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1978 POPULATION CENSUS VOLUME VIII

POPULATION OF TANZANIA: 1978

TANZA

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FOREWORD

This is the eighth and final volume in the publication programme of the 1978 population census results. The primary purpose of this volume is to analyse the census data and make the results of the analysis accessible to those engaged in development planning. Some analytical details in this volume may appear unnecessary to planners. However, since such details couch the results in their proper theoretical perspective, they have been retained in the volume.

It is gratifying to note that most of the chapters in this volume have been contributed by Tanzanians. This confirms the willingness of Tanzanians to translate the principle of self-reliance into reality.

The completion of this volume also signals the completion of a project which in retrospect looks rather ambitious. The scope of the census tabulation and analysis exceeds that in many other developing countries.

We are grateful to the Swedish International Development Authority for its inputs to the project. SIDA assistance started in 1976 and continued over various phases of the project.

We should also express our gratitude to the United Nations Fund for Population Activities and Department of Technical Co-operation for Development for their assistance through Project URT/79/P04. The United Nations inputs started in 1980. Without their inputs it would not have been possible to bring the project to successful completion. I want to thank Dr. M. Rafiq, U.N. Chief Technical Advisor, who made it possible to complete the post-enumeration phase of the project in a record time of two and half years.

If I have to single out one Tanzanian who contributed most during the data processing phase of the project I would name Mr. E.D. Maimu. This, of course, does not imply that other Tanzanians did not make any contributions to the project. However, since they are too numerous to mention individually, we wish to thank them all for their contributions during various phases of the project.

I would also like to convey my appreciation to the authors who contributed chapters to this volume. The size of this volume bears testimony to their hard work and devotion.

May, 1983

N.K. Mbalilaki
GOVERNMENT STATISTICIAN

This is an analytical volume written with a view to providing basic indicators for development planning based on the data generated by the 1978 census of the United Republic of Tanzania. One fundamental feature that sets this volume at variance with corresponding volume based on the 1967 census is that it was guided by the principle of self-reliance -- the cornerstone of the general development policy of the country. A decision made before my arrival in the country in December 1980 called upon the Bureau of Statistics to involve, as far as possible, local expertise in the preparation of this volume. Principal authors of nine chapters are Tanzanians. This, indeed, is a highly promising start considering the fact that only a few Tanzanians contributed chapters to the analytical volumes based on the 1967 census and the 1973 National Demographic Survey.

The work on this volume started in November 1982. Since most of the authors worked on their chapters only after their normal working hours, delays in completion of the chapters were inevitable. Only half of the chapters in this volume had been completed by the end of March 1983. Some chapters had to undergo revisions. The editing had to be confined to a three-week period starting around 15 April 1983. I cannot claim that there is no room for further editorial work but given the time constraints and the pragmatic goal of making census results available to planners as early as possible, it has been decided to send this volume for printing in May 1983. I sincerely hope that my role as a person providing technical assistance when sought and doing editorial work when necessary has not left the impression with the authors of various chapters that the usefulness of their chapters has been reduced.

The time constraint has made it necessary for this volume to be typed on four typewriters by three typists.

I wish to thank the authors of this volume for their understanding and co-operation.

I would also like to thank Mr. N.K. Mbalilaki, Government Statistician for his keen interest in the census project. Without his moral and administrative support it would have been impossible to complete the project in two and a half years.

I would be failing in my duty if I do not acknowledge vital contributions that Mr. E.D. Maimu, Principal Computer Programmer, made to the project during the data processing stage of the project. I am also grateful to him for letting me share his office.

Mrs. Mariam Mkamila typed all the draft chapters and also did the final typing for six chapters in this volume. Mr. Amiri Iddi typed three chapters as well as all the appendixes in this volume.

Mr. R. Mmassy, C. Mugaya and Sudai Ndaki carried out the difficult task of proof-reading the manuscript.

I am also grateful to my colleagues in the United Nations System, Drs. K.V. Ramachandran and I. Ekanem, both from the Economic Commission for Africa, for their valuable comments on the chapters in this volume. However, some of their suggestions could not be incorporated because of lack of time at the disposal of the authors. Nevertheless their support and assistance has improved the usefulness of this volume. Authors of this volume are solely responsible for the defects which may still be there in their chapters.

May 1983

M. Rafiq
Co-ordinator and Editor, Volume VIII
and
Chief Technical Advisor
URT/79/PO4

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CHAPTER 1

INTRODUCTION AND OVERVIEW

by

M. Rafiq^{*}

BACKGROUND

Population census in statistically underdeveloped countries of the world represents the major source of information on a number of areas of vital interest in development planning. That demand for data far exceeds the capacity of a census to meet the demand is often reflected during the preparatory phases of a census when future users compete for inclusion of items pertinent to their own areas of interest. Faced with these competing interests, census has to stage a precarious balancing act to avoid becoming unwieldy and sacrifice the reliability of its results. (The enormity of tasks involved in a census dictates that it should restrict itself to only a few items.)

Ironically, once the census has been completed, the data generated by it are often not fully utilized. A number of factors contribute to the situation. Some of these factors are identified here. First, an ordinary user of the census is generally not aware of its scope and visualizes it as mere head count. Second, more often than not census data are presented in voluminous reports which are too formidable to be comprehensible to non-professional circles. Third, census reports tend to present data on a multitude of topics in a single volume. Fourth, by the time census results are made public the data are already a few years old.

The 1978 census publication programme has not successfully eliminated all the factors identified in the foregoing paragraph. For example, the processing of the data was delayed by at least two years

^{*} The author is working as U.N. Chief Technical Advisor at the Central Census Office, Bureau of Statistics, Ministry of Planning and Economic Affairs. He is solely responsible for the views expressed in this chapter.

mainly because of non-availability of adequate computer facilities. Also, some of the published census reports are quite large. However, two deliberate steps have been taken to make census data more accessible to non-professional users of the census. Firstly, a special volume consisting of a summary of selected basic statistics has been published as a part of the overall publication programme. It is hoped that this experimental volume would make it possible to reach a wider audience than professional circles. Secondly, it was decided that data on topics requiring special skills for their analyses or on such topics which are of immediate interest to planners only, be published in specialized volumes dealing with these topics. Data on fertility and mortality have been published in a separate volume and that on households and housing characteristics have been presented in another volume. A further extension of this decision may also be mentioned here. The data obtained from complete enumeration have been presented in a separate volume. These data, though limited to only broad age groups by sex, have been published at the village/ward level. (The enumeration area data have not been published because of cost consideration, but are available at the Central Census Office.) As may be expected these data are only subject to non-sampling errors and provide information at a level lower than that obtained from the sample which is restricted to regional level subdivided into urban and rural dichotomy. (Sample design in most cases did not permit any further refinement in tabulation.)

Since 1981 following census volumes have been published and are available from the Bureau of Statistics:

- Volume I. Methodology Report (1981): (viii + 79 pp)
- Volume II. Population by Age and Sex for Villages/Wards and Urban Areas (1981): (xiv + 782 pp)
- Volume III. Census Geographical Work (1982): (v + 77 pp)
- Volume IV. A Summary of Selected Statistics (1982): (xix + 92 pp)
- Volume V. Fertility and Mortality Data (1982): (xiv + 180 pp)
- Volume VI. Private Households and Housing Characteristics (1982): (xvi + 154 pp)
- Volume VII. Basic Demographic and Socio-Economic Characteristics (1982): (xxxi + 532 pp)

Before concluding this section one additional point may be noted. As was mentioned earlier, data in Volume II are not influenced by sampling errors because they are based on complete enumeration. Data in Volumes IV - VII are subject to sampling errors. Sample raising factors for the data obtained from the sample presented in Volumes IV and VII appear in Appendix I.1. (An appraisal of these sample raising factors appears in Chapter 17.) Data appearing in Volumes V and VI, though published without the application of sample raising factors, are also subject to sampling errors. (Considerations of cost had led to the decision of not using the sample raising factors for the tabulation published in these volumes.) It may be added that since most of the data used in Volume VIII are based on the sample, one should expect sample variability to play its role in the results appearing in this volume also.

NATURE AND SCOPE OF THIS VOLUME

The primary objective of this volume is to analyse the 1978 census data and make the results of this analysis available for development planning. It was decided by the Government, before my arrival in the country in December 1980, that as far as possible the analysis be carried out by Tanzanians. The analysts involved in this volume had to work under two constraints. First, they had to complete their chapters between November 1982 and April 1983. Since most of them had to prepare the chapters for this volume in addition to carrying out their normal official responsibilities, they often felt that the time allocated for the task was not sufficient. Second, they could not include all the technical and theoretical details into their chapters because such details would have made the volume still larger and also because these details would, at times, appear irrelevant to planners.

The topics covered by various chapters were mainly guided by their relevance for development planning. It may be noted that once again the interest of planners played predominant role in allocating the materials in this volume to various chapters. Similar considerations also led to the decision that appendixes of various chapters should

follow immediately after the relevant chapter. The internal arrangement within a chapter was decided upon by the author(s). The overall co-ordination of the volume, providing technical assistance when required and editorial work were my responsibilities. I sincerely hope that the contributors of various chapters in the volume do not feel that my role has reduced the usefulness of their chapters. As was mentioned in the prefatory note, the time available for the editorial work was so short that there is still ample room for improvement on this aspect of the volume. However, once again practical considerations such as timeliness of the volume prevailed over other considerations and it was decided to go ahead with the printing of the volume. Some chapters in this volume involved one to four revisions before they were accepted for publication.

According to the original plan, this volume was to consist of 14 chapters. However, as the work on the volume progressed it became evident that certain topics such as mortality differentials, subnational projections and sampling deserved to be treated in separate chapters.

A BRIEF OVERVIEW

Chapter 2 deals with the quality of age-sex data generated by the 1978 census. The chapter also provides some indication that the 1967 and 1978 censuses did not exhibit any perceptible relative differentials in over- or under-enumeration. There was some overall improvement in the quality of age-sex data when one compared the data from 1967 and 1978 censuses. However, this improvement did apply across the board to all age-sex categories. The general pattern of age mis-reporting followed the African-South-Asian pattern. This was more true after the smoothing of the 1978 distribution. The chapter also indicates that some, perhaps apparent, refinement in age reporting can be achieved by use of local events in determining the age. There is also some evidence, though by no means conclusive, that the Far Eastern pattern of mortality might approximate more closely the Tanzania Mainland situation in 1978. It should be emphasized that the evidence might be spurious because it may have been caused by problems of age mis-reporting.

Dr. Namfua examines substantive aspects of the age, sex and marital status distributions provided by the 1978 census in Chapter 3. He notes that population has become younger over the 1967-1978 period. This phenomenon can, perhaps to a large extent, be attributed to decline in mortality. He also stresses the importance of age-misreporting in the comparative study of age-sex structures provided by the 1967 and 1978 censuses. Dr. Namfua also indicates that some of the observed differences in the age structure for the Mainland and Zanzibar may have been caused by net outmigration of males from Zanzibar. In the context of rural-urban differences in age-sex distributions it has been shown that urban areas in the Mainland attract disproportionately large number of males of age group 15 - 44.

Dr. Namfua also indicates that age at marriage may be somewhat lower in Zanzibar than in the Mainland. Zanzibar also appears to have a higher divorce rate than the Mainland. Proportions widowed are higher in the Mainland than in Zanzibar. This, among other things, can be attributed to mortality differentials between Zanzibar and the Mainland.

Chapter 4 has been contributed by Professor Maro and examines the spatial distribution of the 1978 population of Tanzania. The amount of work that has gone into the chapter is not faithfully reflected by the size of the chapter. Dr. Maro had to compute areas of 2,235 wards to arrive at the area figures because these figures were not readily available. Ward areas had to be aggregated to arrive at the district and regional figures for the districts and regions as they existed in 1978. (Because of administrative reorganization, districts and regions in 1967 and 1978 were not directly comparable. Same was true at the ward level.)

Zanzibar has a far higher density of population than the Mainland. Within the Mainland, density varies over a very wide range by regions (from 6.6 persons per square kilometer in Rukwa to 73.3 in Mwanza). Dr. Maro notes that in 1978 "there has been a slight tendency towards a less uneven distribution of population when compared to the 1967 population distribution". This tendency, however, was not sufficiently

strong because sparsely populated areas in 1967 continued to be sparsely populated even in 1978. Dr. Maro's chapter would be specially relevant to planners at the regional and district levels.

In chapter 5, Mr. Mbaruku makes an attempt to estimate the components of growth at the regional level. The basic method he uses is to compare the observed 1967-1978 growth rate with the rate of natural increase obtained from the child-woman ratio and the childhood mortality. This comparison provides the estimate of net migration for each region on the Mainland and Zanzibar as a whole. It is important to note that the results in this chapter are not directly comparable with those appearing in chapters 6 and 12, because the basic data used and the methods applied in these chapters are not the same as those used in chapter 5. Mr. Mbaruku demonstrates that the rate of growth for various regions in the Mainland varies from 1.7 percent for Coast region to 7.8 for Dar es Salaam. This variation can be attributed to differentials in employment opportunities, agricultural potential, influx of refugees in some regions, and fertility and mortality. At the national level, the population of Tanzania, though still relatively small, is growing at a very fast rate.

The 1978 census had put special emphasis on the study of migration. Three questions were specifically designed to provide data on this area of interest. Dr. Mlay presents extensive analysis of these data in chapter 6. Internal migration occupies central place in the chapter, though a few observations on international migration are also included. It has been demonstrated that the more recent internal migration at the regional level in the Mainland has been mostly between neighbouring regions. As may be expected, internal migration has followed the usual pattern of age and sex selectivity. Dr. Mlay also shows that migration from rural to urban areas is a major factor in the very rapid growth of urban areas on the Mainland.

Dr. Mlay compares the interregional migrants in Zanzibar and in the Mainland and concludes that such migrants are predominantly adult females in Zanzibar whereas they are predominantly male adults in the

Mainland. The chapter also shows that the sex ratio in urban areas of Zanzibar is below 100.

Chapter 7 looks at the phenomenon of urbanization in Tanzania. The intercensal period (1967 - 1978) witnessed unusually high rate of growth of urban population in the Mainland. Since the definition of urban population had undergone some change between 1967 and 1978, an attempt was made to arrive at a rate which was based on approximately comparable data. The level of urbanization by region is also presented in the chapter. Some of the results in this chapter have been used in the context of population projections.

Mr. Noah and Ms. Lasway analyse the data on literacy and education in chapter 8. The data show that the literacy rate has increased over the 1967 - 1978 period. There is also some evidence that inter regional differentials in literacy are fairly large. The improvement in literacy over the 1967 - 1978 period has brought about some changes in the relative standing of various regions over the 1967 - 1978 period. Mr. Noah and Ms. Lasway also demonstrate that urban areas have some advantage over rural areas both in terms of literacy and educational attainment. Similarly, males enjoy a higher level of literacy and education than females. It is important to note that about 80 percent of the population aged 5 - 14 years was attending school in 1978.

Dr. Amani highlights the difficulties encountered in obtaining data on work force in developing countries (chapter 9). He also emphasizes that since the data for 1967 were based on current activity while that in 1978 on usual activity, no direct comparisons could be made between these two dates. The work force in Tanzania is indeed predominantly engaged in the agricultural sector. One striking feature of the work force is very high crude activity rate for females. This may be explained by cultural factors which require females to work on family shambas (farms). Dr. Amani also shows that males are more likely than females to participate in the non-agricultural sector of the economy. As may be expected, agriculture is still dominated by workers who have low educational attainment. This situa-

tion is likely to improve with future progress in the field of education and with the implementation of new agricultural policy which encourages educated and skilled persons to engage in agriculture. The age-sex specific participation rates for Tanzania, the Mainland and Zanzibar have been presented in chapter 15.

Seven items in the detailed questionnaire of the 1978 census were devoted exclusively to the study of fertility and mortality. The cross-tabulation of these items against other demographic and socio-economic variables constituted more than half of the total tabulations produced by the census. (All tabulations on fertility and mortality have not been published.) Chapters 10 - 13 deal with the analysis of mortality and fertility.

Dr. Sembajwe provides a succinct summary of the quality of mortality data in chapter 10 and informs us that different types of data produced by the census were not equally reliable. The chapter also examines the applicability of various analytical techniques to the Tanzania data. Dr. Sembajwe also stresses the fact that whereas data from the 1978 and 1967 censuses may be directly comparable, data from the 1973 National Demographic Survey may have under-estimated mortality. This, as the author notes, does not imply that there are no flaws in the mortality data from the 1978 census. In fact, Dr. Sembajwe emphasizes the need for improvement in mortality data.

Chapter 10 also provides estimates of the crude death rate, infant mortality rate, level of mortality and expectation of life as well as probability of surviving from birth to age 5 for each region of the country.

In chapter 11, Dr. Sembajwe studies mortality differentials according to age, sex, region of enumeration, education, occupation and place of enumeration (i.e., rural and urban areas). In general, the differentials follow the expected patterns. On the basis of his analyses, Dr. Sembajwe concludes that "in order to improve the health

conditions and overall well-being of the people of Tanzania it is necessary to have an equitable supply of health facilities and socio-economic development ..."

Chapter 12 contributed by Mr. Ngallaba studies the level and pattern of fertility. Mr. Ngallaba concludes that in general data on current fertility were less reliable than that on retrospective fertility. Since basic data were not sufficiently reliable a number of techniques were applied and their results compared for internal consistency before final plausible estimates were accepted. Mr. Ngallaba also provides insights into pattern of fertility by age of woman. The chapter also classifies various regions into a typology of fertility pattern. The mean age of the fertility schedule by region has also been presented in the chapter.

The second chapter contributed by Mr. Ngallaba (chapter 13) deals with fertility differentials. The differentials under study include rural-urban differentials, differentials by education of woman, differentials according to occupation of woman and differentials by occupation of head of household. In addition, the chapter also provides fertility differentials by region. It is interesting to note that fairly large fertility differentials for most of the variables do exist in Tanzania.

Chapter 14 provides projections by age and sex for the Mainland and Zanzibar. Three variants of projections have been presented in the chapter. The basic assumptions involved in the projections were developed in consultation with the local expertise.

Chapter 15 provides a set of subnational projections. This chapter was completed in one week and thus does not contain all possible subnational projections which would be in demand. It is proposed that the Central Census Office may continue to work on additional projections (e.g., regional projections by conventional five year age groups). The chapter also provides headship rates and work force participation rates by age and sex.

Chapter 16 was contributed by Ms. Mponzi, Mr. Mpuya, Mr. Karlson and Mr. Popat. The chapter provides extensive information on characteristics of private households, including the housing conditions of housing unit occupied by private households. The chapter notes that in five regions on the Mainland the data on private households were biased. Comparisons with the Household Budget Survey (1976-77) data are likely to be influenced by the size of the sample used by this survey.

Mr. Olofsson recounts the nature of the sample used in the 1978 census (chapter 17). He concludes that in general the design and the execution of the sample was satisfactory. The possible sources of bias are also identified in the chapter. Mr. Olofsson also computed coefficients of variation for a set of selected ratios for certain areas of the country. An unfortunate oversight during the planning phase of the census caused the omission of the recording of cluster number which made it extremely difficult to extend the work on standard errors to all parts of the country.

APPENDIX 1.1. - SAMPLE MATING PATTERNS BY AGE, SEX AND SAMPLING CATEGORY

Sex	Sample category	0	1 - 4	5 - 9	10 - 14	15 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65+
REGION 01 DODOMA											
Male											
1	61.02128	44.77656	48.89918	46.06792	51.59848	46.85872	51.65217	48.96953	50.54907	48.17518	
2	61.02128	44.77656	48.89918	46.06792	51.59848	46.85872	51.65217	48.96953	50.54907	48.17518	
4	1.43759	1.20225	1.24802	1.28237	1.27788	1.18702	1.22423	1.24271	1.21277	1.22222	
5	2.71852	2.42200	2.45588	2.48383	2.53929	2.46187	2.54668	2.60158	2.76882	2.47945	
8	2.90741	1.97436	2.80889	2.28409	9.34891	4.62536	3.40676	3.24138	4.13333	6.33333	
Female											
1	62.32389	48.73324	46.57498	49.54455	47.41672	49.90187	49.34405	46.86477	47.13938	49.81461	
2	62.32389	48.73324	46.57498	49.54455	47.41672	49.90187	49.34405	46.86477	47.13938	49.81461	
4	1.36643	1.21410	1.25284	1.24513	1.21215	1.20279	1.21997	1.25653	1.13897	1.18531	
5	2.97521	2.36737	2.49093	2.34834	2.42821	2.46389	2.37385	2.68573	2.47222	2.56684	
8	3.68889	1.98261	1.92083	2.22599	3.49263	3.13433	4.00600	5.74074	4.54545	11.80000	
REGION 02 ANTSOA											
Male											
1	40.34896	37.02448	36.14148	35.21090	36.43269	40.33222	38.84825	38.35917	39.93271	40.47826	
2	2.23729	1.74592	1.70149	1.57517	5.30009	4.12025	2.09037	1.76310	1.53211	1.43333	
4	1.05305	0.99844	1.00718	1.01742	1.13405	1.06777	1.05211	1.02733	1.03057	1.05263	
5	2.37136	1.98103	2.21765	2.24473	2.18277	2.12459	2.15759	2.22043	1.98864	2.21481	
8	1.63636	1.28169	1.11719	1.58667	2.99535	1.64384	2.06742	2.15385	5.00000	4.50000	
Female											
1	36.76116	37.33043	37.69222	35.92925	35.95746	39.23209	36.80000	36.48714	34.65829	38.86828	
2	2.11616	1.83308	1.72374	1.62653	2.75865	1.86294	1.52506	1.56373	1.59000	1.34286	
4	1.05946	1.01442	1.02273	1.01503	1.02033	1.00078	1.01590	0.99306	1.02575	1.01081	
5	2.26957	1.99754	2.07452	2.18068	2.12538	2.06677	2.21261	2.20000	1.98901	2.11452	
8	1.86047	1.25949	1.24219	1.60360	1.49026	1.43169	3.88143	2.10000	1.14286	1.00000	

APPENDIX I.1. -- CONTINUED

Sample		0	1 - 4	5 - 9	10 - 14	15 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65+
Sex	category										
REGION 03 KILIMANJARO											
Male	1	41.05014	39.11119	38.49250	38.58962	37.59211	41.50062	38.34457	39.36320	39.04299	41.06061
	2	2.27826	1.89681	1.97481	2.16522	7.34347	2.67697	2.25604	1.85441	2.30508	2.84615
	4	1.11934	0.96692	1.02319	1.00909	1.35299	1.05551	1.04441	1.07629	1.27155	1.37056
	5	2.66209	2.20988	2.35538	2.27861	2.75000	2.46380	2.46325	2.38977	2.22680	2.68902
	Female	1	46.75758	37.35325	38.00425	37.50899	38.13974	39.18954	36.30665	37.76602	37.52656
	2	2.51818	1.92566	2.05525	2.40359	7.40305	4.18719	2.99589	2.55072	3.20000	4.37500
	4	1.15415	0.96981	0.99816	1.01454	1.00396	1.02197	1.00391	1.01543	1.23529	1.25599
	5	2.75978	2.20757	2.31268	2.35462	2.40904	2.42381	2.31242	2.27320	2.08696	2.30168
REGION 04 TANGA											
Male	1	64.16346	43.79971	48.45224	44.38576	45.51631	57.17730	53.67492	49.61274	46.05740	43.65107
	2	1.31009	1.02850	1.07108	1.05734	1.28288	1.18430	1.11440	1.10855	1.13945	1.23419
	4	1.34016	0.96742	1.05277	1.05315	1.05654	1.08719	1.07337	1.08072	1.05610	1.09777
	6	4.64171	3.35382	3.67106	3.64880	3.61466	3.69527	4.01052	3.80561	3.46442	3.71299
	8	2.40741	1.77348	1.73529	2.00000	8.52297	4.43729	3.30415	2.80909	4.31111	4.85000
Female	1	66.47887	48.35737	47.91440	44.82168	49.69565	50.76304	49.33421	45.39196	46.42424	45.59827
	2	1.28865	1.02808	1.06623	1.08288	1.13474	1.09882	1.07468	1.10923	1.17818	1.23889
	4	1.32239	1.01645	1.04575	1.06261	1.05817	1.06441	1.04799	1.04348	1.02952	1.12705
	6	4.40821	3.39979	3.51525	3.58153	3.72708	3.59075	3.54764	3.67236	3.81935	3.69492
	8	2.88889	1.85263	1.72308	1.82911	5.39506	2.38743	2.54023	3.05714	5.70000	4.50000

APPENDIX I.1. -- CONTINUED

Sex	Sample category	0	1 - 4	5 - 9	10 - 14	15 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65+
REGION 07 DAR ES SALAAM											
Male	1	10.05941	7.49836	7.76383	7.21935	8.69787	8.09953	8.42062	8.93264	7.13824	7.06460
	2	10.05941	7.49836	7.76383	7.21935	8.69787	8.09953	8.42062	8.93264	7.13824	7.06460
	7	11.46899	10.73226	11.19724	11.03836	11.43996	11.80793	11.82533	11.19814	11.46024	12.32017
	8	12.60966	8.98312	7.70445	8.07317	30.02180	20.24877	11.67769	14.93243	50.55556	16.92308
Female	1	12.64516	7.03392	7.49290	7.86528	7.70165	8.29313	7.95825	7.78756	7.17730	6.10020
	2	12.64516	7.03392	7.49290	7.86528	7.70165	8.29313	7.95825	7.78756	7.17730	6.10020
	7	12.04866	10.96570	11.28688	10.82479	11.33450	11.19860	11.25432	10.89185	9.87101	12.55079
	8	14.09091	9.34458	8.74678	9.43396	13.30695	10.98643	10.39130	20.86667	12.73333	8.00000
REGION 08 LIMBE											
Male	1	32.03653	25.31811	26.25664	27.59091	29.13465	28.09192	27.24480	27.81094	26.76908	23.93997
	2	32.03653	25.31811	26.25664	27.59091	29.13465	28.09192	27.24480	27.81094	26.76908	23.93997
	4	1.16786	1.04126	1.03080	1.04021	1.29319	1.11322	1.06639	1.03627	1.04421	1.05421
	8	1.16786	1.04126	1.03080	1.04021	1.29319	1.11322	1.06639	1.03627	1.04421	1.05421
Female	1	38.55385	25.15361	25.21960	26.15969	26.52925	27.39371	24.55943	26.12576	23.70580	23.11698
	2	38.55385	25.15361	25.21960	26.15969	26.52925	27.39371	24.55943	26.12576	23.70580	23.11698
	4	1.22524	1.02985	1.03917	1.04599	1.08816	1.03722	1.03571	1.01113	1.01146	1.04881
	8	1.22524	1.02985	1.03917	1.04599	1.08816	1.03722	1.03571	1.01113	1.01146	1.04881

Sex	Sample category	0	1 - 4	5 - 9	10 - 14	15 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65+
REGION 09 NTWARA											
Male	1	52.68539	39.71989	41.44508	40.10634	41.55952	41.05092	45.24799	44.58082	44.20000	47.88674
	4	1.22689	1.03093	1.07157	1.08293	1.07642	1.09926	1.08082	1.08893	1.07199	1.09623
	5	2.99621	1.86219	1.98652	1.98933	2.04127	2.12312	2.03058	2.08281	2.12766	2.24454
	8	2.99621	1.86219	1.98652	1.98933	2.04127	2.12312	2.03058	2.08281	2.12766	2.24454
Female	1	50.96447	40.11589	41.39677	39.32711	40.39519	40.58711	41.84072	43.13478	45.32773	47.65294
	4	1.31659	1.04552	1.06667	1.06673	1.05782	1.06864	1.05294	1.08163	1.07489	1.09557
	5	2.70111	1.86785	1.91200	1.86054	2.22449	2.00706	2.10067	1.89327	2.21654	2.02604
	8	2.70111	1.86785	1.91200	1.86054	2.22449	2.00706	2.10067	1.89327	2.21654	2.02604
REGION 10 KUVUMA											
Male	1	33.25292	25.33696	27.58047	26.73055	29.11520	28.31491	29.80055	27.73090	24.43213	28.81818
	4	1.22898	1.10477	1.12637	1.14795	1.19372	1.19851	1.16723	1.16667	1.13430	1.13268
	8	1.22898	1.10477	1.12637	1.14795	1.19372	1.19851	1.16723	1.16667	1.13430	1.13268
Female	1	38.16318	25.87584	28.13075	27.39830	26.13043	28.89764	26.33505	26.32787	25.56177	27.16164
	4	1.31250	1.10418	1.14113	1.12193	1.26895	1.13009	1.13978	1.12731	1.13360	1.10766
	8	1.31250	1.10418	1.14113	1.12193	1.26895	1.13009	1.13978	1.12731	1.13360	1.10766

APPENDIX I.1. -- CONTINUED

Sex	Sample category	0	1 - 4	5 - 9	10 - 14	15 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65+
REGION 11 IIRIGA											
Male	1	58.70881	38.91565	40.03041	41.23785	43.68565	42.73667	41.17216	43.10403	40.37391	37.41551
	2	2.04762	1.60442	1.73710	2.11675	1.98286	1.37797	1.48712	1.88535	1.58929	3.80000
	4	1.26132	1.00516	1.07407	1.10816	1.06223	1.16234	1.13988	1.13757	1.09494	1.16667
	5	3.05899	2.11545	2.33526	2.41194	3.66381	2.83044	2.67880	2.70324	2.84681	2.57143
	8	3.05899	2.11545	2.33526	2.41194	3.66381	2.83044	2.67880	2.70324	2.84681	2.57143
Female	1	59.34532	39.82057	42.22880	41.30246	40.96878	42.00925	38.93313	40.41564	41.88918	36.87302
	2	1.94318	1.61376	1.76989	2.14493	2.00731	1.78249	2.72043	3.33333	12.33333	13.25000
	4	1.27445	1.02012	1.07627	1.11960	1.03626	1.06064	1.03597	1.12610	1.08676	1.15758
	5	3.59807	2.22826	2.40254	2.32044	2.52406	2.35572	2.37062	2.47865	2.39357	2.36607
	8	3.59807	2.22826	2.40254	2.32044	2.52406	2.35572	2.37062	2.47865	2.39357	2.36607
REGION 12 MBETA											
Male	1	40.75728	32.48306	33.87548	35.00220	36.20779	37.24732	34.96633	34.72780	36.10843	36.18919
	4	1.03093	1.02114	1.01375	1.03671	1.04122	1.04264	1.03525	1.01676	1.04797	1.04571
	5	2.26929	1.88082	1.93628	1.89756	2.41936	2.25482	2.04201	2.05846	2.02203	2.25225
	8	2.26929	1.88082	1.93628	1.89756	2.41936	2.25482	2.04201	2.05846	2.02203	2.25225
Female	1	43.06047	34.28499	34.07480	33.65523	35.58154	35.07027	35.64938	32.86944	33.28642	41.68937
	4	1.05538	1.02029	1.00797	1.01500	1.01657	1.01536	1.01551	1.02335	1.02778	1.03271
	5	2.29048	1.91830	1.94810	1.97532	2.08763	1.99013	2.00664	1.93365	1.93333	2.25660
	8	2.29048	1.91830	1.94810	1.97532	2.08763	1.99013	2.00664	1.93365	1.93333	2.25660

APPENDIX 1.1.1. - CONTINUED

Sex	Sample category	0	1 - 4	5 - 9	10 - 14	15 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65+
REGION 13 SINGIDA											
Male	1	41.08796	29.28191	30.24742	30.77257	32.58977	34.31586	33.23442	32.98305	32.01119	30.32341
	4	1.06680	0.99228	1.00750	1.01161	1.00427	1.01770	1.03112	1.01851	1.01809	1.01659
	8	6.16667	2.96296	4.29412	5.23810	6.45536	3.47619	4.57627	5.82759	12.16667	15.00000
Female	1	44.43396	29.00364	32.33580	30.55266	31.38223	32.86308	32.96489	30.17876	29.89033	29.17068
	4	1.13951	0.97191	0.98933	1.01228	1.00037	0.99344	1.00704	0.97145	0.99911	1.02052
	8	10.62500	4.45714	3.25000	4.74074	9.72152	8.77778	16.12500	16.00000	27.00000	12.00000
REGION 14 TABORA											
Male	1	52.95397	40.48377	41.56573	39.07296	43.31634	44.19706	40.25974	42.16997	42.42105	43.02885
	2	52.95397	40.48377	41.56573	39.07296	43.31634	44.19706	40.25974	42.16997	42.42105	43.02885
	4	1.20559	1.05628	1.08716	1.08405	1.13135	1.11820	1.13524	1.11960	1.11678	1.11233
	5	2.49156	2.00789	2.06280	2.16070	2.66917	2.49817	2.35278	2.26979	2.18371	2.32657
Female	1	57.89362	39.50627	38.86500	41.29563	42.91417	40.91375	40.69420	41.43406	36.09238	44.61250
	2	57.89362	39.50627	38.86500	41.29563	42.91417	40.91375	40.69420	41.43406	36.09238	44.61250
	4	1.28598	1.06804	1.11703	1.08390	1.09259	1.09524	1.07893	1.10277	1.10214	1.08041
	5	2.65185	1.99733	2.05209	2.16509	2.32850	2.12531	2.07496	2.20267	1.84341	1.97425

Sex	Sample category	0	1 - 4	5 - 9	10 - 14	15 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65+
REGION 15 RUWA											
Male	1	29.72143	22.77976	23.65491	24.03234	23.59285	24.21472	25.20695	25.41505	23.83755	22.19799
	2	29.72143	22.77976	23.65491	24.03234	23.59285	24.21472	25.20695	25.41505	23.83755	22.19799
	4	1.19144	1.02676	1.06205	1.08628	1.23859	1.16643	1.13278	1.09892	1.09908	1.03644
	8	1.19144	1.02676	1.06205	1.08628	1.23859	1.16643	1.13278	1.09892	1.09908	1.03644
Female	1	33.03704	23.54668	24.65455	24.08092	22.93953	25.46673	22.69750	23.36682	23.22925	23.61616
	2	33.03704	23.54668	24.65455	24.08092	22.93953	25.46673	22.69750	23.36682	23.22925	23.61616
	4	1.21494	1.04698	1.07529	1.08898	1.08597	1.06207	1.05680	1.04585	1.01240	1.04219
	8	1.21494	1.04698	1.07529	1.08898	1.08597	1.06207	1.05680	1.04585	1.01240	1.04219
REGION 16 KIDUNA											
Male	1	24.73529	22.39014	22.97363	22.54314	23.48715	23.92259	24.29664	24.82173	23.73563	22.69665
	2	24.73529	22.39014	22.97363	22.54314	23.48715	23.92259	24.29664	24.82173	23.73563	22.69665
	4	1.03650	0.98601	1.00000	1.01088	1.02973	1.02658	1.00425	1.02866	1.03646	1.00556
	5	2.18083	2.05224	2.16026	2.14920	2.11468	2.12348	2.22953	2.18319	2.12887	2.17081
	8	3.03846	4.67347	3.45313	3.45283	6.72340	6.06024	6.28571	5.16667	4.30769	2.18750
Female	1	26.54219	22.65351	25.14138	22.66895	22.89761	24.52635	22.97161	23.50959	22.91749	23.19656
	2	26.54219	22.65351	25.14138	22.66895	22.89761	24.52635	22.97161	23.50959	22.91749	23.19656
	4	1.03114	1.00798	1.01097	1.00713	1.01549	1.01018	1.00529	1.01253	0.96414	1.10345
	5	2.40046	2.14927	2.20170	2.13678	2.13222	2.13014	2.24726	2.09275	2.03279	2.19472
	8	4.90000	3.68182	3.01493	3.47458	4.46465	4.00000	2.78125	2.80000	2.33333	1.78261

APPENDIX 1.1. - CONTINUED

Sex	Sample category	0	1 - 4	5 - 9	10 - 14	15 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65+
REGION 17 SHERAFKOTA											
Male	1	46.88286	42.69356	42.72784	42.86994	42.82386	45.38866	45.48605	45.39723	44.36953	49.08206
	2	46.88286	42.69356	42.72784	42.86994	42.82386	45.38866	45.48605	45.39723	44.36953	49.08206
	4	1.11410	0.99947	1.04298	1.03150	1.03012	1.02619	1.03893	1.03677	1.04907	1.05066
	8	4.00000	3.14634	4.80769	4.14286	18.98413	7.96053	6.51351	14.11111	21.00000	45.00000
Female	1	45.81275	42.02030	43.07915	42.50996	44.06789	44.53850	43.33412	43.28000	45.65047	47.08079
	2	45.81275	42.02030	43.07915	42.50996	44.06789	44.53850	43.33412	43.28000	45.65047	47.08079
	4	1.13029	0.99071	1.01628	1.02794	1.02304	1.02587	1.01954	1.00535	1.02768	0.99604
	8	5.85714	3.07692	3.63333	4.04167	7.09259	5.17949	7.41667	9.33333	5.00000	38.00000
REGION 18 WEST LAKE											
Male	1	42.29885	35.06169	37.17169	37.36313	36.94752	34.36750	37.92699	38.87811	37.31250	36.88198
	2	42.29885	35.06169	37.17169	37.36313	36.94752	34.36750	37.92699	38.87811	37.31250	36.88198
	4	1.10019	1.02986	1.04545	1.04835	1.59454	1.34714	1.26653	1.20332	1.20479	1.11358
	8	1.10019	1.02986	1.04545	1.04835	1.59454	1.34714	1.26653	1.20332	1.20479	1.11358
Female	1	40.70316	36.12525	36.78764	36.38885	36.04599	36.88757	41.17895	37.94595	37.61736	36.47381
	2	40.70316	36.12525	36.78764	36.38885	36.04599	36.88757	41.17895	37.94595	37.61736	36.47381
	4	1.21361	1.04169	1.04577	1.03501	1.10124	1.11563	1.11364	1.03601	1.01279	1.01273
	8	1.21361	1.04169	1.04577	1.03501	1.10124	1.11563	1.11364	1.03601	1.01279	1.01273

APPENDIX I.1. - - (CONTINUED)

Sex	Sample category	0	1 - 4	5 - 9	10 - 14	15 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65+
REGION 19 NIAGARA											
Male	1	49.61853	42.14131	41.62379	42.31823	36.50296	39.46971	42.69933	44.36526	41.09897	44.49817
	2	49.61853	42.14131	41.62379	42.31823	36.50296	39.46971	42.69933	44.36526	41.09897	44.49817
	4	1.00590	1.00237	1.00209	1.00412	1.00785	1.01535	1.01784	1.00318	1.02724	1.02687
	5	2.07598	1.96366	1.98925	2.00786	1.96473	2.01532	2.01164	2.04052	1.92350	2.07221
	8	3.96078	2.70098	2.76836	3.05042	8.41899	6.01050	4.48058	3.58491	4.52632	16.20000
Female	1	45.34918	41.32451	44.81469	43.40627	41.40021	44.85526	41.35315	42.87771	40.75120	43.83447
	2	45.34918	41.32451	44.81469	43.40627	41.40021	44.85526	41.35315	42.87771	40.75120	43.83447
	4	1.04552	0.99539	1.00703	1.00257	0.99944	0.99926	1.00403	0.99459	1.00000	1.04323
	5	2.09000	1.99374	2.00843	2.01982	1.96572	2.01018	1.98215	1.91206	1.89857	1.92760
	8	4.03571	3.06011	3.13245	2.93846	5.41212	4.87662	5.07143	10.69231	20.75000	12.66667
REGION 20 NIARA											
Male	1	19.69649	18.53841	19.63917	19.87916	20.28261	19.59452	19.31671	18.89489	20.15929	20.70779
	2	19.69649	18.53841	19.63917	19.87916	20.28261	19.59452	19.31671	18.89489	20.15929	20.70779
	4	1.10224	1.04252	1.06201	1.06453	1.35535	1.17471	1.11995	1.11353	1.15236	1.09114
	8	1.10224	1.04252	1.06201	1.06453	1.35535	1.17471	1.11995	1.11353	1.15236	1.09114
Female	1	21.43781	19.50976	20.27849	19.33444	19.32422	19.21038	19.78983	17.96712	18.74667	19.35392
	2	21.43781	19.50976	20.27849	19.33444	19.32422	19.21038	19.78983	17.96712	18.74667	19.35392
	4	1.12474	1.05513	1.05860	1.05669	1.09791	1.06899	1.07425	1.04874	1.03007	1.03010
	8	1.12474	1.05513	1.05860	1.05669	1.09791	1.06899	1.07425	1.04874	1.03007	1.03010

Sex	Sample category	0	1 - 4	5 - 9	10 - 14	15 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65+
REGION 51 KANSIBAR NORTH											
Male	1	3.28105	3.45693	3.46049	3.68199	3.83491	3.76908	3.57553	3.65850	3.83710	4.11155
	4	0.87059	0.98670	0.96510	0.98663	0.97077	0.97924	0.99605	0.96316	0.98026	0.96410
Female	1	3.80592	3.54562	3.55244	3.75225	3.64881	3.55008	3.63625	3.71304	3.97790	3.81007
	4	0.82979	0.98390	0.95060	0.97260	0.97655	0.96562	0.93277	0.97376	0.93130	0.93571
REGION 52 KANSIBAR CENTRAL											
Male	1	2.56054	2.23591	2.36694	2.36256	2.63333	2.47013	2.39294	2.38926	2.37115	2.27285
	2	2.56054	2.23591	2.36694	2.36256	2.63333	2.47013	2.39294	2.38926	2.37115	2.27285
	4	0.84906	1.02214	0.99338	1.01154	1.01186	1.01987	0.99363	0.97761	0.99123	1.01575
Female	1	2.87137	2.25725	2.28744	2.28559	2.35099	2.26871	2.32735	2.30540	2.24056	2.21206
	2	2.87137	2.25725	2.28744	2.28559	2.35099	2.26871	2.32735	2.30540	2.24056	2.21206
	4	0.93478	1.02034	1.02244	1.01681	0.99042	1.06161	1.01242	0.94964	0.98039	1.02778

APPENDIX I.1. - - CONTINUED

Sex	Sample category	0	1 - 4	5 - 9	10 - 14	15 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65+
REGION 53 LANTIRAR WEST											
Male	1	1.31218	1.30839	1.30066	1.26487	1.85372	1.44081	1.33834	1.31484	1.30208	1.30523
	2	1.31218	1.30839	1.30066	1.26487	1.85372	1.44081	1.33834	1.31484	1.30208	1.30523
	6	3.40609	3.08400	3.18791	3.00202	3.25076	3.35215	3.44554	3.21324	2.99235	3.19401
	8	3.40609	3.08400	3.18791	3.00202	3.25076	3.35215	3.44554	3.21324	2.99235	3.19401
Female	1	1.31675	1.28344	1.30661	1.29403	1.34412	1.30278	1.28112	1.23649	1.25709	1.33527
	2	1.31675	1.28344	1.30661	1.29403	1.34412	1.30278	1.28112	1.23649	1.25709	1.33527
	6	3.53741	3.05831	3.21806	3.09711	3.17066	3.13047	3.16532	3.03226	3.07565	2.95181
	8	3.53741	3.05831	3.21806	3.09711	3.17066	3.13047	3.16532	3.03226	3.07565	2.95181
REGION 54 PERERA NORTH											
Male	1	3.75893	3.35929	3.30420	3.19045	3.54246	3.57260	3.43285	3.31616	3.51308	3.69937
	2	3.75893	3.35929	3.30420	3.19045	3.54246	3.57260	3.43285	3.31616	3.51308	3.69937
	4	1.13595	0.96056	0.98617	0.99334	1.10522	1.12295	1.06412	1.00750	1.01499	1.00000
	8	1.13595	0.96056	0.98617	0.99334	1.10522	1.12295	1.06412	1.00750	1.01499	1.00000
Female	1	4.24747	3.39506	3.39859	3.27428	3.39306	3.42636	3.36519	3.16471	3.45038	3.56576
	2	4.24747	3.39506	3.39859	3.27428	3.39306	3.42636	3.36519	3.16471	3.45038	3.56576
	4	1.14793	0.99674	1.00174	1.00000	0.99429	0.99047	0.97000	0.99049	0.96997	1.01471
	8	1.14793	0.99674	1.00174	1.00000	0.99429	0.99047	0.97000	0.99049	0.96997	1.01471

Sex	Sample category	0	1 - 4	5 - 9	10 - 14	15 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65+
REGION 55 FEMBA SOUTH											
Male	1	3.57213	3.82463	3.70000	3.69308	4.03723	4.00921	3.81265	4.01767	3.71460	4.16293
	4	0.99608	1.00089	1.01850	1.02157	1.03307	1.08402	1.03266	1.05347	1.05015	1.00314
	8	0.99608	1.00089	1.01850	1.02157	1.03307	1.08402	1.03266	1.05347	1.05015	1.00314
Female	1	3.84817	3.69847	3.84044	3.80034	3.88346	3.79251	3.76350	3.90830	3.95028	4.02283
	4	0.97358	1.01336	1.00443	1.00178	1.00730	1.01282	0.99848	1.01905	1.02484	1.01736
	8	0.97358	1.01336	1.00443	1.00178	1.00730	1.01282	0.99848	1.01905	1.02484	1.01736

CHAPTER 2

AN EVALUATION OF COVERAGE AND AGE-SEX DATA

by
M. Rafiq *

INTRODUCTION

To state the obvious, censuses and surveys in statistically under-developed areas of the world have, in general, shown more serious problems of quality of data than those carried out in developed countries. This chapter addresses itself to the preliminary evaluation of quality of data generated by the 1978 population census of the United Republic of Tanzania. Since assessment of quality of relevant data for such substantive areas as fertility, mortality, migration, urbanization, education and literacy and the like, is expected to form an integral part of various other chapters of this report covering these areas, the present chapter restricts itself to the study of completeness of coverage and the quality of age-sex data. The primary focus of attention in this chapter is the 1978 census, though some observations on the earlier censuses would also appear in the chapter to facilitate comparative study of various censuses. The chapter deals only with non-sampling errors. The discussion of the other component of overall error, namely, errors due to sampling, has been deferred to a separate chapter on sampling in this report. One additional point which may be noted is that the Mainland¹ covers 97.3 percent of the 1978 population of the country, and thus the results valid for the Mainland would, in general, also be valid for the country as a whole; though such results may or may not apply to Zanzibar which exhibits substantial differences

*The author is working as U.N. Chief Technical Advisor on project UN/79/PO4-- Processing and Analysis of the 1978 population census. He is solely responsible for the views expressed in this chapter.

¹The Mainland corresponds to Tanganyika of the pre-1964 period. Zanzibar constitutes the second part of the United Republic of Tanzania.

from the Mainland in some aspects of the demographic phenomenon such as growth, age structure, migration and the like.

COMPLETENESS OF COVERAGE

Any discussion of the completeness of coverage in the context of Tanzanian censuses has to be guided by two fundamental constraints. Firstly, the censuses of Tanzania could not be informed of completeness of enumeration by post-enumeration surveys because such surveys were not undertaken. Secondly, collateral evidence such as vital statistics which could facilitate comparative study of the totals returned by various censuses is also not available because registration of vital events is still not sufficiently developed to provide reliable data. As a consequence of these considerations, the evaluation of census totals for completeness has to rest on indirect procedures which cannot be expected to render conclusive results because they rely heavily on collateral evidence of variable quality.

Among other things, Table 1 provides intercensal growth rates covering the period between 1948 and 1978. The table shows that the growth rate increased from 1.77 percent per annum between 1948 and 1957 to 3.04 between 1957 and 1967, on to 3.20 between 1967 and 1978. The most striking feature of the variation in the growth rate, of course, is the excessive change between 1948 and 1957 on the one hand, and between 1957 and 1967 on the other. There is, however, some evidence that the 1957 census had under-enumerated the population. The official sources estimated that the rate of natural increase "for some years preceding the 1957 census" was 2.15 percent². If it is assumed that net immigration between 1948 and 1957 was negligible, the

²Central Statistical Bureau, Tanganyika, African Census Report, 1957 (Dar es Salaam: Government Printer, 1963), pp. 92-3.

TABLE 2.1.— TOTAL POPULATION, SEX RATIOS AND ANNUAL AVERAGE GROWTH RATES, FOR TANZANIA, MAINLAND AND ZANZIBAR: 1948, 1957, 1967 AND 1978^a

Country/Area and date	Population	Sex ratio	Annual growth rates ^c (successive periods)		
			Both sexes	Males	Females
Tanzania					
1948	7744600	94			
1957	9084100	94	1.77	1.77	1.77
1967	12313054	95.2	3.04	3.11	2.98
1978	17512610	96.2	3.20	3.25	3.16
Mainland					
1913	4145000				
1948	7480400	93	1.69		
1957	8788500	93	1.79	1.79	1.79
1967	11958654	95.0	3.08	3.19	2.98
1978	17036499	96.1	3.22	3.27	3.17
Zanzibar					
1948	264200	110			
1957	295600	111	1.25	1.30	1.19
1967	354400 ^b	102.4	1.81	1.43	2.24
1978	476111	98.8	2.68	2.51	2.84

Source: (i) For the 1948 and 1957 statistics: Bureau of Statistics, Recorded Population Changes 1948-1967 (Dar es Salaam: Bureau of Statistics, 1968). (ii) For 1967: Bureau of Statistics, 1967 Population Census, Volume I, Statistics for Enumeration Areas (Dar es Salaam: Central Statistical Bureau, 1969), p.1. (iii) For 1978: 1978 Population Census, Volume II, Population by Age and Sex for Villages/Wards and Urban Areas (Dar es Salaam: Bureau of Statistics, 1981), p.752. (iv) For 1913: Central Statistical Bureau, Tanganyika, African Census Report, 1957 (Dar es Salaam: Government Printer, 1963), p.1.

^aApproximate reference date: August of each year. Mainland population is also available for 1913.

^bSome source as (i) above

^cFor 1948 and 1957, male and female population derived by using sex ratios given in source (i) above.

estimated rate of natural increase is not compatible with the recorded rate of growth (1.77 percent). Further corroborative evidence on the possibility of under-enumeration in 1957 is provided by the growth rate for the Mainland between 1913 and 1948. This rate at 1.69 percent for a period spanning two World Wars, the influenza epidemic of 1918-19, and two famines of 1919 and 1920, indicates that the demographic transition in Tanzania had been underway perhaps long before 1948. Looking at the renewed international efforts for reducing mortality reinforced especially following the establishment of the United Nations with which Tanzania had special historical relationship of long duration, a relatively rapid decline in mortality in the post-World War II era cannot be precluded. It follows that the slight change in growth rate between the pre-1948 period and the 1948-1957 period fails to incorporate the influence of socio-political realities mentioned here.

Demographers involved in the analysis of the 1967 census were aware of the possibility of under-enumeration in 1957. Egero and Henin, for example, indicated that it appeared "...very probable that the 1957 census was under-estimating the population in relation to the 1948 results"³.

TABLE 2.2.-- ASSUMED VITAL RATES FOR PROJECTIONS FOR THE MAINLAND USED BY EGERO AND HENIN

	1967 - 70	1970 - 75	1975 - 80
High Assumption			
Birth rate	48	49	50
Death rate	22	20	18
Growth rate	26	29	32
Low Assumption			
Birth rate	47	47	47
Death rate	22	20	18
Growth rate	25	27	29

Source: B. Egero and R.A. Henin, "Population Growth" in Population of Tanzania, Table 14.3.

³B. Egero and R.A. Henin, "Population Growth" in B. Egero and R.A. Henin (eds.) The Population of Tanzania (Dar es Salaam: BRALUP and Bureau of Statistics, 1973), p.212. This publication hereinafter will be referred to as Population of Tanzania.

The extent of the relative under-enumeration, however, could not be determined precisely because relevant data were not available. This uncertainty, in turn, had led Eggero and Henin to use a set of rates of natural increase in their population projections for the Mainland⁴ (Table 2.2) which in general appears to be lower than what would be needed to account for 3.2 percent growth rate witnessed between 1967 and 1978. There is also some evidence that this discrepancy is not caused by differentials in immigration. In 1967, the total foreign born population enumerated in Tanzania was estimated at 400,000 persons⁵. The corresponding figure for 1978 is 415,681 persons.

Is the growth rate for 1967-1978 compatible with the estimated birth and death rates for the latest intercensal period? The estimated (female) birth rate adjusted for decline in mortality based on the reported female age structure in 1978 and the probability of dying between birth and exact age 2 (2^q₀) along with the death rates presented in Table 2.11 produce a rate of natural increase (females) of 3.018 percent⁶. Since this rate applies to five or six years before the census, the reported rate of growth for females (3.17 percent) does not look implausible. Similar comparison for the 1957-1967 period, however, indicates that the estimated female rate of natural increase (2.484 percent) is substantially below the reported rate of growth (2.98 percent). Some part of this discrepancy may have been caused by under-enumeration of females in 1957. (And, if females had been under-enumerated then males might also have been under-enumerated, perhaps to a larger extent because males were subject to a taxation system which did not apply to females.)

⁴As was mentioned earlier, the Mainland covered 97.3 percent of the total population of the United Republic of Tanzania in 1978.

⁵Eggero and Henin, "Population Growth" in Population of Tanzania, p. 213.

⁶The death rates in Table 2.11 are sensitive to the differences in the age pattern of mortality between the actual population and the life tables involved in their computation. However, in the present context no further refinement of the death rates is necessary.

An attempt is now made to explore whether males and females have experienced any inordinately large differentials in enumeration. The sex ratios derived from the stable populations based on the Far Eastern pattern of mortality corresponding to various levels of growth which approximately bracket the intercensal growth rates in Table 2.1 and selected levels of the expectation of life at birth are compared with the sex ratios returned by the censuses. The procedure is not likely to render very precise results because the actual population cannot be expected to be perfectly stable and the Far Eastern pattern may not exactly reproduce the sex differentials in mortality in Tanzania. However, the procedure can be expected to detect any large differentials in under- or over-enumeration by sex.

Table 2.3 provides the sex ratios derived from the stable populations. It may be noted that the levels of mortality used in this table are expected to cover the entire range of mortality experience over the last four or five decades. The sex ratios appearing in the

TABLE 2.3. -- ESTIMATED SEX RATIOS FROM STABLE POPULATIONS
CORRESPONDING TO VARIOUS COMBINATIONS OF MALE-FEMALE EXPECTATION OF
LIFE

Growth rate	Combinations ^a of male and female e_0			
	(35, 39)	(42, 46)	(35, 38)	(43, 46)
Sex ratio at birth = 102				
0.015	92.7	-	94.8	-
0.020	92.9	-	95.0	-
0.025	93.2	95.0	95.2	96.5
0.030	93.4	95.2	-	96.7
Sex ratio at birth = 103				
0.015	93.6	-	95.7	-
0.020	93.8	-	95.9	-
0.025	94.1	95.9	96.1	97.4
0.030	94.3	96.1	-	97.6

Source: Computed using the "Far Eastern Pattern" stable populations: United Nations, Stable Populations corresponding to the New United Nations Model Life Tables for Developing Countries (New York: United Nations, 1982).

^aFirst number in the parenthesis represents male expectation of life, the second female expectation of life.

table bracket the observed sex ratios in Table 2.1 for the Mainland indicating that no gross differentials in under- or over-enumeration by sex had influenced the censuses⁷. However, it may be stressed that this does not preclude the possibility that the 1957 census may have under-enumerated the male population of the Mainland to some extent. In fact an examination of the pattern of change in sex ratios over time is instructive at this point. The unusually large increase from 1957 to 1967 (i.e., from 93.0 to 95.0) could have been caused in part by relatively higher level of under-enumeration of males than females in the Mainland in 1957.

AGE-SEX DISTRIBUTION

Only two censuses of Tanzania, carried out in 1967 and 1978, provide data by single year of age and by conventional five-year age groups. These data can be subjected to analysis for digital preference. Table 2.4 provides selected indices recommended by the United Nations Secretariat for an assessment of overall quality of

TABLE 2.4.-- SELECTED SEX-RATIO SCORES, AGE-RATIO SCORES AND JOINT SCORES FOR TANZANIA, THE MAINLAND AND ZANZIBAR, RURAL AND URBAN: 1967 AND 1978

Area/ category	Sex-ratio score		Age-ratio score				Joint score	
			1967		1978			
	1967	1978	Male	Female	Male	Female	1967	1978
Tanzania		9.3			12.1	11.1		51.1
Rural		9.3			10.2	9.1		47.2
Urban		12.5			10.0	11.8		59.3
Mainland		6.0			10.1	8.1		36.2
Rural	11.5	9.1	16.0	15.1	10.2	9.1	65.6	36.6
Urban	18.0	11.6	15.2	16.5	11.3	11.5	85.7	57.6
Zanzibar	33.3		32.9	56.6			189.4	

⁷Incidentally, when similar comparisons are done using the North pattern, the reported sex ratios for the Mainland always fall short of the expected (Appendix II.1). It is also interesting to note that the logit differences based on the cumulative Mainland female age distribution as reported in 1978 and the Far Eastern stable populations assuming the expectation of life for females as 46 and the intercensal rate of growth (1967-1978), are smaller than the comparable logit differences based on the 1978 female age distribution and the North Model stable populations (Appendix II.2).

data. Three types of indices, namely, the sex ratio score, the age-ratio score, and the joint score, are presented in the table. One general conclusion emerging from the comparative study of these indices is that there is an overall improvement in the quality of age-sex distribution generated by the 1978 census over that of the 1967 census. (It may be recalled that any improvement recorded in the Mainland also applies to the whole of the country, because the Mainland covers over 97 percent of the total population.) This improvement can be detected across the sex categories as well as rural-urban dichotomy. The table also shows that, in general, the age-sex distribution in Zanzibar shows higher values of the indices than that in the Mainland. This could partly be attributed to migration from Zanzibar and partly to some inherent superiority of the Mainland over Zanzibar in reporting its population by age and sex. The generally higher values of the indices in urban areas can, in part, be explained by the age-sex selectivity of population attracted to urban areas.

In spite of the general improvement in the age-sex distribution returned by the 1978 census, the digital preference still appears to be a serious problem, though some improvement on this front also has been registered (Table 2.5). Whipple's index, which is designed to identify the relative digital preference for 0 and 5, indicates that its value has declined over the 1967-1978 period. Table 2.5 also shows that, in general, preference for 0 and 5 is higher in the case of females than males. This can partly be attributed to the fact that most of respondents in the census tend to be males. Urban areas generally show a lower value of the index than rural areas. Among other things, this can be explained by the literacy and educational differentials favouring urban areas over rural areas, though the relationship is far from perfect (e.g., compare Kilimanjaro region with very high literacy rate with Rukwa region with relatively low literacy rate). Once again, the index values are very high for Zanzibar, specially in Pemba, showing that Zanzibar is at a disadvantage in reporting its age-sex distribution. With the surprising exception of Lindi and Mtwara regions, the regions along the

TABLE 2.5.-- WHIPPLE'S INDEX FOR REGIONS IN 1978 AND FOR THE MAINLAND IN 1967^a

Area/Region	Rural		Urban	
	Male	Female	Male	Female
<u>1978</u>				
Dodoma	164.4	174.0	134.3	157.7
Arusha	171.6	167.9	152.5	173.1
Kilimanjaro	160.0	183.5	144.8	163.7
Tanga	193.9	221.5	191.5	210.8
Morogoro	166.6	189.1	156.5	174.2
Coast	222.3	232.0	189.9	230.9
Dar es Salaam	238.4	265.6	171.6	188.7
Lindi	164.0	193.3	167.7	188.5
Mtwara	152.5	181.5	160.3	174.9
Ruvuma	156.4	173.8	194.2	164.3
Iringa	170.6	191.0	154.0	180.7
Mbeya	152.0	190.3	143.2	173.7
Singida	141.0	147.7	146.8	166.0
Rukwa	146.0	173.2	135.1	158.1
Kigoma	151.5	158.1	163.9	212.8
Shinyanga	152.7	155.1	141.6	154.8
West Lake	168.6	212.7	169.4	198.3
Mwanza	150.2	166.6	146.4	165.4
Mara	141.3	167.2	138.3	162.3
ZANZIBAR	283.4	316.3	213.9	253.8
Zanzibar North	278.7	297.4	280.7	307.0
Zanzibar Central	244.2	280.3	235.1	290.9
Town/West	200.5	239.5	196.3	231.7
Pemba North	316.9	357.2	275.3	328.2
Pemba South	319.6	343.5	246.5	303.7
TANZANIA	165.6	185.8	164.0	186.1
<u>1967</u>				
MAINLAND	180.4	194.4	188.9	210.7

^aComputed from age range 23 to 62.

eastern coast line of the Mainland also show high values of the index.

As can be expected, the value of Myers' index in Table 2.6 like those of the Whipple's index show that the 1978 census had less serious digital preferences than the 1967 census. In general, digital preference was higher for females than for males and also higher in rural areas than in urban areas. The data from Zanzibar

TABLE 2.6.-- MYERS' INDEX FROM THE 1978 CENSUS DATA FOR TANZANIA, THE MAINLAND, AND ZANZIBAR, AND FROM THE 1967 CENSUS DATA FOR THE MAINLAND

	Index 1978		Index 1967	
	Male	Female	Male	Female
Tanzania	28.84	34.19		
Rural	27.2	34.5		
Urban	22.1	32.8		
Mainland	27.2	33.5	39.3	46.8
Rural	34.3	33.8		
Urban	25.1	30.9		
Zanzibar	50.8	60.6		
Rural	62.8	68.3		
Urban	36.3	47.4		

again show higher digital preference than that for the Mainland.

The detailed results of the application of the Myers' method of detecting digital preference appear in Table 2.7. In 1967, only digits 0, 5 and 8 for the Mainland (total population) showed positive values for females. This pattern was repeated in 1978 though with lower values than in 1967. This points to the overall improvement in reporting the age of females. The 1967 male population of the Mainland, on the other hand, registered positive values at 0, 5, 8

and 2 and a zero value at digit 7. In 1978, only digits 0, 5 and 8 had positive values. The most striking feature of the changes observed for males lies in the lack of avoidance of digit 7 in 1967. It appears that the manner in which age was determined in 1967 had some influence on this phenomenon. Only 10 political events covering the period 1890 - 1964 were used in 1967 for the indirect estimation of age. It is likely that in practice while determining age the enumerator tended to use more often those events which centred on calendar years ending in zero (e.g., 1890, 1900, 1910,....). The avoidance of digit 7 in the case of females can be explained by the possibility that their ages were not subject to as much probe as that of men. One other interesting feature of age reporting is that the number of males reported as 67 in 1967 and 78 in 1978 is unusually large as compared to neighbouring ages. This can be explained by the preference of enumerator to determine age using year 1900 as reference point. Before concluding the discussion of digital preference it can be added that some improvement in the age-sex data in 1978 over 1967 could be attributed to the use of a more elaborate set of local events for each district for determining age in 1978. This does not necessarily determine the true age but can be expected to lead to lower digital preference. Of course, some part of the improvement may have come from the general improvement in literacy and education over the 1967-1978 period.

The foregoing discussion of digital preference rested on summary measures which generally conceal the detailed pattern of defects in data by age. An attempt will now be made to examine the age-sex distribution in somewhat greater detail.

In the absence of migration and growth, sex ratios by age can be expected to decline gradually with the increase in age. The

sex ratio at the beginning of the life span in this case is determined only by the sex ratio at birth. Since actual populations usually experience growth as well as migration, sex ratios in these population can be expected to fluctuate more than the ideal conditions mentioned here. However, very wild fluctuations, unless they can be explained by migration, are generally caused by differentials in enumeration between the sexes. Table 2.8 and Figure 2.1 present sex ratios by single year of age for 1967 and 1978 for the Mainland. Following regularities emerge from their examination:

- (i) In general, relative surplus of females for all ages 20 years and over which end in highly preferred digits (0 and 5). This is indicative of somewhat less pronounced digital preference in case of males than females.
- (ii) Relative surplus of females at all ages below 30 except ages 10 - 14.
- (iii) Relative shortfall of female at ages 40 and over.
- (iv) Relative surplus of females under age 10 and shortfall at ages 10 - 14.

The above pattern, in general, manifests itself in both the censuses, indicating that the underlying phenomena causing it were in operation in 1967 as well as 1978. The nature of these phenomena is not discernable because the observed pattern could have been caused, *inter alia*, by the sex-differentials in enumeration, in pattern of age-misstatement, as well as in migration. It is, however, also interesting to note that the overall advantage of 1978 over 1967 in the context of age-sex distribution noted previously, does not obtain uniformly across all ages because Figure 2.1 indicates that the distribution beyond age 50 was not necessarily better reported in 1978 than in 1967.

TABLE 2.8.— SEX RATIOS BY SINGLE YEAR OF AGE FOR THE MAINLAND:
1967 AND 1978

Age	Sex ratio		Age	Sex ratio	
	1967	1978		1967	1978
0	98.59	93.68	40	80.88	76.41
1	99.85	97.12	41	116.72	112.82
2	97.76	95.79	42	107.82	105.07
3	98.12	97.72	43	108.24	101.70
4	95.47	96.24	44	111.69	108.86
5	101.63	101.31	45	111.17	97.78
6	99.10	98.42	46	116.29	109.52
7	102.23	98.23	47	132.42	116.25
8	96.38	95.38	48	96.59	96.99
9	106.86	99.39	49	106.14	112.13
10	107.96	100.90	50	84.57	78.48
11	103.77	98.46	51	109.68	128.58
12	118.20	107.89	52	104.15	116.93
13	113.90	104.02	53	110.72	137.88
14	109.64	102.53	54	109.96	110.34
15	109.50	107.20	55	98.25	103.51
16	96.12	104.85	56	111.57	139.67
17	96.35	100.69	57	123.43	149.76
18	75.92	86.29	58	97.84	112.48
19	77.04	81.96	59	106.84	103.63
20	60.41	69.50	60	84.90	91.48
21	79.80	86.44	61	106.98	107.38
22	70.65	75.68	62	108.66	95.18
23	78.01	82.71	63	108.23	102.65
24	71.79	89.79	64	101.92	115.29
25	75.59	77.36	65	94.15	90.94
26	80.43	89.87	66	133.83	107.12
27	92.72	95.98	67	125.68	145.42
28	72.55	81.58	68	93.39	114.91
29	93.99	101.21	69	98.08	120.10
30	74.87	77.50	70	88.22	100.06
31	112.59	114.29	71	112.50	116.69
32	100.06	93.40	72	110.39	118.98
33	105.72	109.70	73	101.03	140.22
34	99.22	91.88	74	107.94	149.14
35	97.95	89.58	75+	123.92	121.88
36	101.37	100.56			
37	118.03	113.30			
38	93.95	94.51			
39	106.50	110.94			

FIGURE 2.1...SEX RATIOS FOR THE MAINLAND:1967 AND 1978

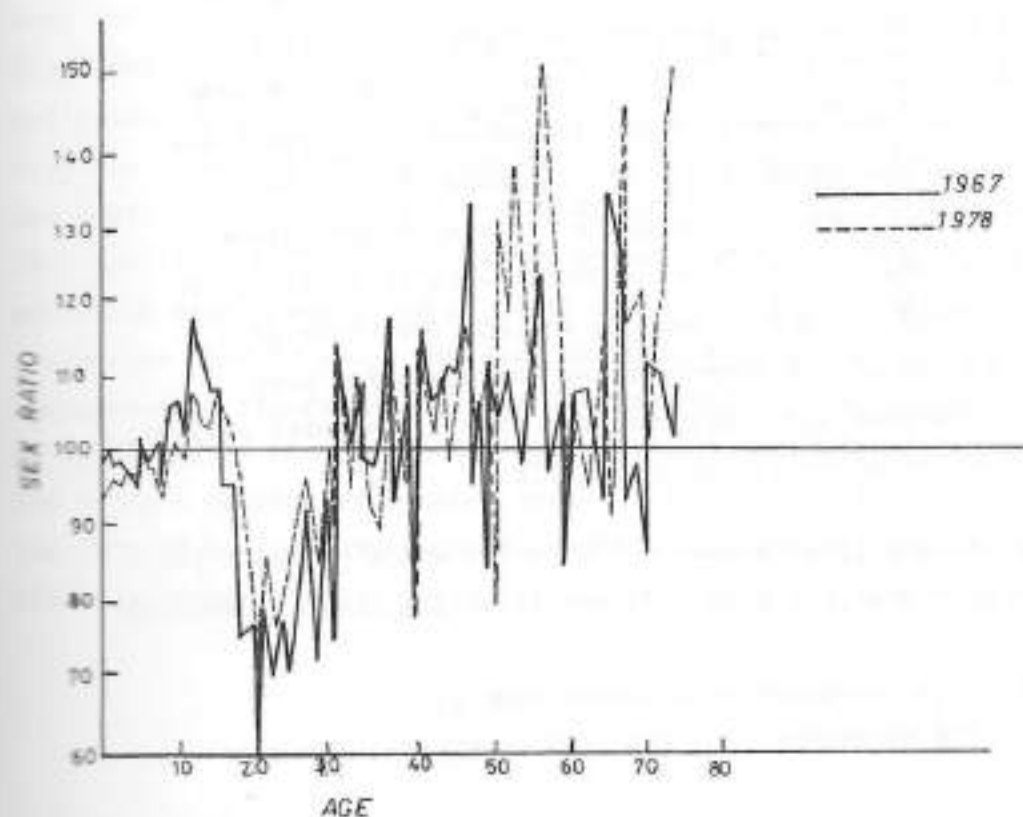
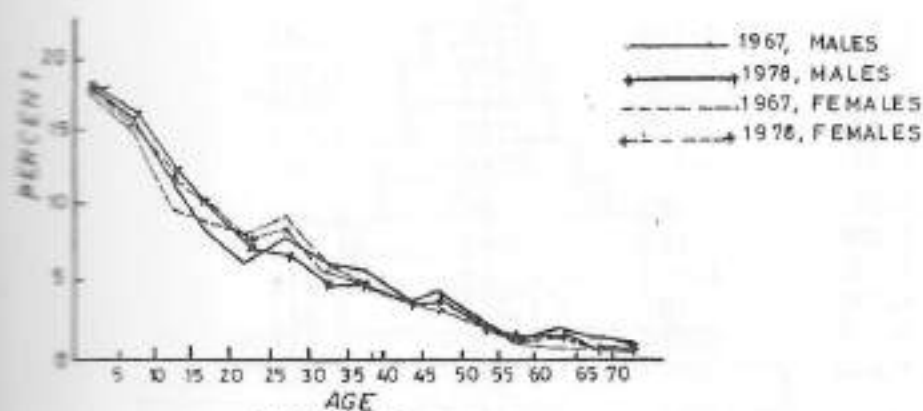


FIGURE 2.2...PERCENT DISTRIBUTION OF THE MAINLAND POPULATION BY AGE AND SEX:1967 AND 1978



SOURCE: TABLE 2.9

Regrouping of the single-year age-sex distribution into conventional five-year age groups has the tendency to suppress some of the fluctuations observed in the former. Figure 2.2 which is based on the five-year age-sex distribution indicates that, in spite of the regrouping, the age distribution still exhibits some of the peculiarities which cannot be attributed solely to the joint effect of fertility and mortality. This is indicated by the general pattern which prevails (barring a few age groups) almost unaltered both in 1967 and 1978. It appears that, in addition to fertility and mortality, factors such as sex differentials in enumeration, patterns of age mis-reporting and migration have influenced the five-year age distribution - though, as noted earlier, perhaps the effect of migration is negligible.

It is also instructive to examine Table 2.9 which provides percentage distributions of the Mainland population for the two censuses.

TABLE 2.9.-- PERCENT DISTRIBUTION OF POPULATION BY AGE AND SEX FOR THE MAINLAND: 1967 AND 1978 CENSUSES

Age	1967 ^a		1978	
	Male	Female	Male	Female
0 - 4	18.148	17.710	18.122	18.127
5 - 9	16.223	15.339	16.152	15.753
10 - 14	11.015	9.476	12.429	11.616
15 - 19	8.593	9.142	9.803	9.829
20 - 24	6.315	8.643	6.846	8.338
25 - 29	7.671	9.110	7.134	7.915
30 - 34	5.928	6.346	5.344	5.660
35 - 39	5.668	5.343	5.144	5.036
40 - 44	3.641	3.709	3.738	3.895
45 - 49	4.216	3.710	3.746	3.522
50 - 54	2.921	2.882	2.708	2.641
55 - 59	1.806	1.643	2.405	1.982
60 - 64	1.780	1.830	1.987	1.949
65 - 69	1.272	1.181	1.457	1.312
70 - 74	0.982	0.994	1.188	1.011
75 and over	3.820	2.943	1.797	1.417
Index of Dissimilarity (1967-1978)				
Males	4.448			
Females	4.449			

^aExcludes age "not stated"

The distributions taken in five-year age groups show fairly large differences at certain points. Such differences for males are discernible at ages 10 - 14, 15 - 19 and 75 and over. For females they tend to surface at ages 10 - 14, 25 - 29 and 75 and over. The index of dissimilarity indicates that about 4.45 percent male and female population would have to be redistributed to achieve a complete agreement between the 1978 and 1967 age-sex distributions. One additional feature of the age-sex distributions provided by the 1967 and 1978 censuses can also be noted. Both censuses returned unusually high proportions at older ages. The proportion of male population aged 60 years and over was 6.43 percent in 1978. The corresponding figure in 1967 was 7.85 percent. These figures cannot be explained by the prevailing conditions of fertility and mortality. The overall surplus at younger ages in 1978 over 1967, on other hand, can in part be attributed to the decline in mortality because fertility appears to have remained constant over the intercensal period.

