DHS REGIONAL ANALYSIS WORKSHOP
FOR ANGLOPHONE AFRICA

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April 1994

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Fertility Levels, Trends, and Socioeconomic Differentials: Findings from the Tanzania Demographic and Health Survey

1 Background Information

The United Republic of Tanzania is a union of the former Tanganyika and the Islands of Unguja and Pemba (collectively referred to as Zanzibar). The country is located in East Africa, South of the Equator. Tanzania shares a border with eight other African countries; namely, Kenya on the northeast, Uganda on the north, Rwanda and Burundi on the northwest, Zaire on the west, Zambia and Malawi on the southwest and Mozambique on the south. On the east, the country is bordered by the Indian Ocean. Mount Kilimanjaro (the highest mountain in Africa) is located in the northeastern part of the country. The three great lakes in Africa are located on Tanzania's borders: Lake Victoria on the north, Lake Tanganyika (the second deepest in the world) on the west and Lake Nyasa on the southwest.

Tanzania is made up of twenty five regions; twenty are on the Mainland and five on the Islands. These regions are divided into districts (the largest region having 8 districts) which are in turn divided into divisions and then wards. In rural areas the wards are sub-divided into villages. On the Islands the districts are divided into branches.

These regions were formed mainly for administrative purposes. Development plans are initiated at the district level and discussed at the regional level before being submitted for final approval at the national level.

Since independence, Tanzania has been able to conduct three decennial censuses (1967, 1978, 1988) and two demographic sample surveys (1973, 1991/92) which collected information on the basic sociodemographic indicators.

This country, like many other developing countries, is characterised by a high fertility rate and a moderately high but declining mortality rate. With respect to age structure, the population is considered young, with about 46 percent of the population under 15 years of age. Table 1.1 gives some basic sociodemographic characteristics of the population of Tanzania.

The Tanzanian population, numbered around 23.1 million according to the 1988 census, is made up of many ethnic groups, each with its own characteristics. Nevertheless, the national language, Kiswahili, is understood by almost all ethnic groups in the country. The main religious denominations are Islam and Christianity.

Table 1.1 Demographic indicators, Tanzania 1978 and 1988

Indicator	1978	1988
Population (millions)	17.5	23.1
Population 0-14 (percent)	-	45.8
Population 15-64 (percent)	-	50.0
Population 65+ (percent)	-	4.3
Annual growth rate[1] (percent)	3.2	2.8
Crude birth rate (per 1000)	49	46
Crude death rate (per 1000)	19.1	15.1
Total fertility rate (per 1000)	6.9	6.5
Infant mortality rate (per 1000)	137	115
Under-five mortality rate (per 1000)	-	192
Expectation of life at birth (e_0)	44	49

[1] The growth rates are intercensal (1967/78 and 1978/88).
Source: Bureau of Statistics, Dar es Salaam, 1991.

1.1 THE DEMOGRAPHIC AND HEALTH SURVEY

The Tanzania Demographic and Health Survey (TDHS) was carried out between October 1991 and March 1992. The main objectives of the survey were:

i) To collect data on fertility and mortality, family planning, fertility preferences, and maternal and child health care for use by policy makers and programme managers to evaluate and improve existing programmes;

ii) To provide the basic information to be utilized in planning and managing family planning and health programmes; and

iii) To provide internationally comparable data from Tanzania to scholars and planners interested in the study of demographic and health behaviour in Tanzania as well as those conducting regional or cross national studies.

1.2 CHARACTERISTICS OF THE SAMPLE

The 1991/92 TDHS was designed to provide regional estimates. In drawing up the sample it was assumed that rural areas within each region were relatively homogeneous. To provide regional estimates, a minimum number of households for each region was fixed. A two-stage sample design was employed to select the households.

The sample frame for the 1991/92 TDHS comprised the enumeration areas demarcated for the 1988 census. For Mainland Tanzania, the 1988 census demarcated villages in the rural areas and wards in the urban areas into Enumeration Areas (EAs). However, in the Islands, branches were demarcated into EAs.

Urban EAs in Mainland Tanzania and all EAs on Zanzibar had around 400 people, whereas rural EAs in Mainland Tanzania had approximately 800 people.

In the first stage, enumeration areas were selected. With the exception of Dar es Salaam, for which 29 clusters (EAs) were selected, 15 or 16 EAs were selected for each Mainland region. Zanzibar and Pemba Islands shared a total of 30 EAs together.

A list of heads of households for each selected EA was prepared. These lists of heads of households were used for the second sampling stage. For each rural EA, an average of 30 households was selected for the female questionnaire, whereas in the urban areas 20 households were selected. In both rural and urban areas, one household out of every four of the selected households was selected for the additional male questionnaire.

1.3 CHARACTERISTICS OF RESPONDENTS

The Questionnaire and the Content of the Interview Schedule

In the 1991/92 TDHS, four types of questionnaires were used:

i) The *Service Availability Questionnaire* was used to collect data on the characteristics of the community and the availability of family planning and maternal and child health care (MCH) services.

ii) The *Household Questionnaire* was used to enumerate all usual members of the household. This questionnaire provided information on age, sex and relationship to the head of the household, as well as educational attainment for all household members. Other information collected using the household questionnaire includes source of water, sanitation facilities and availability of electricity. The information recorded on the household questionnaire was used to identify the eligible respondents for the individual interviews.

iii) The *Female Individual Questionnaire* was used to collect information on the respondent's background, her birth history, knowledge and use of contraception, maternal care and breastfeeding, immunisation and health care of children, marriage, AIDS, fertility preferences, husband's background,women's employment, as well as maternal and child anthropometry.

iv) The *Male Individual Questionnaire* was similar to that of the Female Individual Questionnaire but excluded the birth history and maternal and child health sections. A module on condom knowledge and use was included in this questionnaire.

The Respondents and the Enumerators

As mentioned above, the eligible respondents were identified from the household questionnaire. All women aged 15-49 who spent the night in the household the night before the interview, and, in one-quarter of the households, all men aged between 15 and 60 who spent the night in the household on the night before the interview, were considered eligible.

Nurses were chosen as enumerators because the implementing organisation felt that respondents trusted nurses and would provide the fullest cooperation to such enumerators. Female nurses interviewed female respondents and male nurses interviewed male respondents.

2 Data Quality

Before beginning data analysis it is important to evaluate the quality of the data collected. A key variable in the analysis of data quality is age. This is due to the fact that many demographic analyses depend to a large extent on the accuracy of age reporting. For instance, any information on economic activity, pregnancy history and contraceptive use is asked of individuals whose ages are above a certain age limit.

In societies where ages and dates are not required in daily life, individuals may have little idea of their own ages. This is most likely to occur among those with low levels of education. In the 1991/92 TDHS, respondents were asked to report their birth dates (year and month) and ages in completed years.

When the respondent failed to give either her birth date or her age, the interviewer was instructed to probe and to try to estimate the respondent's age in relation to national events, other members of the household, the date of the respondent's first marriage or first birth, or in any other way that would have been plausible. This procedure can lead to measurement error when the interviewer estimates the respondent's age on the basis of physical appearance, as this is sometimes influenced by both the respondent's as well as interviewer's background. Respondents were also asked to give the birth dates (i.e., month and year) and age for each surviving child and a birth date and age at death for each child who had died. Correct birth date information at the data collection stage would have ensured that the health and anthropometry information was collected for all children younger than the cut off date (January 1, 1986).

2.1 EXTENT OF HEAPING

A number of methods have been proposed by demographers to evaluate the quality of age data. Several of these methods are used here to assess the 1991/92 TDHS data. One of them is to examine the single-year age distribution of the respondents for the urban and rural areas. Figure 2.1 shows the percent distribution of female respondents by single years of age.

A common feature of age distributions is heaping at ages ending with 0 or 5 and to some extent those ending in even numbers. From the figure it can be observed that the Tanzanian data are not very different from other developing countries' data. The distribution is similar to the 1988 census data (Planning Commission, 1991).

The only exception to this trend is found in urban areas where the peak is observed at age 19. There are no specific reasons as to why there should be a heaping at age 19. By grouping the single-year ages into five-year age groups (Figure 2.2), the age distortions are greatly reduced.

