DEMOGRAPHIC SURVEILLANCE SYSTEM - MATLAB

Volume Four

VITAL EVENTS AND MIGRATION-1975

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Vital Events and Migration

1975

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PREFACE

The Cholera Research Laboratory (CRL) operates under a bilateral project agreement between the governments of Bangladesh and the United States of America. Research activities of CRL center on the interrelationships between diarrheal disease, nutrition, fertility and their environmental determinants. CRL issues two types of papers: scientific reports and working papers which demonstrate the type of research activity currently in progress at CRL. The views expressed in these papers are those of authors and do not necessarily represent views of Cholera Research Laboratory. They should not be quoted without the permission of the authors.

Abstract

The results of the Demographic Surveillance System (DSS) in Matlab for the calendar year 1975 are presented in three sections: (A) Summary overview of the vital events, migration, marriages and divorces recorded in 1975 with a descriptive analysis of the results. (B) A detailed study of the demographic implications of the economic crisis of 1974 - 1975 in the DSS area. (C) Selected cross-tabulations of the recorded events.

The present volume is a part of a series describing and analysing the annual results of the DSS-Matlab.

Introduction

The results presented in this volume were obtained from the regular registration of births, deaths and migration in the calendar year 1975. A section reporting on marriages and divorces is included, for the first time, since such registration was made a part of the system in January 1975. A detailed description of the Demographic Surveillance System (DSS), its operation and definitions, is presented in volume 1 of this series. The DSS consists of two parts: longitudinal registration of demographic events, and cross-sectional censuses. The latest census was taken between 22 April and 4 July, 1974. The results of the 1974 census are presented in volume 2 of this series.

The contents of the present volume is presented in three sections: (A) a summary overview and analysis of the main results of the DSS for 1975; (B) an analysis of the demographic implications of the economic crisis of 1974-75 in the DSS area; (C) the basic tabulations of the results of the DSS under four parts: C-1 Deaths; C-2 Pregnancy Terminations and Births; C-3 Migration; C-4 Marriages and Divorces. The number and scope of the tabulations in part (C) does not utilize all of the wealth of information generated by the DSS. Its main objective is to present selected cross-tabulations which may be utilized by health and population researchers for general information. The detailed description of the DSS in volumes 1 and 2 of this series provides leads for special tabulations of the data as they may be required for specialized inquiries and research projects.

The quality of the results of any continuing surveillance system depends on the fieldworkers and their supervisors. There are about 350 of them in the DSS. We wish to acknowledge their untiring effort and dedicated work, both in the Matlab H.Q. of the field operations and in the 228 villages. The staff of the Statistical Branch of the CRL in Dacca verified, coded, punched and processed the data and this contribution to the results of the DSS is gratefully recognized and appreciated.

A. Analysis of the Demographic Surveillance in the Matlab area, 1975

1. Basic Demographic Characteristics in 1975

The DSS was maintained in 228 villages with a population of 263,507 enumerated at the 1974 census. An estimate of the population size as of 1 July, 1975 presented in Table 1 revealed a loss of 4,613 inhabitants of the DSS area between 1 July, 1974 and 30 June, 1975. The estimated population size as of 1 July, 1975 was **259,194** out of which 132,251 were males and 126,943 females, yielding a sex ratio of 104.2 males per 100 females.

For the calculation of demographic measures specific for sex and age an estimate of the age distribution of the population was needed. A technique based on the balancing equation was developed for this purpose and its detailed description is in Annex I.

TABLE 1

Estimate of the mid-1975 population, DSS Matlab

Data and period	Males	Females	Total
Census 1974	134,427	129,080	263,507
Adjustment for the period between census and 1 July, 1974ª/	153	147	300
Estimated population on 1 July, 1974	134,580	129,227	263,807
Births July- December 1974	3,068	2,930	5,998
January - June 1975	1,900	1,786	3,686
Deaths July - December 1974	1,296	1,412	2,708
January - June 1975	1,488	1,398	2,886
Migration			
in - July - December 1974	708	1,047	1,755
January - June 1975	1,228	1,452	2,680
out - July - December 1974	1,680	2,004	3,684
January - June 1975	4,769	4,685	9,454
Estimated population as of 1 July, 1975	132,251	126,943	259,194
Population loss between 1 July, 1974 and 30 June, 1975	2,329	2,284	4,613

a/ See Volume 2 for details.

The sex-age distribution of the population presented in Table 2 does not show any significant deviation of the age structure from that found in the 1974 census, with only one exception: the number of children aged under one year. The number of children aged zero in 1975 was considerably lower than in 1974 mainly because of the reduced number of births and, to lesser extent, on account of the increased infant mortality during the end of 1974 and beginning of 1975. As in 1974, there was an excess of males over females in 1975 in all age groups except at the ages 25-39 years.

A general review of the demographic events recorded in DSS during 1975 is presented in Table 3. There were only 7,622 births recorded during the year and the birth rate dropped to 29.1 per 1,000 population. On the other hand, the number of deaths rose to 5,393 and the death rate jumped to 20.6 per 1,000 population. The net increment of 2,229 persons or 8.5 per 1,000 population was the lowest one on record in the DSS. Even this natural increment

TABLE 2

Estimated sex and age structure of the population of the
DSS Matlab on 1 July, 1975*

Age	Males	Females	Total	Age	Males	Females	Total
0	4,078	3,929	8,007	25-29	6,627	8,099	14,726
1	5,154	4,987	10,141	30-34	6,127	7,828	13,955
2	4,487	4,294	8,781	35-39	6,738	6,960	13,698
3	4,270	3,977	8,247	40-44	6,203	5,646	11,849
4	4,255	4,035	8,290	45-49	5,243	4,619	9,862
0-4	22,244	21,222	43,466	50-54	4,350	3,728	8,078
5-9	18,114	17,051	35,165	55-59	3,549	3,173	6,722
10-14	19,953	19,331	39,284	60-64	2,562	2,339	4,901
15-19	16,697	14,805	31,502	65+	5,132	3,893	9,025
20-24	8,712	8,249	16,961	Total	132,251	126,943	259,194

* For the estimation method see Annex I.

TABLE 3

Vital events and migration registered in DSS Matlab in 1975

Events	Number	Rate per 1,000 population
Mid-year population	259,194	–
Live births	7,622	29.4
Deaths	5,393	20.8
Out of it infant deaths	1,462	191.8*
Migration – in	6,054	23.4
– out	14,127	54.5
Marriages	2,795	10.8
Divorces	681	24.4**
Natural increase	2,229	8.6
Loss due to migration	8,073	31.1
Total population loss 1975	– 5,844	-22.5

* per 1,000 live births;   ** per 100 marriages

was, however, eroded by the heavy excess of out-migrants over in-migrants. Migration loss during 1975 was 8,073 persons (30.9 per 1,000 population). As a result, the DSS population declined during 1975, on the average, by 2.25 percent.

The year 1975 was the first year when registration of marriages and divorces was introduced into the DSS. During the year 2,795 marriages were recorded (10.8 per 1,000 population) and 681 marriages were terminated by divorce (divorce rate of 24.4 divorces per 100 marriages).

2. Mortality

Out of the 5,393 deaths recorded in 1975, half occurred among infants and young children under the age of five years (2,699 deaths, out of them 1,462 under the age of one year, 1,237 at ages 1-4 years). Infant and child mortality has been high in the DSS generally and, in 1975, it further increased because of the food shortage following the 1974 floods. The conventional infant mortality rate of 191.8 deaths per 1,000 live births for 1975 (see Table 3) should, however, be taken with caution. It is a biased index as it relates infant deaths of a given year to the number of live births of the same year. However, the infants who died in 1975 were partly born in 1974 (when the number of births was much larger) and only a fraction of them were born in 1975. To obtain an unbiased estimate of the risk of infant death during 1975 we have to take into consideration the different sizes of the two birth cohorts. An adjustment procedure explained in Annex II was used to achieve that, the adjusted infant mortality rate in 1975 was 174.3 deaths per 1,000 related live births.

Age-specific death rates for 1975 are presented in Table 4. They show a considerable increase of mortality in all age groups and, even more note-worthy, a relatively higher mortality of males over females at all ages beyond 25 years. At some ages, such as for instance 40-54 years, mortality rate of males exceeded that of females by hundred percent and more. However, it should be realized that the number of deaths at those ages and, for that matter, at the younger ones as well, was rather small. With the population at risk between 4,000 and 8,000 in any of the adult age groups, the likelihood of a chance variation of the rates being at least partly responsible for the high M/F ratios should be kept in mind.

To obtain a comprehensive index of the impact of the increased mortality level, an abridged Life Table for 1975 was constructed following the procedure described earlier (see Volume Three of this series). The increased mortality reduced the life expectation at birth of males to 42.9 years and of females to 42.1 years. The life table 'paradox', namely that the longevity reaches its peak not at birth but at some higher age is caused by the high mortality of infants and young children. The highest life expectation, namely 52.3 years, was reached by males at the age of four years; for females, the peak of longevity was at the age of five, that is 55.1 years. (Table 5).

