased in 2013 compared to 2012. The crude birth rate (CBR) was 20.9 per 1,000 populations in 2013 whereas in 2012 the rate was 21.6 and total fertility rate (TFR) was 2.5 per woman in 2013 and 2.6 in 2012. In the icddr,b service area, CBR was 21.7 and TFR was 2.6 and in the Government service area, CBR and TFR were 20.2 and 2.5 respectively.

The crude death rate was 6.7 per 1,000 population in the icddr,b service area, and in Government service area in 2013. The infant mortality rate was 23.1 per 1,000 live births in the icddr,b service area, and in the Government service area it was 26.6. The neonatal mortality rate increased to 17.3 from 15.6 in the icddr,b service area and decreased to 21.2 from 30.3 in the Government service area respectively in 2013 from 2012; post-neonatal mortality increased in the icddr,b service area (4.9 to 5.9) and decreased in the Government service area (7.1 to 5.4). Under five mortality rate has increased from 28.0 in 2012 in the icddr,b service area to 31.6 in 2013, and in the Government service area, the decrease was from 41.7 in 2012 to 38.3 in 2013. The overall rate of natural increase in population size was 14.2 per 1,000 in 2013.

The rate of in-migration increased to 45.0 per 1,000 populations in 2013 from 44.6 in 2012, and the rate of out-migration decreased to 47.3 in 2013 from 53.5 in 2012. The overall annual population growth rate was 1.2%. The marriage rate was 14.3 per 1,000 population, and the divorce rate was 1.4 per 1,000 population.

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.

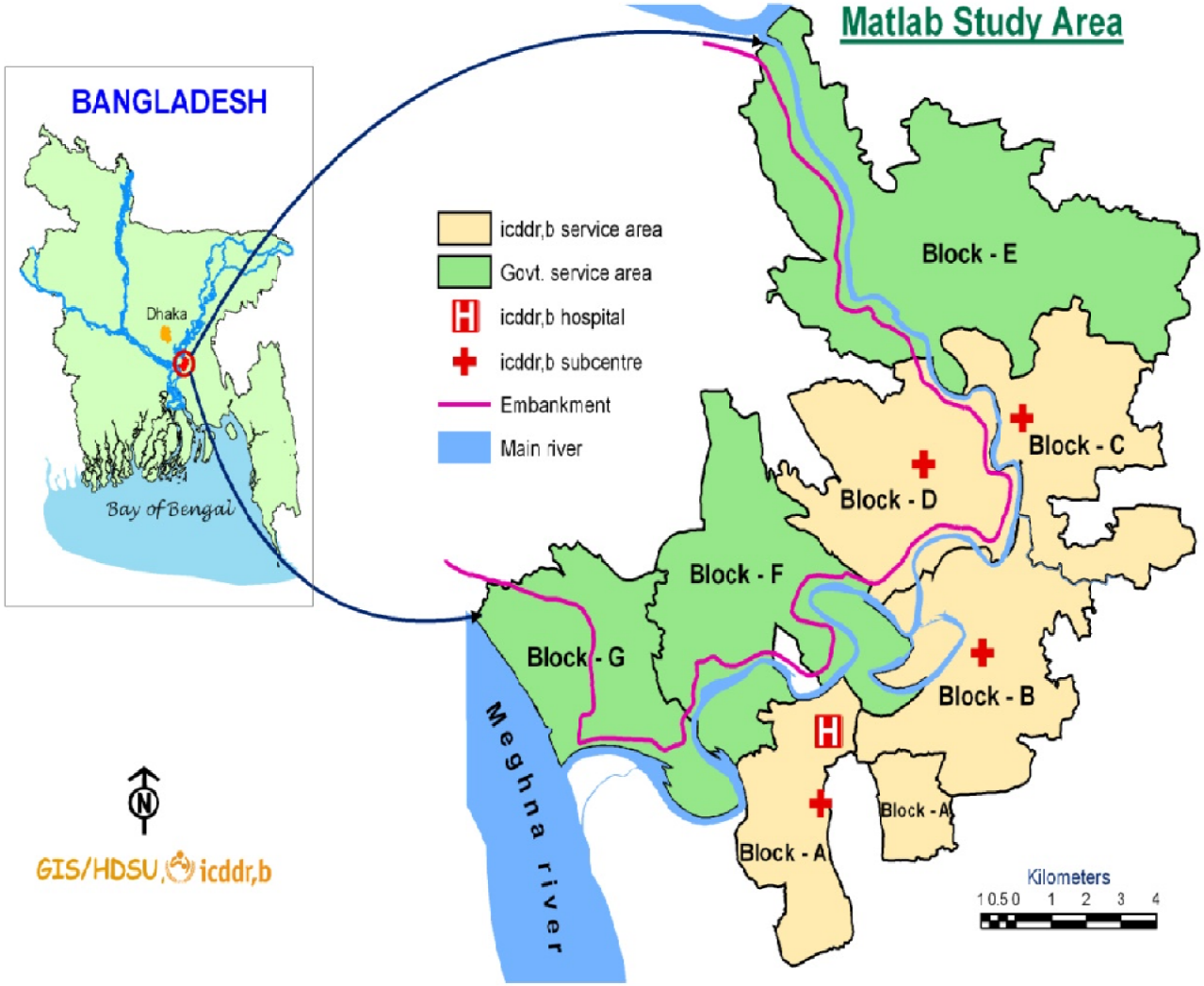
Since 1966, the HDSS has maintained the registration of births, deaths, and migrations, in addition to carrying out periodical censuses. Registration of marital unions and dissolutions began in 1975, internal movement in 1982, and household headship as well as household dissolution in 1993. Later in 1998, 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 in their assigned areas bi-monthly since 2007, monthly prior to that. HDSS data were collected using event registration forms since 2011 by using PDA (Personal Data Assistant). 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)[1], icddr,b Special Publication No. 35 (1994), and 72 (1998)[2].

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 expanded to Government service area in 2001. 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 service area were transferred to the Government service area.

This is the forty seventh 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 2013, along with brief notes and explanations of the tables, are presented in this volume.

[1] Available online at: http://www.icddrb.org/publication.cfm?classificationID=64&pubID=7869
[2] Available online at: http://www.icddrb.org/publication.cfm?year=1998&classificationID=64

Figure 1.1 Map of Matlab study area showing icddr,b and Government service areas

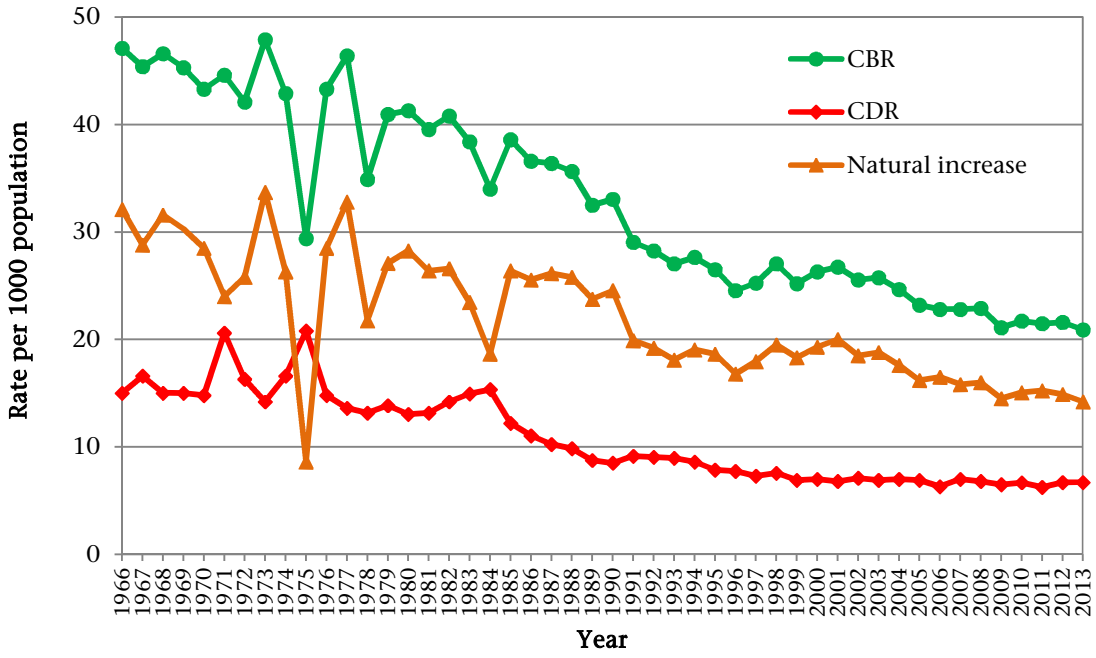


CHAPTER 2

DEMOGRAPHIC TRENDS IN MATLAB

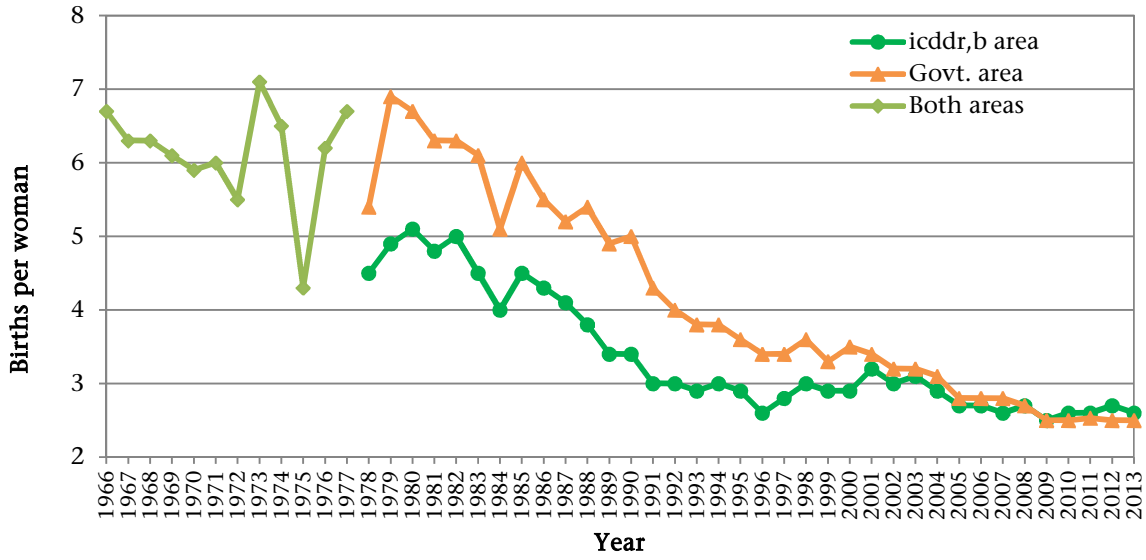
Long term Matlab HDSS data show the various transitions in the Matlab population over the period 1966-2013. In the early stages of demographic surveillance (1960s and 1970s), the Matlab population was characterized by high fertility, high mortality and high population growth. Apart from a Shigella outbreak 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 1966-2013, crude birth rate (CBR) has dropped by 55.6%, crude death rate (CDR) by 55.3%, and natural increase by 55.8%. 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.

Figure 2.1 Demographic transition in Matlab, 1966-2013



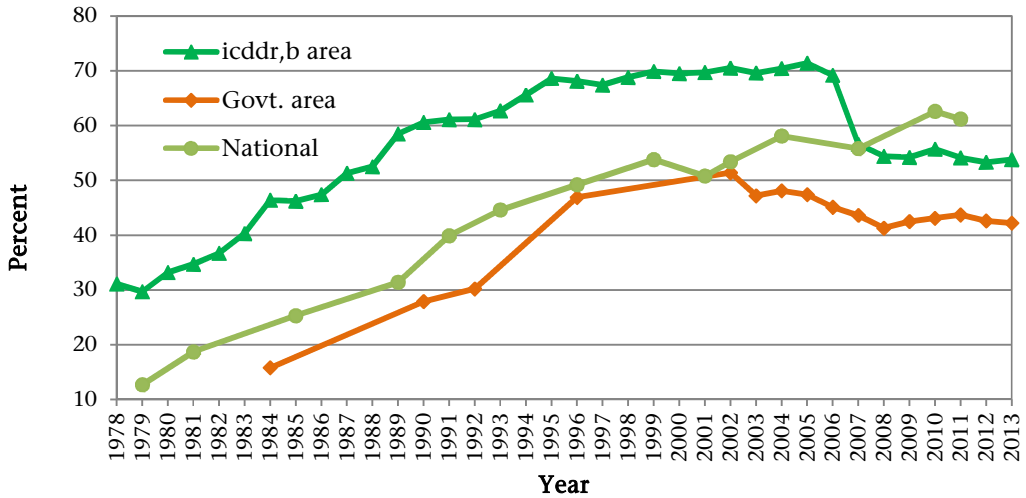
Matlab surveillance area started with a high fertility level of 6.7 children per women in 1966. After reorganization of the surveillance area into icddr,b and Government service areas in 1978, total fertility rate (TFR) in icddr,b service area remained substantially lower than the Government service area (on average 1.1 child less per woman during 1978-2000). But from 2005, TFR in both areas converged. It is 2.6 children per woman in icddr,b service area and 2.5 in Government service area in 2013 (Figure 2.2).

Figure 2.2 Total fertility rates (TFR) in Matlab by area, 1966-2013



Provision of contraceptive supply and advice has been carried out since the inception of the program by female CHRWs. They visited all households in the icddr,b service area on a regular basis and took 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 women's access to contraceptive services in Matlab and is associated with a high contraceptive prevalence rate (CPR). From 2001, this home service delivery system has been switched to the fixed-site system. From 2007, half of the CHRWs were assigned to provide services and another half to carry out the surveillance work. CPR increased in the icddr,b service area from 33.2 in 1978 to 71.4 in 2005, but has declined since 2007 was 56.6 to 53.8 in 2013 and it is lower than the national level. In the Government service area CPR is even lower than the national level, however, CPR declined from 43.6 in 2007 to 42.2 in 2013 (Figure 2.3).

Figure 2.3 Contraceptive prevalence rates (CPR) in Matlab and Bangladesh, 1978-2013



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 79.8% over the period 1978-2013. In Government service area, IMR declined by 78.8% over the same period. Figure 2.5 shows that, during the same period, under-five mortality rate (U5MR) declined by 83.2% in icddr,b service area and 80.8% 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, 1966-2013

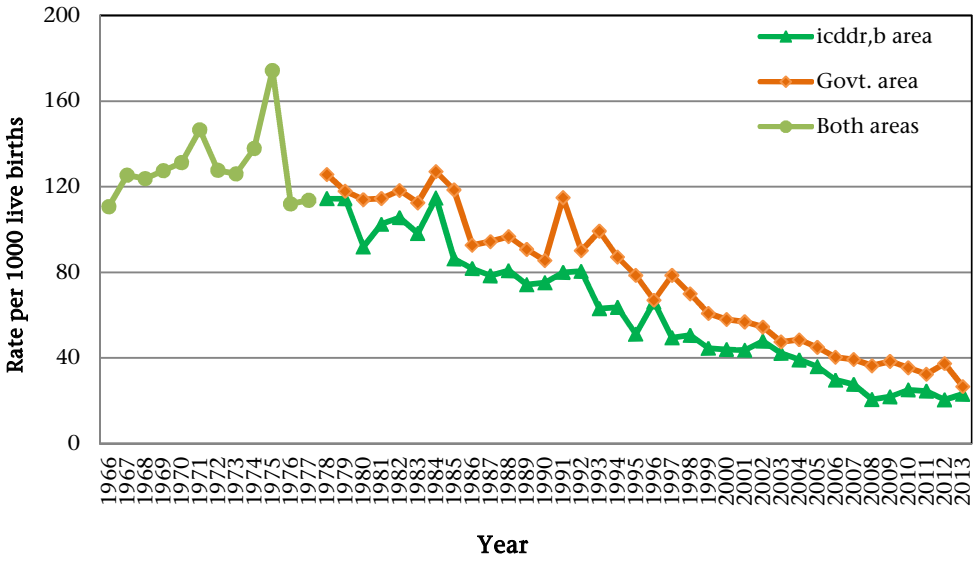
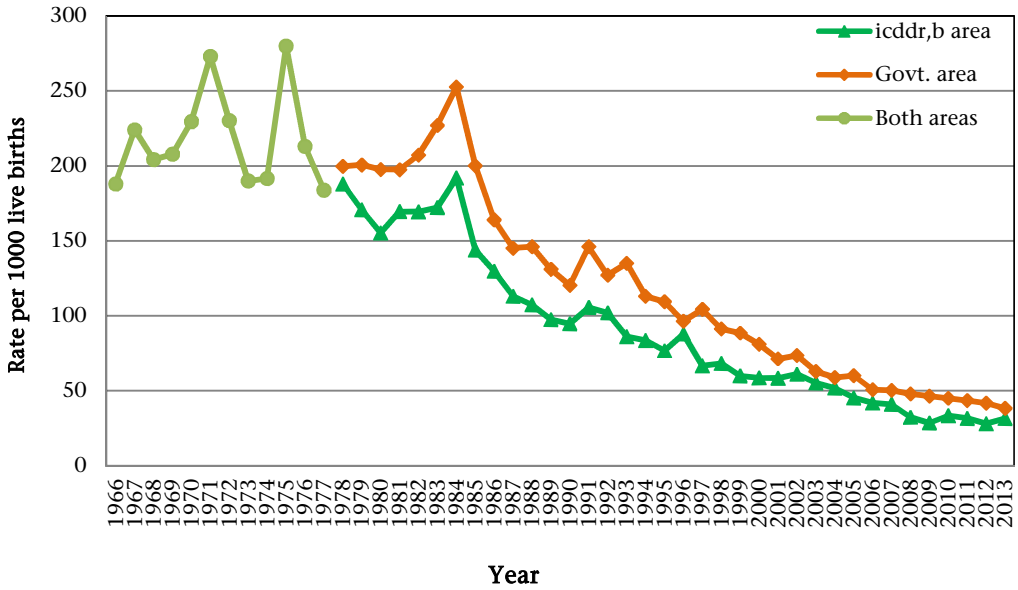
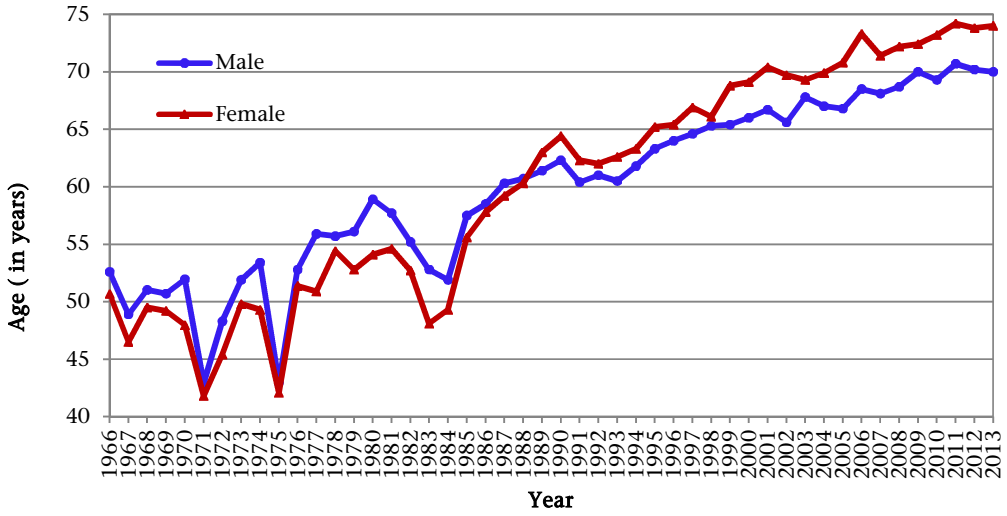


Figure 2.5 Under-five mortality rates (U5MR) in Matlab by area, 1966-2013



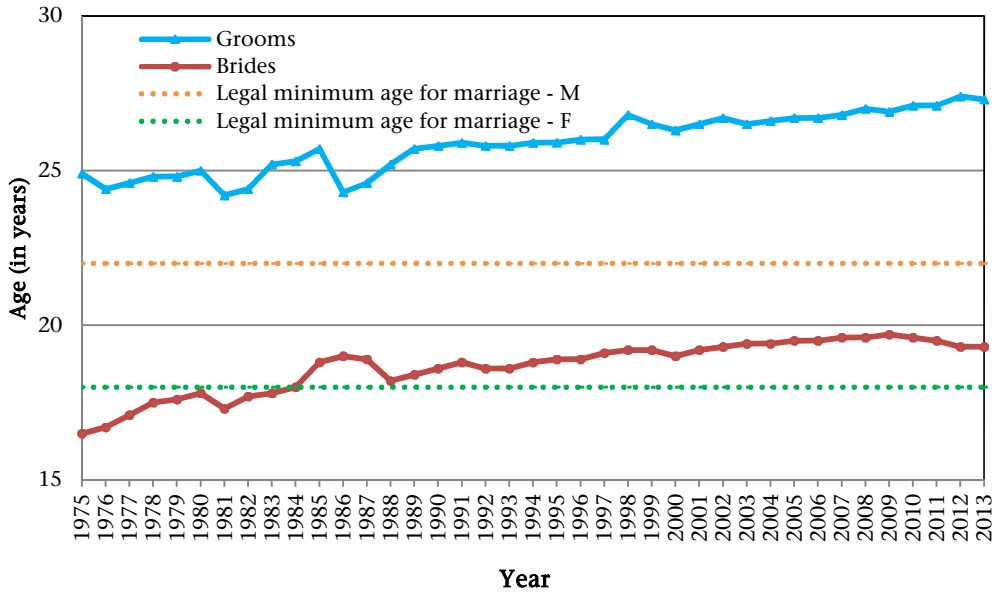
Massive reductions of infant and child mortality have resulted in a remarkable improvement in life expectancy at birth over the last 48 years. The life expectancy at birth for males rose from 53 years in 1966 to 70.0 in 2013, a gain of 17.0 years and for females, the improvement is even more evident, from 51 to 74.0, a gain of nearly 23.0 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, 1966-2013



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 during 1975-2013. During this period, brides' mean age at marriage increased by 2.8 years and for grooms, it increased by 2.4 years.

Figure 2.7 Mean age at first marriage in Matlab, 1975-2013



CHAPTER 3

POPULATION CHANGES

The principal vital statistics of the icddr,b and Government service areas from 2002 through 2013 are summarized in Table 3.1. The mid-year population and the demographic events registered in 2013 in both icddr,b and Government service areas are shown in Table 3.2. Appendix B shows the mid-year population, births, and deaths by village.

In 2013, the crude birth rate slightly decreased to 21.7 and 20.2 in the icddr,b service area and in the Government service area from the 2012 level of 22.6 and 20.5 in the icddr,b service area and in the Government service area respectively. The crude death rates are equal in 2013 (6.7) compared in 2012 for both the areas. The TFR was 2.6 in year 2013 and 2.7 in 2012 in icddr,b service area but in Government service area it was same as 2.5 in 2013 and 2012. The trends in the TFR in both areas are illustrated in Figure 2.2 of Chapter 2.

The infant mortality rate increased to 23.1 in 2013 from 20.5 in 2012 in the icddr,b service area, and decreased to 26.6 in 2013 from 37.4 in 2012 in the Government service area. In the icddr,b service area, neonatal mortality also increased to 17.3 in 2013 from 15.6 in 2012, and in the Government service area it decreased to 21.2 in 2013 from 30.3 in 2012. There was slightly increase in the mortality rate of children aged 1-4 years in the icddr,b service area from 1.9 to 2.2, and in the Government service area from 1.1 to 3.1. As a result of these changes, under-five mortality increased in the icddr,b service area from 28.0 per 1,000 live births in 2012 to 31.6 in 2013, and in the Government service area it decreased slightly from 41.7 in 2012 to 38.3 in 2013. 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 2013 were 10,264 and 10,784 respectively, giving an in-migration rate of 45.0 per 1,000 population, out-migration rate of 47.3 and a net migration rate of 2.3 per 1,000 populations 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 1.2%.