FIGURE 23.....COMPARISON OF AGE-SEX POPULATION DISTRIBUTION FOR 1967 AND 1978:MAINLAND

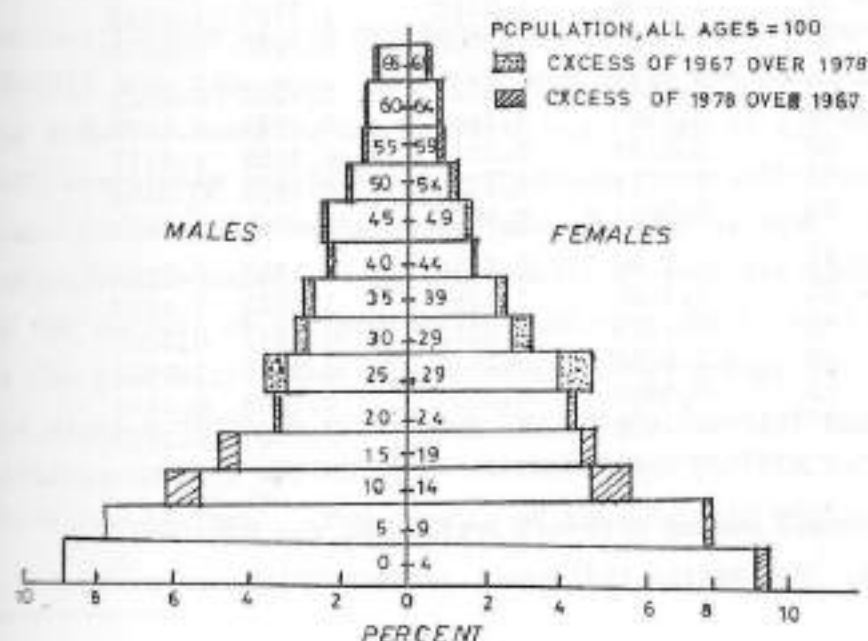


Figure 2.3 highlights the differences in age-sex distributions returned by the two censuses by bringing their respective totals to 100. Relatively substantial surpluses in 1978 for males are registered at ages under 20, 40 - 44, and 55 and over. Except the surpluses mentioned here, all ages registered a deficit in 1978 over 1967. The safest assumption concerning the observed differences is that they have, perhaps to a large extent, been caused by defects in the reported age-sex distributions. Some evidence that this assumption is tenable is provided by the analysis of different hypothetical cohorts reported in the two censuses. This analysis will rest on the study of census survival ratios obtained from the two censuses. It would once again be assumed that the effect of migration is negligible.

TABLE 2.10.-- CENSUS SURVIVAL RATIOS FOR THE MAINLAND AND ZANZIBAR BY SEX AND AGE

Age		Mainland		Zanzibar	
1967	1978	Male	Female	Male	Female
0 - 4	11 - 15	0.9287	0.8717	0.8524	0.7437
5 - 9	16 - 20	0.8289	0.9607	0.7183	0.8757
10 - 14	21 - 25	0.8868	1.2076	1.0598	1.4762
15 - 19	26 - 30	1.2105	1.2560	1.3784	1.4923
20 - 24	31 - 35	1.1176	0.8038	0.9650	0.6075
25 - 29	36 - 40	0.9421	0.8123	0.8208	0.8023
30 - 34	41 - 45	0.8825	0.7640	0.5989	0.4599
35 - 39	46 - 50	0.8878	0.9510	0.8169	1.0117
40 - 44	51 - 55	0.9011	0.7336	0.4959	0.3364
45 - 49	56 - 60	0.9061	0.9002	1.0576	1.3837
50 - 54	61 - 65	0.7546	0.7316	0.4547	0.3282
55 - 59	66 - 70	1.1908	1.1260	1.2225	1.6887
60 - 64	71 - 75	0.7015	0.5313	0.2737	0.1867
65 - 69	76 - 80	0.8288	0.7442	0.8813	1.4317
70 - 74	81 - 85	0.3909	0.2937	0.1639	0.1444
75 and over	86 and over	0.1900	0.1660	0.3035	0.3490

Table 2.10 provides census survival ratios for the Mainland and Zanzibar by sex. The ratios indicate a pattern which, to a

large extent, can be attributed to defects in the age-sex data.

Four significant features of the pattern can be noted:

- (i) Some ratios are larger than one— a theoretical impossibility if migration is negligible. Such values can only be attributed to the defects in the data.
- (ii) Alternating high and low values. These undulations can again be caused by defects in data.
- (iii) Relatively lower survival ratio at older ages for females as compared to males. This relative advantage for males can only be attributed to lower mortality for males at older age— a tendency which is only rarely observed in other populations.
- (iv) Zanzibar tends to show greater variability than the Mainland. This can partly be attributed to better age-sex data in the Mainland and partly to migration which can hardly be assumed negligible in the case of Zanzibar.

It is evident from the foregoing analysis of the age-sex distributions from the 1978 and 1967 censuses that these distributions are influenced by numerous defects. It is generally observed that some of these defects follow generalized patterns. The work on detecting pattern of age mis-reporting has engaged demographers for a fairly long time now. One technique which has been in use for over a decade rests on the comparison of reported age distribution with comparable model stable populations. Strictly speaking such comparisons render estimated parameters such as birth rates, gross reproduction rates and the like under appropriate assumptions, but for the purpose of the present chapter they can be used to explore the possibility that the reported age structure for the Mainland might conform to one of the two standard patterns of age-misreporting, namely, the African-Southern-Asian pattern and the Latin American pattern⁸. The results of the analysis with this goal

⁸For the technique, see: United Nations, Methods of Estimating Basic Demographic Measures from Incomplete Data (New York: United Nations, 1967). Hereinafter this source is referred to as UN Manual IV.

in view appear in Table 2.11. It is evident from the table that the Mainland exhibits the African-Southern-Asian pattern of age mis-reporting both in 1967 and 1978. The only significant exception appears to be that the second peak for the birth rate emerges at age 30 instead of age 35 or 40. This tendency may have been caused by net downward shift in reporting age.

It may be recalled that the 1978 census returned somewhat better age-sex distribution than the 1967 census. It is interesting to examine whether the improvement is a function of methodology used for determining age. The 1967-1978 rates of growth by single year of age and sex are presented in Table 2.12. Two immediate conclusions emerge from the table. Firstly, that for all ages beyond age 12 (except age 49)⁹ the growth rate for two neighbouring ages around ages ending in digits 0 and 5 is always higher than ages ending in 0 and 5. It appears that enumerators in 1978 were aware of the digital preference for these digits and tried to avoid it. It is intriguing that the benefit of this avoidance appears to have gone to some of the digits which are generally either mildly preferred or not preferred at all. Secondly, there is some indication that the reported age in a number of cases depended on the reference materials used in its determination. For example, age 17 registers a very high rate of growth. This can be attributed to the reference to Independence (1961). Similarly, unusually large rate for age 33 may have something to do with the end of World War II. The rate for age 1 may have been inflated by the reference to the birth of CCM (1977).

⁹ This exception refers to the fact that in 1967 this age was determined by reference to the 1918-1919 influenza epidemic.

TABLE 2.11.-- ESTIMATED BIRTH RATE ADJUSTED^a FOR DECLINE IN MORTALITY,
AND DEATH RATE, BASED ON FEMALE AGE STRUCTURE IN 1967 AND 1978 AND
2q₀ USING THE FAR EASTERN PATTERN OF MORTALITY: MAINLAND

Age x	Proportion upto x, C(x)		Adjusted birth rate based on e ₀ = 40 from 1967 data and e ₀ = 46 from 1978 data k ⁰ = 0.000832, and,		Death rate based on census data for	
	1967	1978	t = 24 for 1967	t = 35 for 1978	1967	1978
5	0.17710	0.18127	0.04928	0.04834	0.02449	0.01949
10	0.33049	0.33880	0.05253	0.05126	0.02489	0.01971
15	0.42525	0.45491	0.04830	0.05009	0.02441	0.01960
20	0.51667	0.55320	0.04695	0.04935	0.02429	0.01954
25	0.60310	0.63658	0.04692	0.04886	0.02428	0.01951
30	0.69420	0.71573	0.04932	0.04974	0.02448	0.01956
35	0.75766	0.77233	0.04931	0.04899	0.02448	0.01951
40	0.81109	0.82269	0.04903	0.04872	0.02446	0.01949

Birth rate (male) based on 1978 data = $1.02 \times 0.04974 \times \frac{8686006}{8350492} = 0.05277$

Birth rate (total) based on 1978 data = $0.04974 \times \frac{8686006}{8350492} (1 + 1.02) = 0.05123$

Death rate (male) based on 1978 data = $0.05277 - 0.0327 = 0.02007$

Death rate (total) based on 1978 data = $0.05123 - 0.0322 = 0.01903$

^aAdjustments based on change in the value of 2q₀ obtained from 1967 and 1978 data on child mortality. (1₂ values changed from 83405 to 83605.) Population was assumed to be stable until the mid-1930s. Value of k was obtained from UN Manual IV, Table III.4.

TABLE 2.12.— THE RATE OF GROWTH (1967-1978) BY AGE IN SINGLE YEARS AND SEX, FOR THE MAINLAND

Age	Male	Female	Age	Male	Female
0	3.60	4.06	40	1.56	2.08
1	4.13	4.38	41	5.17	5.48
2	3.15	3.33	42	4.34	4.58
3	2.58	2.62	43	4.63	5.20
4	2.97	2.90	44	6.64	6.87
5	3.56	3.60	45	2.92	4.09
6	2.84	2.90	46	4.96	5.50
7	2.89	3.25	47	2.61	4.79
8	3.88	3.98	48	1.22	1.37
9	2.86	3.52	49	-0.90	-0.14
10	3.43	4.06	50	2.42	3.09
11	5.24	5.71	51	5.62	4.17
12	3.93	4.76	52	5.64	4.61
13	4.80	5.62	53	-3.14	-5.13
14	4.98	5.59	54	5.33	5.30
15	4.16	4.36	55	5.20	4.72
16	4.79	4.00	56	6.47	4.43
17	4.75	4.35	57	4.02	2.27
18	4.77	3.61	58	7.80	6.53
19	3.56	3.00	59	5.13	5.41
20	3.40	2.13	60	2.95	2.27
21	4.03	3.30	61	5.24	5.20
22	5.90	2.79	62	2.97	4.17
23	4.16	3.62	63	2.50	3.00
24	5.39	3.36	64	12.18	11.06
25	1.67	1.46	65	4.18	4.49
26	4.59	3.58	66	5.82	7.85
27	2.23	1.92	67	1.77	0.45
28	2.28	1.20	68	7.01	5.13
29	2.95	2.28	69	3.42	1.58
30	1.17	0.85	70	2.79	1.64
31	4.00	3.86	71	7.63	7.29
32	1.94	2.56	72	5.04	4.35
33	4.47	4.14	73	10.84	7.86
34	2.54	3.24	74	9.38	6.44
35	0.85	1.67	75+	-3.60	-3.45
36	3.89	3.96			
37	1.11	1.48			
38	3.85	3.79			
39	3.06	2.69			

Age 11 may have gained by the reference to the previous census (1967). (The rate for females may also have been inflated in part due to the fact that for females aged 12 years and over the enumerator had to ask additional questions relating to fertility and mortality.) Rates for ages 3 and 14 are also of some interest. In 1967, the Zanzibar Revolution was three years old, which brings the 1967-1978 rate to its existing level. In 1978, the Revolution was 14 years old, hence the unusually high rate. Low rate at age 67 may be attributable to the fact that year 1900 was a convenient point in 1967 for determining age of old persons. It may be added that emphasis here has been on the direct influence of the reference material used for determining age. Of course, such material is also relevant for ages which are not centered on an event in the material (e.g., age of a person at the time of Independence).

TABLE 2.13. -- AGE PATTERN OF SEX DIFFERENTIALS IN GROWTH RATE, r , (1967 - 1978): MAINLAND^a

Age	Male r exceeds Female r	Female r exceeds Male r	No definite pattern
0 - 3		x	
4			x
5 - 15		x	
16 - 31	x		
32 - 40			x
41 - 50a		x	
51 - 58a	x		
59 - 67			x
68 - 74	x		

^aExcludes ages 49 and 53.

In addition to the regularities noted so far, Table 2.12 also indicates an interesting pattern when male and female growth rates are compared by age. The nature of this pattern is summarized in

Table 2.13. Though some part of this pattern might have been caused by decline in mortality which might have influenced the two sex differentially generating some differences in the growth rate by sex, but the possibility that age misreporting might also have contributed to the observed pattern cannot be ruled out, especially when it is known that age misreporting has influenced the age-sex distributions returned by the two censuses.

SMOOTHING OF DATA

The foregoing discussion of defects in the age-sex distribution returned by the 1978 census points to the need for smoothing of the reported distribution. By its very nature, smoothing can hardly achieve the "true" distribution. In fact, there is always a risk that no matter how carefully smoothing is done, it might conceal or disfigure some "true" characteristics of demographic reality. The problem is confounded further by the fact that very little is known about these true characteristics in the developing countries. Ironically, these are the very countries where some form of smoothing is inevitable. Perhaps one of the objective criteria that can be applied to the smoothed data is that the smoothing technique used should rectify the known faults in the reported data without harming inordinately those sections of data which are known to be correct. In practice, however, strict adherence to this principle is quite difficult if not outright impossible.

Three procedures of smoothing have been applied to the 1978 data for the Mainland.

I. The five-term formula from the United Nations Manual II¹⁰ applied to age range 0 - 4, 5 - 9,, 80 and over to obtain smoothed distribution for ages between 10 and 74.

¹⁰United Nations, Methods for Population Projections by Sex and Age (New York: United Nations, 1956), p.12.

II. Logit smoothing applied to cumulative age distribution based on the intercensal growth rate (1967-1978) and assumed expectation of life at birth (e_0) for males as 43 and for females as 46. (The trend was ascertained by using ages 10, 15,, 55.) The Far Eastern pattern of mortality was assumed to apply to males as well as females¹¹.

III. This procedure calls for the following steps:

- a. Average of age combinations in single years of hypothetical cohorts based on 1967 and 1978 age-sex distributions (e.g., age 0 in 1967 and age 11 in 1978).
- b. Five-year moving averages of averages obtained in (a) above and moving age structure backward to obtain estimates for ages 7, 8, assuming a growth rate of 0.030.
- c. Obtaining independent estimates for ages 0, 1, 6 by assuming a birth rate of 0.048 and mortality as represented by Level 10 in the North model life-tables.

The results of these procedures appear in Table 2.14. Procedures II and III appear to be working better than Procedure I because they seem to rectify the errors found in the African-Southern-Asian pattern of age misreporting. These procedures also achieve somewhat better results for the older ages though it appears that Procedure I is less successful than Procedure II in this respect. At younger ages, however, Procedure III appears to provide somewhat better results than Procedure II.

¹¹Logit differences indicate closer fit for females using the Far Eastern pattern than the North model (See: Appendix II.2). The evidence in favour of the Far Eastern pattern in the case of males was not conclusive. However, since males were more likely to be influenced by migration, it was assumed that the Far Eastern pattern also applied to males. (Logit differences for males have not been presented here.)

TABLE 2.14.— REPORTED AND SMOOTHED AGE-SEX DISTRIBUTIONS
(IN PERCENTAGES): MAINLAND^a

Age	Reported 1978		Smoothed using					
			Procedure I		Procedure II		Procedure III	
	Male	Female	Male	Female	Male	Female	Male	Female
0 - 4	18.122	18.127	18.099	18.088	18.230	19.036	18.946	18.206
5 - 9	16.152	15.753	16.131	15.719	15.700	15.300	15.022	14.371
10 - 14	12.429	11.611	12.681	11.973	13.898	13.007	12.574	12.694
15 - 19	9.803	9.829	9.479	9.630	11.903	10.964	8.923	9.100
20 - 24	6.846	8.338	7.393	8.550	9.848	9.093	7.946	8.728
25 - 29	7.134	7.915	6.564	7.501	7.923	7.457	6.038	7.025
30 - 34	5.344	5.660	5.741	6.000	6.230	6.059	6.152	6.841
35 - 39	5.144	5.036	4.799	4.811	4.800	4.880	4.900	4.977
40 - 44	3.738	3.895	4.050	4.046	3.626	3.897	4.412	4.312
45 - 49	3.746	3.522	3.477	3.390	2.677	3.079	3.160	2.929
50 - 54	2.708	2.641	2.869	2.656	1.922	2.386	3.102	2.787
55 - 59	2.405	1.982	2.349	2.080	1.329	1.791	2.272	2.352
60 - 64	1.987	1.949	1.961	1.809	0.874	1.278	1.771	1.616
65 - 69	1.457	1.312	1.504	1.394	0.531	0.850	1.295	1.186
70 - 74	1.188	1.011	1.110	0.941	0.291	0.509	0.994	0.884
75 and) over)	1.797	1.417	1.795	1.415	0.219	0.414	2.496	1.993

^aProcedures I and II refer to 28.VIII. 1978. Procedure III refers to 26.II. 1973.

In a separate exercise, the United Nations Economic Commission for Africa (ECA) subjected the reported 1978 age-sex distribution to five smoothing techniques and suggested that the distribution appearing in Table 2.15 appears to be most plausible.¹² The criterion used by the ECA was the period taken by a distribution to conform to the conditions of stability under the assumption of constant fertility and mortality. (The distribution that took shortest period was preferred over others.) The results of the application of this criterion to the ECA sex-age structure and to that obtained by Procedure III above are provided in Tables 2.16 and 2.17. It is evident from these tables that neither of the two age-sex structures has any strong indication of being preferable over the other using the ECA criterion. Since Procedure III uses the reported distribution for most ages for smoothing, the results of this procedure have been used as base population for population projections (Chapters 14 and 15). It is also interesting to note that the birth rates (females) obtained from the female age distribution produced by this procedure

TABLE 2.15.-- SMOOTHED POPULATION DISTRIBUTION BY AGE AND SEX (IN PERCENTS) SUGGESTED BY E.C.A: TANZANIA, 1980

Age	Male	Female
0 - 4	18.8	19.2
5 - 9	15.5	14.7
10 - 14	12.4	11.6
15 - 19	9.9	9.8
20 - 24	7.7	8.7
25 - 29	6.3	7.5
30 - 34	5.6	5.9
35 - 39	4.9	4.8
40 - 44	4.1	4.1
45 - 49	3.4	3.3
50 - 54	2.8	2.5
55 - 59	2.3	2.1
60 - 64	1.9	1.8
65 - 69	1.5	1.5
70 - 74	1.2	1.1
75 - 79	0.8	0.5
80+	1.0	0.8

¹² ECA suggestion was communicated through a letter to the Director, Central Census Office in April 1983.

TABLE 2.16.-- IMPLIED RATE OF GROWTH UNDER CONSTANT FERTILITY AND MORTALITY USING ECA SMOOTHED POPULATION AS BASE AND THE PROCEDURE III POPULATION AS BASE*

Projection cycle	Rate of growth using	
	ECA Base	Procedure III as base
2000 - 2005	2.938	3.31
2005 - 2010	2.932	3.36
2010 - 2015	2.924	3.37
2015 - 2020	2.922	3.36
2020 - 2025	2.925	3.36

*For footnotes see Table 2.17

and corrected for decline in mortality under the assumptions governing Table 2.11, reproduce more fully the African-Southern-Asian pattern of age misreporting (Appendix II.3) than the unsmoothed data used previously. (The only exception appears at age 15).

TABLE 2.17.-- ECA SMOOTHED FEMALE BASE POPULATION AND THE FEMALE BASE POPULATION SMOOTHED BY PROCEDURE III PROJECTED TO YEARS 2010 AND 2015 BY AGE* (PERCENTAGES) ASSUMING CONSTANT FERTILITY AND MORTALITY

Age	Projected using			
	ECA base to		Procedure III as base to	
	2010	2015	2010	2015
0 - 4	18.83	18.79	19.68	19.68
5 - 9	14.86	14.83	15.85	15.98
10 - 14	12.35	12.39	13.07	13.22
15 - 19	10.31	10.40	10.85	10.85
20 - 24	8.63	8.65	9.01	8.89
25 - 29	7.28	7.21	7.54	7.31
30 - 34	6.30	6.05	5.80	6.08
35 - 39	5.06	5.20	4.52	4.65
40 - 44	3.93	4.16	3.80	3.59
45 - 49	3.22	3.21	2.58	2.99
50 - 54	2.76	2.61	2.31	1.98
55 - 59	2.25	2.18	1.70	1.71
60 - 64	1.63	1.72	1.44	1.19
65 - 69	1.15	1.17	0.86	0.94
70 - 74	0.78	0.75	0.55	0.51
75 - 79	0.43	0.44	0.44	0.43
80+	0.22	0.23		

*ECA smoothing relates to Tanzania while Procedure III smoothing relates to the Mainland. The North model was used in the case of ECA base. The Far Eastern Pattern was used for the population obtained from Procedure III. ECA and other projections presented here do not start with exactly identical assumptions on fertility and mortality.

Before concluding this chapter, one further point of some importance may be considered. The Far Eastern Pattern of mortality has been assumed to prevail in Tanzania for the purpose of population projections. This represents a departure from the usual assumption that the North model life tables approximate the conditions of mortality in Tanzania. The logit differences between the age-sex structure from Procedure III and standard stable populations using the Far Eastern Pattern and the North Pattern have been presented in Table 2.18. It should be noted that the evidence in favour of the

TABLE 2.18.-- LOGIT DIFFERENCES BETWEEN THE SMOOTHED CUMULATIVE AGE DISTRIBUTION USING PROCEDURE III AND THE FAR EASTERN AND NORTH MODEL (LEVEL 10 FOR MALES AND 11 FOR FEMALES) STABLE POPULATIONS WITH INTERCENSAL (1967 - 1978) GROWTH RATE: MAINLAND*

Age x	Logit differences			
	Far East model		North model	
	Male	Female	Male	Female
5	0.02532	0.03444	0.05492	0.05730
10	0.01839	0.03505	0.05205	0.06276
15	0.01532	0.02569	0.05547	0.05570
20	0.04718	0.05255	0.08966	0.08477
25	0.06896	0.05593	0.11348	0.09071
30	0.10816	0.06838	0.15457	0.10583
35	0.12432	0.05707	0.17100	0.09650
40	0.15382	0.06945	0.19869	0.10995
45	0.17999	0.07847	0.22070	0.11827
50	0.23677	0.12473	0.27181	0.16104
55	0.28173	0.16188	0.31097	0.19249
60	0.36136	0.20467	0.38743	0.22704
65	0.47373	0.29527	0.50964	0.30838
70	0.63926	0.43558	0.72522	0.44224
75	0.86081	0.63905	1.14160	0.64625

* For the Far Eastern pattern it was assumed that the expectation of life for males was 43 and for females 46.

Far Eastern Pattern is by no means conclusive because the age structure of mortality in Tanzania is essentially unknown. However, since the assumed pattern of mortality for projections is not going to be of great importance for most ages especially when one is basing projections on scanty knowledge of basic parameters as happens to be the case with Tanzania, the Far Eastern pattern of mortality has been used in the projections.

APPENDIX II.1. - - SEX RATIOS FROM THE NORTH MODEL
 STABLE POPULATIONS CORRESPONDING TO SELECTED LEVELS
 OF GROWTH AND MORTALITY

Growth rate	Level of mortality			
	7	8	9	11
Sex ratio at birth = 102				
0.015	94.8	95.2		
0.020	95.2	95.6		
0.025		95.9	96.3	96.9
0.030		96.2	96.6	97.1
0.035			96.8	97.4
Sex ratio at birth = 103				
0.015	95.7	96.1		
0.020	96.1	96.5		
0.025		96.8	97.2	97.6
0.030		97.1	97.5	98.1
0.035			97.7	98.4

APPENDIX II.2. — LOGIT DIFFERENCES BASED ON CUMULATIVE AGE DISTRIBUTIONS UP TO AGE X AS REPORTED IN 1978 AND THE NORTH MODEL AND THE FAR EASTERN STABLE POPULATIONS WITH INTERGENSAL GROWTH RATE (1967 - 1978): MAINLAND

Age x	Logit differences based on	
	North Level II	Far Eastern ^a
5	0.05995	0.03709
10	0.03339	0.00568
15	0.05127	0.02126
20	0.06561	0.03339
25	0.07866	0.04388
30	0.07075	0.03330
35	0.08891	0.04948
40	0.09882	0.05832
45	0.12205	0.08225
50	0.13442	0.09811
55	0.16777	0.13716
60	0.22761	0.20524
65	0.26568	0.25257
70	0.31565	0.30899
75	0.47374	0.46654

^a Expectation of life at birth for the Far Eastern Pattern of mortality is assumed to be 46.

APPENDIX II.3. — ESTIMATED BIRTH RATES ADJUSTED
FOR DECLINE IN MORTALITY, BASED ON FEMALE AGE
STRUCTURE AS SMOOTHED BY PROCEDURE III: MAINLAND*

Age x	$g(x)$	Adjusted birth rate
5	0.18206	0.04858
10	0.32577	0.04878
15	0.45271	0.04973
20	0.54371	0.04801
25	0.63099	0.04806
30	0.70124	0.04757
35	0.76965	0.04854
40	0.81942	0.04812

*Assumptions for adjustment are the same as those
used in Table 2.11.

CHAPTER 3

AGE, SEX, AND MARITAL STATUS

by

P.P. Namfua*

INTRODUCTION

The data for this chapter were those collected through the general as well as the detailed questionnaire. The quality of the age-sex data has been discussed in Chapter 2. Most of the analysis in the present chapter is based on the actual data as reported in the census. Comparisons between the 1978 census and the 1967 census and to some extent the 1957 census are made in as much as the coverage may allow.

DISTRIBUTION BY AGE AND SEX: TANZANIA

The percent distribution of the population by five-year age groups and by sex for the whole of Tanzania is shown in Table 3.1. The most striking feature of this Table is the relatively young population for both sexes. The proportion of the population under the age of 15 years is 46.7 and 45.5 percent respectively for the male and female populations. When this is compared with the 1967 census, it can be observed that the proportion of the population under the age of 15 years is 45.3 and 42.5 percent respectively

TABLE 3.1.— PERCENT DISTRIBUTION OF THE POPULATION¹ BY AGE AND SEX FOR THE WHOLE OF TANZANIA, 1967 AND 1978

Age Group	Males		Females		Total	
	1967	1978	1967	1978	1967	1978
0-4	18.14	18.12	17.73	18.13	17.93	18.15
5-9	16.24	16.15	15.40	15.75	15.84 ²	16.01
10-14	10.93	12.43	9.40	11.61	10.15	12.00
15-19	8.53	9.80	9.07	9.83	8.81	9.82
20-24	6.29	6.84	8.64	8.34	7.49	7.59
25-29	7.67	7.13	9.10	7.92	8.40	7.50
30-34	5.96	5.34	6.39	5.66	6.18	5.50

*The author is teaching at the University of Dar-es-Salaam. He is solely responsible for the views expressed in this chapter.

¹This excludes the population not stated by age for both 1967 and 1978.

TABLE 3.1. — (Continued)

Age Group	Males		Females		Total	
	1967	1978	1967	1978	1967	1978
35-39	5.67	5.14	5.32	5.04	5.49	5.06
40-44	3.69	3.74	3.76	3.90	3.73	3.83
45-49	4.20	3.75	3.68	3.52	3.93	3.61
50-54	2.96	2.71	2.92	2.64	2.94	2.69
55-59	1.81	2.40	1.63	1.98	1.72	2.17
60-64	1.84	1.99	1.87	1.95	1.85	1.99
65-69	1.27	1.46	1.17	1.31	1.22	1.38
70-74	1.00	1.19	1.01	1.01	1.01	1.11
75+	3.77	1.80	2.91	1.42	3.33	1.61
Total	100.00	100.00	100.00	100.00	100.00	100.00
Number	6012613	8587087	6287198	8925527	12299811	17512614

Source: For 1967: Bureau of Statistics, 1967 Population Census, Vol. 3, Demographic Statistics (Dar-es-Salaam: Bureau of Statistics, 1971).

for males and females. This slight increase in the young population between the two censuses may be attributed to either higher fertility or an improvement in age reporting, especially for female population, or both. Analysis on the data on fertility has indicated that the level of fertility has not changed much between 1967 and 1978 and therefore the most likely reason for this increase in the proportion of the young population is the improvement of age reporting, particularly for the ages above 10 years. The possibility of an improvement in age reporting is made even stronger by an examination of the older population. In the case of the 1978 census, the proportion of the population aged 65 years and above is 4.5 and 3.7 percent respectively for the male and female population. The corresponding figures for the 1967 census are 6.0 and 5.1. These higher proportions particularly for the female population in the 1967 census are likely to be due to an overstatement of age in the older ages. This speculation is more plausible when the mortality level between the two periods is taken into consideration. Since mortality has declined between the two censuses, an increase in the proportion of the older population would have been observed. However, this has not been the case. In the meantime, fertility has not increased to an extent of offsetting the decline

in mortality. It is therefore likely that the differences observed in the proportions of the young and old population is an outcome of the improvement in age reporting in the 1978 census over the 1967 one.

The population pyramid is a popular and a very effective method of graphically depicting the age-sex composition of a population. A population pyramid is designed to give a detailed picture of the age-sex structure of a population indicating either single ages, five-year groups, or other age combinations. Figure 2.3 (Chapter 2) is the population pyramid for the whole of Tanzania using data from the 1967 and 1978 Censuses. The 1967 pyramid has been superimposed on the 1978 one. Both pyramids have been truncated at the 65-69 years age group. To facilitate comparisons between the two periods percentages, rather than actual population figures have been used. These percentages have been based on the grand total for the population which includes both sexes and all ages. Percent pyramids show the differences or changes in the proportional size of each age-sex group.

The differences in the two pyramids are obvious. For one thing both pyramids are of the same base which is broad, again a demonstration of a very large proportion of children. Both pyramids narrow rapidly as they approach the vertex at the higher ages indicating a very small proportion of the elderly population. The proportional differences in the different age groups for the two periods do not reflect any regular pattern. Certain ages reflect an excess of females or males either for 1978 over 1967 or vice versa. This, may be partly due to age misreporting for both sexes, and for both periods. The broad base depicted by these two pyramids is an indication of a population experiencing high fertility, and the rapid narrowing towards the vertex is a suggestion of a population with a relatively high mortality.

Analysis of census data by sex holds a position of prime importance in demographic studies. Separate data for males and females are important not only in themselves, but for the analysis of other types of data, and for the evaluation of the completeness and accuracy of the population census counts. Because the expected proportions of the sexes can often be independently determined within a narrow range, the tabulations by sex are useful in the evaluation of census and survey data,

particularly with respect to the coverage of the population by sex and age.

The principal measure of sex composition is the sex ratio. This is usually defined as the number of males per 100 females. One hundred is the point of balance of the sexes according to this measure. A sex ratio above 100 denotes an excess of males while a sex ratio of below 100 denotes an excess of females. In other words, the greater the excess of males, the higher the sex ratio, and the greater the excess of females the lower the sex ratio. Table 3.2 gives the sex ratio by five-year age groups for the whole of Tanzania for the censuses of 1967 and 1978. The overall sex ratio is 96 males per 100 females for both periods. The sex ratio by age follows a similar pattern in the two periods, if the last two age groups are ignored. A clearer picture of this pattern is shown in Figure 3.1. The effect of age misreporting is evident from the behaviour of the ratios as demonstrated by the pattern shown in this figure. The pattern for 1978 census begins with a sex ratio of less than 100 for age group 0-4.

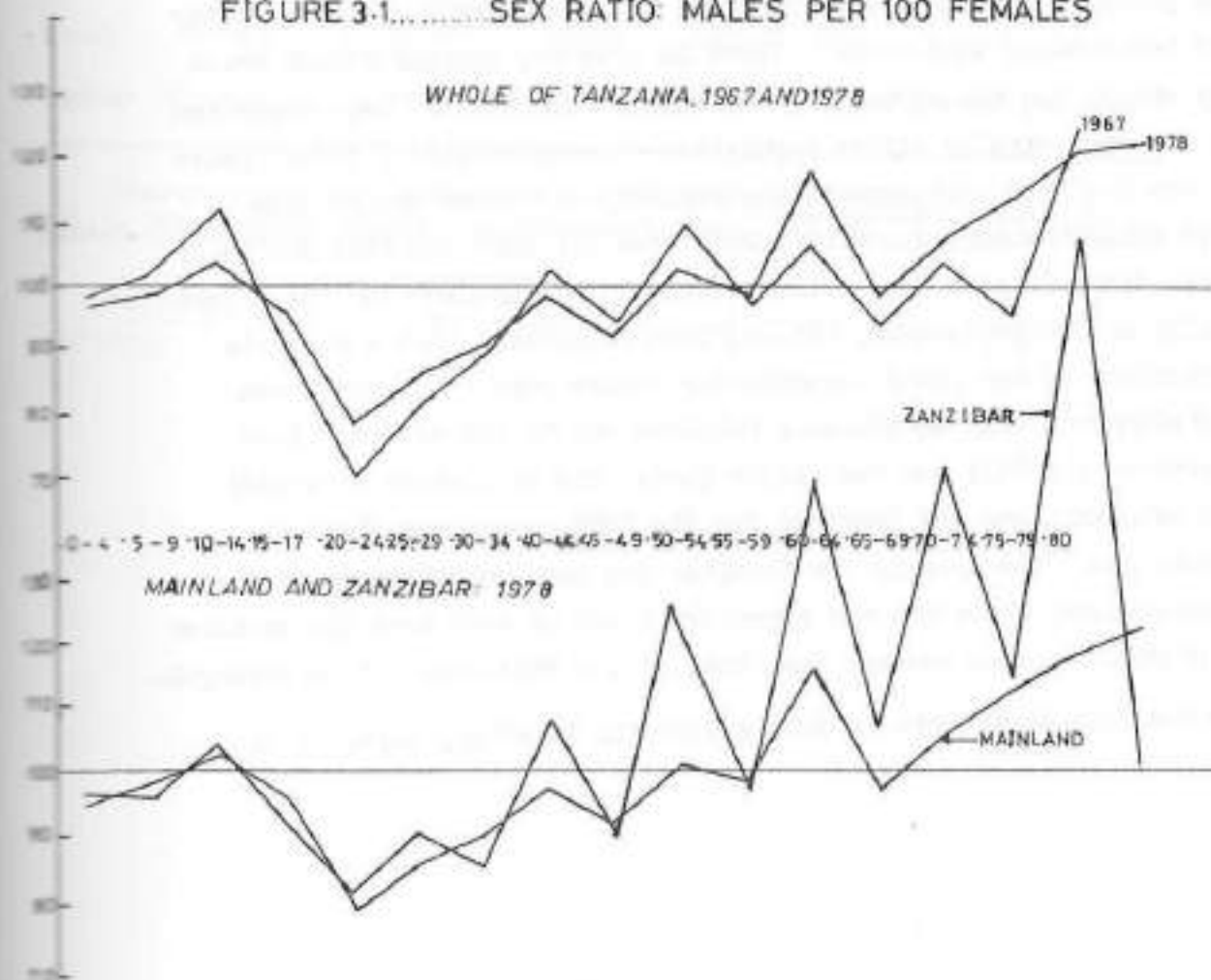
TABLE 3.2.— SEX RATIO BY FIVE-YEAR AGE GROUPS FOR THE WHOLE OF TANZANIA, 1967 AND 1978

Age Group	Sex Ratio	
	1967	1978
0-4	98	96
5-9	101	98
10-14	111	103
15-19	90	96
20-24	70	79
25-29	81	87
30-34	89	91
35-39	102	98
40-44	94	92
45-49	109	103
50-54	97	98
55-59	106	117
60-64	94	98
65-69	104	107
70-74	95	113
75+	124	122
Total	96	96

Source: For 1967: Bureau of Statistics, 1967 Population Census, Vol. 3, Demographic Statistics (Dar-es-Salaam: Bureau of Statistics, 1971).

then rises to 103 for age group 10-14, then declines sharply to 79 for age group 20-24, and rises again to reach 103 for age group 45-49. Fluctuations dominate the pattern up to age group 65-69, after which point the sex ratio systematically shows an excess of males. The 1967 population follows a similar pattern though not of the same magnitude. This pattern of behaviour is contrary to expectations. Under normal conditions of sex ratio at birth and differential mortality, there is an excess of males in the youngest age groups on account of the larger number of male births; this surplus of males is then slowly reduced with age by the higher male mortality rates, ending in an excess of females in the older age groups. The behavior observed from both the 1978 and the 1967 censuses demonstrates an effect of age distortions during the data collection process. It is an indication of either a general underestimation of the ages of females or an overestimation of the ages of males or both. These age distortions appear to be less in the 1978 census than in the 1967 census if the older ages are not taken into consideration.

FIGURE 3.1.....SEX RATIO: MALES PER 100 FEMALES



Tanzania Mainland and Zanzibar

The percent distribution of the population by five-year age groups and by sex for Tanzania Mainland and for Zanzibar is shown in Table 3.3 and Figure 3.2. The percentages shown in the table are for the 1978 census as well as for the 1967 census. Since the Mainland covers over 97 percent of the total population of Tanzania, the observations made in the context of whole of Tanzania in the previous section also apply to the Mainland. In the case of Zanzibar, the 1978 population appears younger than that of 1967. The proportion under the age of 15 is 49.0 and 48.5 percent respectively for males and females while the corresponding percentages for 1967 are 42.9 and 42.7 respectively. The proportions for the older age groups over the age of 65 are not that different in the two censuses. These are 5.0 and 4.0 respectively for males and females in 1978 compared with 4.0 and 4.1 percent for the respective sexes in 1967. These observations may be a reflection of either higher fertility levels for 1978 over 1967, or an improvement of age reporting between the two periods or both. The former is not that likely since fertility has not changed that much. There is however, another factor which may affect the age structure, and that is migration. The proportion of the economically active population —between ages 15 and 65 years — are 46.0 and 47.5 percent respectively for males and females in 1978 while the corresponding percentages for 1967 are 53.1 and 53.2. These disparities indicate the effect of outmigration for the economically active population. It has been postulated that a sizeable proportion of the young economically active population have been migrating not only to Tanzania Mainland but to the oil-rich Arab states of the Gulf and the Middle East. The population pyramids for both Mainland and Zanzibar for the 1978 census are shown in Figure 3.2. The pyramid for Zanzibar has been superimposed on the Mainland one. From the two pyramids it can be seen that the Zanzibar population is much younger than that of the Mainland. This strengthens the fact that there is outmigration in Zanzibar, while if it

TABLE 3.3.— PERCENT DISTRIBUTION OF THE POPULATION¹ BY FIVE-YEAR AGE GROUPS FOR TANZANIA MAINLAND AND ZANZIBAR, 1967 AND 1978

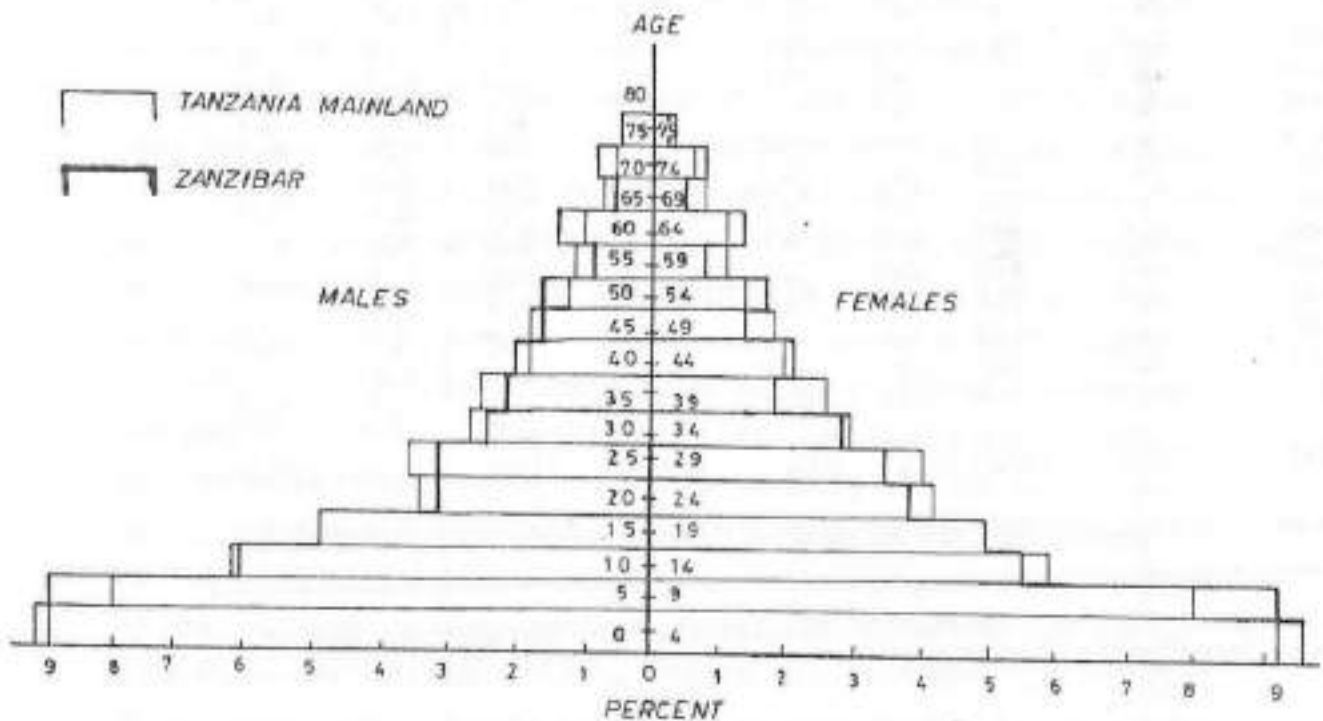
Age Group	Mainland				Zanzibar			
	Males		Females		Males		Females	
	1978	1967	1978	1967	1978	1967	1978	1967
0-4	18.0	18.2	18.1	17.7	18.9	18.0	19.2	18.5
5-9	16.0	16.2	15.7	15.3	18.0	16.8	18.3	17.5
10-14	12.4	11.0	11.6	9.5	12.1	8.1	11.0	6.7
15-19	9.7	8.6	9.8	9.1	9.6	6.3	10.1	6.8
20-24	6.8	6.3	8.3	8.6	6.3	5.6	7.6	8.4
25-29	7.1	7.7	7.9	9.1	6.2	7.7	6.7	8.7
30-34	5.3	5.9	5.7	6.3	4.8	7.1	5.5	7.9
35-39	5.1	5.7	5.0	5.3	4.2	5.8	3.8	4.7
40-44	3.7	3.6	3.9	3.7	4.0	5.3	4.3	5.5
45-49	3.7	4.2	3.5	3.7	3.2	3.7	2.5	2.6
50-54	2.7	2.9	2.6	2.9	3.2	4.3	3.2	4.2
55-59	2.4	1.8	2.0	1.6	1.9	2.0	1.3	1.2
60-64	2.0	1.8	1.9	1.8	2.8	3.8	2.5	3.2
65-69	1.4	1.3	1.3	1.2	1.3	1.3	0.9	0.7
70-74	1.2	1.0	1.0	1.0	1.6	1.8	1.4	1.5
75+	1.8	3.8	1.4	2.9	2.1	2.3	1.7	1.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number	8350494	5837837	8686005	613600	236592	177917	239519	176202

Source: For 1967: Bureau of Statistics, 1967 Population Census, Vol. 3, Demographic Statistics (Dar-es-Salaam: Bureau of Statistics, 1971).

¹This excludes the population not stated by age for both 1967 and 1978.

exists in the Mainland, it is negligible. As for the other individual

FIGURE 3.2..... POPULATION PYRAMID FOR TANZANIA MAINLAND
AND FOR ZANZIBAR



age groups, little can be said, except that they both indicate under-enumeration and overenumeration for various age groups.

The sex ratio by five year age groups for the Mainland and for Zanzibar are shown in Table 3.4 and Figure 3.1. The table gives the sex ratio for 1967 and 1978 censuses. There is hardly any difference in the overall sex ratio for the two periods. In the case of

the Mainland, the sex ratio was 95 and 96 males per 100 females respectively in 1967 and 1978 while the corresponding figures for Zanzibar were 101 and 99 respectively for the two periods. This is in conformity with the ratio for the whole country. The ratio

TABLE 3.4.— SEX RATIO BY FIVE-YEAR AGE GROUPS FOR TANZANIA MAINLAND AND ZANZIBAR, 1967 AND 1978

Age Group	Mainland		Zanzibar	
	1967	1978	1967	1978
0-4	98	96	98	97
5-9	101	99	97	97
10-14	111	10	123	109
15-19	90	96	94	94
20-24	70	79	67	82
25-29	80	87	89	91
30-34	89	91	91	86
35-39	101	98	126	108
40-44	94	92	98	90
45-49	108	102	145	126
50-54	97	99	103	98
55-59	105	117	165	146
60-64	93	98	119	107
65-69	103	107	185	148
70-74	94	113	116	116
75-79	124	120	120	183
80+		123		101
Total	95	96	101	99

for both the mainland and Zanzibar follow the same pattern agewise. This can be observed in Figure 3.1. However the fluctuations are higher for Zanzibar than for the Mainland. The higher sex ratios after the 45-49 age group for Zanzibar may imply an overenumeration of males and an underenumeration for females. The age composition and the sex ratio, for Mainland and Zanzibar, which have been obtained from the 1978 indicate that in general the quality of the data is better for Mainland than for Zanzibar.

Urban Rural differentials

The percent distribution by five-year age groups for the rural and urban populations is presented in Table 3.5 for the censuses of 1967 and 1978. The population pyramid for the 1978 census is presented in Figure 3.3. Some points of interest can be noted from the table as well as from the pyramid. Although the pyramids have the same shape as that for the whole country, certain dissimilarities can be observed between the urban and the rural ones. The pyramid for the rural population depicts a proportionate excess of both males and females in both the young and old ages over the pyramid for the urban population. For

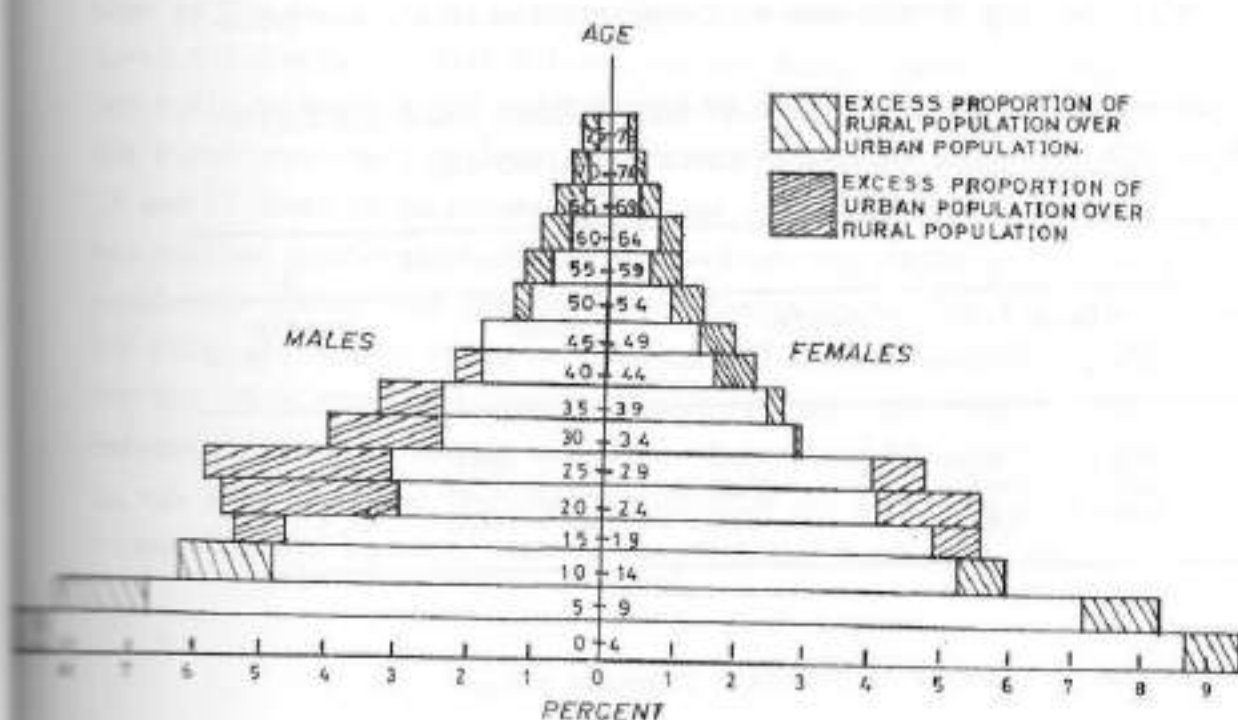
TABLE 3.5.— PERCENT DISTRIBUTION OF THE POPULATION BY AGE AND SEX FOR URBAN AND RURAL TANZANIA, 1967 AND 1978 ¹

Age Group	Rural				Urban			
	Male		Female		Male		Female	
	1967	1978	1967	1978	1967	1978	1967	1978
0-4	18.4	18.5	17.7	18.2	14.0	16.1	16.7	17.8
5-9	16.6	16.8	15.4	16.0	10.4	12.8	13.2	14.7
10-14	11.2	12.9	9.5	11.7	7.8	9.3	8.5	10.9
15-19	8.5	9.7	9.0	9.6	10.3	10.4	11.4	11.7
20-24	6.0	6.1	8.5	7.8	10.9	10.9	12.1	11.6
25-29	7.3	6.4	9.0	7.6	13.1	11.4	11.9	9.9
30-34	5.7	4.9	6.3	5.6	9.1	7.6	7.5	5.9
35-39	5.5	4.9	5.3	5.0	7.9	6.4	5.5	4.8
40-44	3.6	3.7	3.7	4.0	4.6	4.2	3.5	3.2
45-49	4.2	3.8	3.7	3.6	4.1	3.5	2.8	2.6
50-54	2.9	2.8	2.9	2.8	2.5	2.1	2.1	1.9
55-59	1.8	2.5	1.7	2.1	1.5	1.7	1.1	1.3
60-64	1.8	2.1	1.9	2.0	1.2	1.2	1.1	1.4
65-69	1.3	1.6	1.2	1.4	0.7	0.8	0.6	0.9
70-74	1.0	1.3	1.0	1.1	0.5	0.6	0.5	0.7
75+	4.0	2.0	3.0	1.4	1.2	0.8	1.4	0.8
Number	5511030	7337247	5836800	7762463	326807	1249839	276800	1163061

¹ The 1967 data refer to Mainland Tanzania only.

the age group 15 to 44 the pyramid for the urban population indicates a proportionate excess of males over the pyramid for the rural population. A similar excess for the female population is indicated between the age group 15 to 29. These differentials in the age composition between the rural and urban populations should be expected. The proportionate excess in the urban areas over the rural areas for the population in the middle ages is a reflection of the typical labour force in existence in the urban areas. Rural-urban migration favours the educated as well as the young and active members of the population who are in search of employment in government, industry and the services sectors situated in the urban centres. The rural areas have little to offer in terms of salaried employment and hence the need to migrate to the urban areas for better opportunities and prospects. This is more so

FIGURE 3.3...POPULATION PYRAMIDS FOR URBAN AND RURAL POPULATION BY FIVE-YEAR AGE GROUPS, 1978



for males than for females as indicated by the sex differentials in the proportionate age difference between the urban and the rural areas.

This argument can be supported further by examining Table 3.5. The proportion of the population under 15 years for the rural areas is 48 and 46 percent respectively for males and females while the corresponding percentages for urban population are 38 and 43 respectively. When the age group 15 to 44 is considered, the opposite is observed. The percentages in this age group are 36 and 40 respectively for males and females in the case of the rural population, as against 51 and 47 respectively for males and females in the urban areas. On the other hand, for the population aged 65 years and above, the corresponding percentages for males and females respectively are 5 and 4 for the rural population compared with 2 and 2 for the urban population.

A similar pattern is observed from the 1967 census as indicated in Table 3.5. The differentials in the age composition between the urban and rural population are even higher for the 1967 census than the 1978 one. The proportion of the population under 15 years for males and females respectively was 46 and 43 in 1967 and 48 and 46 for the rural areas, while the corresponding figures for the urban area for males and females respectively were 32 and 38 for 1967 and 38 and 43 for 1978. The proportions of the population in the age group 15

TABLE 3.6.— PERCENT OF THE POPULATION FOR SELECTED BROAD AGE GROUPS AND BY SEX FOR THE RURAL AND URBAN POPULATION, 1967¹ AND 1978

Age Group	Rural				Urban			
	Male		Female		Male		Female	
	1967	1978	1967	1978	1967	1978	1967	1978
0-14	46.2	48.2	42.6	45.9	32.2	38.2	38.4	43.4
15-44	36.6	35.7	41.8	39.6	55.9	50.9	51.9	47.1
65+	6.3	4.9	5.2	3.9	2.2	2.2	2.5	2.4

¹ The 1967 data refer to Mainland Tanzania only.

to 44 for the 1967 population are 37 and 42 percent respectively for males and females in the rural areas while the corresponding percentages for the urban population are 56 and 52. The corresponding figures for the 1978 census have been observed to be 36 and 40 percent respectively for males and females in the rural areas as against 51 and 47 in the urban areas. The same is true for population aged 65 years and above. These figures have been summarised in Table 3.6. These disparities in age composition between the 1967 and the 1978 censuses for the urban and rural populations may be an outcome of the efforts of the government to minimize the migration from rural to urban areas. The villagilization policy started in 1973, and the relatively lower proportion of the population between the ages of 15 and 44 in 1978 over 1967 may be an indication that the rural-urban migration which favours this group may have declined.

Sex differentials by age in the rural and urban populations can be clearly seen from Figure 3.4 and Table 3.7. The latter includes comparable data for the 1967 census. From Figure 3.4 it can be observed that the sex ratio for the urban population follows a different pattern from that of the rural population.

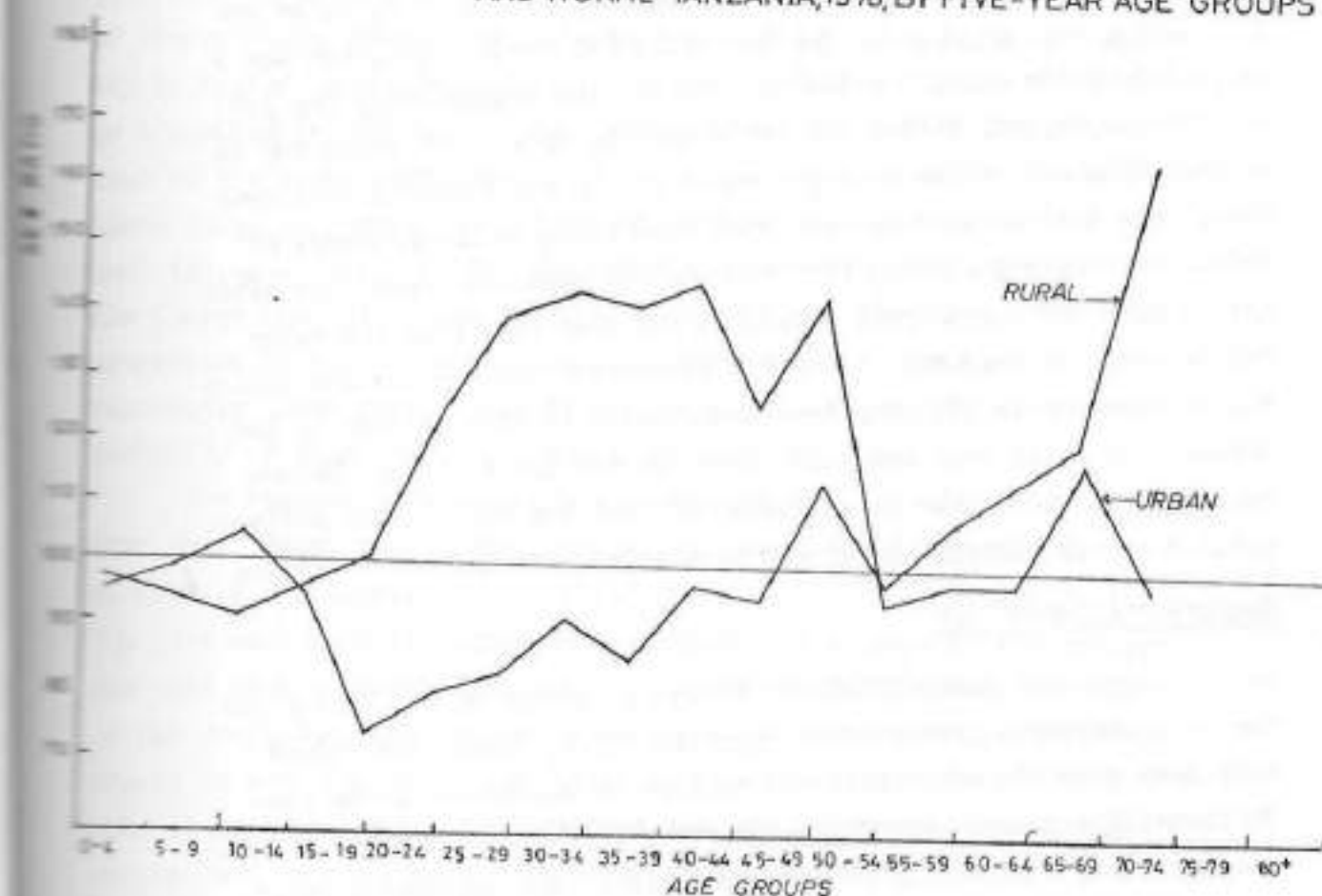
The sex ratio for the urban population starts with an excess of females over males from the first age group to the 15-19 age group and then begins to rise until it reaches 145 males per 100 females for the 45-49 age group. In fact between the age groups 30-34 and 55-59 the sex ratio is between 140 and 145 males per 100 females. The ratio for the rural population follows a different pattern. Between the ages of 15 and 55 there is an excess of females over males. This strengthens the earlier hypothesis that the rural-urban migration favours the male population rather than the female population in the working ages. For the rural population there is an excess of females over males, while for the urban population there is an excess of males over females between the ages of 20 and 55 years. The excess of males over females in the older ages for the rural population may be a result of over-enumeration for males or underenumeration for females or both.

TABLE 3.7.— SEX RATIO BY FIVE-YEAR AGE GROUPS FOR URBAN AND RURAL TANZANIA, 1967¹ AND 1978

Age Group	Rural		Urban	
	1967	1978	1967	1978
0-4	98	96	99	97
5-9	101	99	93	94
10-14	111	105	108	92
15-19	89	96	106	96
20-24	67	74	107	101
25-29	77	80	130	123
30-34	86	83	144	139
35-39	98	92	168	144
40-44	91	86	157	141
45-49	106	98	174	145
50-54	95	96	140	121
55-59	103	115	171	144
60-64	92	99	125	95
65-69	102	108	135	99
70-74	94	114	109	98
75-79	(	121	(	119
80+	(	164	(	99
All ages	94	94	118	107

¹ The 1967 data refer to Mainland Tanzania only.

FIGURE 3.4.....SEX RATIO: MALES PER 100 FEMALES FOR URBAN AND RURAL TANZANIA, 1978, BY FIVE-YEAR AGE GROUPS



Comparable figures for 1967 are given in Table 3.7 together with those for 1978. The sex ratios for the latter have already been discussed. The 1967 sex ratios by five-year age groups follow the same pattern as those for 1978, but with bigger magnitude, for both the urban and the rural populations. However, for urban areas the 1967 data indicate an excess of males over females from the 10-14 age group. The ratio continues to rise and peaks at 174 males per 100 females in the age group 45-49. This ratio does not fall below 100, even in the older age groups as it did in the 1978 census. It is interesting to note that the sex ratios for the rural popula-

tion for 1967 follow the same pattern as that for 1978, with differences in magnitude only.

The overall sex ratio for the rural population is 94 males per 100 females for both census periods while the urban population has a sex ratio of 118 and 107 males per 100 females respectively for 1967 and 1978. The drop in the sex ratio for the urban population may be an indication of either an improvement in age reporting in 1978 over 1967, or a decline in male migration from rural to urban areas, or both. The decline in male migration may be possible especially after noting that the rural-urban movements has been favouring the males rather than the females. Again the government villagelisation policy which commenced in 1973 may have contributed to this decline in the movement of males from the rural areas to the urban areas. Before concluding this section it can be added that the rural-urban differentials of the regional level can be studied from Appendixes III.1.

Regional Differentials

The percent distribution by broad age groups and by region for the 1978 census is presented in Appendix III.2. These age groups have been selected for brevity as well as to conform with the conventional age groups separating the young population, the old population and the economically active population. The dependency ratio can be computed from summing the young and old population together and dividing this sum by the economically active population. Here the young population is under the age of 15 years; the old population is aged 65 years and above; while the economically active population is aged between 15 and 64 years.

The proportions for Tanzania as a whole are 47 and 46 percent for the young population, 49 and 51 percent for the economically active population, and 4 and 4 percent for the old population, respectively for males and females. There are regional disparities for these proportions and these may be partly due to the demographic behaviour being experienced in some of these regions and partly due to the extent of underenumeration or over enumeration or both. The

regions with the youngest population with respective percentages for males and females in parentheses are Kilimanjaro (50,48), Iringa (52,47), Mara (52,48), Pemba North (54, 51), and Pemba South (53,50). One of the possible reasons for this high proportion of a young population may be higher levels of fertility or lower infant and child mortality or a combination of both. The regions with relatively low proportions of the young population are: Morogoro (44,44), Coast (44,42), Lindi (42,41), Mtwara (43,41) Dar-es-Salaam (36,43), and Zanzibar West (43,46). The last two are urban centres which are affected by the immigration of adults seeking employment and therefore reduce the proportion of the young population. Some possible reasons for this relatively lower proportions of the young population, may be low fertility or high infant and child mortality or both.

The regions with relatively higher proportions of the old population are: Coast (8,6), West Lake (6,6), Zanzibar Central (7,5), Singida (6,6), Zanzibar North (6,5), Lindi (6,5), and Kilimanjaro (5, 5). The most notable region here is Coast and a possible explanation for this high proportion of the old population may be its proximity to Dar-es-Salaam, the largest urban centre in the country. One hypothesis is that Dar es Salaam having been the headquarters of the Government as well as the leading business centre, had attracted a lot of people, who on retirement from their jobs in government and business moved to the Coast region where they had established their permanent homes. In the case of other regions, a possible explanation for their having a relatively high proportion of the old population is either a low level of mortality or a high degree of exaggeration in age reporting or both. The regions with relatively low proportions of the old population are Dar-es-Salaam (2,2), Iringa (3,3), Mwanza (4,3) and Mara (4,3). The case for Dar-es-Salaam may be due to its being the leading centre for government and business activities. Once people retire from their jobs here, they decide either to return to their original places of birth or migrate to other regions where they establish their permanent residences. The case for the other regions can be explained by a possibility relatively high adult mortality.

TABLE 3.8.— REGIONAL SEX RATIOS

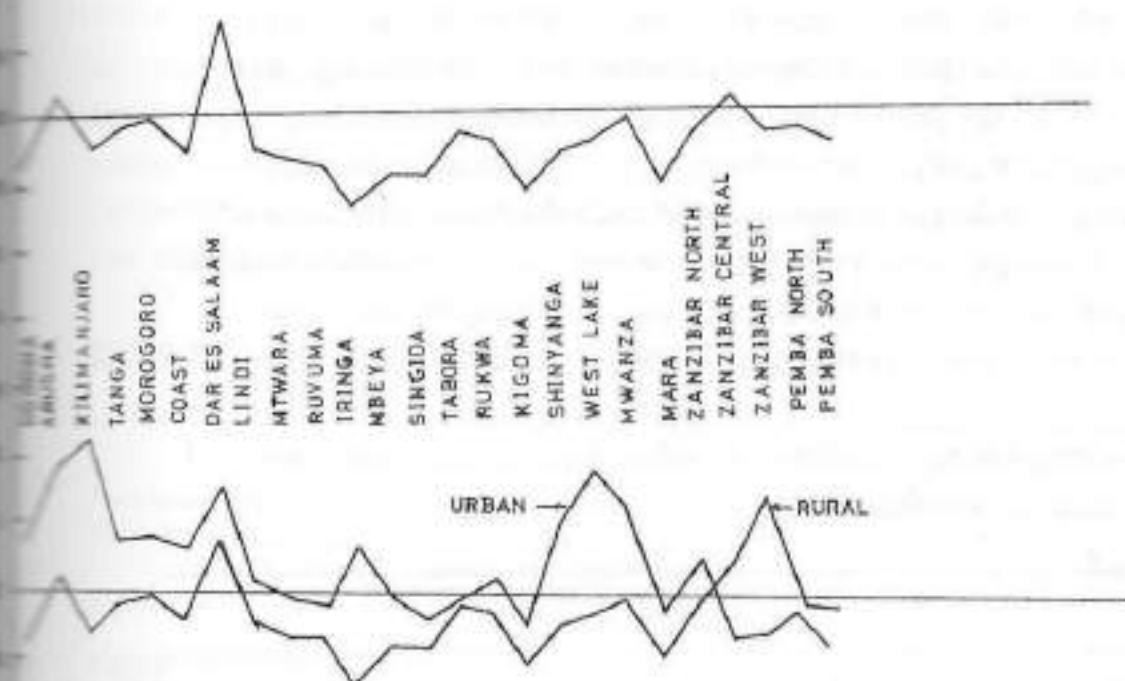
Region	1978			1967
	Rural	Urban	Total	Total
Dodoma	93	108	94	94
Arusha	102	119	104	103
Kilimanjaro	94	122	96	95
Tanga	98	107	99	105
Mbogo	99	107	100	98
Coast	95	106	96	98
Dar es Salaam	107	115	114	*
Lindi	95	101	95	*
Mtwara	93	99	93	*
Ruvuma	92	97	93	90
Iringa	86	106	87	88
Mbeya	91	97	92	*
Singida	91	95	91	87
Tabora	98	99	98	*
Rukwa	96	101	97	*
Kigoma	89	95	89	84
Shinyanga	95	110	95	94
West Lake	96	118	97	92
Mwanza	98	112	100	99
Mara	90	97	90	91
Zanzibar North	98	104	99	*
Zanzibar Central	104	94	103	*
Zanzibar West	114	94	98	*
Pemba North	99	97	99	*
Pemba South	99	92	98	*
Tanzania	94	107	96	95

* Comparable data not available because of geographical coverage.

The regional sex ratios are presented in Table 3.8 and Figure 3.5 both for rural and urban areas and for the total regional population. The latter sex ratios range from a low of 87 males per 100 females for Iringa region to a high of 114 for Dar-es-Salaam region. There are only three regions with an excess of males over females and these are Arusha with a sex ratio of 104, Dar-es-Salaam with a ratio of 114 and Zanzibar Central with a ratio of 103. The regions with very low sex ratios are Iringa with a ratio of 87, Kigoma with a ratio

FIGURE 3.5.....SEX RATIO BY REGION: MALES PER 100 FEMALES

TOTAL POPULATION



of 89, Mara with a ratio of 90 and Singida with a ratio of 91. A possible reason for the very low ratios could be a high rate of outmigration for males.

Urban rural differentials in the sex ratio for the regions portray an interesting pattern. Except for the Zanzibar regions the urban sex ratios are higher than the rural sex ratios for all the regions. Thirteen out of the twenty Mainland regions have an excess of males over female in the urban areas, with Arusha, Kilimanjaro, Dar-es-Salaam and West Lake topping the list with respect-

ive sex ratios of 119, 122, 115 and 118. Two Mainland regions have very low urban sex ratios. These are Singida and Kigoma both with a ratio of 95 males per 100 females.

Comparison with Other Countries

The population of Tanzania is not very much different from population of other developing countries. This is characterised by large proportions of the young population and a relatively small proportion of the old population. Some comparative figures for other countries are presented in Table 3.9. Tanzania Mainland, Zanzibar, Kenya, Zambia and Ghana are all developing countries while Sweden is a developed country. The contrasts in the age distribution between Sweden and the others are obvious. The proportion of the young population (aged below 15 years) is 21 percent for Sweden

TABLE 3.9.— PERCENT DISTRIBUTION OF POPULATION BY SELECTED AGE-GROUPS FOR SELECTED COUNTRIES

Country	Age group			
		0-14	15-64	65+
Tanzania Mainland	1967	43.9	50.5	5.6
	1978	46.1	49.8	4.1
Zanzibar	1967	42.8	52.4	4.8
	1978	48.7	46.8	4.5
Kenya	1967	48.4	48.0	3.6
	1969	46.3	51.5	2.2
Zambia	1970	46.9	49.5	3.6
Ghana	1973	20.7	64.7	14.5
Sweden				

Source: United Nations, Demographic Yearbook, 1974.

while the percentage for Tanzania and the other African countries is in the mid-forties. The proportion of the old population (aged 65 years and above) is over 14 percent for Sweden while that for Tanzania and the other countries ranges between 2 and 6 percent. In fact the 6 percent for Tanzania in 1967 may have been an outcome

of age over-reporting rather than an actual proportion. These differences in the age composition between the developed and the less developed countries are due to the demographic behaviour pertaining to these countries. The less developed countries have been experiencing relatively high fertility and relatively high but rapidly declining mortality. This type of behaviour has resulted in a population with a very high proportion of the young and a very low proportion of the old population. The developed countries on the other hand have been experiencing very low fertility as well as very low mortality. This behaviour has caused their population to be almost stable with a relatively low proportion of the young population and a sizeable proportion of the old population.

TABLE 3.10.— SEX RATIOS FOR SELECTED COUNTRIES

Country	Year	Sex ratio
Tanzania Mainland	1967	95
	1978	96
Zanzibar	1967	101
	1978	99
Kenya	1969	100
Zambia	1969	96
Ghana	1970	98
Sweden	1973	99

Source: United Nations, Demographic Yearbook, 1974.

The sex ratios for the same countries are presented in Table 3.10. Tanzania is not unique in this case, and nor is Sweden. Many of the countries in the world have a sex ratio close to 100, with a slight excess of females over males.

MARITAL STATUS

Marital status was enumerated in the detailed questionnaire under four categories: single, married, widowed and divorced. Those who had never married were enumerated as single; those currently married — religious ceremony, civil marriage, traditional marriage, and consensual unions — were enumerated as married; those enumerated

as widowed included all those whose spouses were dead but who had never remarried; the divorced category included all those who reported being permanently separated either by divorce or by informal separation.

The distribution of the male and female population by marital status is shown in Tables 3.11 - 3.13 for the whole of Tanzania, Tanzania Mainland, and Zanzibar, respectively. For Tanzania as a whole around 64 percent of the males are single as compared with 54 percent for females. On the other hand, less than one percent of the males and 5 percent of the females are widowed. The proportion currently married are 33 and 38 percent respectively for males and females. The main difference between the male and female distributions by marital status is that the male tend to remain single for a longer period than the females. The marital distribution of the population reaches a close parity in the age group 35-39 years after which the proportion of married males in each age group exceeds that of the females. This is because relatively few males have been reported as widowed which may be due to the fact that males, whose spouses died, remarried more frequently than females. This is particularly so after age 40 when the relative differences in the proportion widowed between the males and females are very large. This is in conformity with most African cultures where marriage is linked to fertility, and therefore women whose chances of bearing children are minimal have little or no chance at all of getting remarried.