TABLE 4

Age-specific death rates and Male/Female ratio of death rates, 1975

Age at death	Deaths per 1,000 persons of given sex and age		Ratio M/F	Age at death	Deaths per 1,000 persons of given sex and age		Ratio M/F
	Males	Females			Males	Females	
0	165.1*	184.1*	.90	25-29	4.7	3.7	1.27
1	38.4	56.8	.68	30-34	4.6	4.5	1.02
2	31.4	46.1	.68	35-39	8.6	6.9	1.25
3	26.0	37.7	.69	40-44	14.8	6.0	2.47
4	17.2	20.6	.83	45-49	22.3	11.7	1.91
5-9	4.9	6.8	.72	50-54	34.9	13.7	2.55
10-14	1.5	2.0	.75	55-59	44.5	35.9	1.24
15-19	1.9	2.8	.68	60-64	60.9	49.2	1.24
20-24	3.1	3.9	.79	65+	113.4	111.5	1.02

* per 1,000 related live births.

TABLE 5

Abridged Life Table based on mortality rates of 1975

Age	Males			Females			$\overset{o}{e}_x(m) - \overset{o}{e}_x(f)$
	$1000\ {}_nq_x$	1_x	$\overset{o}{e}_x$	$1000\ {}_nq_x$	$1x$	$\overset{o}{e}_x$	
0	165.06	100,000	42.94	184.09	100,000	42.08	+ .86
1	37.69	83,494	50.37	55.18	81,591	50.51	− .14
2	30.94	80,347	51.33	45.07	77,089	52.43	− 1.10
3	25.66	77,861	51.95	37.02	73,614	53.88	− 1.93
4	17.01	75,863	52.31	20.36	70,889	54.94	− 2.63
5	24.27	74,573	52.20	33.45	69,446	55.07	− 2.87
10	7.49	72,763	48.44	9.78	67,123	51.89	− 3.45
15	9.54	72,218	43.78	13.75	66,466	47.37	− 3.59
20	15.38	71,529	39.18	19.21	65,552	43.00	− 3.82
25	23.12	70,429	34.76	18.35	64,293	38.79	− 4.03
30	22.59	68,801	30.52	22.11	63,113	34.47	− 3.95
35	42.13	67,247	26.17	33.90	61,718	30.19	− 4.02
40	71.51	64,413	22.21	29.66	59,626	26.17	− 3.96
45	105.68	59,807	18.72	56.79	57,857	21.89	− 3.17
50	160.68	53,487	15.64	66.14	54,571	18.06	− 2.42
55	200.30	44,893	13.16	164.84	50,962	14.16	− 1.00
60	264.23	35,901	10.83	218.92	42,562	11.46	− 0.63
65	−	26,415	8.82	−	33,244	8.97	− 0.15

Seasonal variation of mortality was, in 1975, not only the result of variations in the climate and associated with them fluctuations in the incidence of morbidity and fatality of the prevailing diseases, but also of the food shortage in the early part of the year and its implications. Among the population aged five years and more, the frequency of deaths was consistently higher during the first quarter of 1975 and during the last two months of the year (Table 6). The observed monthly number of deaths exceeded the expected one[1]/ by 14-19 percent during January-March and by 8-10 percent during November-December periods. Among young children aged 1-4 years the months of increased incidence of death were March, April and August; this observed excess over the expected deaths amounted to about 23-28 percent in the former two months and about 14 percent in August.

TABLE 6

Seasonal variation in the number of death by month

Age at death	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	Ratio of 100 observed/expected deaths											
5 and more	114	115	119	106	64	81	101	107	98	77	110	108
1 - 4	69	102	128	123	101	106	102	114	101	94	87	72

& Deaths during the first year and, in particular, during the first month of life fluctuate not only because of the seasonality of the causes of death but also because of the seasonality of termination of pregnancy. The monthly rates - neonatal and post-neonatal mortality - presented in Table 7 and the indices of their seasonal variation were calculating by taking into consideration the births to which those deaths were related. The methodological notes in Volume Three (Annex) explain the procedure used here.

In 1975, the post-neonatal component of infant mortality was slightly larger than the neonatal one, the latter representing 47 percent of infant deaths. Neonatal mortality rates exceeded the annual average in January (by 20 percent) and later throughout the third quarter of the year (by 23 - 36 percent). Post-neonatal mortality rates exceeded the annual average during February through April but were considerably below the average during the last five months of 1975.

The reporting of the cause of death relies on the description of symptoms and circumstances provided by the family and relatives of the deceased person. As such, it is not a very reliable source of information on the specific causes. Moreover, quite a considerable fraction of all deaths remains un-

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1/ Expected number of death in a given month was calculated as 1/365 of the annual number of deaths multiplied by the number of days in the given calendar month.

TABLE 7

Neonatal and post-neonatal mortality rates by month, 1975

Month	Deaths per 1,000 related births		Seasonal index (annual average = 100)	
	Neonatal	Post-neonatal	Neonatal	Post-neonatal
Jan	93.5	94.1	120	108
Feb	66.7	116.6	86	134
Mar	70.8	156.2	91	180
Apr	79.6	136.7	102	157
May	54.0	81.2	69	93
Jun	66.0	92.5	85	106
Jul	105.9	79.2	136	91
Aug	95.4	51.3	123	59
Sep	102.2	58.8	131	68
Oct	61.8	46.5	80	53
Nov	69.8	48.9	90	56
Dec	69.9	46.6	90	54
Year	77.77	87.05	100	100
Number of deaths	609	853		

identified as to cause which further reduces the validity of the conclusions drawn from the data. Despite those limitations, it is worth noting that in about one-quarter of reported deaths dysentery and diarrhea were mentioned as the cause. This percentage rose to 34 among the deaths of children aged 1-4 years. A frequent cause of death of infants continued to be tetanus, accounting for about one-quarter of deaths at that age. Drowning was reported as a cause of death of children aged 1-4 years rather often, accounting for 10 percent of deaths of boys and 5 percent of girls of that age.

3. Fertility

There were 8,437 pregnancies recorded in DSS in 1975, yielding a pregnancy rate of 183 pregnancies per 1,000 married women aged less than 50 years. Out of the recorded pregnancies 10.3 percent resulted in foetal loss: 618 mis-

carriages and 251 stillbirths, or 7.3 and 3.0 per 100 pregnancies respectively. Among the pregnancies terminated by live birth, 67 produced twins and 3 triplets. Of the 143 children born from multiple confinements, 19 were stillborn (all triplets were live born). In all, there were 7,622 children live born, that is 29.4 live births per 1,000 population.

The age-specific fertility rates for 1975 are presented in Table 8. The level and pattern of fertility, if continued, would result in a total fertility rate (TFR) of 4.3 ever-born children per woman and in a gross reproduction rate (GRR) of 2.1 daughters per woman at the end of her reproductive

TABLE 8

Age specific fertility rates, 1975

Age group	Number of live births	Number of women 1.7.1975	Age specific fertility rate (births per 1,000 women)
10-14	71	19,331	3.7
15-19	1,723	14,805	116.4
20-24	1,842	8,249	223.3
25-29	1,622	8,099	200.3
30-34	1,404	7,828	179.4
35-39	661	6,960	95.0
40-44	205	5,646	36.3
45-49*	33	4,619	7.1
Total	7,561	75,537	TFR - 4,307.5

GRR - 2,101.2**

GFR - 100.1

TFR - total fertility rate) per 1,000 women
GRR - gross reproduction rate) at the end of
GFR - general fertility rate) reproductive life

* all births to women aged 45 years and over;
** assuming a sex ratio at birth 1.05.

life cycle (assuming none of the women died). It may be pointed out as a matter of interest that this level of fertility associated with the female mortality of 1975, if continued, would eventually generate a net reproduction rate of 1.34 surviving female children per each woman reaching the end of reproductive life, and a rate of population growth of 1.0 percent a year.

The seasonal variation of the terminations of pregnancies carried to term (i.e. live and stillbirths) exhibited two peaks in 1975 (see Table 9): the first one in January-February, and the second one in September-October.

TABLE 9

Seasonal variation of the termination of pregnancies carried to term in 1975

Month:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Seasonal index*	130	122	107	98	73	58	76	91	127	120	104	96

* Seasonal index is calculated as a ratio of the observed and expected events in the given month, multiplied by 100. Expected events are 1/365 of the annual total multiplied by the number of days in the given month.

The former peak, at which the recorded births exceeded the expected number by 30 and 22 percent respectively, corresponded to conceptions during April-May 1974. The second peak, only slightly lower than the first one (27 and 20 percent above the expected number respectively), coincided with the conceptions that occurred during December 1974-January 1975.

The mothers who gave birth to a child in 1975 had experienced, on the average, 3.5 pregnancies before the presently terminated one. (Table 10.) The average number of previous pregnancies increased progressively from 0.1 among mothers aged less than 15 years to 4.0 among those in their late twenties and to 8.9 among the mothers aged 45-49 years. Due to the persistence of high infant and child mortality as well as to stillbirths (miscarriages were not included in the determination of pregnancy parity) the average number of living children at the time the mother was delivered of her present pregnancy was considerably less. The average number for all mothers, namely 2.4 living children (present birth excluded) fell short of the average number of pregnancies by 31 percent. Among the mothers in the prime age of childbearing, aged 25-29 years, only 2.8 children were still alive out of 4.0 pregnancies; among those approaching the end of their reproductive life cycle at the age 40 years and over, 5.8 children were alive out of 8.4 pregnancies, that is a loss of 32 percent.