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.1a. 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 1978-2013 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 2013, this proportion had fallen to 32.4%. In the Government service area, the change in age distribution was almost same 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 Government service area from 1978 to 32.6% in 2013 . 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 10.1% in 2013 due to the decline in both fertility and mortality. The net

population increase was 12.0 per 1,000 in 2013 while it was 6.0 per 1,000 in 2012, due to the decrease in the number of out-migrants. A major cause for men being fewer than women in age group 15-49, 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*, 2002-2013

Vital rate (per 1,000)	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Crude birth rate												
icddr,b area	25.8	26.4	24.5	23.2	22.9	22.6	23.5	21.6	22.0	21.8	22.6	21.7
Government area	25.3	25.1	24.8	23.1	22.7	23.0	22.1	20.5	21.4	21.1	20.5	20.2
Both areas	25.6	25.7	24.7	23.2	22.8	22.8	22.9	21.1	21.7	21.5	21.6	20.9
Total fertility rate**												
icddr,b area	3.0	3.1	2.9	2.7	2.7	2.6	2.7	2.5	2.6	2.6	2.7	2.6
Government area	3.2	3.2	3.1	2.8	2.8	2.8	2.7	2.5	2.5	2.5	2.5	2.5
Both areas	3.1	3.1	3.0	2.8	2.7	2.7	2.7	2.5	2.6	2.6	2.6	2.5
Crude death rate												
icddr,b area	6.9	6.8	6.7	6.9	6.3	6.8	6.4	6.2	6.7	6.1	6.6	6.7
Government area	7.3	7.0	7.4	7.0	6.4	7.1	7.2	6.9	6.7	6.4	6.7	6.7
Both areas	7.1	6.9	7.0	6.9	6.3	7.0	6.8	6.5	6.7	6.2	6.7	6.7
Neonatal mortality***												
icddr,b area	34.4	31.5	29.6	26.5	23.5	20.3	15.8	16.2	18.5	18.2	15.6	17.3
Government area	36.4	33.8	35.3	35.4	30.1	29.9	26.1	33.5	27.3	25.5	30.3	21.2
Both areas	35.4	32.6	32.5	30.9	26.8	25.1	20.7	24.4	22.7	21.7	22.4	19.1
Post-neonatal mortality***												
icddr,b area	13.5	10.6	9.5	9.6	6.2	7.4	4.9	5.7	6.7	6.3	4.9	5.9
Government area	18.1	13.7	13.2	9.6	10.3	9.4	10.4	4.9	8.1	6.9	7.1	5.4
Both areas	15.9	12.1	11.4	9.6	8.2	8.4	7.5	5.3	7.4	6.6	5.9	5.7
Infant mortality***												
icddr,b area	47.9	42.1	39.1	36.0	29.7	27.7	20.6	21.9	25.1	24.6	20.5	23.1
Government area	54.5	47.5	48.5	45.0	40.4	39.3	36.4	38.4	35.4	32.4	37.4	26.6
Both areas	51.2	44.8	43.9	40.5	35.0	33.5	28.1	29.8	30.1	28.3	28.3	24.7
Child mortality (1-4yrs) #												
icddr,b area	3.5	3.6	3.4	2.4	3.2	3.4	3.0	1.7	2.1	1.8	1.9	2.2
Government area	5.2	4.1	2.7	4.0	2.6	2.8	2.9	2.1	2.5	2.9	1.1	3.1
Both areas	4.4	3.9	3.1	3.2	2.9	3.1	3.0	1.9	2.3	2.3	1.5	2.6
Under five mortality***												
icddr,b area	61.1	55.2	51.9	45.3	41.9	41.0	32.3	28.6	33.4	31.6	28.0	31.6
Government area	73.6	62.9	58.9	60.2	50.7	50.3	47.9	46.4	45.0	43.6	41.7	38.3
Both areas	67.5	59.1	55.4	52.8	46.2	45.7	39.7	37.1	39.0	37.4	34.2	34.7
Rate of natural increase												
icddr,b area	18.9	19.6	17.8	16.3	16.6	15.8	17.1	15.4	15.3	15.7	16.0	15.0
Government area	18.0	18.0	17.5	16.1	16.3	15.9	14.9	13.7	14.7	14.8	13.8	13.5
Both areas	18.5	18.8	17.6	16.2	16.5	15.8	16.0	14.5	15.1	15.2	14.9	14.2
In-migration	45.7	40.4	42.1	35.7	43.5	40.0	44.0	54.1	48.5	41.5	44.6	45.0
Out-migration	52.4	55.4	57.9	53.3	57.3	63.5	65.7	58.0	59.5	57.6	53.5	47.3
Growth (%)	1.2	0.4	0.2	-0.1	0.3	-0.8	-0.6	1.1	0.4	-0.1	0.6	1.2

*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, 2013

Demographic indicator	Number			Rate (per 1,000)		
	Total	Male	Female	Total	Male	Female
Total Population (as of 30 June 2013)						
icddr,b service area	117677	54507	63170	-	-	-
Government service area	110176	51031	59145	-	-	-
Both areas	227853	105538	122315	-	-	-
Events registered (Jan-Dec. 2013)						
Births						
icddr,b service area	2549	1302	1247	21.7	-	-
Government service area	2222	1172	1050	20.2	-	-
Both areas	4771	2474	2297	20.9	-	-
Deaths						
Infants*						
icddr,b service area	59	35	24	23.1	26.9	19.2
Government service area	59	38	21	26.6	32.4	20.0
Both areas	118	73	45	24.7	29.5	19.6
All deaths						
icddr,b service area	788	440	348	6.7	8.1	5.5
Government service area	740	398	342	6.7	7.8	5.8
Both areas	1528	838	690	6.7	7.9	5.6
In-migration	10264	4696	5568	45.0	44.5	45.5
Out-migration	10784	4956	5828	47.3	47.0	47.6
Marriage	3260	-	-	14.3	-	-
Divorce**	322	-	-	1.4	-	-
Population change (Jan-Dec. 2013)						
Net migration	-520	-260	-260	-2.3	-2.5	-2.1
Natural increase						
icddr,b service area	1761	862	899	15.0	15.8	14.2
Government service area	1482	774	708	13.5	15.2	12.0
Both areas	3243	1636	1607	14.2	15.5	13.1
Net increase	2723	1376	1347	12.0	13.0	11.0

*Rate per 1,000 live births
**Rate per 1,000 populations

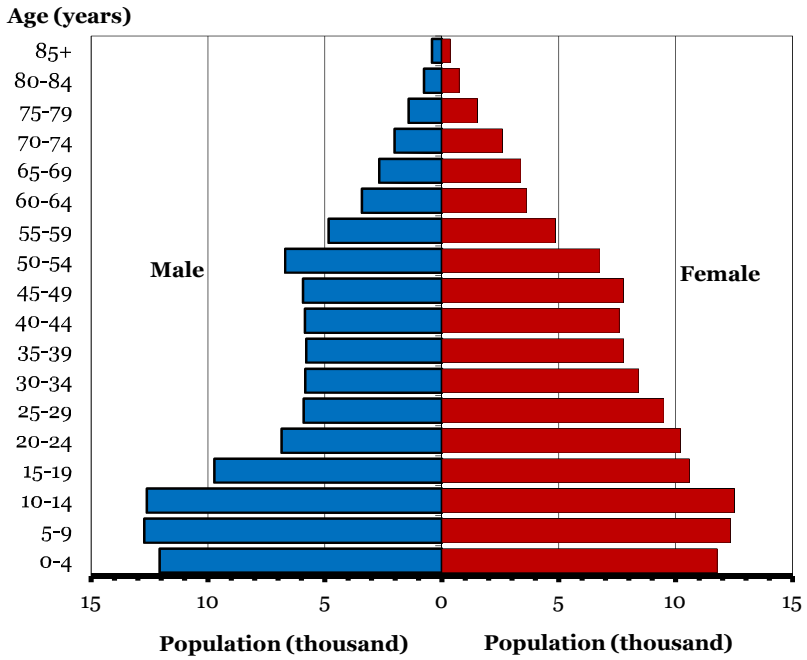
Table 3.3. Mid-year population by age and sex, 2013

Age (years)	Number			Percent		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	227853	105538	122315	100.0	100.0	100.0
<1 year	4753	2389	2364	2.1	2.3	1.9
1 – 4	19086	9678	9408	8.4	9.2	7.7
1	*5050*	*2580*	*2470*	*2.2*	*2.4*	*2.0*
2	*4712*	*2384*	*2328*	*2.1*	*2.3*	*1.9*
3	*4566*	*2292*	*2274*	*2.0*	*2.2*	*1.9*
4	*4758*	*2422*	*2336*	*2.1*	*2.3*	*1.9*
5 – 9	25069	12720	12349	11.0	12.1	10.1
10-14	25124	12617	12507	11.0	12.0	10.2
15-19	20310	9731	10579	8.9	9.2	8.6
20-24	17050	6845	10205	7.5	6.5	8.3
25-29	15414	5910	9504	6.8	5.6	7.8
30-34	14257	5841	8416	6.3	5.5	6.9
35-39	13568	5795	7773	6.0	5.5	6.4
40-44	13431	5850	7581	5.9	5.5	6.2
45-49	13696	5929	7767	6.0	5.6	6.3
50-54	13462	6694	6768	5.9	6.3	5.5
55-59	9694	4838	4856	4.3	4.6	4.0
60-64	7037	3411	3626	3.1	3.2	3.0
65-69	6061	2674	3387	2.7	2.5	2.8
70-74	4615	2020	2595	2.0	1.9	2.1
75-79	2934	1416	1518	1.3	1.3	1.2
80-84	1508	762	746	0.7	0.7	0.6
85+	784	418	366	0.3	0.4	0.3

Table 3.4. Mid-year population by age, sex, and area, 2013

Age (years)	icddr,b service area			Government service area		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	117677	54507	63170	110176	51031	59145
<1 year	2574	1288	1286	2179	1101	1078
1 – 4	9957	5083	4874	9129	4595	4534
1	*2684*	*1370*	*1314*	*2366*	*1210*	*1156*
2	*2374*	*1220*	*1154*	*2338*	*1164*	*1174*
3	*2411*	*1234*	*1177*	*2155*	*1058*	*1097*
4	*2488*	*1259*	*1229*	*2270*	*1163*	*1107*
5 – 9	12955	6627	6328	12114	6093	6021
10-14	12622	6206	6416	12502	6411	6091
15-19	10180	4806	5374	10130	4925	5205
20-24	8694	3372	5322	8356	3473	4883
25-29	8117	3104	5013	7297	2806	4491
30-34	7465	3078	4387	6792	2763	4029
35-39	7338	3201	4137	6230	2594	3636
40-44	7056	3084	3972	6375	2766	3609
45-49	7218	3155	4063	6478	2774	3704
50-54	6989	3517	3472	6473	3177	3296
55-59	4945	2499	2446	4749	2339	2410
60-64	3600	1764	1836	3437	1647	1790
65-69	3023	1334	1689	3038	1340	1698
70-74	2298	1033	1265	2317	987	1330
75-79	1465	729	736	1469	687	782
80-84	773	398	375	735	364	371
85+	408	229	179	376	189	187

Figure 3.1. Age pyramid of the 2013 mid-year population



CHAPTER 4

MORTALITY

The distribution of 1,528 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 1,528 deaths, 7.7% were infants, 3.3% were children aged 1-4 years, and 66.0% were aged 60 years and above.

Table 4.3 shows difference in mortality rates per 1000 mid-year population and per 1000 person-years. The age-specific rates did not differ for changing units from mid-year population to person-years. Henceforth, subsequent tables provide rate per 1000 mid-year population. Table 4.4 shows the corresponding age-sex-specific mortality rates for the icddr,b and Government service areas respectively. In 2013, the overall death rates for males and females were 7.9 and 5.6 respectively. Infant mortality rate was 29.5 per 1,000 live births for males and 19.6 for females. It was lower in the icddr,b service area (26.9 and 19.2, respectively) than in the Government service area (32.4 and 20.0, respectively), a result of improvements in the neonatal mortality in the icddr,b service area. Block-wise deaths in the icddr,b service area by age and sex are shown in Appendix A.2a.

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 was 70.0 years for males and 74.8 for females in 2013 and 70.2 for males and 73.8 for females in 2012. The level of male adult (15-59 years) mortality decreased in 2013 compared to 2012. The probability of dying for males aged 15-59 years ($_{45}q_{15}$) was 147.0, and for females it was 99.0 per 1,000 populations in 2013 and in 2012 it was 159.7 and 107.7 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 females than males in both the icddr,b service area and the Government service area. In 2013, the gender difference in expectation of life was lower in the icddr,b service area (3.7 years) than in the Government service area (4.3 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 5-64 years tend to peak in the months June, December-January. Neonatal deaths were most frequent in July and November. Post-neonatal deaths and child deaths, on the other hand, were lower in most of months. Figure 4.1 shows that the probability of survival for males and females started to differ from age 45 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 hepatitis and tuberculosis occurred more in males than females in icddr,b service area and septicaemia and respiratory

infections occurred more in males than females in the Government service area. Prematurity and low birth weights 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 other cardiovascular disesase), neoplasms, COPD, 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 area.

Table 4.1. Deaths by age and sex in both areas, 2013

Age (years)	Both sexes		Male		Female	
	Number	Cumulative percentage	Number	Cumulative percentage	Number	Cumulative percentage
All ages	1528	-	838	-	690	-
<1 year	118	-	73	-	45	-
< 7 days	*72*	*4.7*	*50*	*6.0*	*22*	*3.2*
7 - 29 days	*19*	*6.0*	*14*	*7.6*	*5*	*3.9*
1- 5 months	*18*	*7.1*	*8*	*8.6*	*10*	*5.4*
6-11 months	*9*	*7.7*	*1*	*8.7*	*8*	*6.5*
1 – 4 years	50	-	23	-	27	-
1	25	9.4	9	9.8	16	8.8
2	12	10.1	7	10.6	5	9.6
3	8	10.7	5	11.2	3	10.0
4	5	11.0	2	11.5	3	10.4
5 – 9	15	12.0	9	12.5	6	11.3
10-14	13	12.8	8	13.5	5	12.0
15-19	20	14.1	6	14.2	14	14.1
20-24	15	15.1	6	14.9	9	15.4
25-29	17	16.2	8	15.9	9	16.7
30-34	12	17.0	5	16.5	7	17.7
35-39	17	18.1	10	17.7	7	18.7
40-44	19	19.4	14	19.3	5	19.4
45-49	52	22.8	32	23.2	20	22.3
50-54	74	27.6	41	28.0	33	27.1
55-59	98	34.0	60	35.2	38	32.6
60-64	114	41.5	79	44.6	35	37.7
65-69	148	51.2	75	53.6	73	48.3
70-74	214	65.2	112	66.9	102	63.0
75-79	228	80.1	114	80.5	114	79.6
80-84	169	91.2	89	91.2	80	91.2
85+	135	100.0	74	100.0	61	100.0

Table 4.2. Deaths by area, age, and sex, 2013

Age (years)	icddr,b service area			Government service area		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	788	440	348	740	398	342
<1 year	59	35	24	59	38	21
< 7 days	*29*	*20*	*9*	*43*	*30*	*13*
7 - 29 days	*15*	*11*	*4*	*4*	*3*	*1*
1- 5 months	*10*	*4*	*6*	*8*	*4*	*4*
6-11 months	*5*	*0*	*5*	*4*	*1*	*3*
1 – 4 years	22	10	12	28	13	15
1	*9*	*4*	*5*	*16*	5	11
2	*7*	*3*	*4*	*5*	4	1
3	*1*	*1*	*0*	*7*	4	3
4	*5*	*2*	*3*	*0*	*0*	*0*
5 – 9	7	4	3	8	5	3
10-14	4	3	1	9	5	4
15-19	9	2	7	11	4	7
20-24	10	4	6	5	2	3
25-29	6	1	5	11	7	4
30-34	9	3	6	3	2	1
35-39	9	6	3	8	4	4
40-44	9	5	4	10	9	1
45-49	28	18	10	24	14	10
50-54	39	22	17	35	19	16
55-59	51	31	20	47	29	18
60-64	56	40	16	58	39	19
65-69	81	43	38	67	32	35
70-74	120	64	56	94	48	46
75-79	122	62	60	106	52	54
80-84	77	49	28	92	40	52
85+	70	38	32	65	36	29

Table 4.3. Death rates by age and sex in both areas, 2013

Age (years)	Rate per 1,000 mid-year population			Rate per 1,000 person-years		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	6.7	7.9	5.6	6.7	7.9	5.6
<1 year*	24.7	29.5	19.6	24.7	29.5	19.6
*<7 days**	*15.1*	*20.2*	*9.6*	*15.1*	*20.2*	*9.6*
*7 - 29 days**	*4.0*	*5.7*	*2.2*	*4.0*	*5.7*	*2.2*
*1- 5 months**	*3.8*	*3.2*	*4.4*	*3.8*	*3.2*	*4.4*
*6-11 months**	*1.9*	*0.4*	*3.5*	*1.9*	*0.4*	*3.5*
1 – 4 years	2.6	2.4	2.9	2.6	2.4	2.9
1	5.0	3.5	6.5	5.0	3.6	6.5
2	2.5	2.9	2.1	2.5	2.9	2.2
3	1.8	2.2	1.3	1.7	2.2	1.3
4	1.1	0.8	1.3	1.0	0.8	1.3
5 – 9	0.6	0.7	0.5	0.6	0.7	0.5
10-14	0.5	0.6	0.4	0.5	0.6	0.4
15-19	1.0	0.6	1.3	1.0	0.6	1.3
20-24	0.9	0.9	0.9	0.9	0.9	0.9
25-29	1.1	1.4	0.9	1.1	1.4	1.0
30-34	0.8	0.9	0.8	0.8	0.9	0.8
35-39	1.3	1.7	0.9	1.3	1.7	0.9
40-44	1.4	2.4	0.7	1.4	2.4	0.7
45-49	3.8	5.4	2.6	3.8	5.4	2.6
50-54	5.5	6.1	4.9	5.5	6.1	4.9
55-59	10.1	12.4	7.8	10.0	12.3	7.8
60-64	16.2	23.2	9.7	16.2	23.2	9.7
65-69	24.4	28.0	21.6	24.4	28.0	21.5
70-74	46.4	55.4	39.3	46.4	55.6	39.3
75-79	77.7	80.5	75.1	76.7	79.5	74.2
80-84	112.1	116.8	107.2	111.8	116.5	107.0
85+	172.2	177.0	166.7	170.0	175.5	163.6

*Rate per 1,000 live births

Table 4.4. Death rates by area, age, and sex, 2013
(per 1,000 population)

Age (years)	icddr,b service area			Government service area		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	6.7	8.1	5.5	6.7	7.8	5.8
<1 year	23.1	26.9	19.2	26.6	32.4	20.0
*<7 days**	*11.4*	*15.4*	*7.2*	*19.4*	*25.6*	*12.4*
*7 - 29 days**	*5.9*	*8.4*	*3.2*	*1.8*	*2.6*	*1.0*
*1- 5 months**	*3.9*	*3.1*	*4.8*	*3.6*	*3.4*	*3.8*
*6-11 months**	*2.0*	*0.0*	*4.0*	*1.8*	*0.9*	*2.9*
1 – 4 years	2.2	2.0	2.5	3.1	2.8	3.3
1	*3.4*	*2.9*	*3.8*	*6.8*	*4.1*	*9.5*
2	*2.9*	*2.5*	*3.5*	*2.1*	*3.4*	*0.9*
3	*0.4*	*0.8*	*0.0*	*3.2*	*3.8*	*2.7*
4	*2.0*	*1.6*	*2.4*	*0.0*	*0.0*	*0.0*
5 – 9	0.5	0.6	0.5	0.7	0.8	0.5
10-14	0.3	0.5	0.2	0.7	0.8	0.7
15-19	0.9	0.4	1.3	1.1	0.8	1.3
20-24	1.2	1.2	1.1	0.6	0.6	0.6
25-29	0.7	0.3	1.0	1.5	2.5	0.9
30-34	1.2	1.0	1.4	0.4	0.7	0.2
35-39	1.2	1.9	0.7	1.3	1.5	1.1
40-44	1.3	1.6	1.0	1.6	3.3	0.3
45-49	3.9	5.7	2.5	3.7	5.0	2.7
50-54	5.6	6.3	4.9	5.4	6.0	4.9
55-59	10.3	12.4	8.2	9.9	12.4	7.5
60-64	15.6	22.7	8.7	16.9	23.7	10.6
65-69	26.8	32.2	22.5	22.1	23.9	20.6
70-74	52.2	62.0	44.3	40.6	48.6	34.6
75-79	83.3	85.0	81.5	72.2	75.7	69.1
80-84	99.6	123.1	74.7	125.2	109.9	140.2
85+	171.6	165.9	178.8	172.9	190.5	155.1

*Rate per 1,000 live births

Table 4.5. Abridged life table by sex, 2013

Age (years)	Male				Female			
	$_nq_x$	l_x	L_x	$e0_x$	$_nq_x$	l_x	L_x	$e0_x$
0	29.5	100000	97492	70.0	19.6	100000	98335	74.0
1	3.5	97049	96850	71.2	6.5	98041	97667	74.5
2	2.9	96711	96570	70.4	2.1	97408	97303	74.0
3	2.2	96428	96323	69.6	1.3	97199	97135	73.1
4	0.8	96218	96178	68.8	1.3	97071	97008	72.2
5	3.5	96138	479909	67.8	2.4	96946	484189	71.3
10	3.2	95799	478295	63.0	2.0	96711	483110	66.5
15	3.1	95495	476800	58.2	6.6	96518	481121	61.6
20	4.4	95201	475048	53.4	4.4	95881	478433	57.0
25	6.7	94785	472451	48.6	4.7	95459	476256	52.2
30	4.3	94145	469801	43.9	4.2	95008	474132	47.5
35	8.6	93743	466859	39.1	4.5	94614	472089	42.7
40	11.9	92938	462137	34.4	3.3	94189	470229	37.8
45	26.7	91832	453497	29.8	12.8	93878	466620	33.0
50	30.2	89384	440673	25.6	24.1	92677	458219	28.4
55	60.3	86685	421263	21.3	38.4	90443	444156	24.0
60	109.8	81461	386276	17.5	47.2	86967	425302	19.8
65	131.5	72514	340057	14.3	102.6	82862	394360	15.7
70	244.5	62976	277663	11.1	179.7	74362	339955	12.2
75	335.8	47581	198447	8.8	317.0	61000	257463	9.3
80	450.2	31605	121809	7.0	421.9	41665	163927	7.4
85+	1000.0	17378	98160	5.6	1000.0	24085	144512	6.0

Table 4.6. Deaths by month and age, 2013

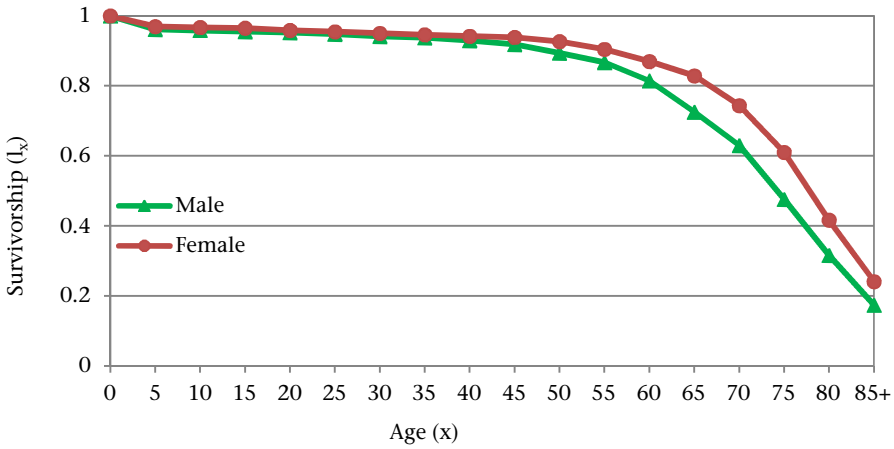
Months	All ages	Age at death				
		<1 month	1-11 months	1-4 years	5-64 years	65 years and above
January	213	7	4	5	64	133
February	123	2	4	1	36	80
March	130	9	3	4	40	74
April	96	3	5	5	23	60
May	121	9	1	1	45	65
June	120	7	0	8	38	67
July	102	10	1	4	36	51
August	94	9	0	4	32	49
September	110	6	2	6	31	65
October	111	7	2	4	35	63
November	155	13	0	6	36	100
December	153	9	5	2	50	87
Total	**1528**	**91**	**27**	**50**	**466**	**894**

Table 4.7. Age-standardized mortality rates by cause of death, 2013 (per 100,000 population)*

Cause of death	Male		Female	
	icddr,b area	Government area	icddr,b area	Government area
Communicable diseases				
Diarrhoeal	(2.06)	12.05	13.98	(7.63)
Dysentery	0.00	0.00	0.00	0.00
Tuberculosis	16.17	(6.88)	0.00	0.00
Meningitis	0.00	0.00	(1.40)	0.00
Hepatitis	24.80	13.49	(5.64)	(1.63)
Chicken pox	0.00	0.00	0.00	(1.44)
Rabies	(1.39)	0.00	0.00	0.00
Septicaemia	12.85	19.31	13.25	18.10
Respiratory infections	(8.20)	20.48	14.98	17.19
Other communicable	(2.26)	0.00	0.00	0.00
Maternal and neonatal conditions				
Maternal death	-	-	14.44	0.00
Premature and LBW	(2.80)	(3.27)	(4.20)	(1.67)
Birth asphyxia	9.78	26.16	(5.60)	10.02
Other neonatal	30.75	16.35	7.00	(5.01)
Nutritional	(3.15)	12.97	8.53	24.45
Non-communicable diseases				
Neoplasm	95.97	73.73	30.44	37.50
Neoplasm in female organ	0.00	0.00	9.80	8.71
Congenital malformation	(4.17)	9.49	8.47	7.97
Diabetes	24.38	14.99	13.23	11.59
Other endocrine	(2.43)	0.00	(1.37)	(1.54)
Neuro-psychiatric	(4.67)	(6.32)	8.79	(4.08)
Rheumatic heart disease	0.00	0.00	0.00	0.00
Hypertensive disease	(3.80)	(4.72)	(5.83)	0.00
Ischaemic heart disease	125.73	149.46	77.05	95.13
Stroke	244.06	192.37	258.24	229.10
Other cardiovascular	52.29	53.49	43.77	39.14
COPD**	79.84	60.80	31.72	22.70
Asthma	0.00	(2.78)	0.00	(1.92)
Other respiratory	(5.62)	(4.54)	0.00	13.10
Digestive disease	35.16	27.47	11.51	26.63
Renal failure	20.20	19.29	(4.89)	9.41
Other non-communicable	0.00	0.00	(3.22)	(1.77)
Accident/injury				
Accident	37.60	37.96	18.58	8.68
Drowning	16.05	31.91	13.20	16.99
Suicide	(1.39)	(2.23)	7.90	7.98
Homicide	(1.31)	(6.99)	(2.88)	(3.70)
Miscellaneous causes				
Fever of unknown origin	0.00	0.00	0.00	(5.03)
Sudden infant death	0.00	0.00	(1.40)	(1.67)
Unknown/missing/unspecified	30.55	48.26	38.14	38.61
Total	**899.42**	**877.77**	**679.45**	**680.09**

*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, 2013



CHAPTER 5

FERTILITY

In 2013, there were 4,771 live births in the Matlab HDSS area as outcomes of 5,503 pregnancy terminations recorded. Table 5.1 shows the number of pregnancy terminations and their outcomes in 2013. In the Matlab HDSS area as a whole, 85.9% 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, 45 were multiple births. Among these two had triple live births

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 August, October, November, December and January. The sex ratio of live births was 108 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 peaks in January, September, November and December.