Figure 2.1
Single-Year Age Distribution of Women by Residence

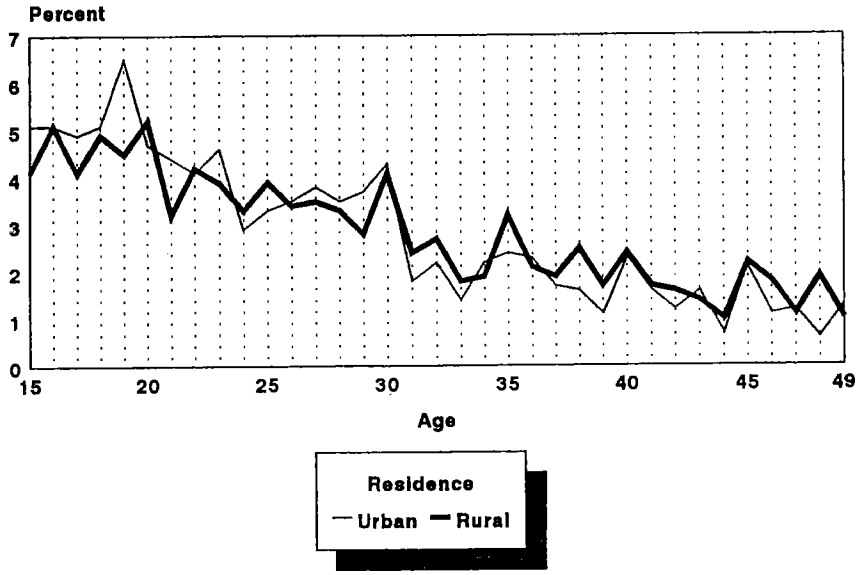

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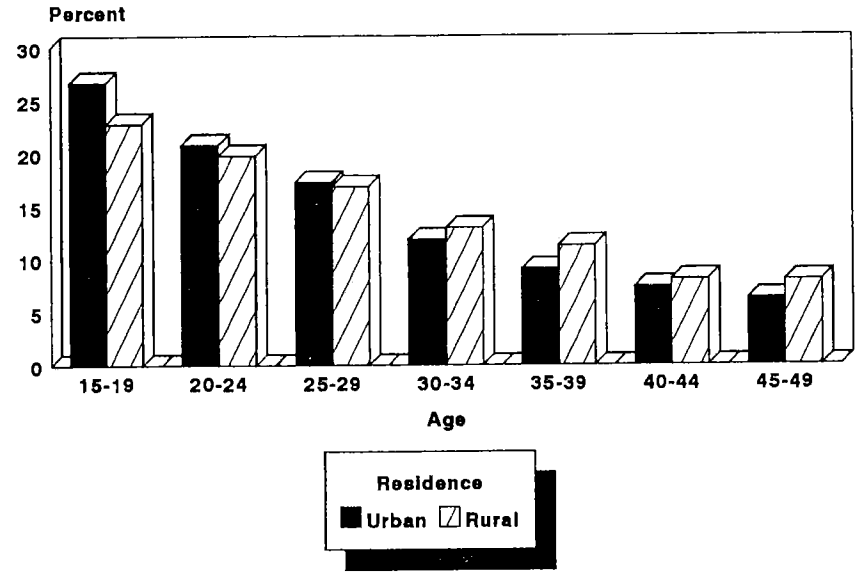
Figure 2.2
Grouped Age Distribution of Women by Residence



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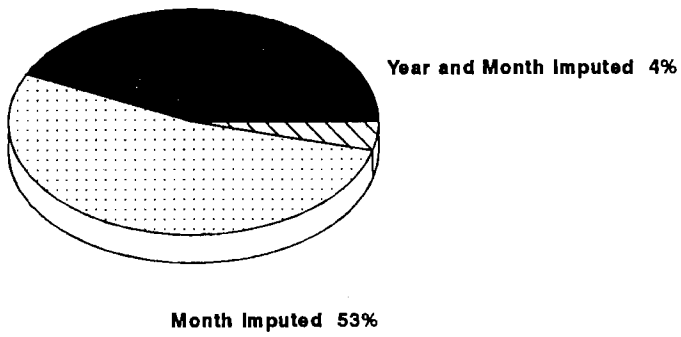
2.2 COMPLETENESS OF REPORTING

The second method used in evaluating the TDHS data is to examine the percent of respondents who were able to report complete birth dates and ages for themselves and their children. When complete information on year and month of birth was not reported, the dates were assigned by imputation. Figures 2.3 and 2.4 give the distribution of birth date reporting for the respondents and their children, respectively.

As shown in Figure 2.3, only 43 percent of all respondents were able to report both the month and the year of their birth dates, while about 53 percent were able to report only the year of their birth. In these cases the month of birth was imputed. About 4 percent of the respondents could report neither the month nor the year of their birth and their date of birth was imputed on the basis of the information in the questionnaire.

Figure 2.3
Completeness of Information on Respondent's Date of Birth



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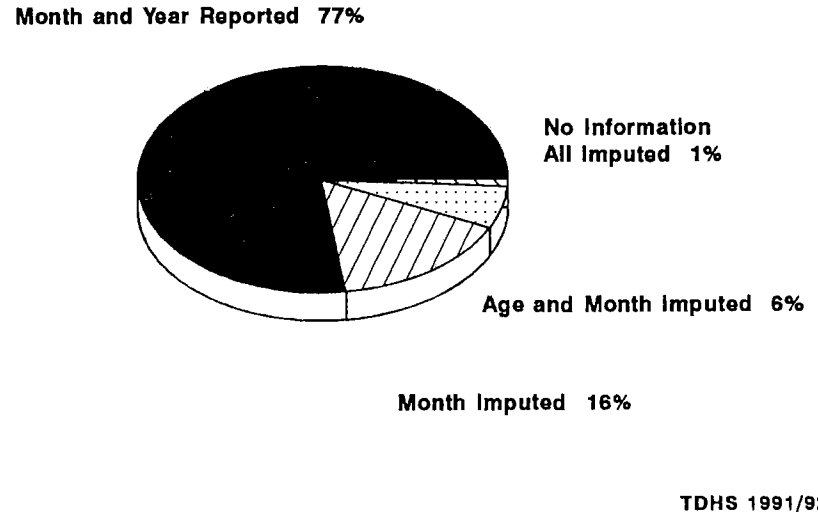
On the other hand, respondents were able to report both the month and the year of birth for about 77 percent of the children (Figure 2.4). For 16 percent of the children the respondents could report only the year and age, while for 6 percent they could only report the year of birth. The respondents could not report the birth date for only 1 percent of the children.

Figure 2.4
Completeness of Information on Children's Date of Birth



Comparing birth date reporting for children with other neighbouring countries from East and Southern Africa, for which the DHS data are available, it is found that the reporting in Tanzania is not as good as that of other countries, as there is still around 23 percent of children whose birth dates were not completely reported (Table 2.1).

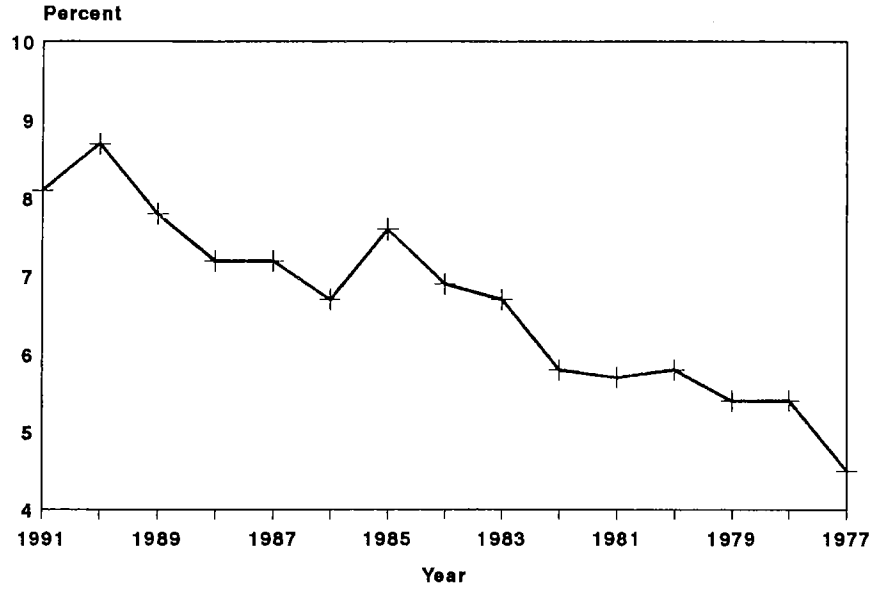
Table 2.1 Percent distribution of children born to survey respondents by completeness of information on date of birth and age of children, Tanzania 1991/92

Country	No imputation	Year and month reported	Year reported Month imputed	Age reported Year and month imputed	Year, age, and month imputed
Botswana	96.3	2.6	0.3	0.1	0.7
Burundi	78.6	13.7	7.4	a	0.2
Kenya	96.2	0.8	2.4	0.3	0.3
Tanzania	77.1	16.0	6.1	0.2	0.6
Uganda	99.9	a	a	a	a
Zimbabwe	99.4	0.1	0.2	0.1	0.2

a: Less than 0.05 percent
Source: DHS, Methodological Report 1, 1990.

On checking the quality of the reported births, it was important to look at the percentage distribution of births reported for the past 15 years (Figure 2.5). The figure shows that the births in 1985 appear to be over-reported. There is a possibility that some of the interviewers tended to push out some of the 1986 births to 1985 so as to avoid asking questions related to the health status of the children born between January 1986 and the date of interview. This type of displacement of births in time has been found to be severe in the majority of African DHS survey countries, especially in Botswana, Burundi, Liberia, Mali and Togo (Arnold and Blanc, 1990).