4. Migration

As mentioned earlier, the year 1975 was marked by a large exodus from the DSS area, particularly during the first and second quarter of the year. More than 14,000 people left the area of DSS, two thirds of them during the first six months. In contrast, over 6,000 persons migrated into DSS area, one third of them during the last quarter of 1975. The seasonal pattern of migration is presented in Table 11 by sex and direction of the movement. In-migration exceeded the expected number (calculated on the assumption of an even distribution of migration throughout the year) by 13 to 44 percent for males and by 36-53 percent for females during the last three months of the year. (In the case of female in-migration only October and December show significantly increased levels of in-migration). In addition, women moved into the DSS in greater numbers than average during June as well.

TABLE 10

Births 1975 by mother's parity (previous pregnancies) and the
number of living children

Age of mother	Total number	Number of previous pregnancies (present one excluded)									Average number of pregnancies
		0	1	2	3	4	5	6	7	8+	
under 15	71	66	4	1							0.08
15-19	1723	1010	546	147	17	2	1				0.52
20-24	1842	153	524	615	350	135	36	17	7	5	2.02
25-29	1622	17	61	202	377	398	274	162	75	56	4.03
30-34	1404	6	14	38	97	198	281	282	217	271	5.86
35-39	661	1	1	2	21	28	67	89	118	334	7.56
40-44	205	3	-	2	3	4	4	23	32	134	8.33
45+	33	1	-	-	-	-	-	1	6	25	8.94
Total	7561	1257	1150	1007	865	765	663	574	455	825	3.49

Age of mother	Total number	Number of living children (present birth excluded)									Average number of living children
		0	1	2	3	4	5	6	7	8+	
under 15	71	70	1								0.01
15-19	1723	1271	402	50							0.29
20-24	1842	303	777	535	191	32	3	1			1.39
25-29	1622	36	185	447	479	316	121	30	6	2	2.85
30-34	1404	19	48	135	281	361	316	162	60	22	4.10
35-39	661	3	8	25	74	106	161	134	89	61	5.28
40-44	205	4	3	5	16	21	43	41	36	36	5.73
45+	33	1	-	-	3	3	4	11	3	8	5.91
Total	7561	1707	1424	1197	1044	839	648	379	194	129	2.42

TABLE 11

Seasonal variation of migration of males and females, 1975*

Month		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Males	In	99	103	76	82	78	102	88	86	91	144	113	137
	Out	151	175	142	102	108	124	83	68	47	68	46	63
Females	In	82	100	68	80	83	122	94	94	87	136	102	153
	Out	142	190	140	101	102	125	100	75	58	60	44	70

* For the method of calculation see Table 9 (footnote).

Out-migration was high during the first three months of the year, the number of out-migrants exceeding the expected one by 42-75 percent for males and by 40-90 percent for females. Another month of a considerable out-migration was June when the actual number exceeded the expected one by about 25 percent for males as well as females.

In terms of age, movements of males in both directions culminated at the age 25-29 years, but out-migration was almost as high as this peak at the age 20-24 years as well. More than 7 men out of 100 residents moved out of DSS at ages 20-29 years, while in-migration added about 5 men to 100 residents aged 20-24 years. The migration rates, in both directions, declined steeply from their respective peak values.

Even steeper than the age pattern of migration of males was the age profile of the female migration. Both in and out movements culminated at the ages 15-19 years: over 11 women out of 100 residents moved out and about 7 moved in. At the age 20-24 years the relative number of out-migrants was only slightly below that of in-migrants, but for all other age groups out-migration rates greatly exceeded the rates of in-migration (Table 12).

Migration pattern by age as well as the seasonality of the movements are, in general, dependent on the causes of the movement. Almost two out of five male migrants were dependents (37.8 and 39.8 percent of in-migrants and out-migrants respectively). About one out of five moved into DSS area seeking job, for business or other such reason; two out of five leaving the DSS area did so on this account. About 130 boys and young men arriving in 1975 and 329 leaving the DSS gave study as the reason for the movement. (Table 13).

Almost half of the women who moved into the DSS area in 1975 were dependents as were close to two thirds of those who left the area. Another six percent of female in-migrants and eight percent of out-migrants changed residence to join their husband, parents, or close relatives. Apart from dependents,

TABLE 12   Sex and age-specific migration rates, 1975

| Age | Migrants per 1,000 mid-year population of a given sex and age | | | |
| | Males | | Females | |
	In	Out	In	Out
O	20	94	19	95
1	17	52	16	47
2	26	51	27	44
3	24	52	25	50
4	23	39	19	40
O-4	22	57	21	55
5-9	21	46	21	44
10-14	16	51	16	55
15-19	15	59	70	111
20-24	27	75	57	49
25-29	47	76	31	58
30-34	37	71	16	51
35-39	30	52	11	40
40-44	18	51	8	28
45-49	17	42	9	27
50-54	13	33	5	28
55-59	10	25	10	26
60-64	8	25	12	30
65+	8	20	13	29
Total	20.8	52.9	26.0	56.1
Number	2,755	7,000	3,299	7,127

TABLE 13   Cause of Migration, 1975

| MALES | In-migration | | Out-migration | | FEMALES | In-migration | | Out-migration | |
Cause	Number	%	Number	%	Cause	Number	%	Number	%
Dependents	1042	37.8	2783	39.8	Dependents	1579	47.9	4502	63.2
Service	126	4.6	919	13.1	Marriage	678	20.6	884	12.4
Business	84	3.0	287	4.1	Divorce	164	5.0	180	2.5
Work	200	7.3	894	12.8	Separation	190	5.8	163	2.3
Livelihood	126	4.6	608	8.7	Join husband	77	2.3	399	5.6
Better living	237	8.6	235	3.4	Join parents	70	2.1	75	1.0
Returning home	239	8.7	35	0.5	Join relatives	60	1.8	109	1.5
after study	14	0.5	20	0.3					
after service	79	2.9	11	0.2					
Study	130	4.7	329	4.7					

the second largest group of women on the move were brides: 21 percent of
female in-migrants and 12 percent of out-migrants changed residence at the
occasion of marriage. Marital breakdown made 354 women to return to their
parental homes in DSS (11 percent of in-migrants) and 343 women left the DSS
for similar reason (5 percent of out-migrants).

5. Marriage and Divorce

As noted earlier, marriage and divorce registration became a part of the
DSS from 1975. During that year, there were 2,795 marriages and 681 divorces
recorded in the area. Marriages were heavily concentrated in June-August and
in December. Divorces were rather evenly distributed throughout the year,
although some clustering may be noticed in March, May-June, October and
December. The relative frequency of marriages was about 10.3 per 100 non-
married males aged 15 years and over and 7.4 per 100 non-married females aged
10 years and over.

Among the grooms 67 percent were single, 6 percent widowers and 21 per-
cent divorced. Another 6 percent of grooms were already married and in their
present marriage took an additional wife. The overwhelming majority of brides,
81 percent, were single, less than 2 percent were widows and 17 percent
divorcees.

The average age of grooms and brides varied according to their marital
status (Table 14). The single brides and grooms were the youngest ones, half
of the former being 16.4 years of age and half of the latter slightly over
25 years old. Remarrying widowers and widows were the oldest group to marry,
the males on the average 38.4 years and the females 26.7 years. The range of
the bridal ages was much narrower than that of the grooms; only exceptionally
was a bride older than 30 years whereas grooms aged 40 years and older were
not infrequent. Consequently the older widows and divorcees had a very small
chance of re-marrying while most widowers and divorced men did so.

TABLE 14 Average and median age at marriage, 1975

Marital status	Grooms			Brides		
	Average	(S.D.)	Median	Average	(S.D.)	Median
Single	24.9	(3.95)	25.3	16.5	(1.96)	16.4
Married	36.0	(10.35)	33.6	-	-	-
Widowed	38.4	(10.13)	37.4	26.7	(9.07)	24.7
Divorced	29.8	(7.35)	28.3	20.4	(4.68)	19.5

The age difference between the partners at marriage was quite high and increased considerably the older the groom was (Table 15). The grooms in their twenties were likely to be about five to six years older than their brides, whereas those marrying or re-marrying while in their forties took brides 20 and more years younger than themselves.

TABLE 15 Average difference (years) between the groom's and bride's ages at marriage, 1975

Groom's marital status	Groom's age at marriage								
	Under 20	20-24	25-29	30-34	35-39	40-44	45-49	50+	All grooms
	Bride younger by years (on average)								
Single	3.4	6.4	10.2	13.8	19.6	--------25.8---------			8.6
Married	3.0	5.9	9.7	12.6	19.4	22.7	-----32.4----		17.3
Widowed	------4.8------		10.9	13.5	17.5	23.3	22.1	30.4	18.0
Divorced	2.8	5.6	9.6	12.8	18.7	21.9	22.8	32.8	11.6

Divorce was quite frequent in 1975: the ratio between divorces and marriages recorded in that year reached 24.4 per 100 marriages. Divorcing wives and husbands were relatively young: half of the husbands was just slightly over 28 years of age and half of the wives was between 18 and 19 years old. The average duration of marriage of the divorcing couples was less than four years with a trend of the duration to increase among the older husbands. (Table 16.) Almost half of the marriages of the divorcing couples where the husband was under 25 years of age lasted for less than two years but only about one quarter of the marriages was of such a short duration where the husband was 35 years old or older.