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 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 is comparatively very little difference between the two areas for every birth order.

Table 5.4 shows marked variation in the distribution of live birth pregnancies by place of delivery and area. Institutional delivery accounts for 83.7% in the icddr,b service area and 42.9% in the Government service area. More commonly used places for institutional delivery in the Government service area were private clinic/nursing home (33.1%) and Upazila Health Complex (4.7%), and in icddr,b service area, icddr,b hospital and sub-centre (35.4% and 7.9% respectively) followed by private clinic/nursing home (32.4%). Table 5.5 shows the distribution of live birth pregnancies by birth attendants[3] and area. In the icddr,b service area, MBBS doctor assisted was the highest number (38.4%) followed by nurse (33.6%) and Family Welfare Visitor (FWV) (12.8%) of the live-birth deliveries as opposed to TBAs (36.8%), and MBBS doctor (32.1%) in the Government service area. The respective figures for trained TBAs were 4.0% and 16.6% in the icddr,b service area and Government service area, respectively. Medically trained birth

[3] The most qualified attendant was considered if there was more than one in attendance.

attendants (doctors, nurses or midwives, lady family planning visitors or family welfare visitors) assisted 84.7% of the live birth deliveries in the icddr,b service area and 46.0% in the Government service area.

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 64.3% in the icddr,b service area and 69.2% in the Government service area. Instrumental deliveries, especially caesarean were 35.7% and 30.8% respectively in the icddr,b service area and government service area.

Matlab HDSS recorded antenatal care received by mothers in different stages of pregnancy in 2013. Table 5.7 shows antenatal care received by mothers who had a live birth in 2013 in three trimesters by type of service providers. In the icddr,b service area, in first trimester 56.9% of the mothers did not receive any antenatal care as opposed to 88.1% in the Government service area. The respective figures for 2nd and 3rd trimester were 2.7% and 1.5% in the icddr,b service area and 38.6% & 13.8% in the Government service area. In the icddr,b service area, seeking antenatal care from skilled providers accounts for 42.9% in first trimester and 97.1%-98.4% in second and third trimesters. In this area, providers of antenatal care are icddr,b sub-centres (58.4% and 32.6% in 2nd and 3rd trimesters respectively) and icddr,b Matlab hospital (32.4% and 53.5% in 2nd and 3rd trimesters respectively). In the Government service area, skilled providers of antenatal care are private clinics (36.3% and 71.1% in 2nd and 3rd trimesters respectively), community clinics or Health family welfare centres (11.0% and 6.0% in 2nd and 3rd trimesters respectively) and government hospitals (3.1% and 2.5% in 2nd and 3rd trimesters respectively). In this area, others (that include untrained village doctors, herbalists (*kabiraj*) and homeopaths) are common providers of antenatal care.

Figure 5.1. Number of births and deaths by month, 2013

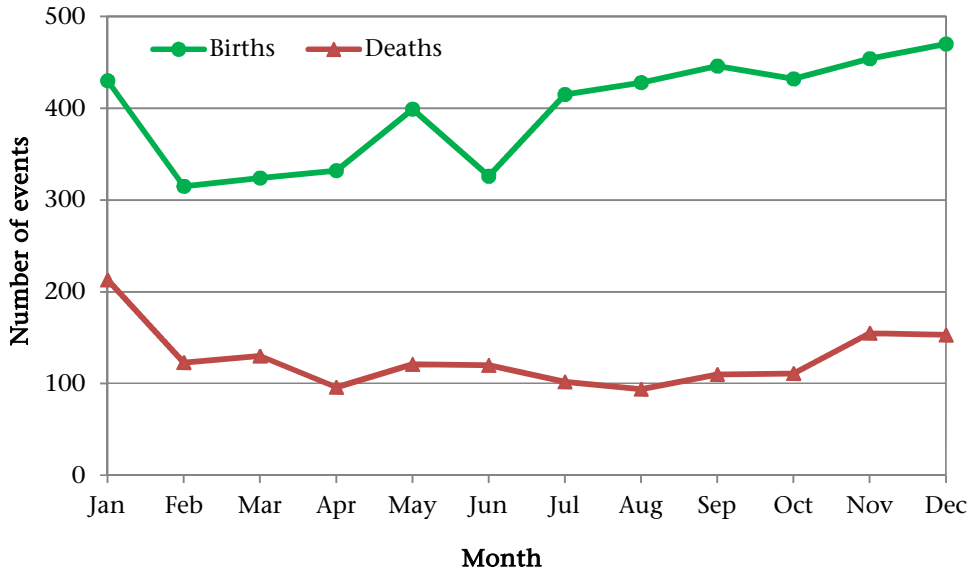


Table 5.1. Numbers and rates of pregnancy outcomes by type and area, 2013

Type of pregnancy outcome	Both areas		icddr,b area		Government area	
	Number	Rate	Number	Rate	Number	Rate
Total pregnancies*	5503	89.0	2914	90.3	2589	87.6
Live birth preg.**	4725	858.6	2524	866.2	2201	850.1
Fetal wastage**	778	141.4	390	133.8	388	149.9
Early(miscarriage)***	699	127.0	362	124.2	337	130.2
Induced	225	40.9	72	24.7	153	59.1
Spontaneous	474	86.1	290	99.5	184	71.1
Late (still birth)	79	14.4	28	9.6	51	19.7
Multiple birth pregnancy	47		24		23	
Multiple live birth pregnancy	45		24		21	
Three live births	2		2		0	
Two live births	41		21		20	
One live birth	2		1		1	
Still birth pregnancies	0		0		0	
Three still births	0		0		0	
Two still births	0		0		0	
Miscarriage pregnancies	2		0		2	

*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, 2013

Months	Pregnancy outcome					No. of live born children			
		Miscarriage		Still	Live	Both			
	All	Induced	Spon.	birth	birth[a]	sexes	Male	Female	Ratio
All months	5503	225	474	79	4725	4771	2474	2297	1.08
January	513	21	38	5	449	430	235	195	1.21
February	437	29	34	6	368	315	160	155	1.03
March	465	22	53	10	380	324	164	160	1.03
April	469	30	50	7	382	332	157	175	0.90
May	429	22	46	11	350	399	203	196	1.04
June	390	23	45	6	316	326	190	136	1.40
July	487	16	52	8	411	415	222	193	1.15
August	481	13	36	7	425	428	206	222	0.93
September	460	19	42	4	395	446	209	237	0.88
October	525	17	48	9	451	432	240	192	1.25
November	501	19	43	10	429	454	233	221	1.05
December	524	20	38	4	462	470	255	215	1.19

[a]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, 2013

Age (years)	Both areas		icddr,b area		Government area	
	Births	Rate	Births	Rate	Births	Rate
All ages	4771	77.2	2549	79.0	2222	75.2
15-19*	748	70.7	435	80.9	313	60.1
20-24	1515	148.5	814	153.0	701	143.6
25-29	1296	136.4	676	134.8	620	138.1
30-34	807	95.9	403	91.9	404	100.3
35-39	340	43.7	181	43.8	159	43.7
40-44	60	7.9	38	9.6	22	6.1
45-49**	5	0.6	2	0.5	3	0.8
Total fertility rate		2519		2572		2463
General fertility rate		77		79		75
Gross reproduction rate		1213		1258		1164
Net reproduction rate		1156		1202		1107

*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 birth pregnancies by place of delivery by area, 2013

Place of Delivery	Both areas		icddr,b area		Government area	
	Number	Percent	Number	Percent	Number	Percent
Home	1665	35.2	411	16.3	1254	57.0
icddr,b sub-centre	201	4.3	200	7.9	1	0.0
icddr,b hospital	893	18.9	893	35.4	0	0.0
Upazila health complex	116	2.5	12	0.5	104	4.7
District hospital	244	5.2	185	7.3	59	2.7
Clinic/nursing home	1548	32.8	819	32.4	729	33.1
Union Health and Family Welfare Centre	55	1.2	3	0.1	52	2.4
Others	3	0.1	1	0.0	2	0.1
Total	4725	100.0	2524	100.0	2201	100.0

Source: Birth registration form

Figure 5.2. Age-specific fertility rates by area, 2013

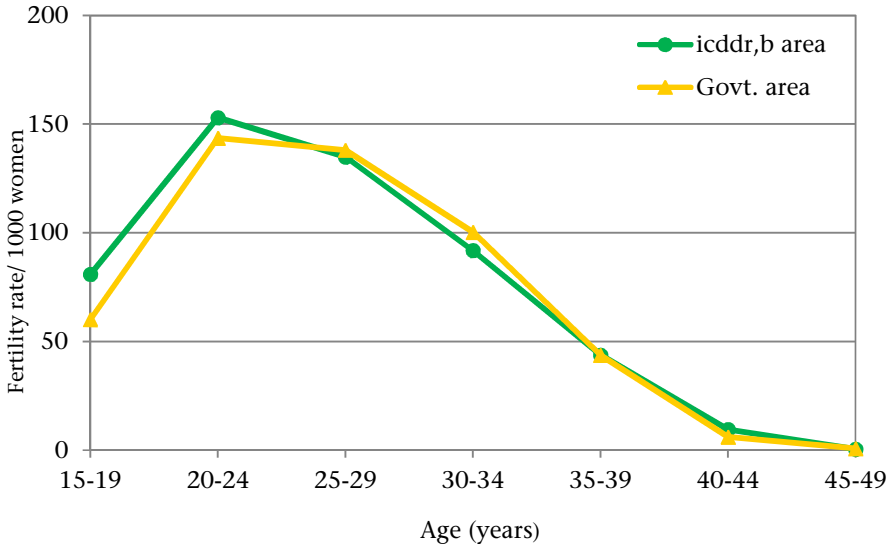


Table 5.5. Distribution of live birth pregnancies by attendant and area, 2013

Birth attendant	Both areas		icddr,b area		Government area	
	Number	Percent	Number	Percent	Number	Percent
TBA	1082	22.9	272	10.8	810	36.8
Trained TBA	467	9.9	102	4.0	365	16.6
FWV	420	8.9	322	12.8	98	4.5
Nurse	1056	22.3	847	33.6	209	9.5
MBBS doctor	1674	35.4	968	38.4	706	32.1
Others	24	0.5	11	0.4	13	0.6
None	2	0.0	2	0.1	0	0.0
Total	4725	100.0	2524	100.0	2201	100.0

TBA=Traditional Birth Attendant
FWV= Family Welfare Visitor

Table 5.6. Distribution of mode of delivery by area, 2013

Mode of Delivery	Both areas		icddr,b area		Government area	
	Number	Percent	Number	Percent	Number	Percent
Normal vaginal	3146	66.6	1623	64.3	1523	69.2
Operation (C/S)	1578	33.4	900	35.7	678	30.8
Instrumental (forcep & ventose)	1	0.0	1	0.0	0	0.0
Total	4725	100.0	2524	100.0	2201	100.0

Table 5.7. Percentage of prenatal care in different trimesters and area, 2013

Sources	icddr,b service area			Government service area		
	1st trimester	2nd trimester	3rd trimester	1st trimester	2nd trimester	3rd trimester
Trained TBA	0.0	0.0	0.0	0.0	0.1	0.2
CC/H &FWC/Sat. Clinic	0.0	0.0	0.0	1.5	11.0	6.0
icddr,b Sub-centre	33.2	58.4	32.6	0.0	1.2	0.4
Govt. Hospital/UHC	0.2	0.8	0.9	0.7	2.9	2.2
icddr,b Hospital	6.2	32.4	53.5	0.0	0.3	0.3
Chandpur MCWC	0.0	0.1	0.1	0.0	0.2	0.3
Private Clinic	3.2	5.5	11.3	8.5	36.3	71.1
Others	0.2	0.2	0.1	1.0	9.5	5.7
No care	56.9	2.7	1.5	88.1	38.6	13.8
No. of live birth	2524	2524	2524	2201	2201	2201

CC=Community Clinic, H&FWC=Health and Family Welfare Centre, UHC= Upazila Health Complex
MCWC=Maternal and Child Welfare Centre

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 2013 was 3,260, giving a crude marriage rate of 14.3 per 1,000 populations. This rate was 14.6 in 2012.

Tables 6.1 and 6.2 show the distribution of grooms and brides by age at marriage and previous marital status. The mean ages at marriage were 28.2 and 19.9 years for all grooms and brides respectively; 27.3 and 19.3 years for those marrying for the first time—are almost the same as those of 2012. One-third (34.1%) of the brides, who are married for the first time aged below 18 years and 7.2% of the grooms who are married the first time aged below 21 years . 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.

Table 6.3 shows the marriage rates by age and sex. Among males, the marriage rate was 40.4 per 1,000 males aged 10 years and above, and for females the rate was 33.2 per 1,000 females aged 10 years and above. For females, the highest rate was 204.6 per 1,000 at the age of 18 years, while for males the highest rate was 252.5 per 1,000 in the age of 28 years. The age group for the highest rate of marriage for males changed to age 28 years in 2013 from 27 years in 2012, but the age group for the highest rate of marriage for female was the same to age 18 years in 2013 that of in 2012. Table 6.4 shows distribution of current marital status of the study population by age and sex in 2013. Of the total population 48.2% were currently married and it was higher for females than males (50.4% vs 45.6%). Widows also constituted a higher proportion for females (9.7%) than males (0.8%) - this difference, along with age-difference at marriage and life expectancy, maybe due to remarriage, which is more common for men than for women.

Table 6.6 shows the distribution of marriages by type of gifts received from bridal party at the time of marriage in 2009-2013. Groom's party received marriage gifts from the bride's father in half 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 a gift was given for daughter's happiness. The first contract can be regarded as dowry and its incidence was 50.6% in 2013. Incidence of giving dowry shows a declining trend over time from 2009-2013 which indicates the improvement of social awareness. Dowry was paid in full at the time of marriage for one-sixth of the marriages and partially for one-fourth of all marriages.

The state law requires legal registration of marriages and divorces of Muslims and Christians (no such law exists for Hindus in Bangladesh). Table 6.7 shows registration of Muslim marriage is an increasing trend. It increased to 94.2% in 2013 from 87.7% in 2001. The number of divorces was less than 300 each year during 1998-2001. Since 2002, this figure has been more than 300. In general, the incidence of divorce in Matlab has fallen. HDSS recorded 322 divorces in 2013 (Appendix A.12) and of them, 76.6% were registered with Kazi -the marriage register (Table 6.8). 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 33.6 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 2013 but marriages were high in March

and August and low in June and July. Table 6.9 shows the distribution of causes of divorce by area reported by CHRWs. CHRWs interviewed male and female partners (if available) and neighbours to determine the cause of the divorce. Most common cause was wife maladjustment with husband or husband's family (29.5%) followed by wife's affairs with other man (21.7%) and husband's affairs with other woman (9.6%).

Figure 6.1. Marriages and divorces by month, 2013

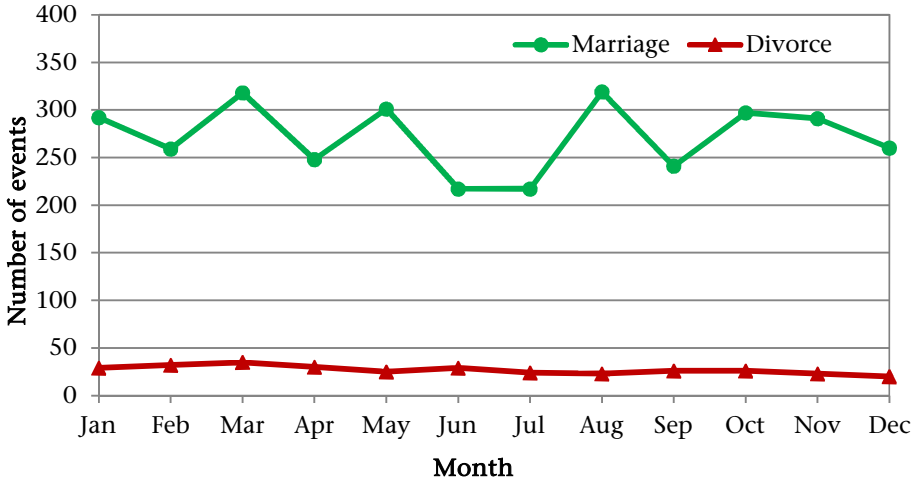


Table 6.1 Groom's age at marriage by previous marital status, 2013

Age (years)	All grooms	Previous marital status (%)			
		Single	Married	Divorced	Widowed
All ages	100 (n=3260)	86.2 (n=2810)	2.4 (n=77)	9.3 (n=302)	2.1 (n=69)
10-14	0.0	0.0	0.0	0.0	0.0
15-17	1.0	1.2	0.0	0.0	0.0
18	1.3	1.4	0.0	1.0	0.0
19	1.7	1.9	0.0	0.3	0.0
20	2.5	2.6	2.6	1.3	1.4
21	1.8	2.0	3.9	0.3	0.0
22-24	16.0	17.0	6.5	12.5	1.4
25-29	41.1	43.8	24.7	28.3	4.3
30-34	25.1	24.7	22.1	31.9	14.5
35-39	5.8	4.5	13.0	13.5	17.4
40-44	1.8	0.7	11.7	5.6	18.8
45-49	0.8	0.1	5.2	3.9	10.1
50-54	0.5	0.0	6.5	0.7	14.5
55-59	0.2	0.0	0.0	0.7	5.8
60-64	0.2	0.0	2.6	0.0	5.8
65+	0.2	0.0	1.3	0.0	5.8
Median age*	28.0	27.0	32.0	30.0	43.0
Mean age*	28.2	27.3	34.9	31.1	44.1
Standard deviation*	5.9	4.5	10.5	6.7	12.1

*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, 2013

Age (years)	All brides	Previous marital status (%)			
		Single	Married	Divorced	Widowed
All ages	100 (n=3260)	89.5 (n=2919)	-	9.6 (n=314)	0.8 (n=27)
10-14	3.8	4.2	-	0.0	0.0
15	5.9	6.5		0.6	0.0
16	9.4	10.2		2.5	3.7
17	12.0	13.1		2.9	0.0
18	12.7	13.6		5.1	0.0
19	12.2	12.8	-	7.6	0.0
20-24	31.5	31.0	-	38.2	7.4
25-29	8.7	7.0	-	23.9	18.5
30-34	2.4	1.3	-	10.5	22.2
35-39	0.6	0.0	-	4.5	25.9
40-44	0.4	0.1	-	2.2	11.1
45-49	0.2	0.0	-	1.9	0.0
50-54	0.1	0.0	-	0.0	7.4
55-59	0.1	0.0	-	0.0	3.7
60-64	0.0	0.0	-	0.0	0.0
65+	0.0	0.0	-	0.0	0.0
Median age*	19.0	19.0	-	23.5	33.0
Mean age*	19.9	19.3	-	24.9	34.0
Standard deviation*	4.6	3.7	-	6.4	9.1

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

Table 6.3 Marriage rates by age and sex, 2013

Age (years)	Male			Age (years)	Female		
	Marriages	Population	Rate*		Marriages	Population	Rate*
All ages (10+ yrs)	3260	80751	40.4	All ages (10+ yrs)	3260	98194	33.2
10-14	1	12617	0.1	10-14	123	12507	9.8
15-19	130	9731	13.4	15	193	2281	84.6
20-24	664	6845	97.0	16	308	2134	144.3
25	257	1214	211.7	17	391	2022	193.4
26	267	1254	212.9	18	413	2019	204.6
27	278	1243	223.7	19	398	2123	187.5
28	277	1097	252.5	20-24	1026	10205	100.5
29	261	1102	236.8	25-29	284	9504	29.9
30-34	817	5841	139.9	30-34	78	8416	9.3
35-39	189	5795	32.6	35-39	21	7773	2.7
40-44	58	5850	9.9	40-44	13	7581	1.7
45+	61	28162	2.2	45+	12	31629	0.4

*per 1000 population per year

Table 6.4. Distribution of current marital status (%) by age and sex, 2013

Age (years)	Male					Female				
	NM	CM	WID	DIV	Total	NM	CM	WID	DIV	Total
0-4	100.0	0.0	0.0	0.0	12067	100.0	0.0	0.0	0.0	11772
5-9	100.0	0.0	0.0	0.0	12720	100.0	0.0	0.0	0.0	12349
10-14	100.0	0.0	0.0	0.0	12617	99.5	0.5	0.0	0.0	12507
15-19	98.8	1.2	0.0	0.0	9731	73.6	25.5	0.0	0.8	10579
20-24	81.9	17.8	0.0	0.4	6845	24.0	74.2	0.1	1.8	10205
25-29	42.3	57.1	0.0	0.6	5910	6.3	91.9	0.2	1.6	9504
30-34	14.0	85.3	0.0	0.7	5841	1.9	95.9	1.0	1.2	8416
35-39	3.4	96.0	0.0	0.6	5795	0.7	96.1	2.2	1.0	7773
40-44	1.4	97.8	0.1	0.6	5850	0.4	94.3	4.1	1.2	7581
45-49	0.6	98.8	0.1	0.4	5929	0.4	88.9	9.2	1.4	7767
50-54	0.5	98.7	0.4	0.4	6694	0.3	81.4	16.6	1.8	6768
55-59	0.5	98.3	0.9	0.4	4838	0.1	69.7	28.4	1.8	4856
60-64	0.2	97.5	2.1	0.3	3411	0.0	53.0	45.5	1.5	3626
65-69	0.4	95.5	3.8	0.3	2674	0.1	39.8	59.0	1.1	3387
70-74	0.2	93.1	6.6	0.1	2020	0.0	23.9	75.1	0.9	2595
75-79	0.1	88.6	11.2	0.1	1416	0.1	11.2	88.1	0.7	1518
80-84	0.1	79.0	20.7	0.1	762	0.1	5.1	94.1	0.7	746
85+	0.0	62.7	37.1	0.2	418	0.0	1.4	97.5	1.1	366
All (%)	**53.4**	**45.6**	**0.8**	**0.2**	**100.0**	**39.0**	**50.4**	**9.7**	**0.9**	**100.0**
Total	**56338**	**48076**	**864**	**260**	**105538**	**47709**	**61661**	**11808**	**1137**	**122315**

NM=Never married, CM=Currently married, WID=Widowed, DIV=Divorced

Table 6.5. Duration (months) of all marriages at divorce by age and sex, 2013

Age at divorce (years)	Male				Female			
	No.	Mean	Median	SD	No.	Mean	Median	SD
< 20	7	9.3	0.0	19.4	112	10.4	0.0	14.7
20 - 24	38	8.9	0.0	13.6	114	27.1	26.0	27.3
25 - 29	107	27.7	13.0	35.0	57	62.1	52.0	53.2
30 - 34	93	28.7	26.0	34.2	23	72.9	39.0	64.0
35 - 39	44	58.3	39.0	56.1	5	148.2	169.0	78.3
40 - 49	25	78.0	52.0	66.5	10	62.4	45.5	51.6
50+	6	45.5	19.5	74.8	1	0.0	0.0	.
Unknown	2	6.5	6.5	9.2	-	-	-	-
All ages	**322**	**33.6**	**13.0**	**44.2**	**322**	**33.6**	**13.0**	**44.2**

Table 6.6. Marriages by type of gifts received by grooms party from bridal party, 2009-2013

Type of gift received	Year				
	2009	2010	2011	2012	2013
None	40.1	43.2	57.6	48.5	48.5
Gift without prior negotiation	0.6	0.6	0.9	1.1	0.9
Gift after prior negotiation	59.3	56.2	41.5	50.3	50.6
Gift payment					
Full	19.1	18.8	13.2	16.7	18.8
Partial	33.7	31.1	22.4	26.8	25.9
Not yet paid*	6.5	6.3	5.8	6.8	5.9

*Was agreed at the time of marriage but did not pay as yet

Table 6.7. Registration status of Muslim marriages, 2002-2013

Year	Registered with Kazi		Not registered	
	Number	Percent	Number	Percent
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
2009	2760	94.6	158	5.4
2010	2643	92.3	221	7.7
2011	2620	93.2	192	6.8
2012	2666	93.4	187	6.6
2013	2687	94.2	165	5.8

Table 6.8. Registration status of divorces of Muslim marriages, 2002-2013.

