

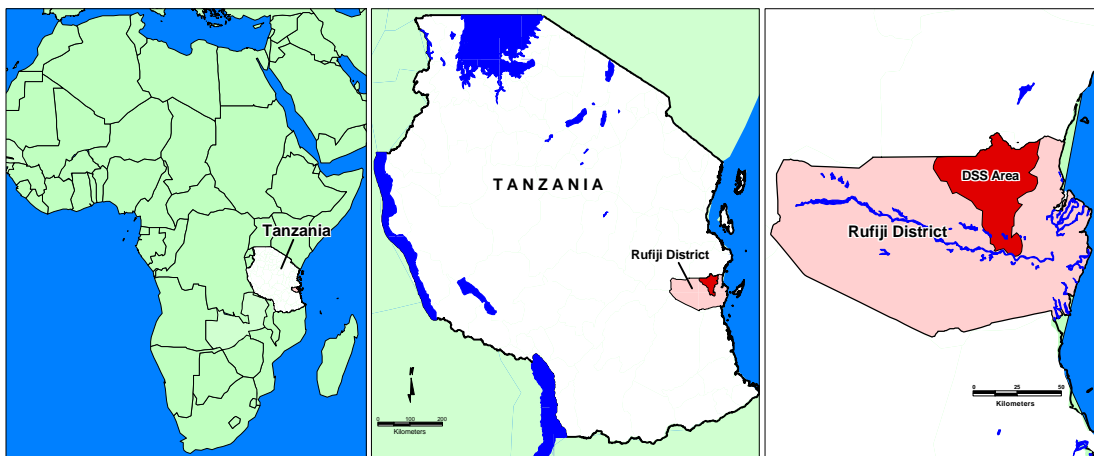
RUFIJI DSS

TANZANIA

TANZANIA MINISTRY OF HEALTH

TANZANIA ESSENTIAL HEALTH INTERVENTIONS PROJECT

ADULT MORBIDITY AND MORTALITY PROJECT



LOCATION OF RUFIJI DSS SITE, TANZANIA: Monitored Population 85,000

Eleuther Mwageni, Devota Momburi, Zaharani Juma, Mohamed Irema, Honorati Masanja, and the

TEHIP and AMMP Teams

1. RUFJI DSS SITE DESCRIPTION

1.1 Physical Geography of the Rufiji DSS Area

The Rufiji DSS (RDSS) area extends from 7.47⁰ to 8.03⁰ south latitude and 38.62⁰ to 39.17⁰ east longitude. The RDSS is located in Rufiji District, Tanzania about 178 kilometres south of Dar-es-Salaam. Rufiji District is one of the six Districts of the Coast Region, the others being Bagamoyo, Kibaha, Kisarawe, Mafia and Mkuranga. Rufiji District, located in the south of the Region, has six Divisions with 19 Wards divided into 94 registered villages with 385 hamlets. The District covers an area of approximately 14,500 square kilometres. The RDSS operates in six contiguous wards and 31 villages (about 60 km long by 30 km wide) and covers an area of 1,813 square kilometres.

Rufiji District has an overall mean altitude of less than 500 metres. Its vegetation is mainly formed of tropical forests and grassland. The district has hot weather throughout the year and two rainy seasons; short rains (October to December) and long rains (February to May). The average annual precipitation in the district is between 800 to 1000 millimetres. A prominent feature in the District is the Rufiji River with its large flood plain and delta, the most extensive in the country. Mangrove forests flank the tributaries of the delta. The river, from which the District takes its name, divides the district geographically into approximately equal halves. The district is also a gateway to Selous Game Reserve. The reserve has a variety of wild animals such as zebras, buffaloes, hartebeest, monkeys, lions, hyenas, warthogs and elephants.