The pattern of marital status for Tanzania Mainland follows that of the whole of Tanzania. But that for Zanzibar is slightly different. Over 95 of the females have been married by the age of 25 years compared with less than 80 percent for Mainland. This may contribute to the higher fertility observed in Zanzibar than that observed in the Mainland. For Zanzibar, marital distribution of the population reaches a very close parity in the age group 30-34 years while that for the Mainland is reached at age group 35-39 years. The proportion divorced in all age group are relatively higher, for both males and females, in Zanzibar than in the Mainland. This may reflect a higher level of marital instability in

TABLE 3.11.—PERCENT DISTRIBUTION OF THE POPULATION BY FIVE-YEAR AGE GROUP, SEX AND MARITAL STATUS FOR THE WHOLE OF TANZANIA: 1978

Age Group	Single		Married		Divorced		Widowed		Total		Sex Ratio
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	
0-4	100	100	0	0	0	0	0	0	100	100	96.1
5-9	100	100	0	0	0	0	0	0	100	100	98.5
10-14	99.9	99.1	0.1	0.9	0	0	0	0	100	100	103.1
15-19	96.5	62.5	3.4	35.7	0	1.6	0	0.2	100	100	95.8
20-24	65.4	16.1	33.0	78.7	1.4	4.5	0	0.7	100	100	79.0
25-29	28.6	5.3	68.2	87.9	2.9	5.3	0.3	1.5	100	100	86.8
30-34	11.8	2.9	83.1	89.1	4.3	5.5	0.7	2.5	100	100	90.6
35-39	7.5	1.9	86.7	87.3	4.9	6.4	0.9	4.4	100	100	98.4
40-44	5.1	1.6	88.4	84.0	5.1	7.3	1.5	7.1	100	100	92.2
45-49	4.4	1.2	88.1	78.2	5.8	8.5	1.6	11.9	100	100	102.8
50-54	3.7	1.6	87.4	70.3	6.4	9.5	2.5	16.6	100	100	98.6
55-59	3.3	1.7	87.7	63.1	5.8	9.8	3.2	25.4	100	100	117.2
60-64	2.8	1.4	85.6	51.2	7.2	11.1	4.4	36.3	100	100	98.3
65-69	3.0	1.4	83.8	45.0	7.5	9.3	5.7	44.3	100	100	107.5
70-74	3.0	1.9	81.5	35.9	7.4	9.7	8.1	52.5	100	100	113.1
75-79	3.1	1.7	82.4	30.6	5.8	9.4	8.7	58.4	100	100	120.9
80+	3.1	3.1	74.3	22.9	7.1	7.1	15.5	15.5	100	100	122.5
All ages	64.4	53.9	32.7	38.0	2.0	3.2	0.9	5.0	100	100	96.2

TABLE 3.12.— PERCENT DISTRIBUTION OF THE POPULATION BY FIVE-YEAR AGE GROUPS, SEX AND MARITAL STATUS FOR TANZANIA
MAINLAND, 1978

Age Group	Single		Married		Divorced		Widowed		Total		Sex Ratio
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	
0-4	100	100	0	0	0	0	0	0	100	100	96.1
5-9	100	100	0	0	0	0	0	0	100	100	98.6
10-14	99.9	99.2	0.1	0.8	0	0	0	0	100	100	102.9
15-19	96.6	63.2	3.3	35.0	0.1	1.6	0	0.2	100	100	95.9
20-24	65.7	16.3	32.8	78.5	1.4	4.4	0.1	0.7	100	100	78.9
25-29	28.9	5.5	68.0	87.9	2.8	5.2	0.3	1.4	100	100	86.6
30-34	11.9	2.9	83.0	89.1	4.4	5.4	0.7	2.5	100	100	90.8
35-39	7.5	2.0	86.7	87.4	4.9	6.3	0.9	4.3	100	100	98.2
40-44	5.1	1.6	88.4	84.1	5.0	7.1	1.5	7.2	100	100	92.3
45-49	4.4	1.4	88.2	78.3	5.8	8.4	1.6	11.9	100	100	102.3
50-54	3.7	1.6	87.5	70.4	6.3	9.2	2.5	18.8	100	100	98.6
55-59	3.3	1.7	87.8	63.2	5.7	9.6	3.2	25.5	100	100	116.7
60-64	2.7	1.5	85.9	51.2	7.0	10.7	4.4	36.6	100	100	98.0
65-69	3.0	1.4	83.9	45.1	7.4	9.0	5.7	44.5	100	100	106.8
70-74	2.9	1.9	81.7	35.9	7.2	9.2	8.2	53.0	100	100	113.0
75-79	3.1	1.6	82.7	30.6	5.5	9.1	8.7	58.7	100	100	119.8
80+	3.1	2.4	74.5	22.6	6.7	6.2	15.7	68.8	100	100	123.5
All ages	64.5	53.9	32.7	38.0	1.9	3.1	0.9	5.0	100	100	

TABLE 3.13.— PRESENT DISTRIBUTION OF THE POPULATION BY FIVE-YEAR AGE GROUPS, SEX AND MARITAL STATUS FOR ZAMBIA, 1973

Age Group	Single		Married		Divorced		Widowed		Total		Sex Ratio
	Males Females		Males Females		Males Females		Males Females		Males Females		
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	
0-4	100	100	0	0	0	0	0	0	100	100	97.2
5-9	100	100	0	0	0	0	0	0	100	100	96.7
10-14	99.8	96.2	0.2	3.6	0	0.2	0	0	100	100	109.4
15-19	95.0	35.3	4.7	60.5	0.2	3.5	0.1	0.7	100	100	93.9
20-24	53.9	4.8	43.6	85.0	2.2	8.6	0.3	1.6	100	100	81.7
25-29	117.7	2.0	77.8	86.7	3.9	9.1	0.6	2.2	100	100	91.3
30-34	7.5	1.0	87.4	87.5	4.2	8.7	0.9	2.8	100	100	85.8
35-39	4.3	0.8	89.7	84.7	5.4	10.3	0.5	4.2	100	100	108.5
40-44	4.7	1.0	88.0	79.9	6.3	12.5	1.0	6.6	100	100	90.2
45-49	4.1	1.2	86.7	74.1	7.8	15.6	1.4	9.1	100	100	126.1
50-54	4.0	1.2	84.7	65.5	9.1	19.0	2.2	14.3	100	100	98.2
55-59	4.3	1.3	83.1	60.7	10.2	19.2	2.4	18.7	100	100	145.8
60-64	5.3	0.8	77.7	49.8	12.5	23.1	4.5	26.3	100	100	107.5
65-69	4.5	1.0	78.1	40.2	13.4	25.5	4.0	33.3	100	100	147.8
70-74	4.2	1.1	75.4	35.9	14.6	22.9	5.8	40.1	100	100	116.2
75-79	3.9	2.2	72.7	28.0	16.8	26.6	6.6	43.2	100	100	183.4
80+	2.6	1.5	69.1	27.7	17.2	23.5	11.1	47.3	100	100	101.4
All ages	64.0	52.4	32.3	37.6	2.9	5.8	0.8	4.2	100	100	98.8

Zanzibar than in the Mainland. However, the proportions widowed, for both sexes, are lower in Zanzibar than in the Mainland. This may reflect a higher rate of remarriages for both widows and widowers in Zanzibar than in the Mainland. However errors of misclassification for the marital categories of single, divorced and widowed should not be discounted in both Zanzibar and the Mainland. It is hard to explain the case for Zanzibar where over 4 percent of the males remain single for the rest of their lives. There may be a possibility of classifying widowed males as single particularly in the older age groups. The high proportions of widowed females in the older age groups may also reflect the higher mortality for males than for females, which should be expected. However, this contradicts the pattern of the observed sex ratios by age group which give greater number of males than females in the older age groups. This point has been discussed earlier.

SUMMARY AND CONCLUSIONS

This chapter has been concerned with the age, sex and marital status using the actual data collected in the 1978 census. The exercise of evaluating the quality of the data was undertaken in Chapter 2. Any conclusions drawn in this chapter are therefore based on the actual data regardless of their quality. Some comparisons between the 1978 and the 1967 censuses have also been made whenever the coverage allowed.

The percent distribution of the population by five-year age group revealed that Tanzania still has a relatively young population. The proportion of the population under the age of 15 years is over 45 percent for both males and females while for the population aged 65 years and over it is under 5 percent for both males and females. This is typical of the less developed countries which have relatively high fertility and medium but declining mortality. The effect of migration in Tanzania as a whole is negligible and therefore this relatively young population for Tanzania has been an outcome of the high fertility. The population pyramid in Figure 2.3 confirms this where the broad base is an indication of a population experiencing high fertility, while the rapid narrowing towards the vertex is an outcome of a population with

a relatively high mortality. The analyses on fertility and mortality have shown this to be true for Tanzania and further discussions on these issues can be found in the relevant chapters.

The sex ratio has been the principal measure of sex composition in this discussion. The overall sex ratio for the whole of Tanzania is 96 males per 100 females. This does not deviate much from the 1967 census. Even the pattern of the sex ratio by age for the two censuses is the same. However, this pattern indicates an effect of age misreporting during the two censuses with the 1967 census having more age distortions than the 1978 census.

Analysis on marital status was rather limited by the data collected in the detailed questionnaire. Marital status was categorised into four groups which were single, married, divorced, and widowed. There was no information collected on age at first or subsequent marriage, age at widowhood or divorce, and neither were data on polygamy collected. It was therefore not possible to have detailed analysis on marital status and therefore the discussion on this topic covered only the four broad categories listed above with little or no implications at all on the patterns that were observed.

This chapter also has presented analyses on Tanzania Mainland and Zanzibar as well as urban and rural areas separately. In addition, broad regional comparisons were made. In the case of Zanzibar the effect of outmigration on the age structure was observed. The proportion of the economically active population in Zanzibar was observed to have declined between the 1967 and the 1978 censuses. This indicated that the outmigration in Zanzibar favoured the young and active population. A similar but stronger phenomenon was observed in the age composition of the urban and rural areas. However, this age selective migration to the urban areas also favours the males more than the females. It was also observed that there were disparities in the age composition between the 1967 and 1978 censuses for the urban and rural areas. The relatively lower proportion of the economically active population in the urban areas in 1978 over 1967 may be an outcome of the government efforts on the villagization policy which started in 1973. However, it has to be noted that there was a change in the defi-

nition of urban population between the two censuses, and this may have a slight effect on the disparities in the proportion between the two censuses.

There is not much to note on the regional comparisons. Part of the reason is that no detailed analyses were undertaken. To have achieved this it would have been necessary to do the same for all the 25 regions. Perhaps such an exercise can be undertaken at a later stage and published separately as a Census Occasional Paper of the Bureau of Statistics.

REGION	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65+
Dodoma	18.7	16.7	13.2	10.3	5.6	6.0	5.0	5.3	3.1	3.6	2.8	3.0	2.1	4.7
Arusha	18.7	16.8	12.8	9.4	7.2	7.0	5.1	5.3	3.4	3.5	2.6	2.4	1.5	4.3
Kilimanjaro	18.1	18.0	15.6	10.3	5.8	4.6	4.1	4.3	3.5	3.6	2.6	2.5	1.8	5.1
Tanga	17.7	17.5	12.9	9.1	5.1	5.7	5.2	5.4	3.8	4.2	3.1	2.6	2.3	5.3
Morogoro	17.1	15.5	12.1	9.6	6.2	7.2	5.4	5.4	4.2	4.2	3.1	2.9	2.2	5.1
Coast	16.9	16.5	10.9	7.9	4.4	5.6	4.6	5.3	4.2	4.6	3.8	3.3	3.5	8.4
Dar es Salaam	14.6	13.6	8.8	8.7	7.4	7.8	5.7	6.5	4.2	5.2	3.9	3.1	3.3	7.2
Lindi	16.7	15.0	11.1	9.9	5.5	6.4	5.7	5.7	4.5	4.4	3.3	3.0	2.8	5.9
Mtwara	16.2	13.6	11.4	9.4	6.6	6.2	6.2	6.1	4.2	4.7	2.9	2.9	2.3	5.1
Nyasa	18.4	16.8	13.1	10.4	6.4	6.1	4.8	4.8	3.8	3.7	2.7	2.3	2.0	4.4
Iringa	20.6	18.1	14.8	10.4	5.9	6.2	4.3	4.4	2.8	3.2	2.1	2.0	1.6	4.5
Mbeya	18.5	16.8	13.6	10.2	6.3	6.4	4.7	4.7	3.6	3.9	2.5	2.4	2.1	4.3
Singida	17.9	16.6	13.4	9.8	4.8	5.6	4.8	4.8	3.7	4.2	3.1	3.0	2.4	5.8
Tabora	18.2	16.0	11.4	9.1	6.1	7.4	5.5	4.8	4.0	4.2	3.1	2.5	2.5	5.1
Nkaya	20.6	15.7	13.3	9.7	7.4	7.1	5.0	4.4	3.3	3.4	2.0	1.4	1.6	4.5
Kigoma	21.3	16.5	12.6	9.6	5.7	6.5	4.5	4.5	3.1	3.5	3.0	2.5	2.0	4.7
Shinyanga	18.4	17.9	13.0	9.6	6.2	7.3	5.1	4.6	3.6	3.2	2.6	2.1	2.0	4.2
West Lake	18.6	15.2	12.6	9.7	7.0	6.5	4.7	4.8	3.4	3.7	2.8	2.3	2.3	6.1
Kwanza	18.7	16.7	12.6	9.3	7.1	7.2	5.2	4.9	4.0	3.4	2.7	2.4	1.9	3.8
Mara	20.1	17.9	14.9	10.3	5.8	5.0	4.3	3.9	3.4	3.3	2.7	2.6	1.7	4.0
Zanzibar North	18.9	19.3	11.1	9.4	5.6	6.3	4.4	4.0	4.1	3.2	3.2	1.8	3.0	5.9
Zanzibar Central	16.3	17.6	13.0	10.0	5.8	4.9	4.2	0.6	4.2	3.3	4.0	2.6	3.3	6.8
Zanzibar West/Town	15.9	14.1	10.9	13.4	9.1	6.4	4.6	4.2	3.8	3.9	3.0	2.2	3.0	5.4
Pemba North	22.0	20.2	12.7	8.5	4.9	5.6	4.5	3.7	3.4	2.5	3.0	1.3	2.7	4.8
Pemba South	20.2	20.2	13.2	9.7	4.9	5.1	4.3	4.2	3.7	2.7	2.8	1.3	2.7	4.9
Tanzania	18.5	16.7	12.9	9.7	6.9	6.4	4.9	4.9	3.7	3.8	2.8	2.5	2.1	4.6
Mainland	18.4	16.7	12.9	9.7	6.1	6.4	4.9	4.9	3.7	3.8	2.8	2.5	2.1	4.8
Zanzibar	19.4	19.0	12.4	9.8	5.6	5.6	4.4	4.0	3.8	3.0	3.2	1.7	2.9	5.4

AGE

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
Dodoma	18.0	15.8	11.8	9.8	7.5	7.9	5.5	5.2	3.8	3.8	2.5	2.3	2.3	3.8
Arusha	19.6	16.6	11.9	9.8	8.4	7.7	5.6	4.9	3.3	3.2	2.2	1.7	1.6	3.5
Kilimanjaro	17.2	16.8	14.6	10.3	7.5	6.2	4.8	4.6	3.6	3.2	2.7	1.8	2.0	4.8
Tanga	17.9	17.1	12.1	9.7	7.4	7.4	5.9	5.0	3.9	3.5	2.7	1.8	2.0	3.7
Morogoro	17.6	15.4	11.2	9.6	7.8	8.0	5.9	5.8	4.0	4.1	2.8	2.2	2.0	3.7
Gesati	16.9	15.4	9.3	7.5	6.4	7.2	6.6	5.8	4.8	4.3	3.9	2.9	2.7	6.5
Dar es Salaam	16.7	14.8	8.5	7.2	7.2	7.6	6.3	6.4	4.8	4.8	3.6	2.3	2.3	6.2
Lindi	16.7	14.5	9.7	8.0	7.6	8.0	7.0	6.3	5.0	4.1	3.0	2.4	2.7	5.0
Kivara	15.8	14.6	10.2	9.2	8.0	8.6	5.9	6.2	5.0	4.4	3.0	2.4	2.2	4.6
Pwani	17.6	15.6	11.9	9.5	8.2	7.4	5.8	5.4	4.1	3.4	3.1	2.1	2.0	3.7
Iringa	18.8	16.2	12.3	9.9	8.6	7.6	5.6	5.0	3.5	3.5	2.3	1.9	1.6	3.1
Mbeja	18.1	15.6	11.8	9.8	7.9	7.7	5.7	5.2	4.2	3.9	2.7	2.2	1.9	4.3
Singida	16.9	15.0	11.6	8.5	7.2	7.5	5.5	5.1	4.3	4.5	3.4	2.7	2.8	5.0
Tabora	18.7	15.5	10.3	9.1	8.0	7.8	6.2	5.1	4.1	3.7	3.2	2.1	2.3	4.0
Ruhia	20.8	15.4	12.3	11.1	8.7	7.7	5.1	4.2	3.4	2.7	2.2	1.4	1.5	3.5
Ligoma	19.8	14.8	10.7	9.8	8.1	8.2	5.5	5.0	4.1	4.2	2.9	2.2	1.6	3.0
Shinyanga	18.2	17.4	11.8	9.9	7.8	8.1	5.6	4.7	3.7	3.2	2.5	2.0	1.8	3.3
West Lake	18.4	15.1	11.8	9.1	7.6	7.0	4.8	4.8	3.8	3.5	3.2	2.0	2.7	6.0
Kwana	19.1	16.6	11.9	9.9	8.1	7.4	5.7	4.5	4.3	3.2	2.5	2.0	1.8	3.0
Kara	18.6	16.2	13.2	9.8	8.0	7.1	4.9	4.5	3.7	3.7	2.7	2.0	2.0	3.6
Zanzibar North	19.5	19.4	9.3	9.9	7.2	6.2	5.6	3.9	4.5	2.7	3.3	1.4	3.6	4.6
Zanzibar Central	17.8	17.7	11.6	9.5	6.7	5.8	5.5	4.0	4.8	2.7	4.2	1.5	3.3	5.0
Zanzibar West/Town	18.7	17.0	11.1	10.6	7.6	6.8	5.0	4.1	4.0	2.7	3.5	1.7	2.5	4.7
Pemba North	21.5	19.9	10.1	9.1	7.5	6.8	5.9	3.3	4.3	2.2	2.7	0.8	2.3	3.3
Pemba South	20.1	19.9	10.6	9.3	7.3	5.9	5.6	3.8	4.5	2.2	3.2	1.0	2.4	4.2
Zanzania	18.1	15.9	11.6	9.5	7.8	7.5	5.6	5.0	4.0	3.5	2.8	2.1	2.0	4.1
Mafiland	18.1	15.9	11.7	9.5	7.8	7.6	5.6	5.0	4.0	3.6	2.7	2.1	2.0	4.0
Zanzibar	19.9	19.2	10.4	9.5	7.3	6.4	5.6	3.7	4.5	2.4	3.2	1.2	3.5	4.2

AGE

REGION	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
Dodona	15.4	12.7	10.4	11.7	11.8	10.1	7.2	5.9	4.2	3.3	2.0	2.0	1.1	2.3
Arusha	15.6	11.1	8.3	11.0	14.7	13.1	8.3	6.6	3.8	2.9	1.5	1.2	0.8	1.3
Kilimanjaro	14.7	11.8	8.2	12.5	14.4	12.6	6.7	5.9	4.0	2.9	1.8	1.5	1.0	2.0
Tanga	15.5	13.5	10.0	10.8	9.7	9.6	6.8	6.5	4.4	4.2	2.7	2.2	1.5	2.5
Morogoro	15.6	12.7	9.6	9.9	11.2	11.1	7.4	6.6	4.4	3.8	2.2	1.9	1.2	2.3
Coast	16.0	13.2	9.2	12.4	10.1	8.8	6.0	5.3	3.7	3.7	2.9	2.2	2.2	4.4
Dar es Salaam	15.2	12.1	8.3	9.8	11.4	13.4	8.9	7.1	4.4	3.6	1.9	1.4	1.0	1.4
Lindi	15.8	12.9	9.6	12.0	9.8	9.9	7.2	6.3	4.2	3.9	2.3	1.7	1.5	2.7
Mtwara	15.8	14.3	9.8	9.3	8.3	10.8	7.3	7.1	4.4	3.8	2.6	2.0	1.5	3.1
Ruvuma	17.1	14.0	10.1	10.3	10.8	18.8	7.8	5.9	3.8	3.2	2.0	1.5	1.0	2.1
Iringa	16.1	12.8	10.1	14.2	12.7	10.2	7.1	5.5	3.4	2.7	1.8	1.2	0.7	1.5
Moysa	17.6	14.0	10.8	11.0	10.0	10.3	7.1	6.0	4.0	3.4	1.9	1.6	0.9	1.4
Singida	17.4	14.3	11.2	9.7	7.9	8.2	6.7	6.3	4.1	3.9	2.3	2.2	1.6	4.1
Tabora	16.7	12.8	9.8	10.1	9.5	10.1	6.7	6.0	3.9	4.0	2.6	2.3	1.6	3.7
Rukwa	18.3	14.2	11.0	11.2	9.5	9.0	6.3	5.4	3.8	3.3	2.3	1.8	1.3	2.7
Kigoma	19.6	15.6	11.4	10.5	8.4	8.6	5.7	5.0	3.4	3.2	2.2	1.9	1.5	1.9
Shinyanga	16.9	12.9	9.4	10.2	11.6	11.9	7.5	6.4	4.0	3.0	1.8	1.6	0.7	1.8
West Lake	14.9	9.6	7.7	13.9	14.8	12.0	6.9	5.8	4.3	3.2	2.0	1.6	1.0	2.4
Mwanza	16.4	11.5	8.2	9.6	12.4	12.8	8.5	6.6	4.3	3.3	2.0	1.6	1.0	1.8
Mara	18.8	14.2	10.4	10.3	10.3	9.6	7.2	5.8	3.9	3.3	2.0	1.5	3.1	6.3
Zanzibar North	17.5	18.7	12.5	10.4	5.3	5.9	3.7	4.0	4.5	2.9	3.3	1.9	3.2	7.1
Zanzibar Central	17.6	16.4	14.4	9.2	4.8	4.6	3.8	3.2	5.4	3.3	3.8	3.0	2.2	3.8
Zanzibar West	17.5	15.3	11.1	9.3	8.7	8.1	5.9	4.8	4.3	3.8	3.1	2.1	2.9	4.3
Pemba North	19.6	16.3	12.4	9.3	5.8	6.1	5.2	4.8	4.2	3.6	3.4	2.0	2.7	4.3
Pemba South	18.0	17.3	14.2	8.8	5.3	5.9	4.8	4.6	4.4	3.3	3.2	2.1	2.7	4.3
Tanzania	16.1	12.9	9.3	10.4	10.9	11.4	7.7	6.4	4.2	3.5	2.2	1.7	1.2	2.2
Malindi	16.0	12.7	9.2	10.5	11.1	11.6	7.8	6.5	4.2	3.5	2.1	1.7	1.1	2.2
Zanzibar	17.9	15.8	11.7	9.3	7.8	7.5	5.6	4.8	4.3	3.7	3.2	2.1	2.4	4.1

APPENDIX III.1.—URBAN AREAS, FEMALES

REGION	AGE														
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 +	
Bodoma	17.4	14.5	12.2	11.9	11.0	9.1	5.6	4.7	3.0	2.9	1.9	1.5	1.6	2.8	
Arusha	18.3	13.7	10.2	14.3	14.5	10.6	5.6	4.0	2.5	1.8	1.3	0.9	0.9	1.5	
Kilimanjaro	18.0	14.4	11.1	11.6	13.1	10.4	5.7	4.4	3.0	2.3	1.7	1.1	1.0	1.4	
Tanga	17.4	15.2	11.8	12.2	10.4	9.3	5.7	4.9	3.6	2.9	2.0	1.3	1.3	2.1	
Morogoro	16.9	14.3	11.4	11.3	11.4	9.8	6.2	5.2	3.3	3.1	2.0	1.5	1.3	2.4	
Coast	17.1	14.9	10.6	9.9	9.3	8.2	5.6	5.1	4.0	3.3	3.0	1.8	2.3	4.9	
Dar es Salaam	18.0	14.8	10.6	11.5	12.8	11.0	6.2	4.9	2.8	2.3	1.5	1.0	1.0	1.6	
Lindi	16.7	14.6	9.8	11.6	9.9	10.4	6.8	5.6	3.9	2.9	1.9	1.3	1.7	2.9	
Mtwara	16.1	14.8	9.7	11.0	11.1	10.3	6.6	5.7	3.7	3.1	2.2	1.3	1.4	2.9	
Evruwa	17.5	14.6	10.4	12.2	12.7	9.8	5.8	4.7	3.2	2.6	1.8	1.4	1.2	2.2	
Iringa	17.6	15.0	12.7	13.1	12.3	9.6	5.3	4.4	2.5	2.2	1.4	1.0	1.0	1.7	
Mbeya	17.8	14.8	12.1	12.3	11.5	9.3	5.8	4.8	3.1	2.7	1.7	1.2	1.1	1.6	
Siigida	16.9	13.8	11.2	10.3	10.3	8.9	5.8	5.1	3.5	3.5	2.3	2.0	1.9	4.3	
Tabora	17.0	13.4	10.2	11.0	10.3	9.1	6.2	5.2	3.4	3.6	2.6	1.8	2.0	4.1	
Bukwa	19.3	15.2	11.7	10.6	10.2	9.0	5.8	5.1	3.3	2.8	1.8	1.2	1.3	2.7	
Kigoma	20.0	14.7	10.9	10.5	9.4	8.4	5.8	4.8	3.4	2.9	2.8	1.6	1.8	2.7	
Shinyanga	18.1	14.7	11.3	12.0	12.1	11.3	5.7	4.4	2.6	2.1	1.6	1.2	1.0	2.0	
West Lake	17.6	11.6	9.7	13.7	14.0	9.2	5.1	4.4	3.1	2.6	2.2	1.4	1.6	3.5	
Mwanza	18.9	13.6	9.8	12.6	12.3	10.4	5.6	4.4	3.2	2.4	1.9	1.4	1.3	2.1	
Nara	19.0	15.3	11.2	11.1	11.0	9.4	5.6	4.2	3.3	2.7	1.9	1.5	1.4	2.2	
Zanzibar North	20.0	19.6	10.0	9.3	6.9	6.5	5.3	3.9	3.4	2.0	3.6	1.4	2.9	4.6	
Zanzibar Central	17.7	16.4	12.4	8.5	7.4	6.5	5.0	3.7	4.6	3.2	3.5	1.3	3.8	5.7	
Zanzibar West	17.3	16.3	11.9	11.5	8.7	7.7	5.2	4.1	4.1	2.7	3.1	1.5	2.4	3.4	
Pwani North	19.3	17.3	12.6	11.2	8.0	7.1	5.4	3.5	4.3	2.3	2.9	0.9	2.4	2.8	
Pwani South	18.4	17.0	14.0	10.1	7.1	6.3	5.6	4.3	3.9	2.4	2.9	1.2	2.9	3.6	
Tanzania	17.8	14.7	10.9	11.7	11.6	9.9	5.9	4.8	3.2	2.6	1.9	1.3	1.4	2.4	
Mainland	17.8	14.5	10.9	11.7	11.8	10.1	6.0	4.8	3.1	2.6	1.8	1.3	1.3	2.2	
Zanzibar	17.8	16.6	12.1	11.2	8.3	7.4	5.3	4.1	4.1	2.6	3.1	1.4	2.5	3.5	

REGION	AGE GROUPS								Total Population	
	0 - 14		15 - 64		65+		Male	Female	Total	
	Male	Female	Male	Female	Male	Female				
Dodoma	47.6	45.6	47.9	50.7	4.5	3.7	470434	501574	972008	
Arusha	47.1	47.7	48.9	49.1	4.0	3.2	471379	454843	926222	
Kilimanjaro	50.3	48.2	44.8	47.2	4.9	4.6	440810	461624	902434	
Tanga	46.8	46.6	48.4	50.0	4.8	3.4	516553	521232	1037765	
Morogoro	43.7	43.9	51.6	52.6	4.7	3.5	469362	469906	939268	
Coast	43.9	41.6	48.0	52.1	8.1	6.3	252738	263847	516585	
Dar es Salaam	35.6	43.1	52.4	54.8	2.0	2.1	449915	393184	843099	
Lindi	42.3	40.9	52.0	54.4	5.7	4.7	257396	270226	527622	
Mtwara	42.7	40.5	52.2	55.1	5.1	4.4	373047	398772	771824	
Ruvuma	47.8	45.0	48.0	51.5	4.2	3.5	270106	291466	561572	
Iringa	52.1	47.1	44.6	49.9	3.3	3.0	430897	494140	925037	
Mbeya	49.3	45.4	47.7	51.4	4.0	3.2	516301	563561	1079862	
Singida	47.4	43.4	47.0	51.7	5.6	4.9	292735	321209	613944	
Tabora	44.8	44.0	50.3	52.0	4.9	4.0	404393	413512	817908	
Rukwa	48.9	48.2	46.8	48.4	4.3	3.4	222535	229368	451903	
Kigoma	50.0	45.4	45.5	51.6	4.5	3.0	306069	342873	648942	
Shinyanga	48.9	47.2	47.0	49.5	4.1	3.3	646190	677345	1323535	
West Lake	46.1	45.1	48.0	48.9	5.9	6.8	496385	513375	1009760	
Mwanza	44.8	47.1	51.6	50.0	3.6	2.9	720137	723241	1443378	
Kara	52.1	47.8	44.1	49.0	3.8	3.2	343120	380703	723823	
Zanzibar North	49.3	48.2	44.8	47.2	5.9	4.6	38270	38750	77020	
Zanzibar Central	47.0	47.1	46.2	48.0	6.8	4.9	26262	25466	51748	
Zanzibar West	43.0	45.7	52.9	50.6	4.1	3.7	70360	71678	142046	
Pemba North	53.7	51.2	41.6	43.6	4.7	5.2	52787	53503	106290	
Pemba South	53.2	50.4	42.0	45.5	4.8	4.1	48909	50103	99014	
Tanzania	46.6	45.5	49.8	50.8	4.4	3.7	8587087	8925527	17512614	

CHAPTER 4

POPULATION DISTRIBUTION AND DENSITY

by

Paul S. Mago*

INTRODUCTION

The population of a country is both a productive resource and the resource user; indeed it is the very objective of development, for it demands essential services such as education, health, food, clean water supply, transport, housing, law and order and participation in the nation's affairs. Because of these needs, it is imperative to know how many people there are and where they are located. This is particularly important in the planning and implementation of development programmes.

Population Distribution usually refers to the way people are spread within the area available to them for exploitation and settlement. Population density is a more specific expression of distribution, showing the ratio of a given number of people to a given area of land. It is an average value applied to an administrative area. To analyse distribution and density of population, one needs data on both the absolute numbers of people, and a well-defined and properly located territory. The 1978 population census covered, among other things, total population by sex and age groups for villages, wards, districts and regions. Comparisons with 1967 characteristics of the distribution and density of population can therefore be made at appropriate levels.

Between 1967 and 1978 the country undertook the massive task of ensuring that the whole rural population live in registered villages.

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The villages, however, in most cases have not been surveyed and hence their areas are not accurately known. Analysis of distribution and density demands that the areas of villages, wards and districts be known. For this chapter, the areas of all the wards in the country had to be calculated from the district enumeration maps used in the census. However, the task was compounded not only by the sheer number of wards but also by the fact that scales shown on those maps were different for most districts and were in some cases wrong scales. There have also occurred changes in the district boundaries with the creation of a large number of new districts since 1967. Published areas of districts have had to be adjusted accordingly.

DISTRIBUTION OF POPULATION IN TANZANIA

Distribution and density of population express the spatial concentration and spread of population. Density therefore reflects the areal variation of other factors such as soils, rainfall and relief. Areas with fertile soils and high rainfall usually have heavy concentrations of population and form core zones of development. Planners and policy makers are therefore faced with the problem of whether to encourage further development and growth in the high-density, high-potential areas or to create a more equitable development by stimulating development in low-density, low-potential areas¹.

The total population of Tanzania in 1978 was 17,512,60 occupying an area of 885,987 square kilometres. Out of these totals Zanzibar and Pemba had 476,111 people on 2644 square kilometres. Comparable figures for 1967 were 12,313,496 people on 885,250 square

¹J.E. Moore, 'Population distribution and density; in B. Egero and R.A. Herin (eds) The Population of Tanzania: An analysis of the 1967 Population Census, Census Vol. 6, (Dar-es-Salaam: BRAIUP and Bureau of Statistics, 1973), p.40.

kilometres for the whole of Tanzania, and 354,815 persons on 2644 square kilometres for the islands².

The population of Tanzania is unevenly distributed over the national area, a fact that has been noted in previous censuses³. The degree of uneven distribution at regional level can be seen from Table 4.1 and from Appendix IV.1 which shows distribution at district level. The regions and districts have been arranged in order of density from highest to lowest and the cumulative percentage contributions to the total population and total area Tanzania have been computed.

TABLE 4.1.— TOTAL POPULATION AND AREA BY REGION 1978

REGION	POPULATION	ACCUMULATED % OF TOTAL POPULATION	AREA (sq. km)	ACCUMULATED % OF TOTAL AREA	DENSITY (person per sq. km.)
Dar-es-Salaam	843,090	4.8	1,393	0.2	553.2
Zanzibar/Pemba	476,111	7.5	2,460	0.3	193.5
Manza	1,443,379	15.8	19,683	2.6	73.3
Ilimanjaro	902,437	20.9	13,250	4.1	68.1
Mwara	771,818	25.3	16,710	5.9	46.2
Tanga	1,037,767	31.3	26,677	9.0	38.9
W. Lake (Kagera)	1,009,767	37.0	28,456	12.2	35.5
Nara	723,827	41.2	21,760	14.6	33.2
Shinyanga	1,323,535	48.7	50,760	20.3	26.1
Dodoma	972,005	54.2	41,311	25.0	23.5
Mbeya	1,079,864	60.4	60,350	31.8	17.9
Ilgoma	648,941	64.1	37,040	36.0	17.5
Iringa	925,044	69.4	56,850	42.4	16.2
Coast	516,586	72.3	32,547	46.1	15.9
Mt. Morogoro	939,264	77.7	70,624	54.1	13.3
Mingida	613,949	81.2	49,340	59.7	12.4
Arusha	926,223	86.5	82,098	68.9	11.3
Tabora	817,907	91.2	76,150	77.5	10.7
Mvuma	561,575	94.4	63,669	84.7	8.9
Mindji	527,624	97.4	66,040	92.1	8.0
Salama	451,897	100.0	68,635	100.0	6.6
Tanzania	17,512,610		885,987		19.8

Source: Bureau of Statistics, 1978 Population census Vol. II (Dar-es-Salaam: Bureau of Statistics, 1981) and 1978 Population Census Preliminary Report, (Dar-es-Salaam: Bureau of Statistics, 1980).

²Differences in areas between 1967 and 1978 are due to errors made in the 1967 census.

³Moore, *op. cit.*, p. 41.

From Table 4.1 it can be seen that about 64 percent of the total population occupied 36 percent of the total area in 1978. The concentration becomes obvious at district level as Appendix IV.1 shows that 65 percent of the population occupied 28 percent of the total area. When analysed at ward level the concentration of population becomes more conspicuous, with 65 percent occupying only 20.6 percent of the total area.

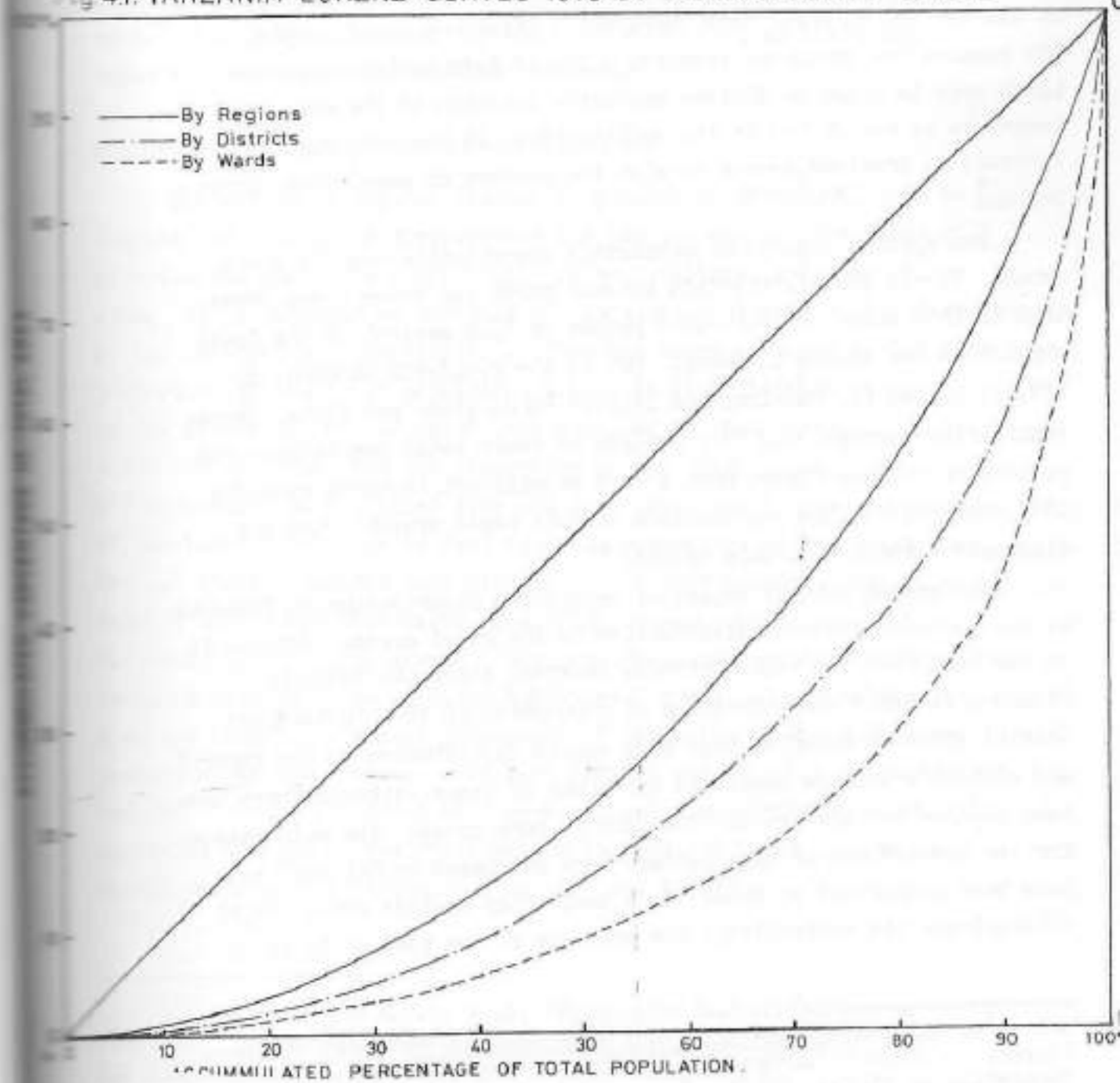
It is interesting to note that there has been a slight tendency towards a less uneven distribution of population when compared to the 1967 population distribution. When analysed at district level, 63 percent of the population occupied 25 percent of the total area and at the sub-district level 65 percent occupied only 18.8 percent of the total area in 1967. This tendency towards more spreading out is also confirmed by the analysis of percentage change in density which will be discussed later together with the reasons for such a tendency.

When the accumulated percentages of population and area are graphed against each other, a Lorenz curve of distribution is the result (Fig.4.1). The diagonal line A-C would represent a perfectly even distribution while a line coinciding with the axes A-B-C would represent a population completely concentrated at one point. Usually populations have curves somewhere between the two extremes. The size and number of areal units in the calculation influence the shape of the curve.⁴ The curve for regions, which are few in number but large in area and in population, obscures the variations which occur within the regions while districts and wards curves show greater local variations.

Comparison with the 1967 Lorenz curves of distribution reveals that although the shapes of the regional, district and division (ward) curves are similar, there is a slight flattening of the regional and district curves towards line A-C indicating a tendency towards a more even distribution in 1978 than in 1967.

⁴J.P. Cole and C.A.M. King, Quantitative Geography: Techniques and theories in Geography (London: John Wiley, 1969), p.243.

Fig 4.1: TANZANIA LORENZ CURVES 1978 BY ADMINISTRATIVE LEVEL.



The most visually effective technique of showing population is the dot map on which dots represent a given number of people. But because the technique requires a lot of information about the local area in order to achieve realistic location of the dots, the technique is restricted in its application. It has been used in Tanzania in previous census to show the pattern of population distribution.⁵

Two spatial aspects of population distribution need be considered. First, the distribution between rural and urban areas shows that in 1978 there are 2,412,900 people or 13.8 percent of the total population now living in towns. Out of the 2,412,900 in towns, 2,257,121 are on the Mainland and 154,979 in Zanzibar and Pemba, representing 13.3 percent and 29.4 percent of their total populations respectively. These figures show a very significant increase over the 1967 figures, but the implications of this rapid urbanization are discussed elsewhere in this volume.

The second spatial aspect of population distribution in Tanzania is the pattern of uneven distribution in the rural areas. Suffice it to say here that the basic pattern, observed since the 1930s by Gillman, of heavy concentrations of population in the highland and coastal areas contrasting with very sparse distribution in the central and plateau areas has persisted for about 50 years although there have been changes in relative distribution in many areas. The main reasons for the persistence of this pattern were discussed by Gillman⁶ and have been summarized by Moore⁷ in a map. They include total annual rainfall and its reliability; the presence of the tsetse fly in an

⁵C. Gillman, A Population Map of Tanganyika Territory (Dar-es-Salaam: Government Printer, 1936); P.W. Porter, 1966 'East African Population as of Aug. 1962', Map supplement No. 2 Annals, Association of American Geographers, Vol. 56 No.1 (1966); and Atlas of Tanzania, 1976, p.16. The work on dot maps for 1978 is in progress at the University of Dar-es-Salaam.

⁶Gillman, op.cit.

⁷Moore, op.cit., p.44.

area about 60 percent of the country; predominance of infertile, leached soils, and low level of technology for altering the environment.⁸ The 1978 pattern of population distribution is discussed below in comparison with the 1967 pattern.

CHANGES IN POPULATION DISTRIBUTION 1967-1978

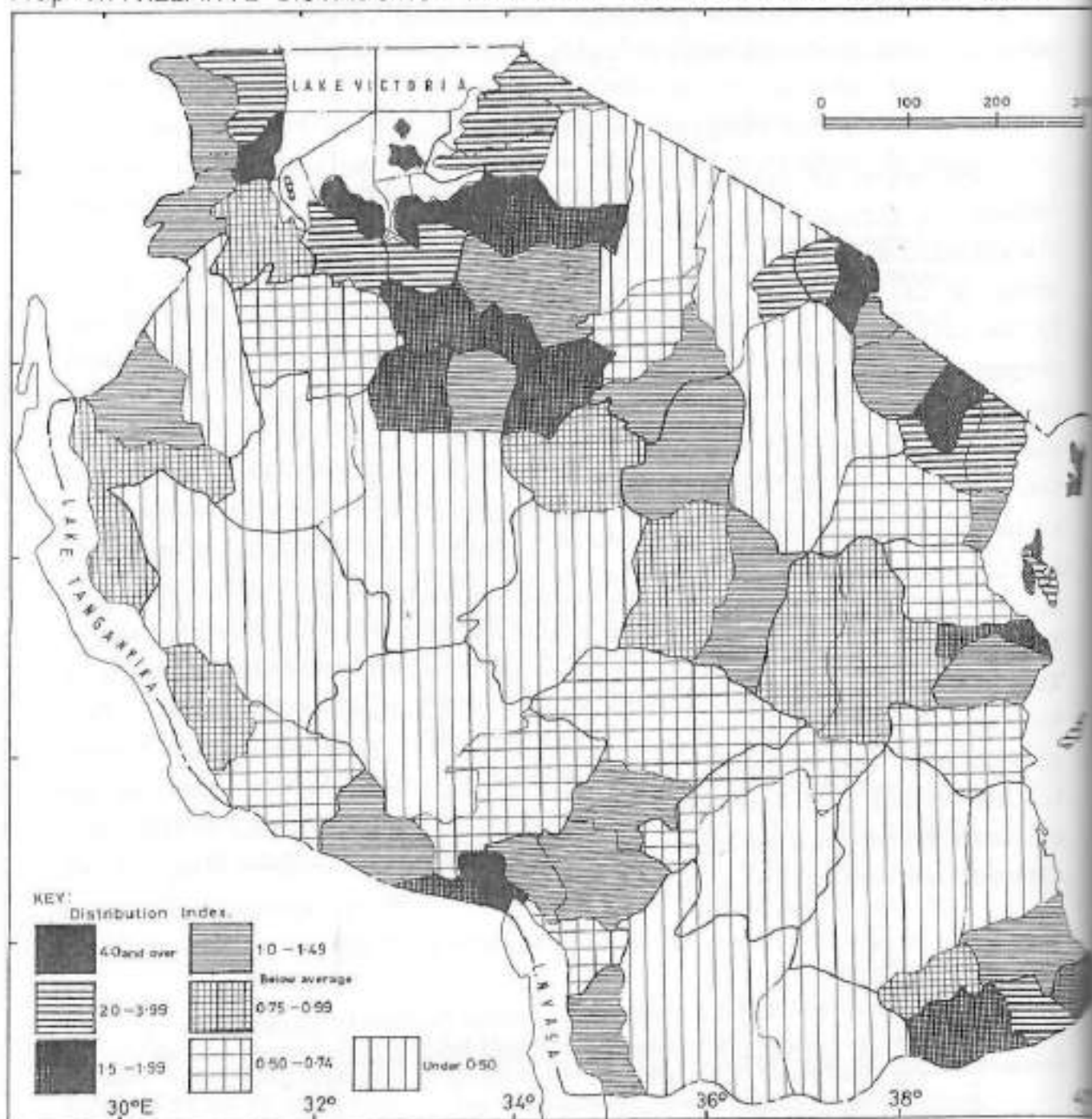
One method of showing changes in population distribution is to compare the indices of distribution for the two years. The index of distribution shows the contribution of each district relative to its area. It is obtained by dividing the population density of the district by the national average density⁹. When the index is equal to 1.0 the proportion of the total population living in that district is equal to the proportion of the total area occupied by that district. Values above 1.0 indicate that the proportion of the total population exceed the proportion of the total area and when less than 1.0 the proportion of the total population is less than the proportion of the total area. Map 4.1 shows a pattern very similar to the 1967 relative distribution, namely, that areas with heavy population concentrations around Lake Victoria, Kilimanjaro, Arumeru, Southern Highlands and southeastern Tanzania have an index of distribution well above 1.0 indicating that they are carrying a higher proportion of population numbers than the proportion of their areas. The same pattern was noted by Moore from the 1967 census¹⁰. Areas with sparse population distribution in 1967 continued to show sparse distribution in 1978 and their indices of distribution were less than 0.5 in 1967 and in 1978.

⁸P.S. Maro, and W.F.I. Mlay, 'Population Redistribution in Tanzania,' in J.I. Clark and L.A. Kosinski (eds) Redistribution of Population in Africa (London: Heinemann, 1982), pp. 176-181.

⁹Egero and Herin, op.cit., p.256

¹⁰J.E. Moore, "Population Distribution and Density" in Egero and Herin, op.cit., p.45.

Map 4.1: RELATIVE DISTRIBUTION OF RURAL POPULATION BY DISTRICT 1978.



When the distribution index for 1978 is expressed as a ratio of the distribution index for 1967, an index of distributional change is obtained. Values greater than 1.0 show that the contribution of the district to the total population has increased, and when less than 1.0 it indicates a decrease. The index of distributional change was computed for each district but the results have not been shown on a map because they can be interpreted straight from the computed tables. Patterns observed in changes between 1948 and 1967 tended to persist in the 1967-78 period. Districts showing relative increase in their contribution to the total population included those from heavily populated areas: Moshi, Hai, Mwanga, Arumeru, Karagwe, Bunda, Kyela, Muleba, Sengerema, Zanzibar North A and Mwanza; and also those with sparse population: Ngorongoro, Monduli, Chunya, Mpanda, Serengeti, Mufindi, Pangani, Mwapwa, Songea, Urambo, Tabora, Kahama, Nkansi, Kilombero, Ludewa, Sumbawanga, Nachingwea, Biharamulo, Mbeya¹¹. The first group has high agricultural potential and are often very closely linked to major urban areas; while the second group are having government induced development after effective collectivization of the population into villages. There is no doubt that changes in relative distribution between 1967 and 1978 especially increased district contribution to the total population is a result of the villagization drive and subsequent development programmes such as cotton and tobacco projects in these areas of low population concentration but with moderate to high agricultural potential.

The number of districts whose relative contribution to the total population decreased between 1967 and 1978 increased significantly. Districts with heavy population concentration that experienced a decline in the relative contribution to the total population included Ukerewe, Zanzibar West and North B, Rungwe, Magu, Lushoto, Tarime, Zanzibar Central and South, Bukoba, Korogwe, Newala, Geita, Shinyanga and Mafia. Sparsely populated districts whose relative contribution to the total population declined included Kiteto, Manyoni, Kilwa, Kibondo, Rufiji, Iringa, Mbulu, Bagamoyo, Handeni, Kilosa, Kondoa, Singida, Morogoro, Kisarawe and Mbinga.

¹¹The lists are not exhaustive of all districts.

Most of these districts have experienced villagization but their agricultural potential is often low and some have poor and unreliable transport and communication facilities.

In conclusion we can observe that changes in relative distribution between 1967 and 1978 are due to natural increase of population in the heavily populated areas; intra-regional readjustment during the villagization process which involved limited physical movements within the regions¹²; and rural - rural and rural-urban migration in various parts of the country. But the basic pattern of "belts" or "zones" of heavy concentration and "troughs" of sparse population¹³ remains basically unchanged.

THE DENSITY OF POPULATION

The density of population for the whole country in 1978 was 19.8 persons per square kilometre and 180.1 for Zanzibar and Pemba combined. The density for the Mainland alone was 18.7 persons per sq.km. Density figures in 1967 were 13.5 and 134.2 persons per sq.km. for the Mainland and the Islands respectively. Comparison with other countries shown in Table 4.2 indicates that other countries have experienced comparable increases in their national average population densities; for example, that of Kenya increased from 19 persons per sq.km in 1969 to 28 per sq.km. in 1980, Uganda's increased from 40 to 56, Zambia's from 6 to 19, Nigeria's from 69 to 83 and Brazil's from 11 to 14 in the same time period. However, national average densities are not very useful because they obscure the density variations which are a result of variations in natural conditions of each country.

¹²P.S. Maro, and W.F.I. Mlay, 'Decentralization and the organization of space in Tanzania, Africa, 49 (3), (1979) pp.291-301.

¹³I.D. Thomas, 1971, 'Population and Population change 1957-67' in L. Berry (ed) Tanzania in Maps

TABLE 4.2.— POPULATION AREA AND POPULATION DENSITY FOR SELECTED COUNTRIES

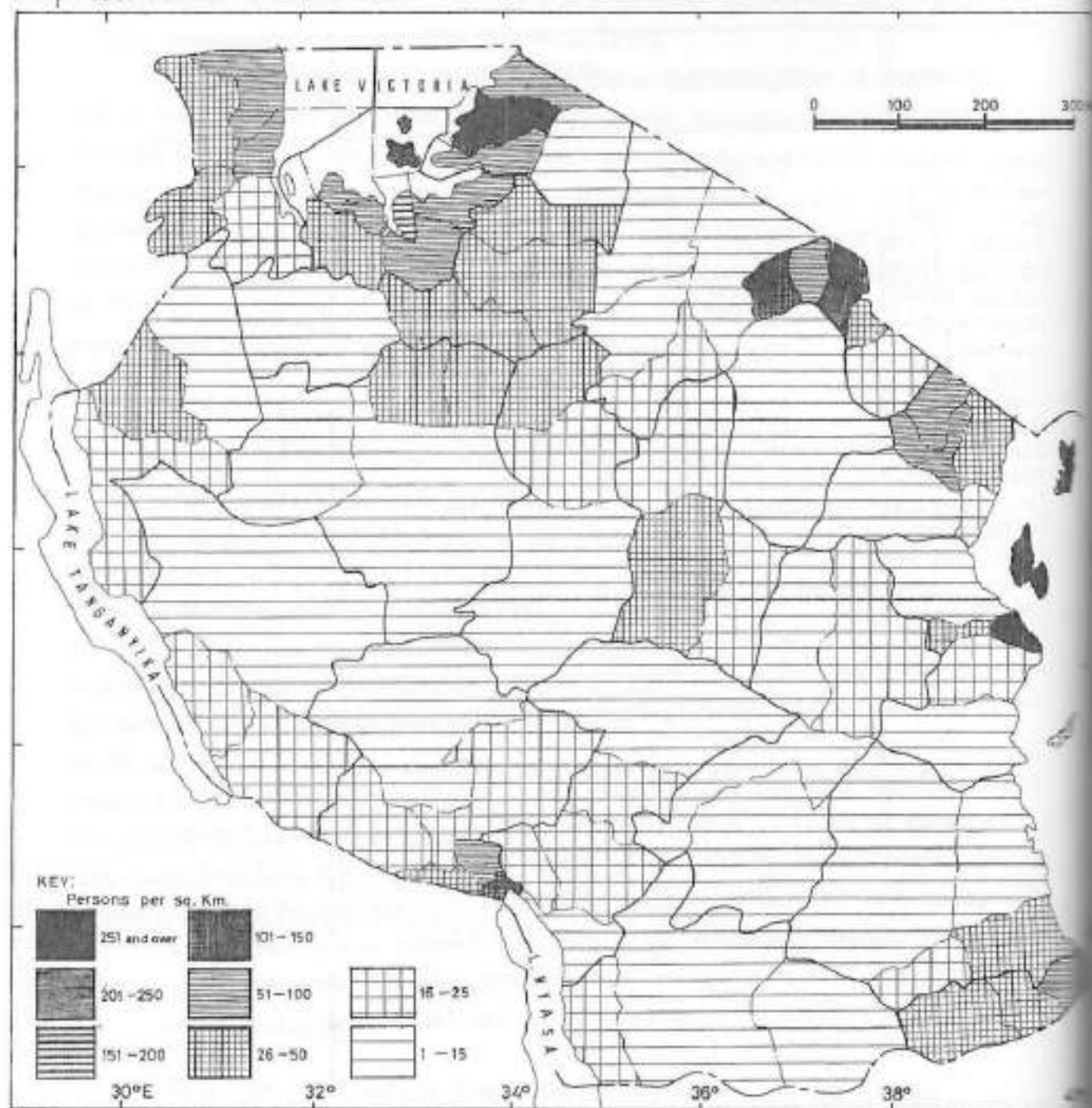
Country	Population	Surface Area (1980)	Density (1980) ² (persons per Km ²)
Kenya (1979)	15,322,000	582,646	28
Uganda (1980 mid yr est)	13,201,000	236,036	56
Zambia (1980)	5,679,808	752,614	19
Burundi (1979)	3,992,130	27,834	162
Malawi (1977)	5,547,460	118,484	50
Nigeria (1980 mid. yr. est)	77,082,000	923,768	83
Egypt (1980 mid. year est)	41,995,000	1,001,449	42
India (1981)	683,810,051	3,287,590	202
Japan (1980)	117,057,485	373,313	314
Brazil 1980 (mid year est)	123,032,000	8,511,965	14
Netherlands (1980 mid year est)	14,144,000	40,844	346
Tanzania (1978)	17,512,610	885,987	19.8
Africa	469,000,000	30,330,000	

Source: United Nations, Demographic Yearbook 1980

Appendix IV.1 and Map 4.2 show the district density variations in Tanzania in 1978¹⁴. From the table it is apparent that 75 percent of the total population live at densities higher than the national average of 19.8 persons per sq.km. occupying 37.8 percent of the land area. Except for three districts, the density map almost coincides with Map. 4.1 showing the distribution index of each district, with the same pattern of concentration in the densely populated cores

¹⁴Except for Zanzibar town and Dar-es-Salaam, the density figures are regarded as average and apply to rural districts in the sense that the area and population of urban districts and centres were added to the area and population of the whole district in each case when the density was calculated.

Map 4.2: RURAL POPULATION DENSITY BY DISTRICT 1978.



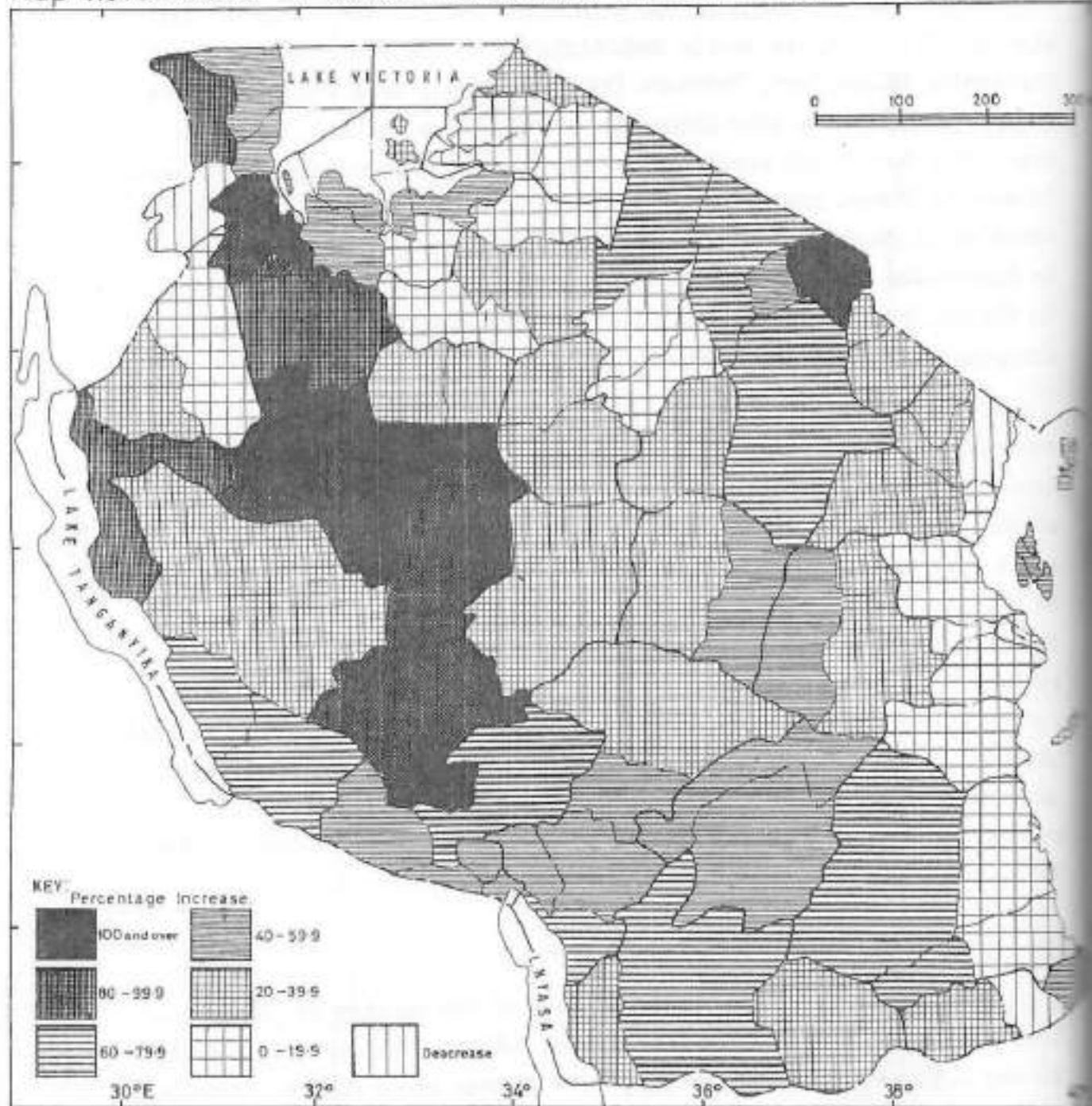
then a rapid decrease outward. The same areas identified in 1967 as regions of high, medium and sparse population zones persist in the same status in 1978 although the population density has changed. The high density zones are easily identifiable on the map as the northern highlands, Kilimanjaro, Usambara (Pare and Meru), Lake Victoria shores and plains extending into Shinyanga, parts of the southern highlands especially Rungwe and coastal areas intermittently from Tanga to Dar-es-Salaam and Mtwara including Zanzibar and Pemba. In these high density zones rural density of population varies from 300 persons per sq.km. in Chakechake and 233.6 per sq.km. in Moshi rural, to 134.5 per sq.km. in Musoma, 95.9 in Rungwe, 80.5 in Sengerema, and 45.6 per sq. km. in Shinyanga districts (Appendix IV.1).

Zones exhibiting moderate to high densities include parts of central Tanzania (Mbala, Kondoa, Iramba), parts of the Southern Highlands (Sumbawanga, south from Lake Rukwa to Iringa Region), and parts of Morogoro and Dodoma Regions. The density of population in these zones vary greatly from 30.4 per sq. km. in Masasi and 26.3 in Dodoma, to 22.6 in Mbinga, 21.0 in Singida, and 16.7 in Sumbawanga. A significant percentage of the national area (56 percent) falls into the sparsely populated zone with densities of less than 15 persons per square kilometre and covers the Mkombo woodlands and bush of the central plateau, south-eastern Tanzania and Masailand. Most of these areas are tsetse - infested and contain national parks, game and forest reserves. Because of their leached soils and low and unreliable rainfall, they have low agricultural potential.

CHANGES IN POPULATION DENSITY 1967 - 1978

One of the most interesting aspects of the density of population in Tanzania between 1967 and 1978 is the pattern of changes in density. As Map 4.3 shows, three observations can be made about changes in density. First, the greatest percentage change (more than 60 percent) occurred in the districts with low densities (less than 15 per sq. km.), except for Kilimanjaro (Hai, Moshi and Rombo) and Karagwe. This pattern can be accounted for by the fact that the increased density is due to

Map 4.3: CHANGES IN RURAL POPULATION DENSITY 1967-1978.



natural increase in the population and also as a result of the villagization programme which involved physical movements and re-location of people in the sparsely populated areas. The highest absolute increase of 37.9 percent sq.km. occurred in Mwanza and Wagu followed by Kilimanjaro (Hai, Moshi, Rombo) with 36.5 per sq. km. and Biharamulo with 10 per sq. km. The highest relative increase (over 80percent) was recorded in Biharamulo (133.0 percent), Chunya (115.0 percent), Kilimanjaro (101.4 percent), Tabora and Urambo (100.0 percent), Kahama (97.2 percent), Kigoma (95.4 percent) and Karagwe (82.7 percent).

Secondly, the high density areas recorded low absolute and relative change in density. These include the coastal areas and areas around Lake Victoria. It is possible, as other chapters will confirm, that these are areas of low rates of natural increase and/or areas of out-migration. Thirdly, five districts, namely Ngara, Muheza (Tanga), Newala, Mzizima and Dar-es-Salaam region recorded a decrease in density but in three of the cases the decrease is "artificial" rather than real. The separation of Muheza and Tanga into two districts, the great extension of the area of Dar-es-Salaam to create three districts, and the creation of Kibaha as a district all affected the area and population and hence their densities. Only Ngara and Newala districts recorded relative decrease in density. In the 1948 - 67 analysis, Ngara also recorded a decrease in density.

SUMMARY AND CONCLUSIONS

The patterns of distribution and density of population revealed by the 1978 census resembles previous patterns in that the population continues to be concentrated into a few core zones separated by extensive areas of sparsely populated land. But unlike the previous patterns there has emerged a tendency for the population to spread out into the sparsely populated areas. This tendency is a result of both natural increase of population and of movements within regions that experienced "operations" during the villagization efforts of the mid-1970s.

The density of the rural population has increased greatly and even at district level, densities vary from 300 per sq. km. to less than 1.0 per sq. kilometre, and about 10 percent of the population live at densities exceeding 150 per sq. km. Unlike the record in previous census, percentage change in density of population between 1967 and 1978 has been largest in the sparsely populated areas, with very low increase occurring in the high density zones.

This information about trends in the distribution and density of population in Tanzania should be used in regional planning since the planning is for the development of the people. There is need to carry the analysis further to assess the land resource potential in relation to population numbers especially in the sparsely populated areas into which inevitably the population is spreading.

APPENDIX IV.1. — POPULATION, AREA AND DENSITY BY DISTRICTS 1978*

DISTRICT	POPULATION	ACCUMULATED % of total population	LAND Area (Sq. km)	ACCUMULATED % of total area	DENSITY (persons per Sq. km)
Zanzibar Town	110506	0.6	13	0.001	8500.5
Ilala	218426	1.9	224	0.02	975.1
Kimondoni	366159	4.0	517	0.08	708.2
Tanga	143868	4.8	209	0.11	680.4
Tesake	258505	6.3	700	0.19	369.2
Chakechake	47208	6.5	157	0.21	300.7
Krooni (Pemba)	51806	6.8	175	0.23	296.0
Moshi	364087	8.9	1558	0.42	233.6
Mkerewe	138729	9.7	640	0.49	216.8
North 'A'	48124	10.0	240	0.52	200.5
Nyansa	169527	11.0	895	0.71	189.4
Veta	58923	11.2	315	0.66	187.1
Konde (North Pemba)	47367	11.5	259	0.69	182.9
West (Zanzibar)	31535	11.7	217	0.72	145.3
Eyala	114551	12.3	791	0.81	144.8
Nyasa	263129	13.9	1957	1.04	134.5
North 'B'	28893	14.0	230	1.07	125.6
Arumeru	324807	15.9	2979	1.42	109.0
Kombo	157715	16.8	1482	1.60	106.4
Bungwe	235314	18.1	2454	1.88	95.9
Kaleba	217493	19.3	2500	2.17	87.0
Kaga	258777	20.9	3095	2.54	83.6
Lushoto	286049	22.5	3497	2.94	81.8
Dengerema	243630	23.9	3028	3.30	80.5
Kai	172444	24.9	2269	3.57	76.0
Terima	253010	26.3	3885	4.03	65.1
Central (Zanzibar)	29797	26.4	462	4.08	64.5
Pakoba	333768	28.4	5530	4.73	60.4
Kisiba	325295	30.2	5546	5.39	58.7
Bunda	156699	31.1	2782	5.72	56.3
South (Zanzibar)	21952	31.3	392	5.77	56.0
Niwara	192524	32.4	3756	6.21	51.3
Isirogwe	191178	33.5	3756	6.65	50.9
Nwala	307385	35.2	4015	7.13	48.1
Delia	307421	37.0	6388	7.88	48.1
Shinyanga	430903	39.4	9454	9.00	45.6
Kafia	23105	39.6	518	9.06	44.6
Nkusa	198737	40.7	4712	9.62	42.2
Kibaha	68722	41.0	1812	9.83	37.9
Illoje	71228	41.5	1935	10.06	36.8

APPENDIX IV.1. -- Continued

DISTRICT	POPULATION	ACCUMULATED % of total population	LAND Area (Sq. km)	ACCUMULATED % of total area	DENSITY (persons per Sq. km)
Mtanga	225001	42.8	6961	10.89	32.3
Iramba	242060	44.2	7900	11.82	30.6
Bariadi	296931	45.9	9777	12.98	30.4
Mamusi	271909	47.4	8936	14.03	30.4
Lindi	272295	49.0	9454	15.15	28.8
Igunga	189104	50.0	6788	15.95	27.9
Mvanga	60249	50.4	2170	16.21	27.7
Kasulu	255649	51.8	9224	17.30	27.7
Mgara	107910	52.5	3940	17.77	27.4
Karagwe	185016	53.5	6993	18.59	26.5
Dodoma	435213	56.0	16576	20.55	26.3
Maswa	304079	57.7	11607	21.93	26.2
Seme	147942	58.6	5730	22.61	25.8
Manang	229063	59.9	8988	23.67	25.5
Mbozi	235396	61.2	9586	24.80	24.6
Mufindi	173782	62.2	7123	25.64	24.3
Pangani	33340	62.4	1425	25.80	23.4
Mbinga	196161	63.5	8417	26.81	23.3
Kwepwa	261514	65.0	11526	28.17	22.6
Kisarawe	153450	65.9	6896	28.99	22.3
Mjombe	236691	67.3	10668	30.25	22.1
Makete	91220	67.8	4128	30.74	22.0
Ligoma	253301	69.2	11655	32.11	21.7
Morogoro	418083	71.2	19296	34.40	21.7
Singida	269623	73.2	12821	35.91	21.0
Kondoa	275278	74.7	13209	37.79	20.8
Kilosa	274544	76.3	14245	39.16	19.3
Mbeya	333966	78.2	18519	41.35	18.0
Biharamulo	165580	79.1	9477	42.47	17.5
Sumbawanga	223565	80.4	13417	44.05	16.7
Nachingwea	102051	81.0	6115	44.78	16.6
Nkasi	146322	81.8	9375	45.89	15.6
Lahama	291622	83.5	19943	48.24	14.6
Handeni	184595	84.6	13209	49.81	14.0
Bagamoyo	135967	85.3	9842	50.97	13.8
Mbulu	93767	85.8	7070	51.81	13.3
Iringa	347661	87.9	28620	55.19	12.1
Ludewa	75690	88.3	6325	55.94	11.9
Rufiji	135342	89.1	13339	57.52	10.1
Kilombero	133013	89.8	13577	59.12	9.8

APPENDIX IV.1. — Continued

DISTRICT	POPULATION	ACCUMULATED % of total population	LAND Area (Sq. km)	ACCUMULATED % of total area	DENSITY (persons per Sq. km)
Kibondo	139991	90.6	16058	61.02	8.7
Kilwa	113872	91.3	13857	62.66	8.2
Kunduru	135535	92.0	18778	64.88	7.2
Krasbo	149104	92.9	21299	67.40	7.0
Kongea	229876	94.2	36303	71.79	6.3
Kabara	256327	95.7	41103	76.55	6.2
Kakaga	113510	96.3	23681	79.35	4.8
Kerengeti	50989	96.6	10942	80.64	4.7
Kandali	71765	97.0	16291	82.57	4.4
Kanyoni	102266	97.6	28620	84.6	3.6
Kunya	89409	98.1	27065	86.4	3.3
Kgorongoro	47031	98.4	14498	91.8	3.2
Kwanda	82010	98.9	45843	95.6	1.8
Kiteto	59790	99.2	32480	96.80	1.8
Kilele	39406	100	36620	100.00	1.0

* Land area only.

CHAPTER 5

REGIONAL POPULATION GROWTH AND ITS COMPONENTS

by

H. Mbaruku*

INTRODUCTION

Analysis of population growth requires periodic and systematic information on population totals and the regular collection of birth and death records, together with data on migratory movements. Unfortunately for Tanzania relevant information in this detail is not available.

There are however ways of computing fairly accurate separate estimates for births and deaths. Crude Birth rates can be computed from the child-woman ratio and crude Death rates from childhood mortality estimates. Having obtained two out of the three components of population growth, the third component "net migration" can easily be estimated for any given population growth¹. The assumption in this case is that differences between estimated rate of natural increase and the intercensal rate of growth are attributable to net migration. It may be emphasized that the components of growth estimated by this procedure cannot be expected to be very precise though for the purpose of this chapter they can provide a fairly accurate pattern at the regional level. It may also be noted that the estimates of net migration appearing in this chapter are the only source of information on this aspect because in 1978, the usual place of residence was not ascertained thus making it impossible to obtain current migration data.

Tanzania had an enumerated population of 12,313,469 in 1967 and 17,512,610 in 1978. The total population thus increased by some 5.2

*The author is working at the Central Census Office. He is solely responsible for the views expressed in this chapter.

¹Growth Rate = Birth rate - Death rate $\pm$ Net Migration.

million, or 42.2 percent, during the eleven year intercensal period, representing an annual growth rate of 3.2 percent. Population change was experienced all over the country, and it has been possible to examine this variation in relation to fertility, mortality and net migration at the regional level.

INTERCENSAL GROWTH

Table 5.1 gives intercensal growth rates separately for Tanzania Mainland, Zanzibar as a whole, Zanzibar Island, Pemba Island and Tanzania as one country.

TABLE 5.1.— INTERCENSAL POPULATION GROWTH

Area	Population 1967	Population 1978	Percentage Change 1967/78	Annual growth rate 1967/78
Mainland	11,958,654	17,036,499	42.5	3.2
Zanzibar	354,815	476,111	34.2	2.7
Zanzibar Island	190,494	270,807	42.2	3.2
Pemba Island	164,321	205,304	24.9	2.1
TANZANIA	12,313,469	17,512,610	42.2	3.2

Tanzania Mainland population grew by 5,077,845 between the censuses of 1967 and 1978. This represented a population increase of 42.5 percent over the recorded 1967 population thereby giving an annual growth rate of 3.2 percent. This rate appears to be quite compatible with past trends shown in Table 5.2, except for the rate for 1948-57 which was influenced by under-enumeration in the 1957 census².

²The Population of Tanzania, (Dar-es-Salaam: Bureau of Statistics, 1967) Census Vol. 6, p. 212.

TABLE 5.2. -- RATES OF POPULATION GROWTH 1948-1978

Area	Population ('000)		Annual Growth Rate %			
	1948	1957	1958	48-57	57-67	48-67 67-78 ^c
Mainland	7480.4	8788.5	-	1.8	3.1 ^b	2.5 3.2
Zanzibar	264.2	-	299.1	1.2 ^a	1.9 ^b	1.5 2.7
Zanzibar Island	149.6	-	165.3	1.0 ^a	1.6 ^b	1.3 3.2
Pemba Island	114.6	-	133.9	1.6 ^a	2.3 ^b	1.9 2.1

Source: Bureau of Statistics, Recorded Population changes 1948-1967 Tanzania (Dar-es-Salaam: Bureau of Statistics, 1968)

^aFigures refer to 1948-1958

^bFigures refer to 1958-1967

^cPopulation figures for 1967 and 1978 appear in Table 5.1

The 1978 census recorded a population of 476,111 inhabitants in the Islands of Zanzibar and Pemba. Zanzibar Island had a population of 270,807 and Pemba Island a population of 205,304 persons. This represented an increase of 42.2 percent over the 1967 census figure, and an annual growth rate of 3.2 percent for Zanzibar Island and a population increase of 24.9 percent with an annual growth rate of 2.1 percent for Pemba Island. The overall population increase for Zanzibar as a whole was 34.2 percent and the annual growth rate was 2.7 percent.