Year	Registered with Kazi		Not registered	
	Number	Percent	Number	Percent
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
2009	239	77.1	71	22.9
2010	319	82.6	67	17.4
2011	302	84.4	56	15.6
2012	299	82.4	64	17.6
2013	239	76.6	73	23.4

Table 6.9. Cause of divorces by area, Matlab, 2013

Cause of Divorce	Both areas		icddr,b area		Government area	
	Number	Percent	Number	Percent	Number	Percent
Dowry	5	1.6	3	1.9	2	1.2
Domestic violence	15	4.7	9	5.6	6	3.7
Husband affairs with other woman	31	9.6	17	10.6	14	8.6
Wife affairs with other man	70	21.7	33	20.6	37	22.8
Maladjustment with husband/his family	95	29.5	41	25.6	54	33.3
Husband addicted to drugs/gambling	12	3.7	8	5.0	4	2.5
No trace of husband	10	3.1	6	3.8	4	2.5
Husband/wife not good looking	11	3.4	3	1.9	8	4.9
Husband mentally/physically disabled	30	9.3	15	9.4	15	9.3
Wife mentally/physically disabled	10	3.1	6	3.8	4	2.5
Others /unspecified	33	10.2	19	11.9	14	8.6
Total	**322**	**100.0**	**160**	**100.0**	**162**	**100.0**

Source: Divorce registration form

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. Exceptions are made if someone move into the area due to marriage or divorce or settlement. These definitions are used in the surveillance area as a whole.

During 2013, the total of 10,264 persons (4,696 males and 5,568 females) moved into the HDSS area, which represented an annual average in-migration of 4.5% for both males and females of the mid-year population. On the other hand, 10,784 persons (4,956 males and 5,828 females) left the HDSS area or on an average 4.7% for both males and females of the mid-year population (Table 7.1 and Appendix A.13), giving a crude rate of in-migration of 45.0 per 1,000 population, and out-migration rate of 47.3 per 1,000 population. The highest incidence of in-migration for males was 10.0% in the age group 30-34 and for females was 10.4% in the age group 20-24. More males and females out-migrated in the age group 15-19 was 10.4% and 20-24 was 12.4%, respectively. More males out-migrated than females in the age group (0-54). 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 86 males per 100 females in 2013. More out-migration of working age (15-59) group males compared to females caused a decline in the sex ratio over the period.

In-migration rate increased and out-migration rate decreased in 2013 over those of 2012. The net loss of migrants was 2.3 per 1,000 in 2013, whereas it was 8.9 per 1,000 in 2012. 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. 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 area, 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).

Table 7.1. Age and sex-specific migration rates (per 1,000 population) by direction, 2013

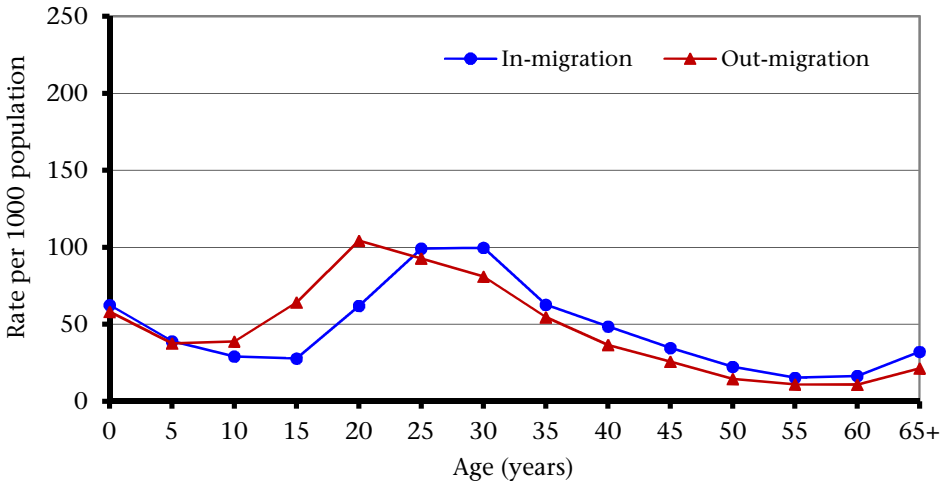
Age (years)	Both sexes		Male		Female	
	In	Out	In	Out	In	Out
All ages	45.0	47.3	44.5	47.0	45.5	47.6
0 - 4	64.0	57.3	62.5	58.1	65.5	56.6
5 - 9	39.5	36.8	38.9	37.7	40.0	35.9
10-14	29.1	35.9	29.1	38.8	29.0	33.0
15-19	67.6	89.3	27.7	64.2	104.2	112.4
20-24	84.8	116.5	61.9	104.3	100.0	124.7
25-29	82.1	81.5	99.2	92.7	71.5	74.5
30-34	68.9	62.4	99.6	81.0	47.6	49.5
35-39	41.5	37.3	62.6	54.5	25.7	24.4
40-44	30.9	24.3	48.5	36.6	17.3	14.8
45-49	23.5	18.0	34.6	25.8	15.1	12.1
50-54	16.9	12.3	22.4	14.5	11.5	10.2
55-59	13.8	11.8	15.3	11.0	12.4	12.6
60-64	13.9	11.1	16.4	10.8	11.6	11.3
65+	32.0	34.5	32.2	21.3	31.9	44.9

Table 7.2. In- and out-migrations by sex and month, 2013

Months	In-migration			Out-migration		
	Both sexes	Male	Female	Both sexes	Male	Female
All months	10264	4696	5568	10784	4956	5828
January	1115	512	603	1425	668	757
February	856	382	474	922	412	510
March	831	376	455	910	420	490
April	1036	495	541	909	448	461
May	687	301	386	869	388	481
June	863	403	460	786	384	402
July	767	374	393	810	368	442
August	805	352	453	1013	426	587
September	634	293	341	826	398	428
October	1285	608	677	959	444	515
November	775	345	430	800	362	438
December	610	255	355	555	238	317

Figure 7.1. In- and out-migration rates by sex and age in Matlab, 2013

(a) Male



(b) Female

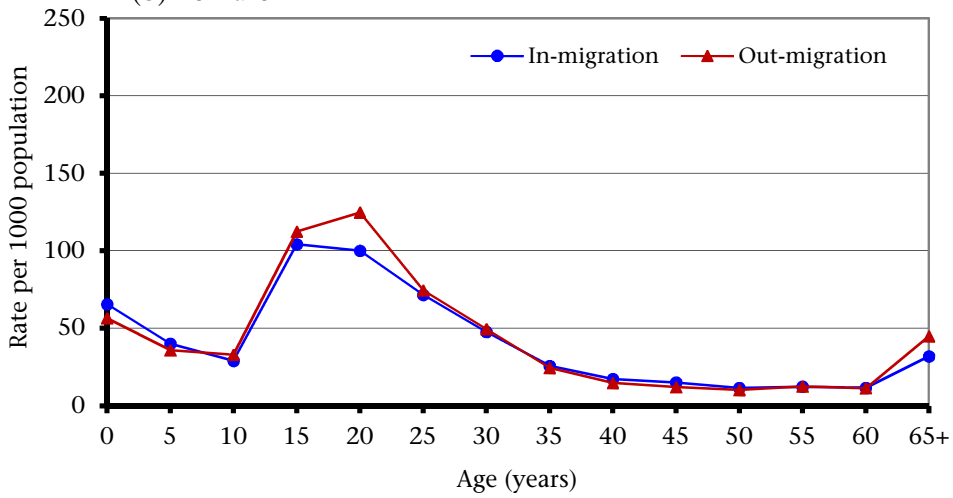
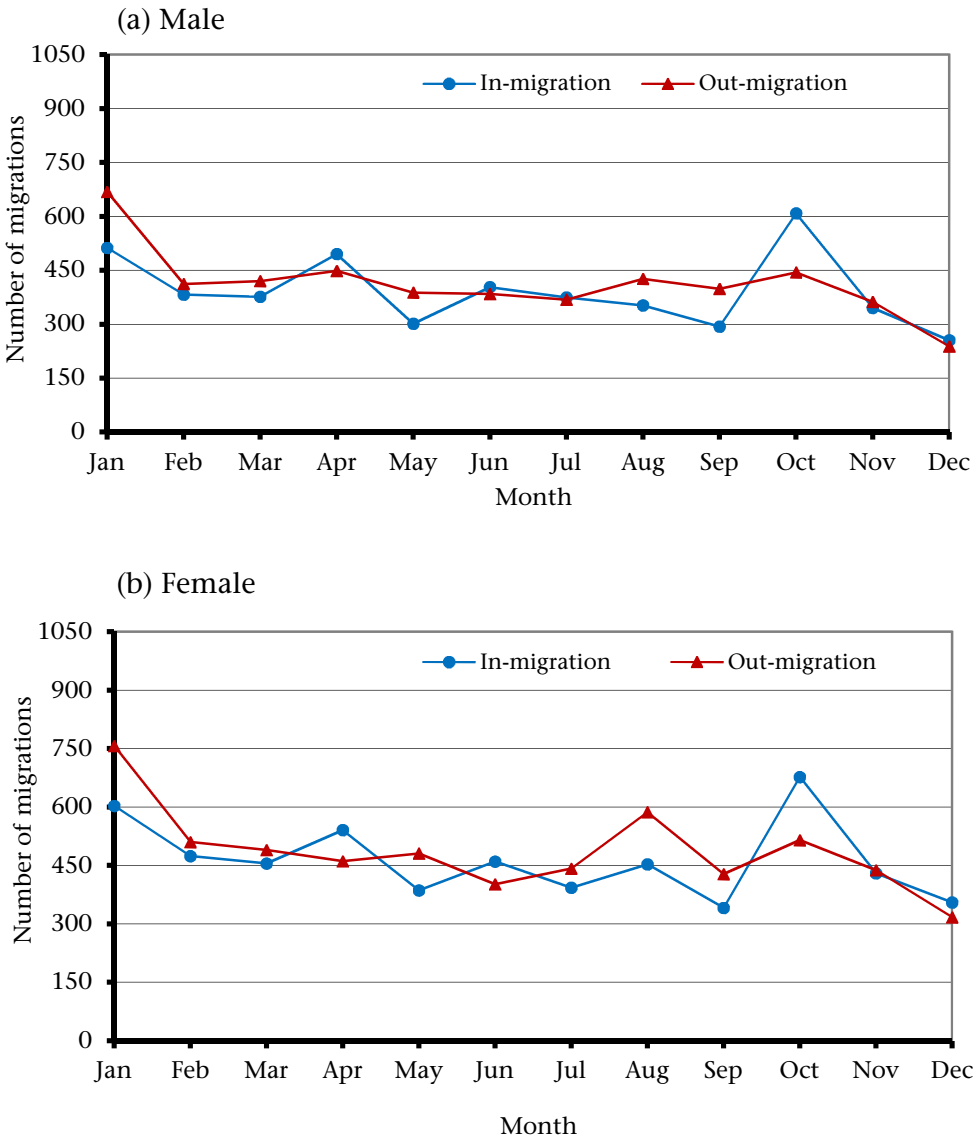


Figure 7.2. Number of in- and out-migrations by sex and month in Matlab, 2013



CHAPTER 8

FERTILITY REGULATION

In the icddr,b service area, 41 service CHRWs have been providing maternal and child health and family planning (MCH-FP) services including EPI from fixed site clinics since 2001. In case of any complications they 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 in each union 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 in addition to private and NGO sectors.

The 38 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. During home visits they sometimes give advice to oral pill users to procure pills in timely manner, pregnant women to seek antenatal care and have safe delivery; and parents to immunize children and treat sick children by formally trained providers. In 2013 the contraceptive use rate was 53.8% in the icddr,b service area and 42.2% in the Government service area (Table 8.1). Contraceptive use rate in the Government service area is lower than the use rate of 51.4% recorded in Chittagong division in 2011. Table 8.2 shows the difference in contraceptive method-mix between the icddr,b and Government service areas in 2013 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, tubectomy and condom. Changes in the method-mix in the icddr,b service area during 1999-2013 are shown in Table 8.3. 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 whereas in the Government service area (Table 8.5), the pill, then injectables are the most popular method in all age groups except age group 45 years and over. Tubectomy is 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, 1985-2013

Year	Matlab		National**
	icddr,b area	Government area*	
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	58.1
2007	56.6	43.6	55.8
2008	54.4	41.3	59.5
2009	54.2	42.5	-
2010	55.7	43.1	62.6
2011	54.1	43.7	61.2
2012	53.3	42.6	
2013	53.8	42.2	62.0

*Sources: In-depth and KAP surveys, 1984 & 1990; MDHS 1992; HDSS census 1996 and HDSS 2002-2013.
**Sources: Contraceptive prevalence survey, Bangladesh fertility survey 1989; Bangladesh demographic and health survey 1993-94,1996-97,1999-2000,2004,2007,2011; Bangladesh maternal health services and maternal mortality survey 2010; Utilization of Essential Service Delivery Survey 2006,2008,2013.

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

Method	Matlab		National	
	icddr,b service area, 2013	Government service area, 2013	BMMS 2010	BDHS 2011
Pill	30.1	43.2	49.7	44.5
Condom	9.7	6.7	6.2	9.0
Injectables	40.8	28.3	19.6	18.3
IUD	1.4	1.1	1.0	1.1
Tubectomy	11.1	13.4	6.9	8.2
Vasectomy	2.0	0.7	1.0	2.0
Norplant/Implant	2.4	1.9	1.3	1.8
Others*	2.4	4.8	14.2	15.1
Total	**100.0**	**100.0**	**100.0**	**100.0**

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 service area, 1999-2013

Method	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Pill	28.7	30.6	31.9	33.3	33.9	32.6	34.1	35.8	34.6	30.6	30.3	30.1	29.0	29.4	30.9
Condom	7.7	9.5	10.8	11.1	11.0	10.9	11.2	10.8	8.6	9.0	9.5	9.2	9.4	9.9	10.0
Injectables	50.4	47.8	45.7	44.5	44.4	45.2	42.7	41.3	43.6	47.4	46.6	46.8	46.4	45.2	41.8
IUD	3.3	2.4	1.9	1.8	1.9	2.4	2.6	2.4	1.9	1.8	1.7	1.8	1.7	1.5	1.4
Tubectomy	9.8	9.1	8.6	7.7	7.2	7.4	7.6	7.9	9.2	9.0	9.4	9.3	10.3	10.5	11.4
Vasectomy	0.1	0.6	1.1	1.5	1.5	1.4	1.4	1.5	1.6	1.7	1.9	1.9	2.1	2.1	2.0
Norplant	-	-	-	-	0.0	0.1	0.3	0.3	0.5	0.5	0.6	0.9	1.1	1.4	2.5
All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

*Currently married women using any modern method.

Table 8.4. Method specific contraceptive use rate among currently married women by age in icddr,b service area, 2013

Age (years)	Not using	Any method used	Method used								No. of eligible women
			Pill	IUD	Injectables	Condom	Tubectomy	Vasectomy	Others*	Norplant	
<20	74.3	25.7	11.3	0.4	9.3	3.6	0.0	0.0	0.2	0.9	1349
20 – 24	56.6	43.4	15.9	0.7	20.4	4.6	0.1	0.0	0.4	1.4	3799
25 - 29	52.5	47.5	16.4	0.7	22.0	5.0	1.1	0.2	0.4	1.7	4440
30 - 34	44.6	55.4	18.5	0.7	23.7	4.7	4.8	0.7	1.0	1.4	4145
35 - 39	36.6	63.4	18.0	1.0	24.0	5.9	10.6	1.5	1.5	1.0	3878
40 - 44	33.6	66.4	17.0	0.9	23.7	6.0	12.4	2.1	2.8	1.5	3491
45 - 49	40.1	59.9	11.8	0.7	22.3	6.3	12.2	3.1	2.9	0.8	2768
Total	46.2	53.8	16.2	0.7	21.9	5.2	6.0	1.1	1.3	1.3	23870

*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, 2013

Age (years)	Not using	Any method used	Method used								No. of eligible women
			Pill	IUD	Injectables	Condom	Tubectomy	Vasectomy	Others*	Norplant	
<20	82.5	17.5	9.1	0.0	3.2	4.5	0.0	0.0	0.5	0.3	1096
20 – 24	71.5	28.5	16.0	0.2	7.9	2.9	0.1	0.0	0.6	0.7	3123
25 - 29	62.9	37.1	19.1	0.4	11.9	2.8	1.2	0.1	0.9	0.8	4057
30 - 34	53.9	46.1	20.9	0.5	13.7	3.4	5.0	0.4	1.3	1.0	3817
35 - 39	46.1	53.9	22.4	0.6	15.6	2.9	8.9	0.4	2.1	1.0	3404
40 - 44	46.7	53.3	19.1	0.7	14.1	2.3	11.7	0.5	4.1	0.8	3173
45 - 49	57.3	42.7	12.6	0.8	10.6	1.7	11.3	0.5	4.7	0.5	2426
Total	57.8	42.2	18.2	0.5	12.0	2.8	5.7	0.3	2.0	0.8	21096

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

CHAPTER 9

CHILD HEALTH SERVICE USE

Immunization

The Community Health Research Workers (CHRWs) started measles vaccination to all children in blocks A&C and blocks B&D in 1982 and 1985 respectively and Rubella vaccination in all blocks from 2012. Vaccination for DPT and polio started in 1986 in all four blocks (Appendix E). From the beginning of these interventions, vaccination records have been maintained by CHRWs in the icddr,b service area. The record keeping system (RKS) was started in icddr,b and Government services areas in 1977 and 2000 respectively. In contrast, the CHRWs in Government service area record only vaccination status either by checking vaccination cards or by asking mothers about vaccination of children if the vaccination card was missing.

The World Health Organization recommends that all children receive a BCG vaccination against tuberculosis; three doses of DPT for the prevention of diphtheria, pertussis and tetanus; hepatitis B; three doses of polio vaccine; and a vaccination against measles before their first birthday. In January 2009, the Bangladesh EPI program introduced hemophilus influenza type B (Hib) vaccine in the form of pentavalent vaccine that included the DPT and hepatitis B vaccines and the new Hib vaccine. By June 2009, the pentavalent vaccine had replaced the DPT and hepatitis B in the EPI program. Therefore, vaccination of children aged 12-23 months is presented to allow comparison of results across the areas.

Table 9.1 shows the rates of coverage of different vaccines among children aged 12-23 months in icddr,b service area from 1987 to 2013 and the Government service area from 2000 to 2013. In 2013, immunization of children was almost universal: 98.1% received BCG, 97.2% received three doses of pentavalent and polio and 88.5% received rubella vaccines in icddr,b area and 97.6% received BCG, 94.7% received three doses of pentavalent and polio and 81.8% received rubella vaccine in Government service area. The BDHS estimates of immunization coverage were 97.8% for BCG, 93.2% for DPT/penta, 93.4% for polio, and 87.5% for measles in 2011.

Table 9.1. Immunization coverage (%) among children aged 12-23 months in icddr,b area, 1987-2013 and Government service area, 2000-2013

Vaccination coverage rate of children aged 12 - 23 months								
	BCG (1 dose)		Pentavalent and polio (3 doses)		Measles (1 dose)		All*	
Year	icddr,b area	Government area	icddr,b area	Government area	icddr,b area	Government area	icddr,b area	Government area
1987	88.4	-	76.1	-	85.2	-	69.3	-
1988	93.3	-	82.8	-	87.9	-	77.2	-
1989	94.6	-	88.4	-	92.0	-	84.0	-
1990	98.7	-	95.7	-	96.4	-	93.8	-
1991	98.6	-	95.6	-	97.0	-	94.1	-
1992	99.1	-	96.9	-	97.8	-	96.0	-
1993	99.5	-	97.6	-	98.1	-	96.6	-
1994	99.5	-	97.7	-	97.0	-	95.7	-
1995	99.3	-	96.8	-	97.0	-	95.0	-
1996	99.5	-	98.0	-	97.9	-	96.7	-
1997	99.3	-	98.5	-	98.0	-	97.3	-
1998	99.2	-	97.7	-	96.1	-	95.4	-
1999	99.0	-	97.7	-	94.8	-	94.1	-
2000[a]	99.2	73.6	97.7	67.8	95.9	50.2	95.1	48.5
2001	99.1	89.8	98.2	80.0	96.0	74.1	95.4	71.0
2002	99.3	96.7	98.5	90.6	95.7	84.5	95.4	83.1
2003	99.2	97.4	98.5	92.0	95.9	84.3	95.6	83.2
2004	99.3	97.6	98.2	93.1	96.6	86.2	95.9	85.3
2005	99.6	97.9	99.0	94.6	97.8	86.0	97.3	84.9
2006	99.0	97.3	97.6	93.7	95.2	81.7	94.3	80.4
2007b	99.8	99.8	98.8	99.0	96.3	95.1	96.1	94.7
2008b	97.8	96.3	97.3	95.9	95.1	93.6	94.8	93.6
2009b	97.4	97.8	96.7	97.5	95.0	95.6	94.6	95.6
2010	96.6	95.8	93.7	92.4	92.3	91.3	88.6	87.4
2011	95.9	95.1	93.2	92.1	87.0	84.0	86.0	83.1
2012	97.4	95.3	94.2	89.9	86.1	88.0	83.0	82.5
2013	98.1	97.6	94.7	88.5	86.1	81.8	88.3	81.7

*Children fully vaccinated (i.e those who received BCG, measles and three doses of pentavalent and polio).
[a]Immunization coverage rate is about 20% under reported in the Government area due to not checking of vaccination cards during the initial months of 2000.
[b]Child immunization data are collected on sample basis in 2007-2009

CHAPTER 10

GEOGRAPHICAL INFORMATION SYSTEM (GIS)

The Geographic Information System (GIS) was established in 1994 under the Public Health Sciences Division to produce cartographic, thematic and analytic maps as per requirements of the investigators of icddr,b. 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). Spatial data include locations of baris (cluster of a group of households sharing common yard), tube-wells, ditches, ponds, health facilities, educational institutes, mosques, markets, etc. The FRSs are trained in using handheld GPS device and collecting geo-coordinates of new bari, road, health facility, educational institute, etc. The spatial database is periodically updated with new data. HDSS residents are linkable to the geo-reference objects of the Matlab spatial database.

New development of GIS software and satellite images has expanded the scope of GIS activities in different fields. Currently GIS generates thematic maps, creates spatial variables and performs spatial and temporal analyses 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 changes in measureable indicators, such as morbidity, mortality or risk factors of morbidity and mortality. This facilitates targeting interventions to the high-risk areas and efficient use of scarce resources.

The Figure 10.1 shows the crude birth rate (CBR) by village in HDSS area during 2012-2013. In most of the villages CBRs were higher than the average national CBR of 20 in both areas. The Figure 10.2 shows the crude death rate (CDR) by village in HDSS area during 2012-2013. CDRs were in between 6.1 and 8.0 in most of the villages.