1.2 Population Characteristics of the Rufiji DSS Area

The Rufiji District has a population size of about 182,000 of which 85,000 (about 47% of the District) are under survey. The population densities for the district and survey area are 12.5 and 46 per square km respectively. The mean household size for the whole district is about 5 persons (Bureau of Statistics, 1994). The district is largely rural although the population is clustered around Utete (District headquarters), Ikwiriri, Kibiti and Bungu townships. See Section 3.1 for DSS generated demographics.

Rufiji district is home to several ethnic groups. The largest group is the Ndengereko (who, according to oral tradition, are the original inhabitants of the area), other groups include the Matumbi, Nyagatwa (concentrated in the delta area), Ngindo, Pogoro, and Makonde. The majority of the people are Moslems with few Christians and followers of traditional religions. In addition to local languages, Kiswahili is widely spoken; English is not commonly used in the area.

The majority of the people in Rufiji District are subsistence farmers. Farming areas are often located some distance from the family home and make use of periodically flooded alluvial soils. Temporary houses located on this farmland means that some households are often split geographically for up to four months of the year. For polygenous households, this may mean a seasonal 'double' splitting of their membership. Major crops grown include cassava, maize, rice, millet, sesame, coconut and cashew nuts. Fruit such as mangoes, oranges, pineapples, papaya and jackfruit are also grown. Some residents are involved in fishing while others in small-scale commercial activities such as selling wood products (e.g. timber, furniture and carvings).

Each village has at least one primary school (from standard one to seven). There are four secondary schools in the district (three government and one private) of which two are located in the DSS area. A Folk Development College, providing post-primary polytechnic education, is located in Ikwiriri

Township. According to the 1988 population census results (Bureau of Statistics, 1994) males are more literate (66%) than females (34%) in the district.

Most villages in the survey area have a central place consisting of shops and a market. The dwellings are simple, consisting of a mixture of huts with walls made of mud and wooden poles with thatched or corrugated roofs as well as conventional brick houses in the townships. In the Rufiji flood plain *Dungus*, traditionally built shelters on stilts that suit the flooding conditions, are a common feature. Tap water supply is very limited and the majority of people rely on communal boreholes or use natural spring or river water for domestic purposes, while a few use harvested rainwater. In terms of transport the DSS area is crossed from North to South by the Dar-es-Salaam – Lindi / Mtwara trunk road, half of which is paved and the remainder unsealed. Unpaved feeder roads and tracks link most of the villages to this trunk road. Telephone facilities in the district are located in the three townships. The district is not connected to the national electricity grid, but Ikwiriri township has 24 hour, diesel generated, electrical power from the national electrical supply company. Other places that have electricity depend on private generator units.

The district has 56 health facilities. They include two hospitals (one government and one mission), five government health centres and 48 government dispensaries. A private dispensary based at Kibiti offers mobile clinic services in some parts of the district. Over the counter drugs are available from many private shops and kiosks in the villages. Many people also obtain services from traditional healers including traditional birth attendants. Malaria and waterborne diseases such as cholera and diarrhoea are the major health problems of the area as reported through the health services and as perceived by local people. Major causes of mortality include acute febrile illnesses including malaria, acute lower respiratory infections, tuberculosis, AIDS, and perinatal causes. Immunisation coverage ranges from 85% for BCG (tuberculosis) to 66% for measles in children 12-23 months of age. About 89% of the population live within 5 kilometres of a formal health facility. All villages and health facilities in the district have been positioned by GPS and mapped in a GIS database of district health resources.

2. RUFJI DSS PROCEDURES

2.1 Introduction to the Rufiji DSS Site

The objectives of the RDSS are to provide sentinel data for health policy and planning and to monitor the impact of health reforms. Data and experiences from the RDSS are being assessed for their use in assisting District Health Management Teams, policy makers and planners to make more appropriate resource allocation aimed at improving the health situation in the district and the country at large. Experiences from RDSS are also informing the development (with AMMP) of methods for a national sentinel system for monitoring the burden of disease in Tanzania. The RDSS commenced field operations in November 1998.

