MATLAB DSS

BANGLADESH

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1. MATLAB DSS SITE DESCRIPTION

1.1 Physical Geography of the Matlab DSS Area

Matlab *thana* is in Chandpur district of Bangladesh. It is located about 55 kilometers southeast of the country's capital, Dhaka at 23.38° north latitude and 90.72° east longitude. The total DSS area is 184 sq. km. The climate is sub-tropical with three seasons: monsoon, cool-dry, and hot-dry. The average annual rainfall of 2159 mm is concentrated in the monsoon season extending from June through September. Being flat and low-lying, it is subject to annual flooding by many canals and rivers which cross the area.

1.2 Population Characteristics of the Matlab DSS Area

In the 1996 census 212,328 individuals were counted, yielding a population density of about 1,100 per km^2 residing in 142 villages. The area is typical of many rural and riverine delta areas of Bangladesh. Almost 90% of the population are Muslims and the great majority of the remainder Hindu; all of them speak in *Bangla*. The principal economic activities are agriculture and fishing, the latter being primarily a Hindu occupation. In 1974, 65% in the Treatment area and 69% in the Comparison area were illiterate, decreasing to 40% in 1996. For most dwellings, roof material is tin (95%), while in 30% tin was also used for wall material. Use of tubewells for drinking water is common (95%) but use of this water for cooking and bathing is negligible (2-6%). Sanitary latrine use is low (20%) and most people use an open latrine. Travel within Matlab *thana* and between the villages is mostly by foot or by rickshaw or country boats, particularly during the monsoon season. In 1974, 60% of households had a hurricane lamp, and that increased to about 90% in 1996, while ownership of a radio increased from 10% to 40% during the same period. There are two hospitals located in the Matlab *thana* headquarter. In addition, about 10 union level health centres are run by the government, and four health centres are run by ICDDR,B in the Treatment area. Immunization coverage is high, however, it is much higher in the Treatment area than in the Comparison area. Matlab is considered as endemic cholera zone.

2. MATLAB DSS PROCEDURES

2.1 Introduction to the Matlab DSS Site

The fundamental mission of ICDDR,B is to develop and disseminate solutions to major health and population problems facing the world, with emphasis on simple and cost-effective methods of prevention and management.

The objectives of the project are as follows:

- To provide a small-area registration system which is suitable for assessment of the effectiveness, safety and acceptability of maternal and child health and family planning interventions.

- To undertake research related to diarrhoeal diseases, and on the measurement and determinants of fertility and mortality.

- To develop a demographic field site that can be used for training of programme planners, researchers and implementors.

The DSS has been operating in Matlab since 1966. At the onset, 132 villages were included in the system, and 101 villages were added in 1968. The *dais* (TBA, elderly women mostly illiterate) were responsible to detect the event through weekly household visit. The Health Assistant (HA) accompanied by the *dai* visited the household every six weeks to record the events on the standard registration form. A major modification in the field structure and programme activities was made in October 1977 with the contraction of the DSS area, eighty-four villages (120,000 population) were xcluded and 149 villages (173,443 population) were retained. The Family Planning and Health Services Project was then launched in 70 villages (Treatment area) with a population of 88,925 and the remaining 79 villages, with a population of 84,518 were considered as a Comparison area. At the introduction of the program, all *dais* of both the Treatment and Comparison areas were replaced by female Community Health Workers (CHW) and were recruited from the same locality. The 1982 census covered the entire population of 149 villages, but the project was reduced to 142 villages in 1993 because 7 villages of the Comparison area disappeared due to river erosion. Most of these villagers, however, resettled in nearby villages of the DSS area.

The monitoring system covers all households of the DSS villages. A typical village consists of several *baris*, or groups of houses around a central courtyard, which function as an economic and social unit. Data are being collected only from individuals who are regular residents. A resident is a person residing in the DSS area permanently or continuously for at least six months. Causes of death data have been collected since the beginning of the project.

The recording of events in the DSS area did not start at the same time. Births, deaths, and migrations (in- and out) have been recorded since 1966, while enumeration of marital unions and dissolution began in 1975. The recording of inter-village movements has been continued since the 1982 census, while recording of split households and change in household head began after the 1993 census.