Figure 10.1 Crude birth rate (CBR) by village in HDSS study area, Matlab, 2012-2013

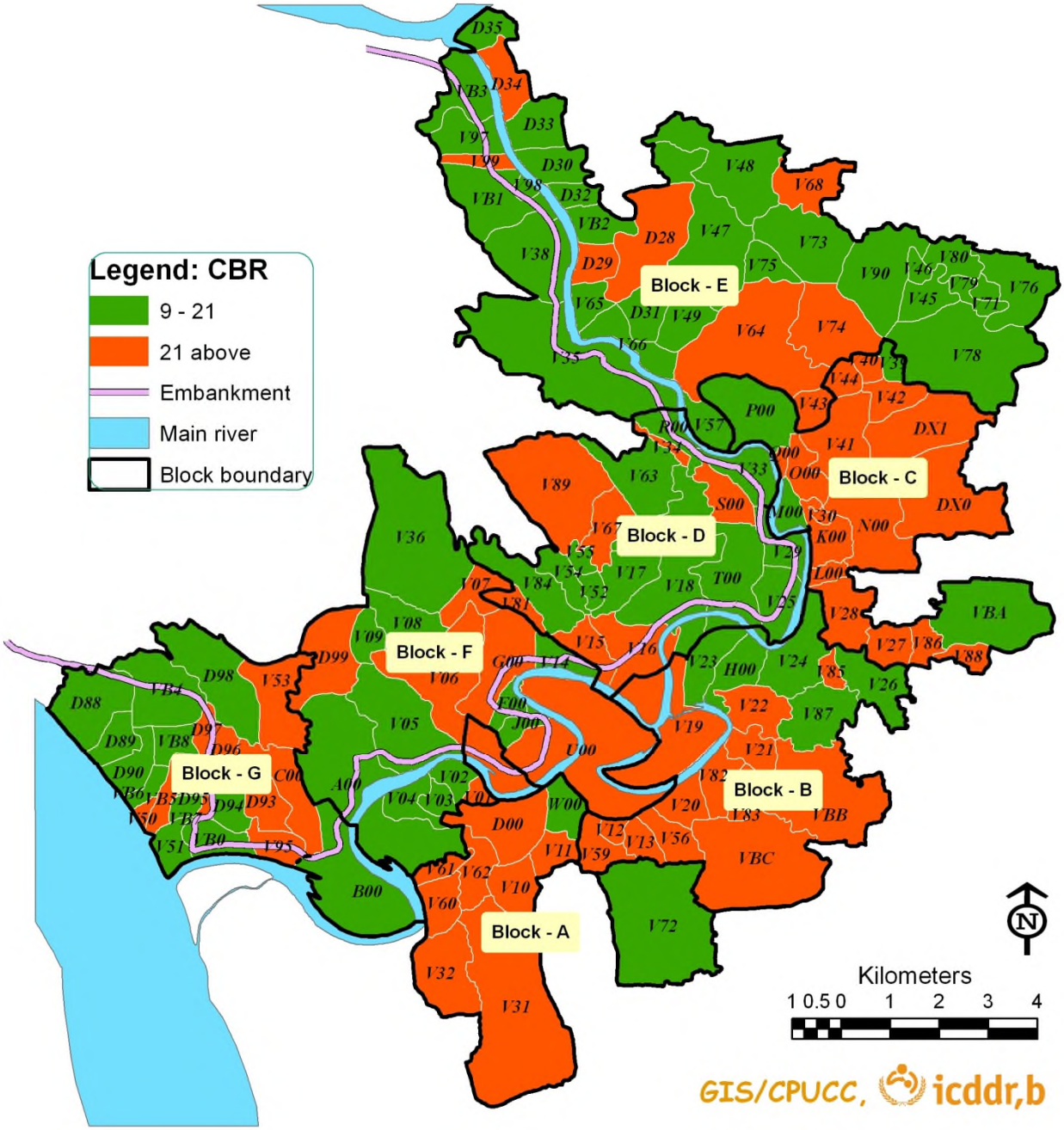
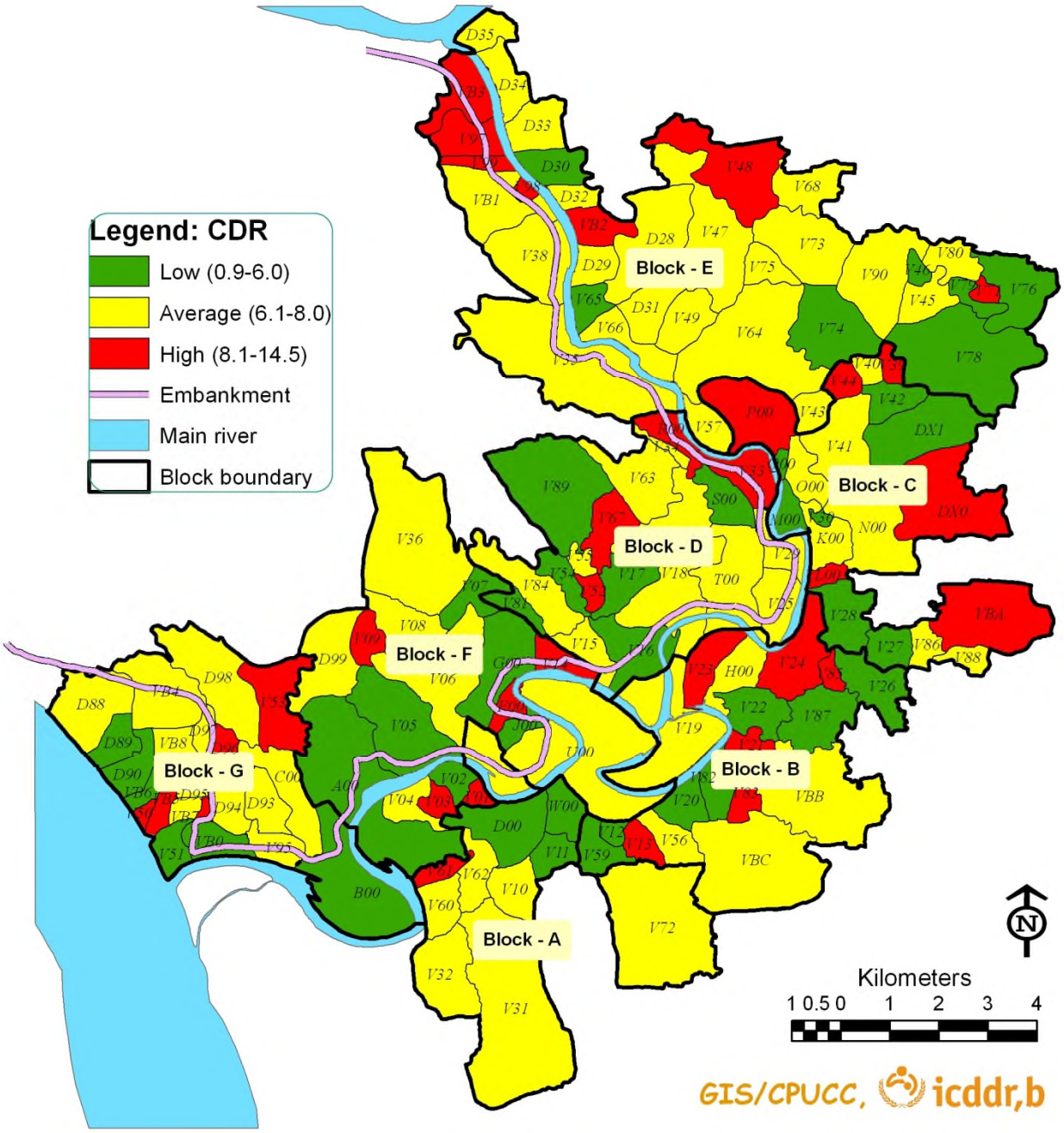


Figure 10.2 Crude death rate (CDR) by village in HDSS study area, Matlab, 2012-2013



CHAPTER 11

FOOD SECURITY AND DIETARY DIVERSITY IN MATLAB: TRENDS AND DIFFERENTIALS

Summary

Rising prices of essentials including grains were a global phenomenon in late 2007 and 2008 and were breaking the budgets of the poor and middle-income groups (people who are just under a dollar a day and who are just above that borderline – one dollar a day). In Bangladesh, the low income workers rallied in the streets for wage raise and food rationing in Dhaka and Chittagong (The Daily Star 14 April 2008). For monitoring household security, periodic sample survey was introduced in Matlab health and demographic surveillance system (HDSS) area in 2008 and continued up to 2013. This chapter presents levels and trends in household food security, dietary diversity and coping mechanisms in case of food insecurity in the area.

Data on household food security and dietary diversity were collected in eight rounds and anthropometry (height and weight) of under-five children and their mothers once in December 2010. Five trained female community health research workers visited sampled households for recording access to food, quality of meals, dietary diversity, coping strategies in case of food insecurity such as child labour, sale or mortgage of assets, and borrow of money and receive donation for buying food. Respondents were women who prepared and served food to the household members. Descriptive statistics and graphs are used to show the results on household food insecurity measures and nutritional status of under-five children and adult women who prepared and served food.

In 2013, around 99% of the households have access to full meal three times every day in a week which was 91% in 2008. Eating meals with vegetables and protein in a day, an indicator of quality of meals, increased from 62% in 2008 to 87% in 2013. Access to quality meals has also increased from 58% to 81% among the households of the lowest two wealth quintiles. Dietary diversity has also gradually increased over the years. Borrowing money or receiving donations for food has decreased to 8% from 20% among the households of the lowest two wealth quintiles. Incidence of child labour for food was very low, <1%.

Despite improvements in levels of household food security and dietary diversity after 2008, 43% of the under-five children were stunted and 20% of the women were underweight. Prevalence of stunting among under-2 children was three times higher and underweight among women was two times higher belonging to the households in the lowest wealth quintile than highest wealth quintile. One fifth of the women belonging to the highest wealth quintile was overweight or obese while it was 8% among women belonging to the lowest wealth quintile. Under-five children of the households having access to meal with fish or meat always or more often (4-6 days in a week) are less stunted (39%) than their peers of the households having limited (3 days or less) access (64%).

Key Words: Access to food, dietary diversity, meal with fish/meat, stunting, wasting, under-weight, household economic status.

INTRODUCTION

Bangladesh is a low-income, food-deficit country with annual average food grain imports of 2 million metric tons per year till 2014. Rising prices of essentials including grains were a global phenomenon in 2008. The world food situation was very serious with food riots reported from many countries like Egypt, Cameroon, Haiti, Burkina Faso and Senegal (FAO 2008). Bangladesh was struggling with poverty and hunger and the effects of the soaring prices of food and other essentials. Soaring prices were breaking the budgets of the poor and middle-income groups (people who are just under a dollar a day and who are just above that borderline – one dollar a day). Garment workers are of low income, rallied in the streets for wage raise and food rationing in Dhaka and Chittagong (The Daily Star 14 April 2008). Soaring prices may have hindered the country's progress toward achieving MDGs by raising poverty and hunger (MDG 1); school drop out of children (MDG 2); and under-nutrition and mortality (MDG 4 and MDG 5).

Consequences of the recent price hikes on levels of household food security and on nutrition, healthcare seeking and education of children were anecdotal. Food security is commonly described as a condition where all people can afford sufficient quantity of nutrient food. The World Food Summit of 1996 defined food security as – "when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life". In Matlab, Bangladesh household food security correlated well with infant feeding practices and growth of infants and young children (Saha et al 2008). This chapter aimed to estimate levels of different facets of household food insecurity and dietary diversity and identify coping strategies in response to food insecurity in different seasons in a rural area where ICDDR, B maintains the health and demographic surveillance system (HDSS) for last five decades. Results will help policy makers to plan future remedial action.

METHODS AND DATA

Study area: HDSS maintained by icddr,b in Matlab records longitudinally health and demographic events occurring in 142 villages since 1966. The surveillance area is divided into 1,359 clusters each consists of 30-36 households in 5 or 6 *baris (*sharing a common area with a distinct boundary wall or fence). A routine surveillance worker visits all households in a cluster in a working day in her bi-monthly rounds. For assessment of household food insecurity and dietary diversity, eight rounds of the sample survey were conducted over 2008 to 2013. The samples were randomly selected, the first stage was selection of clusters and the second stage was selection of households. Five female CHRWs visited the sampled households with structured questionnaire in PDA (personal digital assistant). In absence of the main respondent, the immediate next household was surveyed. One field research officer supervised their field activities on a regular basis. Following the fifth round of the survey in 2010, anthropometric data of under-five children and their mothers were collected from the fifth round survey households and linked with the household food security and dietary data. A brief description of the rounds of the surveys is given in Table 11.1.

Survey Instrument: Frongillo et al (2003) developed a questionnaire to measure food insecurity in rural households in Bangladesh in 1999-2000 and it was subsequently used in the Maternal and Infant Intervention in Matlab trial in 2001 (Frongello et al 2004). We adopted this

questionnaire to assess household food insecurity (access) experience and to assign households along a continuum of severity, from food secure to severely food insecure.

Table 11.1: Data collection period, number of survey workers, survey clusters per worker and households interviewed per round and anthropometry survey, HDSS 2008-2013

Survey round	Data collection period	# cluster per worker	# worker	# households interviewed
FIS-1	03 Jun – 22 Jul, 2008	30	5	1,341
FIS-2	29 Sep – 03 Dec, 2008	45	5	2,062
FIS-3	11 Mar – 03 Jun, 2009	45	5	2,055
FIS-4	01 Aug – 14 Nov, 2009	45	5	2,032
FIS-5	27 Jul – 15 Nov, 2010	45	5	1,884
FIS-6	13 Sep – 20 Nov, 2011	45	5	1,874
FIS-7	12 Jun – 08 Aug, 2012	45	5	1,874
FIS-8	1 Jan – 08 Jun, 2013	45	5	1,834
Anthropometry	6 Dec, 2010 – 04 Jan, 2011	75	3	760

Note: FIS – Food Insecurity Survey

Field Procedure and Data Collection: Data were collected by face-to-face interview. Each interviewer was given the lists of clusters and households in advance to visit women responsible for preparing and serving foods at their homes. She sought their permission prior to interview. Interviewers asked women about the quantity and quality of access to and consumption of foods in last one week and last one month.

RESULTS

Household access to food

Household access to food is measured with access to full meal and access to meal with fish/meat. These measures have been used to get an idea about the access to food and the quality of meal that the household members had in the week preceding the survey.

Access to full meal: Very poor cannot eat 3 fulfilling meals every day. They often eat rice with salt, chili, onion or bharta (smashed vegetables) in the morning and evening. To cope with the situation they sometimes substitute rice with less preferred and less expensive food items; potato, maize, liquid starch or vegetables. In lean seasons they eat either small meals or fewer meals a day. As a result they sleep hungry at night and starve in extreme cases. Interviewers inquired about consumptions of fulfilling meals which refer to all members of the household ate full meal three times a day 7 days in last week preceding the survey.

Table11.2: Percent of households had access to 3 full meals a day during last 7 days preceding the survey, HDSS 2008-2013

Month	Year					
	2008	2009	2010	2011	2012	2013
January	-	-	-	-	-	98.9
February	-	-	-	-	-	99.6
March	-	96.3	-	-	-	99.3
April	-	94.2	-	-	-	100.0
May	-	96.2	-	-	-	-
June	89.7	-	-	-	98.4	-
July	90.1	-	98.6	-	99.6	-
August	-	96.0	98.8	-	100.0	-
September	95.2	98.3	97.9	98.3	-	-
October	93.2	98.1	96.8	98.3	-	-
November	91.0	99.1	97.4	98.6	-	-
December	95.7	-	-	-	-	-

Note: Results with denominator less than 25 cases are not reported in this table. So, the averages of years are also omitted.

Household access to full meal always was quite similar in different months within a year but different between the years and over time it had increased (Table 11.2). In 2008, it varied from 90% to 95% in different months, in 2010 it varied within 97% to 99% and in 2013 the variation was in between 99% to 100%. Almost all households in Matlab HDSS area have secured access to full meal since 2012.

Access to quality meal: Access to meal with quality (animal/fish) protein is a measure of access to quality meal. Fish and meat are the main sources of quality protein. The poor usually gather fish and vegetables from common natural water bodies and resources, roadsides and fields. Particularly in Matlab, people have greater access to fish over meat as there are rivers, canals, *bills*, ditches and ponds that are great sources of fishes. So, fish is the main contributor to access to quality protein in Matlab. The well-off usually buy fish, meat and vegetables from market. Interviewers asked them about number of times they bought rice and perishable food items from market in the preceding week and month.

Access to fish always – all members of the household ate any or three meals with fish everyday in last week. *Access to fish often* – all members of the households ate any or three meals with fish 4-6 days in last week. *Limited access to fish* – any member of the household ate any or three meals with fish less than 3 days in last week. *Access to meat always* – all members of the households ate any or all meals with meat 4-7 days in last week. *Access to meat often* – all members of the household ate any or all meals with meat 1-3 days in last week. *Limited access to meat* – any member of the household ate any or all meals with fish 4-6 days in last week. *Access to fish/meat always* – all members of the household had access to meals with fish always or with meat always. *Access to fish/meat often* – all members of the household had access to meals with fish often and limited meat, or with meat often and limited fish, or with fish often and meat often. *Limited access to fish/meat* – any member of the household had limited access to fish or meat. Interviewers asked about meals with fish and meat, rice substitutes and small and fewer meals.

Access to meal with fish/meat always/often was more similar between different months within a year than between years (Table 11.3). In 2008 it increased from 82% to 88%, in 2010 it varied in between 86% to 94% and in 2013 it varied from 87% to 92%. Except in month of May 2009,

access to meal with fish/meat always or often was above 82% in every month from 2008 to 2013.

Table11.3: Percent of households had access to meal with fish/meat at least 4 days in last 7 days preceding the survey, HDSS 2008-2013

Month	Year					
	2008	2009	2010	2011	2012	2013
January	-	-	-	-	-	88.8
February	-	-	-	-	-	91.5
March	-	81.6	-	-	-	88.7
April	-	80.0	-	-	-	86.7
May	-	76.7	-	-	-	-
June	84.6	-	-	-	87.8	-
July	82.2	-	87.4	-	86.7	-
August	-	80.6	88.1	-	84.7	-
September	88.1	85.8	93.8	87.9	-	-
October	86.8	86.1	86.4	89.5	-	-
November	84.7	88.3	91.1	93.9	-	-
December	81.9	-	-	-	-	-

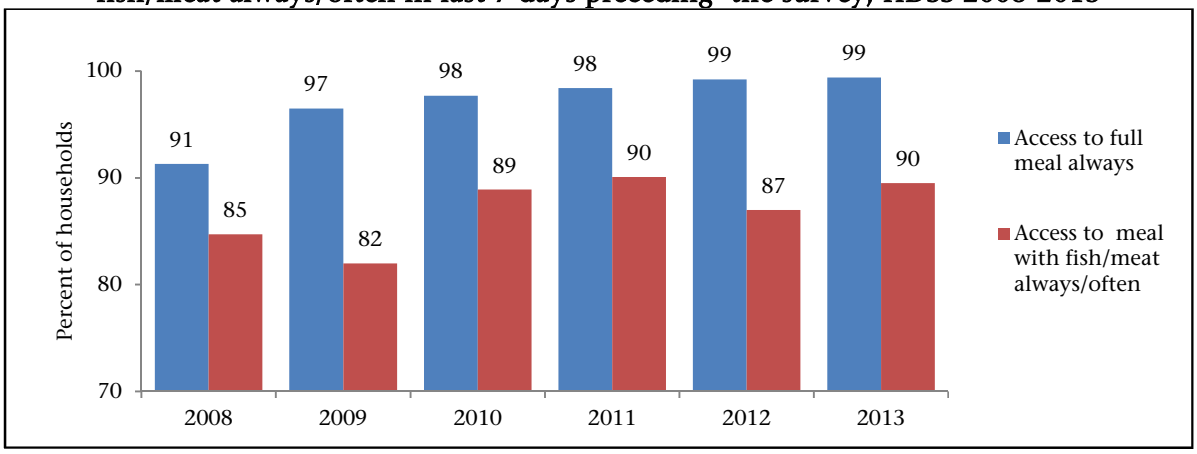
Note: Results with denominator less than 25 are not reported in this table. So, the averages of years are also omitted.

Overall, the two indicators; access to 3 full meals a day and access to meal with fish/meat in the week preceding the survey did not vary much between the months within a year, but varied between the years with upward trends (Figure 11.1). Therefore, further analyses did not consider month of the year and presented yearly percent or mean.

Table11. 4: Percent of household had access to full meal always, and meal with fish, meal with meat, meal with fish/meat always or (4-6 days) in last 7 days preceding the survey, HDSS 2008-2013

Year	Full meal	Meal with fish	Meal with meat	Meal with fish/meat	Number
2008	91.3	81.4	30.8	84.7	3,403
2009	96.5	76.6	32.8	82.0	4,087
2010	97.7	85.4	34.5	88.9	1,886
2011	98.4	82.4	43.6	90.1	1,872
2012	99.2	82.9	39.8	87.0	1,874
2013	99.4	86.7	39.9	89.5	1,834

Figure 11.1: Percent of households had access to 3 full meals and to meal with fish/meat always/often in last 7 days preceding the survey, HDSS 2008-2013



Household deprivation of food

Measure of deprivation **of food**: A household is considered to be deprived of food if any member of the household ate less than 3 meals for lack of food in any of the days in last week preceding the survey. Deprivation of food, the extreme consequence of household food insecurity, had sharply declined after 2008 in Matlab (Table 11.5). Around 6% of the households reported that they ate less than 3 times a day in any/few days in the preceding week of the survey in 2008. After that percentage of households deprived of food started to decline – from 2% in 2009 to near 1% in 2010 and 2011, and further dropped to 0.2% in 2013. There was no household without food in the preceding week of the survey over the period of 2008-13.

Table 11.5: Percent of households had been deprived of food in last 7 days preceding the survey, HDSS 2008-2013

	Households deprived of food				
Year	**Never**	**1-4 days**	**5-7 days**	**Total**	**Number**
2008	93.6	5.5	0.9	100.0	3,403
2009	98.0	1.6	0.4	100.0	4,087
2010	98.9	0.7	0.3	100.0	1,886
2011	98.7	0.9	0.4	100.0	1,872
2012	99.5	0.4	0.1	100.0	1,874
2013	99.8	0.2	0.0	100.0	1,834

Consequences of household food insecurity

There might have numerous consequences of lack of access to food and experience of deprivation of food. Food insecurity leads people towards borrowing money for buying food, selling and/or mortgaging assets, diverting loan money to food, engraining child in labour, taking support from government VGD/VGF facility, consuming less preferred food, begging and sometimes committing anti-social activities like stealing. Respondents were asked about strategies they adopted to cope with food insecurity. Strategies include eating less preferred food items, receiving food or money as relief or donation, borrowing food or money from relatives,

neighbour and money lenders, selling labour and crops in advance, selling or mortgaging assets, deferring purchase of sari for women and dress for children, deferring payment of NGO loan, diverting NGO loan to food, etc.

Here the consequences of household food insecurity is measured in terms of receiving donation or borrowing money, sale or mortgaging asset, receiving support from government VGD/VGF facilities, childhood labour and substitution of rice with less preferred food.

Borrowing money or receiving donations: Percent of the households received some sorts of donations was higher in 2008 and 2009, followed by a declining trend in following years (2010-2013). Borrowing money for food from relatives showed a decline from 8% in 2008 to 3% in 2013 (Table 11.6). Borrowing from neighbour was around 2% over the years except 4% in 2009. Borrowing from money lender was higher in 2008 and 2009 than in 2013. Overall borrowing or receiving donations for food had markedly declined to 5% in 2013 from 12% in 2008 and 2009.

Table 11.6: Percent of households borrowed money or received some kinds of donations for buying food in the preceding week of the survey, HDSS 2008-2013

Year	Received donation	Borrowed from relative	Borrowed from neighbour	Borrowed from moneylender	Borrowed /got donation	Number
2008	3.3	7.7	2.4	0.9	11.8	3,403
2009	4.5	7.3	3.9	3.3	12.6	4,087
2010	1.2	2.7	2.1	0.7	4.9	1,886
2011	1.1	2.7	2.4	0.4	5.0	1,872
2012	1.0	1.5	0.8	0.4	2.8	1,874
2013	1.6	2.6	2.3	0.3	4.6	1,834

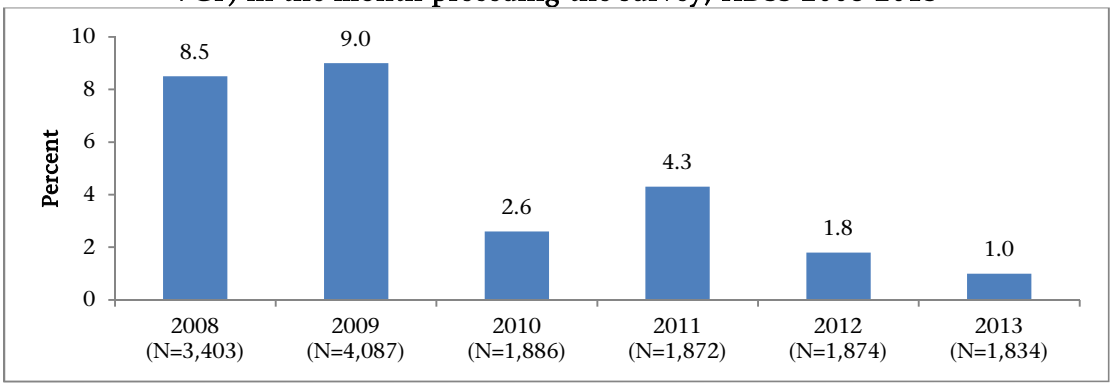
Sale or mortgage of assets for food: Selling assets for food in last month is a rare event in Matlab. It was 0.3% in surveyed households in 2008 and 0.1% in 2013; otherwise it never exceeded 0.05% in 2009-2012 (Table 11.7). Percent of households that mortgaged assets for food was 0.1-0.2% in 2008-'13 except in 2010-'11 when it was around 0.4%. Overall selling or mortgaging of assets was less than 0.5% households in 2008-'13.

Table 11.7: Percent of households sold or mortgage assets for food in the month preceding the survey, HDSS 2008-2013

Year	Sold	Mortgage	Sold/mortgage	Number
2008	0.26	0.09	0.35	3,403
2009	0.02	0.17	0.20	4,087
2010	0.05	0.42	0.48	1,886
2011	0.05	0.37	0.43	1,872
2012	0.00	0.05	0.05	1,874
2013	0.11	0.16	0.22	1,834

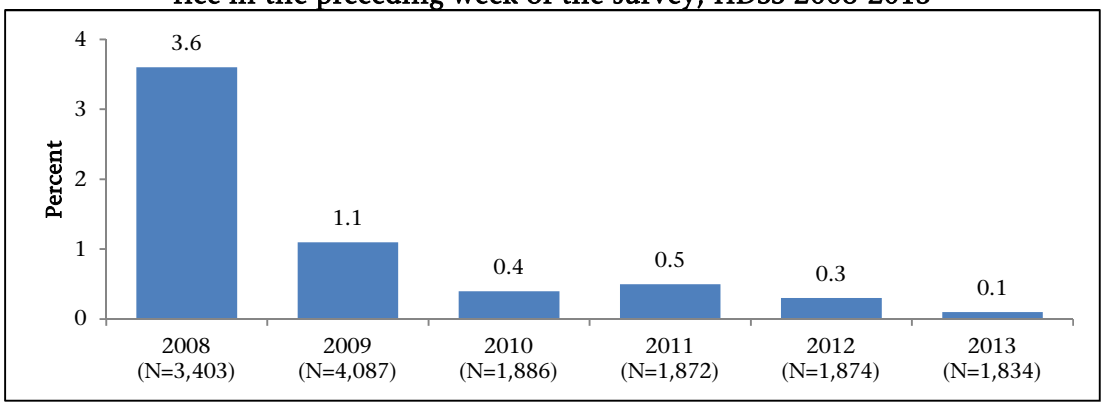
Receiving support from government VGD/VGF Programme: Around 9% of households received support from VGD/VGF programmes in last month preceding the survey in 2008-2009 (Figure 11.2). In 2010 and 2011 receiving VGD/VGF supports was 3% and 4%, respectively, and declined to 2% in 2012 and to 1% in 2013. The overall decline in getting VGD/VGF supports during 2008-2013 was due to either cut in volume of the government supports or improvement in economic conditions of the people to get the supports.