Figure 2.5
Percent of Births by Calender Year



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3 Fertility Levels and Trends

Assessment of fertility trends is one of the most important objectives of demographic surveys. Since a decline in fertility is the primary goal of most national planning programs, reliable data on the current level of fertility, as well as past levels, are critical for monitoring change (Arnold and Blanc, 1990). In this section, the levels and trends of fertility are examined in relation to the socioeconomic characteristics of the population.

With respect to the fertility data from the TDHS, each respondent was asked for information on her age, her birth history, and the dates of birth of her children. Fertility rates are calculated from this information.

3.1 LEVELS AND PATTERNS AND TRENDS

Age-specific fertility rates (ASFRs) and the total fertility rate (TFR) measure the current levels and patterns of fertility in Tanzania. The TFR is the average number of births a woman would have at the end of her reproductive period if she experiences the age-specific fertility rates prevailing during a given period. Table 3.1 gives the ASFRs and the TFRs for Tanzania for the periods 0-3, 4-7 and 8-12 years prior to the survey.

Table 3.1 Age-specific fertility rates and total fertility rates for Tanzania for specific periods before the survey, Tanzania 1991/92

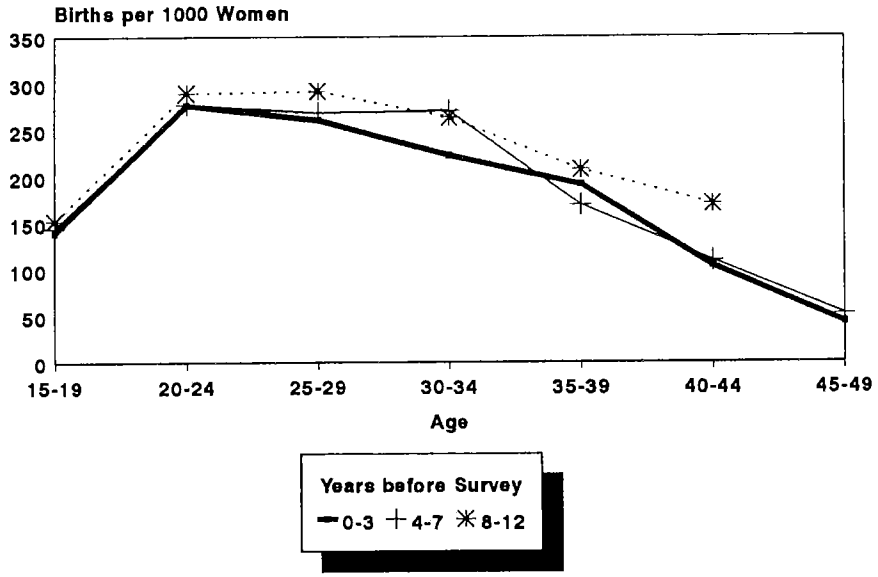
	Age-specific fertility rates (per 1000 women)		
Age group	0-3 years prior to survey	4-7 years prior to survey	8-12 years prior to survey
15-19	139	146	153
20-24	277	278	290
25-29	261	269	292
30-34	223	271	264
35-39	192	170	208
40-44	104	110	171
45-49	43	51	-
TFR	6.2	6.5	6.2*

* The rate is for women aged 15-44. There was no exposure for women aged 45-49 in the period 8-12 years before the survey.

From Table 3.1, it can be observed that there has been a decline in the level of fertility between the two most recent periods. However, the fact that fertility varies with age makes it important to look at the age pattern of fertility between the two periods. Figure 3.1 gives the age pattern of fertility for Tanzania for the periods 0-3, 4-7, 8-12 years prior to the survey.

Figure 3.1 shows that during the 0-3 year period prior to the survey, the level of fertility reached its maximum at age 20-24, compared with ages 20-34 and 25-29 in the periods 4-7 and 8-12 years prior to the survey, respectively. This suggests that women aged 25-29 and 30-34 may be starting to control their fertility.

Figure 3.1
Age-Specific Fertility Rates for Specific Periods Prior to the Survey



4 Fertility Differentials

Many studies have documented differentials in fertility between urban and rural dwellers and between women with different levels of education. Each of these factors is considered below.

4.1 URBAN-RURAL DIFFERENTIALS

About 75 percent of the respondents live in rural areas. Table 4.1 gives the urban-rural TFRs for the two four-year periods prior to the survey and shows that fertility in urban areas is lower than in rural areas.

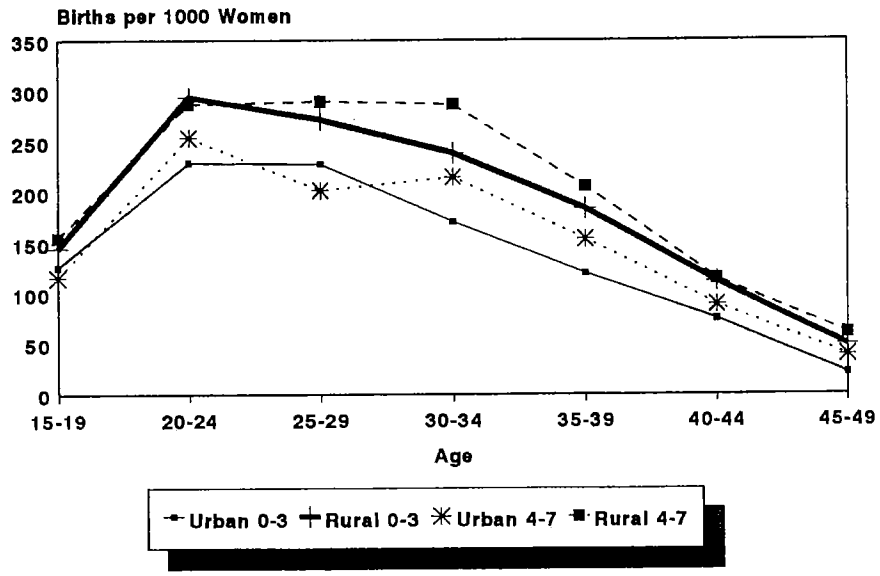
Table 4.1 Total fertility rates by residence, Tanzania 1991/92

Residence	0-3 years	4-7 years
Urban	4.85	5.34
Rural	6.48	7.01

Furthermore, there has been a decline between the periods 4-7 and 0-3 years prior to the survey. This decline occurred both in the rural and urban areas of the country (from TFR=7.0 to TFR=6.5 in rural areas; from TFR=5.3 to TFR=4.9 in urban areas). This is supported by Figure 4.1, which shows the age pattern of fertility for the rural and urban areas of Tanzania for the two periods.

In the figure below it can be observed that the decline is more pronounced in the age groups 25-29 and 30-34. This decline may be attributed to the fact that these women are more aware of family planning and some of them may actually be practising it. In addition, the programme encourages family planning for spacing and women in these age groups may have the greatest interest in spacing.

Figure 4.1
Age-Specific Fertility Rates by Residence for Specific Periods Prior to the Survey



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4.2 EDUCATIONAL DIFFERENTIALS

Most previous studies in Tanzania and elsewhere show that fertility is inversely related to level of education. The formal educational system in Tanzania starts with seven years of primary education, followed by six years of secondary education (four years of ordinary level and two years of advanced level). At the tertiary level, the University of Dar es Salaam and the Sokoine University of Agriculture offer three- and four-year degree courses, post graduate diplomas, masters and doctorate degrees in a number of subjects. Various post secondary courses are also offered in a number of colleges. The nonformal education includes adult education classes. For the purpose of studying educational differentials in fertility, three educational groups were considered: those with no formal education, those with primary education and those with secondary or higher education. This grouping was necessitated by the fact that the number of respondents with education beyond secondary levels was not large enough to be able to draw reliable conclusions. Table 4.2 gives the levels of fertility in the periods 0-3 and 4-7 years prior to the survey for educational groups.

Table 4.2 shows that there are substantial differences in fertility levels between educational groups, particularly between women with secondary education and those who have only primary or no formal education. Fertility has declined among all educational groups. However, the decline in fertility for those with primary education or less is smaller than for women with secondary or higher education.

Table 4.2 Total fertility rates by woman's education, Tanzania 1991/92

Education	0-3 years	4-7 years	n
No education	6.35	6.82	3089
Primary	6.14	6.47	5605
Secondary/Higher	4.00	5.31	483

4.3 REGIONAL DIFFERENTIALS

Table 4.3 gives the level of fertility (in descending order for the period 0-3 years prior to the survey) in different regions in the country for the periods 0-3 and 4-7 years before the survey. For the purpose of analyzing fertility in these regions, areas in Pemba and Unguja were grouped to form two regions (this is due to the small sample size, which did not allow for the presentation of all five regions in the Islands separately).