TABLE 16 Average duration of marriage of the divorces registered in 1975

Husband's age at the time of divorce	Number	Average marriage duration (S.D.) in months	Percentage of divorces with marriage duration under 2 yrs.	
			Number	Percent
under 25	160	29.8 (20.6)	78	48.8
25 - 29	202	37.3 (27.5)	75	37.1
30 - 34	146	47.4 (32.6)	45	30.8
35 and over	173	63.9 (39.5)	43	24.9
All husbands	681	44.4 (33.3)	241	35.4

B. The economic crisis of 1974-1975 and its demographic implications in the DSS area.

In 1974, widespread flooding damaged two rice crops, the minor aus and the major aman, in many parts of Bangladesh. The next available crop, boro, was to be harvested in April-May 1975. This is not a major crop and would not have been able to provide sufficient food supply, in particular to landless village labour. The normal foodgrain consumption, at least for a considerable segment of the rural population, was deferred to the next aman harvest at the end of 1975. Destruction of the crops had an additional indirect effect: it deprived the landless labour of the normal work opportunities and thus of the income, mostly in kind, needed to provide for them and their families.

A factor aggravating the situation was the sharp rise of the price of rice[2]. Although price of rice had been rising continuously since 1971, the trend was only gradual. At first in 1974 the price rise started gaining momentum - even before the crop failure - and when it reached its peak in January 1975 it was at a point 3.5 times above the level recorded in December 1973.[3]

The disaster in 1974 was probably more severe in its demographic consequences than the 1971 war. Its impact in the DSS was manifested in almost all measurable events: mortality increased in general, but particularly so of infants (characteristically in the post-neonatal component of the infant mortality rate) and of the youngest children aged 1-4 years. Fertility of mothers at all ages declined. The volume of migration increased considerably and the rates of out-migration amounted to an exodus of the rural population. In Table 17 we present the recorded events by quarters of the years 1974 and 1975 to be able to trace the path of the demographic impact of the famine. The rates are related to the estimated person-years in each quarter[4] to assure a formal comparability between the quarters.

Of the demographic events recorded in the DSS, the mortality rates responded to the food shortage almost immediately. The crude death rates rose by almost 50 percent in the third quarter of 1974 and rapidly leapt to the maximum point in the last quarter of 1974 and in the first quarter of 1975. During those two quarters mortality rates were almost twice as high as in the early

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2/ See Chen and Chowdhury (1977) Figure 1.

3/ The price of rice stood at about 80 Taka per maund (about 40 kg) in December 1973 and leapt to 280 Taka in January 1975 in the Chandpur division (includes DSS area). Data are from Chowdhury and Huber (1976) Figure I.

4/ The quarterly estimates of population were based on the demographic balancing equation using the monthly numbers of events: births, deaths, net balance of migration. The rates assume that the population estimated to be present in the mid-point of each quarter was 'at risk' for three months; thus a quarterly

rate $r(i) = \frac{1}{4} \frac{E(i)}{P(i)}$ where i stands for the given quarter, E for the number of events and P for the population size at the mid-point of the quarter.

TABLE 17

Demographic Events by Quarters, 1974-1975, in DSS area.

Quarterly demographic change in DSS Matlab

	I	II	III	IV	I	II	III	IV
Mid-period population	261,560	263,256	264,202	265,157	263,514	260,506,	258,488	259,036
Live births	2,950	2,368	2,662	3,336	2,259	1,426	1,887	2,050
Deaths	836	818	1,170	1,538	1,606	1,280	1,339	1,168
Natural increase	2,114	1,550	1,492	1,798	653	146	548	882
Migration – in	705	415	787	968	1,300	1,380	1,374	2,000
– out	981	577	1,368	2,316	5,527	3,927	2,574	2,099
Balance (net migration)	-276	-162	-581	-1,348	-4,227	-2,547	-1,200	-99
TOTAL CHANGE	+1,838	+1,388	+911	+450	-3,574	-2,401	-652	+783
Infants deaths	343	355	389	472	529	379	315	239
Percent of all deaths	41.0	43.4	33.2	30.7	32.9	29.6	23.5	20.5
Infant mortality rate								
conventional	116.3	149.9	146.1	141.5	234.2	265.8	166.9	116.6
adjusted to related births	115.6	119.3	132.7	166.5	196.9	159.2	149.4	123.5
Crude birth rate (annual basis)	45.1	36.0	40.3	50.3	34.3	21.9	29.2	31.7
death rate	12.8	12.4	17.7	23.2	24.4	19.6	20.7	18.0
Migration rate – in	10.8	6.3	11.9	14.6	19.7	21.2	21.3	30.9
– out	15.0	8.8	20.7	34.9	83.9	60.3	39.8	32.4
Natural increase	32.3	23.6	22.6	27.1	9.9	2.3	8.5	13.7
Net balance of migration	-4.2	-2.5	-8.8	-20.3	-64.2	-39.1	-18.5	-1.5
TOTAL CHANGE	28.1	21.1	13.8	6.8	-54.3	-35.8	-10.0	12.2

1974. During the next three quarters, to the end of 1975, mortality rates slowly receded but by the end of the year they still remained about 40 percent above the level recorded early in 1974. The relatively slow return of mortality rates to their pre-crisis level may have been due to a general deterioration of the nutritional status of the population and of children in particular, during as well as after the crisis. The limited information available (Chowdhury and Huber, 1976) indicates that more children were malnourished in 1975 than in 1972 and the nutrition deprivation was worse among the moderately and severely malnourished groups. The trend of the infant mortality (IMR)[5]/ followed a path almost identical with that of general mortality. Taking the first quarter of 1974 as a benchmark, IMR climbed rapidly to a peak in the first quarter of 1975 when it stood at 70 percent above the base level. During the subsequent three quarters it fell back and by the end of 1975 it was at about the same level as in the first quarter of 1974.

Another, almost immediate, response to the food shortage was out-migration from the villages of the DSS area. The rates started increasing gradually during the last two quarters of 1974, leapt suddenly to an unprecedented 84 out-migrants per 1,000 population in the first quarter and only abated to 60 in the second quarter of 1975. Towards the end of the year, however, the in-migration rate increased, presumably as some individuals and families started returning when the time of the aman harvest approached. By the end of 1975 in-migration and out-migration rates were almost equal.

The time lag between conception and delivery delayed the direct response in the birth rates to 1975. The crude birth rate maintained its high level throughout 1974, dropped during the first quarter of 1975 and reached the lowest recorded level of 21.9 per 1,000 population in the second quarter of that year. It recovered from that trough subsequently, but only to 31.7 per 1,000 population in the last quarter of 1975. Considering that normally the last quarter of a year shows an increase of terminations of full-term pregnancies[6]/, the rise of the birth rate towards the end of 1975 could hardly be interpreted as a starting point of a gradual recovery. The time of the conceptions of those births, moreover, fell into the first quarter of 1975 which, it should be remembered, was the quarter of the highest out-migration from the villages. If the out-migration rate was an indication of the harshness of the living conditions and, if in response to them, reproductive behaviour was adjusted to avoid or postpone pregnancy, no true recovery could be expected before mid-1976 or even later.

5/ The infant mortality rate was adjusted to take into account the variations in the quarterly numbers of live births.

6/ See, for instance, the seasonal pattern in 1974 described in Volume Three of this series.

The last demographic response to be considered is marriage formation. Unfortunately, recording of marriages and divorces did not commence in the DSS before 1975 and we do not have a base-line data to compare 1975 returns with. The number of marriages in 1975 was, at 2,795 or 10.8 per 1,000 population, relatively low. In contrast, divorces were rather frequent; their number amounted to 681 and the ratio to marriages was 24.4 per 100 marriages. If we take female migration accompanying marriage and divorce or separation as indicators of the likely levels of marriage formation and breakdown we may be able to venture an estimation of the marriage and divorce levels in 1974. Table 18 presents the relevant data. Assuming that migration of women associated with

TABLE 18

Migration of women due to marriage, divorce and separation in 1974 and 1975

Migration	1974		1975		1974 as percentage of 1975	
	Marriage	Divorce & separation	Marriage	Divorce & separation	Marriage	Divorce & separation
In	544	196	678	354	80	55
Out	678	180	884	343	77	52
Total	1,222	376	1,562	697	78	54

marriage formation as well as dissolution is directly proportionate to the levels of nuptiality and divorce, the number of marriages in 1974 may have been between 2,150 and 2,240. Similarly, the number of divorces might have been somewhere between 350 and 380. If those figures are approximately correct, marriages would have been already reduced in 1974, but the increased incidence of marriage dissolutions as a response to the crisis and famine would have occurred with some time lag at first in 1975.

The quarterly data for 1975 give some support to this conjecture. Marriage rates were already low in the first quarter of 1975 at 8.2 marriages per 1,000 population but gradually moved upwards to 13.2 per 1,000 population in the last quarter. In contrast, the ratio of quarterly divorces to marriages was at its peak level in the second quarter of 1975 and rapidly declined towards the end of the year (Table 19).

The rapid fall of birth rates in the wake of famine or disruption of social order such as war has been atributed to the operation of two mechanisms: behavioural and biological. "Behaviourally, coital frequency may be reduced because of fear, anxiety, or the desire to postpone pregnancy. Induced abortions may increase and the number of couples entering reproductive life may

TABLE 19

Quarterly incidence of marriages and divorces in 1975

	Marriages					Divorces			
i	ii	iii	iv	Total	i	ii	iii	iv	Total
542	640	756	857	2,795	150	191	162	178	681
rate per 1,000 population					ratio per 100 marriages				
8.2	9.8	11.7	13.2	10.8	27.7	29.8	21.4	20.8	24.4

diminish from postponement of marriage. An intensification of malnutrition and disease could reduce conceptions by prolonging the period of post-partum amenorrhea, increasing the frequency of anovulatory cycles, or increasing foetal wastage. Migration could contribute to reduced conceptions by either voluntary or involuntary separation of spouses." (Chen & Chowdhury, 1977:422).