The Rufiji project employs a demographic survey system (DSS) to collect health status and demographic data. The DSS approach involves a continuous monitoring of households and members within households in cycles or intervals, known by RDSS as ‘rounds’ of four months each. Members (or residents) of the RDSS are individuals who have resided in the survey area for a period of the previous four months. The RDSS collects information on demographic, household, socio-economic and environmental characteristics of the population. Verbal autopsy conducted on all RDSS registered deaths using specific standard questionnaires, is used to determine cause of death. The verbal autopsy instruments and coding procedures used in the RDSS are identical to those used by AMMP.

The RDSS has a team of 52 people who are entirely district based. The staff, headed by a Station Manager, is organised into three groups namely field (Field Manager, 7 Enumerator Supervisors, 3 Verbal Autopsy Supervisors, 4 Migration Supervisors and 25 Enumerators), data (Data Manager, Data Assistant, Filing Clerk and 3 Data Entry Clerks) and support (Accountant, Secretary, Driver/Mechanic, Cleaner and Watchmen). Most field workers are deployed throughout the DSS area, whereas the data and support teams are based in the field station that is located in Ikwiriri Township, south of the DSS area. The RDSS also has access to about 118 key informants. These are community leaders whose responsibilities are to assist the field staff in reporting births or deaths in their respective areas and sometimes finding prospective households for inclusion in the DSS.

The project is co-managed by TEHIP (funded by the International Development Research Centre, Canada) and AMMP (funded by the Department for International Development, UK). Both TEHIP and AMMP are projects under the auspices of the Tanzania Ministry of Health. AMMP is implemented in partnership with the University of Newcastle upon Tyne (UK).

The local District Health Management Team, the Tanzania Ministry of Health, and national and international collaborative research and development projects are the main consumers of the RDSS data.

2.2 Rufiji DSS Data Collection and Processing

2.2.1 Field Procedures

a) Mapping

The RDSS employed a non-randomised, purposive technique in selecting the wards under survey. The RDSS covers the total population in the six contiguous wards of Bungu, Kibiti, Ikwiriri, Mchukwi, Mgomba and Umwe. The RDSS operates exclusively to the north of the Rufiji River, which flows along a roughly West-East axis through the district. This side of the river is home to the majority of the population and is more easily accessible throughout the year while communities south of the river as well as those in the delta may be inaccessible for varying periods during the long rains. The RDSS targeted an initial population size of 70,000 which was set in order to provide similar mortality data to other DSS sites in the AMMP (See Hayes, et al., 1989 and AMMP chapters in this volume). Given an average household size of 4 to 5, it was estimated that between 14,000 to 17,500 households would be needed for inclusion. All villages have been positioned by GPS. Mapping of households is planned.

b) Initial Census

The RDSS data collection begins with enumerators conducting an initial census in the sampled area to establish the baseline population. This population forms the foundation to establish a longitudinal DSS and provides background data on the population. The census data is obtained using standard questionnaires with both closed- and open-ended questions. Data collected is on household (household head, relation to household head), demographic (age, sex), socio-economic (education, occupation), and environmental (source of drinking water and sanitation facility) conditions. For purposes of identity, each registered household and person is given a unique number within its village and his household respectively. The unique number for each individual is known as the permanent identification and consists of identifications of the village, household and the individual number within the household.

c) Regular update rounds

Longitudinal data collection of demographic, household, socio-economic and environmental characteristics is maintained by subsequent update rounds. These rounds take four months to complete; the day after one round finishes the next round begins and households are visited in sequence. Update rounds are undertaken to maintain accurate denominators for estimation of age, sex and cause specific death rates. In their periodic visits enumerators may register new people found in the households. These include unregistered individuals who could have been missed during the initial census. During the rounds the enumerators check, verify or change the status of each household and individual using the household registration books (HRB). The enumerators make all alterations in the respective HRB in conjunction with filling a Changes Form.

d) Continuous surveys

The RDSS involves the continuous recording of vital events within households and among members over time. These events, recorded by enumerators using specific event forms, include births, deaths, pregnancies, pregnancy outcomes, marital status changes, as well as migrations (in and out of the survey area). In addition, lay key informants assist the enumerators by independently recording births and deaths that happen in their respective hamlets.