Within the country, differential rates of population growth exist by region (Table 5.3), and within each region by district (Appendix V.1).

TABLE 5.3. -- REGIONAL POPULATION GROWTH: MAINLAND

Region	Population 1967	Population 1978	Annual growth rate 1967/78
Dar-es-Salaam	356,286	843,090	7.8
Malawi	276,091	1,51,897	4.5
Tabora	502,068	817,907	4.4
West Lake (Kagera)	658,712	1,009,767	3.9
Arusha	610,474	926,223	3.8
Shinyanga	899,468	1,323,535	3.5
Mtwara	753,765	1,079,864	3.1
Mwanza	395,147	561,575	3.2
Dodoma	709,380	972,005	2.9

TABLE 5.3.— (Continued)

Region	Population 1967	Population 1978	Annual growth rate 1967/78
Kilimanjaro	652,722	902,437	2.9
Morogoro	682,700	939,264	2.9
Ngoma	473,443	648,941	2.9
Mwanza	1,055,883	1,443,379	2.8
Tanga	771,060	1,037,767	2.7
Iringa	689,905	925,044	2.7
Singida	457,938	613,949	2.7
Mara	544,125	723,827	2.6
Lindi	419,853	527,624	2.1
Mtwara	621,293	771,818	2.0
Coast	428,041	516,586	1.7

Dar-es-Salaam, a predominantly urban region, experienced the highest rate of population growth, 7.8 percent, while Coast region experienced the lowest population growth rate, 1.7 percent. In Dar-es-Salaam region the highest growth rate was recorded in Kinondoni district, 9.9 percent and incidentally it also ranks as the highest among all the districts in the country. In the same region, Temeke district also recorded a very high growth rate, 8.6 percent and ranks third in the country. It is therefore not a surprise for Dar-es-Salaam region to rank first in the country. For Coast region, the lowest growth rate was recorded in Rufiji district, 1.0 percent. This district is among the five districts with the lowest population growth rates: Kilondo (0.2 percent), Lindi rural (0.7 percent), Ngara (0.8 percent) and Pangani (0.9 percent).

Rukwa, Tabora, W. Lake and Arusha are among the first five regions that have experienced the highest rate of population growth. Rukwa region recorded a population growth rate of 4.5 percent with Moanda district recording the highest growth rate, 8.0 percent, and ranking fifth in the country. Tabora region recorded a growth rate of 4.4 percent. The major contributing district in this region was Urambo which recorded a growth rate of 9.4 percent and ranked second in the country. West Lake had a growth rate of 3.9 percent and all the districts (except Ngara) contributed towards this high growth with Niharensulo district (6.6 percent) taking the lead. A similar case was experienced in Arusha region, which recorded a growth rate of 3.8 per-

cent. Except for Mbulu district (1.5 percent), all districts experienced a fairly high growth rate. Some districts recorded very high growth rates even though their respective regional figures reflected moderate growth rates. In most cases, these are "urban" districts suggesting a rural to urban movement. For example, Songea urban district recorded a growth rate of 9.9 percent while the regional figure is only 3.2 percent. For Mbeya Urban district, the growth rate is 8.4 percent and the regional rate is 3.3 percent. The same is true for Mtwara Urban, Morogoro Urban and Iringa Urban districts.

Possible factors for differential growth are differences in rates of natural increase, (see Table 5.4); varying intensity of internal migration, in the form of resettlement schemes or individual migration from economically unattractive areas to economically attractive ones (see Table 5.5); and differences in international immigration, especially refugees. Rufaa and Tabora regions are a good example of regions with refugee camps. The two regions also receive a lot of individual Sukuma settlers from Shinyanga and Mwanza regions.

In the case of Zanzibar, a similar analysis at Regional/District level is not possible due to lack of comparable data collected in the 1967 census. The intercensal growth rate is however given at national level as analysed earlier in this section.

NATURAL INCREASE

In the previous section, we observed the recorded population growth rates at national, regional and district level. We further tried to speculate on the possible factors that caused differential growth among the regions/districts in the country. One of the factors mentioned is "Differences in rates of natural increase", that is difference between fertility and mortality. In this section we are going to look at these two components of natural increase and hopefully ascertain as to whether our earlier speculation is justified. Table 5.4 gives the distribution of crude birth rates, as computed from the child-women ratio, and crude death rates computed from childhood mortality estimates, and rates of natural increase at national and regional level.

TABLE 5.1.— ESTIMATION OF THE CRUDE BIRTH RATE, THE CRUDE DEATH RATE AND THE RATE OF NATURAL INCREASE, BY REGIONS^a

Region	Crude Birth Rate (CBR) ^b	Crude Death Rate (CDR) ^b	Rate of Natural Increase (%)
Kilimanjaro	44.7	10.2	3.5
Arusha	48.6	14.8	3.4
West Lake	51.0	18.5	3.3
Rukwa	54.9	23.1	3.2
Mara	51.0	19.3	3.2
Mwanza	49.7	19.2	3.1
Kigoma	52.9	22.9	3.0
Tanga	45.0	15.5	3.0
Coast	45.9	16.9	2.9
Tabora	48.0	19.1	2.9
Dodoma	47.4	18.6	2.9
Shinyanga	48.9	20.7	2.8
Tringa	49.9	21.8	2.8
Singida	46.7	19.1	2.8
Ruvuma	47.1	20.0	2.7
Meya	48.0	21.7	2.6
Morogoro	44.7	19.0	2.6
Der-es-Salaam	38.8	15.1	2.4
Lindi	43.0	20.4	2.3
Mtwara	40.8	22.3	1.9
Mainland	47.5	19.1	2.8
Zanzibar North	54.2	18.9	3.5
Zanzibar South	50.2	16.4	3.4
Zanzibar Town/West	44.6	15.5	2.9
North Pemba	57.1	18.5	3.9
South Pemba	54.8	17.2	3.8
ZANZIBAR	51.6	17.0	3.5
TANZANIA	47.6	19.1	2.9

^aEstimates appearing in this table cannot be expected to be very precise mainly because of defects in the basic data. However, for the purpose of this chapter, these estimates can be expected to reflect the regional differentials quite satisfactorily.

^bAs calculated by Dr. Sembajwe — author of Mortality chapters.

It is believed that increasing rates of growth are common among countries in Africa and in many parts of the Third World. Tanzania is not an exception to that trend. Rural development programmes offering improved water supplies, malaria eradication, vaccination campaigns and the like, reduce the mortality of the population without basically changing their economic situation, thus fertility levels remain high.

and rates of natural increase go up.

As indicated in Table 5.4, Tanzania with a birth rate of 48 per thousand belongs to the countries with high fertility. The death rate of 19 per thousand is still high compared with the "developed" nations. But the death rate will certainly decline further, and the rate of natural increase of 2.9 per year might soon be above 3 percent. This is not an unusual situation in Africa. Tanzania is near the average for Tropical Africa in both levels and trends of population increase. A growth rate of 3 percent was estimated for Kenya almost 17 years ago, and more recent estimates are still higher.

Tanzania's population, 17.5 million in 1978, will most likely exceed 20 million by 1985. Still this is a small population for a country of the size of Tanzania. A population density of 19.8 per sq.km is very low by international comparison; although the average for Africa is 13, for Asia it is 82 and for Europe 96. And these rates are still low in comparison with, for instance, England and Wales' 336 or Holland's 334 persons per Sq. Km³. Thus Tanzania's population can be described as small but growing fast.

Table 5.4 indicates that fertility and mortality differentials exist at the regional level which in turn give rise to differences in the rate of natural increase. Kilimanjaro region recorded the highest rate of natural increase, 3.5 percent. This is a result of having experienced the lowest death rate among regions (10 per thousand) with a reasonably high birth rate of 45 per thousand. However, Kilimanjaro sets a very interesting example, because its annual growth of 2.9 percent suggests that the region is losing its people (see Table 5.5). It is possible that most of the outmigrant from Kilimanjaro have moved to Arusha, which has a rate of growth of 3.8 percent. Among regions which experienced higher annual population growth rates, some do not give corresponding high rates of natural increase indicating varying impact of migration. Dar-es-Salaam, for example, recorded the highest annual growth rate in the country, yet the region observed a rate of natural increase of 2.4 percent only. Similarly Coast region which recorded the lowest annual growth rate, experienced a moderate rate of natural increase of 2.9 percent.

³United Nations, Demographic Yearbook, 1975.

Zanzibar as a whole experienced a very high rate of natural increase (3.5 percent) though the annual growth rate was only 2.7 percent. Among the Zanzibar regions, North Pemba experienced the highest rate of natural increase (3.9 percent) followed by South Pemba (3.8 percent). These two regions also recorded the highest birth rates in Tanzania except for Rukwa region. North Pemba experienced a birth rate of 57 per thousand and South Pemba 55 per thousand. Their death rates are well below the average for Tanzania, yet Pemba Island experienced one of the lowest annual growth rates (2.1 percent) in the country. This means that Pemba Island is losing its population. Probably most of them might have moved to Dar-es-Salaam for economic reasons.

MIGRATION

In addition to the natural increase, migration plays an important role in the overall growth of population unless, of course, you are considering a population living in a "closed" area. In this section, we are going to ascertain two things: that there is varying internal migration intensity and that the component "Net migration" has an impact on population growth rate. The "Net Migration" figures given in Table 5.5 need not necessarily correspond to estimates under the migration chapter; since in this case, the only assumption considered as mentioned in the "Introduction", is that "differences between the estimated rates of natural increase and the intercensal rates of growth are due to net migration".

TABLE 5.5.— REGIONAL NET MIGRATION, 1967-1978

Region	Annual growth Rate 1967/78 (%)	Rate of Natural Increase (%)	Net Migration (%)
Dar-es-Salaam	7.8	2.4	+5.4
Rukwa	4.5	3.2	+1.3
Tabora	4.4	2.9	+1.5
West Lake (Kagera)	3.9	3.3	+0.6
Arusha	3.8	3.4	+0.4
Shinyanga	3.5	2.8	+0.7
Mbeya	3.3	2.6	+0.7
Ruvuma	3.2	2.7	+0.5

TABLE 5.5.— (continued)

Region	Annual growth Rate 1967/78 (%)	Rate of Natural Increase (%)	Net Migration (%)
Dodoma	2.9	2.9	+0
Kilimanjaro	2.9	3.5	-0.6
Morogoro	2.9	2.6	+0.3
Mtwara	2.9	3.0	-0.1
Mwanza	2.8	3.1	-0.3
Tanga	2.7	3.0	-0.3
Iringa	2.7	2.8	-0.1
Singida	2.7	2.8	-0.1
Mara	2.6	3.2	-0.6
Lindi	2.1	2.3	-0.2
Mbarota	2.0	1.9	+0.1
Coast	1.7	2.9	-1.2
Mainland	3.2	2.8	+0.4
Zanzibar	2.7	3.5	-0.8
TANZANIA	3.2	2.9	+0.3

Since census data cannot give us a reasonable estimate of emigrants, not much can be said on international migration. Thus, the national figures indicated in Table 5.5 have also been estimated using the national annual growth rates and rates of natural increase which makes them unreliable. The figures indicate that, the Mainland high growth rate of 3.2 percent is partly due to a gain in population, probably from neighbouring countries, as the rate of natural increase is only 2.8 percent. On the other hand, Zanzibar's annual growth rate of 2.7 percent as against a rate of natural increase of 3.5 is due to the fact that Zanzibar is losing its population perhaps mainly to the Mainland.

As mentioned earlier, having recorded the highest growth rate, Dar-es-Salaam region has also experienced the highest rate of net migration (+5.4 percent). This means the high population growth rate experienced by this region is mostly due to an inflow of population in the region — most probably because of employment opportunities. Rukwa, Tabora, West Lake and Arusha regions with high annual growth rates, continue to show that apart from the reasonably high rates of natural

increase, the regions also have a positive factor of net migration. The rates of net migration for Rukwa, Tabora, West Lake and Arusha are +1.3, +1.5, +0.6 and +0.4 percent, respectively. Coast region ranked at the bottom for having recorded the lowest growth rate, had also a net migration rate of -1.2 percent though its rate of natural increase was 2.9 percent. This means the region's recorded low growth rate is due to an outflow of population from the region to most probably Dar-es-Salaam. It could also be due to the split of the Coast Region in 1975 into two separate regions, namely, Coast and Dar-es-Salaam. Kilimanjaro is the next region in the line of those regions losing population. Its high rate of natural increase is moderated by a negative factor of net migration (-0.6 percent) to give a moderate annual growth rate. Dodoma is the only region which had a zero net migration rate. This means that the region did neither gain nor lose its population. Mara is another region which lost its population. The net migration rate of -0.6 percent moderated the rather high rate of natural increase (3.5 percent) to give an annual growth rate of 2.6 percent.

Apart from the extreme cases, the regions that experienced a loss of population are Mwanza, Tanga, Lindi, Kigoma, Iringa and Singida. Those which gained included Shinyanga, Mbeya, Ruvuma, Morogoro and Arusha. The receiving regions are known for their extremely fertile land. Thus, fertile land could be considered a one of the factors that causes these regions to attract inflow of populations while the other regions, probably with less attractive land and/or population pressure had to lose.

It should clearly be stated here that the aim of this chapter was only to analyse population growth as observed between the 1967 and 1978 censuses. But by doing so, one could not avoid touching on birth rates and death rates, which give the rate of population increase, and migration movements which give the net migration factor. Details on fertility, mortality and migration are found in the relevant chapters of this report.

APPENDIX V.1. — DISTRICT POPULATION GROWTH

REGION/DISTRICT	POPULATION 1967	POPULATION 1978	ANNUAL GROWTH RATE 1967/78	RANK
BAR KS SALAANI:				
Kinondoni	123,418	366,159	9.9	1
Tenaka	100,024	258,505	8.6	3
Ilala	132,844	218,426	4.5	26
BUKWA:				
Kpanda	60,803	146,322	8.0	5
Sumbawanga Urban	26,988	57,802	6.9	10
Sumbawanga Rural	188,300	247,773	2.5	40
TABORA:				
Uranbo	53,278	149,104	9.4	2
Tabora Urban	29,688	67,388	7.5	6
Tabora Rural	117,085	186,939	4.3	28
Isoga	163,792	225,001	2.9	36
Iguaga	138,225	189,475	2.9	36
WEST LAKE:				
Biharamulo	79,689	165,580	6.6	11
Karagwe	97,407	185,016	5.8	16
Muleba	147,152	217,493	3.6	30
Sakoba Rural	177,990	256,349	3.3	33
Sakoba Urban	57,987	77,419	2.6	39
Igara	98,487	107,910	0.8	55
ARUSHA:				
Arusha	46,362	86,707	5.7	17
Manyang	125,838	229,063	5.4	19
Kiteto	35,038	59,790	4.9	23
Monduli	71,854	118,796	4.7	24
Aruseru	167,854	238,028	3.2	34
Mbulu	163,528	193,767	1.5	49
SHINYANGA:				
Lahama	147,628	291,622	6.2	14
Shinyanga Urban	36,956	68,733	5.6	18
Baridadi	206,304	296,931	3.3	33
Kasva	224,612	304,079	2.8	37
Shinyanga Rural	283,968	362,170	2.2	43

APPENDIX V.1. -- Continued

REGION/DISTRICT	POPULATION 1967	POPULATION 1978	ANNUAL GROWTH RATE 1967/78	RANK
MNYA:				
Mbeya Urban	30,846	78,186	8.4	4
Chunya	53,618	89,409	4.6	25
Mbosi	147,489	235,396	4.3	28
Mbeya Rural	161,841	255,860	4.2	29
Ileje	56,225	71,228	2.2	43
Kyala	91,003	114,551	2.1	44
Rungwe	212,743	235,314	0.9	54
MUVUMA:				
Songea Sub-Urban	16,611	49,297	9.9	1
Tunduru	97,555	135,535	3.0	35
Mbinga	144,098	196,161	2.8	37
Songea Rural	137,183	180,582	2.5	40
DODOMA:				
Dodoma Urban	100,665	158,595	4.2	29
Mpwapwa	176,186	261,514	3.6	30
Kembo	212,195	275,278	2.4	41
Dodoma Rural	220,334	276,618	2.1	44
KILIMANJARO:				
Moshi Urban	29,423	52,046	5.2	20
Bai	116,974	172,444	3.5	31
Pare	149,635	208,191	3.0	35
Rombo	114,615	157,715	2.9	36
Moshi Rural	242,075	312,041	2.3	42
MOROGORO:				
Morogoro Urban	33,535	74,114	7.2	8
Kilombero	71,826	133,813	5.6	18
Kilosa	193,810	274,544	3.2	34
Morogoro Rural	282,837	344,083	1.8	47
Nahenge	100,692	113,510	1.1	52
KIGOMA:				
Kigoma Rural	95,339	194,482	6.5	12
Kigoma Urban	33,575	58,819	5.1	21
Kasulu	207,611	255,649	1.9	46
Kibondo	136,918	139,991	0.2	57

APPENDIX V.1. — Continued

REGION/DISTRICT	POPULATION 1967	POPULATION 1978	ANNUAL GROWTH RATE 1967/78	RANK
MAITA:				
Kwanza	97,692	169,527	5.0	22
Sangerema	164,168	243,630	3.6	30
Seita	207,239	307,421	3.6	30
Kagu	196,103	258,777	2.5	40
Ikerevo	109,277	138,729	2.2	43
Kviba	281,404	325,295	1.3	51
TANGA:				
Tanga	90,616	143,868	4.2	29
Handeni	133,235	184,595	3.0	35
Lushoto	210,484	286,049	2.8	37
Korogwe	140,306	191,178	2.8	37
Mbeya	167,993	198,737	1.5	49
Pangani	28,426	33,340	1.4	50
IRINGA:				
Iringa Urban	26,503	57,164	7.0	9
Mufindi	118,467	173,782	3.5	31
Ludewa	54,200	75,690	3.0	35
Iringa Rural	226,124	290,497	2.3	42
Mjicabo	264,611	327,911	2.0	45
SINGIDA:				
Singida Urban	34,421	55,891	4.4	27
Singida Rural	159,398	213,732	2.7	38
Irumba	183,962	242,060	2.5	40
Manyoni	80,157	102,266	2.2	43
MARA:				
Musoma Urban	21,637	43,993	6.5	12
Farina	188,536	253,010	2.7	38
Serengeti	158,984	207,688	2.4	41
Musoma Rural	174,968	219,136	2.0	45
LINDI:				
Lindi Urban	13,681	27,312	6.3	13
Nachingwea	53,298	102,051	5.9	15
Litale	27,184	39,406	3.4	32
Kilwa	97,957	113,872	1.4	50
Lindi Rural	227,733	244,983	0.7	56

APPENDIX V.1. -- Continued

REGION/DISTRICT	POPULATION 1967	POPULATION 1978	ANNUAL GROWTH RATE 1967/78	RANK
MTWARA:				
Mtwara Urban	21,428	48,491	7.4	7
Mtwara Rural	113,330	144,033	2.2	43
Nasasi	213,683	271,909	2.2	43
Newala	272,852	307,385	1.1	52
COAST:				
Mafia	16,748	23,105	2.9	36
Bagamoyo	105,113	135,967	2.3	42
Kisarawe	185,156	222,172	1.7	48
Rufiji	121,024	135,342	1.0	53

CHAPTER 6

MIGRATION: AN ANALYSIS OF THE 1978 CENSUS

by
W. Mlay*

INTRODUCTION

Migration Data in previous censuses

Population censuses are the main sources of data for the comprehensive study of human migrations across administrative boundaries. All the previous censuses in Tanzania Mainland and in Zanzibar including Pemba (1948, 1957/58 and 1967) provided information which made it possible to estimate various types of both internal and international migrations¹. From the 1948 and 1957/58 censuses it was possible to calculate the emigration rates for males and females for each tribe in Tanzania² and to estimate the extent of dispersion or migration of the different tribes from their assumed area of origin³. The 1967 Population Census was a milestone immigration study in Tanzania in that for the first time it was possible to use the place-of-birth data to identify specific interregional flows and gross migration patterns for each administrative region and for the main urban centres⁴.

*The author is teaching at the University of Dar-es-Salaam. He is solely responsible for the views expressed in this chapter.

¹A.W. Southall, "Population Movements in East Africa", in K.M. and R.M. Prothers (eds.), Essays in African Population, (London: Routledge Keegan, 1961), and C.F. Claeson and B. Egero, "Interregional Migration in Tanzania", Paper read at the United Nations Population Conference held in Ghana, February 1972.

²Southall, op.cit.

³M.A. Hirst, "Tribal Migration in East Africa: A Review and Analysis", Geografiska Annaler, 52 B, 1970.

⁴C.F. Claeson and B. Egero, "Migration" in B. Egero and R. Amin (eds.) The Population of Tanzania, (Dar-es-Salaam: BRAIUP and Bureau of Statistics, 1973).

1978 Population Census

Nevertheless despite improvements in the 1967 population census, it was felt that data on the place-of-residence at some time in the past should be collected using the sample questionnaire in order to supplement the place-of-birth statistics. As a result the 1978 population census had the following data for migration analysis:

- . Place-of-birth data.
- . Place-of-residence at a fixed prior date (February 5th, 1977 and August 26th, 1967).

Thus, in addition to a study of lifetime migration as was the case in the 1967 census, using the data on place of residence at two fixed prior dates, it is possible to construct time-specific migration matrices for flows between each of the 25 regions in Tanzania (20 Mainland and 5 Zanzibar administrative regions). The chosen dates were relatively easy for the population to remember -- 5th February 1977 was the date for the inauguration of the new National political party, The Revolutionary Party (CCM); 26th August 1967 was the last census date. However, as can be appreciated, these dates give rather cumbersome time intervals for purposes of computation and analysis.

The tabulation of the above data has yielded a wealth of information which can be used to study migration in Tanzania. It is not possible in this first analysis to do justice to all the data. Rather, the chapter attempts a fairly general survey of what we can learn concerning migration from the 1978 population census data. It is expected that detailed and more analytical papers will follow. For convenience, Tanzania Mainland and the Islands of Zanzibar and Pemba will be treated as two separate entities.

The basic census tables used in this study show for both Mainland Tanzania and Zanzibar and Pemba:

1. Population (sex and age) by region/country of birth and place of residence at a fixed date: 1977 and or 1967.
2. Population by place of residence at two fixed dates: 1967 and 1977.

3. Urban population by place of residence and place of birth for 4 residence/birth categories: Same Region; Other Region; Zanzibar and Pemba or Mainland Tanzania; Outside Tanzania.

MAINLAND TANZANIA

INTERREGIONAL MIGRATION

Lifetime migration

Birth place statistics have been used to show the magnitude of migration for the population born in Tanzania and still resident in the country at the time of the census in 1978. In Table 6.1, the migrant population is identified as those resident outside their region of birth on the Mainland (Other Region and Outside Tanzania).

TABLE 6.1.— MAINLAND POPULATION (000') BY PLACE OF BIRTH (REGIONS)

Region	Total Popula- tion	Birth Place categories (%)			Total Migrant (%)
		Same Region	Other Region	Outside Mainland Tanzania	
		(SR)	(OR)	(OT)	
Mainland Tanzania	17037	84	13	3	16
Dodoma	972	93	7	0	7
Arusha	926	87	13	1	14
Wilimanjaro	902	90	9	1	10
Dar es Salaam	1038	90	9	1	10
Morogoro	939	83	16	1	17
Geest	517	79	20	1	21
Dar-es-Salaam	813	35	60	5	65

TABLE 6.1.— (Continued)

Region	Total Popula- tion	Birth Place categories (%)			
		Same Region	Other Region	Outside Mainland Tanzania	Total Migrant
		(SR)	(OR)	(OT)	(%)
Lindi	528	85	13	2	15
Mtwara	772	91	4	5	9
Ruvuma	562	91	6	3	9
Iringa	925	96	4	0	4
Mbeya	1080	91	8	1	9
Singida	614	92	8	0	8
Tabora	818	70	24	6	30
Rukwa	452	81	7	12	19
Kigoma	649	90	4	6	10
Shinyanga	1324	82	18	0	18
Kagera	1010	82	10	8	18
Mwanza	1443	86	13	1	14
Mara	724	91	7	2	9

In sum there were 2.2 million interregional migrants and 0.5 million immigrants according to the birth place statistics. There is a wide variation in the pattern of interregional migration (Other Region category). Five regions: Dar-es-Salaam (60 percent), Tabora (24 percent), Coast (20 percent), Shinyanga (16 percent) and Morogoro (16 percent), had migrant proportions above the national average of 13 percent. On the other extreme the regions with the lowest migrant proportions were Mtwara (4 percent) and Kigoma (4 percent). The case of Dar-es-Salaam is special because the region is largely made up of the city population. If Dar-es-Salaam is excluded, the region with the highest migrant proportion is Tabora. The population exchange between Mainland Tanzania and Zanzibar accounted for only 0.2 percent of the population. The immigrants to Tanzania (outside Tanzania category) constitute approximately 3 percent of the total population. Except Dar-es-Salaam, all regions showing immigrant proportions above the national average are border regions: Rukwa (12 percent), Kagera

(8 percent), Tabora (6 percent), Kigoma (6 percent) and Mtwara (5 percent). It is known that a substantial proportion of these immigrants are either refugees from across the border or peasant farmers who have settled in neighbouring regions. In the case of Dar-es-Salaam, the immigrant proportion is more heterogeneous in origin. The general pattern and magnitude of migration as can be discerned from the 1978 census birth place data is very similar to that depicted by similar data in the 1967 population census.⁵

FIGURE 6.1.....INTERREGIONAL MIGRATION: STREAMS
EXCEEDING 5000 PEOPLE (00')
(BIRTH PLACE AND PLACE OF RESIDENCE
1977)



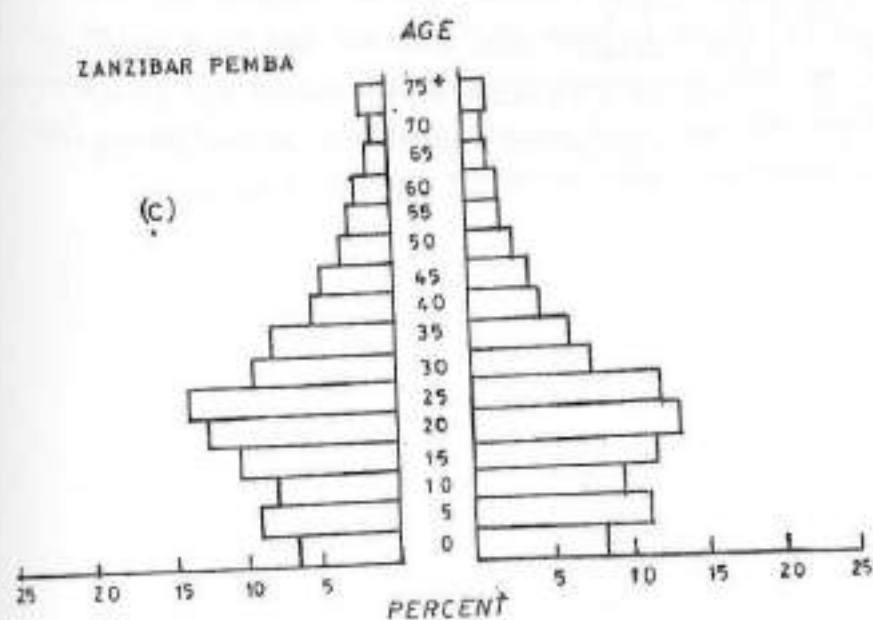
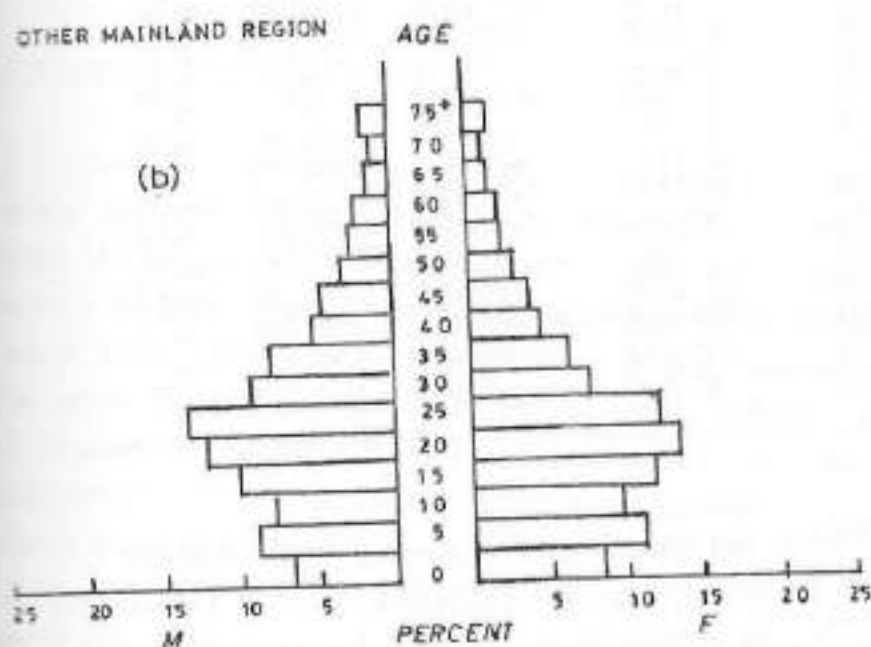
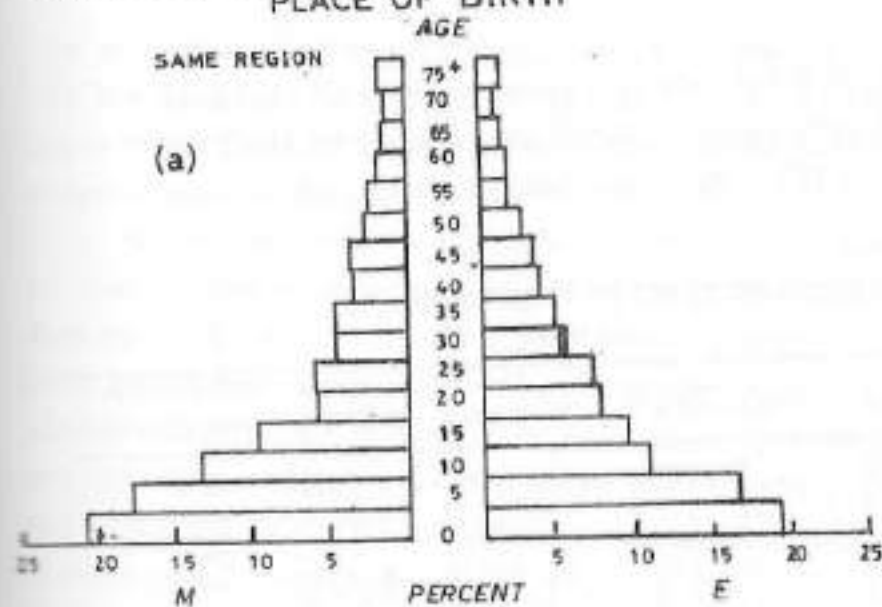
(EXCLUDES DAR ES SALAAM REGION)

⁵ Claesson and Eggero, *op.cit.*, footnote 1, pp.3 - 5.

Figure 6.1 shows the direction of migration streams between birth places and places of residence in 1977. There is a conspicuous intensity of migrant exchanges between neighbouring regions. However the most notable feature of the interregional migration is the existence of very long distance migration streams, especially between Kigoma, Mbeya, Iringa and Ruvuma (origins) and Tanga (destination). Similarly but to a lesser extent, Kilimanjaro, Arusha, Bukoba and Mwanza are destinations of migrants from beyond neighbouring regions. These streams are a reflection of movements which took place during the peak periods of labour migration in the mid-1950s to the coastal estates and small holder farms around the lake and in the Northern Tanzania. A substantial proportion of these migrants subsequently settled in the regions of destination and that is why they appear as in-migrants in the place of birth statistics. The actual volumes of in- and out-migration is shown in Table 6.2. The bulk of net migration is concentrated in Dar-es-Salaam Region but other regions with large net gains are the traditional centres of labour employment and or regions with extensive arable land such as Arusha, Morogoro, Tabora, Rukwa, Shinyanga and Kagera (West Lake). The effectiveness ratio shows the extent to which migration is in one or other direction (in or out). Only Dar-es-Salaam Region has migration largely towards itself. The other regions with relatively high positive effectiveness ratio are Arusha and Kagera. These Regions have a high attraction for migrants because of employment opportunities but they do not tend to have large numbers of out-migrants. Rukwa has a high proportion of immigrants. On the other hand, the only region with a relatively high negative effectiveness ratio is Iringa which has a high outmigration and little in-migration.

The age distribution of the Mainland population according to birth place categories is illustrated in Figure 6.2 (Appendix VI.1). A comparison between the age distribution for the same Region (non-migrant) population (Fig. 6.2 (a)) and that of the other Mainland

FIGURE 6.2.....MAINLAND POPULATION BY AGE AND PLACE OF BIRTH



Region population (Fig.6.2 (b)) shows a preponderance of children in the former (child/adult ratio of 0.61) as compared to the latter (child/adult ratio of 0.11). The characteristic bulge of the age

TABLE 6.2.— PLACE OF BIRTH BY PLACE OF RESIDENCE: 1967

Region	Out Migrants	In Migrants	Net Migrants	Gross Migrants	Effective-ness Ratio
Dodoma	111,056	64,694	-46,362	175,750	-.26
Arusha	11,768	118,317	+76,549	160,085	+.48
Kilimanjaro	110,590	83,627	-26,963	194,217	-.14
Tanga	110,074	105,464	-4,610	215,538	-.02
Morogoro	126,686	148,081	+21,395	274,767	+.08
Coast	148,434	98,758	-49,676	247,192	-.20
Dar-es-Salaam	70,040	485,280	+415,240	555,320	+.75
Lindi	90,752	74,176	-16,576	164,928	-.10
Mtwara	85,266	69,548	-15,718	154,814	-.10
Ruvuma	66,835	48,200	-18,635	115,035	-.16
Iringa	146,570	37,865	-107,705	183,435	-.59
Mbeya	86,874	82,728	-4,146	169,602	-.02
Singida	85,404	46,424	-38,980	131,828	-.30
Tabora	110,791	237,574	+87,803	348,365	+.25
Rukwa	29,561	84,206	+54,645	113,767	+.48
Kigoma	95,969	72,214	-23,755	168,183	-.14
Shinyanga	176,180	224,240	+48,060	400,420	+.12
Kagera	61,583	158,036	+96,453	219,619	+.44
Mwanza	255,678	170,192	-85,486	425,870	-.20
Mara	63,938	58,940	-4,998	122,878	-.04

distribution of the "Other Mainland Region" category is indicative of the age-selectivity in migration. The child/adult ratio (i.e., the ratio of children 0-4 to adults 15-44) is high for the non-migrant and low for the migrant population. In the non-migrant population Figure 6.2 (a) there is only 20.7 percent and 24.9 percent of adult males and females respectively in the 20-39 age group as compared to 42.9 percent and 39.8 percent in the same age groups for the migrant population in "Other Mainland Region" category.

The sex ratio for these populations are 83 for the former and 108 for the latter. The sex ratio for the migrant population (119) is above the national average of 96 by 23 points, indicating a high proportion of males in the migrant population.

Since the migrants identifiable by place of birth and place of enumeration or residence are lifetime migrants, in the case of Tanzania this would include a substantial number of labour migrants both recent and those who settled in other regions during colonial times. Such moves tended to be predominantly made up of adults and until recently, more adult males than females. The sex ratio for the different birth place categories shows a higher sex ratio in the migrant population (Appendix VI.1).

MIGRATION DURING A SPECIFIED INTERVAL

Intercensal Migration

Cross-classification of data on place of enumeration in 1978 census and place of residence at the time of the last census in 1967 gives the proportion of migrants per region during the interval. The migrant in this case is defined as a person whose residence at the 1978 census date differs from his residence at the time of the 1967 census. The interval in this case is 11 years. This information excludes about 30 percent of the population which was born during the interval. In addition it ignores those who moved and returned to the same region within the interval.

Table 6.3 shows a cross-classification of migrants by place of enumeration and place of residence in 1978 and 1967, respectively. Accordingly, about 2.5 million people crossed regional boundaries and 0.4 million immigrants came into Mainland Tanzania in the 11 year interval. This gives an annual average rate of 1.3 percent inter-regional migrants and 0.2 percent immigrants.

TABLE 6.3.— MAINLAND POPULATION BY PLACE OF RESIDENCE IN 1967 (%)

Region	Place of residence in 1967			Total
	SR	OR	OT	
Mainland Tanzania	81	13	2	15
Dodoma	93	7	0	7
Arusha	88	12	0	12
Kilimanjaro	89	10	1	11
Tanga	92	7	1	8
Morogoro	85	15	0	15
Coast	79	21	0	21
Dar-es-Salaam	46	50	4	54
Lindi	89	10	1	11
Mtwara	94	5	1	6
Ruvuma	92	7	1	8
Iringa	92	8	0	8
Mbeya	91	8	1	9
Singida	92	8	0	8
Tabora	73	19	7	27
Rukwa	79	8	13	21
Kigoma	89	6	5	11
Shinyanga	84	16	0	16
Kagera	83	10	7	17
Mwanza	87	12	1	13
Mara	91	7	2	9

SR = Same Region;

OR = Other Mainland Region;

OT = Outside Tanzania

The magnitude of migration in the intercensal period (1967-1978) does not differ too much from that of the "lifetime" migration considered in the previous section. In the case of movement into "Other Regions", the same five regions — Dar-es-Salaam, Coast, Tabora, Shinyanga and Morogoro had above national average percentage of inter-regional migrants while the same two regions, Kigoma and Mtwara, had the least regional migrants in their populations.

Similarly only border regions had significant percentages of immigrants. It is noteworthy that both the southern regions of Ruvuma and Mtwara showed a lower proportion of immigrant resident in the regions in 1967 and 1978 than in the "birth place" categories. There was little change in the level of immigration for the western regions —Rukwa, Tabora, Kagera (West Lake) and Kigoma. In the southern border regions, the decline in immigration is related to the Independence of Mozambique in 1974 when many Mozambique nationals in Tanzania returned home and further emigration declined. In the western border regions most immigrants who came in as refugees from Burundi, Uganda, Zaire and Rwanda have generally settled down permanently.

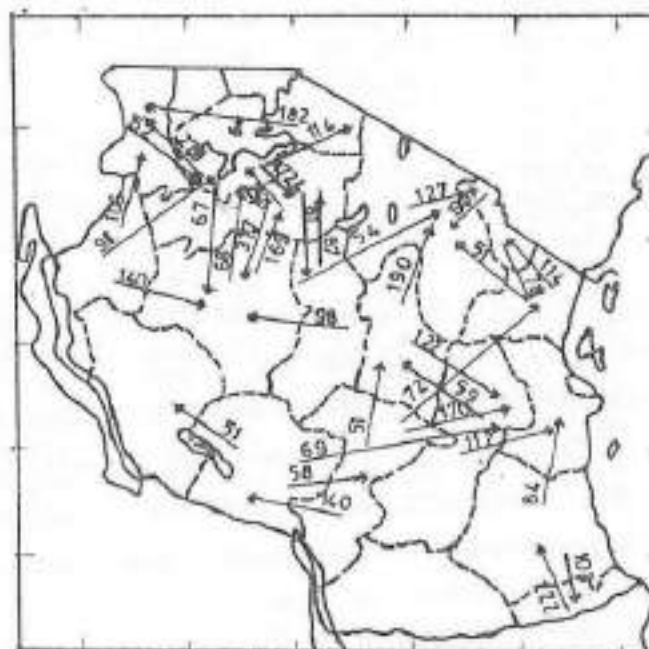
TABLE 6.4.— CHANGE OF RESIDENCE BETWEEN 1967 AND 1977

Region	Out Migrants	In- Migrants	Gross Migrants	Net Migrants	Effect- iveness ratio
Dodoma	67,126	10,287	107,713	-27,139	-0.25
Arusha	36,226	65,612	101,838	+29,386	+0.29
Kilimanjaro	72,995	52,200	125,195	-20,795	-0.17
Tanga	73,227	19,707	122,934	-23,520	-0.19
Morogoro	72,333	79,189	151,822	+ 7,156	+0.05
Coast	58,136	60,956	119,092	+ 2,820	+0.02
Dar-es-Salaam	75,123	259,271	334,694	+183,848	+0.55
Lindi	13,334	33,880	77,214	- 9,454	-0.12
Mtwara	13,890	25,033	68,923	-18,857	-0.27
Ruvuma	28,815	22,887	51,732	- 5,958	-0.12
Iringa	65,856	29,692	99,548	-35,164	-0.35
Ibeya	50,327	53,005	103,332	+ 2,670	+0.03
Singida	13,310	32,527	75,867	-10,813	-0.14
Tabora	60,121	128,871	189,292	+68,450	+0.36
Rukwa	16,609	54,535	71,144	+37,926	+0.53
Kigoma	39,112	38,410	77,552	- 732	-0.01
Shinyanga	90,375	116,598	206,973	+26,223	+0.13
Kagera	10,193	91,397	131,590	+51,204	+0.39
Mwanza	113,189	94,661	237,850	-48,528	-0.20
Kara	10,335	31,512	71,847	- 8,763	-0.12

The pattern of interregional migration for this period is illustrated in Fig.6.3 which shows the direction of migration streams for the population which changed place of residence between 1967 and

1977. There is the characteristic exchange between neighbouring regions especially around Lake Victoria (Mwanza, Shinyanga, Tabora and West Lake (Kagera) Regions) and also around the northeast coast (Tanga, Morogoro, Arusha, Kilimanjaro). There is a complete absence of the long distance migration observed for the "lifetime" migration (Fig.6.1). This change in direction is significant in that it reflects the decline in labour demand in coffee and tea plantations and sisal estates in Kilimanjaro, Tanga and Coast Regions. However the development of new settlement schemes and the early spontaneous Ujamaa villages of the late 1960s, encouraged some interregional migration with main destinations being in Tanga (e.g. Mombo and Segera settlement schemes) Arusha (Upper Kitete) and Tabora (Urambo tobacco schemes). (Detailed data on interregional migration appear in Appendixes VI.4 and VI.5).

FIGURE 6.3 INTERREGIONAL MIGRATION: STREAMS EXCEEDING 5000 PEOPLE (00)
(PLACE OF RESIDENCE 1967 AND 1977)



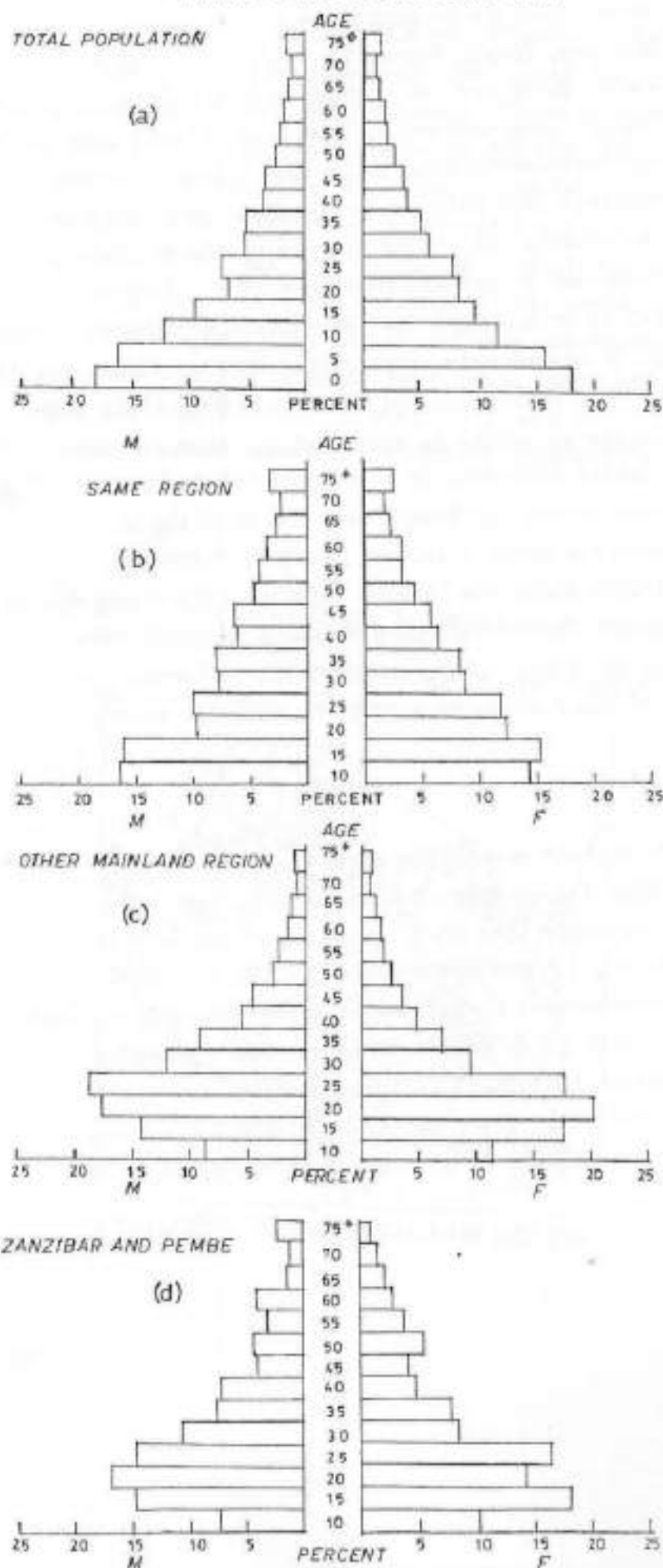
EXCLUDES DAR-ES-SALAAM REGION

Table 6.4 shows the volume of in-and out-migration for each region. The regions showing net-gain in migration in the period 1967-1977 are Arusha, Morogoro, Coast, Mbeys, Tabora, Rukwa, Shinyanga and Kagera (West Lake). These are the regions in which major developments to expand export crop production have taken place since independence to reinforce investments made during the colonial period. As a consequence more migrants from neighbouring regions were attracted to these areas than to others. It should also be mentioned that these regions (except Rukwa and Shinyanga) have some of the largest towns which attract rural to urban migrants. Rukwa is a peripheral region with poor links. It has no major cash crop. However it has surplus fertile land for food production and migrants from densely populated regions were attracted to settle in this region. Most of the deficit regions are generally inaccessible like Rukwa but lacking its advantages. Some like Kigoma and Ruvuma were the traditional labour reserves, but since the decline in long distance migration, fewer people leave. Iringa shows the largest negative effectiveness ratio. Most of the migrants from Iringa have moved into neighbouring regions of Mbeys and Morogoro. This outmigration is partly related to the decline of the region as a major producer of maize.

Age-sex distribution

Only the Country's "total" population gives the complete age structure of the population (since none of those aged 0-9 and only some of the population currently aged 10-14 would have been born in 1967) (Fig. 6.4, Appendix VI.2). The age pyramid for the country's total population, is characterised by a broad base and a rapidly reduced population in the higher ages (Fig. 6.4a). This contrasts somewhat with the population resident in 'other' regions, Zanzibar and Pemba and outside the country in 1967. These populations have large proportions of adults ages between 20-39 (57.5 percent of males and 53.4

FIGURE 6.4.....MAINLAND POPULATION BY AGE AND PLACE OF RESIDENCE IN 1967



percent of females for those who migrated from other Mainland regions) when compared to the same age group in the total country's population (24.3 percent males and 26.9 females). The contrast is also evident in sex ratios. The sex ratio for the "migrant" population in the 20-39 age category is 108 as compared to 86 for the same age group in the non-migrant population. This indicates that adult males predominate over adult females in the migration.

Migration Occurring between 1977 and 1978

The other data used to identify previous residence refers to 5th February 1977. A question on the place of residence at a specific date is particularly useful if the interval is reasonably short because the total number of movers tend to be understated as the interval increases. On the other hand, if the interval is too short it may not be possible to catch a significant proportion of all moves taking place. In the previous section the migration interval was eleven years. This is considered rather long and may partly explain why the difference in magnitude and patterns of interregional migration between lifetime movers and those during the interval is small. The date chosen for the second migration question gives an interval of 567 days or 1.55 years. Table 6.5 shows the classification of migrants and non-migrants based on place of residence in the interval.

As would be expected, because of the shorter interval, there is a great ¹⁷⁷reduction of the proportion of migrants in the populations of all regions. There is little or no record of immigrants except for Dar-es-Salaam and Kagera regions. The number of immigrants moving into the country since February 5th 1977 is about 50,000 (including 7,000 from Zanzibar and Pemba) and accounting for only 0.3 percent of the population. Interregional migrants numbered 600,000 or almost 4 percent of the entire population. This gives an average annual turnover of 2.48 percent per region. However the sources of

interregional migrants with above average percentage contributions

TABLE 6.5.— MAINLAND POPULATION BY PLACE OF RESIDENCE IN 1977 (%)

Region	Place of Residence in 1977			Total
	SR(Non-migrant)	OR(Inter-regional)	OT(Inter-national)	
Mainland				
Tanzania	96	3.7	0.3	4.0
Dodoma	97	2.5	—	2.5
Arusha	97	2.9	0.1	3.0
Kilimanjaro	96	3.7	0.3	4.0
Tanga	97	2.4	0.1	2.5
Morogoro	95	5.0	0.1	5.0
Coast	94	5.7	0.1	5.8
Dar-es-Salaam	84	14.8	1.8	16.6
Lindi	96	3.8	0.1	3.9
Mtwara	98	1.9	0.1	2.0
Ruvuma	97	2.9	—	2.9
Iringa	95	4.5	—	4.5
Mbeya	97	2.8	0.6	3.4
Singida	97	2.8	—	2.8
Tabora	96	4.0	0.2	4.2
Rukwa	97	2.5	0.1	2.6
Kigoma	97	2.2	0.4	2.6
Shinyanga	97	3.1	0.1	3.2
Kagera	96	2.6	1.4	4.0
Mwanza	96	3.8	0.2	4.0
Mara	97	2.9	0.4	3.3

include three regions which were not listed in the previous estimates. These are Iringa(4.5 percent), Mwanza (3.8 percent) and Kilimanjaro (3.7 percent). The regions which over the longer and shorter intervals have contributed most to interregional migration are Dar-es-Salaam (14.8 percent), Coast (5.7 percent), Morogoro (5.0 percent) and Tabora (4 percent). Shinyanga (3.1 percent) seems to have a smaller proportion of interregional migrants in the shorter migration interval.

When the patterns of migration for the four periods: Lifetime, 1967-1978, 1967-1977 and 1977-78 are considered together, the following conclusions can be drawn:

1. Interregional migration is an important factor of population change in Tanzania. The influence of migration has continued from the past but is still important today.
2. The main difference between "lifetime" migration and recent and current interregional migration is that past migrations involved long distance movements of labour, while current migrations are mostly between neighbouring or 'near' regions.
3. Migration is sex selective. It is evident from present trends that there is a greater participation of adult men than women in migrations just as in the past. This may mean that more single men are participating in migration than females and or those migrating tend to leave their wives and children behind.
4. The movement of adult males and females have important influences on both the population composition and growth of the sending and receiving areas. This is an aspect which needs further analysis.

INTERNATIONAL MIGRATION

In the previous sections some aspects of international migration have already been mentioned. The main feature of international migration as can be learned from the census data is that most of the immigrants into Tanzania originate from the neighbouring African countries. Further, apart from the main urban centres, the main destination of international migrants are the regions which border the countries of origin. Unfortunately the census data gives little evidence on the emigration which occurs.

Nationally, immigration accounts for about 2.4 percent of the population or 122,000 foreign born. Table 6.6 and Appendix VI.6 show the volume of immigration for three periods: "Lifetime" immigrants in 1978 and 1977 and immigrants in the interval 1977 and 1978. Burundi is by far the largest source of immigrants, accounting for about 38 percent of all immigrants into the country. The other major sources are Mozambique (21 percent), Rwanda (11 percent), Kenya (10 percent) and Uganda (7 percent). In terms of importance, the sources of immigrants do not seem to have changed much up to 1978.

TABLE 6.6.— SEX COMPOSITION OF IMMIGRANTS IN MAINLAND TANZANIA 1977

Country of birth	Male	Female	Both Sexes	%	Sex Ratio
Burundi	73,907	72,783	146,690	38	102
Kenya	16,398	22,260	38,658	10	74
Malawi	4,727	3,618	8,345	2	131
Mozambique	40,690	38,408	79,098	21	106
Rwanda	24,482	16,348	40,830	11	150
Uganda	13,658	13,622	27,280	7	100
Zaire	4,146	4,052	8,198	2	102
Zambia	6,997	7,891	14,888	4	89
Outside Africa	8,115	6,102	14,217	4	133
All Countries	195,178	186,553	381,731	100	105

The highest sex ratios are to be found in the immigrants from Rwanda (150), Outside Africa (133) and Malawi (131). This suggests that these immigrants are largely labour migrants with their characteristic male dominance. Immigrants from Burundi (102), Mozambique (106) and Uganda (100) on the other hand have lower sex ratios indicating an almost equal participation of males and females in the migration. This is the characteristic of the refugee populations which constitute the main type of migrants from these countries into Tanzania.

Unfortunately it is not possible to distinguish between the age distributions of the different types of immigrants from the census tabulations. All immigrants have been grouped together. The age-sex pyramids for the different migration periods is shown in Figure 6.5 and Appendixes VI.2 and VI.3. The age distribution of those born outside the country (Fig. 6.5a) shows a large proportion of adults in the age group 20-39 (37.2 percent males and 39.7 females). The corresponding values for the other groups are: 52.9 percent males and 52.9 percent females for immigrants resident outside the country in 1967 (Fig. 6.5b) and 51.8 percent males and 46.2 percent females for those who moved in since 1977 (Fig. 6.5c). The sex ratios for these groups are as shown in Table 6.7.

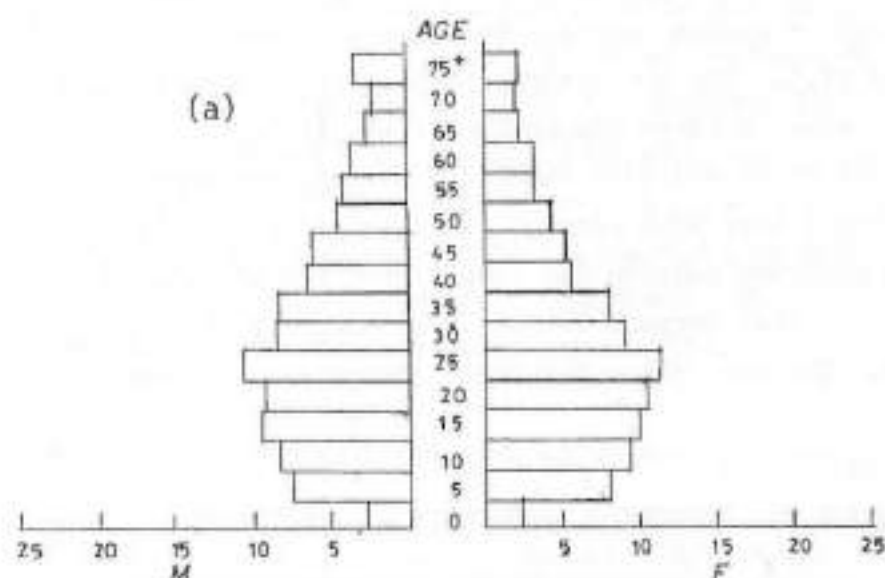
TABLE 6.7.— SEX RATIO FOR THE DIFFERENT CATEGORIES OF IMMIGRANTS

Immigrant Category	Total	Sex Ratio
Born outside the country	421,906	111
Resident outside the country in 1967	202,253	130
Resident outside the country in 1977	42,170	208

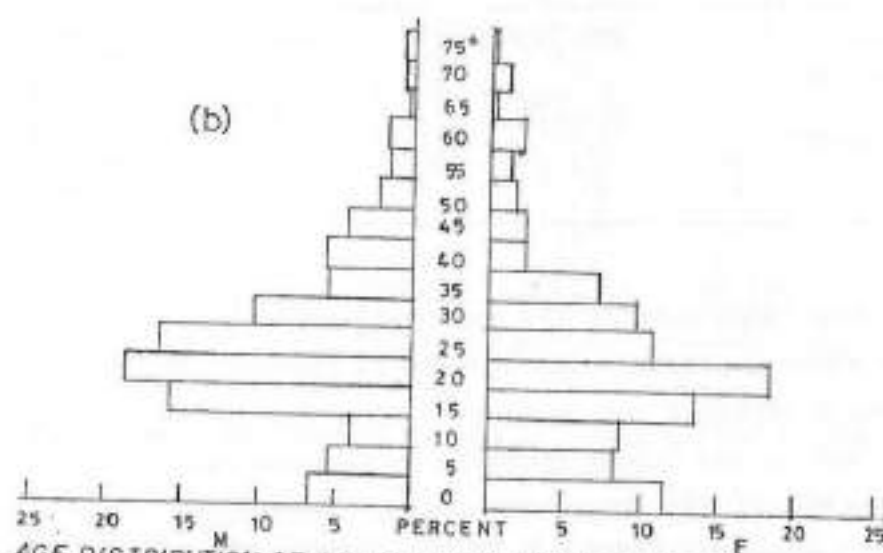
The sex ratio for the 'Born outside the country' category is much lower than for the other two categories because it includes all types of immigrants: labour migrants and contracted expatriates who tend to have higher sex ratios and border crossing immigrants and refugees who tend to have relatively lower sex ratios. This would suggest that more recent immigrants (1977 onwards) are increasingly of the labour migrant type since they are predominantly male.

The pattern of immigration from neighbouring countries is as depicted on Fig. 6.6. Neighbouring countries contribute over 80 percent of the immigration into Tanzania. Receiving regions in Tanzania border the sending countries. In most cases most of the immigrants into these

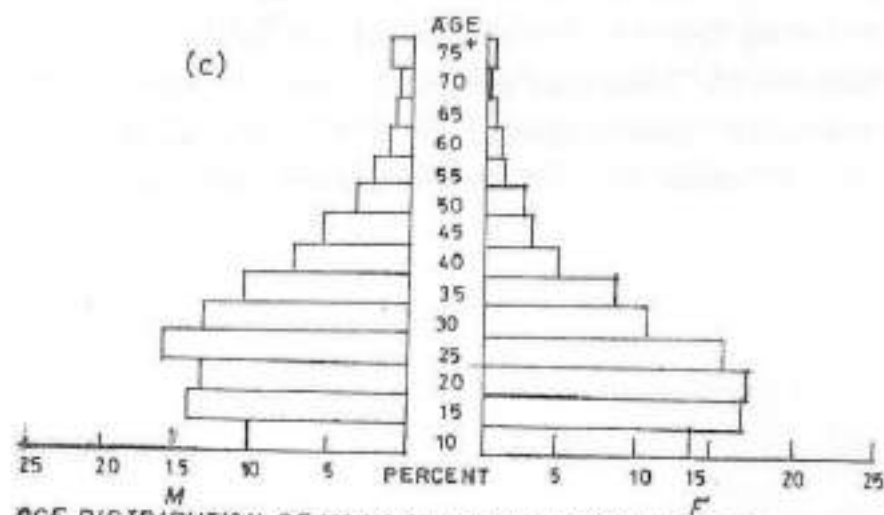
FIGURE 6-5.....MAINLAND POPULATION BY PLACE OF BIRTH
AND PLACE OF RESIDENCE IN 1967 AND 1977



AGE DISTRIBUTION OF MAINLAND POPULATION BORN
OUTSIDE TANZANIA



AGE DISTRIBUTION OF THE MAINLAND POPULATION RESIDENT OUTSIDE
TANZANIA IN 1977



AGE DISTRIBUTION OF MAINLAND POPULATION RESIDENT OUTSIDE
TANZANIA IN 1967

FIGURE 6.6.....IMMIGRATION NEIGHBOURING COUNTRIES:
(BIRTH PLACE BY PLACE OF RESIDENCE
IN 1977)



regions come from one to three major sources. On the one hand Mtwara received 99 percent of immigrants from Mozambique, Tabora and Bulawa regions received 96.7 percent and 83 percent of immigrants, respectively, from Burundi alone. On the other, Kagera (West Lake) receives its immigrants mainly from Uganda (31 percent), Rwanda (45 percent) and Burundi (21 percent). Dar-es-Salaam Region is different because of its urban status and it will be treated under the section on rural-urban migration. The sex ratios for immigrants in the main receiving regions (with over 20,000 immigrants) is shown in Table 6.8.

TABLE 6.8.— SEX RATIOS FOR THE IMMIGRANT POPULATION IN THE RECEIVING REGIONS

Receiving Region	Total immigration	No. of main sources	Sex ratio
Dar-es-Salaam	21,030	4	119
Mtwara	35,536	1	95
Tabora	50,836	1	104
Bulawa	54,856	1	95
Kigoma	39,169	1	73
Kagera (West Lake)	71,130	3	126

The immigrants in regions with single main sources generally have a low sex ratio when compared to those with several sources of immigration. Both Dar-es-Salaam and Kagera regions while having their share of refugees are also important destinations of labour migrants, hence their higher proportions of males. Kigoma has a particularly low sex ratio, indicating a predominance of females in the immigrant population, mainly from Burundi.

Is international migration on the increase or is it waning? It is not possible to say with any certainty given the available data but using the two migration periods, it can be seen that the rate of

immigration per year is slightly higher for the shorter more recent period (1977-78) i.e., 6.4 percent per year; than in the longer period (1967-1978) i.e., 4.4 percent per year. However what will determine the volume and rate of future immigration is the changes which may occur in the sending countries concerning the factors which have influenced immigration to date. At least 50 percent of immigrants from neighbouring countries are refugees most of whom have settled in the country. A change in their status or of conditions in their countries of origin may affect the present composition and future proportion of immigrants in the country.

MIGRATION INTO URBAN AREAS

The 1978 Population census obtained data for a range of urban areas including Regional Headquarters (RHQ), District Headquarters (DHQ) and other smaller urban centres. The total urban population for Mainland Tanzania in 1978 was given as 2.26 million. Table 6.9 shows the population of the main urban centres (RHQs), their sex ratios and child/adult ratios.

TABLE 6.9.— THE POPULATION OF MAIN URBAN CENTRES IN MAINLAND TANZANIA (REGIONAL HEADQUARTERS, 1978)

Regional Headquarters	Total Population	%	Sex Ratio	Child/Adult Ratio
Dodoma	15,807	2	118	.29
Arusha	55,223	2	112	.29
Moshi	52,046	2	128	.29
Tanga	103,399	5	111	.34
Mtongoro	60,782	3	102	.33
Dares-Salaam	769,445	34	115	.32
Mindji	27,312	1	104	.30
Mtwara	48,491	2	103	.32
Songea	17,955	1	98	.31
Iringa	57,164	3	99	.36
Mbeya	76,601	3	98	.36

TABLE 6.9.— (Continued)

Regional Headquarters	Total Population	%	Sex Ratio	Child/Adult Ratio
Singida	29,258	1	99	.36
Tabora	67,388	3	102	.36
Sumbawanga	28,586	1	106	.41
Kigoma	50,075	2	96	.47
Shinyanga	20,439	1	108	.31
Bukoba	21,547	1	124	.26
Mwanza	110,553	5	116	.33
Misoma	31,051	1	95	.42
Total	1,673,122	74	—	—
Total Mainland				
Urban Population	2,257,921	100	108	.34

The distribution of the urban population shows the overwhelming importance of Dar-es-Salaam as the primate city (34 percent). The next largest urban centres — Mwanza and Tanga — share only 5 percent of the urban population each. A comparison between the sex ratio and the child/adult ratio shows the expected correspondence between low sex ratios and high child adult ratios (and vice versa). Over 60 percent of the main urban centres have sex ratios of over 100, and this together with the relatively low child adult ratios suggest the influence of adult male migrants who constitute a substantial portion of the urban population. For example only 36 percent of Dar-es-Salaam's 1977 population was born in the city. The rest of the population (64 percent) was born in other regions as shown in Table 6.10.

Column 2 in Table 6.10 shows the total population from different birthplaces for the population resident in Dar-es-Salaam in 1977. Most of the migrants into the city were born in the neighbouring regions of Coast (17 percent) and Morogoro (8 percent) although Dar-es-Salaam attracts migrants from most areas of the country. Column 4 gives the vol-

use of immigration into Dar-es-Salaam in the period 1967 to 1977. The migration streams for the two time periods are depicted in Fig. 6.7. The pattern of migration into Dar-es-Salaam is not too different from migration into the other main urban centres. This

TABLE 6. 10.— MIGRATION INTO DAR-ES-SALAAM REGION

Region of Origin	Birth to 1977	%	1967 to 77	%
Ndona	15,346	2	11,693	2
Krasha	4,141	—	4,300	1
Ililimanjaro	29,505	4	19,700	4
Tanga	35,571	5	20,970	4
Morogoro	63,912	8	32,876	6
Coast	129,524	17	48,610	9
Dar-es-Salaam	276,433	36	270,720	51
Mindj	37,449	5	17,481	3
Mwara	15,812	2	10,316	2
Buruna	14,437	2	7,731	1
Iringa	14,062	2	9,011	2
Mbeya	18,134	2	11,903	2
Singida	5,835	1	3,501	1
Tabora	16,491	2	8,934	2
Rukwa	3,291	—	1,816	—
Mgombe	8,231	1	4,764	1
Minyanga	6,125	1	3,925	1
Kagera (West Lake)	12,089	2	8,150	2
Mwanza	7,717	1	6,210	1
Mara	8,805	1	5,951	—
Kenya	17,260	2	10,145	2
Outside Tanzania	21,030	3	10,070	2
Total	761,236	100	528,777	100

N.B. The table refers to the Dar-es-Salaam Region but since the urban population constitutes 91 percent of the Regional population it is used here to study the pattern of in-migration into the city.

is discussed below.

The tabulation of migration data for the urban population gives

FIGURE 6-7.....MIGRATION INTO DAR-ES-SALAAM



a breakdown of the total urban population in Regional and District Headquarters by place of residence in 1967 and 1977. The place of residence is classified as follows:-

1. Same (Mainland) Region (SR)
 - Regional Headquarters
 - District Headquarters
 - Rural Areas
2. Other (Mainland) Region (OR)
 - Regional Headquarters
 - District Headquarters
 - Rural Areas
3. Zanzibar and Pemba
4. Outside Tanzania.

TABLE 6.11.— MAINLAND TOTAL URBAN POPULATION BY PLACE OF RESIDENCE IN 1967 AND 1977

Direction of Migration	Type of migration				
	a. Intra-		b. Inter-		
	(SR/SR)	%	b(i). (SR/OR)	Regional b(ii). (OR/SR)	b(iii). (OR/OR)* %
1. Urban - Urban					
DHQ - DHQ	7,316	4	2,103	12,520	3,656 3
DHQ - RHQ	28,335	16	2,175	79,069	8,591 16
RHQ - RHQ	-		6,698	95,914	14,371 26
DHQ - DHQ	-		1,176	12,814	31,563 8
2. Urban - Rural					
DHQ - RA	4,832	3	2,639	5,614	2,716 2
DHQ - RA	1,106	3	573	3,033	1,715 1
3. Rural - Urban					
RA - RHQ	68,817	40	1,127	119,511	11,782 24
RA - DHQ	58,816	34	996	21,587	1,228 5
4. Rural-rural-Urban	-		2,297	17,997	61,728 15
Total	172,582	100	23,381	368,089	170,383 100
Grand Total =	734,438				

*N.B.: SR = Same Region;

RHQ = Regional Headquarters

RA = Rural Areas.

OR = Other Region

DHQ = District Headquarters

Two types of urban migrants can be distinguished from Table 6.11: a) Short distance: Intra-regional migration

b) Long distance: Inter-regional migration.

Interregional migrants can be further subdivided according to the pattern of their movements. Thus some migrants moved once in the period 1967-1978, from one region to another b(i) while others moved more than once, returning to the regional urban residence they were in 1967 having moved out either in 1967 or 1977 b(ii) or having moved from both their region of residence in 1967 and 1977 and settled in an urban centre of yet another region, b(iii).

The direction of migration is also of interest. Four main directions are identifiable from the tabulations: (i) Urban - urban (ii) Urban - rural (iii) Rural - urban (iv) Rural - rural - urban.

Table 6.11 summarizes these types of migrants. According to the categorization of migrants by place of residence in 1967 and 1977 there were 734,138 migrants in the urban population. This is about 33 percent of the 1978 urban population in Mainland Tanzania. Of these, 40 percent were direct rural to urban migrants while 11 percent had moved between rural areas in different regions before finally moving into an urban area. This brings the total of rural to urban migrants to 51 percent of the total migration occurring according to the 1967-1978 change of residence. Another notable feature of the migrants in the urban population is that 19 percent of the movers recorded were inter-urban migrants while 3.5 percent were urban to rural migrants (but again registered in urban centres in 1978). Migration from small towns (DHQ) to larger towns (RHQ) was 16 percent and from large town to small town was 3 percent.

A comparison between intra-regional (or short distance) moves and interregional migrants reveals some interesting characteristics of the urban migrants. In total, Intra-regional urban migrants comprised 23 percent while interregional migrants comprised 77 percent of total migrants. For the intra-regional urban migrants the largest proportion were movers from rural areas to Regional Headquarters (40

percent). The next largest group were those moving from rural areas to District Headquarters. In other words, the most significant moves within regions were rural to urban (71 percent). It can be generalised from this that most of the rural-urban migration within regions is towards the regional capital. Movement towards the District Headquarters accounted for only 16 percent of the intra-regional urban migration.

As a contrast, the data show that over three quarters of the rural-urban migration is also an inter-regional migration. That is, people moving into towns are also more likely to cross regional boundaries than otherwise. Two directions dominate the interregional migration for the urban population. These are Urban to Urban (movement between Regional Headquarters 26 percent and movement from District Headquarters to Regional headquarters (stepwise migration), 16 percent); Rural to Urban (Rural area to Regional Headquarters 24 percent and Rural area to rural area in another Region and then to urban area 15percent).

Conclusion

The available data on urban migration provides important information which can be further analysed in relation to other variables. Knowledge about the direction and distance of urban migration is useful for studying changes in the pattern of rural-urban migration and in identifying factors which influence them.

ZANZIBAR

INTRODUCTION

Zanzibar has a demographic history which is related to the coast of Mainland Tanzania, but which is also distinct in some respects. The

1967 population census for example, showed that non-Africans constitute 20 percent of Zanzibar's population compared to the Mainland's 1 percent. In this analysis of migration in Tanzania, some attempt has been made to present a separate analysis for Zanzibar. It is hoped that this analysis will provide a basis for comparing the Mainland's and Zanzibar's populations and for identifying characteristics which may be peculiar to Zanzibar.

Zanzibar is divided into 5 regions. These are Zanzibar North, Zanzibar Central/South and Zanzibar West/Town on the Island of Zanzibar and Pemba North and Pemba South on the Island of Pemba. At the time of the census in 1978 Zanzibar had a population of 1,76,111, 32.6 percent of which was enumerated in urban areas, mainly, Zanzibar town (71 percent).

'LIFETIME' MIGRATION

An analysis of the birthplace statistics for 1978 shows that 22.6 percent of Zanzibar's population was "lifetime" migrants. These are people who were enumerated outside their region of birth in Zanzibar (18.1 percent) or were born in Mainland Tanzania (3.7 percent) or outside Tanzania (0.6 percent). Table 6.12 shows the population of Zanzibar by birthplace categories.

TABLE 6.12.— POPULATION BY BIRTHPLACE CATEGORIES: ZANZIBAR AND PEMBA

Region	Total Popu- lation	Birth Place Categories (%)				Lifetime Migrants %
		Same Region	Other Island Region	Mainland Tanzania	Outside Tanzania	
Zanzibar and Pemba	1,76,111	77.4	18.1	3.6	0.9	22.6
Zanzibar North	77,017	90.2	8.4	1.9	0.4	10.7
Zanzibar Central	51,749	79.5	14.0	5.6	0.8	20.4
Zanzibar West	1,20,411	47.8	42.4	8.0	1.7	52.1
Pemba North	1,06,290	92.3	6.3	1.1	0.3	7.7
Pemba South	99,014	92.8	6.3	0.7	0.3	7.3

The "Other Island Region" category constitutes interregional migrants, and this makes up for 80 percent of all migrants. Most migrants originate from the Island of Zanzibar: Zanzibar West (68.9 percent), Zanzibar Central (9.8 percent) and Zanzibar North (7 percent). The over-whelming importance of Zanzibar West in terms of migration is related to its relatively larger population and to Zanzibar town which is in this Region. This aspect will be discussed under the section on rural-urban migration. The age structure of life-time migrants for each birthplace category is illustrated by age-sex pyramids in Fig. 6.8 (Appendix VI.7). The population enumerated in the region of birth (Fig. 6.8a) has the characteristic broad base and rapidly declining proportions in the higher ages. This contrasts sharply with populations in migrant categories in which adults dominate as a result of the influx of adults due to in-migration. The age structure of the migrants from outside Tanzania portrays an extreme situation in which adults 15 years and over constitute 84.7 percent of the population (almost twice as many adults as in the "Same Region" category). The proportions for the other categories are as follows: Same region (non-migrant), 1.6 percent; Other Island Regions, 66.2 percent; and Mainland Tanzania, 81 percent; (Appendix VI.8). However the sex ratio for the different birthplaces do not show the expected dominance of males for the interregional migration within Zanzibar.