In the paragraphs that follow we shall attempt to present evidence about the characteristics of the fertility decline between 1974 and 1975 in the DSS.

The first noteworthy aspect of the fertility decline was the uniformity with which it was reflected in various fertility measures. The crude birth rate (CBR) dropped in one year by 31.5 percent from 42.9 in 1974 to 29.4 in 1975; the general fertility rate (GFR) declined by only a marginally higher proportion of 33 percent from 148 to 100 births per 1,000 women aged 10-49 years; by the same proportion the total fertility rate (TFR) declined from 6.46 to 4.31 births per woman.

Formally, the three measures of fertility differ only in the system of weights which are used in each of them in combination with the set of age-specific fertility rates. In general terms, each of the three measures of fertility may be expressed as $F = \Sigma\ f(x)\ w(x)$ where F is the fertility measure, $f(x) = \frac{B(x)}{W(x)}$ is the age-specific fertility rate relating births to mothers of a given age B(x) to the number of women of the same age W(x), and $w(x)$ is the weight which may vary with age. In the case of the CBR the set of weights consists of the proportions of women of a given age W(x) in the total population P, namely $w(x) = \frac{W(x)}{P}$. In the GFR the weights are the proportions of women of a given age W(x) out of the total female population in childbearing ages W (here taken as the ages 10-49 years), namely $w(x) = \frac{W(x)}{W}$. Lastly, the TFR being a sum of the f(x) uses a uniform weight for all ages, namely unity, $w(x) = 1$.

As the change in the three measures of fertility was almost the same, it was obviously occasioned by changes in the f(x) values and not by changes in the sex and age structure of the population which is what the weights are based on.

The comparison of the two sets of age specific fertility rates f(x) for 1974 and 1975 in Table 20 shows the extent of this change.

TABLE 20

Age-specific fertility rates in the DSS, 1974 and 1975

Year	Live births per 1,000 women of given age							
	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49
1974	5.6	161.3	311.8	323.3	253.8	163.4	55.8	16.3
1975	3.7	116.4	223.3	200.3	179.4	95.0	36.3	7.1
Difference (-)	1.9	44.9	88.5	123.0	74.7	68.4	19.5	9.2
Percentage decline	34	28	28	38	29	42	35	56

The age pattern of a fertility decline differs, generally, depending upon whether it reflects the predominance of a limiting or spacing behaviour. The former is parity-dependent and, ipso facto, age dependent; larger fertility reduction may be expected to occur at older ages of women. The latter reflects parity-independent control over fertility. It is not always volitional as Knodel (1977:241) pointed out: "... abstinence or very infrequent coitus during periods of severe economic crisis or epidemic mortality ... would have the effect of reducing marital fertility independently of parity, but might result as much from a loss of interest in sexual relations during such times as from a conscious attempt to postpone the next birth."

Parity-independent control is typically a temporary one. It results from the anticipation of a short-term benefit from the postponement of pregnancy and birth. Such behaviour may be expected in a population principally exercising very little control over its fertility, as is the case in the DSS villages, when faced by a major economic or natural calamity. The proportionate decline of fertility by age presented in the bottom row of Table 20 appears to corroborate this proposition. Fertility rates dropped somewhat less at the ages 15-24 years and 30-34 years than at the other age groups. The former ages contain undoubtedly a large proportion of recently married women, and even if marriages were less frequent in the later part of 1974 and early 1975, as suggested earlier, at least some of the recently married women would have become pregnant and delivered a child. The relatively large reduction of fertility at the youngest ages and among the oldest wives should be interpreted with caution; fertility rates at those ages were low and small declines may result in rather large relative decreases. Moreover, it is likely that less girls aged 10-14 years got married in the time of scarcity than would have been the case otherwise.

A difficult task is to explain plausibly the irregularity in the pace of decline between the ages 25-44 years. It fits unequivocally neither the model of parity-independent decline nor the parity dependent one. Some part of the observed irregularities may be due to migration. The effect of migration would operate in two ways: out-migration of males leaving their wives behind in the villages would have considerably and differentially reduced the risk of pregnancy. The monthly variation of female out-migration might have distorted to some degree the estimates of the mid-year population by age and thus the base for the calculation of the fertility rates. The latter is likely to have been of less consequence than the former. Neither, however, can be assessed with any degree of precision.

In general, the data indicate a prevalence of parity-independent regulation of fertility. The distribution of mothers by pregnancy parity and by the number of living children further strengthens this conjecture. In Table 21 a comparison is made of the average pregnancy parities and average number of living children of mothers that delivered a child in 1966/7, 1967/8, 1974 and 1975. The two former years refer to the Old Trial Area (OTA) and the two latter ones to the DSS.

TABLE 21 Average number of previous pregnancies and of living children of mothers whose latest pregnancy was terminated by live birth in 1966/7, 1967/8, 1974 and 1975

Year	Area	All mothers	Age of mother at delivery in the given year							
			under 15	15-19	20-24	25-29	30-34	35-39	40-44	45+
a. average number of previous pregnancies
1966-67	OTA	3.50	.16	.62	2.19	4.17	5.91	6.96	7.97	8.73
1967-68	OTA	3.59	.09	.58	2.20	4.32	5.96	6.93	7.56	8.45
1974	DSS	3.55	.09	.48	1.89	3.88	5.78	7.36	8.12	8.16
1975	DSS	3.49	.08	.52	2.02	4.03	5.86	7.56	8.33	8.94
b. average number of living children
1966-67	OTA	2.32	.07	.35	1.48	2.84	3.88	4.57	5.04	5.23
1967-68	OTA	2.24	.02	.33	1.48	2.92	3.92	4.60	4.97	5.74
1974	DSS	2.52	.02	.29	1.35	2.81	4.12	5.17	5.78	5.66
1975	DSS	2.42	.01	.29	1.39	2.85	4.10	5.28	5.73	5.91

The mothers of 1974 and 1975 did not differ significantly in either of the two characteristics under consideration: number of previous pregnancies and number of surviving children. Moreover, the mothers in the range of ages from

15 to 30 years did not show any significant difference from those who gave birth in 1966-7 or 1967-8 in the OTA. The older mothers might have experienced more pregnancies and certainly had more surviving children in 1974-5 than in the previous two years.

Lastly, let us examine the distribution of births in the four years by mother's pregnancy order and by her number of surviving children at the time of the termination of the latest pregnancy. (Table 22.) As in the previous case, there is no indication whatsoever that the mothers in 1975 were in any of the two aspects different in a significant degree and in a systematic way from those of the preceding year and, for that matter, of the earlier two periods examined in the table.

TABLE 22   Percentage distribution of mothers by pregnancy order and the number of surviving children, 1966-7, 1967-8, 1974 and 1975

Year	Area	Percentage of mothers by the number of previous pregnancies											Total mothers
		0	1	2	3	4	5	6	7	8	9	10 +	
1966-67	OTA	17.1	14.1	12.2	11.1	11.1	9.9	8.5	5.7	4.5	2.4	3.2	5,477
1967-68	OTA	17.5	15.2	12.7	11.6	10.4	9.5	8.0	5.8	3.9	2.6	2.8	5,614
1974	DSS	16.5	14.2	12.3	11.5	11.1	9.6	7.8	6.2	4.9	2.9	3.0	11,213
1975	DSS	16.6	15.2	13.3	11.4	10.1	8.8	7.6	6.0	4.5	2.8	3.6	7,561

Year	Area	Percentage of mothers by the number of surviving children										Total mothers
1966-67	OTA	22.5	18.0	17.0	15.5	12.0	8.4	3.8	1.6	----- 1.2 ---------		5,477
1967-68	OTA	23.8	18.2	17.5	15.7	11.0	7.1	3.6	2.1	----- 1.0 ---------		5,614
1974	DSS	21.3	17.3	15.8	14.9	11.8	9.0	5.5	2.7	----- 1.7 ---------11,213		
1975	DSS	22.6	18.8	15.8	13.8	11.1	8.6	5.0	2.6	----- 1.7 --------- 7,561		

This may lead to further questions rather than to a conclusion. If the mothers that had a child in 1975 were in no obvious way different from those of the previous years, it would appear that those who avoided pregnancy, by volitional or non-volitional action, must have had similar characteristics - number of surviving children and pregnancy parity - as well. The parity-independent regulation of fertility in 1975 seems to be confirmed. The differentials, if any, between the mothers and those who avoided pregnancy would have to be sought in other direction. The socio-economic status appears to be the obvious area to be explored. Unfortunately, at this stage the data available are not suited for an analysis of fertility differentials by socio-economic characteristics of the family.

One more point should be raised before concluding the discussion on the fertility decline in the DSS during 1975. This is the possibility of the data being defective due to omissions, failure to record events during the crisis,

or other such errors that might have occurred in the system itself. The omissions, if they occurred, would have affected not only births but other demographic events, migration and marriages as well. There does not appear to be any significant deficiency in those other records. The timing of the events, as it was discussed on the preceding pages, is also in agreement what one would a priori expect to be a response to the crisis situation.