Figure 11.2: Percent of households received money from social safety nets (e.g., VGD or VGF) in the month preceding the survey, HDSS 2008-2013



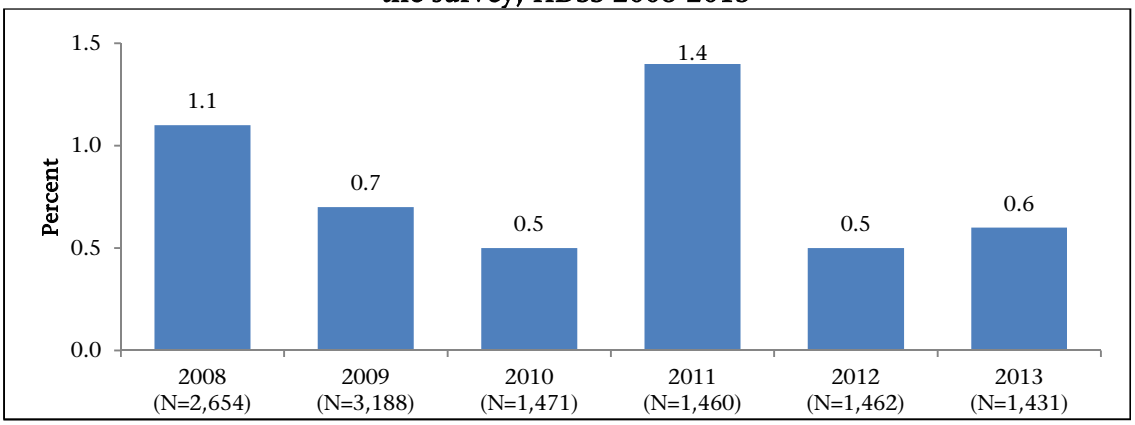
Substitute rice with less preferred food: Rice is the main food grain in Bangladesh. Potato, wheat, bread, corn, *kaun*, etc. are not preferred as substitute(s) of rice. But, lack of access to rice sometimes forces people to substitute rice with those less preferred food or food grain(s). Figure 11.3 shows that around 4% households reported that they had to substitute rice with potato, bread, corn, *kaun*, vegetables (that can be collected from yard or places around home), *jau* (semi liquid rice of broken rice grain) or liquid starch because they could not afford rice. This penury has improved in the following years and substituting rice with those less preferred food declined to around 1% in 2009 and continuing this trend it reached to 0.1% in 2013.

Figure 11.3: Percent of households ate substitutes of rice (potato/bread/corn/ kaun/vegetables/semi liquid rice/ broken rice grain/liquid starch for lack of rice in the preceding week of the survey, HDSS 2008-2013



Child labour for food: In 2008, 1% of the households reported that members under fifteen years old worked for food in last week preceding the survey (Figure 11.4). It dropped to around half in the following years 2009-2013 except 2011 when it was 1.4%.

Figure 11.4: Percent of households with any child worked for food in last week preceding the survey, HDSS 2008-2013



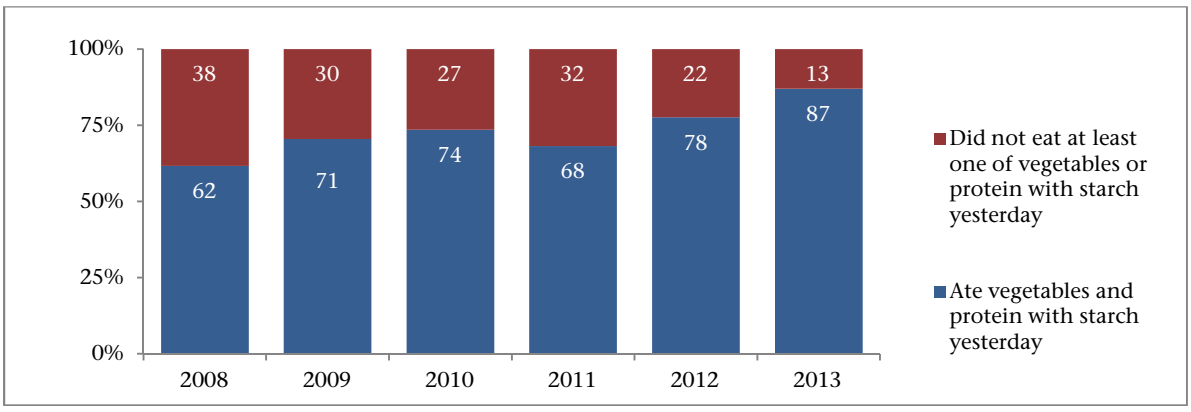
(Note: There are under-fifteen children in 78% households in Matlab)

Quality of diets

Discussion of food security comes with the question – "how many people get full meal to eat?" followed by the question – "how is the quality of meals?" Protein and vegetables with starch are the most important food items that can be an indicator of the quality of diet and dietary diversity can explore more information about quality of meals.

Consumption of vegetables and protein with starch: Around 62% of the households' members consumed starch with vegetables and protein yesterday in 2008 (Figure 11.5). It reached to 87% in 2013 with a gradual increase every year except in 2011. The survey respondents were women of the households who were involved in cooking and serving food to the family members and in rural areas of Bangladesh it is quite unlikely that a woman consumed some foods which other members of the household didn't. Consumption of food by a woman in fact reflects the consumption of the household members. So it can be stated that eating starch with vegetables and protein had increased by 25% points of the people in Matlab over the period 2009-2013.

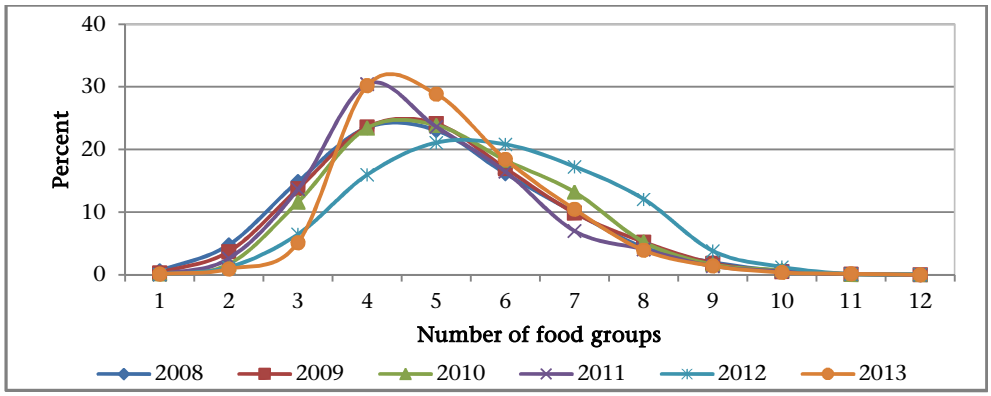
Figure 11.5: Households' consumption of vegetables and protein with starch yesterday, HDSS 2008-2013



Household dietary diversity: The respondents (women who cook food for the household and serve) were asked about the food items she ate yesterday using few structured questions. In the socio-cultural context of rural Matlab, it is very unlikely that the women who cook and serve food for the household ate a food item and other members of the household did not eat that food. Considering the contextual reality, in this report respondent's dietary diversity has been used as a proxy measure of household dietary diversity.

Household dietary diversity score (HDDS) was measured with number of food groups consumed of out of 12 groups, but not with number of food items. Food groups include cereals, root and tubers, vegetables, fruits, meat and poultry, eggs, fish (fresh or dried), pulses, milk, oil and fat, sugar and honey and miscellaneous. Interviewers inquired about consumptions of food groups in the last week. Consumptions of each food group are coded 1 for 'yes' and 0 for 'no'. Household dietary score is the number of food groups consumed in last week. It ranges from 0 to 12, and gives a quantifiable measure of household food diversity. Distribution of number of food groups consumed gradually shifted towards to more food groups (Figure 11.6)

Figure 11.6: Percent of households by number of food groups ate yesterday, HDSS 2008-2013

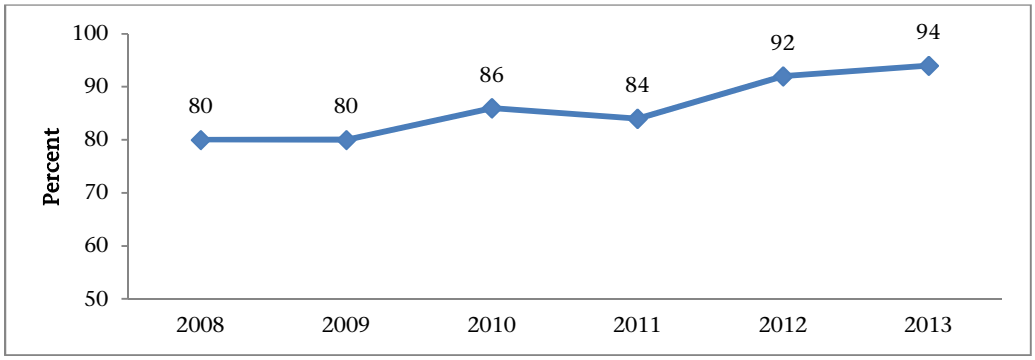


Eating 1-3 food groups yesterday, an indication of very low quality diet, was reported by 20% respondents in 2008 which decreased to 6% in 2013 (Table 11.8). On the other hand, eating from 4-6 food groups yesterday increased from 63% in 2008 to 78% in 2013. Only in 2012 it dropped to 58% from 71% in 2011 because eating 7-12 food groups increased to 35% during that survey period from the previous year when it was 13%. Otherwise, the change in eating 4-6 food groups yesterday shows a gradual increase. Eating 7-12 food groups is almost similar over the five year period which varied in between 13-22% with the exception in 2012. People generally do not eat more than 9 food groups in Matlab. Around 1% respondents reported that they ate 10-12 food groups yesterday (not segregated in the table). Overall, eating at least four food groups yesterday increased to 94% in 2013 from 80% in 2008 (Figure 11.7). Mean HDDS was 4.9 in 2008 and significantly increased over the years except in 2011.

Table 11.8: Household dietary diversity: ate number of food groups and mean, HDSS 2008-2013

Year	Ate 1-3 food groups	Ate 4-6 food groups	Ate 7-12 food groups	Mean HDDS±SD	% increase in mean HDDS (p-value)	Number of women
2008	20.3	62.7	17.0	4.90±1.68	Base year	3,403
2009	17.7	64.7	17.5	5.00±1.63	2.04 (0.017)	4,087
2010	13.5	65.6	21.9	5.19±1.59	5.92 (0.001)	1,886
2011	16.4	70.5	13.1	4.86±1.51	-0.82 (0.332)	1,872
2012	7.7	57.8	34.5	5.81±1.68	18.57 (0.001)	1,874
2013	6.2	77.5	16.3	5.16±1.39	5.31 (0.001)	1,834

Figure 11.7: Percent of households by members ate at least four food groups, HDSS 2008-2013



Association of household economic condition with food security measures

Household food insecurity data were linked with household possessions of durable economic assets including land and construction materials of dwelling house that were recorded in 2005. Factor analysis of household durables computes asset score for each household and divides them into quintile. The higher the asset quintile the better is the household economic condition. Household food security and average dietary score are estimated for each asset quintile. Household wealth quintiles correlated well with percent of eating full meal always, eating meals with fish/meat always/often, starvation of household members and borrowing money or receiving loan for buying food. Seven in ten households from lowest wealth quintile reported that they ate meals with fish/meat always/often in the preceding week of the survey compared to 96% of the households from highest quintile (Table 11.9).

Table 11.9: Association of measures of food security with wealth quintiles, HDSS 2008-2013

Background characteristics	Always full meal	Always/ often meal with fish/ meat	Borrowed/received donation last week for food	Number of households
Asset quintile				
Poorer	89.7	71.3	17.1	2,461
Poor	95.2	81.9	10.5	2,918
Middle	97.9	87.0	7.3	2,957
Rich	98.8	92.5	5.0	3,129
Richer	99.4	95.6	2.6	2,771
Missing*	***96.4***	***84.5***	***9.0***	***720***
Total	**96.4**	**86.0**	**9.0**	**14,956**

** These households are new and socio-economic information was not recorded in socio-economic census, 2005.*

Table 11.10 shows about 58% respondents from lowest wealth quintile reported that they consumed vegetables and protein with starch yesterday which was 81% in highest wealth quintile. Consumption of average number of food groups also showed positive association with wealth quintiles.

Table 11.10: Association of measures of household dietary diversity with wealth quintiles, HDSS 2008-2013

Background characteristics	Ate vegetables[1] and protein[2] with starch[3] yesterday	Respondents ate from food groups yesterday					Number of women
		1-3	4-6	7-12	Total	Mean HDDS±SD	
Asset quintile							
Poorer	58.2	29.3	63.3	7.4	100.0	4.3 ± 1.4	2,461
Poor	67.8	17.8	69.8	12.4	100.0	4.8 ± 1.5	2,918
Middle	72.5	14.4	68.5	17.1	100.0	5.1 ± 1.6	2,957
Rich	77.4	8.7	64.9	26.4	100.0	5.5 ± 1.6	3,129
Richer	80.5	6.1	61.2	32.7	100.0	5.8 ± 1.6	2,771
*Missing**	*68.3*	*16.9*	*68.3*	*14.8*	*100.0*	*4.9 ± 1.9*	*720*
Total	71.5	14.9	65.8	19.3	100.0		14,956

** These households are new and socio-economic information was not recorded in socio-economic census, 2005.*

[1] Vegetables include pumpkin, carrots, squash, tomato (that are yellow or orange inside), any dark green leafy vegetables, green banana, green papaya, beans, ladies finger, egg plants, cabbage and cauliflower.

[2] Protein includes any meat – chicken, duck, beef, goat, lamb, etc., fresh or dry fish or shellfish and eggs.

[3] Starch includes rice, wheat flour, Maize/kawn, puffed rice, flatten rice, fried rice and any kind of potato.

Economic inequalities in food security

Overall food security has increased along with decrease in absolute difference in quality of food consumed by the respondents. Absolute difference in consumption starch with vegetables and protein was 26% between the respondents of poorer and richer quintiles in 2008 which

decreased to 9% in 2013 (Figure 11.8). It reveals that the economic inequalities in food insecurity have decreased over the period of 2008-13 in rural Matlab.

Figure 11.8. Percent of poorer and richer households ate vegetables and protein with starch yesterday, HDSS 2008-2013

Nutritional status of children and women

Among all the prerequisites of national development, good nutrition is one of the most important one. In many health indicators like child mortality and maternal mortality Bangladesh has shown remarkable improvement in last few decades. But the improvement in nutritional status of children and women, physiologically and economically the most vulnerable group, is not up to the mark. BDHS 2011 shows that still 41% of the under-five children are suffering from chronic malnutrition (stunted), 16% are currently malnourished and 36% are under-weight. Nationally around 24% of ever married women are underweight which 28% is in rural areas of Bangladesh. The objective of this chapter is to explore the nutritional status of children and women of Matlab and finding its association with demographic, economic and food security indices.

Standard indices of child malnutrition

There are three indices widely used to describe child malnutrition –

Table 11.11: Anthropometric measures, cut-off points and nutritional status

Anthropometric measures	Cut-off points of nutritional status	Indication of growth/nutritional status
Height- or length-for-age z-score (HAZ)	HAZ < 3 SD – Severely stunted HAZ < 2 SD – Stunted	Chronic malnutrition
Weight-for-height z-score (WHZ)	WHZ < 3 SD – Severely wasted WHZ < 2 SD – Wasted	Acute malnutrition, current malnutrition
Weight-for-age z-score (WAZ)	WAZ < 3 SD – Severely under-weight WAZ < 2 SD – Under-weight WAZ > 2 SD – Over-weight	Overweight, under-weight
Note: WHO reference population has been used for z-scores calculation in this chapter		

Indicator for women malnutrition

Body mass index (weight/height^2), commonly termed as BMI is a popular and widely used indicator for measuring adult nutritional status. Cut-off points and outcome of this index are: BMI< 18.5 refers to underweight, BMI≥18.5 and BMI≤25 to healthy, BMI> 25 to overweight, BMI > 30 to obese.

Table 11.12: Nutritional status of children and women by demographic, economic and food consumption, 2010

Background variables	Stunted (SD<-2)	Wasted (SD<-2)	Underweight (SD<-2)	Women's BMI: Underweight	Healthy	Overweight[a]/	Missing	Total	Number
Asset quintile									
Lowest	61.4	11.4	39.5	28.1	60.5	7.9	3.5	100.0	114
Second	50.7	10.3	31.5	24.7	60.3	6.9	8.2	100.0	146
Middle	45.1	6.8	30.1	15.8	66.9	12.8	4.5	100.0	133
Fourth	38.5	9.0	26.9	21.2	64.1	13.5	1.3	100.0	156
Highest	21.7	6.8	16.2	13.0	66.5	19.3	1.2	100.0	161
Missing*	***50.0***	***8.0***	***36.0***	***16.0***	***66.0***	***12.0***	***6.0***	***100.0***	***50***
Sex of children									
Male	43.5	8.3	27.5	-	-	-	-	-	375
Female	41.8	9.1	29.6	-	-	-	-	-	385
Age of child (months)									
0-11 (Infant)	16.7	9.7	12.3	-	-	-	-	-	114
12-59 (Child)	47.2	8.5	31.4	-	-	-	-	-	646
Mothers'/Women's age (years)									
Below 25 years	29.7	6.0	16.1	24.1	65.8	8.5	1.5	100.0	199
25-34 years	45.1	8.0	32.0	19.9	65.5	11.9	2.8	100.0	388
35-55	51.2	13.1	34.5	15.5	60.1	18.5	6.0	100.0	168
Missing	-	-	-	-	-	-	-	-	5
Mother's BMI									
Underweight	46.4	9.9	35.8	-	-	-	-	-	151
Healthy	41.2	8.6	27.2	-	-	-	-	-	486
Overweight/obese	36.2	7.5	20.2	-	-	-	-	-	94
Missing	***69.0***	***6.9***	***41.4***	-	-	-	-	-	***29***
Household members ate meal with meat/ fish always/often last week									
Yes	39.3	8.2	26.8	17.8	65.1	13.1	4.0	100.0	656
No	63.5	11.5	39.4	32.7	56.7	7.7	2.9	100.0	104
Respondent ate vegetables and protein with starch yesterday									
Yes	42.1	7.9	26.0	15.9	67.5	13.0	3.6	100.0	554
No	44.2	10.7	35.4	30.6	54.4	10.7	4.4	100.0	206
Total	**42.6**	**8.7**	**28.5**	**19.9**	**64.0**	**12.4**	**3.8**	**100.0**	**760**
National (BDHS 2011)	**41.3**	**15.6**	**36.4**	**24.2**	**59.3**	**16.5**	**0.0**	**100.0**	**C: 7,861** W: 16,024****

** These households are new and socio-economic information was not recorded in socio-economic census, 2005.*

*** C – Number of children and W – Number of ever-married women*

[a] 0.7% were obese and included in 'over weight' category

Status of child nutrition

Stunting: Weight and length were measured for 760 children aged Check lower age limit 3-59 months. Of them 15% aged 6-11 months. Approximately 43% of the under-five children are stunted or suffering from chronic malnutrition. It shows a huge difference between households of different wealth quintile. While 22% of the under-five children from the highest wealth quintile were stunted, it was 61% among those from the lowest wealth quintile. Around 17% of infants are stunted but it is much higher among the children (47%). Children of mothers of age 35 and above suffer more from stunting (51%) compared to children of mothers of age less than 25 years (30%). There are 64% children of the households where members could not eat fish or meat always or often in last week preceding the survey. It is slower among the children who are from those households where the members ate fish or meat always or often compared to previous group but the prevalence of stunting is still high (39%).

Wasting: Prevalence of acute malnutrition among under-five children in Matlab is not as high as stunting (9%) and it does not vary much over different wealth quintiles, child sex, child age, mother's age, or household food security.

Underweight: Around 29% under-five children are underweight that widely varies in different wealth quintiles – 16% in heist quintile and 40% in lowest quintile. Prevalence of underweight in infants is much lower (12%) than children (31%). More children of mothers above 35 years are underweight (35%) than those of young mothers aged less than 25 years (16%).

Status of women's nutrition

Underweight/overweight: One fifth women are underweight in Matlab. Women in lowest wealth quintile are more underweight (28%) than women of highest quintile (13%) and reversely less women are overweight/ obese in lowest quintile (8%) than women of highest quintile (19%). Women of age above 35 years are more overweight/ obese and less underweight than women of age below 25 years.

Conclusion: The survey results show that household access to food and dietary diversity has increased with decrease in food deprivation and borrowing money for food, but an unacceptably high rate of under-5 children is underweight and suffers from chronic malnutrition. Prevalence of underweight among women is also high.

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APPENDIX A

Appendix A-1a Mid-year population in icddr,b service area by age, sex, and block, 2013

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	37978	17426	20552	32420	14935	17485	24552	11508	13044	22727	10638	12089
Under 1	846	424	422	695	356	339	571	278	293	462	230	232
1 - 4	3377	1720	1657	2835	1446	1389	1976	1026	950	1769	891	878
1	*918*	*474*	*444*	*753*	*369*	*384*	*516*	*274*	*242*	*497*	*253*	*244*
2	*790*	*382*	*408*	*701*	*364*	*337*	*474*	*263*	*211*	*409*	*211*	*198*
3	*849*	*445*	*404*	*645*	*333*	*312*	*487*	*245*	*242*	*430*	*211*	*219*
4	*820*	*419*	*401*	*736*	*380*	*356*	*499*	*244*	*255*	*433*	*216*	*217*
5 - 9	4337	2279	2058	3618	1873	1745	2565	1253	1312	2435	1222	1213
10-14	4083	1951	2132	3566	1751	1815	2538	1296	1242	2435	1208	1227
15-19	3192	1418	1774	2915	1349	1566	2157	1051	1106	1916	988	928
20-24	2744	998	1746	2401	920	1481	1896	754	1142	1653	700	953
25-29	2690	956	1734	2211	883	1328	1745	720	1025	1471	545	926
30-34	2512	1062	1450	2048	846	1202	1534	642	892	1371	528	843
35-39	2470	1047	1423	1943	815	1128	1514	680	834	1411	659	752
40-44	2305	1026	1279	1889	803	1086	1520	653	867	1342	602	740
45-49	2369	1061	1308	1932	825	1107	1473	641	832	1444	628	816
50-54	2144	1076	1068	1842	936	906	1474	764	710	1529	741	788
55-59	1502	755	747	1313	659	654	1107	547	560	1023	538	485
60-64	1074	534	540	998	475	523	766	380	386	762	375	387
65-69	954	428	526	807	332	475	646	299	347	616	275	341
70-74	631	303	328	623	262	361	535	251	284	509	217	292
75-79	414	219	195	422	209	213	296	141	155	333	160	173
80-84	200	93	107	237	127	110	167	91	76	169	87	82
85+	134	76	58	125	68	57	72	41	31	77	44	33

Appendix A-1b: Mid-year population in Government service area by age, sex, and block, 2013

Age	Block E			Block F			Block G		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	40218	18914	21304	36046	16639	19407	33912	15478	18434
Under 1	775	378	397	706	360	346	698	363	335
1 - 4	3355	1676	1679	2954	1519	1435	2820	1400	1420
1	*862*	*429*	*433*	*779*	*406*	*373*	*725*	*375*	*350*
2	*853*	*430*	*423*	*778*	*396*	*382*	*707*	*338*	*369*
3	*825*	*402*	*423*	*665*	*334*	*331*	*665*	*322*	*343*
4	*815*	*415*	*400*	*732*	*383*	*349*	*723*	*365*	*358*
5 - 9	4568	2289	2279	3808	1910	1898	3738	1894	1844
10-14	4511	2339	2172	3986	2036	1950	4005	2036	1969
15-19	3656	1847	1809	3392	1636	1756	3082	1442	1640
20-24	3061	1348	1713	2801	1146	1655	2494	979	1515
25-29	2664	1040	1624	2432	980	1452	2201	786	1415
30-34	2524	1043	1481	2203	885	1318	2065	835	1230
35-39	2333	974	1359	1995	845	1150	1902	775	1127
40-44	2380	1044	1336	2103	900	1203	1892	822	1070
45-49	2350	1073	1277	2139	870	1269	1989	831	1158
50-54	2346	1163	1183	2158	1022	1136	1969	992	977
55-59	1711	862	849	1562	823	739	1476	654	822
60-64	1278	596	682	1080	543	537	1079	508	571
65-69	1107	491	616	986	429	557	945	420	525
70-74	765	343	422	804	323	481	748	321	427
75-79	508	239	269	512	212	300	449	236	213
80-84	220	112	108	269	131	138	246	121	125
85+	106	57	49	156	69	87	114	63	51