TABLE 6.13.— SEX RATIO FOR BIRTHPLACE CATEGORIES: ZANZIBAR POPULATION

Region	Birth Place Category			
	Same Region	Other Island Region	Mainland Tanzania	Outside Tanzania
Zanzibar and Pemba	98	88	169	185
Zanzibar North	98	83	215	—
Zanzibar Central	103	85	161	146
Zanzibar West	98	89	150	—
Pemba North	98	85	342	—
Pemba South	97	85	322	—

FIGURE 6.8.....AGE DISTRIBUTION OF POPULATION BY PLACE
OF BIRTH CATEGORIES ZANZIBAR.

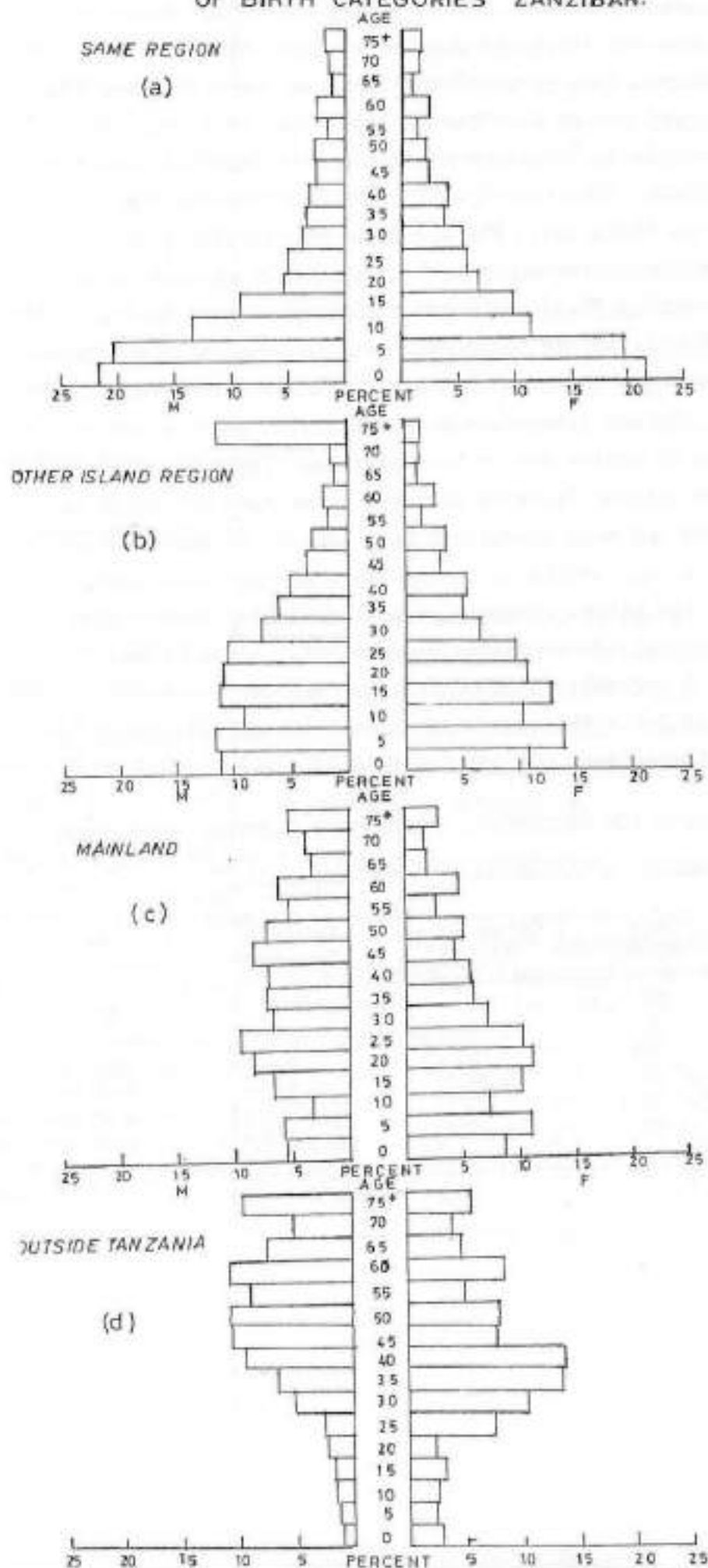


Table 6.13 shows that there is an overwhelming dominance of females in internal migration for all the regions in Zanzibar (on average the sex ratio for internal migrants is 10 points below the sex ratio for the whole of Zanzibar and Pemba). There does not seem to be direct explanation for this except perhaps that more females cross regional boundaries due to marriage than do males. Another possible explanation is that adult male migrants tend to move either to Mainland Tanzania or to the Arab countries with which Zanzibar has historical ties. Whatever other factors may be involved in initiating inter-regional migration in Zanzibar, internal labour migration of males does not seem to be very important. The sex ratios also show that there is a great difference between the sex composition of migrants moving out of the Islands and those moving within them. The sex ratio for migrants to the Mainland and outside Tanzania is twice that of internal migrants. This feature would seem to support the view that most male migrants tend to move outside the Isles.

MIGRATION STREAMS

The census data on migration provides information on migration streams by relating place of birth and place of residence in 1977 (Appendix VI.9). The volume of internal migration is presented in Table 6.14.

TABLE 6.14.— LIFE-TIME INTERNAL MIGRATION IN ZANZIBAR

Region	In Migra- tion	Out-Migra- tion	Gross -- Migration	Net Effe- ctive Migra- tion	Net Migra- tion
				Ratio	Rate
Zanzibar North	5381	18519	23900	-13138	-55
Zanzibar Central	6015	22131	28146	-16116	-57
Zanzibar West	60475	6399	66874	+54076	+81
Pemba North	6289	15772	22061	-9483	-43
Pemba South	5448	20687	26035	-15339	-59
Total	83608	83508	167116		

Over 35 percent of the total population was involved in inter-regional migration. This gives a gross migration rate of 19.2 percent. All regions, except Zanzibar West, had a net loss in migration. Pemba North had the highest percentage net loss (-43 percent) and Pemba South the least (-14 percent). Migration effectiveness was greatest with respect to Zanzibar West where population movement was almost entirely in one direction. The great gain in population for Zanzibar West is mostly likely due to the attraction of Zanzibar Town which is in this region. The sex ratios for the regional migrants and those who were residing in the Mainland in 1977 is shown in Table 6.15 (Appendix VI.10).

TABLE 6.15.— SEX-RATIO FOR THE MIGRANT POPULATION IN EACH RESIDENCE CATEGORY

Birth Place	Place of Residence in 1977			
	Same Region	Other Isles Region	Mainland Tanzania	Outside Tanzania
Zanzibar North	99	91 (90%)	119 (10%)	--
Zanzibar Central	103	99 (96%)	123 (4%)	--
Zanzibar West	99	97 (91%)	111 (9%)	--
Pemba North	99	97 (93%)	143 (7%)	--
Pemba South	98	96 (98%)	152 (2%)	--
Child/Adult Ratio	.67	.21	.13	.05

For the interregional migrants within Zanzibar, females were dominant. The overall sex ratio for interregional migrants in Zanzibar was below the Isles average of 99 males per 100 females. This confirms the characteristic observed in the foregoing section concerning lifetime migrants. Similarly the sex ratios show that males were dominant in the migrants for the Mainland Tanzania category. In addition, the child/adult ratio is lowest for all the migrant categories (.21, .13

and .05) when compared to the average child/adult ratio for the whole Zanzibar population (0.67). This means that the migrant population is distinct in having a very high proportion of adults when compared to the overall population. Furthermore, the inter-regional migrants who have a low sex ratio have also a low child/adult ratio indicating that many adult women were involved in the migration. This may lend weight to the association of interregional migration within Zanzibar with marriage. International migration constituted less than 1 percent of the population.

PERIOD-SPECIFIC MIGRATION

A cross-tabulation of place of residence at the time of the last census in 1967 and place of residence in February 1977 gives a measure of migration during a specific interval. Table 6.16 shows the volume of interregional migration for Zanzibar between 1967 and 1977.

TABLE 6.16.— ZANZIBAR INTERREGIONAL MIGRATION 1967-1977

Region of Residence 1967	Region of Residence in 1977					Total
	Zanzibar North	Zanzibar Central	Zanzibar West	Pemba North	Pemba South	
Zanzibar North	<u>11971</u> *	356	1892	245	249	17713
Zanzibar Central	<u>231</u>	<u>26113</u>	7571	150	210	31618
Zanzibar West	755	1362	<u>63752</u>	786	851	67506
Pemba North	197	320	<u>5187</u>	<u>57509</u>	1324	64837
Pemba South	905	108	6385	<u>1399</u>	<u>53328</u>	62425
Total	11372	28889	87787	60089	55962	277099

*Figures underlined constitute non-migrants.

From Table 6.16, the in-migrants and outmigrants have been computed and presented in Table 6.17.

TABLE 6.17.— IN AND OUT MIGRATION IN ZANZIBAR, 1967 - 1977

Region	In-Migration	Out-Migration	Gross Migration	Net-Migration	Effectiveness Ratio	Net Migration Rate (%)
Zanzibar North	21,01	5742	8143	-3341	-0.41	7.0
Zanzibar Central	24,46	8175	10621	-5729	-0.54	16.5
Zanzibar West	24,035	3754	27789	+20281	+0.73	30.0
Pemba North	2580	7328	9908	-4748	-0.48	7.3
Pemba South	2634	9097	11731	-6463	-0.55	10.4

The Overall volume of migration for the period accounts for 11.3 percent of the population, and gives a gross interregional migration rate of 12.3 percent or 1.3 percent per year during the period 1967-1977. Compared to Table 6.10, which shows lifetime population exchanges between the regions, it can be seen that in both cases Zanzibar West commands the largest proportion of migration and has an overwhelming net gain. All the other regions have net losses, the greatest loser being Pemba South which had 70 percent of its migrants in 1977 in Zanzibar West. Appendix VI.11 shows the distribution of the migrant population (1967-1977) by sex and residence categories (Mainland, Isles and outside Tanzania). We cannot place too much significance on the sex ratios for the population resident outside Tanzania in 1977 since the numbers involved in all cases except one, are small (below 100). The Mainland and Isles residence categories of migrants bear comparison. As it has been pointed out above, there is a distinct difference between the sex ratio of migrants moving outside the Isles and those moving within. Although in this case the ratio of males to females in the interregional migration streams was on average, almost balanced (99 males to 100 females) nevertheless this ratio is below that of migrants moving to Mainland Tanzania and elsewhere outside the Isles by more than 40 percentage points. Interregional migra-

nts in the Isles are also distinctly different from those on the Mainland who have the characteristic surplus of males (see Fig. 6.9 and 6.10 and Appendix VI.12 and VI.13).

CONCLUSIONS ON INTER-REGIONAL MIGRATION

An analysis of the migrant population in Zanzibar using different sets of tables provided by the 1978 census shows interesting results. Foremost, for Zanzibar as a whole, the main focus (destination) of interregional migration is Zanzibar West, which is also the region with the largest Population and contains the Isles capital of Zanzibar. All the other regions are net-losers in all the different migration types, lifetime and period-specific migrations. This pattern is different from that obtaining on the Mainland where several regions exert comparable attraction for interregional migration. Secondly, interregional migration within the Isles is largely dominated by adult females unlike on the Mainland where interregional migration is distinctly male-dominated. For lack of a readily identifiable reason, it is assumed that emigration of males and migration occasioned by marriage, may be a strong factor which influence the composition of interregional migration. Thirdly, apart from migration to the Mainland (largely Dar-es-Salaam Region) international migration plays a minor role in population change on Isles. This may mean that the large proportion of non-Africans currently in Zanzibar are those who have lived there for generations and that there is little exchange of international migrants particularly after the mid-1970s. The census does not however show the substantial numbers of emigrants who must have left the Islands after the Zanzibar Revolution in 1964 and in early 1970s. This may be another explanation for the current composition migration and of the relatively slow rate of growth of Zanzibar's population in general.

FIGURE 69. AGE DISTRIBUTION OF THE POPULATION OF ZANZIBAR AND PEMBA ACCORDING PLACE OF RESIDENCE IN 1967.

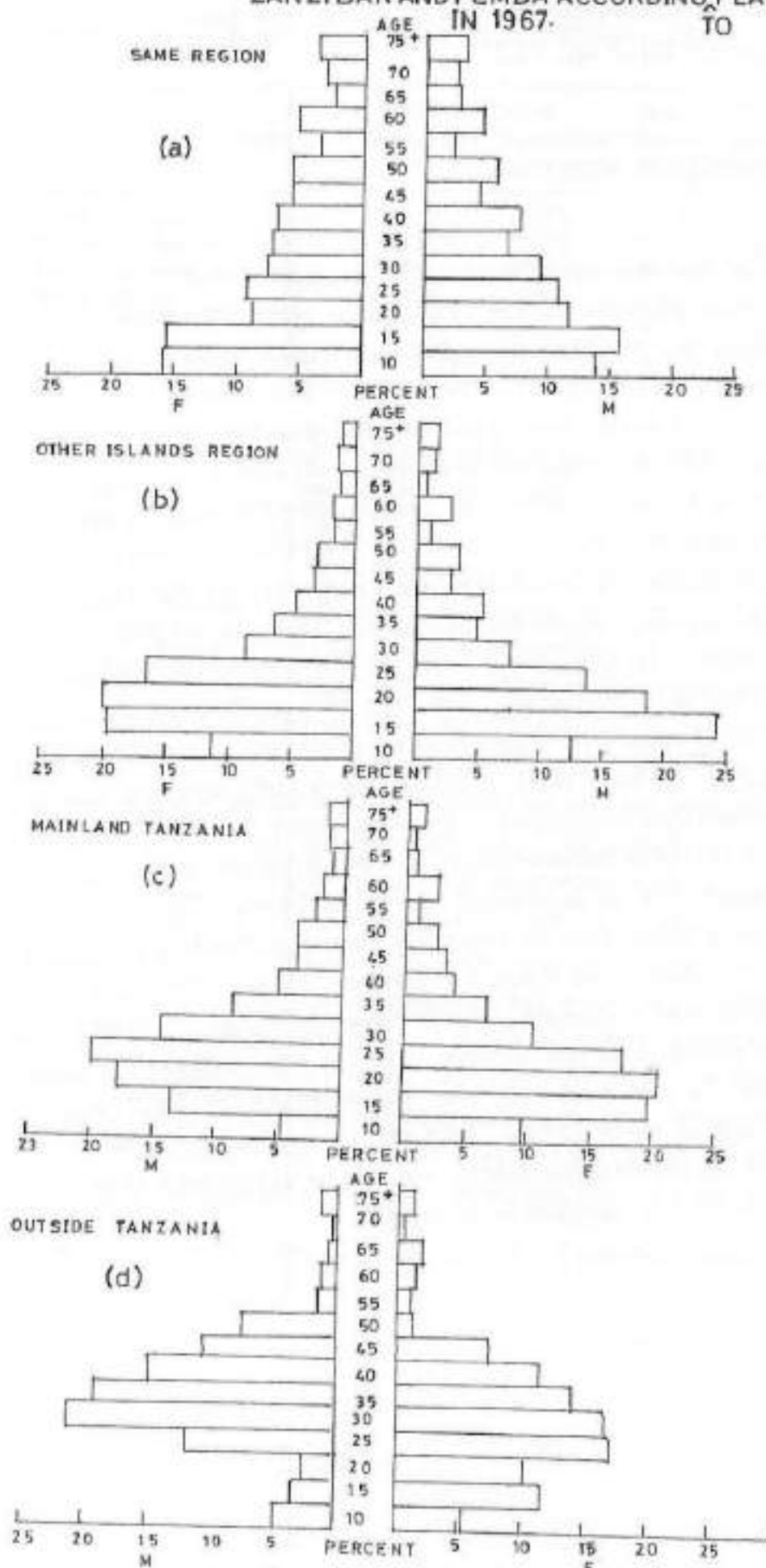
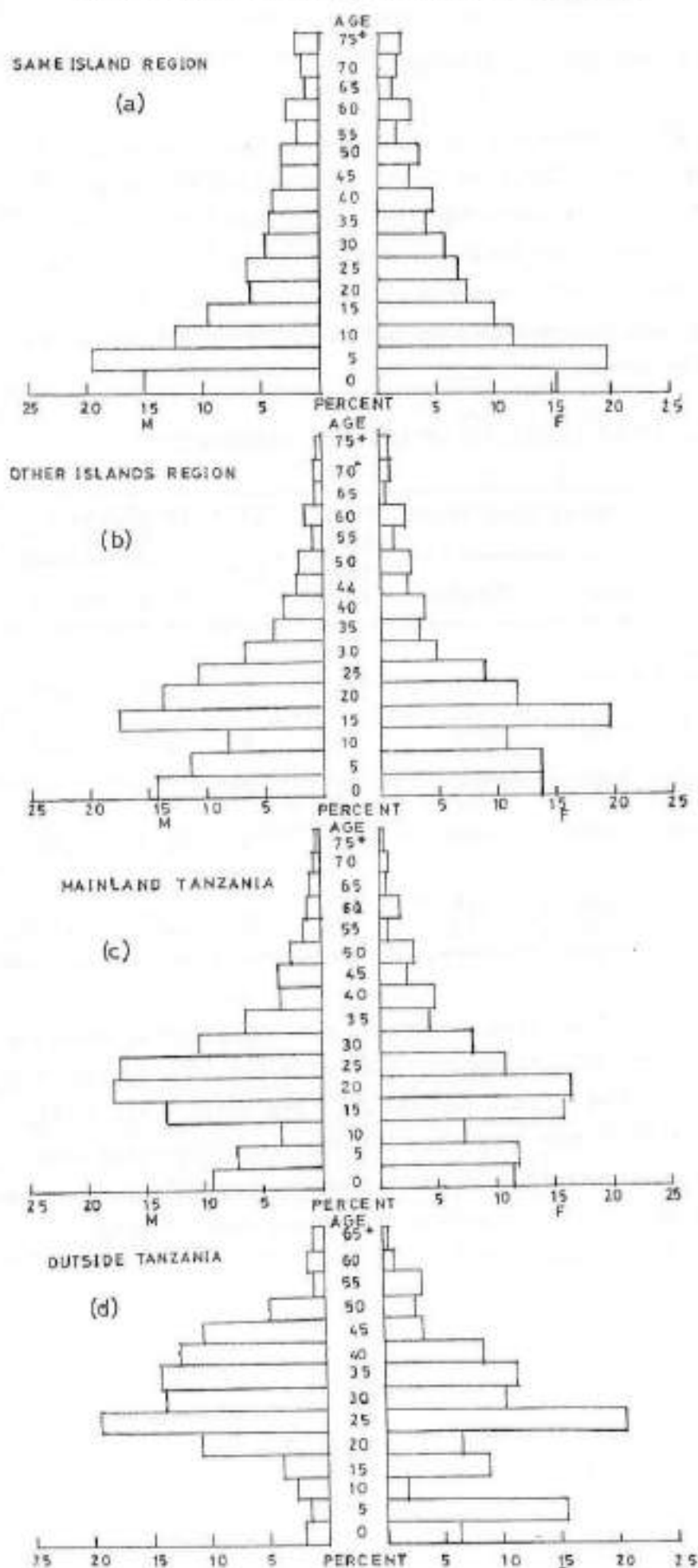


FIGURE 6.10...AGE DISTRIBUTION OF THE ZANZIBAR AND PEMBA POPULATION BY PLACE OF RESIDENCE IN 1977



RURAL - URBAN MIGRATION IN ZANZIBAR

The only significant urban centre in Zanzibar in terms of population size is Zanzibar Town. At the time of the 1978 population census Zanzibar urban had a population of 110,500 or 71 percent of the entire urban population on the Isles. Table 6.18 summarizes the main features of the urban population in the five Regional Headquarters in Zanzibar. These comprise 87 percent of the urban population.

TABLE 6.18.— URBAN POPULATION IN REGIONAL HEADQUARTERS

Regional Headquarters	Total Population		% of Urban Popula- tion	Sex Ratio	Child/adult Ratio	
	Male	Female			Male	Female
Zanzibar Town (Zanzibar West)	53592	56914	71.3	94	.43	.42
Wete (Pemba North)	6196	6678	8.3	93	.50	.48
ChakeChake (Pemba South)	4597	5043	6.2	91	.55	.49
Mkokotoni (Zanzibar North)	577	593	0.8	97	.53	.66
Koani (Zanzibar Central)	426	406	0.5	105	.47	.49

Table 6.18 shows that Zanzibar's urban population displays the same ratio of males to females (95 males per 100 females) that we find in the Isles migrant population. The child/adult ratio for males is also higher than that for females; indicating that there are proportionately more adult females than males. A comparison of the Zanzibar's urban population with that of Mainland

Tanzania underscores these differences. The average sex ratio for the Mainland urban population is 108 males per 100 females while the child/adult ratio for the same is .31 for males and .38 for females. These measures show that the Mainland urban population is dominated by an adult male population unlike the Zanzibar urban population.

The pattern of intra-regional rural-urban migration occurring between 1967 and 1977 is shown in Table 6.19.

TABLE 6.19.— (a) INTRA-REGIONAL RURAL-URBAN MIGRATION IN ZANZIBAR

Place of Residence 1967	Place of Residence in 1977		
	Regional HQ	District HQ	Rural Area
Regional Headquarter	55223	108	202
District Headquarter	211	8550	93
Rural Area	2656	1106	1299

TABLE 6.19 .— (b) VOLUME OF IN-AND-OUT-MIGRATION

	In- Migration	Out- Migration	Gross Migration	Net Migration	Effective- ness Ratio
Regional HQ	2,867	310	3,177	+2557	+.80
District HQ	1,214	304	1,518	+ 910	+.60
Rural Area	295	3,762	4,057	-3467	-.85

Predictably, the largest volume of migration is from rural areas to the regional urban centres (mainly Zanzibar Town). The volume of rural to regional urban centres is almost three times that of rural to district urban centres. There is little urban to rural migration. Regional urban centres dominated by Zanzibar Town have

a high positive effectiveness ratio indicating that migration is almost completely in one direction (urbanward) while rural areas have a high but negative effectiveness ratio showing that movement is largely outward. District urban centres also have a fairly high effectiveness ratio with most migrants originating from rural areas but some moving on to the Regional Headquarters.

Rural-urban migration across regional boundaries is important because there is only one major urban centre in Zanzibar. The volume of inter-regional urbanward migration is almost five times that of intra-regional urbanward migration. Table 6.20 summarizes inter-regional migration between rural areas, District Headquarters and Regional Headquarters for the same period, 1967-1977.

TABLE 6.20.— (a) INTER-REGIONAL RURAL-URBAN MIGRATION

Place of Residence 1967	Place of Residence in 1977		
	Regional HQ	District HQ	Rural areas
Regional HQ	5266	111	576
District HQ	1547	501	13
Rural Areas	11467	304	479

TABLE 6.20.— (b) VOLUME OF IN-AND-OUT-MIGRATION

	In- Migration	Out- Migration	Gross Migration	Net Migration	Effectiveness Ratio
Regional HQ	13,014	987	14,001	+12,027	+0.86
District HQ	715	1590	2,305	- 875	-0.38
Rural areas	619	11771	12,390	-11,152	-0.90

Rural areas and Regional Headquarters are the main terminals of rural-urban migration for inter-regional moves. The direction of

movement is almost entirely from rural to regional urban areas. District headquarters contribute substantially to regional urban centres but receive few migrants directly from rural areas.

CONCLUSIONS ON RURAL URBAN MIGRATION

Despite evidence of substantial rural-urban exchange in Zanzibar the contribution that migration makes in terms of volume to population change is only modest. Only about 20 percent of the urban population was involved in moves enlisted in the 1967-1977 period. Population growth rate for Zanzibar urban in the 1967-1978 inter-censal period is estimated to be 3.85 percent per annum which is small given the much higher rate for Mainland Tanzania. Several possible explanations may be proposed for the anomalies observed for the Zanzibar population. First, although there is no explicit evidence from the census, it would seem possible that there may be substantial emigration from Zanzibar to the Arabian Peninsula, especially up to 1975. Historically there have been strong ties between the Isles and the Middle Eastern Arab countries. Emigration was particularly important after the Zanzibar Revolution in 1964. Such emigration would almost invariably be male dominated. Secondly there have been constant moves between Zanzibar and Mainland Tanzania, especially to Dar-es-Salaam. About 2 percent of the urban population in Zanzibar in 1978 was resident on the Mainland in 1967 and a similar proportion was resident on the Mainland in 1977. In both cases emigrants from urban areas in Zanzibar (including Zanzibar Town) are overwhelmingly male (over 180 males per 100 females). This fact would explain why urban centres in Zanzibar (including Zanzibar Town) have low sex ratios. Finally, it would seem that migration to town in Zanzibar is more of a residential change than of a labour migration. Culturally Zanzibaris are more urban oriented than Mainland Tanzanians. Hence the move to urban areas is more likely to be a family migration.

There are fairly limited employment opportunities in urban centres in Zanzibar, including Zanzibar Town. Those seeking employment generally migrate to the Mainland (Dar-es-Salaam and Tanga) or Kenya (Mombasa) or to the Middle East Arab countries, most probably leaving their families in Zanzibar Town or other Isles urban centres.

APPENDIX VI.1. — MAINLAND POPULATION BY AGE AND PLACE OF BIRTH (%)

AGE	TOTAL	PLACE OF BIRTH							
		SAME REGION		OTHER MAINLAND REGION		SANGGAR AND PEMA		OUTSIDE TANZANIA	
		M	F	M	F	M	F	M	F
0 - 4	3,007,783	20.7	19.9	6.7	8.5	4.2	7.9	2.7	2.6
5 - 9	2,717,074	17.7	16.6	9.0	11.3	6.1	9.0	7.7	8.1
10 - 14	2,046,473	13.4	11.9	7.9	9.8	6.8	9.6	8.2	9.9
15 - 19	1,672,396	9.7	9.5	10.1	11.9	13.9	13.1	9.5	10.1
20 - 24	1,295,925	5.8	7.6	12.1	13.5	16.4	12.8	9.2	10.8
25 - 29	1,283,234	5.9	7.2	13.4	12.2	13.7	13.6	10.7	11.6
30 - 34	937,889	4.5	5.3	9.4	7.7	10.8	8.2	8.7	9.2
35 - 39	886,959	4.5	4.8	8.0	6.4	7.4	7.0	8.6	8.1
40 - 44	650,435	3.4	3.8	5.4	4.5	5.8	4.6	6.6	5.9
45 - 49	618,800	3.5	3.4	4.9	3.9	4.1	4.6	6.4	5.5
50 - 54	455,550	2.5	2.6	3.4	2.8	8.7	3.2	4.8	4.5
55 - 59	373,025	2.3	1.9	2.9	2.0	3.0	1.3	4.4	3.4
60 - 64	335,172	1.9	1.9	2.2	2.0	1.9	2.1	3.7	3.4
65 - 69	235,638	1.4	1.3	1.5	1.3	1.0	1.0	2.9	2.4
70 - 74	187,010	1.2	1.0	1.1	1.0	0.6	0.8	2.3	2.1
75 +	273,159	1.7	1.4	1.8	1.3	0.6	0.6	3.6	2.4
		6,893,415		121,940		17,089		216,788	
Total	17,036,502	14,343,868		2,244,297		30,237		411,985	
SR		93		119		130		111	

APPENDIX VI.2. — MAINLAND POPULATION BY AGE AND PLACE OF RESIDENCE IN 1967 (%)

AGE	SAME REGION		OTHER MAINLAND REGION		ZANZIBAR AND PUNJA		OUTSIDE TANZANIA		TOTAL POPULATION	
	M	F	M	F	M	F	M	F	M	F
0 - 4									18.1	18.1
5 - 9									16.2	15.7
10 - 14	16.3	14.2	8.9	11.4	7.2	10.1	10.3	13.8	12.4	11.6
15 - 19	16.0	15.2	14.1	17.8	14.8	18.2	14.1	17.2	9.8	9.8
20 - 24	9.7	12.2	17.6	20.1	16.9	14.3	13.4	17.3	6.8	8.3
25 - 29	9.9	11.9	18.8	16.8	14.7	16.5	15.8	15.9	7.1	7.9
30 - 34	7.8	8.8	12.0	9.5	10.7	8.5	13.2	10.9	5.3	5.7
35 - 39	8.0	8.1	9.1	7.0	7.7	7.7	10.5	8.8	5.1	5.0
40 - 44	6.0	6.4	5.5	4.6	7.1	4.8	1.4	5.0	3.7	3.9
45 - 49	6.2	5.8	4.5	3.6	4.1	4.0	5.5	3.4	3.7	3.5
50 - 54	4.6	4.4	2.9	2.5	4.3	5.4	3.1	2.9	2.7	2.6
55 - 59	4.1	3.3	2.2	1.9	3.4	3.8	2.3	1.3	2.4	2.0
60 - 64	3.5	3.3	1.6	1.8	4.2	2.6	1.2	1.2	2.0	1.9
65 - 69	2.6	2.2	1.1	1.1	1.4	2.0	0.9	0.7	1.5	1.3
70 - 74	2.1	1.7	0.7	0.8	1.2	1.4	0.2	0.6	1.2	1.0
75 +	3.2	2.4	1.0	0.9	2.1	0.6	1.1	0.7	1.8	1.4

APPENDIX VI.3. — MAINLAND POPULATION BY AGE AND PLACE OF RESIDENCE 1977 (%)

AGE	SAME REGION		OTHER MAINLAND REGION		ZANZIBAR AND PEMBA		OUTSIDE TANZANIA	
	M	F	M	F	M	F	M	F
0 - 4	14.2	13.9	10.6	12.7	4.4	15.0	6.7	11.4
5 - 9	17.3	16.7	10.0	13.1	5.4	2.2	5.4	8.3
10 - 14	13.4	12.3	7.3	9.9	3.7	13.7	4.0	8.7
15 - 19	10.1	10.1	14.0	16.2	18.1	19.0	15.6	13.5
20 - 24	6.7	8.4	18.2	17.4	15.4	12.5	18.7	18.5
25 - 29	7.2	8.2	14.3	11.4	15.9	5.6	16.4	10.8
30 - 34	5.5	6.0	8.5	5.2	15.0	6.3	10.1	9.7
35 - 39	5.4	5.3	5.8	3.8	7.5	3.8	6.6	7.2
40 - 44	3.9	4.2	3.4	2.6	2.7	3.3	6.6	2.3
45 - 49	4.0	3.8	2.7	2.3	5.1	1.1	4.2	2.3
50 - 54	2.9	2.8	1.4	1.5	1.2	1.3	2.2	1.9
55 - 59	2.6	2.1	1.3	1.1	2.0	0.6	1.6	1.4
60 - 64	2.1	2.1	0.8	1.2	1.2	1.8	0.7	2.1
65 - 69	1.6	1.4	0.6	0.7	0.5	0.5	0.2	0.3
70 - 74	1.3	1.1	0.3	0.4	-	0.6	0.3	1.1
75 +	1.9	1.5	0.6	0.4	2.0		0.4	0.4

APPENDIX VI.4. — INTER-REGIONAL MIGRATION (FOR POPULATION 11 YEARS AND OVER) (1957 = 1977) '00

Destination Outside		REGIONS OF ORIGIN																	
Region	Tanzania	Dodoma	Arusha	Kilimanjaro	Tanga	Morogoro	Coast	Lindi	Mtara	Ruvuma	Iringa	Mbeya	Singida	Tabora	Bahra	Igoma	Shinyanga	West Usambara	Manyara
Dodoma		45			59							51		36					
Arusha		190		190	51									54					
Kilimanjaro	42	127			114														
Tanga			73		45							72							
Morogoro		122	36	85		84		36	170	69									
Coast			38	112															
Lindi								222											
Mtara						103		35											
Ruvuma						39		39											
Iringa	74	39								58									
Mbeya					35					140									36
Singida		36									49		81						
Tabora	377										98		40	140	377				67
Bahra	364											51	40						
Igoma	180													39					
Shinyanga														87	169				724
West Lake	362															106			273
Manyara	46													68		91	232	152	182
Usambara	53																		114

APPENDIX VI.6. -- INTERNATIONAL MIGRATION ('000)

Country of Birth	Unli- grants	Dodoma Arusha	Kilima- njaru	Moro- goro	Coast Dar Lindi	Mtwara	Iringa	Mbeya	Sin- gida	Tabora	Rukwa	Kigoma	Shim- anga	Eastern Kwana	Mara	Tanga	Total population in Tanzania 1978
	1977																421,906
Burundi	146,690									491	456	205		149		30	156,427
Kenya	38,658	38	66		34									11	22	155	42,667
Malawi	8,345				11				37								9,102
Malagasy	53																75
Mozambique	79,099			14	40	64	104	350	143							62	81,123
Zambia	40,830										50			318	12		43,463
Seychelles	121																122
Senegal	268																1,005
Uganda	27,200				13									224	11		31,183
Zaire	8,198										30	39					8,453
Zambia	14,688								56			58					16,714
Zimbabwe	495																499
South Africa	739																1,174
Namibia	119																172
Other Africa countries	1,133																1,641
Outside Africa	14,218			12		65											21,054

APPENDIX VI.7c -- AGE DISTRIBUTION OF POPULATION BY PLACE
OF BIRTH CATEGORIES: ZANZIBAR AND PEMBA

AGE	(a)		(b)		(c)		(d)	
	M	F	M	F	M	F	M	F
0 - 4	21.7	21.7	11.1	10.8	15.4	8.7	1.0	2.9
5 - 9	20.3	19.8	11.8	14.0	5.7	11.0	1.2	2.3
10 - 14	13.4	11.3	9.4	10.4	3.2	7.4	1.7	2.4
15 - 19	9.4	9.4	11.6	13.0	6.6	10.3	1.7	3.1
20 - 24	5.2	6.8	11.0	10.7	8.4	11.1	2.3	2.2
25 - 29	5.0	5.8	10.8	9.9	9.6	10.2	2.5	7.5
30 - 34	3.9	5.1	7.9	6.8	6.8	7.1	6.3	10.1
35 - 39	3.5	3.4	6.3	5.0	7.3	5.8	7.9	13.4
40 - 44	3.4	4.0	5.1	5.3	7.2	5.7	9.6	13.7
45 - 49	2.6	2.3	3.9	3.1	8.4	4.3	10.8	7.6
50 - 54	2.8	3.0	3.2	3.6	7.2	5.0	10.9	7.9
55 - 59	1.6	1.2	1.8	1.4	5.2	2.5	9.3	4.9
60 - 64	2.5	2.4	2.3	2.6	6.3	4.6	10.9	8.1
65 - 69	1.1	0.8	1.2	1.0	3.4	1.8	7.8	4.5
70 - 74	1.5	1.4	1.3	1.2	3.9	1.7	6.3	3.9
75 +	2.0	1.7	11.7	1.3	5.3	2.8	9.8	5.4

- (a) Same Region
 (b) Other Island Region
 (c) Mainland Tanzania
 (d) Outside Tanzania

APPENDIX VI.9. -- PLACE OF BIRTH BY PLACE OF RESIDENCE 1977: ZANZIBAR

Place of Birth	Place of Residence 1977					Total
	ISLES					
	Zanzibar North	Zanzibar Central	Zanzibar West	Pemba North	Pemba South	
Zanzibar North	67682	1221	16060	613	625	86201
Zanzibar Central	607	38025	20750	382	392	60156
Zanzibar West	1512	3195	63104	920	772	69503
Pemba North	1119	773	10321	93575	3559	109347
Pemba South	2143	826	13344	4374	87938	108625
Total	73063	44040	123579	99864	93285	433832

APPENDIX VI.10. -- POPULATION BY PLACE OF BIRTH AND PLACE OF RESIDENCE IN 1977: ZANZIBAR

Place of Birth (Region)	Place of Residence in 1977									
	Total Population		Mainland		Isles		OUTSIDE Tanzania		Stated	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Zanzibar North	38270	38747	4349	3655	42043	44159	55	58	46447	47812
Zanzibar Central	26263	25486	1450	1181	29853	30283	26	11	31337	31475
Zanzibar West	70361	71680	3583	3220	34247	35256	105	119	37935	38599
Pemba North	52787	53503	4477	3137	53951	55397	47	17	58475	58551
Pemba South	48911	50103	1574	1033	53100	55525	49	5	54723	56563
Total	236592	239519								

APPENDIX VI.12. — POPULATION (IN PERCENTS) BY AGE AND PLACE OF RESIDENCE 1967:
 ZANZIBAR AND PENINSULA

AGE GROUP	Total	(a) Same Region		(b) Other Island Regions		(c) Mainland		(d) Outside Tanzania	
		Male	Female	Male	Female	Male	Female	Male	Female
	476111	119447	120212	16814	18902	4608	3044	629	257
0 - 4	90636	50.3 %		16.8 %		1.6 %		0.2 %	
5 - 9	86431								
10 - 14	54973	15.8	13.7	11.1	12.6	4.8	9.8	4.6	5.4
15 - 19	46903	15.7	15.8	19.7	24.2	13.6	19.8	3.2	11.7
20 - 24	33172	8.9	11.7	20.0	18.7	17.9	20.2	2.4	10.1
25 - 29	30640	9.1	10.7	16.5	13.7	20.1	17.5	11.9	17.1
30 - 34	24447	7.5	9.4	8.7	7.6	14.6	10.1	22.1	16.7
35 - 39	19197	7.0	6.7	6.1	4.9	8.9	6.7	19.1	14.0
40 - 44	19757	6.9	7.7	4.7	5.2	5.1	4.0	14.9	11.3
45 - 49	13543	5.7	4.4	3.2	2.8	3.8	3.3	10.5	6.2
50 - 54	15114	5.7	5.8	3.0	3.3	3.8	2.6	7.2	1.2
55 - 59	7406	3.4	2.3	1.7	0.9	2.2	1.0	1.3	1.2
60 - 64	12601	5.1	4.6	1.9	2.7	1.8	2.5	1.1	1.6
65 - 69	5228	2.4	1.6	1.2	0.7	1.0	0.9	0.5	1.9
70 - 74	7123	3.0	2.5	1.3	1.1	1.1	0.7	0.2	0.4
75 +	6941	3.9	3.1	1.0	1.5	1.2	1.1	1.1	1.2

- (a) Same Region
 (b) Outside Islands Regions
 (c) Mainland Regions
 (d) Outside Tanzania

APPENDIX VI.13a -- POPULATION (IN PERCENTS) BY AGE AND PLACE OF RESIDENCE 1977

Age	(a)		(b)		(c)		(d)	
	Male	Female	Male	Female	Male	Female	Male	Female
	210496	212942	11039	12386	3470	2427	309	214
	88.9 %		4.9 %		1.2 %		0.1 %	
0 - 4	15.0	15.2	14.3	13.9	9.3	11.5	2.0	6.1
5 - 9	19.5	19.7	11.3	13.9	7.1	11.9	1.5	15.4
10 - 14	13.2	11.6	8.1	10.8	3.5	7.1	2.6	1.9
15 - 19	9.6	10.0	17.5	19.6	13.3	15.9	3.9	8.9
20 - 24	6.0	7.7	13.8	11.7	17.9	16.4	10.8	6.5
25 - 29	6.1	6.9	10.8	8.9	17.1	10.7	19.5	20.6
30 - 34	4.8	5.8	6.8	4.8	10.6	8.0	13.9	10.3
35 - 39	4.4	4.1	4.2	3.1	6.5	4.3	14.1	11.2
40 - 44	4.2	4.6	3.5	3.7	3.6	4.7	12.6	8.8
45 - 49	3.4	2.7	2.4	2.1	3.8	2.2	10.5	3.3
50 - 54	3.4	3.4	2.3	2.5	2.6	3.0	4.9	2.8
55 - 59	2.0	1.3	1.0	1.0	1.4	0.9	1.0	3.3
60 - 64	3.0	2.7	1.7	2.0	1.2	1.9	1.5	0.9
65 - 69	1.4	1.0	0.7	0.4	1.0	0.5	1.0	0.5
70 - 74	1.8	1.5	0.8	0.8	0.7	0.7	"	"
75 +	2.3	1.9	0.7	0.8	0.5	0.4	"	"

- (a) Same Region
 (b) Outside Islands Regions
 (c) Mainland Regions
 (d) Outside Tanzania

CHAPTER 7

URBANIZATION: AN ONGOING PROCESS

by
M. Rafiq*

INTRODUCTION

Three conclusions are likely to emerge even from a cursory examination of levels and trends of urbanization in the United Republic of Tanzania¹:

- a. Overall level of urbanization in Tanzania is still fairly low.
- b. Urban population of Tanzania has experienced very rapid growth in the more recent past.
- c. The Mainland and Zanzibar exhibit substantial differences in the level as well as tempo of urbanization.

In general, the contents and organization of this chapter have been guided by these preliminary considerations. The bulk of the chapter views urbanization as a subsystem in a state of moving equilibrium. The processual aspects of urbanization have been inferred from variations in the urban structure over time, especially those witnessed since 1967. It is, however, important to note that the study of individual urban localities falls beyond the scope of this chapter because all urban localities taken as a subsystem in the larger context of population distribution provide the point of departure for the chapter. The chapter also does not cover the historical antecedents and correlates of evolution of urbanization in Tanzania². It may also be added that

*The author is working as U.N. Chief Technical Adviser in Tanzania. He is solely responsible for the views expressed in the chapter.

¹The United Republic of Tanzania (hereinafter referred to as Tanzania) comprises two constituent parts, namely, the Mainland (Tanganyika) and Zanzibar (including Pemba). Level of urbanization is taken as percentage of total population found in urban localities.

²For some insights on these aspects, see: A. Mascarenhas, "Urban Growth", in B. Egoro and R. Henin (eds.), *The Population of Tanzania* (Dar-es-Salaam: ERAIUP and Bureau of Statistics, 1973), pp. 76-97.

because of the marked differences in urbanization between the Mainland and Zanzibar, these two areas will be covered separately in the chapter. The chapter also does not promise any extended discussion of rural-urban differentials relating to variables such as age, sex, marital status, literacy, education, economic activity, housing conditions and the like, because these aspects are covered under the individual chapters of this volume dealing with these variables. In fact the design of the sample used in the 1978 census was such that rural-urban differentials can, in most cases, be studied down to the regional level.

THE MAINLAND

Problems of Comparability

Table 7.1 presents some of the basic statistics for the study of levels and trend of urbanization in the Mainland. Two sets of statistics appear in the table. The first set provides unadjusted data directly taken from the official sources and the second (enclosed in parentheses) deals with adjusted statistics. The need for adjustment of data primarily arose from the variations in definition of urban localities used

TABLE 7.1.— TOTAL POPULATION, URBAN POPULATION, PERCENT URBAN, AND RATE OF GROWTH OF URBAN POPULATION FOR THE MAINLAND, ZANZIBAR AND TANZANIA: SELECTED DATES

Year	Total Population ^a	Urban Population ^a	Percent Urban ^d	Urban Annual Growth rates (successive periods) ^d
<u>Mainland</u>				
1948	71,804,00	197,300	2.64	6.81
1957	87,885,00	364,100 ^b	4.14	6.32(7.97)
1967	119,586,54	685,092 ^b	5.73(6.76)	10.84(9.34)
1978	170,364,99	225,7921	13.25	

TABLE 7.1.-- (Continued)

Year	Total Population ^a	Urban Population ^a	Percent Urban ^d	Urban Annual Growth rates (successive periods) ^d
<u>Zanzibar</u>				
1948	264,200	52,700	19.95	-
1957	295,600	72,000	24.36	3.47
1967	354,400	101,475 ^e	28.63	3.43
1978	476,111	154,979	32.55	3.85
<u>Tanzania^c</u>				
1967	12,313,054	786,567	6.39	
1978	17,512,610	2,412,900	13.78	10.19(8.87)

^aSource for the 1948 and 1957 population statistics: Bureau of Statistics/Central Statistical Bureau, Recorded Population Changes 1948-1967, (Dar-es-Salaam: Bureau of Statistics, 1968), p.6.

^bSource: Appendix VII.2

^cDerived by aggregating the population figures for the Mainland and Zanzibar.

^dAdjusted figures appear in parentheses. Adjustments are based on the 1967 urban population taken as 808,162. For adjustment procedure see text.

^eIncludes four town planning areas listed in 1967 census Vol.2

in various censuses. A brief description of the background and nature of the adjustment follows.

With minor exceptions, the definition of urban localities used in the 1948 and 1957 censuses was guided by an interplay of legal status of locality ("gazetted" or "declared" urban centres) and the administrative functions fulfilled by the locality, with legal status invariably receiving higher saliency than the other criterion. Theoretically, this orientation can be expected to lead to the exclusion of some urban localities resulting in under-estimation of urban population. However, in the context of the present chapter, it has been assumed that the contribution

of these localities (if any) to the total urban population would have been negligible. This assumption seems tenable because general conditions prevailing between 1948 and 1957 were not conducive to unregulated growth of urban localities.

The period intervening between the 1957 and 1967 censuses was marked by immense administrative reorganization of the Mainland as well as by somewhat accelerated pace of urbanization especially after Tanganyika won independence in 1961. The 1967 census, however, by restricting itself predominantly to the legal status of locality in defining urban localities, tended to exclude some urban localities which otherwise would qualify as urban. In fact this orientation resulted in the exclusion of even some of the administrative headquarters which on the basis of other criteria such as size, nature of economic activity and the like were pre-eminently qualified to be classified urban³. The net effect of the predominantly legalistic and inordinately restrictive view of urbanization, of course, was that the 1967 urban population was under-estimated. It may be added that in 1967 only 32 localities were treated as urban, out of which 31 had been "gazetted" at one time or another in the past—a continuation of the tradition of higher saliency attached to the legal status of locality.

The 1978 census classified following areas as urban⁴:

(i) All regional and district headquarters with boundaries as identified by the Village Act 1975 and Urban Ward Act 1976 were considered urban localities. Within the boundaries of these urban localities some wards were treated as "mixed wards" for the census and the enumeration areas within these wards which did not qualify as urban were identified by the local administrative authorities which had been assigned special census-related responsibilities. While deciding as to which enumeration areas were not urban, the local authorities were guided by size-density criterion and/or by nature of economic activity and pattern of land use.

³For details, see: Mascarenhas, *ibid.*

⁴For details, see: Bureau of Statistics, *Methodology Report* (Dar-es-Salaam: Bureau of Statistics, 1981), p. 22.

(ii) Areas falling outside the boundaries of regional or district headquarters which bore physical proximity to them and could be treated as urban based on size-density and/or nature of economic activity and pattern of land use criteria. The decision on inclusion of these areas rested with the local authorities.

(iii) Other urban localities which did not bear physical proximity to any regional or district headquarters but met size-density and/or nature of economic activity and pattern of land use criteria.

It should be evident from the foregoing that the 1967 and 1978 census returns on urban population were not directly comparable. The adjusted figures in Table 7.1 have been derived under the assumption that the 1978 definition of urban areas is acceptable and that the 1967 urban population had been under-estimated. The first component of adjustment consists of addition of the population of 29 district headquarters which were not classified as urban by the 1967 census to the total enumerated urban population. Mascarenhas computed the average size of these headquarters as 1,974⁵. Addition of this component to the enumerated urban population brings the total for 61 urban localities to 742,338. The second component of the adjustment rests on the assumption that, in addition to the sixty-one urban localities already covered, there were some urban localities which should have been classified urban in 1967. The basic procedure for the estimation of this component of adjustment assumed that these additional localities were ranked in size from 62 to 110 in 1967. (There were 110 localities classified as urban in 1978). The estimated population of these localities was derived by extrapolation from an empirical model

⁵A. Mascarenhas, op.cit., pp.87-88.

linking rank and size⁶. The size of the second component of adjustment works out to be 65,824 which brings the overall estimated urban population of 1967 to 808,162 instead of 685,092 recorded by the census for 32 urban localities. In so far as the basic assumptions for adjustment are tenable, the modified figures are comparable with the urban population of 1978 and the resultant growth rates can be conceived as net effect of natural increase, migration as well as annexations and deletions/omissions (if any).

Levels and Trends

A reappraisal of Table 7.1 at this point would reinforce the preliminary conclusions listed in the introductory part of this chapter. To recapitulate, it can be stated that the Mainland population is still a predominantly rural population and that the Mainland urban population has witnessed quite rapid growth over the past three decades. This is particularly true of the period intervening between the two most recent censuses. In terms of growth of urban population, the Mainland appears to be the fastest growing population even in the African context (Table 7.2). Some of the implication of this phenomenon for development plan-

⁶The relationship is expressed by $S.R.^{1.1788743} = 209660$, where S and R represent size and rank, respectively. This relationship is based on the first 26 observations. Transformed variables produce product-moment correlation of -0.9672. The rank-size distribution appears in Appendix VII.2. This procedure of estimation was preferred over the alternative of case by case comparison of localities because of lack of direct comparability between basic materials such as maps etc., though some work on the latter has been undertaken by the Building Research Unit under the guidance of Mr. R. Karlsson. Incidentally, the procedure adopted here provides estimate of ranks 33-61 as 67792 as compared to 57246 as the population of the 29 district headquarters discussed under the first component of adjustment. It is also interesting to note that the expected population for ranks 1-32 is 667002 as against 685092 — a fairly close estimate considering the limitations of basic data.

TABLE 7.2.— PERCENT URBAN AND RATE OF GROWTH OF URBAN POPULATION (1970-1980): SELECTED COUNTRIES

Country/Area	Percent Urban 1980	Annual urban growth rate (1970-1980)
Malawi	10	6.8
Uganda	4	5.9 ^b
Mainland Tanzania	13.25 ^a	9.34 ^b
Senegal	34	7.2
Sierra Leone	12	7.0
Kenya	14	6.8
Zambia	38	5.5
Sweden	87	1.0

Source (excluding Mainland Tanzania): The World Bank, World Development Report, 1981 (New York: Oxford University Press, 1981), pp.172-173.

^aFor August 1978.

^bFor 1967-1978. Source: Table 7.1.

ing would be pursued in the context of population projections to be presented in another chapter of this volume.

The foregoing changes in levels and trends were accompanied by important changes in the structure of urbanization. Some of the structural changes for the years intervening between the two most recent censuses can be inferred from Table 7.3⁷, though it should be noted that since unadjusted data for 1967 are being used the observed differences would not be precise indicator of the magnitude of changes. Gini Concentration Ratio has fairly high values both in 1967 and 1978. The Ratio

⁷For comparison of the 1967 census with the earlier censuses, see: A. Mascarenhas, op.cit.

TABLE 7.3.— DISTRIBUTION OF URBAN LOCALITIES AND URBAN POPULATION BY SIZE-CLASS OF LOCALITY FOR THE MAINLAND TANZANIA: 1967 AND 1978

Size-class of Locality	1967		1978	
	Local- ities	Popula- tion	Local- ities	Popula- tion
500-999	—	—	3	1779
1000-1999	2	3666	7	8918
2000-4999	9	31412	34	120278
5000-9999	7	47354	30	221057
10000-19999	3	41243	18	250722
20000-49999	9	227538	8	252491
50000-99999	1	61058	7	419279
100000-499999	1	272821	2	213952
500000-or more	—	—	1	769445
Total	32	685092	110	2257921
Gini Concentration Ratio		0.6377		0.6790
Duncan's Index of Concentration Δ		47.53		56.95

also showed a slight increase over the period 1967-1978 period. However, while interpreting this result one should recall that in 1967 a disproportionately large number of relatively smaller urban communities was excluded from the urban population. Duncan's Index of Concentration shows that the maximum curvature of the Lorenz Curve from the equidistance line was somewhat smaller in 1967 than in 1978.

Some further insights about structural changes are afforded by an examination of the median size of locality and the size of place of the median inhabitant. Table 7.4 indicates that the median size of urban locality increased from 4,223 in 1957 to 6,833 in 1978. (The decrease in the median size between 1967 and 1978 is attributable to the exclusion of relatively smaller urban localities in 1957). More striking, of course, is the change in the size of place of the median urban inhabitant. The results indicate that whereas the median inhabitant in

TABLE 7.4.— MEDIAN SIZE OF URBAN LOCALITY AND THE SIZE OF PLACE OF MEDIAN INHABITANT FOR THE MAINLAND: 1957, 1967 AND 1978

Indicator	1957	1967	1978
Median size of Locality	4,223	8,810 ^a	6,833
Size of Place of Median Inhabitant	17,100 ^a	34,246 ^a	60,688 ^a

^aComputed by arraying the localities in the size group in which median falls. The relatively high level of median size of locality in 1967 is to a large extent attributable to failure to include urban localities of relatively small size. (For details see "Problems of Comparability").

1957 was staying in an urban locality of 17,100 persons, by 1978 he/she was staying in a locality of 60,688 persons. In other words, in 1978 half of the urban population was staying in urban localities of 60,688 or more persons while the corresponding figure for 1957 was 17,100. The relatively small overall increase in the median size of locality between 1957 and 1978 is partly explained by the growth of smaller urban localities. The large change in the size of place of the median inhabitant is indicative of higher attraction of largest urban localities. Further corroborative evidence on this phenomenon is provided by the primacy rate for Dar-es-Salaam which changed from 68.00 to 72.59 percent between 1967 and 1978. (Primacy rate has been computed by using data from four largest urban localities.) With the administrative decentralization and other state-sponsored programmes aimed at discouraging further urban concentration, it is likely that the primacy rate of Dar-es-Salaam would not register additional gains in the future, though Dar-es-Salaam can be expected to play a dominant role in urbanization for some time to come.

Some Additional Observations on Urban Structure in 1978

The data appearing in Table 7.5 provide indications of regional variations in the proportion of total population enumerated in urban localities in 1978. The proportions exhibit a very wide range, from

TABLE 7.5.— DISTRIBUTION OF TOTAL POPULATION, POPULATION IN URBAN LOCALITIES AND PERCENT URBAN BY REGIONS: 1978 CENSUS

Region	Population	Urban Population	Percent Urban
MAINLAND	17036499	2257921	13.25
Dodoma	972005	85177	8.76
Arusha	926223	73635	7.95
Kilimanjaro	902437	67599	7.49
Tanga	1037767	145964	14.07
Morogoro	939264	135305	14.41
Coast	516586	37282	7.22
Dar-es-Salaam	843090	769445	91.26
Lindi	527624	53190	10.08
Mtwara	771818	92355	11.97
Ruvuma	561575	43423	7.73
Iringa	925044	84076	9.09
Mbeya	1079864	96623	8.95
Singida	613949	58010	9.45
Tabora	81907	107499	13.14
Rukwa	451897	53092	11.75
Kigoma	648941	64438	9.93
Shinyanga	1323535	55955	4.23
West Lake	1009767	34261	3.39
Mwanza	1443379	147772	10.24
Mara	723827	52820	7.30
ZANZIBAR ^a	476111	154979	32.55
North	77017	5801	7.53
South	51749	3769	7.28
Town/West	142041	110506	77.80
North Pemba	106290	19585	18.43
South Pemba	99014	15318	15.47
TANZANIA	17512610	2412900	13.78

^aData for Zanzibar will be used in a later section of this chapter.

the lowest value of 3.39 percent in West Lake region to the highest value of 91.26 percent in Dar-es-Salaam region. Only three regions, namely, Dar-es-Salaam, Morogoro and Tanga, have percentage urban higher

than the overall figure for the Mainland (13.25 percent). It is also interesting to note that these three regions taken together cover 46.53

percent of the total urban population of the Mainland. This proportion rises to 57.84 if Mwanza and Tabora regions are added to this list. The foregoing, once again, attests the uneven distribution of urban localities in the Mainland. The eastern zone which has fairly long history of urbanization and has come to occupy a position of remarkable significance in the economic and administrative life of the country still tends to dominate the urban spectrum in the Mainland.

Table 7.6 has been derived from Appendix VII.1 which provides population distribution of all urban localities by region and the nature of locality. The main purpose of Table 7.6 is to provide a summary of selected additional indicators of the distribution of urban localities in 1978. It is evident from the table that the regional headquarters have a very dominant role in the urban population of the Mainland. They cover about three-fourths (74.10 percent) of the urban population and have an average size of 88,059 persons. Less than one-fifth (18.92 percent) of the total urban population was enumerated in the district headquarters in 1978. The average size of district headquarters was 7,364. "Other localities" account for only 6.98 percent and have an average size of 4,778. It appears that the three types of localities have quite distinct size differentials. A more intriguing feature of the typology is that Regional and District headquarters grew slower than the third category. This, of course, has very far reaching implications for the emerging urban structure in the Mainland and is also perhaps a reflection of the administrative decentralization coupled with the more liberal definition of urban localities used in 1978.

TABLE 7.6.— DISTRIBUTION OF NUMBER AND POPULATION OF URBAN LOCALITIES BY NATURE OF LOCALITY FOR THE MAINLAND, 1978 AND SELECTED OTHER INDICATORS OF THE DISTRIBUTION AND RATE OF GROWTH 1967-1978

Nature of locality and Indicator		Percent residing in	Growth rate 1967-1978
<u>Regional headquarters</u> ^a		74.00	9.06
Number	19		
Population	1673122		
Population Range	17955-769445		
Average size	88059	18.92	
<u>District headquarters</u> ^b			
Number	58		
Population	427111		
Population Range	527-18631		
Average size	7364		
<u>Other Localities</u>		6.98	11.19 ^d
Number	33		
Population	157688		
Population Range	608-11639		
Average size	4778		
<u>All Localities</u>		100.00	9.34
Number	110		
Population	2257921		
Population Range	527-769445		
Average size	20527		

Source: Derived from Appendix VII.1.

^aHeadquarters of Coast region is located in Dar-es-Salaam.

^bDistrict headquarters of 37 districts were either located in the Regional headquarters or were not considered urban for the purpose of the census.

^c1967 population taken to be $685092 + (29 \times 1974) + 65824$ or 808162. The last component (65824) is the expected population for ranks 62 to 110. For the procedure for obtaining expected population, see: "Problems of Comparability".

^dBase population taken to be the expected population of ranks 78-110 (33,094 persons). For the procedure for obtaining expected population refer to "Problems of Comparability".

Table 7.7 presents the rank-size distribution of all urban localities for the 1978 census, with Dar-es-Salaam ranked as 1 and Manda as

TABLE 7.7.— RANK-SIZE DISTRIBUTION OF URBAN LOCALITIES, FOR THE MAINLAND: 1978 CENSUS

Rank	Locality	Population	Rank	Locality	Population
1	Dar-es-Salaam	769445	56	Mahuta	6668
2	Mwanza	110553	57	Mlandizi	6484
3	Tanga	103399	58	Utete	6242
4	Mbeya	76601	59	Ngerengere	5957
5	Tabora	67388	60	Njombe	5874
6	Morogoro	60782	61	Muheza	5676
7	Iringa	57164	62	Bondeni	5672
8	Arusha	55223	63	Mikumi	5508
9	Moshi	52046	64	Kilwa Kivinje	5443
10	Kigoma	50075	65	Kaliua	5429
11	Mtwara	48491	66	Same	5292
12	Dodoma	45807	67	Kyela	4906
13	Musoma	31051	68	Magu	4859
14	Singida	29258	69	Igunga	4847
15	Sumbawanga	28586	70	Mombo	4814
16	Lindi	27312	71	Bariadi	4603
17	Bukoba	21547	72	Pangani	4320
18	Shinyanga	20439	73	Kilwa Masoko	4289
19	Mpwapwa	18631	74	Msemulwa	4265
20	Newala	18395	75	Rombo Mauu	4154
21	Tunduru	18160	76	Mugumu	4042
22	Songea	17955	77	Kilindoni	4033
23	Bagamoyo	16272	78	Ngara	3937
24	Korogwe	15388	79	Usoke	3932
25	Ifakara	15250	80	Ngudu	3894
26	Sengerema	13745	81	Mahenge	3874
27	Mpanda	13450	82	Mbulu	3784
28	Masasi	13129	83	Muleba	3721
29	Kilosa	12886	84	Sanya Juu	3634
30	Kondoa	12182	85	Bukene	3614
31	Kidodi	11639	86	Kibondo	3525
32	Mafinga	11414	87	Itumba	3430
33	Kasulu	10838	88	Biharamulo	3349
34	Urambo	10692	89	Malampaka	3032
35	Mwadui	10451	90	Chunya	3020
36	Kidatu	10245	91	Lushoto	2923

TABLE 7.7.— (Continued)

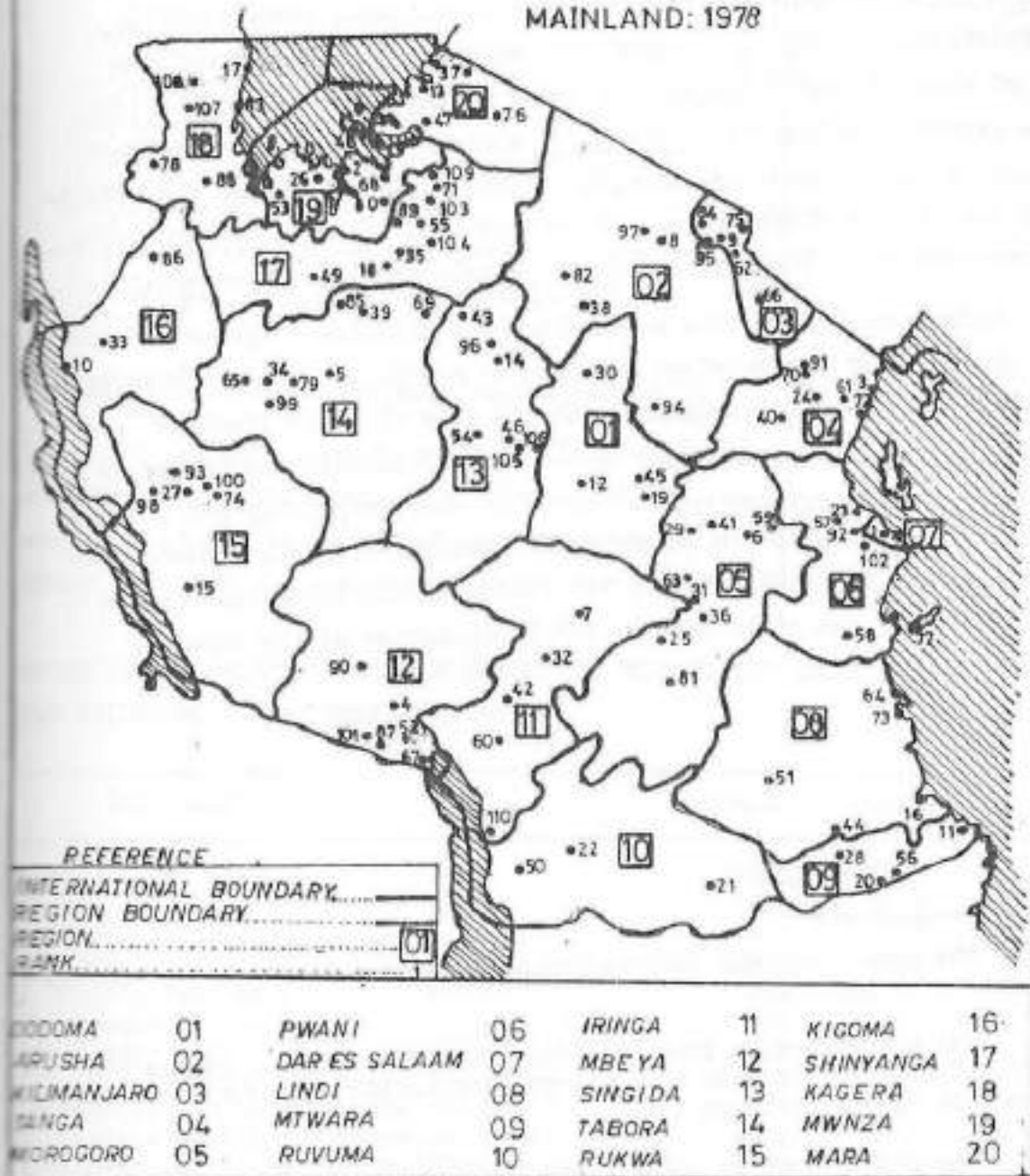
Rank	Locality	Population	Rank	Locality	Population
37	Tarime	9854	92	Tumbi	2817
38	Babati	9759	93	Sharwe	2622
39	Nzega	9542	94	Kibaya	2621
40	Handeni	9444	95	Masama South	2473
41	Kimamba	9164	96	Iguguno	2472
42	Makambako	9097	97	Monduli	2248
43	Kiomboi	9039	98	Misunkamilo	2122
44	Nachingwea	8886	99	Ushokola	2055
45	Kongwa	8557	100	Kawajense	2047
46	Manyoni	8157	101	Vwawa	1585
47	Bunda	7873	102	Kisarawe	1434
48	Nansio	7804	103	Iaguru	1253
49	Kahama	7637	104	Lalago	1228
50	Mbinga	7308	105	Kilimatinde	1212
51	Liwale	7260	106	Kintinku	1143
52	Tukuyu	7081	107	Bukene	1063
53	Geita	6917	108	Karagwe	614
54	Itigi	6729	109	Somanda	606
55	Maswa	6704	110	Manda	527

110. The approximate location of these localities along with their rank is shown in Map.7.1. The 18 largest urban localities (with 20,000 or more population) in 1978 had their ranks ranging from 1 to 21 in 1967 with 12 localities showing the net shift in ranks of 3 or less⁸. This indicates that the large urban localities as a group tended to retain their ranks fairly well⁹. In general, this can be taken as evidence of the larger localities not getting influenced by the more liberal definition of urban population used in 1978.

⁸Excludes Sumbawanga which was not treated as urban in 1967. For the rank-size distribution of 1967 see: Appendix VII.2.

⁹The Spearman's correlation based on 17 observations is 0.73897, with $p = 0.0033$. Sumbawanga was excluded from these computations.

MAP 7.1 APPROXIMATE LOCATION
AND RANK OF URBAN LOCALITIES,
MAINLAND: 1978



An attempt has also been made here to explore the applicability of the rank-size relationship based on 86 localities with population of 3,500 or more persons. The empirical relationship is given below:

$$S.R. = 1.0739982 \cdot 469280$$

(S and R stand for size and rank of urban localities, respectively). This relationship shows quite good predictive value over most of the range of observations¹⁰ (except for large localities where distortions can be expected because of, *inter alia*, high primary rate of Dar-es-Salaam). A more general and significant observation based on the relationship can also be stated here. It appears that between 1967 and 1978, the slope tended to converge toward the simple rank-size hypothesis¹¹.

Before concluding this sub-section one additional feature of the urban structure of the Mainland may also be noted. It appears that sex-selectivity in urban areas varies with the size of urban locality¹². In general, Table 7.8 shows that as the size of locality increases so does the sex ratio. There appears to be greater propensity for the male population to be located in larger urban localities. This tendency co-exists with the invariably higher sex ratios in all size-class groups than the overall sex ratio for the total population of the Mainland (96.1).

¹⁰The product-moment correlation after transformation of variables turns out to be -0.99067.

¹¹The net change is from 49.69 to 47.04 degrees. Of course the value for 1967 might have to some extent been influenced by the relatively small number of observations (26).

¹²The product-moment correlation for the data in Table 7.8 is 0.859.

TABLE 7.8.— SEX RATIOS BY SIZE -CLASS OF URBAN LOCALITIES FOR THE MAINLAND: 1978 CENSUS

Size - class of Locality	Sex Ratio
500-1,999	103.5
2,000-4,999	100.9
5,000-9,999	99.6
10,000-19,999	102.7
20,000-49,999	106.6
50,000-99,999	105.5
100,000-1,99,999	114.0
500,000 or more	115.2

Source: Derived from Appendix VII.1.

A Summary of Selected Rural-Urban Differentials

For reasons already indicated this subsection provides only a summary of selected rural-urban differentials. The choice of differentials included in Table 7.9 is also somewhat arbitrary, though an effort has been made to cover some of the more important differentials.

TABLE 7.9.— SELECTED SOCIO-ECONOMIC AND DEMOGRAPHIC INDICATORS FOR THE MAINLAND, 1978: RURAL AND URBAN

Indicator	Urban	Rural
Sex ratio	108.4	94.4
% under 15 years	40.4	46.9
% 60 years and over	3.4	6.5
% Single, males (12 years and over)	45.5	40.8
% Single, females (12 years and over)	28.6	24.5
Child-woman ratio	701	821
Dependency Ratio (%)	77.9	114.6
% Literate, males (10 years and over)	84.4	61.5
% Literate, females (10 years and over)	59.8	35.6
% Literate, total (10 years and over)	73.0	48.1
% with no formal education (10 years and over)	27.7	51.7
% with primary school completed (10 yrs & over)	21.6	6.4
% with secondary school completed (10 yrs & over)	0.36	0.01

Table 7.9 indicates that, as compared to rural areas, urban areas are characterized by a disproportionately large male population. Urban areas also have fewer young (under 15 years of age) and old (over 60 years of age) persons than rural areas. Dependency ratio derived from these age-compositional differentials indicates that urban areas have lower dependency burden than rural areas. There is also some indication that perhaps age at marriage is somewhat higher in urban areas. The level of fertility also appears to be lower in urban areas. Both literacy and educational attainment tend to favour urban areas.

Concluding Observations

Urban population of the Mainland has been growing at a very high rate since 1967. This is essentially true even if one adopts a more rigid definition than the one used in 1978. This rate of growth cannot be expected to operate indefinitely in the future. However, on the other hand, it would be unrealistic to expect any dramatic decline in this rate in the near future. Economic and other measures necessary for such decline would take time before they could register appreciable impact.

It appears that district and regional headquarters would continue to absorb most of the growth of urban population, though it is likely that other localities would grow in their number and, to a less marked extent, in their contribution to the overall urban population. It also follows that, in general, the larger localities would have to absorb quite a large number of new arrivals.

ZANZIBAR

A re-examination of Table 7.1 would indicate that the level of urbanization in Zanzibar was higher than that in the Mainland. In 1978, about one-third (32.55 percent) of the total population of Zanzibar was living in urban localities. The corresponding figure for the Mainland was 13.25 percent. It is also evident from the table that in 1948 Zanzibar had one-fifth of its population reported urban. This places

Zanzibar ahead of the Mainland in urbanization — the latter had only 2.64 percent urban population in 1948. Though comparable data are not readily available, it seems plausible that for quite some time Zanzibar had higher levels of urbanization than other countries in the region.

Another striking feature of urbanization of Zanzibar is the relatively persistent slow growth of urban population. The annual average growth rates presented in Table 7.1 appear to have changed only marginally over time. (The slight decline registered for 1957-1967 might be due to the 1964 revolution and subsequent departure of some of the urban population). The near constancy of these rates at low level indicates that rural-urban migration has played only a secondary role in the growth of urban population, with most of the growth attributable to the natural increase. This, once again, sets Zanzibar at variance with the Mainland where rural-urban migration appears to have played a more significant role.

Population data from four urban localities in Zanzibar are available for 1958, 1967 and 1978¹³. Table 7.10 provides these basic data and also presents the average annual growth rates for these localities for selected periods. Between 1958 and 1967 the fastest growing urban locality appears to be Mkoani, and the slowest, Chakechake. (In fact, Chakechake was growing slower than the total population of Zanzibar). Zanzibar town during this period was growing at a somewhat faster rate than the total population of Zanzibar (2.33 against 1.88 percent). Between 1967 and 1978, the growth of Zanzibar town was slower than rate of growth of urban population in Zanzibar. The fastest growing urban locality during 1967-1978 was Wete. It is also interesting to note that Chakechake which appeared to have lost its growth momentum between 1958 and 1967, had experienced a relatively higher growth rate between 1967 and 1978. It may also be added that

¹³Comparable data for 1948, though available, have been excluded from analysis here. The inclusion of these data would not alter general conclusions. Zanzibar census was carried out in 1958 and data were later adjusted to 1957 for arriving at estimates comparable with the 1957 Mainland census.

TABLE 7.10.— DISTRIBUTION OF URBAN POPULATION BY URBAN LOCALITIES, AND ANNUAL AVERAGE GROWTH RATES FOR SELECTED LOCALITIES, FOR ZANZIBAR: 1958, 1967 AND 1978

Urban locality	Population			Annual growth rate		
	1957 ^a	1967 ^a	1978	1958-67	1967-78	1958-78
Zanzibar						
Town	65300	80588	110506	2.33	2.87	2.63
Mkokotoni	-	-	1170			
Msufini			4631			
Koani			832			
Kijini			2937			
Wete	7500	9039	12874	2.07	3.22	2.70
Konde			6711			
Chakechake	7200	7560	9640	0.54	2.21	1.46
Mkoani	3200	44288	5678	3.25	2.55	2.87
Total						
Urban	83200	101475	154979	2.21	3.85	3.11
Total (rural + urban)	299100	354400	476111	1.88	2.68	2.32

Source: (i) For 1957: Bureau of Statistics, Recorded Population Changes 1948-1967, Tanzania (Dar es Salaam: Bureau of Statistics, 1968), pp.11-12. Zanzibar census was conducted in 1958 and adjusted to 1957 for comparability with the Mainland. (ii) For 1967: Bureau of Statistics, 1967 Population Census, Volume 2, Statistics for Urban Areas (Dar es Salaam: Bureau of Statistics, 1970), p.x.