In the eight years before the survey, fertility declined considerably in some regions, but in others there was either a small or nonexistent decline. Among the regions which showed a considerable decline are Pemba, Tanga, Lindi, Tabora, Coast, Mbeya, Dar es Salaam and Mtwara. A slight decrease in fertility is observed in Kigoma, Arusha, Iringa, Ruvuma, and Kilimanjaro. The rest of the regions showed no decline or even a slight increase in fertility between the two periods. The observed differences in the levels in fertility between the regions may partly be attributed to the socioeconomic differences that exist between different regions in the country. Figure 4.2 reveals the regional fertility differences. It is interesting to note that the regions with lower fertility 4-7 years before the survey were more likely to have declined in the recent past than high-fertility regions.

Table 4.3 Total fertility rates by region, Tanzania 1991/92

Region	0-3 years	4-7 years
Shinyanga	7.4	7.0
Rukwa	7.3	7.2
Pemba	7.2	8.4
Dodoma	7.0	6.6
Kigoma	6.9	7.0
Singida	6.7	6.6
Mwanza	6.6	6.6
Arusha	6.5	6.9
Mara	6.5	6.5
Kagera	6.4	6.2
Morogoro	6.4	6.0
Unguja	6.3	5.4
Tanga	6.2	6.9
Lindi	6.0	6.8
Iringa	6.0	6.3
Ruvuma	5.8	6.1
Tabora	5.7	6.3
Coast	5.5	6.1
Kilimanjaro	5.4	5.8
Mbeya	5.3	6.1
Dar es Salaam	4.1	5.1
Mtwara	3.9	4.6

4.4 PARITY PROGRESSION RATIOS:

Parity Progression Ratios (PPRs) are another useful indicator of fertility trends. They are the proportion of women at parity i who go on to have an $(i+1)^{th}$ birth. Compared with other methods of estimating fertility, this method may be better, since it does not rely very much on age, which in many cases is not correctly reported by women. This method is best when age reporting is particularly poor.

Figure 4.2
Total Fertility Rates by Region

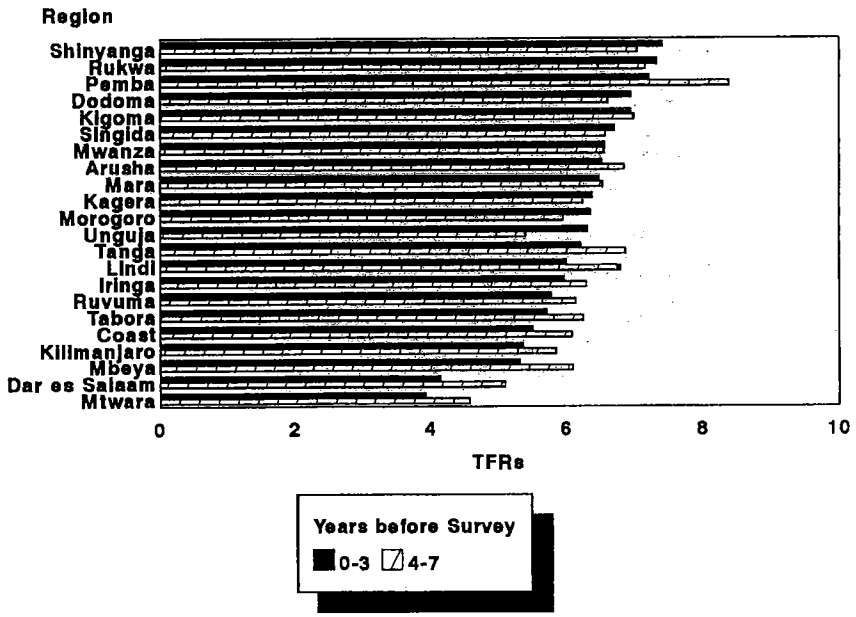

Figure 4.3 shows PPRs calculated for births at parity *i* which took place in three different periods prior to the survey (6-10 years, 11-15 years and 16-20 years). The PPRs provide further evidence that fertility has been declining over the last fifteen years in Tanzania.

The decline is most evident after parity 5. It seems that women, rather than first having many children and then deciding to limit further births, are spacing their births out over a longer period and reaching the natural end of their childbearing years at lower parities than in the past.

Figures 4.4 and 4.5 show the PPRs for urban and rural areas, respectively. These show the same pattern of declining fertility over time as for the nation as a whole. It is difficult to interpret the PPRs for women in urban areas at the time of the survey. Many of these women are migrants to the urban areas, particularly Dar es Salaam, and their fertility behaviour in the past is a mix of rural norms (though affected by the fact that these women had characteristics which led them to migrate), urban influences and upheavals associated with migration.

The PPRs for the rural areas show the beginning of a decline above parity 7 about 11-15 years ago and evidence of decline at parities 5 and 6 in the period 6-10 years ago.

Figure 4.3
Parity Progression Ratios for Specific Periods Prior to the Survey

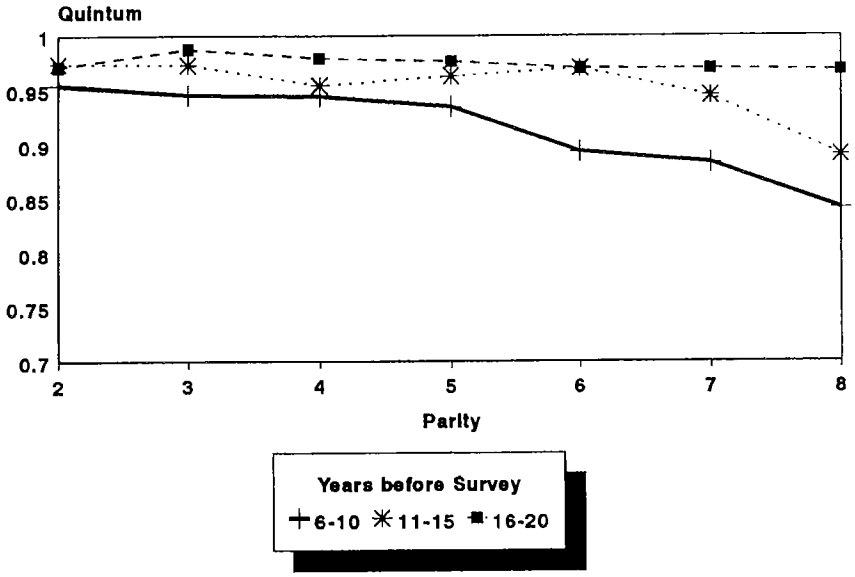

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Figure 4.4
Parity Progression Ratios for Specific Periods Prior to the Survey Urban Tanzania

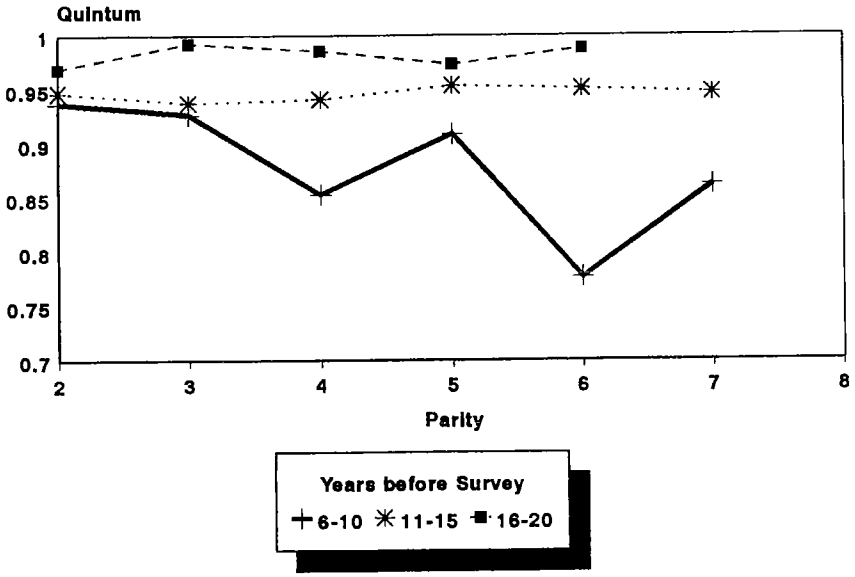

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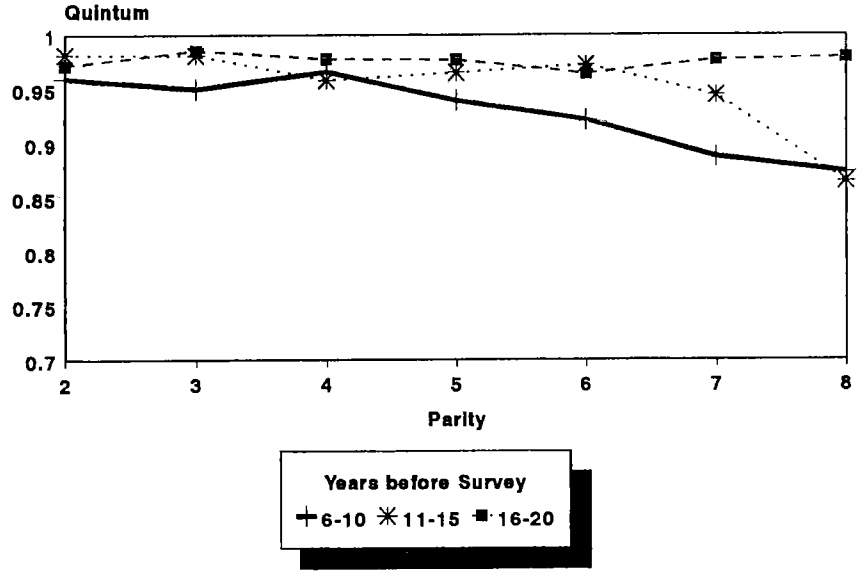
Figure 4.5
Parity Progression Ratios for Specific Periods Prior to the Survey
Rural Tanzania



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5 Proximate Determinants of Fertility

In many societies the socioeconomic factors which influence fertility act through a set of intermediate variables known as proximate determinants. These proximate determinants of fertility can be defined as the biological and behavioral factors that affect fertility directly. Davis and Blake (1956) grouped these factors into three broad groups, each with its own subgroups. These include: i) Factors affecting exposure to intercourse, ii) Factors affecting exposure to conception, and iii) Factors affecting gestation and successful parturition.