Appendix A-2a Deaths in icddr,b service area by age, sex, and block, 2013

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	234	126	108	227	127	100	190	107	83	137	80	57
Under 1	20	12	8	23	15	8	10	7	3	6	1	5
< 7 days	6	5	1	16	10	6	6	5	1	1	0	1
7- 29 days	8	6	2	3	3	0	2	1	1	2	1	1
1- 5 months	5	1	4	2	2	0	2	1	1	1	0	1
6-11 months	1	0	1	2	0	2	0	0	0	2	0	2
1 - 4	6	3	3	4	1	3	7	3	4	5	3	2
1	5	3	2	2	0	2	0	0	0	2	1	1
2	1	0	1	1	1	0	3	1	2	2	1	1
3	0	0	0	0	0	0	0	0	0	1	1	0
4	0	0	0	1	0	1	4	2	2	0	0	0
5 - 9	2	0	2	1	0	1	2	2	0	2	2	0
10-14	0	0	0	3	2	1	0	0	0	1	1	0
15-19	4	1	3	2	1	1	2	0	2	1	0	1
20-24	6	3	3	1	0	1	3	1	2	0	0	0
25-29	1	0	1	4	1	3	1	0	1	0	0	0
30-34	4	2	2	4	1	3	0	0	0	1	0	1
35-39	2	1	1	2	1	1	4	3	1	1	1	0
40-44	0	0	0	4	2	2	3	2	1	2	1	1
45-49	6	6	0	7	2	5	9	6	3	6	4	2
50-54	12	5	7	9	5	4	11	7	4	7	5	2
55-59	16	10	6	12	10	2	15	6	9	8	5	3
60-64	19	10	9	10	8	2	16	13	3	11	9	2
65-69	31	16	15	18	10	8	21	12	9	11	5	6
70-74	29	17	12	38	20	18	26	13	13	27	14	13
75-79	40	22	18	35	19	16	27	12	15	20	9	11
80-84	17	10	7	25	16	9	20	12	8	15	11	4
85+	19	8	11	25	13	12	13	8	5	13	9	4

Appendix A-2b Deaths in Government service area by age, sex, and block, 2013

Age	Block E			Block F			Block G		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	275	150	125	241	116	125	224	132	92
Under 1	16	7	9	20	14	6	23	17	6
< 7 days	10	6	4	15	10	5	18	14	4
7- 29 days	2	1	1	1	1	0	1	1	0
1- 5 months	3	0	3	2	2	0	3	2	1
6-11 months	1	0	1	2	1	1	1	0	1
1 - 4	9	5	4	12	4	8	7	4	3
1	*5*	*2*	*3*	*9*	*2*	*7*	*2*	*1*	*1*
2	*1*	*1*	*0*	*2*	*2*	*0*	*2*	*1*	*1*
3	*3*	*2*	*1*	*1*	*0*	*1*	*3*	*2*	*1*
4	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
5 - 9	1	0	1	4	2	2	3	3	0
10-14	4	3	1	2	2	0	3	0	3
15-19	6	2	4	3	1	2	2	1	1
20-24	3	2	1	2	0	2	0	0	0
25-29	7	4	3	3	2	1	1	1	0
30-34	1	0	1	0	0	0	2	2	0
35-39	5	3	2	2	1	1	1	0	1
40-44	5	5	0	2	2	0	3	2	1
45-49	9	6	3	8	5	3	7	3	4
50-54	15	7	8	12	5	7	8	7	1
55-59	22	12	10	15	10	5	10	7	3
60-64	28	17	11	16	10	6	14	12	2
65-69	27	12	15	20	9	11	20	11	9
70-74	32	20	12	32	14	18	30	14	16
75-79	36	23	13	31	11	20	39	18	21
80-84	29	10	19	27	9	18	36	21	15
85+	20	12	8	30	15	15	15	9	6

Appendix A-3 Abridged life table for icddr,b service area by sex, 2013

Age (years)	Male				Female			
	$_nq_x$	l_x	L_x	$e0_x$	$_nq_x$	l_x	L_x	$e0_x$
0	26.9	100000	97715	70.2	19.2	100000	98364	74.0
1	2.9	97312	97144	71.2	3.8	98075	97856	74.4
2	2.5	97028	96909	70.4	3.5	97703	97534	73.7
3	0.8	96790	96751	69.6	0.0	97365	97365	73.0
4	1.6	96711	96635	68.6	2.4	97365	97246	72.0
5	3.0	96558	482119	67.7	2.4	97127	485107	71.1
10	2.4	96267	480799	62.9	0.8	96897	484313	66.3
15	2.1	96034	479713	58.1	6.5	96822	482661	61.3
20	5.9	95835	477868	53.2	5.6	96193	479720	56.7
25	1.6	95268	475987	48.5	5.0	95652	477165	52.0
30	4.9	95115	474508	43.6	6.8	95176	474387	47.3
35	9.3	94652	471224	38.8	3.6	94528	471850	42.6
40	8.1	93769	467098	34.1	5.0	94186	469837	37.7
45	28.2	93012	458998	29.3	12.2	93712	465916	32.9
50	30.8	90393	445513	25.1	24.2	92566	457647	28.3
55	60.3	87606	425736	20.8	40.1	90325	443220	23.9
60	107.6	82325	390805	17.0	42.7	86701	424912	19.8
65	149.7	73463	341254	13.7	106.8	82998	394159	15.6
70	269.2	62463	271432	10.7	200.1	74130	335128	12.1
75	351.2	45646	188488	8.7	339.2	59294	246747	9.5
80	468.1	29616	112608	7.0	315.4	39179	165521	8.1
85+	1000.0	15752	94927	6.0	1000.0	26820	150024	5.6

Appendix A-4 Abridged life table for Government service area by sex, 2013

Age (years)	Male				Female			
	$_nq_x$	l_x	L_x	$e0_x$	$_nq_x$	l_x	L_x	$e0_x$
0	32.4	100000	97244	69.8	20.0	100000	98300	74.0
1	4.1	96758	96522	71.1	9.5	98000	97452	74.5
2	3.4	96359	96193	70.4	0.9	97072	97031	74.2
3	3.8	96028	95847	69.6	2.7	96989	96857	73.3
4	0.0	95666	95666	68.9	0.0	96724	96724	72.5
5	4.1	95666	477426	67.9	2.5	96724	483067	71.5
10	3.9	95274	475515	63.2	3.3	96484	481689	66.7
15	4.1	94903	473629	58.4	6.7	96167	479351	61.9
20	2.9	94518	471966	53.6	3.1	95523	476938	57.3
25	12.4	94247	468536	48.8	4.4	95230	475173	52.5
30	3.6	93078	464614	44.4	1.2	94806	473761	47.7
35	7.7	92741	462065	39.5	5.5	94689	472247	42.7
40	16.1	92029	456714	34.8	1.4	94169	470546	38.0
45	24.9	90543	447492	30.3	13.4	94039	467283	33.0
50	29.5	88284	435396	26.0	24.0	92777	458738	28.4
55	60.3	85681	416385	21.7	36.7	90550	445048	24.1
60	112.2	80518	381356	18.0	51.8	87226	425632	19.9
65	113.1	71488	338431	14.9	98.3	82709	394475	15.8
70	217.7	63406	283852	11.5	159.8	74577	344592	12.2
75	319.1	49601	209080	8.9	295.4	62659	268026	9.1
80	429.9	33776	132130	6.9	513.9	44151	161892	6.8
85+	1000.0	19256	101095	5.3	1000.0	21460	138379	6.4

Appendix A-5 Male deaths by cause and age, 2013

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+
Communicable diseases																				
Diarrhoeal	6	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	2	1
Dysentery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tuberculosis	11	0	0	0	0	0	0	0	0	0	1	0	1	1	3	1	3	1	0	0
Meningitis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hepatitis	18	0	0	0	0	0	0	0	0	2	2	1	2	2	3	0	3	0	2	1
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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Septicaemia	15	0	0	1	0	0	0	0	0	0	0	1	1	0	0	2	3	4	2	1
Respiratory infections	13	3	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	3
Other communicable	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Maternal and neonatal conditions																				
Maternal death	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neonatal condition																				
-Premature and LBW	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Birth asphyxia	23	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Other neonatal	32	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nutritional	8	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	2	2	0
Non-communicable diseases																				
Malignant neoplasm																				
-Neoplasm	82	0	1	0	1	1	1	0	0	3	1	1	12	10	13	8	10	12	6	2
-Neoplasm in female organ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Congenital malformation	9	6	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Endocrine disorder																				
-Diabetes	19	0	0	0	0	0	0	0	1	0	0	1	2	3	3	3	2	4	0	0
-Other endocrine	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Neuro-psychiatric	5	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	1	0	0	0
Diseases of circulatory system																				
-Rheumatic heart disease	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Hypertensive disease	4	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	1	0
-Ischaemic heart disease	125	0	0	0	0	0	0	0	0	0	2	11	5	17	10	16	25	15	11	13
-Stroke	193	0	0	1	0	0	0	0	1	0	0	6	7	9	20	19	39	30	34	27
-Other cardiovascular	46	0	0	0	1	0	0	1	0	1	0	0	1	3	7	2	3	14	3	10
Respiratory disease																				
-COPD	63	0	0	0	0	0	0	0	0	1	0	2	2	3	5	10	12	11	12	5
-Asthma	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
-Other respiratory	5	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	1	0	0
Digestive disease	30	1	1	0	0	1	0	1	1	0	0	2	2	5	6	3	0	4	1	2
Genitourinary disease																				
-Renal failure	18	0	0	0	1	0	1	1	0	0	1	1	0	2	0	2	3	3	2	1
-Nephritis syndrome	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other non-communicable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Injuries																				
Unintentional injuries																				
-Accident	35	0	0	0	2	3	1	3	1	1	4	2	3	3	0	2	0	5	2	3
-Drowning	29	0	18	3	1	0	0	1	1	1	0	1	1	0	0	0	0	1	1	0
Intentional injuries																				
-Suicide	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
-Homicide	4	0	0	1	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0
Miscellaneous																				
-Senility	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Fever of unknown origin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- sudden infant death	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unknown/missing	35	3	0	0	0	0	0	0	0	0	1	1	0	2	5	5	3	5	5	5
Total	**838**	**73**	**23**	**9**	**8**	**6**	**6**	**8**	**5**	**10**	**14**	**32**	**41**	**60**	**79**	**75**	**112**	**114**	**89**	**74**

COPD=Chronic obstructive pulmonary disease

Appendix A-6 Female deaths by cause and age, 2013

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+
Communicable diseases																				
Diarrhoeal	11	1	0	0	0	0	1	0	1	0	0	0	1	2	0	0	1	2	1	1
Dysentery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tuberculosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Meningitis	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hepatitis	4	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	1	0	0	0
Chicken pox	1	0	0	1	0	0	0	0	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	0	0	0	0
Septicaemia	14	1	0	0	0	0	0	0	0	1	0	0	1	0	1	0	2	0	6	2
Respiratory infections	17	4	4	0	0	0	0	0	0	0	0	0	0	1	1	1	0	3	2	1
Other communicable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maternal and neonatal conditions																				
Maternal death	9	0	0	0	0	2	2	3	2	0	0	0	0	0	0	0	0	0	0	0
Neonatal condition																				
-Premature and LBW	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Birth asphyxia	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Other neonatal	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nutritional	15	2	1	0	0	0	0	0	0	1	0	0	1	0	0	1	0	3	2	4
Non-communicable diseases																				
Malignant neoplasm																				
-Neoplasm	39	0	1	3	1	1	1	0	2	0	0	6	4	4	4	6	3	1	2	0
-Neoplasm in female organ	11	0	0	0	0	0	0	1	0	0	0	1	5	2	0	2	0	0	0	0
Congenital malformation	11	7	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Endocrine disorder																				
-Diabetes	13	0	0	0	0	0	0	0	0	0	0	1	1	2	0	2	2	2	3	0
-Other endocrine	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Neuro-psychiatric	7	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2	1	0
Diseases of circulartory sestem																				
-Rheumatic heart disease	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Hypertensive disease	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0
-Ischaemic heart disease	86	0	0	0	0	0	0	0	0	0	2	1	6	8	11	13	13	17	9	6
-Stroke	226	0	0	0	0	0	0	1	0	2	2	2	5	10	7	31	44	50	36	36
-Other cardiovascular	40	0	0	0	0	0	0	0	0	1	0	1	0	0	3	1	15	9	6	4
Respiratory disease																				
-COPD	27	0	0	0	0	0	0	0	0	0	0	1	1	3	2	3	5	8	2	2
-Asthma	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
-Other respiratory	7	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	2	0	1	0
Digestive disease	20	0	0	0	0	0	0	1	0	0	0	2	4	2	0	3	2	4	0	2
Genitourinary disease																				
-Renal failure	8	0	0	0	0	0	0	0	0	1	0	2	2	0	0	2	0	0	1	0
-Nephritis 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	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0
Injuries																				
Unintentional injuries																				
-Accident	15	1	1	0	0	1	1	0	1	0	0	0	0	0	1	2	4	1	2	0
-Drowning	20	0	15	1	1	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0
Intentional injuries																				
-Suicide	10	0	0	0	1	7	1	1	0	0	0	0	0	0	0	0	0	0	0	0
-Homicide	4	0	0	0	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0
Miscellaneous																				
-Senility	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Fever of unknown origin	3	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0
-Sudden infant death	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unknown/missing	38	3	0	0	0	0	1	1	0	1	1	0	1	1	1	3	6	10	6	3
Total	**690**	**45**	**27**	**6**	**5**	**14**	**9**	**9**	**7**	**7**	**5**	**20**	**33**	**38**	**35**	**73**	**102**	**114**	**80**	**61**

COPD=Chronic obstructive pulmonary disease

Appendix A-7 Male deaths by cause, age, and area, 2013

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
Communicable diseases																
Diarrhoeal	1	5	0	0	0	0	0	0	0	0	0	1	1	3	0	1
Dysentery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tuberculosis	8	3	0	0	0	0	0	0	0	1	3	2	5	0	0	0
Meningitis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hepatitis	12	6	0	0	0	0	0	0	3	1	7	1	1	4	1	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	1	0	0	0	0	0	0	0	0	0
Septicaemia	6	9	0	0	0	0	0	1	0	0	1	1	4	7	1	0
Respiratory infections	4	9	1	2	0	0	0	1	0	0	0	1	2	3	1	2
Other communicable	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Maternal and neonatal conditions																
Maternal death	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neonatal condition																
-premature and LBW	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0
-birth asphyxia	7	16	7	16	0	0	0	0	0	0	0	0	0	0	0	0
-other neonatal	22	10	22	10	0	0	0	0	0	0	0	0	0	0	0	0
Nutritional	2	6	0	0	1	0	0	1	1	0	0	0	0	5	0	0
Non-communicable diseases																
Malignant neoplasm																
-neoplasm	47	35	0	0	1	0	0	1	2	4	22	14	20	16	2	0
-neoplasm in female organ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Congenital malformation	3	6	2	4	1	1	0	1	0	0	0	0	0	0	0	0
Endocrine disorder																
-diabetes	12	7	0	0	0	0	0	0	1	0	5	4	6	3	0	0
-other endocrine	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Neuro-psychiatric	2	3	0	0	0	0	0	0	1	1	0	1	1	1	0	0
Diseases of circulatory system																
-rheumatic heart disease	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-hypertensive disease	2	2	0	0	0	0	0	0	0	0	2	1	0	1	0	0
-ischaemic heart disease	59	66	0	0	0	0	0	0	1	1	16	27	35	32	7	6
-stroke	113	80	0	0	0	0	1	0	1	0	24	18	75	47	12	15
-other cardiovascular	24	22	0	0	0	0	1	0	0	2	4	7	13	9	6	4
Respiratory disease																
-COPD	37	26	0	0	0	0	0	0	1	0	7	5	27	18	2	3
-Asthma	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
-Other respiratory	3	2	1	0	0	0	0	0	0	1	1	0	1	1	0	0
Digestive disease	17	13	0	1	0	1	0	0	0	3	10	5	5	3	2	0
Genitourinary disease																
-Renal failure	9	9	0	0	0	0	0	1	1	2	0	3	7	3	1	0
-Nephritis 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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Injuries																
Unintentional injuries																
-accident	18	17	0	0	0	0	0	2	7	6	5	3	5	4	1	2
-drowning	11	18	0	0	7	11	2	2	1	2	1	1	0	2	0	0
Intentional injuries																
-suicide	1	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0
-homicide	1	3	0	0	0	0	1	0	0	2	0	1	0	0	0	0
Miscellaneous																
-senility	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-fever of unknown origin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-sudden infant death	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unknown/missing	14	21	0	3	0	0	0	0	0	1	3	5	9	9	2	3
Total	**440**	**398**	**35**	**38**	**10**	**13**	**7**	**10**	**21**	**28**	**111**	**101**	**218**	**172**	**38**	**36**

Appendix A-8 Female deaths by cause, age, and area, 2013

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
Communicable diseases																
Diarrhoeal	7	4	1	0	0	0	0	0	2	0	1	2	2	2	1	0
Dysentery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tuberculosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Meningitis	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Hepatitis	3	1	0	0	0	0	0	0	0	1	2	0	1	0	0	0
Chicken pox	0	1	0	0	0	0	0	1	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	7	7	1	0	0	0	0	0	0	1	2	0	4	4	0	2
Respiratory infections	8	9	1	3	1	3	0	0	0	0	2	0	4	2	0	1
Other communicable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maternal and neonatal conditions																
Maternal death	9	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0
Neonatal condition																
-premature and LBW	3	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0
-birth asphyxia	4	6	4	6	0	0	0	0	0	0	0	0	0	0	0	0
-other neonatal	5	3	5	3	0	0	0	0	0	0	0	0	0	0	0	0
Nutritional	5	10	1	1	1	0	0	0	1	0	1	0	1	5	0	4
Non-communicable diseases																
Malignant neoplasm																
-neoplasm	18	21	0	0	0	1	1	3	2	2	9	9	6	6	0	0
-neoplasm in female organ	6	5	0	0	0	0	0	0	0	1	5	3	1	1	0	0
Congenital malformation	6	5	4	3	2	1	0	1	0	0	0	0	0	0	0	0
Endocrine disorder																
-diabetes	7	6	0	0	0	0	0	0	0	0	3	1	4	5	0	0
-other endocrine	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0
Neuro-psychiatric	5	2	1	0	1	0	0	0	0	0	1	0	2	2	0	0
Diseases of circulatory system																
-rheumatic heart disease	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-hypertensive disease	3	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0
-ischaemic heart disease	39	47	0	0	0	0	0	0	1	1	12	14	24	28	2	4
-stroke	120	106	0	0	0	0	0	0	4	1	13	11	84	77	19	17
-other cardiovascular	21	19	0	0	0	0	0	0	0	1	2	2	16	15	3	1
Respiratory disease																
-COPD	15	12	0	0	0	0	0	0	0	0	1	6	12	6	2	0
-asthma	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
-other respiratory	0	7	0	0	0	0	0	0	0	0	0	3	0	4	0	0
Digestive disease	5	15	0	0	0	0	0	0	0	1	2	6	1	8	2	0
Genitourinary disease																
-renal failure	3	5	0	0	0	0	0	0	0	1	2	2	1	2	0	0
-Nephritis 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	2	1	0	0	0	0	0	0	0	0	1	0	1	1	0	0
Injuries																
Unintentional injuries																
-accident	10	5	0	1	1	0	0	0	2	1	0	1	7	2	0	0
-drowning	9	11	0	0	6	9	1	1	1	1	1	0	0	0	0	0
Intentional injuries																
-suicide	5	5	0	0	0	0	0	1	5	4	0	0	0	0	0	0
-homicide	2	2	0	0	0	0	1	0	1	1	0	1	0	0	0	0
Miscellaneous																
-senility	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-fever of unknown origin	0	3	0	0	0	0	0	0	0	2	0	1	0	0	0	0
-sudden infant death	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Unknown/missing	18	20	1	2	0	0	0	0	3	1	2	1	9	16	3	0
Total	**348**	**342**	**24**	**21**	**12**	**15**	**4**	**7**	**31**	**20**	**63**	**63**	**182**	**187**	**32**	**29**

Appendix A-9 Age-specific fertility rate and indices for icddr,b service area by block, 2013

Age (years)	Block A		Block B		Block C		Block D	
	Births	Rate	Births	Rate	Births	Rate	Births	Rate
All ages	786	73.4	764	85.9	547	81.7	452	75.9
15-19*	134	75.5	145	92.6	89	80.5	67	72.2
20-24	245	140.3	240	162.1	184	161.1	145	152.2
25-29	215	124.0	204	153.6	144	140.5	113	122.0
30-34	122	84.1	121	100.7	78	87.4	82	97.3
35-39	60	42.2	44	39.0	40	48.0	37	49.2
40-44	10	7.8	9	8.3	11	12.7	8	10.8
45-49**	0	0.0	1	0.9	1	1.2	0	0.0
Total fertility rate		2370		2786		2657		2518
General fertility rate		73		86		82		76
Gross reproduction rate		1140		1313		1326		1315

*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, 2013

Age (years)	Total women	Total birth	Live birth order									
			1	2	3	4	5	6	7	8	9	10+
Both areas												
<15	12507	6	6	0	0	0	0	0	0	0	0	0
15-19	10579	742	694	46	2	0	0	0	0	0	0	0
20-24	10205	1515	894	548	69	3	0	1	0	0	0	0
25-29	9504	1296	226	661	342	59	7	0	0	0	0	1
30-34	8416	807	43	211	348	161	26	15	2	0	0	1
35-39	7773	340	9	41	130	92	38	23	2	5	0	0
40-44	7581	60	1	4	9	20	9	9	4	2	1	1
45-49	7767	5	0	0	0	2	1	1	0	1	0	0
Total		**4771**	**1873**	**1511**	**900**	**337**	**81**	**49**	**8**	**8**	**1**	**3**
icddr,b service area												
<15	6416	4	4	0	0	0	0	0	0	0	0	0
15-19	5374	431	409	21	1	0	0	0	0	0	0	0
20-24	5322	814	478	298	36	2	0	0	0	0	0	0
25-29	5013	676	119	336	184	34	3	0	0	0	0	0
30-34	4387	403	26	119	169	77	7	3	1	0	0	1
35-39	4137	181	6	21	74	49	16	14	0	1	0	0
40-44	3972	38	0	3	6	13	7	4	3	0	1	1
45-49	4063	2	0	0	0	1	0	0	0	1	0	0
Total		**2549**	**1042**	**798**	**470**	**176**	**33**	**21**	**4**	**2**	**1**	**2**
Government service area												
<15	6091	2	2	0	0	0	0	0	0	0	0	0
15-19	5205	311	285	25	1	0	0	0	0	0	0	0
20-24	4883	701	416	250	33	1	0	1	0	0	0	0
25-29	4491	620	107	325	158	25	4	0	0	0	0	1
30-34	4029	404	17	92	179	84	19	12	1	0	0	0
35-39	3636	159	3	20	56	43	22	9	2	4	0	0
40-44	3609	22	1	1	3	7	2	5	1	2	0	0
45-49	3704	3	0	0	0	1	1	1	0	0	0	0
Total		**2222**	**831**	**713**	**430**	**161**	**48**	**28**	**4**	**6**	**0**	**1**

Appendix A-11 Age birth order-specific fertility rates by area, 2013

Age (years)	Total	Live birth order									
		1	2	3	4	5	6	7	8	9	10+
Both areas											
<15	0.0005	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
15-19	0.0701	0.0656	0.0043	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20-24	0.1485	0.0876	0.0537	0.0068	0.0003	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000
25-29	0.1364	0.0238	0.0695	0.0360	0.0062	0.0007	0.0000	0.0000	0.0000	0.0000	0.0001
30-34	0.0959	0.0051	0.0251	0.0413	0.0191	0.0031	0.0018	0.0002	0.0000	0.0000	0.0001
35-39	0.0437	0.0012	0.0053	0.0167	0.0118	0.0049	0.0030	0.0003	0.0006	0.0000	0.0000
40-44	0.0079	0.0001	0.0005	0.0012	0.0026	0.0012	0.0012	0.0005	0.0003	0.0001	0.0001
45-49	0.0006	0.0000	0.0000	0.0000	0.0003	0.0001	0.0001	0.0000	0.0001	0.0000	0.0000
Total	**2.5181**	**0.9193**	**0.7924**	**0.5110**	**0.2018**	**0.0502**	**0.0308**	**0.0051**	**0.0052**	**0.0007**	**0.0018**
icddr,b service area											
<15	0.0006	0.0006	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
15-19	0.0802	0.0761	0.0039	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20-24	0.1530	0.0898	0.0560	0.0068	0.0004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
25-29	0.1348	0.0237	0.0670	0.0367	0.0068	0.0006	0.0000	0.0002	0.0000	0.0000	0.0000
30-34	0.0919	0.0059	0.0271	0.0385	0.0176	0.0016	0.0007	0.0002	0.0000	0.0000	0.0002
35-39	0.0438	0.0015	0.0051	0.0179	0.0118	0.0039	0.0034	0.0000	0.0002	0.0000	0.0000
40-44	0.0096	0.0000	0.0008	0.0015	0.0033	0.0018	0.0010	0.0008	0.0000	0.0003	0.0003
45-49	0.0005	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000
Total	**2.5715**	**0.9883**	**0.7994**	**0.5079**	**0.2004**	**0.0391**	**0.0254**	**0.0059**	**0.0024**	**0.0013**	**0.0024**
Government service area											
<15	0.0003	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
15-19	0.0598	0.0548	0.0048	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20-24	0.1436	0.0852	0.0512	0.0068	0.0002	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000
25-29	0.1381	0.0238	0.0724	0.0352	0.0056	0.0009	0.0000	0.0000	0.0000	0.0000	0.0002
30-34	0.1003	0.0042	0.0228	0.0444	0.0208	0.0047	0.0030	0.0002	0.0000	0.0000	0.0000
35-39	0.0437	0.0008	0.0055	0.0154	0.0118	0.0061	0.0025	0.0006	0.0011	0.0000	0.0000
40-44	0.0061	0.0003	0.0003	0.0008	0.0019	0.0006	0.0014	0.0003	0.0006	0.0000	0.0000
45-49	0.0008	0.0000	0.0000	0.0000	0.0003	0.0003	0.0003	0.0000	0.0000	0.0000	0.0000
Total	**2.4630**	**0.8471**	**0.7849**	**0.5140**	**0.2033**	**0.0624**	**0.0366**	**0.0054**	**0.0083**	**0.0000**	**0.0011**