Health data (not all at once but gradually) has been collected in the Treatment area since 1977 and collection has recently been introduced in the Comparison area; the system is known as Record Keeping System (RKS). The health data covers currently married women of reproductive age (reproductive status, contraception, tetanus, etc.) and children under five (immunization, diarrhoea, acute lower respiratory infection, breastfeeding, etc.). The Geographical Information System (GIS) data has been collected in the DSS area since 1993. Since July 1998, the three projects (DSS, RKS and GIS) have been brought under a single administration and termed the HDSS (HDSS). The system also collects socioeconomic data and such data are available for 1974, 1982 and 1996.

2.2 Matlab DSS Data Collection and Processing

2.2.1 Field Procedures

a) Initial census and regular update rounds

The DSS has been in operation in Matlab since the initial census of 1966. A major modification in the data collection system has again been made very recently: data collection by the CHWs through monthly household visits. Until very recently (end of 1998 in the Comparison and end of 1999 in the Treatment area), DSS events were being detected by CHWs through monthly household visit. The Health Assistants (HA) accompanied by the CHW (every six weeks) were responsible to record the events on standard registration form; Senior Health Assistants (SHAs) were the supervisors. The DSS data are now being detected by the CHWs through monthly household visit where Field Research Assistant (FRA, previously HAs) are the supervisors, however, the tier of SHAs has been

abolished. On the other hand, RKS data has been collected by CHWs since its inception in 1977 in the Treatment area and February 2000 in the Comparison area). Household coverage by a CHW differs in the two areas; visit 20-25 households are visited per day in the Treatment area, and 50-55 households per day in the Comparison area. This difference in coverage is because CHWs also provide health services to mothers and under five children in the Treatment area, while in the Comparison area they simply advise the client to go to the government health facility. Until the 1982 census, a single identification number was used for each individual. At the time of the 1982 census, however, a dual numbering system (current and registration) was introduced. The current identification number identifies the current location (village 1-3, household 4-7 and individual 8-9) while the registration number (phase 1-1, village 2-4, household 5-8 and individual 9-10) is permanent for an individual. The denominator is updated through the monthly rounds using 1982 census as a base population for the database. However, periodic censuses are used mainly to check the accuracy of the database and to collect socioeconomic data.

b) Continuous surveys

During the household visit, a CHW enquires about demographic events which occurred since the last visit, and also updates/collects health data (RKS). For all DSS events other than pregnancy outcome, the respondent can be any responsible member of the household, pregnancy-related information is collected by interviewing the respective individual, and health data are always collected from the mother. Special forms are used to record DSS data, and Record Keeping Books (RKB) are used to record health data. Since 1986, a modified version of the International Classification of Disease-9 has been introduced to code the death cause on verbal autopsy forms. Importance is given to data on symptoms and events preceding death, and coding, which was previously done by the field workers, is now done by a medical assistant. This person also makes independent field visits (10-15% of cases) to clarify cause of death where necessary.

c) Supervision and quality control

At the field level, 90 Community Health Workers (CHW) are involved in data collection through monthly household visits, supervised by 12 Field Research Assistants. The overall field activities are supervised by the field manager and his three assistants. Until very recently field-level data quality checks were made by staff members who worked within the system. However, a quality control team has formed and it consists of two female Field Research Assistants. The quality control work is supervised by the HDSS Dhaka staff under the supervision of the Head of the Matlab Health and Research Programme. The quality control staff are responsible to make random checks through household visit to assess the data quality.

2.2.2 Data Management

Completed event forms are brought fortnightly by the CHWs to the subcentre where they are checked by the FRAs. These filled-in forms are then taken by the FRAs to the Matlab office to update census volumes and then pass on to the computer unit for data entry. Record Keeping Books of the Treatment area are brought to the subcentre meeting where the data is first copied to a coding sheet and then entered on the computer located at the Matlab office. Data of the Comparison area, however, are directly entered on the computer from the RKB. Oracle database management software has been used to develop data entry and database maintenance under Windows NT network environment. At Matlab, 8 data entry technicians and two programming staff are involved while in Dhaka, there are three programming staff and 5 data management staff. Data processing and database maintenance are being done in Dhaka office in Oracle environment using Developer 2000 under Unix operating system. To access data from the oracle database, client tools of Oracle,

Developer-2000, MS Access, Excel and SPSS are used. For reporting, MS Excel and MS Word are used.