VA interviews on all DSS registered deaths are conducted by VA supervisors using specific standard questionnaires for: a) deaths of children under 31 days of age; b) those under 5 years but above 31 days; and c) deaths to those aged five years and above. The interviews are held with one of the adult relatives of the deceased (preferably a caretaker) who was well informed of the sequence of events leading to death. VA supervisors conduct interviews within two months of a death being reported and use any available documents such as death certificates and prescriptions to obtain confirmatory evidence about cause of death from the health facility where the deceased visited or was hospitalised for the last time. Such evidence, however, is often unavailable. The completed questionnaires are then coded independently by two physicians according to a list of causes of death based upon the tenth revision of the *International Classification of Diseases*. A third physician is used to independently code in the case of discordant results. Where there are three discordant codes, the cause is registered as unknown.

e) Supervision and quality assurance

The Field Manager supervises all field operations and spends about 60% of time supervising field activities and the remainder in the field station's office. Upon completion of interviews or household visits, field supervisors randomly select and revisit between 3-5% of the households interviewed or updated by the enumerators for quality control. Errors noted are communicated immediately to enumerators or brought for discussion during the regular bi-monthly field staff meetings.

2.2.2 Data Management

The RDSS data collection process uses a variety of forms. These forms include Baseline Census, Event, Changes, HRBs and VA questionnaires. A reliable mechanism is in place to ensure smooth production and flow of these forms between the field and the RDSS data centre. The RDSS filing clerk is responsible for ensuring production and distribution of the forms to the field staff. Upon completion of the data collection the supervisors or the filing clerk take the forms to the RDSS data centre where they are registered by the filing clerk before data entry.

Data management of the RDSS employs the standard Household Registration System (HRS) public domain computer software with in-built reporting and checking routines (Indome et al, 1995). The HRS is capable of maintaining a consistent record of vital events that occur among a population in a

fixed geographic area and generating up-to-date registration books for field use. Once enumerators have completed their interviews the data are taken to the RDSS data centre for entry. The data entered is then printed in loose sheets or forms known as household registration books (HRBs). The filing clerk systematically arranges the HRBs by household and hamlet to facilitate the fieldwork and household contacts for the interviewers. The HRB is printed in such a way that it can maintain three rounds of interviews. Likewise, completed verbal autopsy forms are double entered in the RDSS data centre differences reconciled and then dispatched for physician coding and returned to the RDSS data centre for final processing.

The software for data entry has an in-built series of logical checks and menu driven procedures that maintain the consistency of the event data with data in the database. For example, data entry of a pregnancy of a male resident will be disallowed by HRS. In order to optimise quality, field activities are performed in conjunction with data operations in an integrated manner. Completed forms from the field are taken to the RDSS data centre for data entry. Errors noted during data entry are verified, then reported to the field supervisors for diagnosis and corrected both in the field and RDSS data centre.

The HRS software is also used for data analysis. The software can compute basic demographic rates such as fertility, mortality, as well as in and out migration and person-time denominators. If all the field and data protocols are followed, at the end of each four-monthly round, fully edited and cleaned data should result. The data can be used to describe characteristics of the population such as age, sex, marital and parental relations, and household head-ship as well as dynamics in terms of births, deaths, migration and nuptiality. The addition of the mortality monitoring using the VA allows the generation of cause-specific mortality rates and other measures of disease burden (such as years of life lost) for all ages and both sexes. The findings obtained are presented in simple tables or graphics to the community through bi-annual newsletters issued to every household in the monitoring area. In addition the findings are re-processed by TEHIP into intervention addressable shares of the burden of disease before being provided in graphical format to the Rufiji District Health Management Teams and the Ministry of Health.