Appendix A-12. Marriages and divorces by month, 2013

Month	Marriage		Divorce	
	Number	Percent	Number	Percent
January	292	9.0	29	9.0
February	259	7.9	32	9.9
March	318	9.8	35	10.9
April	248	7.6	30	9.3
May	301	9.2	25	7.8
June	217	6.7	29	9.0
July	217	6.7	24	7.5
August	319	9.8	23	7.1
September	241	7.4	26	8.1
October	297	9.1	26	8.1
November	291	8.9	23	7.1
December	260	8.0	20	6.2
Total	**3260**	**100.0**	**322**	**100.0**

Appendix A-13. In- and out-migrations by age and sex, 2013

Age (years)	In-migration			Out-migration		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	10264	4696	5568	10784	4956	5828
0-4	1525	754	771	1367	701	666
5 - 9	989	495	494	922	479	443
10-14	730	367	363	902	489	413
15-19	1372	270	1102	1814	625	1189
20-24	1445	424	1021	1987	714	1273
25-29	1266	586	680	1256	548	708
30-34	983	582	401	890	473	417
35-39	563	363	200	506	316	190
40-44	415	284	131	326	214	112
45-49	322	205	117	247	153	94
50-54	228	150	78	166	97	69
55-59	134	74	60	114	53	61
60-64	98	56	42	78	37	41
65+	194	86	108	209	57	152

Appendix A-14. In-migrations by age, sex, and area, 2013

Age (years)	icddr,b service area			Government service area		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	5097	2241	2856	5167	2455	2712
0-4	778	388	390	747	366	381
5 - 9	484	247	237	505	248	257
10-14	324	151	173	406	216	190
15-19	734	106	628	638	164	474
20-24	774	199	575	671	225	446
25-29	635	277	358	631	309	322
30-34	484	293	191	499	289	210
35-39	282	192	90	281	171	110
40-44	192	139	53	223	145	78
45-49	135	89	46	187	116	71
50-54	98	66	32	130	84	46
55-59	55	33	22	79	41	38
60-64	45	27	18	53	29	24
65+	77	34	43	117	52	65

Appendix A-15. Out-migrations by age, sex, and area, 2013

Age (years)	icddr,b service area			Government service area		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	5690	2595	3095	5094	2361	2733
0-4	794	413	381	573	288	285
5 - 9	514	269	245	408	210	198
10-14	504	275	229	398	214	184
15-19	906	285	621	908	340	568
20-24	953	323	630	1034	391	643
25-29	645	269	376	611	279	332
30-34	474	241	233	416	232	184
35-39	285	184	101	221	132	89
40-44	182	116	66	144	98	46
45-49	146	95	51	101	58	43
50-54	74	44	30	92	53	39
55-59	55	29	26	59	24	35
60-64	37	21	16	41	16	25
65+	121	31	90	88	26	62

Appendix A-16. Male out-migration by cause of movement and age, 2013

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	4956	701	479	489	625	714	548	473	316	214	153	97	53	37	57
Work/economic/educational															
Acquired/seeking job	2496	0	6	93	385	560	437	382	262	149	106	68	24	17	7
Job completion/retirement	15	0	0	1	0	3	2	1	1	0	0	0	3	3	1
To acquire education	441	0	75	138	120	74	20	1	1	5	3	3	0	0	1
Educ. completed/interrupted	7	0	2	2	3	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
Housing/environmental															
Acquired/seeking new land/house	162	2	0	3	3	6	21	23	24	26	16	5	12	6	15
River erosion	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marriage / familial															
Marriage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Separation/divorce/widow	27	0	0	0	5	6	11	3	0	1	1	0	0	0	0
Move or join with spouse/follow parents	1590	690	394	246	99	47	34	16	10	9	15	7	5	3	15
Move or join with other relatives	15	8	2	0	0	0	0	0	0	0	1	0	0	1	3
Adoption	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Family friction/breakdown	74	0	0	3	2	14	10	18	7	10	1	4	3	0	2
Health or old age care	13	0	0	0	0	0	2	0	0	0	0	0	2	2	7
Legal problems	45	0	0	0	2	2	5	13	6	6	4	4	2	0	1
Other and not stated															
Others n.e.c.*	64	0	0	2	6	2	4	16	5	8	4	6	2	5	4
Unknown or not stated	6	0	0	1	0	0	2	0	0	0	2	0	0	0	1

*n.e.c.=Not elsewhere classified

Appendix A-17. Female out-migration by cause of movement and age, 2013

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	5828	666	443	413	1189	1273	708	417	190	112	94	69	61	41	152
Work/economic/educational															
Acquired/seeking job	430	0	1	33	100	90	78	60	34	13	9	8	0	2	2
Job completion/retirement	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
To acquire education	271	0	53	68	65	35	14	16	10	7	1	1	1	0	0
Educ. completed/interrupted	5	0	1	0	1	0	1	0	0	2	0	0	0	0	0
Student lodging	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Housing/environmental															
Acquired/seeking new land/house	188	0	0	0	12	24	44	35	21	11	13	6	11	3	8
River erosion	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marriage / familial															
Marriage	1023	0	0	38	467	372	113	22	8	2	1	0	0	0	0
Separation/divorce/widow	129	0	0	7	58	35	12	10	5	0	0	0	2	0	0
Move or join with spouse/follow parents	3196	651	379	237	370	571	363	237	94	65	58	41	35	22	73
Move or join with other relatives	48	9	3	7	5	4	1	3	3	1	1	4	1	1	5
Adoption	8	6	1	0	0	1	0	0	0	0	0	0	0	0	0
Family friction/breakdown	198	0	2	1	34	74	44	18	7	4	4	3	2	0	5
Health or old age care	117	0	0	0	16	16	13	4	1	1	3	1	3	10	49
Legal problems	4	0	0	1	0	0	1	0	0	2	0	0	0	0	0
Other and not stated															
Others n.e.c.*	191	0	2	15	57	50	19	10	7	4	4	4	6	3	10
Unknown or not stated	19	0	1	5	4	1	5	2	0	0	0	1	0	0	0

*n.e.c.=Not elsewhere classified

Appendix A-18 Male in-migration by cause of movement and age, 2013

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	4696	754	495	367	270	424	586	582	363	284	205	150	74	56	86
Work/economic/educational															
Acquired/seeking job	699	0	1	5	34	112	139	151	103	68	34	26	14	5	7
Job completion/retirement	595	0	0	0	3	56	125	135	88	66	54	31	15	14	8
To acquire education	176	6	45	72	34	10	4	2	1	0	1	1	0	0	0
Educ. completed/interrupted	8	0	0	1	1	4	1	0	1	0	0	0	0	0	0
Student lodging	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Housing/environmental															
Acquired/seeking new land/house	771	0	0	4	10	68	140	164	98	82	63	55	27	26	34
River erosion	58	0	0	0	0	3	4	6	6	12	6	8	3	2	8
Marriage / familial															
Marriage	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Separation/divorce/widow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Move or join with spouse/follow parents	1920	727	432	274	149	125	92	57	25	11	8	4	2	4	10
Move or join with other relatives	35	8	8	3	0	2	2	2	1	2	1	2	1	1	2
Adoption	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0
Family friction/breakdown	55	1	1	1	5	6	12	12	5	5	2	2	0	1	2
Health or old age care	63	0	0	0	3	2	4	9	6	8	8	8	3	1	11
Legal problems	85	0	0	0	2	5	26	13	11	12	12	1	2	1	0
Other and not stated															
Others n.e.c.*	213	4	4	7	28	31	35	30	16	18	16	12	7	1	4
Unknown or not stated	11	2	4	0	1	0	2	1	1	0	0	0	0	0	0

*n.e.c.=Not elsewhere classified

Appendix A-19 Female in-migration by cause of movement and age, 2013

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	5568	771	494	363	1102	1021	680	401	200	131	117	78	60	42	108
Work/economic/educational															
Acquired/seeking job	121	0	0	3	13	30	27	26	7	10	1	4	0	0	0
Job completion/retirement	14	0	0	0	1	3	2	3	4	1	0	0	0	0	0
To acquire education	193	5	53	61	31	8	12	15	7	1	0	0	0	0	0
Educ. completed/interrupted	3	0	0	1	0	0	0	1	0	0	1	0	0	0	0
Student lodging	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Housing/environmental															
Acquired/seeking new land/house	255	0	0	0	26	52	45	31	24	19	10	12	13	7	16
River erosion	8	0	0	0	0	0	0	0	0	0	3	1	2	1	1
Marriage / familial															
Marriage	604	0	0	11	367	175	28	13	4	5	0	0	1	0	0
Separation/divorce/widow	89	0	0	1	31	23	21	10	2	0	0	1	0	0	0
Move or join with spouse/follow parents	3820	740	430	274	567	626	456	255	128	85	95	47	38	25	54
Move or join with other relatives	60	11	7	4	8	7	2	2	4	0	2	0	0	3	10
Adoption	13	13	0	0	0	0	0	0	0	0	0	0	0	0	0
Family friction/breakdown	157	0	1	0	17	36	50	27	12	5	2	1	0	0	6
Health or old age care	98	0	0	0	19	32	19	6	5	1	2	1	1	1	11
Legal problems	2	0	0	0	0	0	0	0	1	0	0	0	0	1	0
Other and not stated															
Others n.e.c.*	127	1	2	8	22	28	18	12	2	4	1	10	5	4	10
Unknown or not stated	4	1	1	0	0	1	0	0	0	0	0	1	0	0	0

*n.e.c.=Not elsewhere classified

Appendix A-20 Male migration by destination or origin, 2013

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	34	8	5	6	5	58	29	5	5	2	5	46
	Urban	808	704	451	202	207	2372	609	328	427	196	204	1764
Chittagong	Rural	533	88	90	86	54	851	748	194	233	124	169	1468
	Urban	221	138	87	49	55	550	168	61	81	71	40	421
Sylhet	Rural	7	0	1	2	0	10	8	1	4	3	1	17
	Urban	9	14	9	3	4	39	12	3	9	5	4	33
Khulna	Rural	5	1	1	0	1	8	8	3	2	1	1	15
	Urban	2	4	2	0	3	11	3	1	4	2	1	11
Rajshahi	Rural	5	0	1	1	3	10	7	4	6	3	1	21
	Urban	10	5	4	1	0	20	6	3	2	2	2	15
Barisal	Rural	8	0	2	3	1	14	11	2	6	5	1	25
	Urban	8	8	4	2	1	23	4	0	4	0	0	8
India		5	5	3	1	2	16	0	1	2	0	2	5
Asia		0	125	85	38	14	262	1	13	72	43	17	146
Middle-east		9	223	253	120	40	645	2	74	303	182	118	679
Others		5	16	23	16	7	67	0	1	8	8	5	22
Unknown		0	0	0	0	0	0	0	0	0	0	0	0
Total		**1669**	**1339**	**1021**	**530**	**397**	**4956**	**1616**	**694**	**1168**	**647**	**571**	**4696**

Appendix A-21 Female migration by destination or origin, 2013

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	34	66	23	6	4	133	22	45	17	5	3	92
	Urban	683	948	483	162	248	2524	605	548	417	127	175	1872
Chittagong	Rural	537	1131	402	77	93	2240	760	1322	461	142	168	2853
	Urban	193	239	151	40	44	667	171	151	139	40	47	548
Sylhet	Rural	4	2	3	0	1	10	7	5	4	1	2	19
	Urban	8	9	7	1	6	31	18	10	8	4	1	41
Khulna	Rural	7	4	1	1	2	15	7	9	4	1	1	22
	Urban	5	3	4	0	1	13	3	3	2	2	1	11
Rajshahi	Rural	9	5	2	1	1	18	8	9	5	1	0	23
	Urban	9	10	9	0	1	29	3	2	4	2	1	12
Barisal	Rural	8	9	6	0	1	24	12	10	6	1	2	31
	Urban	11	11	6	1	3	32	3	1	3	1	0	8
India		5	4	2	2	3	16	1	0	0	0	2	3
Asia		1	3	3	1	0	8	2	1	4	0	0	7
Middle-east		8	9	20	10	3	50	6	7	6	4	2	25
Others		0	9	3	0	6	18	0	0	1	0	0	1
Unknown		0	0	0	0	0	0	0	0	0	0	0	0
Total		**1522**	**2462**	**1125**	**302**	**417**	**5828**	**1628**	**2123**	**1081**	**331**	**405**	**5568**

APPENDIX B

POPULATION, BIRTHS, AND DEATHS BY VILLAGE, 2013

Village code	Village name	Population (mid-year)	Live births	Deaths	Birth rate	Death rate
icddr,b	**SERVICE AREA**					
D00	Charmukundi	2559	48	14	18.8	5.5
W00	Kaladi	7975	143	34	17.9	4.3
V10	Dhakirgaon	1988	54	12	27.2	6.0
V11	Nabakalash	3011	74	15	24.6	5.0
V31	Dighaldi	9861	206	69	20.9	7.0
V32	Mobarakdi	3579	68	24	19.0	6.7
V60	Suvankardi	976	20	5	20.5	5.1
V61	Munsabdi	694	16	6	23.1	8.6
V62	Shilmondi	982	23	8	23.4	8.1
V72	Upadi	6353	134	47	21.1	7.4
Block A Total		**37978**	**786**	**234**	**20.7**	**6.2**
H00	Lamchari	1237	15	11	12.1	8.9
V12	Bhangerpar	786	21	5	26.7	6.4
V13	Baburpara	713	24	6	33.7	8.4
V19	Lakshmipur	2854	50	25	17.5	8.8
V20	Dagorpur	1438	33	8	22.9	5.6
V21	Khadergaon	557	20	5	35.9	9.0
V22	Beloti	606	13	3	21.5	5.0
V23	Baluchar	689	9	6	13.1	8.7
V24	Machuakhal	3021	55	27	18.2	8.9
V26	Narayanpur	3322	70	18	21.1	5.4
V56	Pailpara	1686	50	12	29.7	7.1
V59	Doshpara	2292	70	13	30.5	5.7
V82	Dhanarpar	1768	47	6	26.6	3.4
V83	Padmapal	608	17	5	28.0	8.2
V85	Bhanurpara	510	14	10	27.5	19.6
V87	Hurmaisha	697	14	4	20.1	5.7
VBB	Nagda	4652	117	29	25.2	6.2
VBC	Naogaon	4984	125	34	25.1	6.8
Block B Total		**32420**	**764**	**227**	**23.6**	**7.0**
K00	Shahpur	1001	29	10	29.0	10.0
L00	Tatkhana	552	12	5	21.7	9.1
M00	Char Nayergaon	198	6	0	30.3	0.0
N00	Aswinpur	2226	37	16	16.6	7.2
O00	Nayergaon	2151	46	16	21.4	7.4
P00	Titerkandi	2022	27	24	13.4	11.9
Q00	Char Shibpur	262	3	0	11.5	0.0
V27	Panchghoria	1003	28	5	27.9	5.0
V28	Khidirpur	1592	49	6	30.8	3.8
V30	Harion	606	15	4	24.8	6.6
V39	Gobindapur	304	5	7	16.4	23.0
V40	Masunda	787	20	6	25.4	7.6
V41	Paton	1887	41	17	21.7	9.0
V42	Adhara (South)	794	19	3	23.9	3.8
V44	Panchdona	615	18	5	29.3	8.1
V86	Adhara	989	29	4	29.3	4.0
V88	Datikara	556	12	3	21.6	5.4
VBA	Mehron	2139	37	19	17.3	8.9

Village code	Village name	Population (mid-year)	Live births	Deaths	Birth rate	Death rate
DX0	Barogaon	3424	82	35	23.9	10.2
DX1	Naojan	1444	32	5	22.2	3.5
Block C Total		**24552**	**547**	**190**	**22.3**	**7.7**
R00	Nandalalpur	1514	28	14	18.5	9.2
S00	Tatua	974	29	4	29.8	4.1
T00	Amuakanda	1655	33	8	19.9	4.8
V15	Bhati Rasulpur	863	22	2	25.5	2.3
V16	Binandapur	875	17	4	19.4	4.6
V17	Hatighata	1083	22	8	20.3	7.4
V18	Torkey	4003	74	25	18.5	6.2
V25	Char Pathalia	1298	20	7	15.4	5.4
V29	Shibpur (South)	531	10	4	18.8	7.5
V33	Shibpur (North)	443	7	4	15.8	9.0
V34	Satparia	867	25	4	28.8	4.6
V52	Nayakandi	224	4	1	17.9	4.5
V54	Balairkandi	575	10	4	17.4	7.0
V55	Induria	534	11	3	20.6	5.6
V63	Islamabad (East)	2044	24	17	11.7	8.3
V67	Majlishpur	629	9	4	14.3	6.4
V81	Sonaterkandi	687	19	3	27.7	4.4
V84	Shahbajkandi	2318	47	16	20.3	6.9
V89	Islamabad (Middle)	1610	41	5	25.5	3.1
Block D Total		**22727**	**452**	**137**	**19.9**	**6.0**
icddr,b Service Area Total		**117677**	**2549**	**788**	**21.7**	**6.7**
GOVERNMENT SERVICE AREA:						
V35	Durgapur	3507	72	28	20.5	8.0
V38	Galimkha	1493	30	13	20.1	8.7
V43	Kanachak	1174	30	10	25.6	8.5
V45	Bakchar	1036	22	4	21.2	3.9
V46	Silinda	398	7	1	17.6	2.5
V47	Tulatali	1816	30	12	16.5	6.6
V48	Gangkanda	494	5	3	10.1	6.1
V49	Harina Bhabanipur	1250	20	10	16.0	8.0
V57	Baluchar	1089	14	5	12.9	4.6
V64	Kawadi	4843	103	25	21.3	5.2
V65	Nayachar	768	14	3	18.2	3.9
V66	Thatalia	765	11	4	14.4	5.2
V68	Sobahan	959	23	3	24.0	3.1
V71	Khamarpara	474	7	3	14.8	6.3
V73	Sadardia	826	12	6	14.5	7.3
V74	Ketundi	1377	35	7	25.4	5.1
V75	Mukundi	304	3	2	9.9	6.6
V76	Chosoi	1797	26	6	14.5	3.3
V78	Soladana	259	2	2	7.7	7.7
V79	Pitambordi	368	10	2	27.2	5.4
V80	Daribond	1295	25	6	19.3	4.6
V90	Narinda	1264	26	12	20.6	9.5
V97	Dhanagoda	342	4	6	11.7	17.5
V98	Santoshpur	105	2	2	19.0	19.0
V99	Baluakandi	460	11	4	23.9	8.7
VB1	Taltoli	949	16	5	16.9	5.3
VB2	Sree Rayerchar	1190	24	10	20.2	8.4
VB3	Rayerkandi	2929	51	29	17.4	9.9
D28	Bazarkhola	1046	22	8	21.0	7.6
D29	Kirtonkhola	215	4	2	18.6	9.3
D30	Banuakandi	726	19	4	26.2	5.5

Village code	Village name	Population (mid-year)	Live births	Deaths	Birth rate	Death rate
D31	Harina Bazarkhola	1001	16	6	16.0	6.0
D32	Khalisha	782	13	8	16.6	10.2
D33	Nayanagar	1058	20	9	18.9	8.5
D34	Saidkharkandi	1313	36	9	27.4	6.9
D35	Mollah Kandi	546	11	6	20.1	11.0
Block E Total		**40218**	**776**	**275**	**19.3**	**6.8**
A00	Uddamdi	3212	64	19	19.9	5.9
F00	Sepoykandi	1472	25	7	17.0	4.8
G00	Thatalia	3085	77	19	25.0	6.2
J00	Char Harigope	817	16	2	19.6	2.4
U00	Baispur	9178	207	69	22.6	7.5
V01	Kadamtali	367	10	3	27.2	8.2
V02	Nilokhi	435	4	1	9.2	2.3
V03	Char Nilokhi	608	13	5	21.4	8.2
V04	Char Pathalia	366	4	3	10.9	8.2
V05	Gazipur	3313	76	20	22.9	6.0
V06	Fatepur	2519	61	14	24.2	5.6
V07	Nayakandi	281	7	1	24.9	3.6
V08	Goalbhar	1189	18	8	15.1	6.7
V09	Naburkandi	1180	28	6	23.7	5.1
V14	Enayetnagar	631	8	7	12.7	11.1
V36	Ludhua	5396	87	38	16.1	7.0
D99	Mandertoli	1997	37	19	18.5	9.5
Block F Total		**36046**	**742**	**241**	**20.6**	**6.7**
B00	Charmasua	1818	32	11	17.6	6.1
C00	Sarderkandi	3851	89	25	23.1	6.5
V37**	Charputia	-	-	-	-	-
V50	Bakharpur	43	1	0	23.3	0.0
V51	Induriakandi	897	13	4	14.5	4.5
V53	Chhoto Haldia	3032	64	23	21.1	7.6
V58**	Mohishmari	-	-	-	-	-
V69**	Naobangha	-	-	-	-	-
V70**	South Joypur	-	-	-	-	-
V95	Baluchar	2389	67	16	28.0	6.7
V96	Rampur	529	8	3	15.1	5.7
VB4	Ramdaspur	3568	86	22	24.1	6.2
VB5	Thakurpara	787	21	8	26.7	10.2
VB6	Sarkerpara	555	12	0	21.6	0.0
VB7	Mirpur	307	5	3	16.3	9.8
VB8	Farazikandi	1236	24	11	19.4	8.9
VB9**	Ramanathgonj	-	-	-	-	-
VB0	South Rampur	2948	58	18	19.7	6.1
D88	Sankibhanga	1473	21	10	14.3	6.8
D89	Sankibhanga Namapara	993	18	5	18.1	5.0
D90	Zahirabad	859	14	4	16.3	4.7
D91**	North Joypur	-	-	-	-	-
D92**	West Joypur	-	-	-	-	-
D93	Maizkandi	1334	33	9	24.7	6.7
D94	Hazipur	1577	28	12	17.8	7.6
D95	Tapaderpara	635	9	6	14.2	9.4
D96	Sakharipara	1244	39	10	31.4	8.0
D97	Nayakandi	681	13	5	19.1	7.3
D98	Bara Haldia	3253	67	23	20.6	7.1
Block G Total		**33912**	**704**	**224**	**20.8**	**6.6**
Government Service Area Total		**110176**	**2222**	**740**	**20.2**	**6.7**

**Lost due to river erosion in 1987

APPENDIX C

LIFE TABLE EQUATIONS

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

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

2. $l_0 = 100{,}000$

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

3. $L_0 = 0.15\, l_0 + 0.85\, l_1$

   $L_1 = 0.410\, l_1 + 0.590\, l_2$

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

   ${}_nL_x = \frac{{}_nd_x}{{}_nm_x}$, for $5 \leq x \leq 80$

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

4. $e_x = \frac{T_x}{l_x}$, 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: lnC assumed to be 0.095; separation factors in equation 3 correspond to an infant mortality rate of 50 per 1,000 livebirths

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
Total	**100000**	**100**

NOTE: Source: Ahmed OB, Boschi-Pinto, Lopez AD et al. (2000)
Available online at: http://www.who.int/healthinfo/paper31.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 project		X		X
1997	Sub-centre delivery			X	
1998					X
2000			X		
2001		X			
2000	Fixed Site Clinic for delivery on MCH-FP services			X	X
2001		X	X		
2001	Maternal and infant Nutrition intervention (MINIMAT)	X	X	X	X
2002	Arsenic in Tub-well water and mitigation (AS-MAT)	X	X	X	X
2005	Introduction of Hepatitis B	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
2009	Hemophilus influenza type B(Hib) vaccine in the form of pentavalent vaccine	X	X	X	X
2011	Flu Q-QIV (Phase III)	X			
2012	Measles + Robella vaccine introduction	X	X	X	X
May 2012	JE (Japanese encephalitis) vaccine trial	X	X	X	X
Apr 2012	FLU D_QIV (Phase III)	X	X		

Date	Activity	Blocks			
		A	B	C	D
May 2012	OPV vaccine trial	X	X	X	X

APPENDIX F

STAFF OF HDSS, 2013

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HDSS-Matlab

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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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