Range and consistency checks in interactive mode are done during data entry at Matlab. Validation of current identification number, registration number, date of birth, sex and exit status are done during entry. Subsequently when data is loaded into the master database, consistency checks are done with the longitudinal data in Dhaka.

Yearly reports are regularly published and circulated among interested scientists, researchers, policy planners and program managers within and outside the country. HDSS data are being extensively used to write papers for scientific journals. It also provides sampling frame for all studies being undertaken in the Matlab area.

3. MATLAB HDSS BASIC OUTPUTS

3.1 Demographic Indicators Generated by the Matlab DSS Site

According to the *de jure* definition, 212,328 individuals were included in the 1996 census; 104,718 were males and 107,610 were females yielding a male:female sex ratio of 97.3. The age pyramid of the population for both the Treatment and Comparison areas reflect a fertility transition that is well underway with fewer children under 5 years of age than those 5-9 years (Figure 1). In fact, 2.4% population was aged under 1, 12% aged under 5, 26% aged 5-14, 57.4% aged 15-64, and 4.5% aged 65 and older. The population of both areas is young: 36% below 15 years in the Treatment area compared to 40% in the Comparison area. The population 15-49 years was 49% in the Treatment area compared to 46% in the Comparison area. In the Treatment area, household size was 5.9 in 1974, declining to 5.1 in 1996, while corresponding figures in the Comparison area are 5.8 and 5.5 respectively. About 80% of the households are headed by a male, and the remainder by a female. Nearly two-thirds of the male and female headed households belonged to two generations (64% vs 58%).

In the Treatment area, the crude death rate (per 1,000 population) was higher for males than females in both periods (1988 and 1998), and has declined over time from 9.2 to 7.3 for males and 8.3 to 6.7 for females. Mortality under one year of age was found to be similar for males and females in 1988 but was higher for females than males in 1998. The rate has declined from 81.6 to 45.6 for males and from 80.0 to 55.5 for females. A significant decline in mortality has also been observed in the 1-4 year age group, (6.0 to 4.0 for males and 9.3 to 5.3 for females); females had higher mortality than males in 1988, however, the difference is small in recent years. A decline in mortality rate has been observed in all other age categories, however, the magnitude of decline was small in most cases. In ages 15-39 years, female mortality is usually higher than males, but this reverses in ages 40-64 years.

The level of mortality is higher in the comparison area than in the Treatment area; the pattern was similar in the two areas, however, with a few exceptions. For example, crude death rate in the Comparison area was higher for females than males in 1988, and mortality under one year was found to be higher for females than for males in both the periods. The crude death rate has declined from 10.7 to 8.7 for males and 11.3 to 7.5 for females. Mortality under one year of age has declined from 92.5 to 62.6 for males and from 100.5 to 78.2 for females. A significant decline in mortality rate has also been observed in those aged 1-4 years, from 11.2 to 6.0 for males and 17.7 to 5.5 for females. A decline in mortality rate has been observed in all other age categories, however, the magnitude of

decline was again small in most cases. In ages 15-39 years, female mortality was usually higher than males but this was reversed in ages 40-64 years. Age-standardized death rates were found, however, exactly similar to the crude death rate in both the areas and in both the periods.

During the study period, a significant decline in mortality has been observed in both the Treatment and Comparison areas[1] with the decline more marked in children under 5 than in other ages. However, the level of mortality was higher in the Comparison area than in the Treatment area. The ICDDR,B has been maintaining a health intervention programme in the Treatment area[2] that targets mothers and children under 5 and the programme has been successful in reducing mortality of this vulnerable group. The decline in mortality is mainly due to the Bangladesh government's commitment to improve the health status of the population, and this acceptance of the Alma-Ata declaration of primary health care for all. To achieve this goal, the government of Bangladesh has established various institutional-level service facilities[3] since the 1980s.