Out-migration from the DSS might have contributed in two ways to the observed fall in the number of births and decline of birth rates. One has been mentioned earlier, namely the distortion of the estimated sex-age structure at mid-point of 1975, and the consequent distortion of the age-specific fertility rates. The other would have effected the recorded number of births. The 1975 exodus appears to have been to a large degree a movement of families. In comparison to 1974, migration of women in the childbearing ages 15-44 years increased in volume in 1975; the increase was considerably larger with respect to out-migration and left a deficit of 1,649 women in contrast to 350 recorded in 1974. (Table 23.) The heavier losses were concentrated in the young ages

TABLE 23   Migration of women aged 15-44 years in 1974 and 1975

Age group	1974			1975			Difference between 1974 & 1975
	In	Out	Balance	In	Out	Balance	
15-19	635	832	-197	1,042	1,638	- 596	- 399
20-24	376	314	62	467	721	- 254	- 316
25-29	100	171	- 71	253	468	- 215	- 144
30-34	55	120	- 65	127	399	- 272	- 207
35-39	46	125	- 79	123	435	- 312	- 233
Total	1,212	1,562	-350	2,012	3,661	-1,649	-1,299

15-24 years in 1975. If we concentrate on movers who were reported as dependents and on women who migrated to join their husbands, the contrast between 1974 and 1975 will become even sharper. In 1974, among women aged 15-44 years 255 migrated into and 526 out of the DSS as dependents, mostly wives following their husbands; another 15 women of that age moved in and 147 moved out to join their husbands. In all, 403 women aged 15-44 years were 'lost' to the DSS because of migration associated predominantly with the movement of the head of the family.

In 1975, in contrast, 586 female in-migrants and 1,752 out-migrants were recorded as dependents; an additional 74 women joined their husbands in the DSS area and 376 outside the DSS. Thus, in 1975, a total of 1,468 women was 'lost' to the DSS on account of family migration.

It is conceivable that some of those women were pregnant at the time of their migration, and delivered outside the DSS. However, even if as much as one-third to one-half of the additional out-migrants (above the number recorded in 1974) fell into this category, the number of live births 'lost' because of parents' migration rather than as a result of fertility control would have been of the order of 1,065 x 0.3 to 0.5, i.e. 320 - 530 live births. The crude birth rate would have been only slightly higher, between 30.6 and 31.5, instead of the recorded 29.4 per 1,000 population.

To conclude, it appears that the fertility decline in 1975 in the DSS is an example of a parity-independent fertility regulation; in terms of family size as well as pregnancy parity the mothers of children born in 1975 did not differ from those who delivered a child in the preceding years. By impli-cation, those who controlled their fertility, voluntarily or through non-volitional mechanisms, were a randomly selected group as far as those two characteristics are concerned. There is no clear indication that the reduction of fertility was more pronounced at higher ages of wives than among the younger wives. The group that controlled its fertility during the period of crisis may have been selected in terms of social and economic character-istics, such as land-holding, occupation of husband and education. At this stage, however, it is not possible to investigate that aspect of the fertility decline.

ACKNOWLEDGEMENT

C. <u>T a b l e s</u>

TABLE C.1   Deaths by age and month, 1975

Month	All deaths	Under 1 month	1 - 11 months	1 - 4 years	5 years and more	Percent of total deaths were under 1 year
January	512	88	89	73	262	34.5
February	495	52	108	97	238	32.2
March	599	50	142	135	272	32.0
April	534	52	122	125	235	32.6
May	353	29	71	106	147	28.3
June	393	27	78	108	180	26.7
July	447	45	63	107	232	24.2
August	456	52	40	120	244	20.2
September	436	71	44	103	218	26.4
October	357	49	33	99	176	23.0
November	414	50	33	88	243	20.0
December	397	44	30	76	247	18.6
Total	5,393	609	853	1,237	2,694	27.1

TABLE C.2   Deaths by sex and age, 1975

Age	Males	Females	Age	Males	Females	Age	Males	Females
months								
0	320	289	0-4	1,229	1,470	45-49	117	54
1-5	260	301	5-9	89	116	50-54	152	51
6-11	126	166	10-14	30	38	55-59	158	114
years								
0	706	756	15-19	32	41	60-64	156	115
1	198	283	20-24	27	32	65-69	156	139
2	141	198	25-29	31	30	70-74	153	125
3	111	150	30-34	28	35	75-79	116	66
4	73	83	35-39	58	48	80-84	72	52
			40-44	92	34	85+	85	52
						Total	2,781	2,612

TABLE C.3 Deaths by cause, sex and age, 1975

Cause of death	under 1	1-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75+	Total deaths
					MALES						
Smallpox	–	3	1	–	–	–	–	1	1	–	5
Measles	16	41	7	1	–	–	–	–	–	–	65
Tetanus	186	15	1	2	–	–	–	–	–	–	204
Drowning	3	54	12	–	1	1	1	1	1	–	74
Murder	–	–	–	1	3	3	1	1	–	1	10
Suicide	–	–	–	4	–	3	–	–	1	1	10
Diarrhea (acute)	15	17	3	2	4	3	1	1	4	–	50
(chronic)	7	26	9	1	–	3	4	2	6	4	62
Dysentery (acute)	7	58	9	3	1	16	19	32	25	22	192
(chronic)	11	78	14	4	8	24	64	61	58	38	360
Jaundice	1	2	3	1	–	3	1	1	2	–	14
Other	239	94	22	12	10	26	55	47	39	29	623
Gastro-intestinal (other than cholera)	–	2	5	1	2	8	16	7	12	3	56
Respiratory (incl. cold, fever, cough, TB)	66	22	3	3	7	23	20	42	37	20	243
Heart diseases	–	–	–	3	1	2	7	6	9	8	36
Liver diseases	–	2	–	–	2	–	3	1	2	1	11
Venereal diseases	–	–	–	1	–	–	1	–	–	–	2
Skin diseases	23	11	1	–	–	1	1	–	2	2	41
E.N.T. diseases	–	–	–	–	–	1	–	–	–	–	1
Cholera (proved)	–	–	1	–	–	–	–	–	–	–	1
Dropsy	6	25	8	3	8	14	30	36	29	26	185
Rheumatism	2	2	1	1	3	4	11	10	20	16	70
Accident	1	2	1	7	2	1	2	3	–	1	20
Old age	–	–	–	–	–	–	3	14	30	72	119
Fever	42	60	16	8	6	13	29	45	30	29	278
Unknown	31	9	2	1	–	1	–	3	2	–	49
Total	706	523	119	59	59	150	269	314	309	273	2,781

TABLE C.4 Deaths by cause, sex and age, 1975

Cause of death	under 1	1-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75+	Total deaths
					FEMALES						
Smallpox	1	-	-	1	-	-	-	-	-	-	2
Measles	13	85	17	-	2	-	-	-	-	-	117
Tetanus	177	15	2	2	-	2	1	1	1	-	200
Drowning	3	36	7	-	-	1	-	1	1	1	50
Murder	1	-	1	-	-	-	1	-	-	1	4
Suicide	-	-	-	7	2	1	-	-	-	-	10
Diarrhea (acute)	17	13	5	4	4	2	-	2	2	3	52
(chronic)	6	34	-	2	-	1	3	8	10	4	68
Dysentery (acute)	15	73	12	1	2	-	10	21	27	12	173
(chronic)	15	129	24	3	5	13	17	31	49	21	307
Child birth	-	-	1	7	8	4	-	-	-	-	20
Jaundice	1	5	8	3	3	-	-	4	-	2	26
Other	321	119	30	19	14	18	19	33	22	15	610
Gastro-intestinal (other than cholera)	-	2	3	5	-	2	8	11	3	2	36
Respiratory (incl. cold, fever, cough, TB)	64	35	8	3	5	8	10	24	15	8	180
Heart diseases	-	2	-	1	1	1	1	5	7	4	22
Liver diseases	-	1	-	1	-	1	2	3	1	-	9
Venereal disease	-	-	-	-	1	1	1	-	-	-	3
Skin diseases	31	19	2	-	-	-	-	-	-	1	53
E.N.T. diseases	-	-	-	-	-	-	1	1	-	-	2
Cholera (proved)	-	-	-	-	-	-	-	-	-	-	-
Dropsy	5	56	10	2	3	7	11	26	43	25	188
Rheumatism	1	3	1	1	1	4	9	20	14	14	68
Accident	3	3	2	2	1	1	-	-	1	-	13
Old age	-	-	-	-	-	-	-	17	43	46	106
Fever	50	74	21	6	11	14	10	20	22	12	240
Unknown	32	10	-	3	2	1	-	2	3	-	53
Total	756	714	154	73	65	82	104	229	264	171	2,612

TABLE C.5 Terminations of pregnancies by month, 1975

Month	Miscarriage	Stillbirth	Live birth*	Number of live born children		
				Total	Males	Females
January	32	28	838	846	432	414
February	31	21	711	714	369	345
March	50	15	695	699	366	333
April	42	22	603	608	295	313
May	50	16	466	466	241	225
June	57	23	347	352	197	155
July	52	18	490	498	255	243
August	50	16	586	592	311	281
September	65	18	795	797	385	412
October	57	18	780	790	408	382
November	61	30	637	644	342	302
December	71	26	613	616	322	294
Total	618	251	7,561	7,622	3,923	3,699

* Number of confinements resulting in at least one live birth.