^aIncludes Town Planning Areas of each urban locality.

over the 1967-1978 period only Wete showed a higher growth rate than the overall urban growth rate for Zanzibar as a whole. The foregoing highlights the variations in growth of the four localities. However, it is important to note that these variations were not significant enough to change size-rank distribution of these localities over the 1958-1978 period which remained practically the same over this period. The net effect of these variations appears to manifest itself in the primacy rate of Zanzibar Town. This rate (based on four largest loca-

ities) changed from 67.7 percent in 1958 to 79.4 percent in 1967, and then declined to 71.3 percent in 1978.

The data on regional variations in urbanization were presented in Table 7.5. Town/West region (dominated by Zanzibar town) had 77.80 percent population classified as urban, followed by 18.43 percent for North Pemba region and 15.47 percent for South Pemba region. The lowest corresponding figures were found in North region with 7.53 percent and South region with 7.28 percent. The relatively low figures for these two regions can, in part, be attributed to the primacy of Zanzibar town because these two regions are located on the same Island as Zanzibar town and thus are more likely to be influenced by the dominant role played by it.

Table 7.11 provides the percentage distribution of urban population by urban localities in 1978. The table shows that the five urban localities (Zanzibar town, Mkokotoni, Misufini, Koani and Mjini) on Zanzibar Island account for 77.48 percent of the total urban

TABLE 7.11.— PERCENT DISTRIBUTION OF URBAN POPULATION, AND SEX RATIOS BY URBAN LOCALITIES, FOR ZANZIBAR: 1978 CENSUS

Urban Locality	Percent of total Urban Population	Sex ratio	Rank
Zanzibar town	71.30	94.2	1
Mkokotoni	0.75	97.3	8
Misufini	2.99	106.1	6
Koani	0.54	104.9	9
Mjini	1.90	90.8	7
Wete	8.31	92.8	2
Konde	4.33	104.3	4
Chakechake	6.22	91.2	3
Mwanani	3.66	92.6	5
Total	100.00		
Total, urban	154,979	94.6	
Total, rural & urban	476,111	98.8	

Source: Derived from: Bureau of Statistics, 1978 Population Census, Volume II, Population by Age and Sex for Villages/Wards and Urban Areas (Dar-es-Salaam: Bureau of Statistics, 1981), Tables 1 and 2.

population of Zanzibar. The remaining four localities which are located on Pemba Island cover 22.52 percent of the total urban population of Zanzibar. Urban population taken as percent of the total population also differs quite substantially between the two Islands. In Pemba Island, only 17.00 percent population (34,903 out of 205,304) was enumerated in urban localities. The corresponding figure for Zanzibar Island was 44.3 percent (120,076 out of 270,807). These statistics are likely to be of some significance in future urbanization of Zanzibar especially when they are viewed in the context of distribution of total population of Zanzibar between the two Islands. Pemba Island with 43.12 percent of the total population of Zanzibar, relatively small area, and low initial level of urbanization can be expected to contribute disproportionately to the urbanization in Zanzibar.

Another interesting feature of urbanization in Zanzibar is revealed by the study of sex ratios for different urban localities (Table 7.11). Four out of five largest localities had sex ratios smaller than the overall sex ratio of urban population in Zanzibar (94.6). The relatively higher sex ratios than the overall sex ratio were in general associated with smaller urban localities. This, it may be recalled, represents a reversal of the pattern observed in the Mainland. It is also important to note that the sex ratio in the urban population of Zanzibar (94.6) was lower than the sex ratio in the general population of Zanzibar (98.8). It appears that the sex-selectivity in urban population of Zanzibar operated in a direction opposite of what was observed in the Mainland.

Table 7.12 presents a set of selected socio-economic and demographic indicators designed to highlight rural-urban differentials. For reasons already stated, this set is by no means exhaustive and interested reader would have to turn to individual chapters of this volume for further details on rural-urban differentials. Table 7.12 indicates that urban areas in Zanzibar tend to have lower sex ratio than rural areas. Urban areas also have lower proportions of younger

TABLE 7.12.— SELECTED SOCIO-ECONOMIC AND DEMOGRAPHIC INDICATORS FOR ZANZIBAR, 1973: URBAN AND RURAL

Indicator	Urban	Rural
Sex ratio	94.6	100.9
\$ under 15 years of age	45.9	50.1
\$ 60 years and over	6.3	7.5
\$ Single, males (12 years and over)	40.8	37.0
\$ Single, females (12 years and over)	22.1	15.6
Child-woman ratio	805	1002
Dependency ratio (%)	109.2	135.8
\$ Literate, males (10 years and over)	72.6	50.5
\$ Literate, females (10 years and over)	51.6	25.8
\$ Literate, total (10 years and over)	61.9	38.3
\$ with no formal education (10 years and over)	41.5	65.2
\$ with primary school completed (10 yrs and over)	12.0	3.5
\$ with secondary school completed (10 yrs and over)	0.29	0.04

and older persons than rural areas. The net effect of this differential in age-composition is that urban areas have lower dependency ratio than rural areas. There is also some indication that urban areas have lower fertility than rural areas. The table also shows that, as compared to rural areas, urban areas are better off in terms of literacy and education.

It appears that before concluding this section a few additional observations on the future growth of urban population in Zanzibar would be in order. The foregoing analysis indicates that any assumptions about growth should take into account the distinctive features of pattern of growth in the past. In this connection perhaps a model of urbanization could be sought which approximates the given pattern. It is also important to keep in mind that it is highly unlikely that Zanzibar would attain the level of growth observed in the Mainland over the 1967-1973 period. General economic conditions coupled with size and density of population, level of urbanization already attained,

spatial differentials in economic opportunity, relative ease of accessibility between different parts, political and other links with the Mainland, and historical links with the Middle East and other countries of East Africa, all tend to indicate that no dramatic upsurge in urban growth, at least in the near future, is likely to occur. This is not meant to rule out the possibility of some minor increase in the growth rate. It may also be added that the two Islands may manifest growth differentials with some relative gains in favour of Pemba Island.

APPENDIX VII.1. -- POPULATION OF URBAN AREAS (LOCALITIES) BY REGION, SEX AND NATURE OF LOCALITY 1976 CENSUS

Region Urban Area	Regional Code	Population			Nature of locality ^a
		Both sexes	Male	Female	
MAINLAND					
<u>DODOMA REGION</u>	01	85177	44157	41020	
Dodoma		45807	24778	21029	RHQ
Kondea		12182	5898	6284	DHQ
Mpwapwa		18631	9339	9292	DHQ
Kongwa		8557	4142	4415	OTH
<u>ARUSHA REGION</u>	02	73635	39957	33678	
Arusha		55223	30350	24873	RHQ
Monduli		2248	1303	945	DHQ
Kibaya		2621	1410	1211	DHQ
Babati		9759	4982	4777	DHQ
Mbulu		3784	1912	1872	DHQ
<u>KILIMANJARO REGION</u>	03	67599	37247	30352	
Moshi		52046	29213	22833	RHQ
Rombo Mkuu		4154	1796	2358	DHQ
Sana		5292	2894	2398	DHQ
Sanya Jun		3634	1921	1713	DHQ
Nasama South		2473	1423	1050	OTH
<u>TANGA REGION</u>	04	145964	75540	70424	
Tanga		103399	54507	48892	RHQ
Lushoto		2923	1395	1528	DHQ
Karogwe		15388	7624	7764	DHQ
Mombe		4814	2495	2319	OTH
Muhara		5676	2793	2883	DHQ
Pangani		4320	2152	2168	DHQ
Handani		9444	4574	4870	DHQ
<u>MOROGORO REGION</u>	05	135305	70114	65191	
Morogoro		60782	30623	30159	RHQ
Kilosa		12886	6484	6402	DHQ
Kimanba		9164	4788	4376	OTH
Mikumi		5508	2888	2620	OTH
Kidadi		11639	7236	4403	OTH
Ngerengere		5957	3158	2799	OTH
Ifakara		15250	7166	8084	DHQ
Kidatu		10245	5891	4354	OTH
Mahenge		3874	1880	1994	DHQ

APPENDIX VII.1. -- CONTINUED

Region Urban Area	Regional Code	Population			Nature of locality ^a
		Both sexes	Male	Female	
<u>COAST REGION</u>	06	37202	19109	18093	
Bagamoyo		16272	8364	7908	DHQ
Kisarawe		1434	706	728	DHQ
Tumbi		2817	1804	1013	OTH
Mlandisi		6484	3277	3207	OTH
Utete		6242	2902	3340	DHQ
Kilindoni		4033	2136	1897	DHQ
<u>DAR ES SALAAM REGION</u>	07	769445	411833	357612	
Dar es Salaam		769445	411833	357612	DHQ
<u>LINDI REGION</u>	08	53190	26729	26461	
Lindi		27312	13933	13379	DHQ
Kilwa Masoko		4289	2222	2067	DHQ
Kilwa Kivinjo		5443	2463	2980	OTH
Nachingwen		8886	4572	4314	DHQ
Liwale		7260	3539	3721	DHQ
<u>MTRARA REGION</u>	09	92355	45973	46382	
Mtwara		48491	24584	23907	DHQ
Nevala		18395	8921	9474	DHQ
Mahuta		6668	3195	3473	OTH
Bondeni		5672	2740	2932	OTH
Muonsi		13129	6533	6596	DHQ
<u>MUYUHA REGION</u>	10	43423	21398	22025	
Seugen		17955	8877	9078	DHQ
Tunduru		18160	8935	9225	DHQ
Mbinga		7308	3586	3722	DHQ
<u>IRINGA REGION</u>	11	84076	43288	40788	
Iringa		57164	28492	28672	DHQ
Mafinga		11414	6131	5283	DHQ
Njebe		5874	3428	2446	DHQ
Makambako		9097	4929	4168	OTH
Manda		527	308	219	DHQ
<u>MUYA REGION</u>	12	96623	47612	49011	
Mbeya		76601	38009	38592	DHQ
Chunya		3020	1494	1526	DHQ
Kyela		4906	2254	2652	DHQ
Tukuyu		7081	3369	3712	DHQ
Itumba		3430	1682	1748	DHQ
Vwawa		1585	804	781	DHQ

APPENDIX VII.1. — CONTINUED

Region/ Urban Area	Regional Code	Population			Nature of locality ^a
		Both sexes	Male	Female	
SINGIDA REGION	13	58010	28203	29807	
Singida		29258	14539	14719	RHQ
Kioaboi		9039	4205	4834	DHQ
Iguguno		2472	1075	1397	OTH
Manyoni		8157	4093	4064	DHQ
Itigi		6729	3227	3502	OTH
Kilimatindo		1212	515	697	OTH
Kintinku		1143	549	594	OTH
TABORA REGION	14	107499	53359	54140	
Tabora		67388	33979	33409	RHQ
Brega		9542	4689	4853	DHQ
Bukene		3614	1766	1848	OTH
Igunga		4847	2363	2484	DHQ
Urambo		10692	5099	5593	DHQ
Usuke		3932	1838	2094	OTH
Ushokola		2055	1014	1041	OTH
Kalina		5429	2611	2818	OTH
WATA REGION	15	53092	26721	26371	
Susabavanga		28586	14716	13870	RHQ
Mpenda		13450	6588	6862	DHQ
Misvakumilo		2122	1050	1072	OTH
Eesaulwa		4265	2071	2194	OTH
Shanve		2622	1300	1322	OTH
Lava-jense		2047	996	1051	OTH
WUROMA REGION	16	64438	31351	33087	
Kigoma		50075	24587	25488	RHQ
Kibondo		3525	1717	1808	DHQ
Kasulu		10838	5047	5791	DHQ
WUZYANGA REGION	17	55955	29282	26673	
Shinyanga		20439	10616	9823	RHQ
Bariadi		4603	2300	2303	DHQ
Iaguru		1253	674	579	OTH
Susanda		608	389	219	OTH
Kasva		6704	3500	3204	DHQ
Lalago		1228	588	640	OTH
Kalampaka		3032	1504	1528	OTH
Msadui		10451	5894	4557	OTH
Kabasa		7637	3817	3820	DHQ

APPENDIX VII.2. — RANK-SIZE DISTRIBUTION OF URBAN LOCALITIES
FOR THE MAINLAND, 1967 CENSUS

RANK	LOCALITY	POPULATION
1	Dar es Salaam	272821
2	Tanga	61058
3	Mwanza	34861
4	Arusha	32452
5	Moshi	26864
6	Morogoro	25262
7	Dodoma	23559
8	Iringa	21746
9	Kigoma/Vijiji	21369
10	Tabora	21012
11	Mtwara/Mikindani	20413
12	Musoma	15412
13	Lindi	13352
14	Mbeya	12479
15	Singida	9478
16	Sukoba	8141
17	Mwadui	7383
18	Korogwe	6675
19	Songea	5430
20	Bagamoyo	5112
21	Shinyanga	5135
22	Kondoa	4514
23	Kilosa	4458
24	Tukuyu	4089
25	Machingwa	3751
26	Nansio	3607
27	Kahama	3211
28	Pangani	2955
29	Mpwapwa	2429
30	Chunya	2398
31	Kimanba	1863
32	Lushoto	1803
		605092

Source: Bureau of Statistics, 1967 Population Census, Volume 2, Statistics for Urban Areas. (Dar es Salaam: Bureau of Statistics, 1970), p.2.

CHAPTER 8

LITERACY AND EDUCATION

by

Godwin Noah and Rest Lasway*

INTRODUCTION

The significance of educational development as a crucial factor for socio-economic development cannot be over-emphasized. Given the rapidly changing environment and technological advances accompanying modernization, a predominantly illiterate society is definitely disadvantaged and its achievements in the socio-economic field will remain low. Tanzania which inherited at the time of independence in 1961 an extremely underdeveloped educational infrastructure realized the need to develop its education as a pre-requisite to accelerate socio-economic development. Mindful of the high illiteracy rate that existed at the time of independence and unsatisfactory and insufficiently developed system of formal education coupled with extreme poverty, the country set in its earliest development plans three major targets in the field of literacy and education:

- (a) to eradicate illiteracy
- (b) to achieve Universal Primary Education (U.P.E.)
- (c) to develop secondary and higher education to the extent justified by labour force demands.

The third target implied restricted development but it was adopted because of limited resources rather than a desire to limit the expansion of post-primary education.

Right from the beginning Tanzania's educational development was and is still meant to serve the interests of socio-economic development of the nation. Therefore deliberate attempts have been made throughout to link education to socio-economic development by making it relevant to the demands of the various sectors of the economy. Literacy is functional in the sense that knowledge and skills relevant to develop-

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ment needs of the recipients form a major part of the literacy programmes. Reading and writing is just one of the goals.

Literacy and education data from the 1978 census provides vital information about the level of achievement and distribution of education within the country's population. The data enables the nation to determine the extent of success or failure and facilitate planning for the future. It also provides data for comparison with data from other sources, the major one being records from the Ministry of National Education and other censuses and surveys carried out before 1978.

COMPARABILITY OF DATA ON LITERACY

In the 1978 population census literacy data was obtained by merely asking individuals if they could read and write in Kiswahili Language. The answer from the respondents was simply "yes" if they considered themselves capable of reading and writing in Kiswahili or "No" if they thought otherwise. For those who answered "No" it is most likely that they were illiterate. However, it may not be certain for those who answered "yes" that they were all literate. Possible errors could arise on two grounds: first, literacy is regarded by some people as a status symbol and thus some people do not admit that they are illiterate. These could possibly have answered "Yes" even when it should have been "No". Secondly, there could be errors of judgement, some respondents, especially the marginal cases, faced with the direct question "can you read and write in Kiswahili" could find it difficult to judge themselves in the absence of clear criteria or guidelines for determining literacy. Therefore the risk of subjective responses existed.

In the National Literacy Campaigns some standards have been set and are being used by the Ministry of National Education to determine literacy rates. A person is considered literate if he/she has attained levels III or IV of the literacy tests (see Appendix VIII.1). This criterion is more restrictive and the data obtained this way could very likely differ from the census data.

There is one additional shortcoming in the census data. The question asked in the census does not provide qualitative information related to literacy achievement. One of the national goals has been to make literacy functional by integrating the learning of the reading, writing and arithmetic with other development needs of the people. While learning the three R's people also learn about better nutrition, health, agriculture, political education, crafts and the like. Therefore, to have complete information on literacy demands more measures to be taken than merely asking a person if he can read and write. The foregoing implies that it may be difficult to compare directly the census data on literacy with that collected by the Ministry of National Education because the criteria used by the two sources are not identical.

The analysis presented in this chapter is based mainly on the census data as obtained from the field. In spite of the limitations explained above, these data provide useful information on the literacy achievement of the country. The data could be assumed to be of reasonable quality, only 0.06 percent of all respondents aged 10 years and over are in the "not stated" group. This shows that almost all people were successfully entered into the "literate" and "illiterate" categories. The "not stated" being negligible are not taken into account in this analysis.

LITERACY RATES

The census data show that Tanzania Mainland and Zanzibar have a literacy rate of 51.6 percent and 46.3 percent respectively for the population aged 10 years and over (Table 8.1). Tanzania Mainland is therefore 5.3 percent ahead of Zanzibar. This could be attributed to the fact that the literacy campaign in Tanzania Mainland started in 1970 whereas in Zanzibar it started in 1980. Another reason could be that Zanzibar has never conducted any literacy tests which could help individuals to know the levels of literacy they have achieved. Thus a person could simply respond 'No' because he/she has not been nationally recognised as literate.

TABLE 8.1.— PERCENT LITERATE FOR POPULATION AGED 10 YEARS AND OVER BY REGION: 1967 AND 1978 CENSUSES

Region	Percent	Literate
	1967 Census	1978 Census
Dodoma	24	49.5
Arusha	26	41.9
Kilimanjaro	56	74.1
Tanga	40	60.6
Morogoro	37	58.6
Coast	26	44.0
Dar-es-Salaam	60	73.3
Lindi	—	48.4
Mtwara	28	51.4
Ruvuma	41	66.3
Tringa	31	54.0
Mbeya	29	49.2
Singida	27	46.7
Tabora	27	40.5
Rukwa	—	48.5
Kigoma	19	43.7
Shinyanga	16	33.2
West Lake	40	53.9
Mwanza	25	44.3
Mara	35	56.4
Total Mainland	31	51.6
Zanzibar North	—	30.8
Zanzibar Central	—	51.8
Zanzibar West	—	63.2
Pemba North	—	35.5
Pemba South	—	40.3
Total Zanzibar	39	46.3

As for the regional rates, Kilimanjaro has 74.1 percent literacy rate. This is the highest literacy rate among both Mainland and Zanzibar regions. The lowest is Zanzibar North which has a literacy rate of 30.8 percent while in the Mainland Shinyanga region has the lowest literacy rate of 33.2 percent.

When the literacy figures of 1978 census are compared to the figures of the 1967 Census (Table 8.1) it is evident that quite remarkable progress has been achieved in literacy campaign. Tanzania Mainland literate population (aged 10 years and over) increased from 31 percent in 1967 to 51.6 percent in 1978, a rise of 20 percent within 11 years.

In Zanzibar there was an increase from 39 percent in 1967 to 46.3 percent in 1978, a rise of about 7 percent. This shows that Zanzibar was ahead of Mainland Tanzania in literacy rate in 1967 but it has now been surpassed by the Mainland. The obvious reason is that there has been an effort towards the eradication of illiteracy in Mainland Tanzania since 1970 up to date. The proper campaign to eradicate illiteracy in Zanzibar started in 1980.

Table 8.1 also shows an improvement in literacy by regions which were lagging behind in 1967. Kilgoma and Shinyanga regions which had 19 percent and 16 percent literacy rates respectively in 1967 managed to achieve levels of literacy of 43.7 percent and 33.2 percent in 1978. Although they are still among the lowest three regions in the Mainland, the difference between these and other regions has decreased considerably.

LITERACY DIFFERENTIALS

Regional Differentials

The 1967 Mainland census figures showed fairly sharp variations of literacy rates among the regions with Kilimanjaro, for instance, having 56 percent literate and Shinyanga having only 16 percent. The 1978 census figures confirm that the variations still exist. It is interesting to note that Shinyanga is still at the bottom while Dodoma which was the third from the bottom is now the tenth from the top. Kilimanjaro has taken the top position in place of Dar-es-Salaam which has recorded the lowest rise in literacy rate (13 percent) during the 1967-78 period. Ruvuma and Tanga have kept their ranks

unchanged while Tabora which was 12th in 1967 has declined to the 19th position in 1978. Table 8.2 shows the relative position of each region in 1967 and 1978.

TABLE 8.2.— MAINLAND REGIONS BY RANK ACCORDING TO LITERACY RATES FOR POPULATION 10 YEARS AND OVER: 1967 AND 1978 CENSUSES

Region	Rank in	
	1967	1978
Dar-es-Salaam	1	2
Kilimanjaro	2	1
Ruvuma	3	3
Tanga	4	4
West Lake	5	8
Morogoro	6	5
Mara	7	6
Iringa	8	7
Mbeya	9	11
Mtwara	10	9
Singida	11	14
Tabora	12	19
Arusha	13	18
Coast	14	16
Mwanza	15	15
Dodoma	16	10
Kigoma	17	17
Shinyanga	18	20
Rukwa	—	12
Lindi	—	13

Source: For 1967: B. Egero and R. A. Henin (eds.). The Population of Tanzania (Dar-es-Salaam: BRAIUP and Bureau of Statistics, 1973), p. 122.

Zanzibar shows equally sharp variations. Zanzibar West region has a literacy rate of 63.2 percent, highest in Zanzibar, while Zanzibar North has only 0.8 percent the lowest in both Mainland and Zanzibar. This means that Zanzibar North has the highest illiteracy rate in the whole of Tanzania followed by Shinyanga and Pemba North regions. The Zanzibar West literacy rate is surpassed by Kil-

manjaro, Dar-es-Salaam and Ruvuma Regions only. This region also has almost one-third of the total population of Zanzibar (30 percent).

The presence of regional variations could be due to various factors. Before the literacy campaigns started, some regions had higher illiteracy rate than others. Some part of the variations could be due to the differentials in efforts which each region has exerted towards the eradication of illiteracy. Records in the Ministry of National Education show, for instance, that greater efforts towards eradication of illiteracy have been noted in some regions like Kilimanjaro, Morogoro, Dodoma and Ruvuma. Another possibility could be migration which attracts educated people to the more developed regions especially those with large urban areas where employment opportunities are better. The higher literacy rates for Dar-es-Salaam region could partly be attributed to this.

Rural-Urban differentials

Given the small urban population in most regions, the literacy rates for most rural areas do not differ much from those of the total population in those regions. There are however substantial differences between the urban and rural rates, the urban rates being higher than the corresponding rural ones. There is a greater chance for urban areas to achieve higher literacy rates than rural areas because of better educational facilities. This is a result also of concentration of educated people in the urban areas where non-agricultural jobs are available. The differentials are also greater in regions which have least achievement in literacy. Arusha, Dar-es-Salaam, Tabora and Shinyanga regions have the highest differentials of between 32 percent and 42 percent, while Kilimanjaro and Mtwara on the Mainland and Zanzibar North, Zanzibar Central and Zanzibar West have the lowest. It is significant to note that while, Dar-es-Salaam region has the second highest literacy rate (73.3 percent), its rural population especially the females have a very low rate of literacy. Its rural female literacy rate of 26.6 percent is the third lowest for rural females on the Mainland after Shinyanga (18.3 percent) and Tabora (22.7 percent).

Table 8.3 gives the rural and urban literacy rates for all regions.

TABLE 8.3.— LITERACY RATES FOR POPULATION 10 YEARS AND OVER IN RURAL AND URBAN AREAS BY SEX, AND BY REGION: 1978

Region	Literacy Rates					
	Males			Females		
	Rural	Urban	Total	Rural	Urban	Total
Dodoma	59.7	83.5	62.2	35.4	64.1	37.8
Arusha	47.2	87.3	51.0	29.1	69.4	32.2
Kilimanjaro	80.5	90.5	81.5	66.7	75.6	67.3
Tanga	71.0	87.5	73.6	44.7	65.5	47.6
Mbogo	69.3	83.4	71.5	43.4	57.8	45.5
Coast	58.2	76.1	59.6	27.9	46.6	29.2
Dar-es-Salaam	54.5	86.6	83.9	26.6	63.5	60.1
Lindi	62.2	77.6	63.9	31.9	50.6	33.8
Mtwara	63.1	75.4	64.6	38.2	47.6	39.3
Ruvuma	78.3	83.2	78.7	54.5	61.2	55.0
Iringa	67.7	87.3	70.0	38.9	60.5	40.7
Mbeya	62.8	84.4	64.9	32.9	58.1	35.1
Singida	57.9	74.6	59.5	33.8	50.7	35.4
Tabora	49.7	83.2	54.4	22.7	53.7	26.9
Rukwa	64.4	80.3	66.4	28.9	48.7	31.2
Kigoma	57.7	75.6	59.6	28.2	48.0	30.1
Shinyanga	45.2	86.0	47.2	18.3	60.8	20.0
West Lake	65.2	85.2	66.0	41.4	66.5	42.2
Mwanza	55.3	83.5	58.7	26.7	56.9	29.7
Mara	71.8	87.0	73.0	40.9	58.7	42.1
Total Mainland	61.3	83.9	64.9	35.4	59.3	38.6
Zanzibar North	41.1	46.7	41.5	19.7	23.8	20.0
Zanzibar Central	61.3	67.6	61.7	41.0	45.1	41.3
Zanzibar West	67.2	75.6	73.5	42.9	55.2	52.7
Pemba North	44.3	66.4	48.7	17.6	42.7	22.6
Pemba South	49.9	70.4	53.2	23.8	47.1	27.7
Total Zanzibar	50.5	72.7	57.9	25.8	51.6	34.8

Sex And Age Differentials

Males in all regions register higher literacy rates than females (Table 8.3). This is evidence of greater male participation in literacy programmes and perhaps also because of their greater achievement in formal education. Dar-es-Salaam, Kilimanjaro and Ruvuma have the highest

literacy rates for both sexes taken together. Kilimanjaro region where formal education is perhaps the most developed among Mainland regions has the highest female literacy and the lowest differential of only 14.2 percent between male and female rates. In most regions rural males have higher literacy rate than urban females. Zanzibar North has the lowest literacy in the country for both males (41.5 percent) and females (20 percent).

Tanzania Mainland has a sex differential of 26.3 percent, almost the same as Zanzibar (23.1 percent), but has little higher literacy rates for both males and females. This is different from the pattern shown in the 1967 census in which Zanzibar was ahead of Mainland. It seems Mainland Tanzania is achieving faster results in the eradication of illiteracy. Had it not been for Zanzibar West Region which has much higher rates, the Zanzibar literacy rates would have been much lower. If the national literacy targets are to be met greater efforts must be made to uplift the backward regions and especially females.

Table 8.4 gives literacy rates by sex and age groups. Literacy is highest at the lower age groups decreasing almost systematically to extremely low levels at the higher age-groups. This shows there is greater response to illiteracy elimination at younger than older ages. The rapid expansion of formal education (especially primary education)

TABLE 8.4.— LITERACY RATES BY AGE AND SEX LITERATE POPULATION FOR TANZANIA MAINLAND AND ZANZIBAR: 1978

Age	Mainland			Zanzibar		
	Male	Female	Total	Male	Female	Total
10-14	76.2	72.5	74.4	83.1	73.6	78.6
15-19	83.5	60.0	71.5	78.9	56.4	67.3
20-24	76.9	47.4	60.4	73.3	43.7	57.0
25-29	74.5	38.6	55.3	65.9	31.4	47.8
30-34	70.8	28.3	48.5	56.1	18.7	36.0
35-39	63.8	21.5	42.4	50.4	16.1	34.0
40-44	55.2	15.3	34.4	40.0	8.8	23.6
45-49	48.9	12.2	30.8	37.2	7.9	21.2
50-54	40.7	9.0	24.7	30.7	4.4	17.4
55-59	38.8	7.3	24.3	31.2	6.1	21.0

TABLE 8.4.— (Continued)

Age	Mainland			Zanzibar		
	Male	Female	Total	Male	Female	Total
60-64	28.7	4.1	16.3	18.7	2.1	10.7
65-69	27.6	4.3	16.3	18.3	2.0	11.7
70-74	20.3	3.1	12.2	9.6	0.8	5.5
75-79	19.9	1.7	11.6	13.3	3.0	9.6
80+	15.1	1.9	9.2	5.0	1.7	3.3

must have also helped to boost the literacy rates for younger age groups. It is interesting to note that female literacy drops much faster with rising age. This is even more serious with Zanzibar whose female population has a rate of 73.6 percent for age group 10-14 years but the rate drops to under 10 percent for age group 40-44 and above. This indicates that older females have responded very poorly to adult education. The higher rates for the younger age groups could be a result of expanded formal education than pure adult education.

SCHOOL ATTENDANCE

Attendance status by sex

Table 8.5 shows that about one-fifth and one-third of the population aged 5 years and over in the Mainland and Zanzibar respectively was attending school at the time of the census. Zanzibar has a higher percentage than Mainland, and as expected the percentage is higher throughout for males than females. The sex differential is much bigger in rural areas than urban and especially in Zanzibar. It is however interesting to note that unlike Zanzibar, Mainland rural has a higher proportion of population attending school than Mainland urban. This unusual situation could be a result of lower proportion of school age population in urban areas due to influx of older working age popula-

tion some of whom stay without their children or young dependants.

TABLE 8.5.— POPULATION 5 YEARS AND OVER BY SEX AND SCHOOL ATTENDANCE STATUS FOR RURAL AND URBAN AREAS: MAINLAND, ZANZIBAR AND TANZANIA, 1978

Area	Percent Attending			Percent Not Attending		
	Males	Females	Total	Males	Females	Total
Mainland Rural	24.7	19.0	21.8	75.3	81.0	78.2
Mainland Urban	20.8	20.6	20.7	79.2	79.4	79.3
Total Mainland	24.1	19.2	21.6	75.9	80.8	78.4
Zanzibar Rural	31.2	21.8	26.5	68.8	78.2	73.5
Zanzibar Urban	30.8	29.9	30.3	69.2	70.1	69.7
Total Zanzibar	31.1	24.5	27.8	68.9	75.5	72.2

Attendance status by age groups

Table 8.6 gives percentage distribution of population according to school attendance by age groups for Tanzania Mainland and Zanzibar. About 45 percent of the population aged 5 years and over in Mainland and Zanzibar is either attending or has attended school. Zanzibar has a little higher population of the never attended school category.

A great majority in the age group 10-14 years for both Mainland and Zanzibar belong to the 'attending school' category for the simple reason that these are the peak ages in primary school enrolment which is fast developing towards universality. The proportion of those attending school in Zanzibar in the 5-9 year age group is more than double that of Mainland suggesting clearly that in Zanzibar children enrol into primary schools at a younger age than on the Mainland.

It is interesting to note that only 1 percent of Mainland and 0.5 percent of Zanzibar population aged 20 years and over is attending school. This meagre proportion is a reflection of rather slow expansion in post-primary education. Almost three-quarters of Zanzibar population aged 20 years and over has never attended school.

TABLE 8.6.— PERCENTAGE DISTRIBUTION OF POPULATION 5 YEARS AND OVER
ACCORDING TO SCHOOL ATTENDANCE STATUS BY AGE: MAINLAND AND ZANZIBAR,
1978

Area	Age Group	Attending School	Having attended school	Never attended school	Total
Tanzania Mainland	5-9	21.5	0.3	78.2	100
	10-14	80.7	2.6	16.7	100
	15-19	42.5	29.6	27.9	100
	20+	1.0	37.4	61.6	100
	Total				
	5 and Over	21.6	24.2	54.2	100
Zanzibar	5-9	19.9	0.5	19.6	100
	10-14	79.7	3.0	17.3	100
	15-19	40.3	26.6	33.1	100
	20+	0.6	25.3	74.1	100
	Total				
	5 and Over	27.8	16.7	55.5	100

indicating that the expansion of education has only been undertaken recently.

School Attendance Status by Regions

Considering school attendance for population aged 10 years and over (Table 8.7) one finds interesting differentials among the regions. Kilimanjaro Region where formal education is relatively more developed has the highest percentage of the "attending" group and the lowest percentage of the "never attended" group. Its percentage of population having attended school is second only to Dar-es-Salaam region (which is mostly urban and hence privileged educationally). At the other extreme are Tabora and Pemba North which have 16.6 and 11.6 percent, the lowest "attending" and "having attended" categories respectively.

TABLE 8.7.— PERCENTAGE DISTRIBUTION OF POPULATION 10 YEARS AND OVER BY REGION AND SCHOOL ATTENDANCE STATUS: 1978

Area	Attending	Having Attended	Never Attended	Total
Dodoma	23.2	20.5	56.3	100
Arusha	19.1	25.5	55.4	100
Kilimanjaro	31.6	43.9	24.5	100
Tanga	23.5	37.2	39.3	100
Morogoro	21.0	36.9	42.1	100
Coast	18.0	21.0	61.0	100
Dar es Salaam	17.9	53.7	28.4	100
Lindi	18.4	28.1	53.5	100
Mtwara	20.4	30.4	49.2	100
Mvumba	28.2	41.0	33.8	100
Iringa	25.7	26.0	48.3	100
Mbeya	25.0	24.6	50.4	100
Singida	22.6	24.4	53.0	100
Tabora	16.6	23.4	60.0	100
Mbeya	22.5	26.8	50.7	100
Mgombe	21.5	20.5	58.0	100
Sinyanga	16.7	17.7	65.6	100
West Lake	20.8	37.2	42.0	100
Mwanza	19.3	28.5	52.2	100
Mara	27.0	29.7	43.3	100
Total Mainland	21.7	29.9	48.4	100
Zanzibar North	16.9	12.2	70.9	100
Zanzibar Central	25.2	23.4	51.4	100
Zanzibar West	23.2	36.5	40.2	100
Pemba North	19.3	11.6	69.0	100
Pemba South	22.1	13.8	64.1	100
Total Zanzibar	21.4	21.4	57.2	100

Four regions have less than 20 percent of their population (10 years and over) having attended school; of these four, three are in Zanzibar. Zanzibar North and Pemba North are particularly handicapped with about 70 percent having never attended school. This contrasts sharply with the leading regions Kilimanjaro (24.5 percent) and Dar-es-Salaam (28.4 percent).

EDUCATION ATTAINMENT

A great majority of people who have had some formal schooling

terminated their education at primary school level (standards 1-8). With the exception of Dar-es-Salaam region, over 90 percent of the people in all Mainland regions aged 10 years and over who have completed school attained only primary education. Eight regions (Tanga, Lindi, Mtwara, Ruvuma, Singida, Tabora, Shinyanga and Mara) have less than 5 percent going beyond primary school level (Table 8.8). Likewise, only a negligible percentage has university education. Dar-es-Salaam is the only region with a substantial percentage of university degree holders (2.14 percent). All the rest have less than 0.5 percent. The concentration of non-agricultural socio-economic activities

TABLE 8.8.— PERCENT DISTRIBUTION OF POPULATION 10 YEARS AND OVER WHO HAVE COMPLETED FORMAL EDUCATION BY LEVEL OF EDUCATIONAL ATTAINMENT, FOR REGIONS: 1978

Area	Completed Std. 1-8	Completed Secondary Std. 9-14	Completed University	Completed Various Other Courses	Completed Other Education	Total
Dodoma	90.98	2.42	0.35	5.88	0.37	100
Arusha	90.66	3.10	0.44	4.04	1.76	100
Kilimanjaro	92.39	2.29	0.27	4.54	0.51	100
Tanga	95.55	3.11	0.10	1.07	0.17	100
Morogoro	93.28	1.61	0.31	4.53	0.27	100
Coast	94.49	2.93	0.19	2.14	0.25	100
Dar-es-Salaam	79.45	11.16	2.14	6.55	0.70	100
Lindi	96.04	1.87	0.05	1.97	0.07	100
Mtwara	96.96	1.59	0.03	1.35	0.07	100
Ruvuma	96.46	1.51	0.04	1.96	0.03	100
Tringa	94.74	3.32	0.26	1.61	0.07	100
Mbeya	94.64	2.68	0.19	2.44	0.05	100
Singida	96.10	0.85	0.10	2.59	0.36	100
Tabora	96.10	3.74	0.16	1.56	0.44	100
Rukwa	94.20	2.80	0.11	1.92	0.97	100
Kigoma	92.74	2.36	0.17	4.62	0.11	100
Shinyanga	95.03	3.00	0.06	1.85	0.06	100
West Lake	93.68	2.71	0.19	2.02	1.40	100
Mwanza	93.74	2.56	0.24	2.70	0.76	100
Mara	95.41	2.91	0.23	1.41	0.04	100
Total Mainland	92.79	3.32	0.38	3.04	0.47	100
Zanzibar North	35.58	61.98	0.00	2.37	0.07	100
Zanzibar Central	75.04	23.69	0.00	1.24	0.03	100

TABLE 8.8.— (Continued)

Area	Completed Std. 1-8	Completed Secondary Std. 9-14	Completed University	Completed Various Other Courses	Completed Other Education	Total
Zanzibar West	65.13	31.11	0.67	2.92	0.17	100
Pemba North	69.64	25.40	0.05	4.57	0.34	100
Pemba South	73.22	21.48	0.05	4.57	0.68	100
Total Zanzibar	68.27	38.06	0.38	3.06	0.23	100

especially industries and services has resulted in a corresponding concentration of university graduates in Dar-es-Salaam. The distribution of jobs which utilize university graduates and other trained staff is a determining factor in the location of the trained manpower in various regions. The small number of university graduates found in Mtwara, Lindi, and Ruvuma may in most part be due to non availability of jobs that require such staff.

Zanzibar is better off as far as post-primary education is concerned (Table 8.8). Secondary education in Zanzibar is clearly better expanded with 28.6 percent of the 'educated' people having reached secondary school level. This contrasts sharply with the Mainland average of only 1.32 percent. Zanzibar North with 61.98 percent is by far ahead of all other regions in secondary education achievement. However at the university level Zanzibar and the Mainland register identical proportions.

The proportion of population aged 10 years and over which has attended and completed formal education is shown on Table 8.9 by level of attainment. This is the same population group shown in Table 8.8 except here it is given as a percentage of the total population. This table gives a clearer picture on education attainment. Dar-es-Salaam region has the highest proportion of educated people (53.7 percent) and is second only to Zanzibar West Region in the proportion of population with post-primary education. Although three of the five Zanzibar regions have the lowest formal education in Tanzania, Zanzibar is far ahead of Mainland in secondary education which is universal up to standard eleven. In Zanzibar

TABLE 8.9.— PERCENTAGE OF POPULATION 10 YEARS AND OVER WHO HAVE COMPLETED FORMAL EDUCATION BY EDUCATIONAL ATTAINMENT

Area	Completed Std. 1 - 8	Completed Secondary Std. 9-11	Completed University	Completed Various Courses	Completed Other Education	Total Having Attended
Dodoma	18.65	0.50	0.07	1.21	0.08	20.51
Arusha	23.08	0.79	0.11	1.03	0.15	25.16
Kilimanjaro	40.54	1.00	0.12	1.99	0.2	43.87
Tanga	35.49	1.16	0.04	0.40	0.06	37.15
Mbogo	34.37	0.59	0.11	1.67	0.10	36.86
Coast	19.81	0.62	0.04	0.45	0.05	20.97
Dar es Salaam	42.66	5.99	1.15	3.52	0.38	53.70
Lindi	27.01	0.53	0.02	0.50	0.02	28.14
Mwara	29.49	0.48	0.01	0.41	0.02	30.41
Ruvuma	39.55	0.62	0.02	0.81	0.01	41.01
Iringa	24.59	0.86	0.17	0.42	0.02	25.96
Mbeya	23.27	0.66	0.05	0.60	0.1	24.59
Singida	23.42	0.21	0.02	0.63	0.09	24.37
Tabora	21.99	0.87	0.04	0.37	0.10	23.37
Rukwa	25.26	0.75	0.03	0.52	0.26	26.82
Kigoma	18.95	0.49	0.04	0.75	0.02	20.48
Shinyanga	16.79	0.54	0.01	0.33	0.01	17.68
West Lake	34.80	1.01	0.07	0.75	0.52	37.15
Mwanza	26.67	0.74	0.07	0.78	0.22	28.48
Mara	28.31	0.87	0.07	0.42	0.01	29.68
Total Mainland	27.72	0.99	0.11	0.91	0.11	29.87
Zanzibar North	8.27	3.57	0.00	0.30	0.01	12.15
Zanzibar Central	17.53	5.55	0.00	0.29	0.01	23.38
Zanzibar West	23.76	11.36	0.2	1.07	0.06	36.50
Pemba North	8.07	2.98	0.01	0.54	0.04	11.64
Pemba South	10.03	3.01	0.01	0.64	0.10	13.79
Total Zanzibar	14.53	6.04	0.08	0.66	0.05	21.36

6.04 percent have completed secondary education compared to only 0.99 percent in the Mainland.

PRIMARY SCHOOL ATTENDANCE AGE

Standard One Attendance Age

According to the national policy, Tanzania children are supposed to enrol into standard (class) one of Primary School at the age of seven years. With the fast growth of primary school enrolment towards universal education it is expected that the majority of 7 year old children should be in school (class one). Table 8.10 shows the situation for Tanzania Mainland and Zanzibar.

sibar. Sixty-five percent of Zanzibar children aged 7 years are in school compared with only 17.8 percent for Mainland. It can also be

TABLE 8.10.— PERCENTAGE OF 7 YEAR OLD CHILDREN ATTENDING SCHOOL FOR RURAL AND URBAN AREAS: MAINLAND AND ZANZIBAR, 1978

Area	Male	Female	Both Sexes
Mainland Rural	17.9	17.0	17.4
Mainland Urban	19.7	21.7	20.7
Total Mainland	18.1	17.6	17.8
Zanzibar Rural	62.6	57.0	59.9
Zanzibar Urban	78.5	77.7	78.1
Total Zanzibar	66.9	63.2	65.0

observed that urban areas have a higher percentage of 7 year old children in school than in rural areas especially in Zanzibar.

The age distribution of standard one children shown on Table 8.11 elaborates more on the pattern of school attendance age. Most of Mainland children in standard one are aged between 7 and 12 years, the most common ages being 8, 9, and 10 years. Most Zanzibar children in standard one are aged between 6 and 9 years with the age of 7 years showing the highest percentage (30.79 percent). For enrolment policy, it would seem that while the age of 7 is alright for Zanzibar, a more favourable age for Mainland should be 9 years. This however represents the situation in 1978. As the implementation of the Universal Primary Education (U.P.E.) programmes continues the enrolment of 7 year old children to school may gain momentum.

TABLE 8.11.— PERCENTAGE DISTRIBUTION OF POPULATION ATTENDING PRIMARY SCHOOL STD. 1 BY AGE AND SEX: MAINLAND AND ZANZIBAR, 1978

Age	Mainland			Zanzibar		
	Male	Female	Both Sexes	Male	Female	Both Sexes
5	0.40	0.43	0.41	7.13	7.15	7.14

TABLE 8.11.— (Continued)

Age	Mainland			Zanzibar		
	Male	Female	Both Sexes	Male	Female	Both Sexes
6	1.77	1.96	1.86	22.17	23.36	22.71
7	9.62	10.44	10.01	29.07	32.86	30.79
8	18.09	21.10	19.53	17.51	18.93	18.16
9	18.55	20.11	19.30	8.29	8.19	8.25
10	19.61	19.82	19.71	6.98	5.02	6.09
11	10.39	10.38	10.39	1.58	1.44	1.52
12	10.30	8.60	9.48	3.42	1.92	2.74
13	5.04	4.04	4.56	1.65	0.75	1.24
14	3.32	2.05	2.71	1.17	0.30	0.78
15	1.91	0.68	1.32	0.73	0.04	0.42
16	0.71	0.25	0.49	0.26	0.03	0.15
17	0.10	0.04	0.07	0.00	0.00	0.00
18	0.04	0.03	0.03	0.00	0.00	0.00
19	0.03	0.00	0.01	0.00	0.00	0.00
20	0.01	0.01	0.01	0.00	0.01	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.01	0.01	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00
25+	0.09	0.06	0.08	0.04	0.00	0.02
	100	100	100	100	100	100

Primary School Attendance age

Table 8.12 gives the percentage distribution of population attending primary school (standard 1-8) by age. If children started school at the age of 7 and given the 7 year duration of primary education as it existed during the census, primary school age should be 7-13 years. Zanzibar age distribution agrees with this and 77.13 percent of primary school children in Zanzibar are in this age group. The corresponding age group for the Mainland is 9-15 years. This contains 73.62 percent

of the primary school population. It is therefore clear that the Zanzibar Primary School pupils are younger than the Mainland ones by roughly two years. It is interesting to note that the 1967 census figures show a similar situation (Appendix VIII.2). In Zanzibar 71.22 percent of all primary school pupils were aged 7-13 years while on the Mainland 71.55 percent were aged 9-15 years. This shows that Primary School attendance age has not changed much since 1967.

TABLE 8.12.— PERCENTAGE DISTRIBUTION OF POPULATION ATTENDING PRIMARY SCHOOL (STD. 1-8) BY AGE AND SEX: MAINLAND AND ZANZIBAR, 1978

Age	Mainland			Zanzibar		
	Male	Female	Both Total	Male	Female	Both Total
5	0.11	0.13	0.12	1.70	1.70	1.70
6	0.55	0.66	0.60	6.27	7.14	6.67
7	2.97	3.51	3.22	11.95	13.87	12.82
8	6.40	8.20	7.22	12.90	15.80	14.21
9	7.91	9.72	8.73	10.72	13.05	11.77
10	11.28	13.09	12.10	12.63	12.95	12.78
11	8.61	10.40	9.43	6.57	7.45	6.97
12	12.83	13.66	13.21	11.67	10.51	11.14
13	10.59	11.23	10.88	7.92	6.86	7.44
14	10.63	10.65	10.64	7.55	6.14	6.91
15	9.14	8.01	8.63	5.25	2.71	4.10
16	7.13	5.23	6.26	2.39	0.96	1.75
17	4.70	2.75	3.81	0.93	0.32	0.65
18	4.05	1.76	3.00	1.12	0.27	0.74
19	1.50	0.41	1.00	0.21	0.16	0.19
20	0.81	0.20	0.53	0.18	0.07	0.13
21	0.31	0.08	0.21	0.01	0.03	0.02
22	0.15	0.05	0.01	0.01	0.01	0.01
23	0.02	0.02	0.02	0.00	0.00	0.00
24	0.02	0.02	0.02	0.00	0.00	0.00
Total	100	100	100	100	100	100

PROGRESS IN PRIMARY EDUCATION

Table 8.13 gives the number of Mainland Primary School students as recorded in the 1957, 1967 and 1978 censuses together with corresponding figures from the Ministry of National Education. The Primary School enrolment recorded by the Ministry of National Education are close but not equal to the census figures. The Ministry's 1978 figures

TABLE 8.13.— NUMBER OF PRIMARY SCHOOL STUDENTS IN 1957, 1967 AND 1978, ACCORDING TO THE CENSUSES AND THE MINISTRY OF NATIONAL EDUCATION: TANZANIA MAINLAND

Source	Sex	Census			Average annual growth (percent)	
		1957 ('000)	1967 ('000)	1978 ('000)	1957/67	1967/78
Census	Male	272.0	564.5	1594	7.5	9.9
	Female	159.0	365.0	1338	8.6	12.6
	Total	431.0	929.5	2932	8.0	11.0
Ministry of National Education	Male	270.5	507.8	1629	6.6	11.2
	Female	120.6	315.3	1361	10.0	14.2
	Total	391.1	823.0	2990	7.8	12.4

are 2 percent higher than census ones. This could partly be due to errors in both figures and partly due to school drop out since the enrolment statistics were collected in March while census figures were for August. The regional variations between the two sets of figures (Table 8.14) could be due to the fact that the census was taken during school holidays and some students could have travelled (especially) to their home regions. The census being a *de facto* one, these were counted in regions different from those in which they were registered by the Ministry of Education. These variations are however much less sharp than those of 1967 in which the Ministry of National Education enrolment was 11.4 percent below the census figure.

The 1967-78 average annual growth rate in the primary school enrolment is higher than that of the 1957-67 period and between three and four times the rate of population growth. This indicates the growing achievement in the provision of universal primary education. It is worth noting that although female enrolment is lower than that of males, their enrolment growth rate is higher than that of males. Female enrolment level which is presently lower than that of the males could therefore catch up in the near future.

VARIATIONS IN SECONDARY EDUCATION DATA

The data from the 1978 census show that 42,236 students were attending secondary schools (standard 9-14) on the Mainland. The Ministry of National Education records show that there were 61,261 students enrolled in the secondary schools. It has not been possible to obtain enrolment figures by regions from the Ministry but the total enrolment figure from the Ministry is 52 percent higher than the census figure and this is a serious difference. It is possible many secondary school students were missed in the count and some could have been entered as having completed school at various stages of secondary education. Among the missed in the count could be those on transit, travelling to their homes for mid-term holiday during the enumeration.

TABLE 8.14.— PRIMARY SCHOOL ATTENDANCE AS FROM THE 1978 CENSUS AND FROM THE MINISTRY OF NATIONAL EDUCATION STATISTICS: AUGUST 1978

Region	Census 1978	Ministry of Educa- tion 1978	Percent Difference ^a	
			1978	1967
Dodoma	182085	175819	-3.4	-19.8
Irasha	133942	136733	2.1	- 9.0
Milimanjaro	218392	211355	-3.2	-12.9
Tanga	191779	184948	-3.6	- 5.5

TABLE 8.14.— (Continued)

Region	Census 1978	Ministry of Educa- tion 1978	Percent Difference*	
			1978	1967
Morogoro	160610	155759	-3.0	-20.2
Coast	85873	97707	+13.8)	-16.7
Dar-es-Salaam	123566	105088	-14.9)	-
Lindi	81374	87008	6.9	-
Mtwara	133271	136967	2.8	1.2
Ruvuma	112065	112706	0.6	- 3.5
Iringa	177151	188675	6.5	- 1.8
Mbeya	209695	214383	2.2	-25.3
Singida	106287	103802	-2.3	0.6
Tabora	120023	116885	-2.6	9.1
Rukwa	76063	76115	0.1	-
Kigoma	108129	113504	5.0	- 6.2
Shinyanga	186388	200456	7.5	- 3.9
West Lake	160109	159336	-0.5	-14.2
Mwanza	219178	252868	15.4	- 3.4
Mara	146060	160247	9.7	-27.5
Total Mainland	2932040	2990361	2.0	-11.4

* Percent difference between the census and the figures from the Ministry of National Education. Basic data for 1967 available in the 1967 Census, Volume 6, Table 7.11.

APPENDIX VIII. I.— MINISTRY OF NATIONAL EDUCATION DEFINITION OF LITERACY AND ITS LEVELS

The achievement of literacy in Tanzania is based on a national definition for Literacy which was worked out by a National Committee in 1974. The definition is as follows:

- (a) A person is literate if he is able to read and write a letter within the family, is able to locate streets, buildings etc., observe danger warnings in the street and at work; follow simple directions in many everyday situations; be able to read a newspaper; to keep records; be able to read "how to do it yourself" books; little books on better living better foods, better ways of farming etc.
- (b) An Individual is literate when he has acquired the essential knowledge and skills which enable him to engage in all those activities in which literacy is required for effective functioning in his groups and community and whose attainment in reading, writing, and arithmetic makes it possible for him to continue to use those skills towards his own and Community Development.
- (c) Adult Literacy, an essential element in overall development priorities and to present and future manpower needs. All efforts should therefore tend towards functional literacy. Rather than an end in itself, literacy should be regarded as a way of preparing man for a social, civic and economic role that goes beyond the limits of rudimentary literacy training consisting merely in the teaching of reading and writing the very process of learning acquiring more information that can immediately be used to improve living standards; reading and writing should lead not only to elementary general knowledge but to training for work, increased productivity, a greater participation in civic life and a better understanding of the surrounding world and should immediately open the way to basic human culture.

Levels of achievements of functional literacy were agreed to be as follows:

1. Level I:

A participant who has enrolled but must have attended 2/3 of the

literacy courses in any one year of literacy activities.

2. Level II:

A participant who qualifies for level I above, but who also has successfully passed one or both for the following sub-levels.

Sub-Level (i):

A person who is able to recognise words and/or symbols, writes letters of the syllables, writes numbers and/or arithmetic signs including mental calculations.

Sub-level (ii):

A person who is able to read and write a short, simple meaningful sentence, and can add and subtract one figure numbers.

3. Level III:

A person who qualifies for level II above, but who also has successfully passed one or both tests for the following sublevels:

Sub-Level (i):

A person who is able to read and write a short meaningful sentence, and can subtract two figure numbers.

Sub-level (ii):

A person who possesses mastery over symbols in their written form, or is able to encode and decode written messages. Such a person should be able to perform the following; be able to read and write fluently a simple text with understanding (the text itself being based in the Swahili language). He should also be able to write a simple short message or passage, add and subtract three figure numbers; multiply two figure numbers; and divide by one figure.

4. Level IV:

A person who continuously uses the acquired literacy skills such a person should have qualified in Level III above but also should be able to read and write messages, be able to read a newspaper, to keep up with current happenings and obtain information, is able to read "how to do it yourself books, little books on better living, better food, better ways of farming, etc.; and be able to keep records and solve simple arithmetic problems. He should also be able to keep a simple book of accounts on income and expenditure.

APPENDIX VIII.2. -- PERCENTAGE DISTRIBUTION OF POPULATION ATTENDING
 PRIMARY SCHOOL (STD. 1 - 8) BY AGE AND SEX: MAINLAND AND ZANZIBAR, 1967*

AGE	Mainland			Zanzibar		
	Male	Female	Total	Male	Female	Total
5	0.67	0.79	0.71	1.53	1.55	1.54
6	2.09	2.44	2.23	4.26	6.16	5.04
7	5.11	6.05	5.48	9.68	13.50	11.24
8	7.86	9.93	8.66	11.75	15.19	13.16
9	9.65	11.52	10.37	7.87	15.20	12.09
10	12.06	13.71	12.71	11.60	13.46	12.41
11	8.46	10.07	9.09	5.60	6.31	6.13
12	13.47	13.05	13.31	10.03	9.10	9.65
13	10.25	10.12	10.20	6.36	5.33	6.34
14	9.22	8.04	8.76	7.02	4.96	6.18
15	7.89	5.86	7.11	6.65	3.58	5.33
16	5.35	3.65	4.69	4.71	2.25	3.70
17	3.20	1.93	2.71	3.30	0.73	2.33
18	2.41	1.31	1.90	3.15	0.59	2.10
19	1.04	0.52	0.84	1.29	0.23	0.86
20 - 24	1.26	0.96	1.14	2.51	0.38	1.58
Total	100	100	100	100	100	100

* Calculated from 1967 Census, Vol. 4, pp. 47 - 48.

APPENDIX VIII.3. — PERCENTAGE DISTRIBUTION OF POPULATION ATTENDING
SECONDARY SCHOOL (STD. 9 - 14) BY AGE AND SEX: MAINLAND AND ZANZIBAR, 1978

AGE	Mainland			Zanzibar		
	Male	Female	Total	Male	Female	Total
5	0.04	0.00	0.03	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00
7	0.19	0.02	0.13	0.00	0.00	0.00
8	0.01	0.29	0.10	0.00	0.02	0.01
9	0.04	0.31	0.12	0.00	0.07	0.03
10	0.24	0.34	0.27	0.00	0.05	0.02
11	0.05	0.04	0.05	0.00	0.00	0.00
12	0.23	0.15	0.20	0.01	0.02	0.01
13	0.52	0.81	0.61	2.36	3.34	2.76
14	1.50	4.20	2.36	10.81	17.29	13.48
15	5.31	9.18	6.55	21.26	27.38	23.78
16	8.72	17.73	11.61	20.72	24.40	22.23
17	13.88	19.93	15.82	14.99	12.44	13.94
18	20.78	20.40	20.66	16.49	9.86	13.76
19	14.15	12.76	13.70	5.74	3.07	4.64
20	15.35	7.58	12.66	4.92	1.28	3.42
21	8.15	3.17	6.55	1.33	0.46	0.97
22	5.42	1.47	4.15	0.97	0.26	0.68
23	3.41	1.22	2.71	0.31	0.08	0.22
24	2.01	0.40	1.49	0.08	0.00	0.05
Total	100	100	100	100	100	100

CHAPTER 9

ECONOMIC CHARACTERISTICS

by

H.K.R. Amari*

INTRODUCTION

The social and economic characteristics of any country can well be illustrated by basic data on size and composition of the working and non-working sections of the population. The economic characteristics as revealed by the 1978 census should provide the government, and particularly institution responsible for planning, an adequate base for economic planning in the following main areas. First, by uncovering the nature of employment the government should be in a better position to formulate proper or relevant employment policies. Second, detailed information on industry and occupation is critically required for manpower planning. Third, certain aspects of the national income accounts can be calculated from census data.

The usefulness of any census statistical results depend on the extent to which one overcomes several conceptual problems and non-sampling errors. However, such problems are not easy to overcome and the Tanzanian census of 1978 is no exception. Thus in order to prepare the reader to appreciate the actual data and related discussions in subsequent sections of this chapter, the next section of the chapter will present a brief discussion on the quality of data.

*The author is teaching at the University of Dar-es-Salaam. He is solely responsible for the views expressed in this chapter.

QUALITY OF CENSUS DATA

With regard to economic characteristics, one faces a conceptual problem of classifying the population into those who are economically active and those who are economically inactive. Such classification is often subjective, depending on what constitutes productive activity and to what extent a person is active. This is one of the many arbitrary decisions that have to be made in determining economic characteristics.

As the economically active and economically inactive populations are successively sub-classified, the arbitrariness of the census questions introduces new elements which require a more cautious interpretation of the data than appears on the face value of statistical results. A major difficulty lies in classification of those employed. A good example of this was the difficulty in classifying women who worked on family farms as employed instead of "home-makers".

There is the problem of determining the occupational and status classification of each worker. Often one must apply one's subjective judgement. The two classifications are artificial and rarely do they correspond to distinct groups in the population; thus there is hardly any reliable method of assessing the statistics. In addition, the conceptual problem of distinguishing between economic activity and economic status is another evidence of misclassification.

The difficulties in distinguishing the 'employed' from the 'unemployed' are apparent when one encounters the wide divergence between the unemployment rates in rural and urban areas. One can easily associate the term 'employed' with 'wage' employment which applies to a large sector of the urban situation. Consequently, the terms employed and unemployed can be appropriately distinguished in urban areas than in rural areas. A further difficulty is experienced when one has to include "casual workers" in the classification.

Another major problem is the interpretation of the questionnaire. Certain concepts like "occupation", "family worker", or "own-account-

worker" have no direct Swahili translation. It was therefore very difficult for enumerators to communicate with people they interviewed.

There is also a limit to which the census data can be used for planning exercise. Some terms such as 'employment' and 'unemployment' are inadequately defined and thus providing no clear-cut conclusions as to the nature and extent of unemployment. In addition, the occupational classification is too aggregated to be useful for manpower projections and national accounting.

Lastly, there is the general problem of applying census concepts, which are more applicable to industrialized countries, to a basically one with a large subsistence sector like Tanzania. Hence terms like employed, unemployed and working appeared to be ambiguous to many of the rural population.

However, the above limitations of the census data are not suggesting that data on economic characteristics are totally unreliable. There is still room for the data to be used quite effectively for economic planning. Only their use must take into account the limitations presented above.

COMPARISON BETWEEN THE 1967 AND 1978 CENSUSES

In the post-independence period, Tanzania has undertaken two censuses, one in 1967 and the other in 1978. One way of appraising changes in the social and economic conditions of the country is to compare the broad results on economic activity of the population, as obtained from the two censuses. However the comparison of the two censuses is almost impossible for two main reasons. One reason is that the two refer to different time periods. But the primary reason is the use of different concepts. In 1967, the labour force population was categorized into employed and unemployed. The remain-

ing population i.e., those not in the labour force, was categorised into homemakers, students and others. These economic activity groups were defined as follows:

- Employed: this is a person who is gainfully employed. This includes wage earners, self-employed people such as farmers, shop owners etc., pastoralists or family members with the duty of working in any of the above mentioned working categories. In addition, house wives who worked at least one third of the time worked by others were considered employed; persons temporarily absent from work because of illness, leave etc., were also considered as employed.
- Unemployed: anybody who was not working but was looking for work at the time of the census.
- Home-makers: persons who were engaged in household duties in their own home.
- Students: persons who were attending any regular educational institution.
- Income recipients: persons living from pensions, home-rents etc. without working.
- Others not Working: persons other than above mentioned e.g., the permanently sick persons, children not going to school.

The economically active population i.e., those who can engage in the production of goods and services constitute the 'employed' and the 'unemployed'. The employed were further classified into their economic status, occupation and industry. The economic status refers to the status of an economically active person with respect to his employment i.e. whether he is permanently employed, temporary employed, casually employed, own-account worker, or family worker. The definition of each of these is as follows:

Permanently employed: is a person who is employed throughout the year

Temporary employed: is a person who is employed for less than year but receives monthly salary during the working period.

Casually employed: is a person who works on a daily basic and is paid daily

Family worker: is a person who works without pay in an economic enterprise operated by another member of his household. Women who in addition to their household duties work on the family farms or in any family business for at least one third of the time worked by others are also included as family workers.

The occupation referred to the kind of work performed by an individual during the period of twelve months before the census. When one was engaged in seasonal work or in two or more kinds of job, the occupation was determined on the basis of the greatest time spent. The kind of establishment in which a person works irrespective of occupation or type of work performed by the person was recorded. The classification of the establishments into different industry groups was done later in the Central Statistical Bureau.

As for 1978, employment and unemployment categories were replaced by ones' main occupation and economic status. It was not just enough to determine whether one was employed or unemployed. It was thought more useful to know ones main occupation. Although this was also done in 1967, the occupational groups of 1978 are quite different. Table 9.1 shows the differences in the major occupation groups between 1967 and 1978 censuses.

TABLE 9.1.— MAJOR OCCUPATION GROUPS: 1967 AND 1978

1967	1978
1. Farmers, fishermen, hunters, loggers and related workers	1. Agriculture: (a) Cultivators (b) Livestock Rearing (c) Fishermen and Hunters (d) Mixed Agriculture
2. Professional, technical and related workers	2. Others: (a) Craftsmen and machine operators (b) Sales and Clerical Work (c) Professional, technical, teachers and related workers (d) Managers and administrators (e) Labourers (f) Other Workers (g) Students (h) Other unoccupied
3. Clerical workers	(i) Not stated
4. Sales Workers	
5. Administrative, executive and managerial workers	
6. Miners, quarrymen and related workers	
7. Workers in transport and Communication	
8. Craftsmen, production-process workers, labourers not elsewhere classified	
9. Service, sport, and recreation workers	
10. Workers not classifiable by occupation or not Stated.	

Also there were some differences in the classification of the population into economic status (Table 9.2).

TABLE 9.2.— ECONOMIC STATUS: 1967 AND 1978

1967	1978
1. Employer	1. Wage and Salary Employment: (a) Permanent employment (b) Temporary employment (c) Casual employment
2. Own-account	2. Others: (a) Own account enterprise or Shamba (b) Family Work including Shamba Work (c) Not stated.
3. Employee	
4. Family Worker	
5. Not Stated	

It does not make sense, therefore, to attempt strict comparison between the two censuses. The remaining part of this chapter will be mainly confined to the analysis of the 1978 census per se.

THE ECONOMICALLY ACTIVE POPULATION BY SEX AND OCCUPATION

The distribution of manpower among occupational categories shifts with industrialization, and as agriculture becomes more productive and releases resources for other economic activities. In developed countries like Japan, France and Canada, less than 20 percent of the total economically active population is engaged in agricultural sector, and that the contribution of agriculture to Gross domestic product (GDP) is very small as shown in Table 9.3.

TABLE 9.3.— CONTRIBUTION OF AGRICULTURE TO GDP, IN SELECTED COUNTRIES

Country	Agriculture as percent of GDP
Tanzania	50.0
Japan	0.1
Norway	4.0
Sweden	3.6
Australia	4.5
France	4.7
Canada	3.6

Sources: Ministry of Agriculture, Forestry and fisheries Statistical Yearbook, Japan 1977-78; Yearbook of Nordic Statistics, 1978; Institut National de la Statistique et des Etudes Economiques, Annuaire statistique de la France 1977, Paris France.

There is a very close relationship between the contribution of agriculture to GDP and the number of economically active population in the sector. The higher the share of agriculture in GDP the

higher the percentage of people involved in agricultural pursuits.

The population sizes by sex and occupation for the whole of Tanzania are presented in Table 9.4.

TABLE 9.4.— THE ECONOMICALLY ACTIVE POPULATION BY SEX AND OCCUPATION

WHOLE OF TANZANIA		
Occupation	Male %	Female %
1. Agriculture	79.1	95.1
2. Craft/machinery operators	6.1	0.3
3. Sales/clerical	3.7	1.0
4. Professionals/Technicians/Teachers	3.6	1.0
5. Managers/Administrators	0.5	0.1
6. Non agricultural labour	2.8	0.6
7. Other Workers	4.2	1.9
Total	100	100

The occupational structure presented in the Table 9.4, shows, in general terms, the kind of functions male and female workers perform in the Tanzanian economy. The producers of goods are mainly farmers, miners crafts and the like. The administrative, executive and managerial workers are decision makers; while the clerical and sale workers are conveyors of goods and services from producers to consumers.

Occupational Structure of the rural and urban population

In Table 9.5, the structure of the population by sex and also by rural-urban sector for the whole of Tanzania is presented.

TABLE 9.5.— ECONOMICALLY ACTIVE POPULATION BY SEX AND MAJOR OCCUPATION GROUPS, PERCENTS: 1978

Occupation group	Rural			Urban		
	Male	Female	Total	Male	Female	Total
1. Agriculture	86	97	93	15	28	23
2. Craft/Mach. operators	1	0	0	36	13	30
3. Sales/clerical	1	2	1	10	12	11
4. Professional/Technicians/ Teachers	2	2	2	16	18	18
5. Managerial Admin.	0	0	0	5	3	4
6. Non-agriculture labour	2	0	1	7	8	6
7. Other Workers	8	3	3	11	18	8
Total	100	100	100	100	100	100

The occupational structure in the rural areas is found to be significantly different from that of the urban areas, with 93 percent of the workers following agricultural occupations against 23 percent in urban areas. Compared to 1967 the urban population involved in the agricultural sector has increased by 10 percent. This is probably due to food shortage problems in the 1970s which forced urban residents to engage in agricultural production. The degree of urbanisation can be determined by the percentage of population in professional, administrative, clerical and secondary industries; and Table 9.5 shows that such a percentage is relatively higher in urban than in rural areas.

It is also interesting to observe the distribution of occupations by sex. Of women in urban areas, about 46 percent are engaged in skilled occupations i.e., categories 2, 3, 4 and 5; this is an increase of 17 percent over the corresponding figure in 1967. In comparison, about 63 percent of males in urban areas were engaged

in similar occupations, an increase of 34 percent over 1967¹. This is a dramatic change from the 1967 situation when a relatively large proportion of females was engaged in the professional, technical and related workers category. There are two possible reasons for this change. One is the difference in occupational categorization between 1967 and 1978. There were 10 major occupation groups in 1967 compared to only 7 in 1978. Some of the professional, technical and related workers may have been grouped in "wrong" categories. Another possible reason is the change in men's attitudes towards what are traditionally female jobs such as nursing and teaching. This has probably led to more males joining such professions.

Occupational Structure by Years of Schooling

In Table 9.6 agricultural occupations seem to require little educational background than non-agricultural occupations. Among the agricultural workers in Tanzania, about 79 percent had an education level less than 8 years. As the education level increases, fewer and fewer people participate in agricultural production. The opposite is the case with the non-agricultural occupations. This is an indication that non-agricultural occupations require higher levels of education. Thus 98 percent and 99 percent of all Form six and University graduates respectively were found in non-agricultural occupations. As Table 9.6 shows, the same picture can be seen in rural Tanzania, Urban Tanzania, Mainland Tanzania, and Rural and Urban Mainland. The overall picture for Zanzibar seems to follow suit. However in Rural Zanzibar, the percentage of University graduates in the agricultural sector is higher than that of Primary, Form IV or Form VI leavers.

¹See Bertil Egero and Roushdi A. Henin (eds.) The Population of Tanzania: An Analysis of the 1967 population census (Dar-es-Salaam: IRIALUP and Bureau of Statistics, 1973).

Years in School	Mainland Rural			Mainland Urban			Zanzibar			Zanzibar Rural			Zanzibar Urban		
	Agr.	Non-Agr.	Total	Agr.	Non-Agr.	Total	Agr.	Non-Agr.	Total	Agr.	Non-Agr.	Total	Agr.	Non-Agr.	Total
1 - 8	29.6	10.4	100	34.3	65.7	100	30.6	69.4	100	50.3	49.7	100	12	88	100
9 - 12	34.5	65.5	100	5.9	94.1	100	15.2	84.8	100	29.2	70.8	100	4.6	95.4	100
13 - 14	57.1	42.9	100	2.9	97.1	100	2.6	97.3	100	6.1	93.9	100	14	86	100
Primary School leavers	5.9	94.1	100	1.5	98.5	100	1.8	98.2	100	3.9	96.1	100	1.1	98.9	100
Form IV leavers	2.9	97.1	100	0.9	99.1	100	1.7	98.3	100	2.9	97.1	100	0.9	99.1	100
Form VI leavers	4.3	95.7	100	0.6	99.4	100	0	100	100	0	100	100	0	100	100
University Courses	2.8	97.2	100	0.6	99.4	100	1.5	98.5	100	6.0	94.0	100	0	100	100
Other Formal Education	89.5	10.5	100	12.6	87.4	100	0.9	99.1	100	0	100	100	1.1	98.9	100

In general, the major implication of this pattern is that agricultural sector which is the backbone of this country's economy is manned by people whose educational background is not sufficient to overcome the technical and institutional limitations that separate the performance of the sector and those found in developed countries like U.S.A., U.S.S.R. and Japan. For it is difficult for farmers with little education to make use of the professional competence (no matter how little there is) which probably represents their most single limiting resource in the generation and application of more productive inputs for agriculture.

Occupational Structure by Years of Schooling, Sex and Main Usual Occupation

There is a higher percentage of females with higher education in the agricultural sector than males. This is clearly shown by Table 9.7 below — whether one looks at the whole of Tanzania, or Mainland Tanzania. Zanzibar seems to be the only exception. Looking at the whole of Tanzania for example, only 0.8 percent of males with a University education are in the agricultural sector; this compares with 2.9 percent of females with same level of education. The same picture is given by Rural Tanzania. In the case of Zanzibar, none of the Form VI leavers works in the agricultural sector. This is probably because of high demand for people with such education to run government and parastatal organizations. It is possible that with more and more people reaching that level of education, the demand would decrease and some of them would find it profitable to work in the agricultural sector.