I Factors Affecting Exposure to Intercourse:

Included in this group are factors which govern the formation and dissolution of unions (i.e., *age of entry into sexual unions, permanent celibacy and the amount of reproductive period spent after or between unions*) and those factors which govern the exposure to intercourse within unions (i.e., *voluntary/involuntary abstinence and coital frequency*).

II Factors Affecting Exposure to Conception:

These include fecundity or infecundity as affected by involuntary causes, use or nonuse of contraception and fecundity or infecundity as affected by voluntary causes (i.e., sterilisation, medical treatment).

III Factors Affecting Gestation and Successful Parturition:

The factors included in this group are fetal mortality and spontaneous or induced abortion.

5.1 ESTIMATES OF BONGAARTS' MODEL

Bongaarts (1978) grouped Davis and Blake's variables into four major groups. These he termed as the Proximate Determinants of Fertility. The groups were as follows: i) Marriage, ii) Contraception, iii) Abortion, and iv) Postpartum infecundability. He developed a model for decomposing total fertility rates whereby:

$$TFR = TF \times C_i \times C_c \times C_a \times C_m$$

where TF is the total fecundity (approximated at 15.3)
C_i is the index of postpartum infecundability
C_c is the index of contraception
C_a is the index of abortion
C_m is the index of marriage

These indices vary from 0 to 1, depending on the extent to which fertility is reduced by a particular variable. When an index is equal to 1 it means that a particular variable has no effect on fertility reduction in that setting.

5.2 DIFFERENTIALS IN PROXIMATE DETERMINANTS

In the TDHS, information on age of the respondent, her marital status, her age at marriage, contraceptive knowledge and practice, duration of amenorrhea and postpartum abstinence, as well as other information were collected. Information on abortion was not collected in Tanzania where abortion is illegal except when it is performed on medical grounds. Experience has shown that abortions are severely under-reported under such conditions. The above information was used in estimating the levels of fertility in different social settings using Bongaarts' model. The results were as follows:

Table 5.1 Observed and implied differentials in TFRs using Bongaarts' model, Tanzania 1991/92

	Observed TFR	Implied TFR[1]	C_i	C_c	C_m	i^2
Tanzania	6.2	5.06	0.59	0.89	0.63	15.39
Region of residence						
Urban	4.85	4.37	0.63	0.84	0.54	13.20
Rural	6.48	5.31	0.58	0.92	0.65	15.91
Education						
No Education	6.36	6.20	0.57	0.96	0.74	16.49
Primary	6.14	4.87	0.60	0.87	0.61	15.05
Secondary/Higher	4.00	2.17	0.71	0.57	0.35	9.66

[1] Calculated using the Bongaarts Model
[2] The mean duration of insusceptibility

From Table 5.1 it can be observed that the implied TFRs (calculated using Bongaarts' model) are low compared with the observed TFRs. In calculating the index of marriage, ever married women were considered instead of currently married women, because when currently married were used to calculate C_m, the implied TFRs were very low.

Table 5.1 shows the relative effects of the proximate determinants on fertility levels in Tanzania. The values of C_m and C_i, the indices of marriage and breastfeeding, are lower than the index of contraception (C_c), indicating that they have a higher effect on reducing fertility compared with contraception. In Tanzania marriage is almost universal (according to the 1988 census) and breastfeeding is wide-spread. The higher value of C_m in rural as opposed to urban areas is an indicator of earlier marriage in the rural areas. In the rural areas the singulate mean age at marriage is 20, compared with age 22 in urban areas (see Table 5.2).

With regard to contraception, Table 5.1 shows that the fertility reduction from the use of contraception in Tanzania is small. This is evident from the high values of C_c. An exception is women with secondary education among whom use of contraception has a larger impact on fertility than the duration of postpartum infecundability. Section 6 further discusses this result.

The differences observed in the mean duration of insusceptibility, "i" (resulting from women being either amenorrheic or abstaining), are the result of the differences in breastfeeding and postpartum abstinence among women with different socioeconomic backgrounds. Tanzania's mean duration of insusceptibility of 15.4 months is slightly longer than neighbours Uganda, Zambia, Zimbabwe and Kenya (with mean durations of 13, 13, 12 and 11, respectively). The long mean duration of insusceptibility in Tanzania is due to prolonged breastfeeding.

Table 5.2 Singulate mean age at marriage/birth

	1978			1988		
	Total	Urban	Rural	Total	Urban	Rural
SMAM[1]	19.2	19.6	19.1	20.6	22.1	20.1
SMAB[2]	21.4	22.7	21.3	23.2	24.6	22.8

1 Singulate Mean Age at First Marriage
2 Singulate Mean Age at First Birth
Source: 1988 Population Census Initial Analysis.

6 Fertility Regulation and Reproductive Preferences

Family planning activities in Tanzania were started in 1959 by the Family Planning Association of Tanzania (UMATI) and were later incorporated into the Ministry of Health (MoH) in 1974. The Family Planning Unit (FPU) in the MoH is mandated by the Government to coordinate and oversee all family planning and related activities taking place in Tanzania. According to a paper presented to the Family Planning Participating Agencies' Meeting held in Morogoro, Tanzania, in February 1992 (Family Planning Unit, Ministry of Health), all regional and district hospitals, 50 percent of dispensaries, and all health centres have been given Maternal and Child Health (MCH) equipment. These include basic equipment for sterilisation, for screening some of the risk factors, and for IUD insertion. According to the 1991

Annual Report and Plans for 1992 for the MoH, there are 3,370 health facilities in Tanzania, out of which 3,151 have MCH facilities and 2,445 of them (about 72 percent) are equipped with family planning facilities. However, as of present, use of family planning is not very widely spread in Tanzania (the prevalence is about 10 percent). The reasons behind this can be attributed to, among other things, the fact that many Tanzanians consider children to be future assets, as well as the difficulty associated with obtaining the methods in some of the rural areas. In addition, family planning availability through the programme has only recently increased.

6.1 CONTRACEPTIVE PREVALENCE

Table 6.1 shows that the overall contraceptive prevalence in Tanzania is only about 10 percent. A comparison between the urban and rural areas reveals that prevalence is higher in urban areas (13 percent) than in rural areas (6 percent). These differences can be attributed, among other things, to the urban social setting, which is more conducive for family planning purposes, as well as the better availability of contraceptives. Moreover, most of the urban women have received at least some education, which may make them more receptive to family planning.

Table 6.1 Percent distribution of women currently using contraception by method, according to residence and education, Tanzania 1991/92

				Educational attainment		
Method	Total	Urban	Rural	No education	Primary	Secondary/ Higher
Number of women	882	542	341	139	628	115
All methods	9.6	12.8	6.3	4.5	11.2	23.8
Pill	2.9	6.2	1.8	0.8	3.6	8.0
IUD	0.4	0.9	0.2	0.0	0.4	2.5
Injection	0.2	0.4	0.2	0.3	0.2	0.1
Diaphragm/foam/ jelly	0.0	0.0	0.0	0.0	0.0	0.0
Condom	0.6	1.1	0.5	0.1	0.8	1.9
Female sterilisation	1.6	1.7	1.6	1.2	1.8	2.2
Male sterilisation	0.0	0.0	0.0	0.1	0.0	0.0
Rhythm	1.6	2.8	1.7	1.0	2.0	8.1
Withdrawal	2.0	0.9	1.4	0.6	1.7	0.8
Other traditional	0.5	0.6	0.5	0.4	0.6	0.3
Not currently using	90.4	85.5	92.1	95.5	88.8	76.2

Table 6.1 also shows that women with secondary and higher education have a higher prevalence of contraceptive use (about 24 percent) than their counterparts (11 percent for those with primary education and 5 percent for those with no education). The reasons behind these discrepancies may be that educated women are more informed on contraception than those with no education. The pill and rhythm are the most popular methods among those with primary and higher education.