3. RUFJI DSS BASIC OUTPUTS

3.1 Demographic Indicators Generated by the RDSS Site

The RDSS area has a population size of about 85,000 and an annual population growth rate of 2.3%. This means the population in the DSS area will take about three decades to double. The age-sex composition of the area is presented in the population pyramid in Figure 1. The pyramid reveals a broad base that tapers towards the older ages indicating that the population is young. The population structure consists of: <1 y (2.7 %); 0-4 y (16 %); 5 to 14 years (30%); 15 to 64 years (46 %); and 65+ years (8 %). The male to female sex ratio is 92.7:100. There are more females (52%) than males (48%) in the DSS area. The age dependency ratio is 110. The total fertility rate is 6.2 children per woman aged 15 to 49 years. The infant mortality rate is 102.1 per thousand live births. The under five mortality ratio is 133 per 1000 live births. The under five mortality rate is 32.7 per 1000 under five person years. Average household size is 4.8 persons. Males are more likely to be heads of households (73%) and educated (57%) than females (27% and 43% respectively). 26% of the population migrated out of, or into, the DSS area. Out-migration exceeds in-migration in the DSS area. The propensity to migrate into the DSS area is higher among females (57%) than males (43%). These percentages are the same for out-migration.

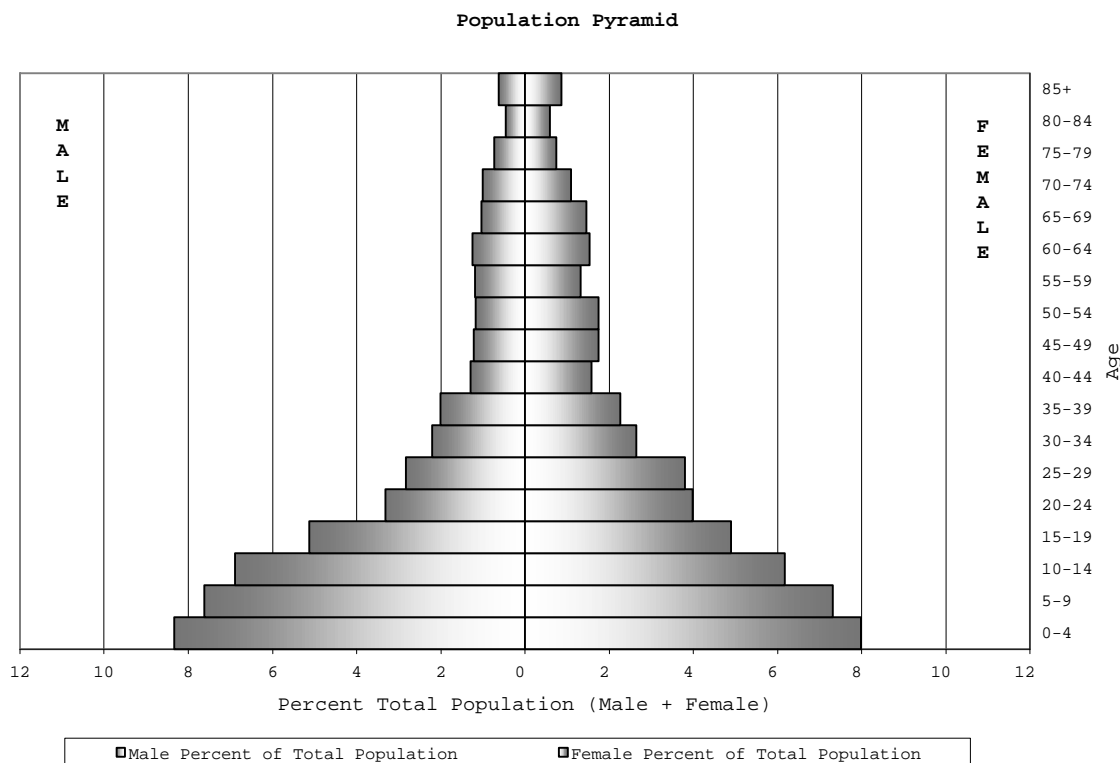


Figure 1: Population pyramid for person-years observed in the Rufiji DSS site, 1999.