TABLE C.6 Multiple confinements, 1975

Sex	No.	Result					
		First child		Second child		Third child	
		Live birth	Stillbirth	Live birth	Stillbirth	Live birth	Stillbirth
M, M	28	26	2	21	7	–	–
M, F	9	7	2	8	1	–	–
F, M	6	6	–	4	2	–	–
F, F	24	21	3	22	2	–	–
F, F, M	1	1	–	1	–	1	–
F, F, F	1	1	–	1	–	1	–
F, M, M	1	1	–	1	–	1	–

TABLE C.7 Number of confinements resulting in live birth by mother's age and the number of surviving children (present birth excluded), 1975

Mother's age	Number of living children											Total mothers
	0	1	2	3	4	5	6	7	8	9	10+	
under 15	70	1										71
15-19	1271	402	50									1723
20-24	303	777	535	191	32	3	1					1842
25-29	36	185	447	479	316	121	30	6	2			1622
30-34	19	48	135	281	361	316	162	60	16	5	1	1404
35-39	3	8	25	74	106	161	134	89	46	13	2	661
40-44	4	3	5	16	21	43	41	36	18	13	5	205
45 & over	1	--	—	3	3	4	11	3	5	3	–	33
Total	1707	1424	1197	1044	839	648	379	194	87	34	8	7561

TABLE C.8 Number of confinements resulting in live birth by mother's age and the number of previous pregnancies, 1975

Mother's age	Number of previous pregnancies (present birth excluded)											Total mothers
	0	1	2	3	4	5	6	7	8	9	10+	
under 15	66	4	1									71
15-19	1010	546	147	17	2	1						1723
20-24	153	524	615	350	135	36	17	7	4	1		1842
25-29	17	61	202	377	398	274	162	75	37	13	6	1622
30-34	6	14	38	97	198	281	282	217	133	69	69	1404
35-39	1	1	2	21	28	67	89	118	130	80	124	661
40-44	3	--	2	3	4	4	23	32	33	39	62	205
45 & over	1	--	-	-	-	-	1	6	4	8	13	33
Total	1257	1150	1007	865	765	663	574	455	341	210	274	7561

TABLE C.9 Number of confinements resulting in stillbirth by mother's age and
the number of previous pregnancies, 1975

| Mother's age | Number of previous pregnancies (present birth excluded) | | | | | | | | | | | Total mothers |
	0	1	2	3	4	5	6	7	8	9	10+	
under 15	6	-	-	-	-	-	-	-	-	-	-	6
15-19	46	14	6	-	-	-	-	-	-	-	-	66
20-24	8	9	14	8	4	1	-	-	-	-	-	44
25-29	1	2	5	16	11	7	2	1	4	-	-	49
30-34	1	-	-	2	4	3	12	8	8	6	2	46
35-39	-	-	-	2	3	1	6	5	4	3	3	27
40-44	-	-	-	-	-	-	-	3	2	2	5	12
45+	-	-	-	-	-	-	-	-	-	-	1	1
Total	62	25	25	28	22	12	20	17	18	11	11	251

TABLE C.10 Number of pregnancies resulting in miscarriage by mother's age and
the number of previous pregnancies, 1975

| Mother's age | Number of previous pregnancies (present birth excluded) | | | | | | | | | | | Total mothers |
	0	1	2	3	4	5	6	7	8	9	10+	
under 15	6	1	-	-	-	-	-	-	-	-	-	7
15-19	98	38	9	3	-	-	-	-	-	-	-	148
20-24	9	38	33	25	11	4	1	-	-	-	-	121
25-29	1	5	14	25	25	21	15	7	5	1	1	120
30-34	-	2	3	9	14	12	16	17	16	11	14	114
35-39	-	1	-	-	1	4	11	13	14	20	15	79
40-44	-	1	-	-	-	2	3	3	7	4	6	26
45+	-	-	-	-	-	-	-	-	-	-	3	3
Total	114	86	59	62	51	43	46	40	42	36	39	618

TABLE C.11 Migration by sex, direction and month, 1975.

Month	Males In	Males Out	Females In	Females Out	Month	Males In	Males Out	Females In	Females Out
January	232	899	230	857	July	207	491	262	605
February	218	1042	252	1036	August	200	404	262	452
March	178	846	190	847	September	207	282	236	340
April	186	606	217	593	October	337	407	380	364
May	182	640	232	619	November	255	273	278	257
June	232	736	331	733	December	321	374	429	424
					Total	2755	7000	3299	7127

TABLE C.12 Migration by sex, age, and direction, 1975

Age	Males In	Males Out	Females In	Females Out	Age	Males In	Males Out	Females In	Females Out
under 5	483	1270	450	1159	40-44	112	314	43	159
5-9	375	836	357	746	45-49	87	218	43	123
10-14	313	1025	307	1070	50-54	57	145	20	103
15-19	255	991	1042	1638	55-59	35	89	32	84
20-24	237	656	467	721	60-64	20	63	29	69
25-29	312	503	253	468	65+	41	103	49	112
30-34	225	438	127	399					
35-39	203	349	80	276	Total	2755	7000	3299	7127

TABLE C.13 Migration by sex, age, direction and cause, 1975

A. MALES - In-migration

Cause	<10	10-14	15-19	20-24	25-29	30-34	35-44	45-54	55-64	65+	Total
Marriage	-	-	1	5	9	4	4	1	1	1	26
Service	-	-	4	15	45	15	28	17	1	1	126
Divorce	-	-	-	-	-	-	-	-	-	-	-
Dependent	799	209	17	8	2	2	-	1	2	2	1042
Study	6	37	56	19	10	1	1	-	-	-	130
Better living	3	6	29	25	40	41	50	26	8	9	237
Return home-after study	-	-	7	2	4	1	-	-	-	-	14
-after service	-	-	3	9	14	15	21	9	6	2	79
-after work	-	4	9	14	8	10	12	7	2	3	69
For livelihood	3	5	19	13	20	22	26	12	3	3	126
Adoption	27	2	-	1	-	-	-	-	-	-	30
Business	-	1	9	17	21	16	13	5	2	-	84
Work	-	30	22	25	48	22	36	9	5	3	200
Change in residence. .	-	-	16	11	10	6	10	9	7	4	73
To join spouse/husband	-	-	-	-	-	-	-	-	-	-	-
parents . . .	14	3	3	5	10	2	7	-	-	-	44
relatives . .	5	6	3	5	4	5	6	4	1	-	39
Unknown	-	3	2	1	1	1	1	1	-	2	12
Separation	-	-	1	-	-	-	1	-	-	-	2
For treatment	-	-	-	-	-	-	-	-	1	-	1
Widow	-	-	-	-	-	-	-	-	-	-	-
Return home	1	6	43	37	20	31	59	28	9	5	239
Regular member	-	1	2	13	17	11	9	7	1	1	62
Other	-	-	9	12	29	20	31	8	6	5	120
Total	858	313	255	237	312	225	315	144	55	41	2755

TABLE C.13   Migration by sex, age, direction cause, 1975

B. MALES - Out-migration

Cause	<10	10-14	15-19	20-24	25-29	30-34	35-44	45-54	55-64	65+	Total
Marriage	-	1	-	-	2	1	1	-	1	-	6
Service	2	19	207	213	187	115	118	39	11	8	919
Divorce	-	-	-	-	-	-	-	-	-	-	-
Dependent	2012	661	57	20	10	5	5	3	2	8	2783
Study	21	81	124	85	18	-	-	-	-	-	329
Better living	-	4	42	22	14	40	53	31	18	11	235
Return home-after study	-	3	15	2	-	-	-	-	-	-	20
after service	1	-	1	3	1	1	-	2	2	-	11
after work	-	2	-	1	3	-	1	-	-	-	7
For livelihood	8	27	99	49	50	80	132	100	38	25	608
Adoption	22	-	-	-	-	-	-	. -	-	-	22
Business	-	21	69	45	36	35	47	24	8	2	287
Work	8	151	218	121	97	71	145	53	21	9	894
Change in residence. .	1	12	102	49	54	56	116	86	35	29	540
To join spouse/husband	-	-	-	-	-	-	-	-	-	-	-
parents . . .	20	16	9	3	-	1	2	-	-	1	52
relatives . .	4	8	4	6	7	9	5	1	3	2	49
Unknown	5	8	23	22	9	12	19	10	6	1	115
Separation	1	1	-	-	1	1	-	-	-	1	5
For treatment	-	-	-	-	-	-	-	-	-	1	1
Widow	-	-	-	-	-	-	-	-	-	-	-
Return home	-	3	9	3	7	3	3	4	1	2	35
Regular member	-	-	-	-	-	-	-	-	-	-	-
Other	1	7	12	12	7	8	16	10	6	3	82
Total	2106	1025	991	656	503	438	663	363	152	103	7000

TABLE C.14 Migration by sex, age, direction and cause, 1975

A. FEMALES - In-migration

Cause	<10	10-14	15-19	20-24	25-29	30-34	35-44	45-54	55-64	65+	Total
Marriage	-	41	541	65	21	4	4	1	1	-	678
Service	-	-	-	2	-	-	-	-	-	-	2
Divorce	-	6	86	48	14	7	1	2	-	-	164
Dependent	733	170	153	161	126	70	76	39	25	26	1579
Study	8	12	5	1	-	-	-	-	-	-	26
Better living . . .	6	13	23	38	20	9	6	3	8	6	132
Return home-after study	-	1	2	-	-	-	-	-	-	-	3
-after service-		-	-	-	-	-	-	-	-	-	-
-after work	-	9	6	-	-	-	-	1	1	-	17
For livelihood . . .	1	6	9	13	7	7	7	2	3	5	60
Adoption	24	-	-	-	-	-	-	-	-	-	24
Business	-	-	1	-	-	-	-	-	-	-	1
Work	1	10	1	1	-	-	1	1	-	-	15
Change in residence	-	-	-	3	-	2	3	1	-	1	10
To join spouse/husband	-	1	40	19	4	6	5	2	-	-	77
parents. . .	21	6	20	11	6	4	1	-	-	1	70
relatives. .	8	3	12	11	4	3	-	3	11	5	60
Unknown	3	-	7	4	1	1	1	-	-	1	18
Separation	-	14	94	53	22	5	1	1	-	-	190
For treatment . . .	-	-	-	-	-	-	-	-	-	-	-
Widow	-	-	7	4	6	3	1	2	2	-	25
Return home	2	9	30	28	17	6	13	4	5	3	117
Regular member . . .	-	-	-	1	1	-	-	-	-	-	2
Other	-	6	5	4	4	-	3	1	5	1	29
Total	807	307	1042	467	253	127	123	63	61	49	3299