Table 6.2 Percent distribution of women currently using contraception by method and age group, Tanzania 1991/92

	Age group						
Method	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Number of women using	78	191	177	154	146	82	55
All methods	3.6	10.4	11.3	13.1	14.7	11.2	7.9
Pill	0.6	3.7	5.1	5.4	3.8	0.8	0.0
IUD	0.0	0.2	0.3	0.5	1.4	0.5	0.4
Injection	0.0	0.1	0.1	0.2	0.6	1.0	0.5
Diaphragm/ foam/jelly	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Condom	0.4	1.1	0.2	1.4	0.5	0.3	0.1
Female sterilisation	0.0	0.3	0.4	1.3	5.5	5.4	4.1
Male sterilisation	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Rhythm	1.8	2.9	2.5	2.0	1.2	0.8	1.4
Withdrawal	0.6	1.4	2.0	1.8	1.3	1.7	0.4
Other traditional	0.2	0.7	0.7	0.6	0.6	0.5	0.5
Not currently using	96.4	89.6	88.7	86.9	85.3	88.9	92.0

Table 6.2 presents contraceptive prevalence for women by method and age. The most popular methods are the pill and female sterilisation. The pill is most popular among women between ages 20 and 34. Above age 35, sterilisation is the most used method. The popularity of the pill may be due to its easy availability in the Maternal and Child Health Care (MCH) clinics, as well as the fact that it has been available for a longer period compared with the other methods. As for female sterilisation, its popularity in the older ages may be due to the fact that these women have achieved their desired family sizes, and as such they are interested in a permanent method of family planning. It is important to note that use of family planning is most common among women aged 35-39, which is the same group of women for which fertility was noted to be decreasing the most.

Table 6.3 Contraceptive prevalence by method and marital status, Tanzania 1991/92

Method	Marital status			Total
	Never married	Married/living together	Formerly married	
Number of women	139	628	115	882
All methods	5.9	10.6	12.1	9.6
Pill	1.3	3.3	4.1	2.9
IUD	0.2	0.5	0.1	0.4
Injection	0.1	0.3	0.3	0.2
Diaphragm/foam/jelly	0.0	0.0	0.0	0.0
Condom	0.6	0.6	0.9	0.6
Female sterilisation	0.1	1.8	4.4	1.6
Male sterilisation	0.0	0.0	0.0	0.0
Rhythm	3.3	1.6	1.5	2.0
Withdrawal	0.2	1.9	0.0	1.3
Other traditional	0.1	0.6	0.7	0.5
Not currently using	94.1	89.4	87.9	90.4

Turning to marital status (Table 6.3), the most popular method for married women is the pill, followed by withdrawal and then female sterilisation. Only a small proportion of never married women (5.9 percent) reported using contraception. The majority who were using reported their current method was rhythm.

As for the formerly married, the most popular method is female sterilisation, followed by the pill. The high sterilisation prevalence for the formerly married women is not surprising because most of them are above age 35. Furthermore, women would not be ready to have children out of wedlock so they may prefer a more permanent method of family planning.

The number of children a woman has may influence her decision to have more children. Therefore it is necessary to look at contraceptive prevalence by the number of living children (see Table 6.4).

Table 6.4 Current contraceptive users by method and number of living children, Tanzania 1991/92

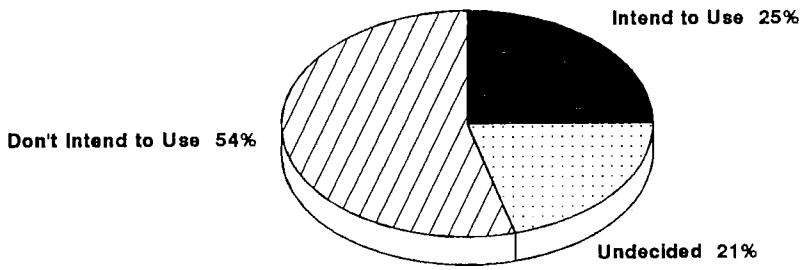
Method	Number of living children								
	0	1	2	3	4	5	6	7	8+
Number of women	75	149	145	104	84	85	69	72	99
All methods	3.2	10.9	12.8	11.5	11.5	12.4	12.0	15.5	10.2
Pill	0.2	4.4	5.5	3.1	4.2	5.2	4.8	2.5	0.6
IUD	0.1	0.0	0.4	1.2	0.6	0.4	0.4	0.7	0.4
Injection	0.0	0.1	0.1	0.0	0.1	0.4	0.6	0.7	1.0
Diaphragm/foam/ jelly	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Condom	0.4	0.8	1.4	0.7	0.3	0.3	1.1	1.0	0.0
Female sterilisation	0.1	1.1	0.4	2.2	1.4	2.5	1.1	5.0	5.2
Male sterilisation	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
Rhythm	2.3	2.9	1.8	2.0	1.5	1.4	1.4	3.1	0.9
Withdrawal	0.1	1.2	2.2	1.5	2.4	1.7	2.4	1.8	1.0
Other traditional	0.0	0.4	0.9	0.9	0.8	0.4	0.3	0.8	0.9
Not currently using	96.8	89.1	87.2	88.5	88.4	87.6	87.9	84.5	89.8

The proportion of women using contraceptives is relatively constant among women with at least one living child. With regard to female sterilisation, the prevalence is highest for women with seven or more children, implying that most women choose to be sterilised after attaining a completed family size of at least 7 children.

The preceding discussion has focused on use of contraception. However, it is important in Tanzania always to remember that prevalence is very low. This low contraceptive prevalence requires that one look at the intentions of the noncontraceptive users (shown in Figure 6.1).

The figure shows that only about 25 percent of the nonusers intend to use contraceptives in the future. About 54 percent have no intention of using contraceptives, while 21 percent of the nonusers are still undecided. When asked about the reasons for not using contraceptives, the majority of the nonusers said they still want more children. Only a small proportion reported opposition from partners or their religion as deciding factors against using contraception.

Figure 6.1
Intention to Use Contraception
Among Women Not Currently Using



TDHS 1991/92

7 Multivariate Analysis

A multivariate analysis of three dependent variables, described below, is used to assess the socioeconomic factors which most influence fertility. The dependent variables are 1) whether or not a woman had a birth in the three years before the survey, 2) whether she has ever used contraception, and 3) whether she was married before age twenty (for the subset of women currently above age 20). These variables are, respectively, one index of current fertility and two factors which influence fertility. Because the dependent variables are dichotomous, logistic regression is necessary to estimate the effects of the independent variables. The independent variables included in the models were region, urban or rural residence, level of education, occupation, age and parity. These factors are the most common variables that affect fertility through the proximate determinants.

7.1 GROUPING OF REGIONS

In the above analyses, Tanzania was divided into over 20 separate regions. Unfortunately, in some regions, because contraceptive prevalence is low, sample size is unacceptably low for multivariate analysis. Hence, it is necessary to form groups of regions for analytic purposes. Hierarchical cluster analysis on thirteen variables for the 21 regions (Zanzibar and Pemba are treated as one region) yielded five groups. Appendix 1 shows the variables and resulting groups.

The cluster analysis approach, with some supplementary data exploration, ensures a robust final grouping.

The regions which form Group(1) have a number of similar characteristics. First, the mean duration of breastfeeding for all regions in Group(1) is around 20 months, while the percentage of women marrying before age twenty is above 65 percent. In addition their mean age at last birth lies between 34 and 36 years. Moreover, Dodoma, Tabora and Kigoma are located on the main route used by the slave traders in the past and similar customs of the slave traders were adopted by the residents in those regions. The similarity with Zanzibar lies in the fact that the main slave market was located there.

The main economic activity in Mwanza, Shinyanga and Mara (three out of the four regions which form Group(2)) is livestock keeping. Most of the residents of Mwanza and Shinyanga belong to one tribe, the Wasukuma. The fact that Shinyanga, Mwanza and Mara border each other (Lake Zone), further increases the possibilities of them being similar. The similarity with Rukwa may stem from the fact that small scale mining is found in all the four regions.

In all regions which form Group(3) the similarities are mostly found in the proximate determinants of fertility and fertility. These include mean duration of breastfeeding which is higher than some of the other groups (between 20 and 22 months), a high percentage of women marrying below age twenty (all are above 65 percent) and their mean age at last birth lies between 35 and 37 years. In addition, Coast region borders Lindi and Morogoro regions. Morogoro, Ruvuma and Mbeya depend very much on agriculture, whereas Lindi and Coast depend on both agriculture and fishing.

Dar es Salaam and Mtwara (which form Group(4)) were grouped together because they both have very low fertility. The low fertility in Dar es Salaam is expected as most of it is urban. As for Mtwara, there are three factors which might have contributed to the low fertility in that region. One, the mean duration of abstinence is the highest in the country (around 21 months). Second, the percentage of women age 40 and above who had never had a birth is the highest in the country (around 10 percent). Finally, the fertility in the peak childbearing ages (20-34 years) is the lowest.