TABLE 9.7.— POPULATION 5 YEARS AND OVER IN THE WORK FORCE BY SEX AND EDUCATIONAL ATTAINMENT AND MAIN USUAL OCCUPATION, PERCENTS: 1978

Years in School	Whole of Tanzania						Urban Tanzania					
	Male			Female			Male			Female		
	Agr.	Non-Agr.	Agr.	Non-Agr.	Agr.	Non-Agr.	Agr.	Non-Agr.	Agr.	Non-Agr.	Agr.	Non-Agr.
1 - 8	72.6	27.4	90.6	9.4	86.1	13.9	95.6	4.4	22.4	77.6	26.7	73.3
9 - 12	15.6	84.4	22.2	77.8	32.5	67.5	46.4	53.6	4.9	95.1	6.1	93.9
13 - 14	14.5	85.5	24.8	75.2	55.4	44.6	51.9	48.1	1.7	98.3	0.8	99.2
Primary School												
Leavers	3.3	96.7	5.3	94.7	4.9	95.1	8.8	91.2	1.3	98.7	2.4	97.6
Form IV leavers	1.9	98.1	1.2	98.8	3.2	96.8	1.5	98.5	0.9	99.1	1.1	98.9
Form VI leavers	1.1	98.9	2.5	97.5	3.9	96.1	4.4	95.6	0.3	99.7	0.7	99.3
University Courses	0.8	99.2	2.9	97.1	2.0	98.0	9.8	90.2	0.5	99.5	0.2	99.8
Other formal education	54.1	45.9	86.7	13.3	84.4	15.6	96.3	3.7	6.6	93.4	8.6	91.4

Agr. = Agriculture

Non-Agr. = Non-Agriculture

TABLE 9.7.—CONTINUED

Years in School	Mainland Tanzania				Mainland Rural				Mainland Urban			
	Male		Female		Male		Female		Male		Female	
	Agr.	Non-Agr.	Agr.	Non-Agr.	Agr.	Non-Agr.	Agr.	Non-Agr.	Agr.	Non-Agr.	Agr.	Non-Agr.
1-8	73.2	26.8	90.8	9.2	86.4	13.6	95.6	4.4	22.7	77.3	64.7	35.3
9-12	15.7	84.3	20.8	79.2	32.9	67.1	43.5	56.5	1.9	98.1	10.2	89.8
13-14	15.1	84.9	26.2	73.8	57.5	42.5	53.4	46.6	1.7	98.3	10.9	89.1
Primary School leavers	3.3	96.7	5.3	94.7	4.9	95.1	8.8	91.2	1.3	98.7	1.8	98.2
Form IV leavers	1.8	98.2	1.2	98.8	3.2	96.8	1.4	98.6	0.9	99.1	1.1	98.9
Form VI leavers	1.2	98.8	2.6	97.4	4.3	95.7	4.5	95.5	0.3	99.7	2.4	97.6
University courses	0.8	99.2	3.0	97.0	1.9	98.1	10.4	89.6	0.5	99.5	1.7	98.3
Other formal education	54.7	45.3	86.9	13.1	84.7	15.3	96.3	3.7	6.7	93.3	38.9	61.1

Agr. = Agriculture

Non-Agr. = Non-Agriculture

TABLE 9.7.—Continued

Years in School	Zanzibar						Zanzibar Urban					
	Zanzibar Rural			Zanzibar Urban			Zanzibar Rural			Zanzibar Urban		
	Male	Female		Male	Female		Male	Female		Male	Female	
	Agr. Non-Agr.	Agr. Non-Agr.	Agr. Non-Agr.	Agr. Non-Agr.	Agr. Non-Agr.	Agr. Non-Agr.	Agr. Non-Agr.	Agr. Non-Agr.	Agr. Non-Agr.	Agr. Non-Agr.	Agr. Non-Agr.	Agr. Non-Agr.
1 - 8	27.1	62.9	59.1	10.9	59.3	10.7	85.4	14.6	14.6	11.6	85.4	24.9
9 - 12	19.3	80.7	29.2	70.8	37.0	63.0	56.6	43.4	43.4	5.9	94.1	9.2
13 - 14	2.4	97.6	1.3	98.7	5.4	94.6	0	100	100	1.4	98.6	1.5
Primary School												
Leavers	1.7	98.3	1.1	98.9	3.7	96.3	0	100	100	1.1	98.7	1.3
Form IV leavers	1.7	98.3	1.6	98.4	3.8	96.2	13.3	86.7	86.7	0.6	99.4	0
Form VI leavers	0	100	0	100	0	100	0	100	100	0	100	0
University Courses	1.3	98.7	0	100	4.9	95.1	0	100	100	0	100	0
Other formal education	1.5	98.5	0.6	100	0	100	0	100	100	1.8	98.2	6.3
												93.7

Agr. = Agriculture

Non-Agr. = Non-Agriculture

Population by Economic Activity in the Agricultural Occupation

The agricultural occupation can be sub-divided into: Cultivators, Livestock rearing, Fishing and hunting, Mixed Agriculture and Agricultural Labour. These are presented in Table 9.8. The dominant activity is cultivation. A little over 90 percent of all agricultural producers are cultivators while only about 5 percent are mixed farmers. Livestock rearing and, fishing and hunting have

TABLE 9.8.— POPULATION AGE 15 AND OVER BY ECONOMIC ACTIVITY: AGRICULTURAL OCCUPATION, PERCENT: 1978

Agricultural Occupation	Whole of Tanzania	Rural Tanzania	Urban Tanzania
Cultivators	91.5	91.4	92.8
Livestock rearing	0.7	0.7	0.3
Fishing and hunting	0.7	0.7	1.1
Mixed Agriculture	5.6	5.8	2.9
Agriculture labour	1.5	1.4	2.9
Total	100	100	100

more or less the same weight. Agricultural labour force i.e., those whose main activity is to work for a wage, is only 1.5 percent although the percentage is higher (2.9 percent) in Urban Tanzania. It is clear from these figures that the agricultural sector is almost wholly dominated by crop production. Little effort is devoted to livestock production although the country has about 13 million heads of cattle, and a few goats and sheep. The custom of feeding livestock on open grazing land does not require much labour.

Agricultural Population by Occupation and by Sex

Comparing male and female population by the type of agricult-

ural occupation they perform is probably the best way of looking into the division of labour between the two sexes. As Table 9.9 shows about 88 percent of all males and 95 percent of all females in the agricultural sector are cultivators. For livestock rearing

TABLE 9.9.— PERCENT OF AGRICULTURAL POPULATION BY OCCUPATION AND BY SEX: 1978

Agricultural Occupation	Whole of Tanzania		Rural Tanzania		Urban Tanzania	
	Male	Female	Male	Female	Male	Female
Cultivators	87.6	94.6	87.6	94.4	86.7	96.3
Livestock rearing	0.8	0.6	0.9	0.6	0.5	0.2
Fishing and hunting	1.4	0.2	1.3	0.2	2.7	0.1
Mixed Agriculture	7.5	4.1	7.6	4.3	4.6	2.0
Agriculture labour	2.7	0.5	2.6	0.5	5.5	1.4
Total	100	100	100	100	100	100

the difference between the two is very small. However for fishing and hunting, agriculture labour and to a less extent, mixed agriculture there is some significant difference. Only 0.2 percent of females participate in fishing and hunting compared to 1.4 percent of male participants. Most of the agricultural labour seems to come from males, with 2.7 percent compared to 0.5 percent from females. These figures seem to conform to the belief that fishing and hunting, and agriculture labour require courage and endurance, qualities which, it is believed, few women possess.

Economically Active Population in the Agricultural Sector by age and Sex

Agricultural production and productivity depend, to some

extent, on the health of participants especially young people and their sex. It has often been shown that old farmers do not have the strength to work in the agricultural sector that his is highly labour intensive. It is also believed that certain agricultural activities require a lot of energy and strength that can only be provided by young men. This is not to suggest that females do not have an important role in the agricultural sector. On the contrary, they probably play a greater role than men. In developing the sector, however, the role of men should be increased. This is true of most countries with a modernized agricultural sector. Table 9.10 presents the age group and sex of the economically active population in the agricultural sector. It is clear from the table that female participants dominate the sector in all ages between 15 and 54; this is true for the whole of Tanzania, Rural Tanzania and Urban Tanzania. Beyond age 55 male participants dominate the sector. It is therefore true that sex differences affect the agricultural sector at different ages and that male participants can work much longer in their life than females.

Work force by Economic status and Educational attainment

There seems to be a direct relationship between the level of education and economic status². This is clearly indicated by

²In 1978, no data were collected for "employer" category.

TABLE 9.10.— PERCENT OF ECONOMICALLY ACTIVE POPULATION IN THE AGRICULTURAL SECTOR, BY AGE AND SEX: 1978

Age Group	Whole of Tanzania		Rural Tanzania		Urban Tanzania	
	Male	Female Total	Male	Female Total	Male	Female Total
15-19	34.0	66.0	34.3	65.7	30.1	69.9
20-24	37.1	62.9	37.6	62.6	30.5	69.5
25-29	40.4	59.6	41.0	59.0	31.8	68.2
30-34	43.8	56.2	42.4	57.6	33.2	66.2
35-39	47.8	52.2	45.4	54.6	36.1	63.9
40-44	44.0	56.0	44.4	55.6	37.6	62.4
45-49	47.7	52.3	48.1	51.9	40.3	59.7
50-54	46.2	53.8	48.6	51.4	42.0	58.0
55-59	54.2	45.8	54.3	45.7	51.5	48.5
60-64	52.1	47.9	52.1	47.9	47.9	52.1
65-69	56.2	43.8	56.4	43.6	52.3	47.7
70+	63.8	36.2	63.9	36.1	59.1	40.9

Table 9.11. Of the population in the work force with up to 8 years of schooling, 64 percent were operating their own economic enterprise or were engaged independently in a profession or trade. This group is followed by family workers and permanent employees with 15 percent and 13 percent respectively. Casual employees are only about 2 percent of the work force with that educational level. As the educational level increases, however, the proportions between own-account and permanent employment are reversed. The percentage of permanent employment increases while that of own-account decreases. Maybe the easiness with which the higher educated groups get employed, coupled with the educational system which prepares high level graduates for employment, explains this tendency. There is also a continuous decline in the family work status; the higher the educational level the fewer the number of people in those levels participating as family workers. A more or less similar tendency is observed under temporary and casual employment. These patterns hold for the whole of Tanzania, Rural Tanzania and Urban Tanzania as shown in the table.

Work Force Economic status, sex and Educational Attainment

Appendix IX.1 (a) (i) and (ii) present the male and female population respectively by economic status and educational attainment for the whole of Tanzania. The pattern of relationship between economic status and educational attainment in each case is the same as that described in the previous section, namely, the higher the educational attainment, the fewer the work force in own-account and the more in permanent employment, with family work following the same pattern; the temporary and casual economic status categories follow more or less the same pattern. The same observations apply to Appendix IX.1(b) and (c) and Appendix IX.2 (a) - (c) which shows the population in the work force by economic status, sex and educational attainment for whole of Tanzania and Mainland Tanzania.

TABLE 9.11. POPULATION 5 YEARS AND OVER IN THE WORK FORCE BY ECONOMIC STATUS AND EDUCATIONAL ATTAINMENT

WHOLE OF TANZANIA: 1978

Years in School	Permanent Employment	Temporary Employment	Casual Employment	Own-account	Family Work	Total
1-8	13.3	5.6	1.9	64.3	14.9	100
9-12	72.4	6.4	1.3	16.9	3.0	100
13-14	77.9	5.0	0.8	14.8	1.5	100
Primary school leavers	90.7	3.9	0.4	3.8	1.2	100
Form IV leavers	94.5	1.9	0.2	3.2	0.2	100
Form VI leavers	90.5	4.5	2.4	2.1	0.5	100
University courses	91.0	4.7	1.9	1.7	0.7	100
Other formal education	30.9	3.3	1.7	52.1	1.2	100

TABLE 9.11. — Continued

RURAL TANZANIA

Years in School	Permanent Employment	Temporary Employment	Casual Employment	On-account	Family Work	Total
1 - 8	5.9	3.9	1.5	72.1	16.6	100
9 - 12	56.9	5.9	1.7	29.9	5.6	100
13 - 14	41.2	7.3	1.8	45.6	4.1	100
Primary School leavers	90.2	2.4	0.4	5.1	1.9	100
Form IV leavers	93.9	1.3	0.1	4.7	0	100
Form VI leavers	89.7	6.3	0	4.0	0	100
University Courses	93.3	4.3	0	2.4	0	100
Other formal education	11.0	1.6	1.5	70.5	15.4	100

TABLE 9.11.--- Continued

URBAN TANZANIA

Year in School	Permanent Employment	Temporary Employment	Casual Employment	Own-account	Family Work	Total
1 - 8	44.4	12.9	3.6	31.5	7.6	100
9 - 12	81.9	6.6	1.0	9.0	1.5	100
13 - 14	90.5	4.3	0.4	4.2	0.6	100
Primary school leavers	91.3	5.6	0.4	2.3	0.4	100
Form IV leavers	94.9	2.3	0.3	2.2	0.3	100
Form VI leavers	90.7	4.0	3.1	1.5	0.7	100
University courses	90.4	4.9	2.4	1.5	0.8	100
Other formal education	74.3	6.9	2.1	11.9	4.8	100

In Appendix IX.3 the population in the work force by economic status, sex and educational attainment is shown for Zanzibar, Rural Zanzibar and Urban Zanzibar. Unlike Mainland Tanzania, casual employment and family work is totally confined to those below Form IV leavers. Not only that but permanent employment is more dominant here than it is in the Mainland. Own-account work force almost competes with temporary employment except for the educational levels higher than Form VI when graduates show an absolute preference of temporary employment over own-account. There is also a striking difference between casual employment status between males and females in the work force, especially in Urban Tanzania. Here, zero percent of females with different levels of education in the work force is engaged in casual employment. As for male population, there are some, with below Form IV, who are casually employed.

In general, however, the patterns that were observed in the Whole of Tanzania and Mainland Tanzania also apply here. People with higher education prefer permanent employment. The only exception, perhaps, is that in Zanzibar, permanent employment seems to surpass all other categories at almost all levels of education.

CONCLUSIONS

This chapter has broadly, and may be vaguely, discussed the economic characteristics of the 1978 population census in Tanzania. The vagueness of the discussion may be a result of the problems in the quality of data, as well as of the problems involved in defining the concepts used. These problems were outlined in the earlier sections of the chapter.

The chapter has also failed to thoroughly compare the results of the 1978 census with those of the 1967 population census. The failure is due to differences in the definitions of some concepts, occupational categories, different age groups used, economically active popu-

lation etc. The same can be said of the comparison between the results of the 1978 population census and population census in other countries. Nor was there any attempt to carry the discussion further down to cover regions. To do this would make the chapter too long, if not repetitive. The author thought that a broader and general discussion would be sufficient for readers to grasp the major economic characteristics of Tanzania as a whole, Mainland Tanzania and Zanzibar. The breakdown of these into rural and urban areas facilitated a little more detailed discussion of the economic characteristics of the country.

As it was in 1967, the population census of 1978 has shown that the agricultural sector is still a dominant sector in Tanzania, particularly in the rural areas. With food shortages in the early 1970's, the sector has also grown in urban areas, though by no means, close to other major occupation groups. In the agricultural sector the role of women is as important, if not more important, than that of men.

Such information is quite relevant for policy makers who often have to choose among various investment opportunities. Since agriculture is the main employer of the population in the work force, and since it is, at least up to now, the backbone of the country's economy, due emphasis should be given for its development.

APPROXIMATE DATA ON POPULATION 3 YEARS AND OVER IN THE WORK FORCE
BY ECONOMIC STATUS, SEX AND EDUCATIONAL ATTAINMENT

(a) Whole of Tanzania

(i) Male Population

Years in School	Permanent employment	Temporary Employment	Casual employment	Own Account	Family Work	Total
1 - 8	17.40	7.4	2.5	67.5	5.2	100
9 - 12	73.4	6.5	1.3	17.4	1.4	100
13 - 14	79.4	5.1	0.7	14.4	0.4	100
Primary School Leavers	90.6	4.5	0.5	4.3	0.1	100
Form IV	94.3	1.8	0.1	3.5	0.3	100
Form VI	90.8	4.3	2.7	2.0	0.2	100
University Course	91.3	4.6	2.0	1.7	0.5	100
Other formal education	40.7	4.5	2.4	51.5	0.9	100

APPENDIX IX.1. -- CONTINUED

(ii) Female Population

Years in school	Permanent employment	Temporary employment	Casual employment	Own Account	Family Work	Total
1 - 8	5.2	2.2	0	57.9	34.7	100
9 - 12	67.9	5.9	1.1	14.9	10.2	100
13 - 14	69.2	4.8	1.0	16.8	8.2	100
Primary school leavers	91.1	2.7	0	3.1	3.1	100
Form IV Leavers	95.0	1.9	0	2.2	0.9	100
Form VI Leavers	88.2	5.9	0	2.3	3.6	100
University Course	87.6	6.2	1.3	1.9	3.0	100
Other formal education	11.8	0	0	53.4	34.9	100

(b) Rural Tanzania

(1) Male population

Years in school	Permanent employment	Temporary employment	Casual employment	Own Account	Family Work	Total
1 - 8	7.2	5.3	2.1	76.8	0	100
9 - 12	59.0	6.5	1.8	36.3	2.4	100
13 - 14	41.9	6.7	2.3	49.0	0.1	100
Primary School Leavers	90.8	2.8	0.5	5.7	0.2	100
Form IV Leavers	93.6	1.3	0.1	5.0	0	100
Form VI Leavers	89.5	6.5	0	4.0	0	100
University course	93.9	4.3	0	1.8	0	100
Other formal education	15.6	2.7	2.4	78.6	0.7	100

APPENDIX II.1. -- CONTINUED

(ii) Female Population

Years in school	Permanent employment	Temporary employment	Casual employment	Own Account	Family Work	Total
1 - 8	2.2	1.2	0	59.8	36.8	100
9 - 12	46.1	3.6	1.3	27.7	21.3	100
13 - 14	38.2	9.9	0	32.0	19.9	100
Primary School Leavers	88.7	1.3	0	3.6	6.4	100
Form IV Leavers	95.6	1.2	0	3.0	0.2	100
Form VI Leavers	92.8	2.9	0	4.3	0	100
University courses	85.9	4.2	0	9.9	0	100
Other formal education	4.5	0	0	59.0	36.5	100

APPENDIX II.1. — CONTINUED

(a) Urban Tanzania

(1) Male Population

Years in school	Permanent employment	Temporary employment	Casual employment	Own Account	Family work	Total
1 - 8	53.2	14.9	4.1	25.5	2.3	100
9 - 12	82.7	6.7	1.0	9.2	0.4	100
13 - 14	91.2	4.6	0.2	3.6	0.4	100
Primary School Leavers	90.4	6.5	0.5	2.5	0.1	100
Form IV Leavers	94.9	2.3	0.2	2.4	0.2	100
Form VI Leavers	91.3	3.7	3.5	1.4	0.1	100
University course	90.7	4.7	2.5	1.7	0.4	100
Other formal education	80.0	7.4	2.4	8.9	1.3	100

APPENDIX II.1. - CONTINUED

(11) Female Population

Years in school	Permanent employment	Temporary employment	Casual employment	Own Account	Family work	Total
0 - 8	20.9	7.9	2.3	47.4	21.5	100
9 - 12	73.0	7.2	1.1	8.5	4.2	100
13 - 14	85.9	2.1	1.6	8.5	1.9	100
Primary school leavers	93.4	3.4	0	1.8	1.4	100
Form IV leavers	94.7	2.2	0	1.8	1.3	100
Form VI leavers	87.6	6.2	0	2.1	3.9	100
University course	87.9	6.6	1.6	0	3.9	100
Other formal education	48.5	5.2	0	25.6	20.5	100

APPENDIX 11.2. - POPULATION 5 YEARS AND OVER IN THE FOUR FORMS BY EMPLOYMENT STATUS, SEX AND EDUCATIONAL ATTAINMENT

(a) Mainland Tanzania

(i) Male Population

Years in school	Permanent employment	Temporary employment	Casual employment	Own Account	Family work	Total
1 - 9	37.3	15.9	5.5	29.7	11.6	100
9 - 12	74.1	5.7	1.3	17.6	1.3	100
13 - 14	79.1	4.8	0	16.1	0	100
Primary School Leavers	90.5	4.5	0	5.0	0	100
Form IV leavers	94.3	1.9	0	3.8	0	100
Form VI leavers	90.7	4.3	2.8	2.2	0	100
University course	91.4	4.5	2.0	1.9	0.2	100
Other formal education	40.2	4.3	2.5	52.1	0.9	100

APPENDIX II.2. - CONTINUED

(ii) Female population

Years in school	Permanent employment	Temporary employment	Casual employment	Own account	Family work	Total
1 - 8	5.0	2.2	0	5.8	34.8	100
9 - 12	69.9	5.6	1.3	13.2	10.0	100
13 - 14	67.4	4.8	1.1	17.9	8.8	100
Primary School Leavers	94.0	2.4	0	2.6	4.0	100
Form IV Leavers	95.0	1.9	0	0	3.1	100
Form VI Leavers	88.1	5.7	0	2.4	3.8	100
University courses	87.4	6.3	1.3	2.0	3.0	100
Other formal education	11.6	0	0	53.6	34.8	100

(b) Rural Mainland

(1) Male population

Years in school	Permanent employment	Temporary employment	Casual employment	Own Account	Family work	Total
1 - 3	24.5	16.7	6.7	33.1	19	100
9 - 12	60.0	4.9	1.9	31.1	2.1	100
13 - 14	40.7	5.5	2.4	51.4	0	100
Primary School Leavers	50.8	2.8	0.4	6.0	0	100
Form IV Leavers	93.6	1.3	0	5.1	0	100
Form VI Leavers	88.7	7.0	0	4.3	0	100
University course	93.9	4.3	0	1.8	0	100
Other formal education	45.2	2.7	2.5	79.6	0	100

APPENDIX II.2. -- CONTINUED

(ii) Female Population

Years in school	Permanent employment	Temporary employment	Casual employment	Own Account	Family work	Total
1 - 8	2.2	1.1	0	59.8	36.9	100
9 - 12	50.3	1.8	1.4	25.1	21.4	100
13 - 14	37.6	9.1	0	32.8	20.5	100
Primary school leavers	88.7	1.3	0	3.6	6.4	100
Form IV Leavers	95.7	1.2	0	3.1	0	100
Form VI Leavers	92.5	3.0	0	4.5	0	100
University course	85.2	4.4	0	10.4	0	100
Other formal education	4.5	0	0	58.9	36.6	100

(e) Urban Malawi

(1) Male population

Years in school	Permanent employment	Temporary employment	Casual employment	Own Account	Family Work	Total
1 - 8	53.7	15.0	4.1	25.7	2.5	100
9 - 12	82.9	6.3	0.1	10.7	0	100
13 - 14	91.0	4.6	0	4.4	0	100
Primary School Leavers	90.2	6.6	0	3.2	0	100
Form IV Leavers	94.9	2.3	0	2.8	0	100
Form VI Leavers	91.3	3.6	3.6	1.5	0	100
University Course	90.7	4.6	2.6	2.1	0	100
Other formal education	80.2	6.9	2.4	9.2	1.3	100

APPENDIX II.1. — CONTINUED

(ii) Female Population

Years in school	Permanent employment	Temporary employment	Casual employment	Own Account	Family work	Total
1 - 8	20.2	7.9	2.4	47.8	21.7	100
9 - 12	79.0	7.3	1.3	7.7	4.7	100
13 - 14	84.7	2.3	1.8	9.2	2.0	100
Primary School Leavers	93.4	3.5	0	1.8	1.3	100
Form IV Leavers	94.6	2.2	0	3.2	0	100
Form VI Leavers	87.7	6.0	0	2.2	4.1	100
University courses	87.7	6.7	1.6	0	4.0	100
Other formal education	47.8	5.2	0	26	21.0	100

(a) Male(i) Male population

Years in school	Permanent employment	Temporary employment	Casual employment	Own account	Family work	Total
1 - 8	47.8	16.9	2.8	30.7	1.8	100
9 - 12	67.4	13.1	1.2	15.8	2.5	100
13 - 14	86.4	10.6	0	3.0	0	100
Primary School Leavers	94.5	2.6	0	2.9	0	100
Form IV Leavers	94.5	2.9	0	2.6	0	100
Form VI Leavers	96.7	3.3	0	0	0	100
University course	89.9	10.1	0	0	0	100
Other formal education	77.9	22.1	0	0	0	100

APPENDIX II.3. - CONTINUED

(11) Female population

Years in school	Permanent employment	Temporary employment	Casual employment	Own Account	Family work	Total
1 - 8	27.6	7.7	1.1	42.7	20.9	100
9 - 12	52.6	7.9	0	23.0	16.5	100
13 - 14	93.6	5.1	0	1.3	0	100
Primary School Leavers	94.5	1.1	0	4.4	0	100
Form IV Leavers	95.9	1.2	0	1.2	1.7	100
Form VI Leavers	99.9	11.1	0	0	0	100
University course	100	0	0	0	0	100
Other formal education	87.6	6.2	0	6.2	0	100

(b) Rural Menzibar

(1) Male population

Years in school	Permanent employment	Temporary employment	Casual employment	Own account	Family Work	Total
1 - 8	26.4	23.5	3.8	44.1	2.2	100
9 - 12	51.4	19.4	1.2	24.0	4.0	100
13 - 14	64.2	29.6	0	6.2	0	100
Primary School Leavers	93.3	2.7	0	4.0	0	100
Form IV leavers	93.3	2.6	1.3	2.6	0.2	100
Form VI leavers	100	0	0	0	0	100
University course	88.6	5.7	0	5.7	0	100
Other formal education	100	0	0	0	0	100

APPENDIX II.3. - CONTINUED

(11) Female population

Years in school	Permanent employment	Temporary employment	Casual employment	Own Account	Family work	Total
1 - 8	6.2	6.4	1.2	53.6	32.6	100
9 - 12	31.1	9.7	0	27.1	22.1	100
13 - 14	63.6	36.4	0	0	0	100
Primary School Leavers	100	0	0	0	0	100
Form IV Leavers	86.7	0	0	0	13.3	100
Form VI Leavers	100	0	0	0	0	100
University course	100	0	0	0	0	100
Other formal education	0	0	0	0	0	0

(c) Urban Leavers(1) Male population

Years in school	Permanent employment	Temporary employment	Casual employment	Own Account	Family work	Total
1 - 8	68.1	10.7	1.9	17.9	1.4	100
9 - 12	79.6	8.2	1.1	9.6	1.5	100
13 - 14	94.6	3.6	0	1.8	0	100
Primary School Leavers	94.9	2.4	0	2.7	0	100
Form IV Leavers	95.4	3.1	0	6.8	0.7	100
Form VI Leavers	92.2	7.8	0	0	0	100
University courses	90.4	9.6	0	0	0	100
Other formal education	72.3	27.7	0	0	0	100

APPENDIX II.3. -- CONTINUED

(ii) Female population

Years in school	Permanent employment	Temporary employment	Casual employment	Own Account	Family work	Total
1 - 8	55.4	9.4	0	28.5	6.7	100
9 - 12	78.7	6.6	0	12.7	2.0	100
13 - 14	98.5	0	0	1.5	0	100
Primary School Leavers	93.8	1.3	0	4.9	0	100
Form IV Leavers	97.2	1.4	0	1.4	0	100
Form VI Leavers	88.0	12	0	0	0	100
University course	100	0	0	0	0	100
Other formal education	87.4	6.3	0	6.3	0	100

CHAPTER 10

MORTALITY LEVELS

by

I.S.L. Sembajwe*

INTRODUCTION

During the 1978 population census of Tanzania, a wide range of information on mortality was collected; more than in any other census in the past¹. This fact, together with the increasing number of techniques for deriving indirect estimates of mortality, provides better chances of making plausible mortality estimates for the country. The information available, however, continues to be bedevilled by a number of errors which mainly arise from misreporting. Therefore any effort to make demographic estimates under such conditions, should be regarded as another attempt to overcome estimation problems existing in a country like Tanzania.

Current information on mortality was not collected during the 1978 population census. This omission was warranted by the unreliability of this type of information collected during the 1967 population census and the 1973 National Demographic Survey². Therefore the mortality estimates produced in this chapter are based on information on the number of children reported surviving among those ever born alive

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¹Central Statistical Bureau, Tanganyika African Census Report, 1957, Dar-es-Salaam, 1963; B. Egero and R.A. Herin (eds.) The Population Tanzania, (Dar-es-Salaam: BRAJUP and Bureau of Statistics, 1973), and Bureau of Statistics, The 1978 Population Census, Vol. I, 1981.

²Current data on mortality (i.e., the number of persons reported dead during the 12 months preceding the census or the survey by age and sex) suffered from a high degree of underreporting. This indicated that the causes of underreporting were more serious than a simple misinterpretation of the reference period. For further discussion of this aspect, see B. Egero, and R.A. Herin, "Mortality", in B. Egero and R.A. Herin (eds.) The Population of Tanzania, 1973, op.cit., p.176 and H.R. Herin and M. Fernal, "Current, Widowhood and other mortality Data", in R.A. Herin (ed.) The Demography of Tanzania, (Dar-es-Salaam: Bureau of Statistics and BRAJUP, 1977), p.199.

by women in different age groups, and on reports of survival of mother and wife or husband by eligible respondents in various age groups.

The analysis was somewhat affected by lack of overall data for Tanzania Mainland, Zanzibar, Tanzania as a whole and for each of the regions in the country because the census tabulations were produced based on sample data for rural and urban areas separately in each region. Given the numerous sub-divisions, 50 rural and urban sub-divisions, it was not possible to test the different methods of estimation and appraise the data on each of the sub-divisions. This work should wait for later extended analysis which may possibly develop into a monograph. The testing of the methods and the appraisal of data were therefore carried out on a few selected areas, and the methods for making final estimates as well as the type of data deemed suitable for the final analysis were then selected and examined for each sub-division.

After estimates for each of the sub-divisions were made, an overall estimate was derived for each region, Tanzania Mainland, Zanzibar and Tanzania using sample raising factors given in Appendix X.1. For example, an estimate for Tanzania urban was obtained using the following formula:

$$q_2 \text{ (Tanzania Urban)} = \frac{\sum_{i=1}^{20} (q_2^{u,i} w_{u,i}) + \sum_{j=1}^5 (q_2^{u,j} w_{u,j})}{\sum_{i=1}^{20} w_{u,i} + \sum_{j=1}^5 w_{u,j}}$$

where i and j are the number of regions in Tanzania Mainland and Zanzibar respectively, with i ranging from 1 to 20 and j ranging from 1 to 5;

$q_2^{u,i}$ is the probability of dying between age 0 and age 2 in the urban area in region i ;

$q_2^{u,j}$ is the probability of dying between age 0 and age 2 in the urban area in region j ;

$W_{u, i}$ is the urban sample raising factor for region i ; and
 $W_{u, j}$ is the urban sample raising factor for region j .

Since the proportion of the urban population in Tanzania is small, estimates made for rural areas were identical to overall estimates for Tanzania Mainland, Zanzibar and Tanzania as a whole and for all regions except for Dar-es-Salaam and Zanzibar Town/West regions. In these two regions the population is predominantly urban while the rural component is small so that the estimates for urban areas were almost identical to the overall estimates for each region.

METHODS OF ESTIMATION AND APPRAISAL OF DATA

The information on children surviving of those ever born alive by females in five year age groups is useful for estimating infant and child mortality. Methods developed to derive childhood mortality from this type of data were utilized and will be discussed in the next sub-section.

The information on survival of mother (orphanhood status) and survival of first wife or first husband (widowhood status) is useful for estimating adult mortality. Methods for deriving adult mortality estimates from this type of data have been developed over the last decade and have assisted to fill a gap on adult mortality whose estimates in the past depended on mere guesses or on assuming a mortality pattern in model life tables that closely matched estimates on infant and child mortality.

Information on Children Surviving

The Brass method together with modifications made by Sullivan and Trussell were considered for application to data on children survi-

TABLE 10.1.— VALUES OF $q(x)$ DERIVED FROM PROPORTIONS OF CHILD DEAD
USING BRASS AND TRUSSELL METHODS¹

Areas	Age x	Brass Estimates		Trussell Estimates	
		R	U	R	U
Dodoma	2	.2173	.1275	.2126	.1245
	3	.2069	.1363	.1921	.1273
	5	.2433	.1722	.2351	.1672
Arusha	2	.1428	.1316	.1384	.1270
	3	.1556	.1089	.1466	.1023
	5	.1819	.1235	.1783	.1210
Kilimanjaro	2	.0953	.0919	.0951	.0888
	3	.1113	.1066	.1056	.1006
	5	.1249	.1208	.1213	.1188
Tanga	2	.1587	.1339	.1504	.1292
	3	.1733	.1326	.1620	.1241
	5	.1935	.1465	.1904	.1431
Morogoro	2	.1945	.1576	.1856	.1499
	3	.2257	.1734	.2096	.1619
	5	.2555	.2243	.2498	.2200
Coast	2	.1743	.1634	.1676	.1522
	3	.1968	.1689	.1781	.1574
	5	.2195	.1972	.1754	.1948
Dar-es-Salaam	2	.1750	.1287	.1593	.1263
	3	.1971	.1480	.1811	.1377
	5	.2325	.1666	.2294	.1634
Lindi	2	.2161	.1607	.2041	.1521
	3	.2632	.1890	.2353	.1762
	5	.2806	.2009	.2763	.1977
Mtwara	2	.2207	.1452	.2074	.1368
	3	.2482	.1718	.2319	.1597
	5	.2971	.2185	.2935	.2147
Ruvuma	2	.2105	.1208	.2101	.1129
	3	.2417	.1917	.2224	.1800
	5	.2646	.2125	.2532	.2108
Iringa	2	.2002	.1622	.1943	.1564
	3	.2345	.1794	.2219	.1672
	5	.2442	.1910	.2401	.1862
Mbeya	2	.2219	.1660	.2171	.1610
	3	.2658	.2027	.2469	.1899
	5	.2877	.2350	.2783	.2293

TABLE 10.1.— (Continued)

Areas	Age x	Brass Estimates		Trussal Estimates	
		R	U	R	U
Singida	2	.1799	.1439	.1842	.1400
	3	.2167	.1715	.2020	.1609
	5	.2292	.1906	.2176	.1861
Tabora	2	.2033	.1632	.1906	.1556
	3	.2091	.1657	.1940	.1528
	5	.2381	.2072	.2337	.2014
Rukwa	2	.2253	.1672	.2080	.1654
	3	.2678	.1871	.2525	.1746
	5	.2960	.2261	.2960	.2185
Igoma	2	.1845	.1318	.1818	.1261
	3	.2071	.1590	.1940	.1487
	5	.2509	.1800	.2334	.1764
Shinyanga	2	.2238	.1370	.2165	.1311
	3	.2089	.1379	.1950	.1291
	5	.2198	.1558	.2145	.1527
West Lake	2	.1770	.1263	.1754	.1225
	3	.2052	.1409	.1923	.1325
	5	.2401	.1798	.2321	.1761
Manza	2	.2438	.1156	.2303	.1112
	3	.1905	.1491	.1725	.1384
	5	.2083	.1694	.1988	.1648
Rara	2	.1931	.1509	.1839	.1428
	3	.2055	.1638	.1918	.1526
	5	.2360	.2031	.2313	.1992
Lanzibar N	2	.1978	.1518	.1764	.1363
	3	.2264	.1500	.2062	.1319
	5	.2412	.1746	.2370	.1637
Lanzibar S	2	.1671	.1911	.1543	.1838
	3	.1793	.1582	.1599	.1468
	5	.2086	.2426	.1971	.2362
Lanzibar T/W	2	.1048	.1353	.0986	.1292
	3	.1555	.1476	.1428	.1340
	5	.1606	.1563	.1562	.1489
Pemba N	2	.1478	.1536	.1338	.1433
	3	.1770	.1536	.1628	.1397
	5	.1972	.1833	.1949	.1767
Pemba S	2	.1442	.1187	.1278	.1164
	3	.1345	.1147	.1225	.1054
	5	.1748	.1355	.1721	.1302

¹R represents Rural
 U represents Urban
 T/W represents Town/West

N represents North
 S represents South

ving of those ever born alive³. Trussell's method was selected for the final estimates because it describes the fertility schedule more adequately, has four mortality patterns to choose from, is simple to apply and is based on a wide range of cases. Moreover, as Table 10.1 indicates, for example, the differences between estimates from one method and those from another are quite small.

One shortcoming in Trussell's method, however, is that it is assumed that fertility and child mortality have been constant in the past⁴. In the case of Tanzania fertility may have been constant in the recent past. It is therefore not likely to cause much bias in the estimates. On the other hand, it has been observed that mortality has experienced some decline in the recent past. Therefore this may cause some bias. One other factor that may affect the results is the assumption that the risk of a child dying is a function only of the age of the child and not other factors such as mother's age and birth order of the child. But it is contended that, in most cases, these problems cause very minor biases than the biases caused by misreporting.

The procedure converts proportions of children dead (D_i) among those ever born alive (reported by women in five year age groups with age 15 as the onset of child bearing) into proportions dying (q_x) before

³W. Brass, et al, The Demography of Tropical Africa, (Princeton: Princeton University Press, 1968); W. Brass Methods of Estimating Fertility and Mortality from Limited and Defective Data, (Chapel Hill: University of North Carolina, 1975); J. M. Sullivan, "Models for estimation of the Probability of Dying Between Birth and Exact ages of Early Childhood" Population Studies, 26 (1), 1972, pp.79-97; J.T. Trussell, "A Re-Estimation of the Multiplying Factors for the Brass Technique for Determining Childhood Survival Rates", Population Studies, 29 (1), 1975, pp.97-108.

⁴This shortcoming also affects the Sullivan and Brass Methods.

exact ages (x) in childhood⁵. The multipliers (k_i) required to adjust the proportions dead for the effects of the age pattern of childbearing are calculated from the ratios P_1/P_2 and P_2/P_3 (where P_1 , P_2 and P_3 are the mean number of children ever born alive to women in age groups 15-19, 20-24 and 25-29) together with standard regression coefficients as follows:

$$k_i = a_i + b_i P_1/P_2 + c_i P_2/P_3$$

The regression coefficients a_i , b_i and c_i are taken from the appropriate family of model life tables (North, South, East and West) selected as a suitable reflection of the age pattern of mortality in the observed population⁶. The North family has been found suitable for Tanzania⁷. Figure 10.1 reflects the relative suitability of this family and the African Standard Model Life Table System to Tanzania.

After getting the multiplying factors, c_x is derived as follows:

$$c_x = k_i D_i$$

Once we have c_x , the proportion surviving to age x (l_x) is derived as follows:

$$1 - c_x = l_x$$

The results shown in Table 10.2 indicate that the risk of a child dying is not a function only of the age of the child. It appears that mother's age, birth order of the child and small numbers in an age group affect the results of the first age group. The results for this age

⁵ i ranges from 1 to n , where n is the total number of five year age groups.

⁶A. J. Coale and P. Demeny, Regional Model Life Tables and Stable Populations, (Princeton: Princeton University Press, 1966).

⁷Evidence from the 1967 census and the National Demographic Survey indicates that the North Family of the Coale-Demeny Model life tables has a mortality pattern which is similar to that of Tanzania. See for example, B. Egero and R.A. Henin, "Mortality", op.cit., and R. A. Henin, et al, "Mortality Estimation", in R.A. Henin, (ed.), The Demography of Tanzania, op.cit.

FIGURE 10.1 LOGIT DIFFERENCES BETWEEN OBSERVED I_x VALUES AND THE STANDARD VALUES ($I_s(x)$) PLOTTED AGAINST THE STANDARD LOGITS OF SELECTED STANDARDS: TANZANIA (BOTH SEXES)

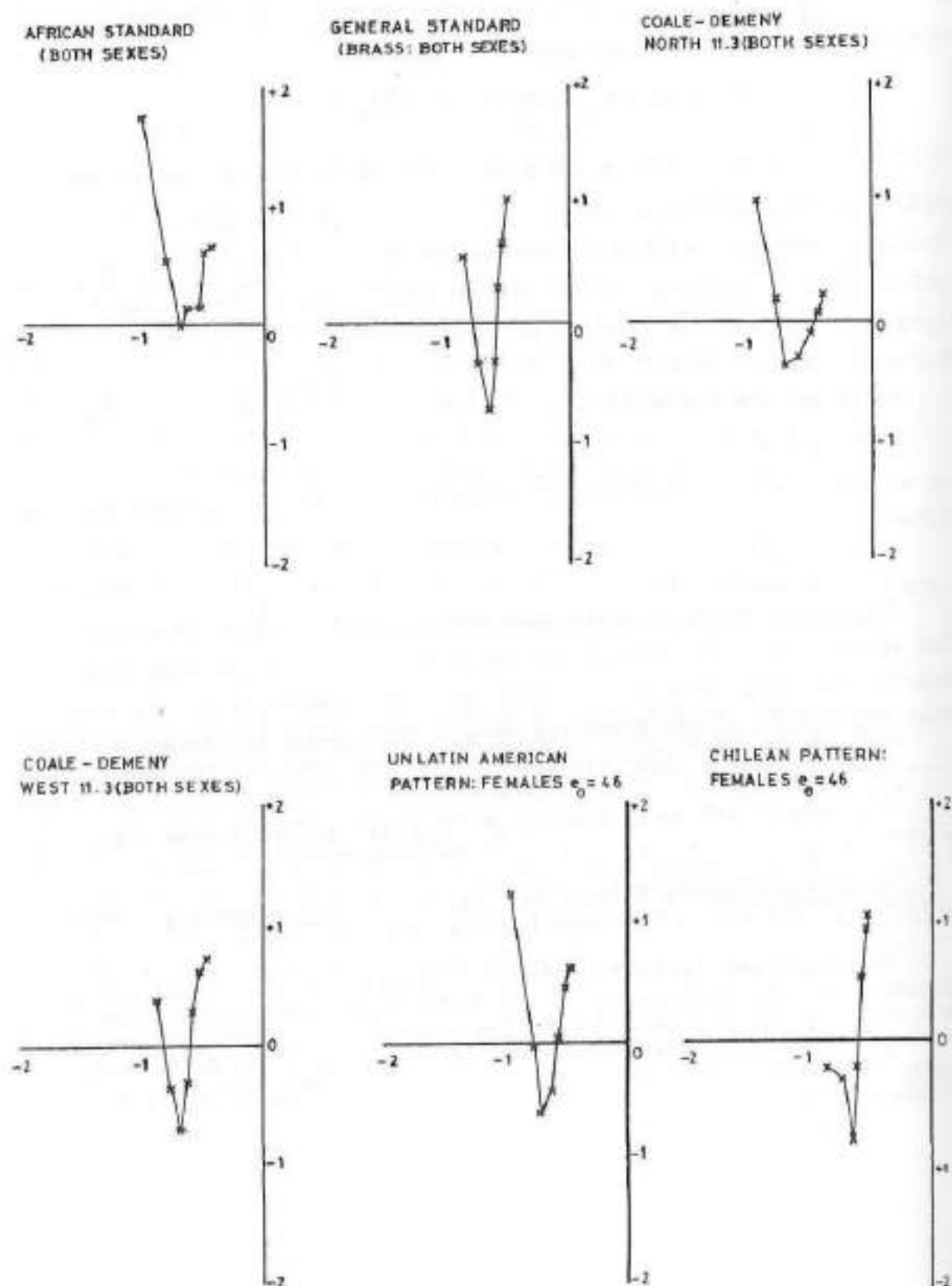


TABLE 10.2.— ESTIMATION OF LEOPS AT BIRTH DOUBLED BY 1_x VALUE FROM AGES 1 TO 20¹

Area	Rural						Urban						
	1 ₁	1 ₂	1 ₃	1 ₅	1 ₁₀	1 ₂₀	1 ₁	1 ₂	1 ₃	1 ₅	1 ₁₀	1 ₁₅	1 ₂₀
Dodoma	44.7	38.4	44.7	43.4	43.4	39.7	48.3	52	54.5	52.0	50.9	49.6	49.6
Arusha	42.2	49.6	50.8	49.6	48.3	50.8	44.7	52	56.9	56.9	55.7	50.8	52.0
Kilimanjaro	53.2	56.9	56.9	59.9	53.2	54.5	53.2	58.1	58.1	58.1	55.7	53.2	52.0
Tanga	38.4	48.3	49.6	48.3	47.1	45.9	47.1	50.8	54.5	54.5	53.2	54.5	45.9
Morogoro	48.3	43.4	43.4	42.2	43.4	40.9	42.2	48.3	49.6	45.9	45.9	42.2	42.2
Coast	31.0	45.9	47.1	48.3	44.7	44.7	43.3	47.4	49.6	48.3	39.7	34.8	44.7
Dar-es-Salaam	47.1	47.1	45.9	44.7	45.9	39.7	44.7	52.0	52.0	52.0	49.6	49.6	48.3
Lindi	31.0	40.9	38.4	39.7	39.7	39.7	39.7	47.1	47.1	48.3	44.7	44.7	44.7
Mtwara	38.4	39.7	38.4	39.7	39.7	34.8	47.1	49.6	49.6	45.9	49.6	47.1	44.7
Ruvuma	29.8	39.7	40.7	42.2	39.7	40.9	39.7	53.2	47.1	45.9	44.7	47.1	44.7
Iringa	42.2	40.9	40.9	43.4	44.7	43.4	21.0	47.1	48.3	49.6	48.3	42.2	38.4
Mbeya	33.5	38.4	38.4	39.7	39.4	43.4	43.4	45.9	45.9	44.7	44.7	44.7	47.1
Singida	26.0	43.4	43.4	44.7	44.7	40.9	48.3	49.6	49.6	49.6	44.7	44.7	42.2
Tabora	36.4	42.2	44.7	43.4	44.7	40.9	48.3	49.6	49.6	47.1	47.1	44.7	44.7
Rukwa	42.2	39.7	38.4	37.2	38.4	42.2	42.2	45.9	47.1	45.9	44.7	44.7	44.7
Kigoma	39.7	43.4	44.7	42.2	39.7	37.2	47.1	52.0	50.8	50.8	47.1	43.4	44.7
Shinyanga	38.4	38.4	44.7	45.9	44.7	44.7	42.2	50.8	53.2	53.2	52.2	49.6	47.1
West Lake	37.2	44.7	44.7	45.9	45.9	40.9	49.6	52.0	53.2	50.8	52.0	48.3	43.4
Mwanza	32.3	37.2	47.2	48.3	44.7	45.9	49.6	54.5	52.0	52.0	49.6	48.3	48.3
Mara	33.5	43.4	44.7	43.4	40.9	40.9	42.2	49.6	50.8	48.3	48.3	45.9	43.4
Zanzibar N	39.7	44.7	43.4	43.4	43.4	39.7	53.2	50.8	53.2	52.0	49.6	44.7	43.4
Zanzibar S	37.2	47.2	49.6	48.3	48.3	47.1	42.2	50.8	53.2	52.0	52.0	49.6	39.7
Zanzibar T/W	42.2	55.7	52.0	52.0	48.3	44.7	42.2	50.8	53.2	53.2	54.5	49.6	43.4
Pemba N	50.8	50.8	49.6	48.3	42.2	43.4	49.6	48.3	52.0	50.8	49.6	45.9	45.9
Pemba S	54.5	50.8	54.5	50.8	49.6	43.4	47.1	53.2	56.9	55.7	53.2	49.6	48.3

¹ Both sexes in the Coale - Demery North Family.

group indicate higher levels of infant mortality than those suggested by q_x values at older ages (q_2 , q_3 and q_5). This is contrary to the ideal expectation of higher life expectation at a younger age than at an older one which would reflect declining mortality. This observation has been made by many other researchers⁸. Expectation of life at birth implied by l_x values from older women is based on events which took place far in the past and which are therefore likely to suffer from memory lapse and/or underreporting caused by involuntary suppression of information related to death in many African Communities, and to be unrepresentative of current mortality conditions or mortality conditions in the recent past.

Because of these factors, from now onwards the major discussion of child mortality will be based on q_2 , q_3 and q_5 (or their complements l_2 , l_3 and l_5) which are regarded as the most reliable. But fluctuations in these values for some areas suggest an effect of age misstatement and some degree of underreporting, especially for Zanzibar Town/West region and for North and South Pemba regions. Smoothing of these values will therefore be necessary.

Levels of child Mortality

Comparison of mortality levels derived from the recent census with estimates from the 1967 population census and the 1973 National Demographic Survey (Table 10.3) suggests that the incidence of child

⁸ For example see W. Brass, *et al*, Demography of Tropical Africa *op.cit.*, I.S.L. Semajwe, "An Analysis of Rural-Urban Differentials in Fertility and Child Mortality in Tanzania", Research Paper No. 28, Bureau of Resource Assessment, University of Dar-es-Salaam, 1974; B. Egero and R. A. Henin, 1973, *op.cit.*; Henin, *et al*, 1977 *op.cit.*, E.K. Sekatawa, "A Test of Indirect Procedures for the Estimation of Mortality", A Thesis submitted for the Degree of Masters of Arts, University of Dar-es-Salaam, 1976.

TABLE 10. 3.— MEAN EXPECTATION OF LIFE AT BIRTH (e_0) DERIVED FROM $1_2, 1_3$, AND 1_5 VALUES (1978 CENSUS) COMPARED WITH ESTIMATES FROM THE 1967 CENSUS AND THE 1973 NATIONAL DEMOGRAPHIC SURVEY

Area	Expectation of Life at birth ¹			Change in e_0 between ⁰	
	1978	1973 ²	1967 ³	1973 and 1978	1967 and 1978
Dodoma	42.6(45)	47(49)	41(46)	-4.4	1.6
Arusha	49.9(50)	55(69)	53(58)	-5.1	-3.1
Kilimanjaro	56.8(65)	55(64)	53(54)	-1.8	3.8
Tanga	49.1(49)	52(56)	48(52)	-2.9	1.1
Morogoro	43.7(44)	48(47)	38(43)	-4.3	5.7
Coast	47.1(46)	48(53)	46(47)	-0.9	1.1
Der es Salaam	49.5(50)	a	51	d	-1.5
Mind	40.0(41)	45(47)	c	-5.0	d
Mwara	38.7(40)	48(44)	38(42)	-9.3	.7
Savuna	41.2(41)	48(47)	36(38)	-6.8	5.2
Iringa	41.3(43)	47(52)	38(40)	-5.7	3.3
Mbeya	38.8(40)	49(55)	34(36)	-10.2	4.8
Singida	43.5(45)	40(58)	36(40)	-3.5	7.5
Tabora	43.5(43)	47(60)	46(50)	-3.5	-2.5
Rukwa	38.7(40)	a	c	d	d
Migoma	43.9(45)	43(67)	41(47)	.9	2.9
West Lake	44.9(46)	43(58)	41(44)	1.9	3.9
Shinyanga	43.6(40)	47(65)	43(47)	-3.4	.6
Mwanza	43.8(38)	47(63)	41(45)	-3.2	2.8
Mara	43.7(44)	47(62)	36(40)	-3.3	7.7
Mainland	43.9(44)	47	41	-3.1	2.9
Zanzibar North	45.3(44)	a	c	d	d
Zanzibar South/					
Central	47.6(46)	a	c	d	d
Zanzibar Town/					
West	52.4(54)	a	c	d	d
Pemba North	49.9(50)	a	c	d	d
Pemba South	52.8(51)	a	c	d	d
Zanzibar	49.7(49)	b	43	d	d
Tanzania	44.1(44)	b	41	d	3.1

¹The figures in brackets are expectation of life at birth based on the initial estimate of 1_2 before adjustment, corrected to the nearest year. Given here merely to show the degree of adjustment which was made before deriving the final estimates. The intercensal differences are not based on these figures.

²Based on Henin R.A., et al, "Mortality Estimation", *op.cit.*, pp.180-198.

³Based on Egero, B. and Henin, R.A. "Mortality" in Egero and Henin, *The Population of Tanzania, op.cit.*, pp.176-185.

^aRukwa region and all the regions in Zanzibar were not yet created, and information was not provided for Der-es-Salaam as a separate region (it was considered as a part of Coast Region).

^bThe survey (NDS) did not include Zanzibar.

^cThese regions did not exist in 1973. ^dNot applicable.

mortality was: (1) overreported in most regions of Mainland Tanzania during the 1978 census and/or (2) underreported during the 1967 population census and the 1973 National Demographic Survey. The former explanation is very unlikely since the traditional view is that in developing areas, reporting errors lead to underestimation of mortality rates. This, combined with other unknown biases, is expected to lead to lower mortality rates which are only indicative of lower limits of mortality conditions that would prevail in the observed population. It is therefore natural to expect that the child mortality estimates from the 1978 census are of the same nature. Moreover, there is no reason at all to expect that females in Tanzania chose to over-report the number of their children who have died as this would amount to inviting death into one's family in most African cultures.

With regard to the latter explanation, it is very likely that the incidence of child mortality was significantly underreported in the 1967 population census and the 1973 National Demographic Survey, especially in the latter. The higher degree of underreporting in the 1967 census than in the 1978 population census may be due to the nature of the question on children ever born and children surviving asked in each census. Whereas in the earlier census, each eligible woman was requested to report the number of children ever born alive and the number of those surviving, in the latter census care was taken to probe for information on (a) children ever born (b) children living at home, (c) children living away from home, and (d) children dead. This latter procedure is advantageous in that (1) during the probing, the woman is assisted to recall even those remote events such as that of a child who died immediately after birth which would be missed if a woman is just requested to state the number of children ever born alive and those surviving, and (2) it provides internal crosschecks which assist the interviewer to check the consistency of the information given.

The pregnancy history approach adopted in the 1973 National Demographic Survey is rather complicated and requires a higher degree of intensive training for the interviewers than the question asked in the census. Much weight is put on the interviewer to probe for information and to list all events in the pregnancy history of the woman such as stillbirths and miscarriages. Its success also depends on a high degree of control and supervision which are easier to achieve in a small scale survey than in an extensive survey or census. Given the extensive nature of the National Demographic Survey, it is likely that enough training, control and supervision of the interviewers may not have been achieved, thus leading to poorer results than in either of the two population censuses. In fact the analysts of the NDS data had this to say: "Demographic enquiries are usually extensive undertakings that involve many field personnel. Their understanding of the procedures must vary and this certainly affects the quality of performance. Thus, part of the variation in data quality inevitably stems from differences in the interview teams' abilities to elicit information from respondents".⁹

Therefore, it is not appropriate to conclude that mortality is increasing in Tanzania by taking estimates from the 1978 population census and the 1973 NDS as indicative of a trend in mortality. However, the increase of about three-tenths of a year per year in life expectation observed for Tanzania as a whole between 1967 and 1978 is quite

⁹Henin, *et al.*, 1977 *op.cit.*, p.187. The superiority of the 1978 population census data on mortality over that from the 1967 population census and the 1973 National Demographic survey may have been, however, reduced by the provision of code 8 on the questionnaire as representing: (1) the highest number of children ever born but living away from home, (8 and above) (2) the highest number of children ever born and living at home, (3) the highest number of children dead, and, (4) not applicable. Therefore in cases where code 8 appeared concurrently for the first/three categories above, it was treated as "not applicable". Otherwise the code was taken to represent number of children ever born and those dead. It is hoped that this factor together with the truncation at number 8 which may have affected a few women with higher parity, had minimal effect on the data.

plausible and similar to that observed in other areas, and the reported 1 year increment per year between 1967 and 1973 seems highly improbable¹⁰. In addition, some evidence from other developing countries suggests that in the 1970s, in some low-income countries of Asia, "the earlier promising tempo of mortality decline slowed, while in others, stagnation or even reversal of the downward trend may have set in"¹¹. This is attributed to the increased proportions of disadvantaged groups who have benefited far less "than the more advantaged segments of national populations from whatever progress has been achieved in disease and mortality control", and to "the slowdown in economic growth due to increasing bills of energy imports, worldwide inflation and unemployment, and decreasing flows of foreign aid"¹². These factors coupled with rapid population growth rates and the problems of providing adequate services such as health care, education, environmental sanitation, housing and transportation, may lead to stagnation or even a reversal in the standard of health of the population. Tanzania is one of the nations that have been affected by these factors.

It is therefore concluded that information on mortality from the recent census is of a better quality than demographic information collected in the past and is supported by estimates based on the female age distribution and an assumed growth rate of 2.9 percent which indicate that female expectation of life at birth during the intercensal period was about 46 years. But this should not be an excuse for complacency. A great deal remains to be done to improve the quality of demographic data in Tanzania. Fluctuations observed among q_2 , q_3 and q_5 values which are the most reliable estimates of child mortality clearly demonstrate this need.

¹⁰For example see D.R. Gwatkin, "Indications of Change in Developing Country Mortality Trends: The End of an Era?" Population and Development Review, 6 (4), 1980, pp.615-644.

¹¹L.T. Ruzicka and H. Hanslukka, "Mortality Transition in South and East Asia: Technology Confronts Poverty", Population and Development Review, 8 (3), 1982, pp.567-588.

¹²Ruzicka and Hanslukka, op.cit.

While regional mortality differentials discussed in a later section give further indication of the plausibility of our estimates of child mortality, final estimates of mortality for each region, Tanzania Mainland, Zanzibar and Tanzania as a whole will not be determined until a second source of information on mortality, namely adult mortality, is examined. This is the task of the next sub-section.

Information on Survival of Mother and Survival of Spouse

As different ways have been designed to collect more indirect information on mortality, more and more efforts have been made to devise new methods or to improve old ones to take advantage of this new information. Among the developed methods are those designed to estimate adult mortality from survival of parents and survival of spouse¹³. Each type of information on which the methods are applied has its advantages and disadvantages and these are discussed below together with the results from the 1978 population census.

Information on survival of parents is easy to collect and involves only three possible answers (yes, no, don't know) to the question "Is your mother alive?" or "Is your father alive?". The loss of a father or a mother is an event that happens once in one's lifetime and it is therefore easier to remember than when a respondent is asked the number of children dead among those ever born alive. This simple question is therefore expected to lead to better responses. However, this type of information is affected by a number of problems:

¹³See for example W. Brass and K. Hill, "Estimating Adult Mortality from Orphanhood", International Population Conference IUSSP, Liege, 1973; H.J. Page and G. Wunsch, "Parental Survival Data: Some Results of the Application of Lederman's Model Life Tables", Université Catholique de Louvain, Département de Démographie, Working Paper No. 6, 1974; K. Hill, "Estimating Adult Mortality Levels from Information on Widowhood", Population Studies, 31 (1), 1977, pp.75-84; K. Hill and J. Trussell, "Further Developments in Indirect Mortality Estimation", Population Studies, 31 (2) 1977, pp. 313-334; and J.G.C. Blacker, "The Estimation of Adult Mortality from Data on Orphanhood", Population Studies, 31 (1), 1977; K. Hill, H. Zlotnik and J. Trussell, Demographic Estimation: A Manual on Indirect Techniques; Committee on Population and Demography, National Academy of Science, Washington DC, 1981.

1. It refers to a long and not well defined period in the past during which mortality is assumed to have remained constant;
2. It reflects only the mortality experience of parents with surviving children;
3. Parents with several surviving children are over-represented when the question is asked of every one, and the attempt to improve this type of information by asking only the eldest surviving children does not seem to yield better results¹⁴;
4. In the case of young children who are orphaned, their adoption by relatives may lead them to regard these relatives as true parents and this inflates the proportion with a surviving parent, especially for the young age groups.

TABLE 10.4.— EXPECTATION OF LIFE AT BIRTH (e_0) IMPLIED BY l_{45} , l_{50} , and l_{55} FROM PROPORTIONS OF MOTHERS SURVIVING IN THE COALE-DEMEYI NORTH FAMILY (FEMALES) FOR DODOMA REGION

Respondent	Expectation of Life			
	l_{45}	l_{50}	l_{55}	Average
<u>From 1978 Census</u>				
All Respondents	53.7	53.3	53.5	53.5
Male Respondents	54.0	52.7	56.1	54.2
Female "	53.4	53.8	51.6	52.9
<u>From 1973 NDS</u>				
All Respondents	57.2	51.6	43.7	50.8
Male Respondents	57.2	51.2	43.7	50.7
Female "	57.2	51.9	43.7	50.9

The results shown in Table 10.4 for Dodoma region indicate that unlike data from the NDS, the 1978 population census data on survival of mother from male respondents yield lower mortality estimates than

¹⁴ Possibly there is a tendency of many respondents to declare themselves as eldest children when they are not.

estimates from information given by female respondents¹⁵. This suggests that female respondents gave better information on survival of mother than male respondents¹⁶. Generally, however, the results from both groups of respondents indicated much lower levels of mortality in comparison to the levels of mortality already indicated by childhood mortality estimates. The average expectation of life at birth from childhood estimates was about 44 years (both sexes) compared to an average of about 54 years (females) from orphanhood data. Although it is difficult to determine the exact reference period for adult mortality estimates it is expected that since mortality has been declining presumably gradually, information on adult mortality should indicate somewhat higher levels of mortality than information on child mortality. But this is not so with the information analysed here. In fact the disparity between the two types of information is very large suggesting that one of them is gravely in error.

Next, information on widowhood was converted into probabilities of surviving (l_x) from birth to exact age x in adulthood for females (from proportions of ever married male respondents with a surviving first wife) and for males (from proportions of ever married female respondents with a surviving first husband)¹⁷. Information on widow-

¹⁵The method applied was as follows:-
 $l_f(25+N) = a(N) + b(N) M + c(N) l_f(2) S(N-5)$(1) where $a(N)$, $b(N)$ and $c(N)$ are regression coefficients whose values for each N are standard and provided in special tables; $l_f(25+N)$ represents the probability of a female surviving from birth to age $25+N$; M represents the average female age at which childbearing takes place; $l_f(2)$ represents the female probability of surviving from birth to age 2; and $S(N-5)$ represents the proportion of respondents with a surviving mother in the age group preceding age group N , $N+4$.

¹⁶As Blacker, *op.cit.*, states, male respondents tend to exaggerate their ages biasing the proportion with living mother upwards.

¹⁷The method used was as follows: $l_f(N) = a(N) + b(N) SMAM_f + c(N) SMAM_m + d(N) (1-W(N)) + e(N) l_f(2)$ where $a(N)$, $b(N)$, $c(N)$, $d(N)$ and $e(N)$ are standard regression coefficients for each age N ; $l_f(N)$ represents the proportion of females surviving from birth to age N ; $SMAM_f$ and $SMAM_m$ are the mean age at first marriage for females and males respectively (these values are shown in Appendix X.2); $W(N)$ represents the proportion of males widowed at age N ; $l_f(2)$ represents the probability of surviving from birth to age 2 for females. If the equation is used for estimating probabilities of surviving for males, $l_f(2)$ and $l_f(N)$ are replaced by $l_m(2)$ and $l_m(N)$ respectively, and the standard regression coefficients are also changed. $W(N)$ becomes the proportion of females widowed at age N .

hood has one major advantage over that on parental survival, and that is that almost in all cases there is only one respondent for each first husband or first wife. In the case of Tanzania it is only in a few cases when two or three wives may report the same male as first husband since in most cases females married to polygamous husbands are those who are experiencing their second or subsequent marriage. The bias caused by this is far less than that caused by parents being reported more than one time by their surviving children. But it has its own disadvantages, too:

1. It refers only to the ever married sub-group of the population, and if marriage is not universal, mortality estimates from this type of information may not strictly represent the picture for the total population;
2. It is assumed that fertility and mortality have been constant in the past;
3. It is assumed that the survival of the respondent and that of his or her spouse are independent.
4. It is assumed that all respondents are married at the mean age at first marriage which may not be true for respondents in younger age groups when a large proportion of the population have not experienced their first marriage.

However, these disadvantages cause biases which are minor compared to errors of reporting that prevail in the data for a country such as Tanzania. Moreover, in Tanzania marriage is almost universal and early, and fertility has remained almost constant over the past decade or so.

The results in Table 10.5 indicate that for ages 45, 50 and 55 when both widowhood and orphanhood data produce comparable $l_f(N)$ values, information on widowhood generally yields lower $l_f(N)$ values than those derived from orphanhood data. It is likely that information on survival of spouse is considerably of better quality than that on survival of

¹⁸. Both types of information, however, indicate levels of mortality which are significantly lower than those indicated by child mortality. But since widowhood information yields results which are closer to those of child mortality, it was selected for more detailed analysis of adult mortality. Its other advantage is that it facilitates the analysis of sex differentials in mortality.

Further examination of information on survival of spouse revealed that male respondents tended to underreport the death of first wife, and this yielded higher survival probabilities for females (Table 10.6). The reports on the survival of first husband seem to be of a much better quality for Mainland Tanzania as they are closer to the estimates from child mortality than estimates from survival of first wife¹⁹. For Zanzibar, on the other hand, the estimates from survival of first wife are closer to the child mortality estimates, while estimates from survival of first husband reflect high male adult mortality, much higher than the levels of mortality indicated by childhood estimates. This is a possible reflection of systematic underreporting of age by females in Zanzibar. But in both cases (survival of first wife and survival of first husband) there are fluctuations in the level of mortality implied

¹⁸ In addition, information on spouse survival from the 1978 population census appears to be of better quality than similar information collected in the National Demographic Survey. This is a possible reflection of the improvement made during the 1978 census in collecting this type of data, when the question on widowhood was not based on the status "ever widowed" but on the question, "Is your first husband or wife still alive?" While information from the former approach is affected by remarriages, information from the latter approach only requires a simple answer (yes, no, don't know) and is related to first husbands or wives only. For further discussion of this aspect, see H.R. Hogan and M. Fasal, 1977, *op.cit.*, pp.202-206.

¹⁹ Some other researchers who have handled this type of data, suggest that normally proportions of males with first wife still surviving are higher than proportions of women with first husband alive, reflecting higher male mortality and the fact that men are on average older than women when they marry. For example, see Central Bureau of Statistics, *Syria Fertility Survey, 1978 Principal Report, Vol.1*, Office of the Prime Minister, Syrian Arab Republic, 1982, p.73. This explanation is, however, not enough to explain the wide gap between male and female mortality reflected by the estimates from the 1978 population census of Tanzania.

TABLE 10.5.— EXPECTATION OF LIFE AT BIRTH (e_0) IMPLIED BY 1_{45} , 1_{50}
AND 1_{55} DERIVED FROM ORPHANHOOD AND WIDOWHOOD DATA

1_x value	Orphanhood e_0 (female)	Widowhood e_0 (female)	Orphanhood less Widowhood
	<u>Dodoma Region</u>		
1_{45}	53.7	51.8	1.9
1_{50}	53.3	51.7	1.6
1_{55}	53.5	52.3	1.2
	<u>Arusha Region</u>		
1_{45}	58.2	48.2	10.0
1_{50}	57.4	48.3	9.1
1_{55}	57.0	48.3	8.7
	<u>Kilimanjaro Region</u>		
1_{45}	63.9	62.1	1.1
1_{50}	63.2	63.3	-.1
1_{55}	61.5	64.8	-3.3
	<u>Tanga Region</u>		
1_{45}	57.0	55.5	1.5
1_{50}	56.8	57.3	-.5
1_{55}	55.0	51.0	4.0
	<u>Mbogo Region</u>		
1_{45}	52.8	53.3	2.5
1_{50}	53.0	47.0	6.0
1_{55}	52.0	51.5	.5
	<u>Coast Region</u>		
1_{45}	57.5	50.5	7.0
1_{50}	55.3	51.8	3.5
1_{55}	54.8	60.3	-5.5
	<u>Dar-es-Salaam Region</u>		
1_{45}	56.5	55.8	.7
1_{50}	56.3	55.8	.5
1_{55}	56.3	55.5	.8
	<u>Lindi Region</u>		
1_{45}	52.8	49.0	3.8
1_{50}	52.3	51.0	1.3
1_{55}	51.5	53.3	-1.8
	<u>Mtwara Region</u>		
1_{45}	51.5	50.8	.7
1_{50}	51.3	50.8	.5
1_{55}	51.0	49.8	.2

TABLE 10.5.— (Continued)

l_x value	Orphanhood e_o (female)	Widowhood e_o (female)	Orphanhood less Widowhood
	<u>Ruvuma Region</u>		
l_{45}	52.5	50.5	2.0
l_{50}	51.3	60.8	-9.5
l_{55}	51.8	57.5	-5.7
	<u>Iringa Region</u>		
l_{45}	52.8	48.5	1.3
l_{50}	52.3	47.3	5.0
l_{55}	51.3	52.3	-1.0
	<u>Mbeva Region</u>		
l_{45}	51.3	50.3	1.0
l_{50}	51.3	51.0	.3
l_{55}	50.3	55.3	-5.0
	<u>Singida Region</u>		
l_{45}	54.8	51.3	3.5
l_{50}	54.0	51.3	2.7
l_{55}	54.3	48.5	5.8
	<u>Tabora Region</u>		
l_{45}	53.3	50.0	3.3
l_{50}	53.8	48.5	5.3
l_{55}	53.3	52.8	.5
	<u>Dulwa Region</u>		
l_{45}	49.3	51.8	-2.5
l_{50}	48.5	49.5	-1.0
l_{55}	48.0	57.3	-9.3
	<u>Kigoma Region</u>		
l_{45}	51.0	45.3	1.3
l_{50}	50.3	43.8	6.5
l_{55}	48.3	40.8	7.5
	<u>Shinyanga Region</u>		
l_{45}	53.0	48.0	5.0
l_{50}	54.0	47.5	6.5
l_{55}	53.8	47.3	6.5
	<u>West Lake Region</u>		
l_{45}	54.3	52.0	2.3
l_{50}	53.5	48.5	5.0
l_{55}	52.0	47.8	4.2
	<u>Mwanza Region</u>		
l_{45}	53.0	51.8	1.2
l_{50}	52.8	52.0	.8
l_{55}	51.3	53.5	-2.2
	<u>Mara Region</u>		
l_{45}	53.3	53.0	.3
l_{50}	53.5	51.3	2.2
l_{55}	51.8	53.3	-1.5

TABLE 10.5.— (Continued)

l_x value	Orphanhood e_o (female)	Widowhood e_o (female)	Orphanhood less Widowhood
	<u>Zanzibar North Region</u>		
l_{45}	53.8	50.0	3.8
l_{50}	51.5	55.3	-3.8
l_{55}	51.8	47.0	4.8
	<u>Zanzibar South Region</u>		
l_{45}	55.8	56.3	-.5
l_{50}	57.0	51.0	6.0
l_{55}	54.5	53.5	1.0
	<u>Zanzibar T/W Region</u>		
l_{45}	59.0	55.0	4.0
l_{50}	57.8	54.0	3.8
l_{55}	57.3	55.5	1.8
	<u>Pemba North Region</u>		
l_{45}	55.8	51.3	4.5
l_{50}	54.5	52.5	2.0
l_{55}	51.0	48.0	3.0
	<u>Pemba South Region</u>		
l_{45}	57.3	53.5	3.8
l_{50}	55.0	53.0	2.0
l_{55}	53.8	53.5	.3

by the derived l_x values apparently due to age misstatement by respondents. In addition, contrary to expectation, the levels of mortality generally decline gradually (in most cases) as the age of respondent increases (this is particularly true for estimates from survival of first wife) thus suggesting that there might be a tendency for older respondents to underreport their widowhood status more than younger respondents possibly due to the remoteness of the events, or to engage in systematic upward shifts of age leading to over-estimation of the proportion with a surviving first wife. This tendency has been observed in other censuses. For example in the 1976 census of Lesotho respondents are said to have exaggerated their ages leading to over-estimation of life expectation at birth²⁰.

²⁰ Bureau of Statistics, Kingdom of Lesotho, 1976 Population Census Analytical Report, Vol. IV, 1981.