TABLE C.14 Migration by sex, age, direction and cause, 1975

B. FEMALES - Out-migration

Cause	<10	10-14	15-19	20-24	25-29	30-34	35-44	45-54	55-64	65+	Total
Marriage	2	180	608	74	14	2	2	2	–	–	884
Service	–	4	6	9	2	1	2	1	–	–	25
Divorce	–	1	98	47	14	17	3	–	–	–	180
Dependent	1816	661	497	369	303	289	294	137	91	45	4502
Study	11	25	18	5	–	–	–	–	–	–	59
Better living . . .	2	7	6	7	6	8	6	4	9	4	59
Return home-after study	–	1	3	–	–	–	–	–	–	–	4
-after service-	–	–	–	–	–	–	–	–	–	–	–
-after work	–	1	1	–	–	–	–	–	–	–	2
For livelihood . . .	6	29	49	28	25	20	42	26	19	31	275
Adoption	21	2	–	–	–	–	–	–	–	–	23
Business	–	1	–	1	–	–	1	–	–	–	3
Work	8	83	24	12	8	11	12	8	3	2	171
Change in residence	3	5	9	6	4	11	21	13	7	5	84
To join spouse/husband	1	15	155	113	54	28	26	6	–	1	399
parents. . .	21	14	27	9	2	1	1	–	–	–	75
relatives. .	4	16	17	5	3	–	8	15	20	21	109
Unknown	5	10	14	5	3	1	4	2	–	1	45
Separation	–	8	95	27	20	7	5	1	–	–	163
For treatment. . . .	–	–	1	–	–	–	–	–	1	–	2
Widow	–	–	4	2	8	1	4	1	–	–	20
Return home	3	4	3	1	1	–	2	3	–	–	17
Regular member . . .	–	–	–	–	–	–	–	–	–	–	–
Other	2	3	3	1	1	2	2	7	3	2	26
Total	1905	1070	1638	721	468	399	435	226	153	112	7127

TABLE C.15   Marriages and Divorces by month, 1975

Month	Number of Marriages	Divorces	Month	Number of Marriages	Divorces
January	166	40	July	276	61
February	207	39	August	287	55
March	169	71	September	193	46
April	116	56	October	255	67
May	200	64	November	155	36
June	324	71	December	447	75
			Total	2,795	681

TABLE C.16A.   Marriages by age and previous marital status, MALES, 1975

Groom's age	Groom's Marital Status Single	Married	Widowed	Divorced	Total
under 20	234	5	1	22	262
20 - 24	607	15	8	108	738
25 - 29	854	26	26	220	1126
30 - 34	157	41	33	114	345
35 - 39	16	30	41	63	150
40 - 44	3	23	28	23	77
45 - 49	1	9	19	19	48
50 - 54	–	12	8	6	26
55 - 59	–	4	3	1	8
60 & over	–	4	8	3	15
Total	1,872	169	175	579	2,795

TABLE C.16B. Marriages by age and previous marital status, FEMALES, 1975

| Bride's age | Bride's marital status | | | Total |
	Single	Widowed	Divorced	
under 12	20	–	1	21
12 - 14	436	1	15	452
15 - 19	1729	10	250	1989
20 - 24	83	15	148	246
25 - 29	3	12	42	57
30 - 34	–	4	8	12
35 - 39	1	2	5	8
40 - 44	–	2	2	4
45 & over	–	4	2	6
Total	2272	50	473	2795

TABLE C.17   Divorce by sex and age

Age	Males	Females

Under 15   )
)
)
15 - 19   )
	19	24
		
		372

20 - 24	141	158
25 - 29	202	71
30 - 34	146	33
35 -39	75	12
40 - 44	26	5
45 - 49	26	3

50 - 54	20)
	          )
	          )
	          )	

55 - 59	16)
	          )
	          )
		3

60 & over	10)	
Total	681	681

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ANNEX I.

Estimation of the mid-year population 1975

The estimation of the population distribution by age as of 1 July 1975 was based on the enumerated population in the 1974 census. From the data by single age, five-year age groups were formed first, starting from 4-8 years, 9-13 and so on up to 64 and over. Those age groups became one year older by 1 July 1975, that is 5-9, 10-14 etc. years of age. To adjust for deaths as well as net balance of migration between 1 July 1974 and 30 June 1975 the balancing equation was used. However, an additional adjustment was made using a set of weights to allow for the ageing of the population. The weights were derived from Lexis Grid implicitly assuming an even distribution of events (deaths and migration) over time as well as within the given age group.

The balancing equation used for the estimation of the population in 1975, say at ages 5-9 years, was

$$P(1975;5\text{-}9) = P(1974;4\text{-}8) + \frac{17}{40} \left\{ M(i) - M(o) - D \right\}_{5\text{-}9}^{1974}$$

$$+ \frac{19}{40} \left\{ M(i) - M(o) - D \right\}_{5\text{-}9}^{1975}$$

$$+ \frac{3}{40} \left\{ M(i) - M(o) \right\}_{0\text{-}4}^{1974} + \frac{1}{40} \left\{ M(i) - M(o) \right\}_{0\text{-}4}^{1975}$$

$$- \frac{3}{8} D(1974; 4) - \frac{1}{8} D(1975;5)$$

where D are deaths, $M(i)$ in-migration and $M(o)$ out-migration.

Similar procedure was used for all other age groups up to 60-64 years. The estimated population aged 65 and over in 1975 was obtained from

$$P(1975; 65+) = P(1974; 64+) - \frac{1}{2} \left\{ M(i) - M(o) - D \right\}_{65+}^{1974}$$

$$- \frac{1}{2} \left\{ M(i) - M(o) - D \right\}_{65+}^{1975}$$

At the youngest ages between 0 and 4 years estimates were made using single age data.

$$P(1975;0) = B(1974; \text{Jul-Dec}) + B(1975; \text{Jan-Jun}) - \frac{1}{2} D(1974;\text{Jul}) - D(1974;\text{Aug-Dec})$$

$$- D(1975;\text{Jan-Jun}) - \frac{1}{2} D'(1974;\text{Aug-Dec}) - D'(1975;\text{Jan-Jun}) - \frac{1}{2} D''(1975;\text{Jan-Jun})$$

where B are live births, D are death at the age under one month, D' deaths between 1-5 months and D" deaths between 6 and 11 months of age. The estimate was then adjusted to allow for migration by

$$+ \frac{1}{8} \left\{ M(i) - M(o) \right\}_{0}^{1974} + \frac{3}{8} \left\{ M(i) - M(o) \right\}_{0}^{1975}$$

For the ages between one and four years the single-age estimation was based on the following equation (using as example the estimation of the population aged one year in 1975)

$$P(1975;1) = P(1974;0) + \frac{3}{8}\left\{ I\ (1974;0) \right\} + \frac{1}{8}\left\{ I\ (1974;1) \right\} + \frac{1}{8}\left\{ I(1975;0) \right\}$$
$$+ \frac{3}{8}\left\{ I(1975;1) \right\}$$

where I stands for $M(i) - M(o) - D$.

When estimates by age were made, the sum for all ages did not agree with the **total esti-mated** population derived earlier by using the balancing equation (Table 1). It was assumed that the estimation of population between the ages 0 and 4 years was closer to reality than at all other ages. Therefore, the age distribution at ages 5 and over was adjusted by a constant multiplier to reach agreement between the two estimates. The difference between the estimation obtained from total population aged 5 years and over and the estimation by age did not exceed 1 per cent (the estimation by age was higher than the estimation of the total population.

ANNEX II.

Unbiased estimate of infant mortality rate

To relate infant deaths to the relevant number of births from which they may have originated, deaths were subdivided by infant's age at death: D are deaths under the age of one month, D' are deaths at ages 1 to 5 completed months, and D" from 6 to 11 completed months of age. From Lexis Grid the appropriate system of weights was derived linking indirectly infant deaths in a given year t with the number of births of the same year B(t) and of the preceding year B(t-1).

Number of deaths in year t by age at death	Denominator B (t)	B(t-1)
D	23/24 D	1/24 D
D'	17/24 D'	7/24 D'
D"	6/24 D"	18/24 D"

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      No. 10.   Demographic Surveillance System - Matlab.   Volume Two.   Census, 1974 by Lado T. Ruzicka, A.K.M. Alauddin Chowdhury.

      No. 11.   Demographic Surveillance System - Matlab. Volume Three.   Vital Events and Migration, 1974 by Lado T. Ruzicka, A.K.M. Alauddin Chowdhury.

D.   Special Reprint:

      Management of cholera and other acute diarrhoeas in adults and children - World Health Organization.