Regions that form Group(5) have the lowest teenage fertility in the country except for that of Dar es Salaam. In addition, the percentage of women aged 20 and above married in their teens is among the lowest in the country. The highest percentages of the ever-use of contraception was found in Kilimanjaro and Arusha regions which are also found in Group(5).

Table 7.1 presents the summary statistics for the independent variables used in the models predicting births in the last three years and the ever-use of contraceptives. Grouping of the occupation variable into agriculture and non-agriculture was done mainly because 92 percent of women in Tanzania work in the agricultural sector (1988 Census Initial Analysis). The unpaid family worker category includes all those who reported to be houseworkers, students and those who worked but did not receive any form of payment.

Table 7.1 **Summary statistics for independent variables for predictive models of births in the last three years and ever-use of contraceptives**

Variable	Proportion in category	n
Constant	1.00	
Region		
Group (1)	.19	1708
Group (2)	.25	2280
Group (3)	.21	1962
Group (4)	.09	846
Group (5)	.26	2350
Education		
No formal education	.35	3222
Primary	.60	5488
Secondary/Higher	.05	436
Occupation		
Unpaid family workers	.33	3028
Agricultural workers	.49	4488
Non-agricultural workers	.17	1587
Not employed	.01	43
Residence		
Urban	.20	1790
Rural	.80	7356
Parity		
0-2	.52	4775
3-5	.25	2313
6+	.23	20
Mean age of respondent	31.25	

7.2 BIRTH IN THE LAST 36 MONTHS

Table 7.2 presents the results of the regression of the probability of a birth in the last 36 months against the independent variables. For each independent variable, the table shows the estimated beta coefficient, the probability of outcome, and whether the independent variable was significantly different from the reference category at the 5% level. The probability of outcome column is designed to communicate the implications of being in a particular category of the independent variable. The other independent variables are held at their mean values, so that comparisons from category to category are possible.

Table 7.2 Regression coefficients and estimated probabilities of outcome for dependent variable: birth in the last 36 months

Variable	b	Probability of outcome	Significant?
Constant	-8.42		*
Region			
Group (1)	0	.49	
Group (2)	-.06	.48	
Group (3)	-.13	.46	
Group (4)	-.52	.36	*
Group (5)	-.07	.51	
Education			
No formal education	0	.45	
Primary	.15	.49	*
Secondary/Higher	-.49	.34	*
Occupation			
Unpaid family worker	0	.45	
Agricultural worker	.19	.50	*
Non-agricultural worker	.02	.46	
Not employed	-1.89	.11	*
Residence			
Urban	0	.46	
Rural	.18	.48	*
Parity			
0-2	0	.26	
3-5	1.32	.57	*
6+	2.68	.86	*
Age	.64		*
Age*Age	-.012		
Age (20)		.65	
Age (25)		.74	
Age (30)		.71	
Age (35)		.52	
Age (40)		.21	

Overall, it appears that the strongest effects are due to education and parity. Women with secondary and higher education have a much lower probability of birth than women with secondary and lower education (34 percent compared with about 47 percent). The probability of birth also increases with parity; this relationship is not surprising as high parity women will be more likely to have their births close together, and hence be more likely to have a birth in the 36 month window before the survey.

Women in Region Group (4) have a significantly lower probability of a recent birth than women in the other groups. This is likely due to the fact that Region Group (4) is largely composed of Dar es Salaam, so it may be picking up the urban effect. This also explains the small difference in probability of outcome

between urban and rural residents. There is little difference in birth probability by occupation type. The category "not employed" is difficult to interpret, because it is less than 1 percent of women.

7.3 EVER-USE OF CONTRACEPTION

The probability of ever-use of contraceptives, shown in Table 7.3, is very low for Region Groups (1) and (2), compared with the other region groups. This difference may be due to the UNICEF child survival programmes which are found in most of these regions. These programmes encourage, among other things, long durations of breastfeeding and child spacing, as well as distributing contraceptive information.

Table 7.3 Regression coefficients and estimated probabilities of outcome for dependent variable: ever-use of contraception

Variable	b	Probability of outcome	Significant?
Constant	-8.86		*
Region			
Group (1)	0	.08	
Group (2)	.23	.10	*
Group (3)	.70	.15	*
Group (4)	.73	.16	*
Group (5)	.93	.19	*
Education			
No formal education	0	.07	
Primary	1.14	.18	*
Secondary/Higher	1.63	.26	*
Occupation			
Unpaid family worker	0	.12	
Agricultural worker	.60	.12	
Non-agricultural worker	.65	.20	*
Not employed	.56	.19	
Residence			
Urban	0	.20	
Rural	-.67	.12	*
Parity			
0-2	0	.11	
3-5	.33	.14	*
6+	.54	.17	*
Age	.37		*
Age*Age	-.006		
Age (20)		.11	
Age (25)		.13	
Age (30)		.24	
Age (35)		.26	
Age (40)		.22	

The probability of ever-use rises markedly with increasing education; possibly the more educated have better contraceptive information and access. The non-agricultural workers have higher ever-use than

unpaid family workers: these include wage-sector workers for whom an unintended pregnancy would have relatively high opportunity costs because of lost wages. Lastly, urban dwellers are more likely to have ever used contraception than rural, probably because of easier access to contraceptive and other social services.

7.4 MARRIAGE BEFORE AGE 20

The independent variable of marriage before age 20 required that the model only be estimated on the subset of women who are currently above age 20. It is unknown whether unmarried women currently below age 20 will marry by that age, so including them would introduce a bias. Table 7.4 presents the distribution of the independent variables. Exploratory data analysis suggested that there is a synergistic interaction between region of residence and secondary education that should enter into the model. Consequently, Table 7.4 shows the distribution of respondents on this interaction. Unfortunately, there are few secondary-educated women in Region Groups (2) through (4), so interpretation of the coefficients is difficult.

Table 7.4 Summary statistics for the independent variables to estimate the probability of marriage before age 20

Variable	Percent in category	N
Education and Region		
No formal education	41.3	2862
Primary	54.6	3788
Secondary+ and region group (1)	1.7	119
Secondary+ and region group (2)	.3	21
Secondary+ and region group (3)	.4	25
Secondary+ and region group (4)	.5	38
Secondary+ and region group (5)	1.2	85
Occupation		
Unpaid family worker	28.3	1966
Agricultural worker	52.2	3620
Non-agricultural worker	19.2	1334
Not employed	.3	18
Residence		
Urban	18.8	1306
Rural	81.2	5632
Parity		
0-2	37.1	2572
3-5	33.3	2308
6+	29.7	2058

Irrespective of the region of residence the probability of a woman marrying before age 20 is high for women with no formal or only primary education (Table 7.5). Women with secondary education have a far lower probability of marrying, with the exception of Region Group (1), where their probability of marriage is comparable to lower educated women. This result may be due to the presence of Zanzibar in Region Group (1). Education in Zanzibar is for all from primary to form 3, and women are allowed to marry while still in school.

Table 7.5 Regression coefficients and estimated probabilities of outcome for dependent variable: marriage before age 20

Variable	b	Probability of outcome	Significant?
Constant	5.60		*
Education and Region			
No formal education	0	.80	
Primary	-.70	.66	*
Secondary+ and region group (1)	-.78	.64	*
Secondary+ and region group (2)	-2.31	.28	*
Secondary+ and region group (3)	-2.90	.18	*
Secondary+ and region group (4)	-1.89	.37	*
Secondary+ and region group (5)	-2.96	.17	*
Occupation			
Unpaid family worker	0	.71	
Agricultural worker	.12	.73	
Non-agricultural worker	-.18	.67	
Not employed	-.77	.53	
Residence			
Urban	0	.73	
Rural	-.12	.71	
Parity			
0-2	0	.45	
3-5	1.34	.76	*
6+	2.20	.88	*
Age	-.29		*
Age*Age	.004		
Age (20)		.86	
Age (25)		.77	
Age (30)		.68	
Age (35)		.62	
Age (40)		.59	

8 Conclusion

Fertility in Tanzania has shown a small decline in the recent past. The decline is a sign of a possible start of fertility transition from high fertility to low fertility. The observed decline in fertility may be the result of contraception, although the contraception prevalence in Tanzania is still only about 10.0 percent. Another factor which might have contributed to the decline is an increase in the age at marriage between 1978 and 1988.

Although contraceptive prevalence is low, it differs among different socioeconomic groups. Women living in urban areas have a higher contraceptive prevalence (about 13 percent) than those living in rural areas (about 6 percent). Furthermore, prevalence of contraceptive use increases with higher levels of education. As expected, the prevalence is higher for ever married women, as well as those of high parity. The most popular contraceptive method for the younger women (age group 15-34) is the pill, while for the older ones it is female sterilisation. Among nonusers of contraceptives, only 29 percent intend to use contraceptives in the future.