The overall crude death rate was higher for males than females in both the areas except in 1988 in the Comparison area. Higher life expectancy for females than males was first observed in this population in the mid-1980s and this pattern has been maintained with some fluctuations. Such a mortality pattern is an indication of overall socioeconomic improvement and the reduction of male-female discrimination.

In ages under 1 and 1-4 years, mortality was usually higher for girls than boys in 1988, but this difference disappeared in ages 1-4 years in 1998. Higher mortality for boys than girls under 1 year (neonatal period) is mainly due to biological reasons, while in ages 1-4 years it is mainly due to behavioural factors. However, with the decline in mortality, girls benefited more than boys in term of survival.

Notes : [1]These two areas are similar with respect to socioeconomic conditions, but differ in access to health services. Theoretically, government health programme exists in both areas, but in practice these operate mainly in the Comparison area. [2]Community Health Workers offer a choice of contraception, motivate and counsel mothers for family planning, monitor and manage adverse effects, administer EPI vaccine, ARI management, promote oral rehydration, distribute vitamin A capsules, provide nutritional education, refer malnourished children, and distribute safe-delivery kits and iron tablets to pregnant women. They refer severely sick mothers or children to the subcentre or clinic. [3]These include Maternal and Child Welfare Centres in urban and sub-urban areas, Thana Health Complex at the thana level, and Family Welfare Centre at the union level. The government has also made health service facilities available at Rural Dispensaries and Satellite Clinics. In addition, both oral rehydration therapy for diarrhoea management and immunization against the six major childhood diseases are being actively promoted.

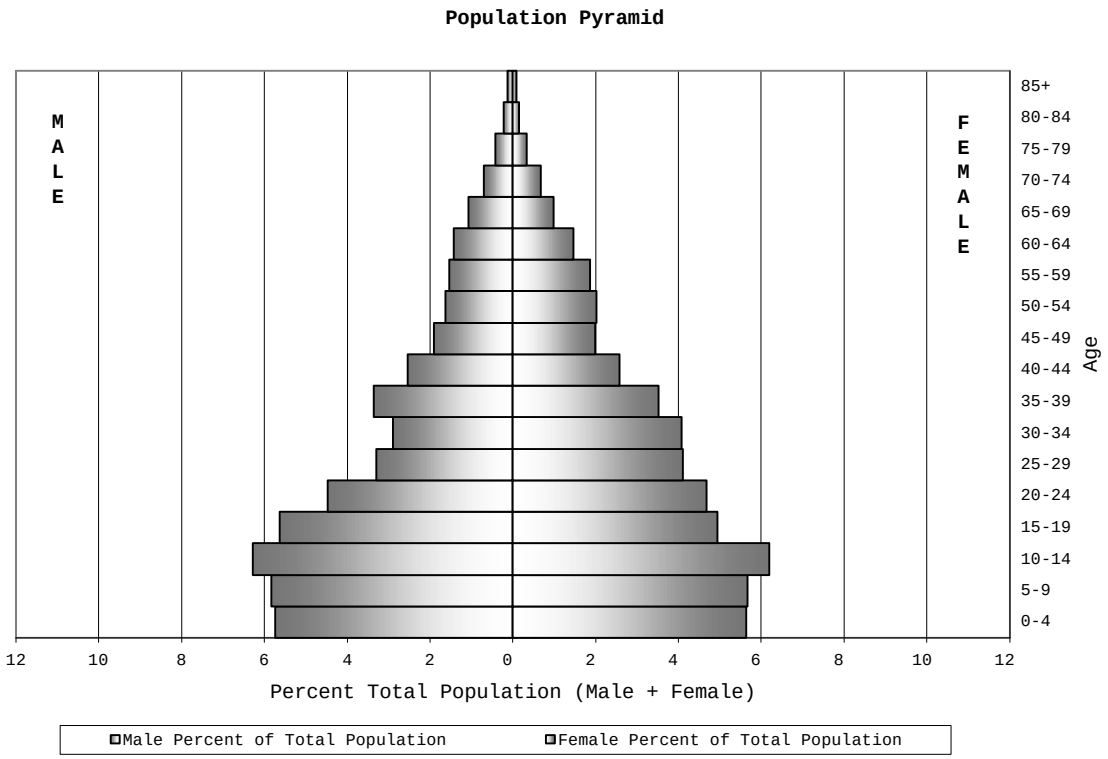

Figure 1. Population pyramid of person-years observed for the Matlab DSS site's Treatment area, 1998.