Table 1: Mortality Rates

** Omitted in Web version **

All cause mortality data for the RDSS is summarised in Table 1. The table reveals that mortality in the DSS area is relatively high. The mortality pattern is U-shaped indicating high death rates among children (below age 5) and adults of age 65 and above. There are variations in the mortality age profile between men and women, with women aged 20 to 44 having higher probabilities of dying than men.

Table 2. Age Specific Fertility Rate

Age group	Person Years	No. births	Fertility Rate per 1000
15-19	3415.5	562	164.5
20-24	2804.2	692	246.8
25-29	2648.8	636	240.1
30-34	1861.0	401	215.5
35-39	1598.5	296	185.2
40-44	1119.8	115	102.7
45-49	1231.4	98	79.6
GFR (15-49)	14679.3	2800	190.7

TFR 6.2

The ASFR and TFR of the DSS area are presented in Table 2. The ASFR show a regular feature with childbearing peak occurring in the ages 20-24 and thereafter fertility levels decline. ASFR distributions can be classified into three broad groups: early peak type (20-24), late peak type (25-29) and broad peak type (where ASFR in the age groups 20-24 and 25-29 differ slightly) (Kpedekpo, 1982). One notes that fertility levels in the RDSS is that of early peak type. This indicates that in the DSS area women marry or begin childbearing early in their life.

Table 3: DSS Population by Sex in 1999

Age groups	Male	Female	Total	Male (%)	Female (%)	Total (%)
0-4	6,906	7,114	14,020	8.07	8.31	16.39
5-9	6,555	6,396	12,951	7.66	7.47	15.14
10-14	6,000	5,339	11,339	7.01	6.24	14.49
15-19	4,346	4,060	8,406	5.08	4.74	9.83
20-24	2,847	3,495	6,342	3.32	4.08	7.41
25-29	2,434	3,266	5,700	2.84	3.81	6.66
30-34	1,969	2,290	4,259	2.30	2.67	4.98
35-39	1,748	1,922	3,670	2.04	2.24	4.29
40-44	1,108	1,372	2,480	1.29	1.60	2.90
45-49	1,048	1,470	2,518	1.22	1.71	2.94
50-54	984	1,452	2,436	1.15	1.69	2.19
55-59	1,013	1,123	2,136	1.18	1.31	2.49
60-64	1,041	1,260	2,301	1.21	1.47	2.26
65-69	891	1,256	2,147	1.04	1.46	2.08
70-74	820	889	1,709	0.95	1.03	1.99
75-79	625	603	1,228	0.73	0.70	1.43
80-84	372	452	824	0.43	0.52	0.96
85-89	258	362	620	0.30	0.42	0.72
90-94	122	124	246	0.14	0.14	0.28
95+	63	116	179	0.07	0.13	0.20
ALL	41,150	44,361	85,511	48.12	51.87	100

4. REFERENCES

Hayes, R., Mertens, T., Lockett, G. and Rodrigues, L. (1989). "Causes of Adult Deaths in Developing Countries: A Review of Data and Methods." Working Paper 246. World Bank, Washington, DC.

Indome, F., Binka, F., MacLeod, B., Kubaze, F., and Phillips, J. (1995). **The Microcomputer Software Component of the Household Registration System (HRS)**. The Population Council, New York.

Kpedekpo, G.M.K (1982). **Essentials of Demographic Analysis for Africa**. Heinemann, London.

Tanzania Bureau of Statistics (1994). **1988 Population Census: Coast Regional Profile**. Government of Tanzania, Dar es Salaam.

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