From the findings, there is a need to educate the public on contraceptive practices so as to accelerate the fertility decline. The need arises from the fact that most of the people are aware of at least one method of family planning but are not practising. The Family Planning Unit in the Ministry of Health and the Family Planning Association of Tanzania must take the initiative to convince people to use family planning. The immediate target groups should be women with no formal education, especially those in rural areas. The programme might be successful if emphasis is placed on limiting births for women aged 35 and over.

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Appendix 1 Grouping of regions based on fertility rates and proximate determinants

Region group	Region name	0-3 TFR			4-7 TFR			Mean months B/F	Mean months PPA	Ever used (%)	Married <20 (now 20+)	Ever married <20	No birth >40	Mean age at last birth
		15-19	20-34	35+	15-19	20-34	35+							
(1)	Dodoma	0.724	4.643	1.584	0.816	4.590	1.204	22.0	11.0	11.1	64.6	34.2	4.0	35.59
	Kigoma	0.626	4.710	1.607	0.687	4.980	1.323	20.9	6.0	8.8	73.9	24.2	2.6	34.62
	Tabora	0.742	3.885	1.090	0.767	4.116	1.370	22.1	10.8	19.4	68.2	23.6	7.9	34.74
	Zanzibar	0.733	4.241	1.603	0.844	4.520	1.406	20.5	3.8	10.6	78.5	33.5	1.0	34.43
(2)	Mara	0.950	3.914	1.627	0.964	3.996	1.575	17.5	7.0	15.4	57.2	37.9	5.2	36.13
	Mwanza	0.882	4.138	1.550	0.828	3.918	1.811	18.1	6.0	11.0	70.0	33.9	0.0	35.45
	Rukwa	0.907	4.300	2.118	0.800	4.528	1.830	22.7	11.0	8.1	71.0	32.8	0.0	37.98
	Shinyanga	0.819	4.433	2.160	0.799	4.225	2.009	19.9	5.7	16.5	76.3	30.2	2.5	38.18
(3)	Coast	0.826	3.230	1.454	0.915	3.511	1.665	22.2	14.7	33.1	72.8	33.3	6.6	36.15
	Lindi	1.113	3.093	1.797	0.904	3.915	1.972	21.8	18.5	23.6	81.6	42.6	1.5	36.79
	Mbeya	1.030	3.267	1.016	0.738	3.874	1.483	19.9	10.4	23.6	75.5	34.6	0.0	35.27
	Morogoro	0.921	3.665	1.776	0.812	3.873	1.269	21.9	12.4	24.9	68.5	45.0	1.6	36.22
	Ruvuma	0.798	3.620	1.362	0.829	4.159	1.154	22.2	20.2	16.2	67.0	29.8	2.9	35.14
(4)	Dar es Salaam	0.373	3.130	0.642	0.578	3.531	1.001	20.1	13.5	38.1	61.4	26.6	5.3	34.37
	Mtwara	0.703	2.408	0.822	0.738	2.715	1.123	21.4	20.7	12.8	76.7	31.3	9.8	33.92
(5)	Arusha	0.546	3.835	2.141	0.726	4.512	1.614	23.4	17.0	39.6	56.2	26.8	0.0	37.87
	Iringa	0.482	3.613	1.872	0.583	4.146	1.569	23.5	19.5	18.0	57.5	12.2	0.0	37.89
	Kagera	0.507	4.007	1.873	0.535	4.290	1.419	21.7	5.0	16.4	64.3	27.8	2.3	37.18
	Kilimanjaro	0.394	3.412	1.568	0.388	3.698	1.764	22.8	9.1	41.8	40.2	3.2	0.0	37.19
	Singida	0.594	4.363	1.759	0.580	4.278	1.719	22.3	11.0	22.7	61.1	15.1	5.8	37.05
	Tanga	0.499	3.750	1.966	0.821	4.444	1.597	21.0	7.5	27.4	60.4	21.9	1.7	36.13

Appendix 2 Coefficients of logistic regression of probability of a birth in the 36 months prior to the survey by background characteristics

Variable	b	s.e(b)	Significance	Odds ratio
Constant	-8.42	0.33		0.00
Region				
Group (1)[1]	0.00	0.00		0.96
Group (2)[2]	-0.06	0.08	0.50	0.90
Group (3)[3]	-0.13	0.09	0.14	0.84
Group (4)[4]	-0.52	0.10**	0.00	0.57
Group (5)[5]	-0.07	0.08	0.38	1.03
Education				
No formal education	0.00	0.00		0.83
Primary	0.15	0.06**	0.01	0.97
Secondary/Higher	-0.49	0.13**	0.00	0.51
Occupation				
Unpaid family workers	0.00	0.00		0.82
Agricultural workers	0.19	0.06**	0.00	0.98
Non-agricultural workers	0.02	0.07	0.78	0.82
Not employed	-1.89	0.58**	0.00	0.12
Residence				
Urban	0.00	0.00		0.77
Rural	0.18	0.06**	0.01	0.92
Parity				
0-2	0.00	0.00		0.35
3-5	1.32	0.08**	0.00	1.31
6+	2.68	0.12**	0.00	5.10

1 Region (1) represents Kigoma, Zanzibar, Dodoma and Tabora Regions.
2 Region (2) represents Rukwa, Shinyanga, Mwanza and Mara Regions.
3 Region (3) represents Coast, Lindi, Morogoro, Ruvuma and Mbeya Regions.
4 Region (4) represents Mtwara and Dar es Salaam Regions.
5 Region (5) represents Singida, Kagera, Tanga, Arusha, Iringa and Kilimanjaro Regions.
** They are significant.

Appendix 3 Coefficients of logistic regression of probability of ever-use of contraceptives by background characteristics

Variable	b	s.e(b)	Significance	Odds ratio
Constant	-8.86	0.39	0.00	
Region				
Group (1)[1]	0.00	0.00		0.09
Group (2)[2]	0.23	0.11**	0.39	0.11
Group (3)[3]	0.70	0.11**	0.00	0.18
Group (4)[4]	0.73	0.12**	0.00	0.18
Group (5)[5]	0.93	0.10**	0.00	0.23
Education				
No formal education	0.00	0.00		0.07
Primary	1.14	0.07**	0.00	0.22
Secondary/Higher	1.63	0.13**	0.00	0.36
Occupation				
Unpaid family workers	0.00	0.00		0.13
Agricultural workers	0.60	0.07	0.43	0.14
Non-agricultural workers	0.65	0.08**	0.00	0.25
Not employed	0.56	0.38	0.14	0.23
Residence				
Urban	0.00	0.00		0.26
Rural	-0.67	0.07**	0.00	0.13
Parity				
0-2	0.00	0.00		0.12
3-5	0.33	0.08**	0.00	0.17
6+	0.54	0.10**	0.00	0.21

1 Region (1) represents Kigoma, Zanzibar, Dodoma and Tabora Regions.
2 Region (2) represents Rukwa, Shinyanga, Mwanza and Mara Regions.
3 Region (3) represents Coast, Lindi, Morogoro, Ruvuma and Mbeya Regions.
4 Region (4) represents Mtwara and Dar es Salaam Regions.
5 Region (5) represents Singida, Kagera, Tanga, Arusha, Iringa and Kilimanjaro Regions.
** They are significant.

Appendix 4 Coefficients of logistic regression of probability of marriage before age 20 by background characteristics

Variable	b	s.e(b)	Significance	Odds ratio
Constant	5.60	0.52		
Education and Region				
No formal education	0.00	0.00		3.90
Primary	-0.70	0.07**	0.00	1.94
Secondary+ and region (1)[1]	-0.78	0.30**	0.01	1.78
Secondary+ and region (2)[2]	-2.31	0.40**	0.00	0.39
Secondary+ and region (3)[3]	-2.90	0.68**	0.00	0.22
Secondary+ and region (4)[4]	-1.89	0.41**	0.00	0.59
Secondary+ and region (5)[5]	-2.96	0.26**	0.00	0.20
Occupation				
Unpaid family workers	0.00	0.00		2.41
Agricultural workers	0.12	0.07	0.08	2.70
Non-agricultural workers	-0.18	0.08**	0.20	2.00
Not employed	-0.77	0.49	0.11	1.11
Residence				
Urban	0.00	0.00		2.72
Rural	-0.12	0.07	0.08	2.41
Parity				
0-2	0.00	0.00		0.82
3-5	1.33	0.07**	0.00	3.13
6+	2.20	0.10**	0.00	7.47

* For women aged 20 and above at the survey date.

1 Region (1) represents Kigoma, Zanzibar, Dodoma and Tabora Regions.

2 Region (2) represents Rukwa, Shinyanga, Mwanza and Mara Regions.

3 Region (3) represents Coast, Lindi, Morogoro, Ruvuma and Mbeya Regions.

4 Region (4) represents Mtwara and Dar es Salaam Regions.

5 Region (5) represents Singida, Kagera, Tanga, Arusha, Iringa and Kilimanjaro Regions.

** They are significant.