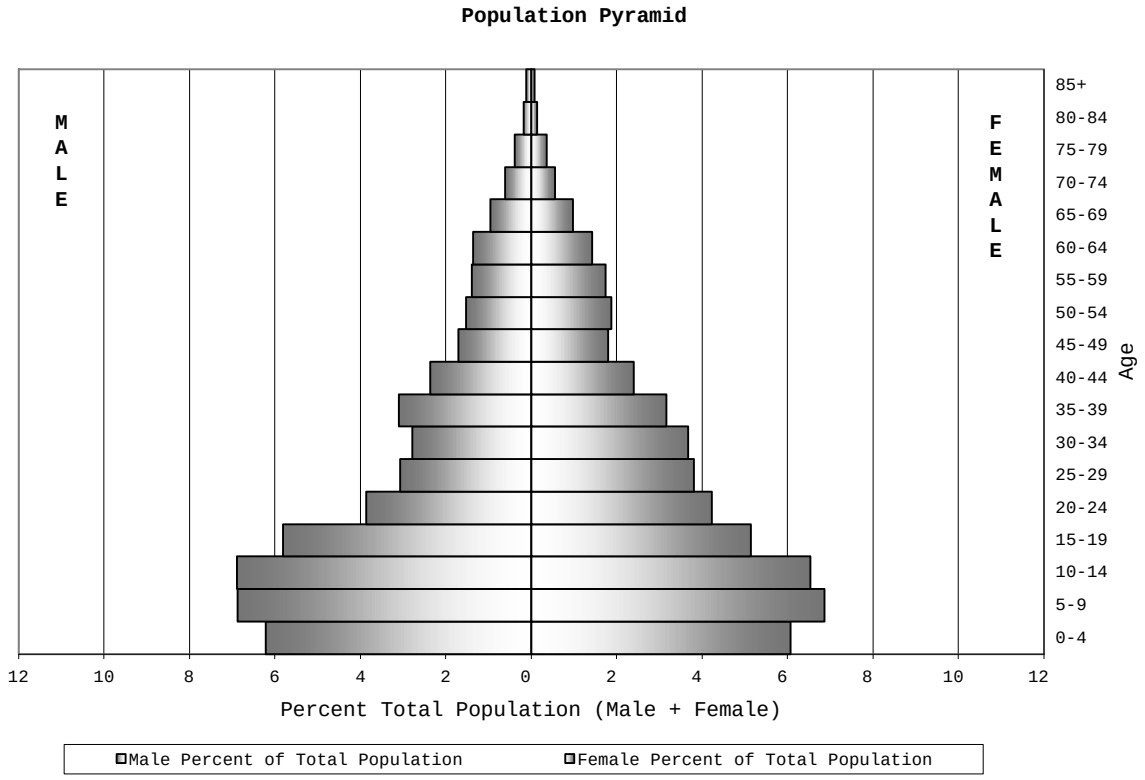

Figure 2. Population pyramid of person-years observed for the Matlab DSS site's Comparison area, 1998.

Tables 1 & 2: Mortality Rates

** Omitted in web version **

Table 3. Age-specific fertility rates and total fertility rates by area, 1998

Age (years)	Treatment area			Comparison area		
	Births	Women	Rate	Births	Women	Rate
All ages	2827	28352	99.7	2998	25645	116.9
15-19	302	5415	55.8	334	5438	61.4
20-24	903	5123	176.3	933	4470	208.7
25-29	796	4497	177.0	852	4037	211.0
30-34	584	4462	130.9	565	3885	145.4
35-39	198	3850	51.4	268	3360	79.8
40-44	38	2827	13.4	41	2551	16.1
45-49	6	2178	2.8	5	1904	2.6
TFR	3038			3625		

4. BIBLIOGRAPHY

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