TABLE 10.6.--- MORTALITY LEVELS DERIVED BY INFORMATION ON SURVIVAL OF FEMALE WIVES AND SURVIVAL OF FIRST HUSBAND

Area	Survival of first wife					Survival of first husband								
	1 ₂₅	1 ₃₀	1 ₃₅	1 ₄₀	1 ₄₅	1 ₅₀	1 ₅₅	1 ₂₅	1 ₃₀	1 ₃₅	1 ₄₀	1 ₄₅	1 ₅₀	1 ₅₅
Dodoma	11.0	12.2	13.6	13.4	13.7	13.7	14.0	9.7	10.0	11.0	9.4	11.5	9.6	9.9
Arusha	12.0	14.0	14.5	14.6	15.2	16.0	15.8	11.0	12.6	13.4	11.7	12.3	12.3	12.3
Kilimanjaro	18.1	18.4	17.8	18.2	17.9	18.3	18.9	14.5	15.2	15.6	15.2	16.1	14.6	16.3
Tanga	9.3	11.3	13.5	13.7	14.8	15.2	15.9	10.2	11.6	13.5	12.7	13.0	12.5	12.5
Morogoro	9.9	10.8	11.2	12.8	13.1	11.8	13.6	8.3	9.4	9.8	9.8	10.5	10.2	11.5
Coast	8.9	12.5	13.5	13.0	13.2	13.7	17.1	9.6	10.7	11.2	10.3	10.6	12.7	13.4
Dar-es-Salaam	9.5	13.4	13.2	14.4	15.3	15.3	15.2	8.4	11.7	10.9	11.7	10.5	10.2	11.2
Lindi	11.9	11.4	11.6	12.6	12.6	13.4	14.3	8.8	10.6	9.9	8.8	10.0	9.7	11.2
Mwara	9.1	10.5	13.3	11.6	13.3	13.3	12.9	8.0	9.4	7.5	10.1	10.6	7.7	10.1
Ruvuma	12.6	12.9	13.2	13.5	13.2	17.3	16.0	8.3	8.1	9.8	9.6	9.6	9.2	8.1
Iringa	6.9	8.9	10.8	12.3	12.4	11.9	13.9	6.8	8.9	8.3	9.1	7.3	9.7	10.5
Mbeya	8.8	9.2	12.4	12.7	13.1	13.4	15.1	6.6	8.9	9.5	10.2	8.9	7.5	8.3
Singida	12.1	13.2	14.0	12.5	13.5	13.5	12.4	8.8	10.6	7.8	9.9	10.0	7.1	6.5
Tabora	9.2	8.8	12.6	12.3	13.0	12.4	14.1	9.4	9.8	12.1	10.2	10.8	9.3	10.2
Rukwa	6.5	10.5	11.2	10.5	13.7	12.8	15.9	5.6	7.3	8.4	9.3	9.9	9.2	9.0
Kigoma	7.7	10.7	9.8	10.1	11.1	10.5	9.3	6.5	6.4	6.5	15.7	6.1	3.7	7.1
West Lake	12.3	13.0	12.7	13.4	13.8	12.4	12.1	10.5	8.8	9.3	9.4	10.0	8.9	8.3
Shinyanga	6.2	8.91	19.4	10.9	12.2	12.0	11.9	6.3	8.9	10.1	9.4	9.7	9.3	10.1
Mwanse	9.9	11.6	12.0	13.1	13.7	13.8	14.4	7.2	8.8	10.3	10.3	10.0	9.2	7.3
Mara	11.2	12.0	12.8	12.4	14.2	13.5	14.3	7.1	7.9	8.2	8.8	9.2	10.3	5.6
Zanzibar North	10.4	10.8	13.6	12.7	13.0	15.1	11.8	8.3	9.9	11.0	9.2	9.8	9.4	13.0
Zanzibar South/Central	12.7	12.8	14.0	13.31	15.5	13.4	14.4	9.7	11.0	11.8	10.2	10.9	9.9	11.3
Zanzibar Town/West	13.7	14.2	14.6	15.4	15.0	14.6	15.2	9.8	10.3	10.2	8.5	8.9	7.4	9.4
Pemba North	11.5	12.1	13.1	12.8	13.5	14.0	12.2	8.0	8.4	6.8	7.7	4.9	5.31	7.3
Pemba South	9.4	11.9	14.4	11.7	14.4	14.2	14.4	9.4	6.8	7.8	7.0	6.2	6.3	9.4

1 Derived using Coale-Demeny Model Life Tables (North Family)

The first l_x value (l_{25}) was the lowest in most cases (except in Kilimanjaro, Lindi, West Lake and Zanzibar Town for estimates from survival of first wife; and Dodoma, Dar-es-Salaam, Mtwara, Ruvuma, Kigoma, West Lake, Mara, Zanzibar Town, Pemba North and Pemba South for estimates from survival of first husband) possibly due to small numbers²¹. The most reliable l_x values seem to be at ages 30, 35 and 40 with extremes lying on either side of these values. It was therefore decided to use these three values for the final estimates of adult

TABLE 10.7.— MEAN EXPECTATION OF LIFE AT BIRTH IMPLIED BY l_{30} , l_{35} AND l_{40} COMPARED WITH THAT IMPLIED BY l_{25} TO l_{55}

Area	Mean e_0 from l_{30} , l_{35} and l_{40}		Mean e_0 from l_{25} to l_{55}	
	Female	Male	Female	Male
Dodoma	50.3	39.6	50.2	39.8
Arusha	53.5	45.5	53.9	44.8
Kilimanjaro	62.8	52.2	63.1	52.3
Tanga	49.5	45.7	51.0	45.0
Morogoro	46.5	38.6	47.2	39.1
Coast	50.0	41.1	50.3	42.3
Dar-es-Salaam	51.8	42.8	52.0	42.8
Lindi	47.3	38.8	48.9	38.9
Mtwara	47.0	36.9	47.5	37.0
Ruvuma	50.5	37.4	52.8	36.8
Iringa	44.3	36.4	45.1	36.1
Mbeya	46.0	38.1	47.8	35.9
Singida	50.5	37.9	50.0	36.1
Tabora	45.5	41.1	46.9	39.9
Rukwa	44.3	35.3	46.4	35.5
Kigoma	43.0	30.1	42.2	29.6
West Lake	50.0	37.4	49.6	37.6
Shinyanga	41.8	38.1	43.1	37.1
Mwanza	48.0	38.8	49.2	36.9
Mara	48.5	35.3	49.8	35.1
Zanzibar North	48.5	39.3	48.8	39.5
Zanzibar South/Central	51.0	41.8	51.8	41.0
Zanzibar Town/West	54.3	38.9	54.3	38.6
Pemba North	49.3	33.6	49.4	31.8
Pemba South	49.3	32.5	49.8	33.4

²¹Few members of the population are ever-married before the age of 25. This is particularly true for males.

mortality, and as Table 10.7 indicates, not much loss was incurred by selecting l_{30} , l_{35} and l_{40} for the final estimates instead of the whole range of l_x values (from l_{25} to l_{55}). The mean expectation of life at birth implied by l_{30} , l_{35} and l_{40} is almost identical to that implied by the whole range of l_x values. This means that the extreme values (lowest and highest values) cancel themselves out.

FINAL MORTALITY ESTIMATES

With regard to child mortality, the final level of mortality reflecting health conditions in childhood was made by getting the mean expectation of life at birth implied in the appropriate level of the Coale-Demeny model life tables, North family, by l_2 , l_3 and l_5 . This procedure was expected to have some kind of smoothing effect on the three l_x values which were earlier noted to have some fluctuations. Column 3 of Table 10.8 shows these final estimates of child mortality (both sexes).

TABLE 10.8.— EXPECTATION OF LIFE AT BIRTH (e_0 FOR BOTH SEXES) IMPLIED BY THE MEAN LEVEL OF ADULT MORTALITY AND THE MEAN LEVEL OF CHILD MORTALITY

Area (1)	e_0 implied by Adult Mortality (2)	e_0 implied by child Mortality (3)
Dodoma	44.9	42.6
Arusha	49.5	49.9
Mt. Meru	57.4	56.8
Tanga	47.6	49.1
Karogoro	42.7	43.7
Coast	45.7	47.1
Meru-Salaam	47.3	49.5
Mind	43.2	40.0
Mwara	41.9	38.7
Mruwa	43.9	41.2
Tringa	40.4	41.3
Mbeya	42.2	38.8
Singida	44.2	43.5
Tabora	43.4	43.5

TABLE 10.8.— (Continued)

Area (1)	e_a implied by Adult Mortality (2)	e_o implied by child Mortality (3)
Rukwa	39.7	38.7
Kigoma	36.5	43.9
West Lake	43.7	44.9
Shinyanga	40.0	43.6
Mwanza	43.4	43.8
Mara	41.9	43.7
Mainland	44.1	43.9
Zanzibar North	43.9	45.3
Zanzibar South	46.4	47.6
Zanzibar Town/West	46.6	52.4
Pemba North	41.4	49.9
Pemba South	40.9	52.8
Zanzibar	43.2	49.7
Tanzania	44.1	44.1

As the differential between estimates from information on survival of first wife and those from survival of first husband seemed to be wide and it was not easy to explain it all by (a) sex differentials in mortality, and (b) a degree of variation in the quality of reporting between males and females (see Table 10.7) it was decided to take an average of the two estimates in each area as a final estimate of the level of mortality indicated by adult mortality. The mean expectation of life at birth representing each selected level is shown in column 2, Table 10.8.

In twelve regions estimates from child survival indicated lower mortality as expected than estimates from spouse survival. The differences in expectation of life at birth derived from both types of estimates were quite small (2.5 years or less). For these regions the level of mortality indicated by childhood estimates was accepted as final. (The regions are Arusha, Tanga, Morogoro, Dar-es-Salaam, Coast, Iringa, Tabora, West Lake, Mwanza, Mara, Zanzibar North and Zanzibar South). The final level selected and the implied expectation of life

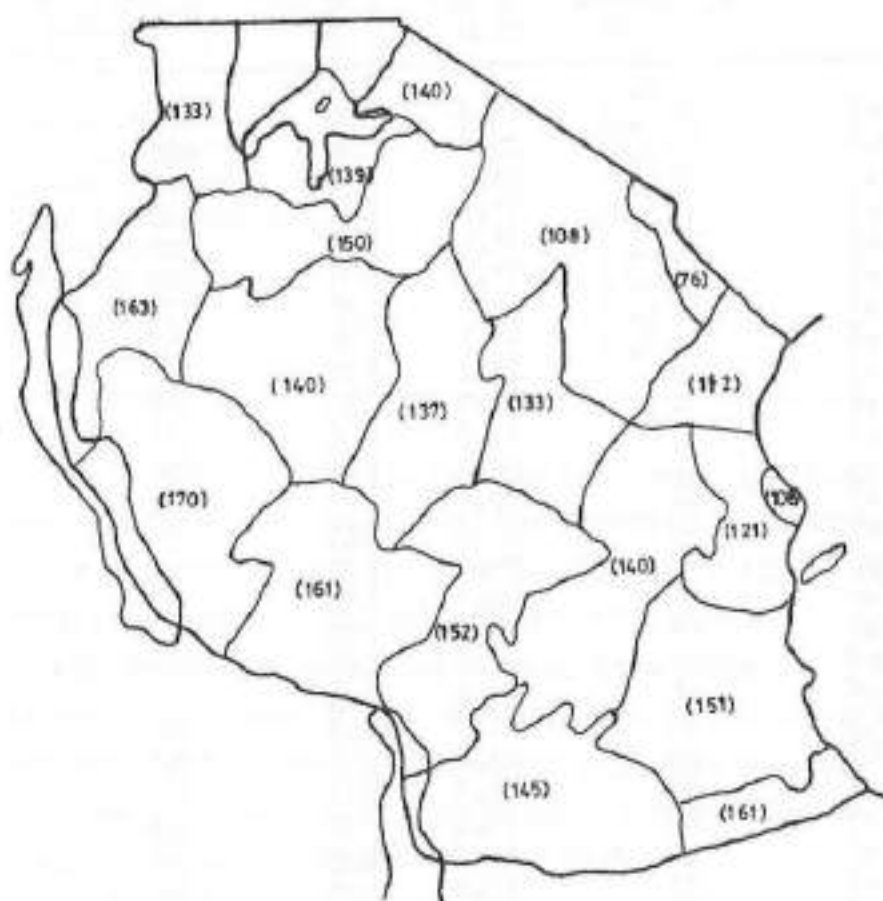
at birth (e_0) are shown in Table 10.9, columns (2) and (3) respectively.

TABLE 10.9.— FINAL ESTIMATES OF EXPECTATION OF LIFE AT BIRTH (e_0 TO THE NEAREST YEAR), CRUDE DEATH RATE (CDR), 1^0_0 AND 1^1_5 FOR EACH REGION RANKED ACCORDING TO DESCENDING ORDER OF e_0 FOR MAINLAND AND ZANZIBAR

(1)	(2)	(3) e_0 (years)	(4) CDR per 1000	(5) 1^0_0 per 100	(6) 1^1_5
Ililimanjaro	16.7	58	10.2	76	881
Arusha	13.7	50	14.8	108	821
Dar-es-Salaam	13.5	50	15.1	108	821
Tanga	13.3	49	15.5	112	813
Coast	12.5	47	16.9	121	796
Dodoma	11.6	45	18.5	133	775
West Lake	11.6	45	18.5	133	775
Mgida	11.3	44	19.1	137	769
Mainland	11.3	44	19.1	137	769
Manza	11.2	44	19.2	139	767
Morogoro	11.1	44	19.3	140	764
Tabora	11.1	44	19.3	140	764
Mara	11.1	44	19.3	140	764
Mvuma	10.7	43	20.0	145	755
Mindi	10.3	42	20.4	151	745
Sinyanga	10.4	42	20.7	150	748
Iringa	10.2	41	21.8	152	743
Mbeya	9.8	41	21.7	161	733
Mtwara	9.8	40	22.3	161	733
Mgombe	9.7	40	22.9	163	731
Mukwa	9.1	40	23.1	170	717
Zanzibar Town/West	13.3	49	15.5	112	813
Zanzibar South	12.7	48	16.4	120	800
Pemba South	12.4	47	17.2	123	794
Zanzibar	12.3	47	17.0	125	791
Pemba North	11.9	46	18.5	128	782
Zanzibar North	11.7	45	18.9	132	777
Tanzania	11.3	44	19.1	137	769

In four other regions, estimates from child survival were lower than those indicated by adult mortality, and the difference between the two sets of estimates was small (2.5 years or less). For these regions

MAP 10.1.....INFANT MORTALITY RATE BY REGIONS
BASED ON 1978 DATA: MAINLAND.



Source : Table 10.9.

(Dodoma, Kilimanjaro, Singida and Rukwa) the level of mortality indicated by adult mortality estimates was accepted as final.

Finally in the remaining nine regions the estimates from child survival and those from adult mortality yielded a large difference of over 2.5 years. In this case, an average of the two estimates was taken as the final level of mortality. The nine regions are Lindi, Mtwara, Ruvuma, Mbeya, Kigoma, Shinyanga, Zanzibar Town/West, Pemba North and Pemba South. In four of these nine regions (Kigoma, Zanzibar Town/West, Pemba North and Pemba South) the gap between child and adult mortality was in the range of about 7 to 12 years, suggesting that the data for these regions was most suspect.

The final estimates indicate an expected regional and zonal pattern of mortality which will be discussed in the chapter on mortality differentials. The emergence of this pattern enhances the plausibility of our regional estimates of mortality. Further the estimate for the country as a whole is close to that interpolated in the Coale - Demery Model Life Tables (North Family) using the cumulated age distribution and an assumed growth rate of 2.9 percent ($e_0 = 46$ years for females).

Columns (5) and (6) of Table 10.9 indicate that infant and child mortality are still high in Tanzania. For example infant mortality ranges from a low of 76 per thousand in Kilimanjaro region to 170 per thousand in Rukwa region. The rate is 137 per thousand for Tanzania Mainland and 125 per thousand for Zanzibar. This suggests that infectious and communicable diseases as well as malnutrition are still very prevalent in Tanzania. A great deal has to be done before the health conditions of its infants reach the standard already acquired in the developed countries where rates of infant mortality as low as 10 per thousand are recorded.

LINKING CHILD AND ADULT MORTALITY

The African standard and the Coale-Demery model life tables (North family) were employed as standards for linking child and adult

mortality. Because of the wide gap between male and female mortality in the initial estimates of adult mortality from spouse survival, the l_x values for adult mortality were taken from the average level of mortality implied by the two sets of l_x values in the Coale-Demeny model life tables (North family). For Mainland and Tanzania as a whole, the level was 11.3. For Zanzibar the average level was 10.9, and this level was found to reflect far higher mortality than the childhood mortality level of 13.6. Thus a decision was made to use level 12.3 which was selected as the final level of mortality in Zanzibar.

The survival values (l_x) for ages 2, 3 and 5 were selected to represent mortality in childhood, while the values for ages 30, 35 and 40 were selected to represent adult mortality. The relationship

$$\Delta l_{(x)} = \frac{1}{2} \ln (1 - l_{(x)}) / l_{(x)}$$

(where Δl_x represents the logit transformation of l_x , $\ln$ represents the natural logarithms and l_x represents the proportion surviving at age x) was used to calculate the logits of the initial $l_{(x)}$ values and to plot them against the standard (see Figure 10.2). This indicated somewhat a linear relationship and estimates of α and β were calculated by using two equations as follows:²²

$$\Delta (l_{(2)}, l_{(3)}, l_{(5)}) = \alpha + \beta \Delta (l_s(2), l_s(3), l_s(5))$$

$$\text{and } \Delta (l_{(30)}, l_{(35)}, l_{(40)}) = \alpha + \beta \Delta (l_s(30), l_s(35), l_s(40))$$

where $\Delta (l_{(2)}, l_{(3)}, l_{(5)})$ represent the average logit for the initial $l_{(x)}$ values at ages 2, 3 and 5.

²²The l_2 , l_3 and l_5 values were initially separated to yield l_2 (males) and l_2 (females) by assuming the following relationship in the Coale-Demeny model life tables (North family);

$$l_2 \text{ (both sexes)} = \frac{l_2 \text{ (females)} + 1.02 \text{ (Males)}}{2.02}$$

A sex ratio of 1.02 rather than 1.03 which is generally accepted for tropical Africa was used. Some available medical statistics and initial information from the vital registration system being currently set up in selected rural areas of Tanzania suggests such a sex ratio.

FIGURE 10-2a.....THE RELATIONSHIP BETWEEN LOGITS OF OBSERVED l_2 , l_3 , l_5 , l_{30} , l_{35} AND l_{40} AND THE AFRICAN STANDARD AS WELL AS COALE-DEMENY NORTH FAMILY LEVEL 11.3: TANZANIA MAINLAND

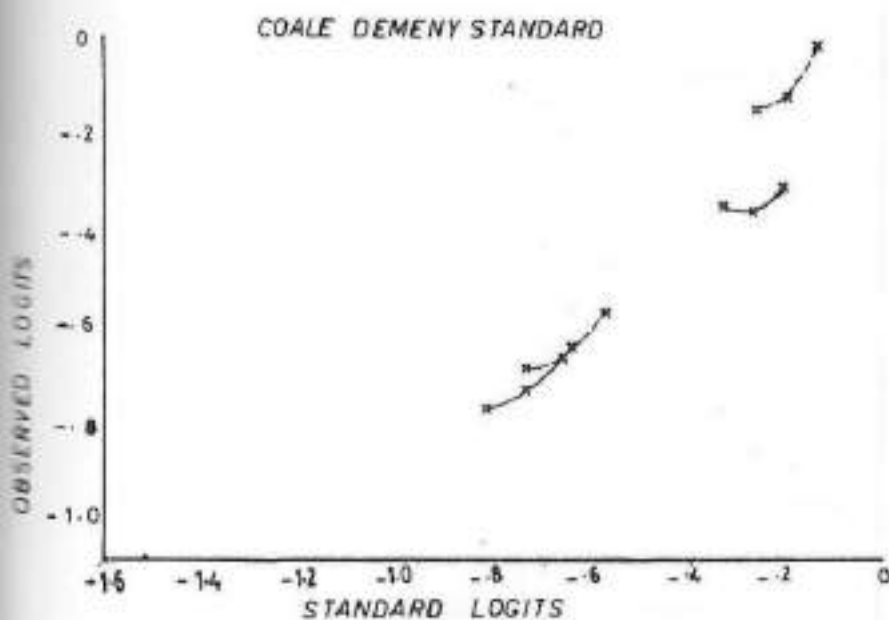
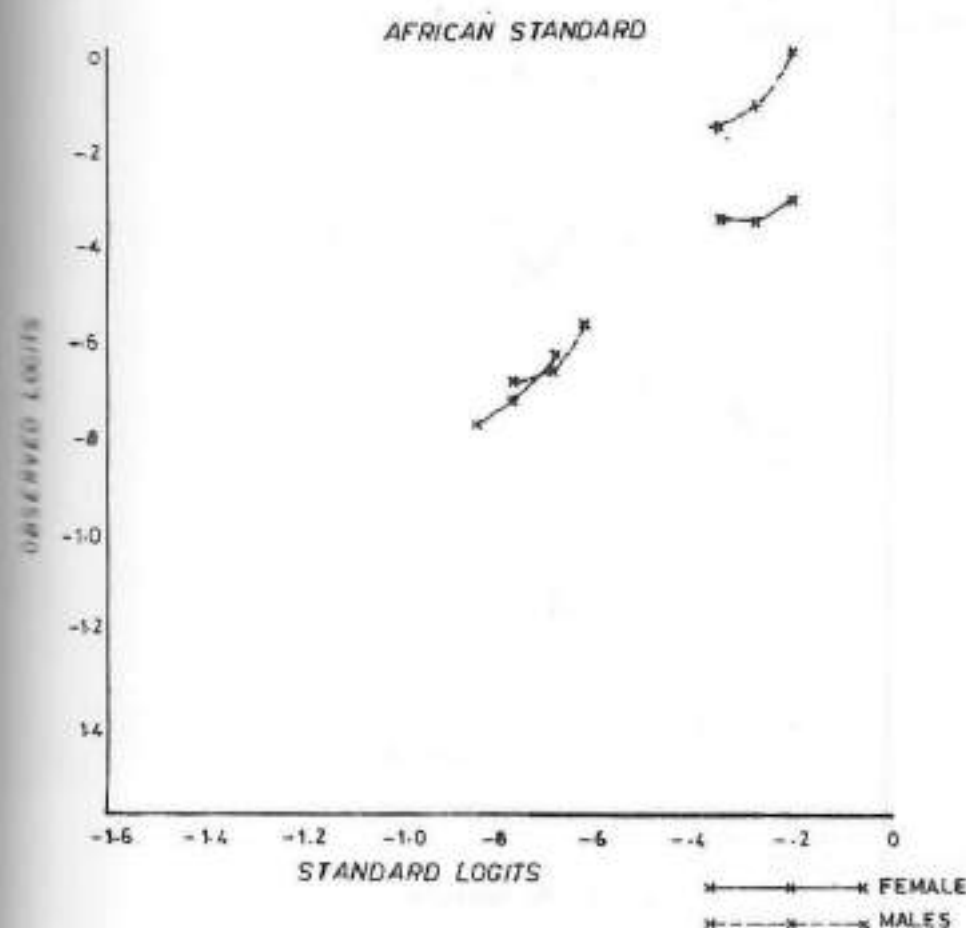
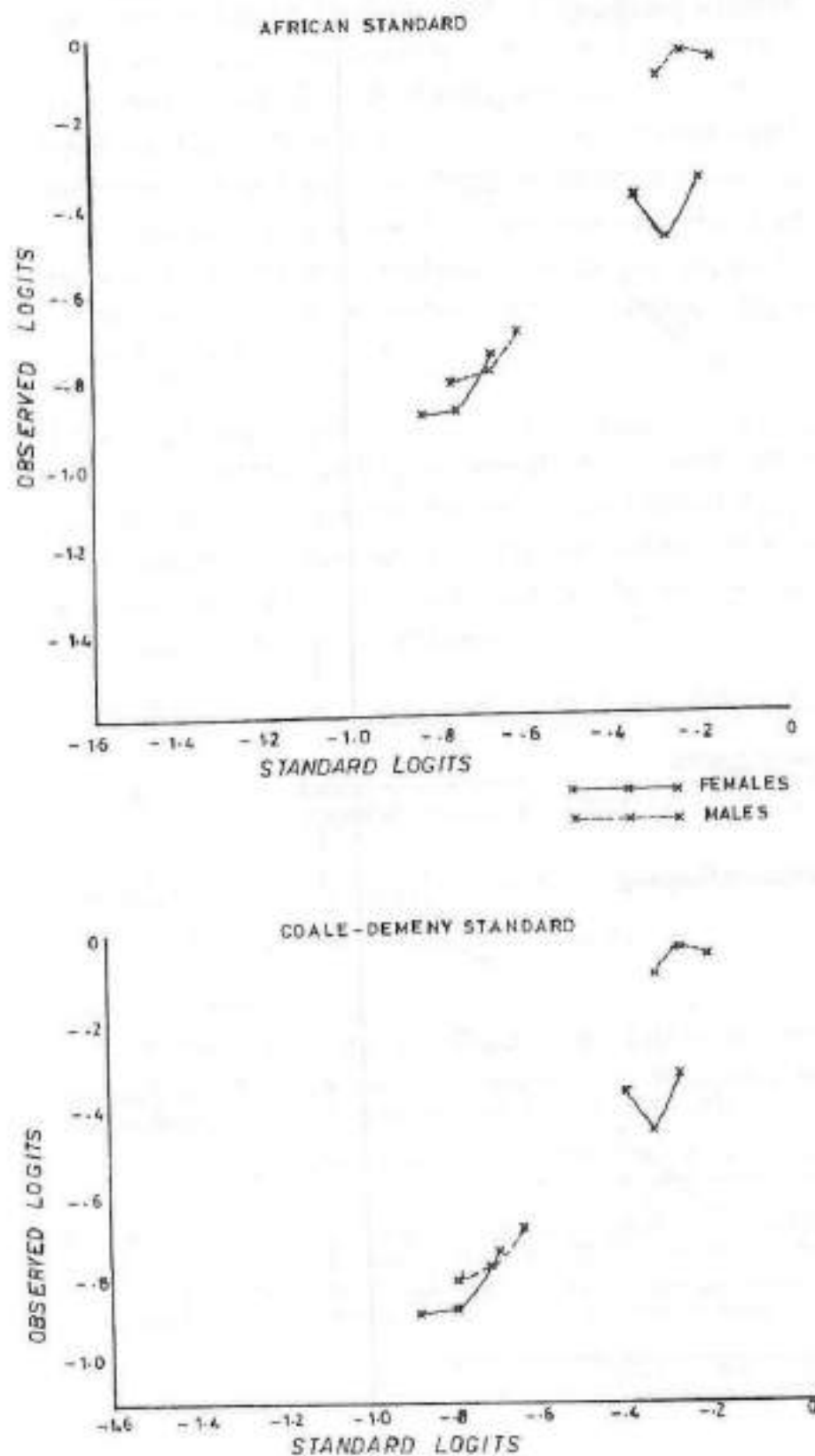


FIGURE 10.2b. THE RELATIONSHIP BETWEEN LOGITS OF OBSERVED $l_2, l_3, l_5, l_{30}, l_{95}$ AND l_{40} AND THE AFRICAN STANDARD AS WELL AS COALE-DEMENY NORTH FAMILY LEVEL 12.3: ZANZIBAR



$\Delta(l_{(30)}, l_{(35)}, l_{(40)})$, represents the average logit for the initial $l_{(x)}$ values at ages 30, 35 and 40.

$\Delta(l_s(2), l_s(3), l_s(5))$ represents the average logit for the standard $l_{(x)}$ values at ages 2, 3 and 5.

and $\Delta(l_s(30), l_s(35), l_s(40))$ represents the average logit for the standard $l_{(x)}$ values at ages 30, 35 and 40.

The results of this exercise are presented in Table 10.10.

TABLE 10.10.— REGRESSION COEFFICIENTS OBTAINED USING THE AFRICAN AND COALE-DEMERY STANDARDS

Area	African Standard		Coale-Demery Standard (North family): level 11.3 for Tanzania and Mainland, level 12.3 for Zanzibar	
	α	β	α	β
Mainland F	-.0106	.8737	-.0146	.9615
M	.0008	.9202	-.0161	.9537
Zanzibar F	-.0729	.9958	.0372	1.1090
M	-.0280	1.0591	.0279	1.1036
Tanzania F	-.0101	.8753	-.0140	.9637
M	.0017	.9213	-.0153	.9579

The parameters α and β have central values of 0 and 1 respectively. While α determines the general level of mortality, β shows the relationship between adult mortality and child mortality. If β is high; adult mortality is high in relation to child mortality. The opposite is true if the reverse holds.

Then the relationship

$$l^1(x) = \frac{1}{1 + e^{2\alpha} + 2\beta\Delta l(x)}$$

was used to construct a smoothed life table representing the average mortality pattern for each area.

The final life tables shown in Appendix X.3 are based on these results. The resulting expectation of life at birth for each sex and for both sexes in each area are shown in Table 10.11. These estimates are quite close to our estimates in section "Final Mortality Estimates". This gives us further confirmation that the level of mortality in Tanzania during the intercensal period was high with an expectation of life at birth of about 44-45 years. Conditions of health appear to be better in Zanzibar, where e_0 is about 47 years.

TABLE 10.11.— EXPECTATION OF LIFE AT BIRTH DERIVED FROM THE LIFE TABLES

Area		Expectation of life at Birth (years)		
		Female	Male	Both sexes
Mainland	Africa standard	46.2	43.0	44.6
	Coale-Demeny	46.2	43.0	44.6
Zanzibar	Africa standard	47.4	45.2	46.2
	Coale-Demeny	47.6	44.4	46.0
Tanzania	Africa Standard	46.2	43.0	44.6
	Coale-Demeny	46.1	42.9	44.5

CONCLUSION

The level of mortality in Tanzania is still high and similar to the levels prevailing in some of the other least developed countries of the world²³. This does not however mean that conditions of health have not improved in Tanzania over the last two decades or so. Indeed some plausible evidence available indicates that both Mainland and Zanzibar have experienced some mortality decline. For example

²³ World Bank, World Development Report, 1980, Washington D.C., 1980. The level of mortality for Tanzania is, however, higher than that of neighbouring Kenya where the expectation of life at birth was estimated to be 51 years in 1977 (see, R.A. Henin. Recent Demographic Trends in Kenya, (Nairobi: Population Studies and Research Institute, University of Nairobi, 1979).

infant mortality appears to have declined in Zanzibar from 160 per thousand in 1957 to 140 per thousand in 1967 and 125 per thousand in 1978. Corresponding values for Tanzania Mainland are 190, 160 and 137 per thousand, respectively. The expectation of life at birth rose from about 37 years in 1957 to around 41 in 1967 and 44 in 1978 for Tanzania Mainland. The comparable values for Zanzibar are 42 years in 1958, 43 in 1967 and 47 in 1978.

Linking adult mortality and infant and child mortality proved not to be a straight forward exercise. It was necessary to get an average representation of adult mortality for males and females separately by selecting l_{30} , l_{35} and l_{40} as indexes of adult mortality from the average level of mortality derived from a combination of the level implied by survival of first wife and that implied by survival of first husband. For Zanzibar, the average level of mortality selected was the mean of child and adult mortality levels.

Finally, it is clear that the living conditions of the population of Tanzania are still poor. This suggests that a great deal still remains to be done to improve the health and socio-economic conditions of the population. Every effort should therefore be made to improve the living conditions of the people of Tanzania.

APPENDIX X.1.— SAMPLE RAISING FACTORS BASED
ON TOTAL POPULATION FOR REGIONS, 1978 CENSUS

	Sample Raising Factors based on Total Population	
	Rural	Urban
MAINLAND		
Dodoma	48.615	1.797
Arusha	25.948	1.672
Kilimanjaro	31.257	1.888
Tanga	11.787	2.231
Moregoro	23.144	1.473
Coast	30.092	1.100
Dar es Salaam	7.806	11.429
Lindi	26.465	1.078
Mtwara	41.890	1.448
Ruvuma	27.439	1.163
Iringa	32.002	1.909
Mbeya	35.012	1.699
Singida	31.539	1.069
Tabora	41.556	1.638
Rukwa	24.033	1.096
Kigoma	23.430	1.784
Shinyanga	43.717	1.091
West Lake	36.965	1.169
Nwanza	41.987	1.697
Nara	19.525	1.104
Mainland, Total	28.511	2.136
ZANZIBAR		
North	3.636	0.966
South	2.349	1.006
Town/West	1.358	3.172
Penba North	3.405	1.014
Penba South	3.829	1.018
Zanzibar, Total	2.905	1.963

APPENDIX I.2.— THE SINGULATE MEAN AGE AT MARRIAGE (SMAM) FOR
REGIONS AND MAINLAND, ZANZIBAR AND TANZANIA AS A WHOLE

Area	Rural		Urban	
	Male	Female	Male	Female
Dodoma	24.4	19.00	25.9	20.3
Arusha	25.7	19.00	26.2	20.7
Kilimanjaro	25.7	21.8	28.2	21.2
Tanga	26.2	19.5	26.5	19.8
Morogoro	25.8	19.5	26.1	19.7
Geasi	26.4	18.9	26.3	18.3
Dar es Salaam	23.9	17.7	26.1	19.5
Lindi	25.3	18.7	25.9	19.2
Mtwara	24.8	18.8	25.4	18.5
Ruvuma	24.1	19.8	24.9	20.0
Iringa	24.6	20.5	25.9	20.0
Mbeya	24.7	18.5	24.4	19.6
Singida	24.8	19.7	25.7	20.2
Tabara	23.5	18.1	25.9	19.7
Rukwa	23.1	18.3	24.2	19.8
Ligoma	23.6	19.2	24.8	19.5
West Lake	24.6	18.4	26.1	19.1
Shinyanga	23.5	18.4	25.5	19.4
Nwanza	24.4	19.6	25.5	19.3
Kara	25.0	17.8	25.2	19.7
MAINLAND	24.7	19.1	25.9	19.7
Zanzibar North	21.8	16.0	23.8	16.8
Zanzibar S/Central	24.3	17.2	22.6	17.5
Zanzibar Town/West	23.6	17.2	24.5	17.8
Pemba North	22.7	16.4	22.9	17.5
Pemba South	22.2	16.2	23.7	17.4
ZANZIBAR	22.7	16.5	24.2	17.7
TANZANIA	24.7	21.1	25.9	19.5

APPENDIX 2.3a. — THE LIFE TABLE FOR TANZANIA MAINLAND USING
THE AFRICAN STANDARD LIFE TABLE SYSTEM AS THE STANDARD

Age	Females		Males	
	L_x	L_{n-x}	L_x	L_{n-x}
0	10000	9097	10000	8954
1	8710	33042	8506	32178
5	7811	38233	7583	37945
10	7482	37095	7235	35840
15	7356	36268	7101	34955
20	7148	35073	6881	33690
25	6881	33740	6595	32273
30	6615	32420	6314	30865
35	6353	31060	6032	29418
40	6071	29563	5735	27830
45	5754	27840	5397	25988
50	5382	25773	4998	23800
55	4927	23270	4522	21175
60	4381	20193	3948	17978
65	3696	16528	3243	14240
70	2915	12360	2453	10088
75	2029	8095	1582	5960
80	1209	12090	802	8020

Assumed $l_0 = 10000$ and $l_{100} = 0$

$$\sum_0^{\infty} \frac{L_x}{n_x} = 461732$$

$$e_0 = 46.2$$

Assumed $l_0 = 10000$ and $l_{100} = 0$

$$\sum_0^{\infty} \frac{L_x}{n_x} = 430297$$

$$e_0 = 43.0$$

$$e_0 \text{ (both sexes)} = 44.6$$

APPENDIX I.3b.— THE LIFE TABLE FOR TANZANIA MAINLAND USING
COALE-DEMERY MODEL LIFE TABLES, NORTH FAMILY LEVEL 11.3, AS THE STANDARD

Age	Females		Males	
	L_x	$L_{n \times}$	L_x	$L_{n \times}$
0	10000	9089	10000	8921
1	8699	32952	8458	31980
5	7777	38010	7532	36818
10	7427	36700	7195	35523
15	7253	35788	7014	34590
20	7062	34775	6822	33470
25	6848	33663	6566	32165
30	6617	32470	6300	30838
35	6371	31105	6035	29455
40	6071	29588	5747	27878
45	5764	28033	5404	26090
50	5449	26305	5032	24063
55	5073	24210	4593	21665
60	4611	21555	4073	18798
65	4011	18125	3446	15348
70	3239	13863	2693	11343
75	2306	9185	1844	7163
80	1368	6168	1021	4378

$$e_0 L_{80} = \frac{e_0 d_{80}}{e_0 M_{80}}$$

$$e_0 M_{80} = .2218 \text{ is taken from the standard life table}$$

$$\sum_{x=0}^{\infty} L_{n \times} = 461584$$

$$e_0 = 46.2$$

$$e_0 L_{80} = \frac{e_0 d_{80}}{e_0 M_{80}}$$

$$e_0 M_{80} = .2332 \text{ is taken from the standard life table}$$

$$\sum_{x=0}^{\infty} L_{n \times} = 430486$$

$$e_0 = 43.0$$

$$e_0 \text{ (both sexes)} = 44.6$$

APPENDIX X.3a. — THE LIFE TABLE FOR ZAMBIA USING THE AFRICAN
STANDARD LIFE TABLE SYSTEM AS THE STANDARD

Age	Females		Males	
	L_x	L_{n-x}	L_x	L_{n-x}
0	10000	9320	10000	9217
1	9029	34422	8882	33724
5	8182	40080	7980	39008
10	7850	38928	7623	37763
15	7721	38063	7482	36828
20	7504	36808	7249	35975
25	7219	35388	6941	33930
30	6936	33968	6631	32373
35	6651	32475	6318	30745
40	6339	30815	5980	28950
45	5987	28888	5600	26868
50	5568	26545	5147	24475
55	5050	23688	4643	21443
60	4425	20180	3934	17655
65	3647	16045	3128	13448
70	2771	11470	2251	8833
75	1817	7018	1282	4705
80	990	9900	600	6000

Assumed $l_0 = 10000$ and $l_{100} = 0$

$$\sum_{x=0}^{\infty} L_x = 474031$$

$$e_0 = 47.4$$

Assumed $l_0 = 10000$ and $l_{100} = 0$

$$\sum_{x=0}^{\infty} L_x = 451942$$

$$e_0 = 45.2$$

$$e_0 \text{ (both sexes)} = 46.2$$

APPENDIX K-34.— THE LIFE TABLE FOR HANXIBAR USING COALE-DEMERY
MODEL LIFE TABLES, NORTH FAMILY LEVEL 12.3, AS THE STANDARD

Age	Females		Males	
	L_x	$L_n x$	L_x	$L_n x$
0	10000	9308	10000	9175
1	9011	34328	8821	32518
5	8153	39910	7938	38810
10	7811	38565	7586	37475
15	7615	37590	7404	36533
20	7421	36560	7209	35310
25	7203	35348	6915	33825
30	6936	33968	6615	32333
35	6651	32475	6318	30768
40	6339	30833	5989	29010
45	5994	29075	5615	27018
50	5636	27120	5192	24718
55	5212	24763	4695	21993
60	4693	21735	4102	18708
65	4001	17803	3381	14833
70	3120	13083	2552	10485
75	2113	8200	1642	6210
80	1167	5477	842	3739

$$\frac{\infty L_{80}}{\infty N_{80}} = \frac{\infty d_{80}}{\infty N_{80}}$$

$\infty N_{80} = .21308$ is taken from
the standard
life table

$$\sum_0^{\infty} \frac{L_x}{n_x} = 476141$$

$$e_0 = 47.6$$

$$\frac{\infty L_{80}}{\infty N_{80}} = \frac{\infty d_{80}}{\infty N_{80}}$$

$\infty N_{80} = .22521$ is taken from
the standard
life table

$$\sum_0^{\infty} \frac{L_x}{n_x} = 444461$$

$$e_0 = 44.4$$

$$e_0 \text{ (both sexes)} = 46.0$$

APPENDIX I.3a. — THE LIFE TABLE FOR TANZANIA USING THE AFRICAN
STANDARD LIFE TABLE SYSTEM AS THE STANDARD

Age	Females		Males	
	L_x	nL_x	L_x	nL_x
0	10000	9098	10000	8968
1	8712	33052	8526	32232
5	7814	38245	7590	37073
10	7484	37103	7239	35860
15	7357	36270	7105	34975
20	7151	35083	6885	33705
25	6882	33748	6597	32278
30	6617	32425	6314	30865
35	6353	31053	6032	29405
40	6068	29555	5730	27810
45	5754	27833	5394	25980
50	5379	25760	4998	23780
55	4745	23253	4514	21138
60	4376	20168	3941	17933
65	3691	16500	3232	14180
70	2909	12335	2440	9905
75	2025	8073	1522	5785
80	1204	12040	792	7920

Assumed $l_0 = 10000$ and $l_{100} = 0$

$$\sum_0^{\infty} \frac{L_x}{n} = 460681$$

$$e_0 = 46.1$$

Assumed $l_0 = 10000$ and
 $l_{100} = 0$

$$\sum_0^{\infty} \frac{L_x}{n} = 429792$$

$$e_0 = 43.0$$

$$e_0 \text{ (both sexes)} = 44.6$$

APPENDIX X.3f. — THE LIFE TABLE FOR TANZANIA USING COALE-DEMOWY
MODEL LIFE TABLE, NORTH FAMILY LEVEL 11.3, AS THE STANDARD

Age	Females		Males	
	L_x	n_x	L_x	n_x
0	10000	9091	10000	8916
1	8702	32964	8451	31944
5	7780	38020	7521	36755
10	7428	36708	7181	35445
15	7255	35798	6997	34505
20	7064	34785	6805	33375
25	6850	33673	6545	32053
30	6619	32418	6276	30710
35	6348	31048	6008	29325
40	6071	29583	5722	27748
45	5762	28028	5377	26013
50	5446	26290	5028	23973
55	5070	24190	4561	21508
60	4606	21530	4042	18635
65	4006	18095	3412	15185
70	3232	13828	2662	11198
75	2299	9153	1817	7045
80	1362	6141	1061	4292

$$\frac{\infty L_{80}}{\infty H_{80}} = \frac{\infty L_{80}}{\infty H_{80}}$$

$\infty H_{80} = .2218$ is taken from
the standard
life table

$$\sum_0^{\infty} L_x = 461335$$

$$e_0 = 46.1$$

$$\frac{\infty L_{80}}{\infty H_{80}} = \frac{\infty L_{80}}{\infty H_{80}}$$

$\infty H_{80} = .2332$ is taken from
the standard
life table

$$\sum_0^{\infty} L_x = 428625$$

$$e_0 = 42.9$$

$$e_0 \text{ (both sexes)} = 44.5$$

CHAPTER 11

MORTALITY DIFFERENTIALS

by

I.S. L. Sembajwe*

INTRODUCTION

Due to varied socio-economic and health conditions among population sub-groups in Tanzania, it is expected that mortality conditions would vary from one sub-population to another reflecting the differences in these conditions. This chapter examines the prevalence of mortality differentials in the country, and is based largely on mortality estimates from child survival information.

Tanzania is predominantly an agricultural country, with about 90 percent of its population found in rural areas. The major economic activity of the rural population is subsistence farming, and over the past ten years or so Tanzania has experienced stagnant or declining agricultural production which has forced it to increasingly depend on foreign sources for food supply and socio-economic development financing. But despite these problems, the Government of the United Republic of Tanzania is striving to make her people enjoy improved socio-economic services such as those related to health, education, transport, water supply and electricity, and an overall improved standard of living. So far, major success has been achieved in the area of literacy where over 50 percent of Tanzanians were reported literate in 1978. In addition, the establishment of universal primary education, has enabled more children to have access to formal education now than was the case in the past.

Tanzania's socio-economic development is not, however, uniform in all its regions. For example the five regions found in the Islands of Zanzibar are somewhat different from the rest of Tanzania in that they are more densely populated than the Mainland and settled by a

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suggest ways in which their health and socio-economic conditions can be improved.

REGIONAL DIFFERENTIALS

The estimates of mortality and selected socio-economic indicators given in Table 11.1 indicate that socio-economically better off regions such as Kilimanjaro, Arusha and Tanga have the lowest levels of mortality in the country (with expectation of life at birth ranging from 49 to 58 years). Dar-es-Salaam region, which is largely an urban region also falls in this category with an expectation of life at birth of about 50 years. On the other extreme somewhat inaccessible and relatively backward regions such as Kigoma, Rukwa and Mtwara have the highest levels of mortality (with expectation of life at birth of about 40 years).

Geographically adjacent regions which in most cases have almost similar socio-economic conditions, have levels of mortality which are almost similar. For example, Dodoma, Tabora and Singida regions (the central zone) have quite close levels of mortality (44 to 45 years), while the North-West Lake regions (West Lake, Mwanza and Mara) have almost identical levels. Along the Indian Ocean coast, Lindi and Mtwara have similar levels, while Coast region which is adjacent to the city of Dar-es-Salaam has somewhat lower mortality than the former two². This is a reflection of the fact that although this region has characteristics of the coastal belt, it is influenced by the socio-economic characteristics of Dar-es-Salaam. For example it benefits from the health, commercial, administrative, transport and other facilities and services which the city enjoys. Therefore its expectation of life at birth should be closer to that of Dar-es-Salaam region than to that of the rest of the coastal belt.

²Dar-es-Salaam region includes the former capital city and the major industrial area in the country.

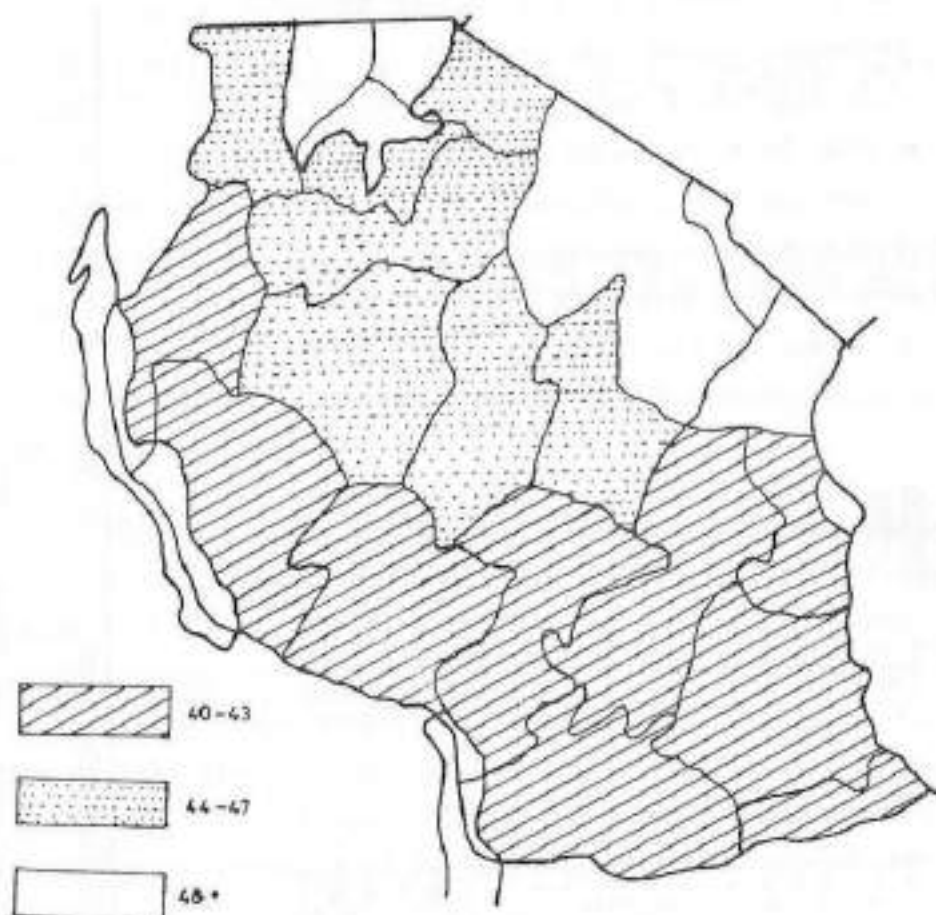
TABLE 11.1.1.--- SELECTED SOCIO-ECONOMIC INDICATORS AND EXPECTATION OF LIFE AT BIRTH IN REGIONS OF TANZANIA GROUPED BY ZONE

Zone	Region	% of Women with 9+ Years of Education 1973 ¹	Gross Regional Product 1978 ¹	Export Crop Value on Peasant Farms (T.Shs.) 1971	Population/Primary Health Care staff 1978 ¹	KM Roads/Area 1974 ¹	Expectation of Life Using 1978 data Reg. Zone
North Eastern Zone	Krusha	1.6	1300	10707	1495	.5	50)
	Kilimanjaro	.8	1093	102500	1051	1.8	58)
	Tanga	.7	1849	23341	2377	1.2	49)
North Western Zone	Mara	.6	748	44840	2395	.6	44)
	Mwasa	.3	800	52160	1889	1.3	44)
	Shinyanga	.1	1055	82500	3646	.7	42)
	West Lake	.5	1041	89560	2146	.8	45)
Central Plateau Zone	Dodoma	.5	680	0	1926	.7	45)
	Singide	.4	640	4240	2067	.5	44)
	Tabora	.3	1026	48080	1925	.4	44)
Western Zone	Kigoma	.2	990	800	2412	.2	40)
	Rukwa	a	814	a	1844	.8	40)
Coastal Zone	Coast	.4	1280	23427	3615	1.0	47)
	Lindi	.6	678	20000	2137	.6	42)
	Morogoro	.6	1275	1720	1692	.4	44)
	Mwara	.2	552	20000	2052	.6	40)
Southern Zone	Iringa	.6	1190	12660	1835	.6	41)
	Mbeya	1.1	1294	31694	1696	.5	41)
	Ruvuma	1.1	689	61162	1576	.4	43)
	Zanzibar N	b	b	b	b	b	45)
	Zanzibar S	b	b	b	b	b	46)
	Zanzibar T/W	b	b	b	b	b	49)
	Pemba N	b	b	b	b	b	46)
	Pemba S	b	b	b	b	b	47)

a. Rukwa Region was formed in 1976 (includes portions from Mbeya and Tabora). b. Data is not available for these regions.

¹U. Schuler. Planning for Rural Development and Physical Village Planning: a Village Planning Handbook (Dar-es-Salaam: Ardhi Institute, 1982).

MAP 11.1..... EXPECTATION OF LIFE AT BIRTH BY REGIONS
BASED ON 1978 DATA: MAINLAND.



Source : Table 11.1.

The estimates for regions in Zanzibar indicate that the Islands indeed enjoy relatively better socio-economic conditions than many parts of Tanzania Mainland. Their level of mortality is between that of the North-Eastern Zone of Tanzania Mainland and the North-Western Lake Zone regions.

AGE AND SEX DIFFERENTIALS

Data on survival of spouse facilitated the estimation of adult mortality indices by sex and age. But the initial estimates indicated such a wide gap between male and female mortality that it was difficult to accept these estimates as plausible. Despite this limitation, females appear to have an advantage over males in mortality. In all cases the probability of surviving from birth to age N was higher for females than for males although Table 11.2 indicates further that the overall sex difference of 9.2 years for the Mainland and Tanzania as a whole and 14.7 years for Zanzibar are rather implausible.

TABLE 11.2.— EXPECTATION OF LIFE AT BIRTH DERIVED FROM SURVIVAL OF SPOUSES

Area	Expectation of Life at Birth		
	Female	Male	Difference
Mainland	48.3	39.1	9.2
Zanzibar	50.0	35.3	14.7
Tanzania	48.3	39.1	9.2

Linking childhood mortality with adult mortality resulted in the construction of male and female life tables. Age specific mortality rates derived from these tables indicate that mortality is lower for females than for males (Table 11.3). Further the rates follow the traditional pattern of high mortality in infant and early childhood years, low mortality in later childhood and early adult years, and high and gradually increasing mortality from about age twenty to age 80.

TABLE 11.3.— AGE SPECIFIC MORTALITY RATES $q(x)$ PER 1000 BY SEX AND AREA

Age	Mainland		Zanzibar		Tanzania	
	Females	Males	Females	Males	Females	Males
0-1	129.0	149.4	97.1	111.8	128.8	147.4
1-4	103.2	108.5	93.8	101.6	103.1	109.8
5-9	42.1	45.9	40.6	44.7	42.2	46.2
10-14	16.8	18.5	16.4	18.5	16.9	18.5
15-19	28.3	31.0	28.1	31.1	28.0	31.0
20-24	37.4	41.6	38.0	42.5	37.6	41.8
25-29	38.7	42.6	39.2	44.7	38.5	42.9
30-34	39.6	44.7	41.1	47.2	39.9	44.7
35-39	44.4	49.2	46.9	54.5	44.9	50.1
40-44	52.2	58.9	55.5	63.5	51.7	58.6
45-49	64.7	73.9	70.0	80.9	65.2	73.4
50-54	84.5	95.2	93.0	97.9	84.4	96.8
55-59	110.8	126.9	123.8	152.7	111.1	126.9
60-64	156.4	178.6	175.8	207.4	156.5	179.9
65-69	211.3	243.6	240.2	280.4	211.9	245.0
70-74	303.9	355.1	344.3	430.5	303.9	376.2
75-79	404.1	493.0	455.1	532.0	405.4	479.6
80+	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0

DIFFERENTIALS BY EDUCATION AND OCCUPATION

As expected information from the 1967 census and the 1973 National Demographic Survey revealed that child mortality was lower for women with some education than for those with no education and lower for high status occupational groups than for lower occupational status sub-populations such as farmers³. In addition a case study of three regions in Tanzania (Kilimanjaro, Mara and Morogoro) indicated that villages with better socio-economic conditions (e.g., more educated people, higher income per household, better nutrition, clean water supply and better housing) also experienced lower mortality (see Table

³ B. Egero and R. A. Henin (eds.) The Population of Tanzania (Dar-es-Salaam: BRAIUP and Bureau of Statistics, 1973); R.A. Henin (ed.) The Demography of Tanzania (Dar-es-Salaam: Bureau of Statistics and BRAIUP, 1977), pp 211-225.

11.4 for a summary of these findings)⁴. This indeed reflects the impact of socio-economic development on mortality decline.

Data from the 1976 census on education and occupation of woman and occupation of head of household is examined in this section to see whether information from the census supports the traditional view of lower mortality for more educated women and higher occupational status groups than for the uneducated women and persons in farming or low status occupations. Tables 11.5 and 11.6 show that indeed this is the case. The indices of mortality shown reflect higher child mortality for women with no formal schooling than for those with some schooling. The higher the education of the woman, the lower the level of child mortality. This differential is however more distinct for Tanzania Mainland than for Zanzibar in the case of urban areas, suggesting that socio-economic differentiation on educational and occupational scales is higher in the former than in the latter. In other words, lifestyles for both educated and uneducated people (for example) in urban areas of Zanzibar are not as different as they are in urban areas of the Mainland. The difference in expectation of life at birth in urban areas is about four years for Zanzibar and about nine years for the Mainland. The slightly apparent higher mortality for women with secondary or higher education than for those with primary education in Zanzibar can, however, be attributed to chance fluctuations due to small numbers.

⁴Sembajwe, op.cit.

TABLE 11.4.— CHILDHOOD MORTALITY AND SELECTED FACTORS INFLUENCING MORTALITY*

Area Region/ Village	Child- hood mortal- ity per 1 1000 ¹ 4 ^{q1}	Medium Income per an- nual per (T.Shs) ucation;	Percent- age of females with some ed- ucation;	Percent- age of women with hus- bands with some edu- cation	Water ²	% of house- holds with children eating be- fore scho-	% of house- holds get- ting 3 meals a day	% of house- holds eating beans at least once a week	% of house- holds eating fruits at least once a week	% of house- holds owning a radio
Kilimanjaro										
Mwanga	16	2150	78.1	90.0	1	89.2	98.3	99.2	86.3	74.6
Kilimo--										
Makuyuni	37	980	76.8	75.1	1	78.1	80.3	83.9	64.9	56.5
Kileleshwa	71	2500	84.0	51.5	1	96.9	95.5	93.6	87.2	47.3
Mweteni	24	2190	71.3	82.7	2	73.6	73.6	93.9	74.0	46.0
Mara										
Bumangi	143	900	37.4	56.6	2	8.8	16.0	40.3	42.3	37.9
Baitenge	180	520	30.2	38.3	2	19.4	35.9	61.9	54.2	20.3
Masonga	76	1160	13.0	40.3	2	9.1	60.9	47.5	43.7	18.7
Morogoro										
Siginali	117	600	24.3	59.5	2	46.3	43.2	28.6	53.9	32.9
Zombo	135	500	42.5	61.4	2	49.1	47.2	72.9	74.0	45.2
Medibira	80	450	45.3	66.1	2	40.8	33.3	79.2	68.2	25.2
Kinonko	135	300	15.2	57.7	2	50.9	32.3	81.6	47.4	40.6

Source: Sembajwe 1982, op.cit.,

* Mortality was significantly negatively correlated with income, education of women, education of husband, eating of children before school, number of meals a day, frequency of eating beans and fruits and ownership of a radio. It was also positively correlated with bad source of water. The correlations were significant at a 5 percent level (t test).

¹ Values acquired by interpolating q_5 values in Brass's one Parameter Model Life Tables (Carrier and Hobcraft, 1971).

² For source of water: 1 represents piped water and 2 represents well/stream/river.

TABLE 11.5.—MORTALITY INDICES DUBLING BY $1_2, 1_3$ AND 1_5 (FOR 1000) BY EDUCATION OF WOMEN

Area	No formal Education			Primary Education			Post-Primary Education ^a		
	1^0_0	1^0_4	e_0 (years)	1^0_0	1^0_4	e_0 (years)	1^0_0	1^0_4	e_0 (years)
<u>Rural</u>									
Malawi	147.7	119.7	42.2	109.3	81.3	49.6	b	b	b
Zambia	114.9	87.5	48.3	82.4	53.8	55.7	b	b	b
Tanzania	147.7	119.7	42.2	109.3	81.3	49.6	b	b	b
<u>Urban</u>									
Malawi	114.9	87.5	48.3	77.4	49.2	56.9	48.9	24.7	64.4
Zambia	98.3	69.3	52.0	82.4	53.8	55.7	87.7	58.9	54.5
Tanzania	114.9	87.5	48.3	77.4	49.2	56.9	53.3	28.3	63.1

a. Secondary and higher education and any other type of education beyond primary.

b. The number of women was small and was added to the lower level of education.

TABLE 11.6.—MORTALITY INDICES IMPLIED BY 1₂, 1₃ AND 1₅ (PER 1000) BY OCCUPATION OF HEAD OF HOUSEHOLD

Area	Cultivators			Other Agriculture			Labourers and other workers			Students and Unoccupied			Craftsmen and operators			Professional, Managerial, Sales, Clerical		
	1 ₂	1 ₃	1 ₅	1 ₂	1 ₃	1 ₅	1 ₂	1 ₃	1 ₅	1 ₂	1 ₃	1 ₅	1 ₂	1 ₃	1 ₅	1 ₂	1 ₃	1 ₅
<u>Rural</u>																		
Mainland	147.7	119.7	42.1	147.7	119.7	42.1	103.7	75.0	50.8	134.0	106.9	44.7	109.3	81.3	49.6	87.6	58.9	54.5
Zanzibar	114.9	87.5	48.3	114.9	87.5	48.3	121.1	94.1	47.1	103.7	75.0	50.8	103.7	75.0	50.8	92.8	63.9	53.2
Tanzania	147.7	119.7	42.1	147.7	119.7	42.1	103.7	75.0	50.8	134.0	106.9	44.7	109.3	81.3	49.6	87.6	58.9	54.5
<u>Urban</u>																		
Mainland	127.3	100.7	45.9	121.1	94.1	47.1	114.9	87.5	48.3	109.3	81.3	49.6	98.3	69.5	52.0	82.4	53.8	55.7
Zanzibar	109.3	81.3	49.6	87.6	58.9	54.5	103.7	75.0	50.8	134.0	106.9	44.7	87.6	58.9	54.5	87.6	58.9	54.5
Tanzania	121.1	94.1	47.1	114.9	87.5	48.3	114.9	87.5	48.3	114.9	87.5	48.3	92.8	63.9	53.2	87.6	58.9	54.5

TABLE 11.7.—POPULATION EMPLOYED BY L_2 , L_3 AND L_5 (FOR 1000) BY OCCUPATION OF WOMEN^a

Area	Cultivators			Labourers and Other Workers			Students and Unemployed			Craftsmen and Operators			Professional, Manage- rial, Sales and Cle- rical		
	1^0	$4^0 1$	e_0	1^0	$4^0 1$	e_0	1^0	$4^0 1$	e_0	1^0	$4^0 1$	e_0	1^0	$4^0 1$	e_0
<u>Rural</u>															
Malindi	127.3	100.7	45.9	114.9	87.5	48.3	121.1	94.1	47.1	114.9	87.5	48.3	92.8	63.9	53.2
Zanzibar	109.3	81.3	49.6	87.6	58.9	54.5	109.3	81.3	49.6	109.3	81.3	49.6	109.3	81.3	49.6
Tanzania	127.3	100.7	45.9	114.9	87.5	48.3	121.1	94.1	47.1	114.9	87.5	48.3	103.7	75.0	50.8
<u>Urban</u>															
Malindi	109.3	81.3	49.6	82.4	53.8	55.7	92.8	63.9	53.2	53.3	28.3	63.1	53.3	28.3	63.1
Zanzibar	103.7	75.0	50.8	72.3	44.6	58.1	103.7	75.0	50.8	92.8	63.9	53.2	59.4	34.2	61.9
Tanzania	109.3	81.3	49.6	82.4	53.8	55.7	92.8	63.9	53.2	65.5	36.1	50.6	53.3	28.3	63.1

^aThe occupational Category "Other Agriculture" had very few women.

With regard to occupation of head of household, child mortality is generally higher for cultivators, those in other agriculture, labourers and other workers, as well as the students and unoccupied than for craftsmen and operators, and white collar workers (professional, managerial, sales and clerical). As in the case of education, the gap between farmers and white collar workers for example is narrower for Zanzibar (5 years for both rural and urban areas) than for the Mainland (12 and 10 years for rural and urban areas respectively). These findings were supported by information based on occupation of woman which indicates similar mortality differentials (Table 11.7).

RURAL URBAN DIFFERENTIALS

The analysis of child mortality in Chapter 10 indicated that mortality is lower in urban than in rural areas. Indeed the results given in Table 11.8 indicate that this is the case. The relatively higher level of mortality in Dar es Salaam City compared to smaller urban areas (for example) those in Kilimanjaro, Arusha, Dodoma, Tanga and Mwanza regions) suggests that mass migration from rural and other areas to Dar-es-Salaam may cause overcrowding, create a large group of unemployed people and put a high strain on the health and socio-economic services in the city, thus reducing the advantage Dar-es-Salaam would have over other areas in terms of better health facilities and services as well as socio-economic conditions.

TABLE 11.8.— MEAN EXPECTATION OF LIFE AT BIRTH AND INFANT AND CHILD MORTALITY RATES BASED ON CHILD SURVIVAL DATA BY RURAL AND URBAN RESIDENCE

Area	Rural			Urban		
	e_0	1^q_0	4^q_1	e^0	1^q_0	4^q_1
Dodoma	42.2	147.7	119.7	53.2	92.8	63.9
Arusha	49.6	109.3	81.3	55.7	82.4	53.8
Kilimanjaro	56.8	77.4	49.2	58.1	72.3	44.6
Tanga	48.3	114.9	87.5	53.2	92.8	63.9
Morogoro	43.4	140.6	113.1	48.3	114.9	87.5
Coast	47.1	121.1	94.1	48.3	114.9	87.5
Dar-es-Salaam	45.9	127.3	100.7	52.0	98.3	69.5
Idindi	39.7	162.2	133.3	47.1	121.1	94.1

TABLE 11.8.— (Continued)

Area	Rural			Urban		
	e_0	1^{q_0}	4^{q_1}	e_0	1^{q_0}	4^{q_1}
Mtwara	38.4	169.9	140.3	48.3	114.9	87.5
Ruvuma	40.9	154.8	126.3	48.3	114.9	87.5
Iringa	40.9	154.8	126.3	48.3	114.9	87.5
Mbeya	38.4	169.9	140.3	45.9	127.3	100.7
Singida	43.4	140.6	113.1	49.6	109.3	81.3
Tabora	43.4	140.6	113.1	48.3	114.9	87.5
Rukwa	38.4	169.9	140.3	45.9	127.3	100.7
Kigoma	43.4	140.6	113.1	50.8	103.7	75.0
Shinyanga	43.4	140.6	113.1	52.0	98.3	69.5
West Lake	44.7	134.0	106.9	50.8	103.7	75.0
Mwanza	43.4	140.6	113.1	53.2	92.8	63.9
Mara	43.4	140.6	113.1	49.6	109.3	81.3
Mainland	43.9	137.9	110.6	50.8	103.7	75.0
Zanzibar North	43.4	140.6	113.1	52.0	98.3	69.5
Zanzibar South	48.3	114.6	87.5	45.9	127.3	100.7
Zanzibar Town/ West	53.2	92.8	63.9	52.0	98.3	69.5
Pemba North	49.6	109.3	81.3	50.8	103.7	75.0
Pemba South	52.0	98.3	69.5	55.7	82.4	53.8
Zanzibar	48.8	112.9	84.5	51.5	100.7	72.0
Tanzania	44.2	136.6	109.1	50.8	103.7	75.0

The only exception to this rural-urban pattern in mortality is observed in Zanzibar where two regions have evidence suggesting that urban mortality is higher than rural mortality. Not much confidence should be put on this evidence, especially in view of the fact that Zanzibar Town/West and Pemba North and South regions are some of the regions which have very low quality of mortality data.

Tables 11.5 and 11.6 suggested further that for each socio-economic group (e.g., for the educated or those without education) mortality was lower in urban than in rural areas. Some fluctuations occur in the case of labourers and other workers, and students and unoccupied. But these fluctuations may be due to small numbers and errors in the data.

CONCLUSION

The differences observed in mortality may not be the exact levels of mortality operating in each population sub-group, but they are at least indicative of the variations which are prevailing in Tanzania. These differences reflect the relatively favourable or unfavourable position held by each population sub-group with regard to health and socio-economic conditions. For example, the educated and those employed in high status occupations have lower mortality than the farmers and less educated, and this is a reflection of their relatively higher income and better knowledge. Those areas with better agricultural production, more educated people, better transportation system and a relatively well distributed supply of health facilities and services have lower mortality than poor regions (e.g., compare Rukwa and Kigoma with Kilimanjaro).

The evidence suggests that in order to improve the health conditions and overall well-being of the people of Tanzania it is necessary to have an equitable supply of health facilities and socio-economic development factors such as education, better housing, income, improved transportation and clean water supply. The Government of the United Republic of Tanzania should continue with its efforts to make this a reality.

CHAPTER 12

FERTILITY LEVELS AND PATTERNS

by

S.A.M. Ngallaba^{*}

INTRODUCTION

The last three modern population censuses held in Tanzania (1948 and 1957 censuses in Mainland Tanzania and 1958 census in Zanzibar, and 1967 census) as well as the 1973 National Demographic Survey in Mainland Tanzania, collected information from which some fertility estimates were obtained. Likewise, the 1978 census provided another opportunity to collect basic information that would be used to derive fertility indices. This chapter tries to examine the methods used in collecting the data, and their reliability. The recorded crude birth rates as well as the age-specific birth rates will also be examined and some methods applied to adjust the data before any serious attempt is made to determine the levels of fertility for the country and the regions.

SOURCES OF DATA ON FERTILITY

For the 1978 Population census, there were two basic questions from which fertility indices were obtained. These questions which were asked of women

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12 years and above were as follows:

- (i) A question was asked as to the number of children ever born alive. This was subdivided into three, the total of which gave the total number of children borne alive by the woman. The first part asked the number of children born alive and living with the mother, the second dealt with the number of children born alive but living elsewhere, while the third part asked about the number of children born alive who had died by the time of the census. This question provided information on the average number of children borne alive by women, and for women who have completed their reproductive life, the average size of completed family.
- (ii) Date of the most recent (last) live birth was another question that was asked to every eligible woman. From this question information on current fertility could be obtained.

In addition to these questions, data on age distribution provide "child/woman" ratios which can be used to infer other fertility indices with the help of stable population models.

A word is necessary about the limitations of data on fertility obtained from the methods explained above. Data on current fertility are usually affected by a number of serious errors. Firstly, births which occurred in 1977 and 1978 and died at infancy might have been missed out because of the reluctance of the people to talk about their dead, and this could have deflated the number of current births. Secondly, the ratio that is used to determine current births assumes that births

are evenly distributed throughout the period. There might have occurred more births at one point of time or during one particular season than the other¹. This would, therefore, result in underestimating or overestimating the number of births for the one year period preceding the enumeration. However, this approach could be considered to be more accurate compared to the direct approach of asking the number of live births which occurred during the twelve months preceding the census, because this direct approach would definitely be subjected to the imprecision in the reference period. Another source of error is sampling error which would affect the estimates because data on fertility was obtained from a sample of women.

The retrospective fertility data are affected by recall lapses particularly in illiterate or semi-literate populations who cannot remember all their children. Since the question on the number of children ever born deals with large numbers, women fail to recall their

¹In order to obtain the total number of live births which occurred during the twelve months before the enumeration date, the following procedure was used:

- (a) the 1978 recorded live births were taken--here they are denoted by " b_{78} ".
- (b) the 1977 recorded live births were also obtained--denoted here as " b_{77} ".
- (c) since the number of days in 1978 refer to the dates between 1 January, 1978, and 27 August, 1978 (that is equivalent to 239 days), then a portion of the year 1977 was added to make a whole year, that is 126 days.

Therefore, the number of live births that occurred during the year before the census referred to as " $B_{(i)}$ " is:

$$B(i) = b_{78}(i) + \frac{126}{365} b_{77}(i),$$

where i is the i th age group.

live births accurately and tend to omit children who have died at infancy. Though, during the last census information on the number of children ever born was subjected to three probe questions, it will be observed at a later stage in this chapter that there are clear omissions particularly at older ages.

It must be pointed out that lack of comparable data makes it difficult to detect all errors in either the current or the retrospective data. Although registration of births has been compulsory under a law enacted in 1921, registration is far from being complete. While registration of live births in rural areas is practically non-existent, in urban areas very few births are actually registered because the law itself is not properly enforced. Attempts will, therefore, be made to make some comparisons with the findings observed from the 1967 census and 1973 National Demographic Survey before levels of fertility for the country and regions are determined.

CRUDE BIRTH RATE

In Table 12.1, recorded crude birth rates from the 1978 census for the regions are compared with adjusted rates obtained from the 1967 census and the 1973 National Demographic Survey (NDS). The recorded rates from the 1978 census are arranged in descending

order².

Table 12.1 shows some agreements in some regions. For example in Arusha, Zanzibar, Mainland, Mtwara, West Lake, Tabora, Shinyanga, Lindi, Coast and Mwanza the recorded crude birth rates lie close to the adjusted rates observed in 1967 census and/or 1973 National Demographic Survey. In Mara, Morogoro, Kigoma and Dar es Salaam, the recorded rates from the 1978 census appear to be on the high side compared to the estimates obtained from the 1967 census. This can be explained by the fact that either there is an over-statement of births in 1978 or possibly births were under-reported in the 1967 census. On the other hand, crude birth rates observed in 1978 in Singida, Iringa, Mbeya, Dodoma, Ruvuma and Tanga regions lie far below those obtained from the 1967 census and/or 1973 National Demographic Survey. While there is no evidence to show

²Only rural and urban sample data for each region were published in Census Volume V. In order to obtain regional estimates the following formula was used:

$$\text{Regional estimate (e.g.CBR)} = \frac{w_R b_R + w_u b_u}{w_R + w_u}$$

where: w_R is rural raising factor

w_u is urban raising factor

b_R stands for fertility rate for rural part of the region, and,

b_u stands for fertility rate for urban part of the region.

To obtain the Mainland's estimate, the products obtained for the 20 regions were accumulated

$$\text{Mainland's fertility rate} = \frac{\sum_{i=0}^{20} (w_{Ri} b_{Ri} + w_{ui} b_{ui})}{\sum_{i=0}^{20} (w_{Ri} + w_{ui})}$$

where i stands for the Mainland regions.

Similarly, the same procedure was used to determine the rate of fertility for Zanzibar and Tanzania Total. The raising factors are presented in chapter 10(Appendix X.1).

TABLE 12.1.-- CRUDE BIRTH RATES FOR 1967 CENSUS, 1973 NDS AND 1978 CENSUS*

Region	Adjusted CBR from		Recorded CBR from 1978 Census
	1967 Census ^a	1973 NDS ^b	
Mara	52(62)	-(-)	68
Rukwa	- -	-(-)	56
Pemba North	- -	-(-)	54
Kigoma	43(54)	-(-)	54
Pemba South	- -	-(-)	53
Arusha	47(56)	48(50.0)	48
Mwanza	49(62)	49(50.9)	48
Shinyanga	51(65)	49(50.8)	48
West Lake	50(53)	-(-)	48
ZANZIBAR	48(58)	-(-)	48
Morogoro	44(50)	43(39.5)	48
Mbeya	52(62)	52(48.4)	46
Zanzibar North	- -	-(-)	46
Kilimanjaro	51(57)	46(45.7)	46
MAINLAND	47 -	47(45.7)	46
Zanzibar West	- -	-(-)	46
Iringa	55(58)	52(53.3)	45
Ruvuma	48(62)	47(46.9)	44
Dodoma	48(61)	48(48.2)	44
Tabora	40(55)	40(42.2)	43
Tanga	46(58)	47(46.7)	42
Dar es Salaam	33 -	45(-)	42
Lindi	- -	38(39.5)	41
Coast	37(48)	- (33.7)	40
Singida	45(55)	44(44.4)	40
Zanzibar South	- -	-(-)	39
Mtwara	38(49)	39(38.7)	38

* Figures in brackets refer to recorded birth rates.

^aB. Egero and R.A. Henin, "Fertility", in B. Egero and R.A. Henin(Eds.), The Population of Tanzania. An Analysis of the 1967 Population Census, Vol.6 (Dar es Salaam: Bureau of Resource Assessment and Land Use Planning, and Central Statistical Bureau, 1973), p.195

^bD.C. Ewbank, "Fertility Estimation", in R.A. Henin et al (eds.), The Demography of Tanzania: An Analysis of the 1973 National Demographic Survey of Tanzania. Vol.6 (Dar es Salaam: Bureau of Statistics and Bureau of Resource Assessment and Land Use Planning, n.d.), Appendix 5.1, pp.300-303.

that fertility is declining in these regions, it is probable that births have been underestimated taking into consideration the seasonal variations that might have occurred in 1977 and 1978. The recorded rate for Kilimanjaro agrees with that from the 1973 NDS but lies below that from the 1967 census.

The five Zanzibar regions and Rukwa region on the Mainland do not have any comparable data since these regions were not treated separately during the 1967 census, while in 1973, the National Demographic Survey did not cover Zanzibar, and Rukwa was part of Mbeya and Tabora regions.

TOTAL FERTILITY RATE

While crude birth rate is a "crude" measure of fertility as it includes the whole population, the total fertility rate takes into consideration the distribution of births during the twelve months' period preceding the enumeration among women of different ages. The total fertility rates recorded from the 1978 census, arranged in descending order, are compared with the adjusted rates obtained by Egero and Henin³ from the 1967 census as well as those obtained by Ewbank⁴ from the 1973 National Demographic Survey. Table 12.2 shows the three sets of values.

³B. Egero and R.A. Henin, (eds), ibid.

⁴D.C. Ewbank, "Fertility Estimation", in R.A. Henin et al(eds.), ibid.

TABLE 12.2.-- RECORDED TOTAL FERTILITY RATES FROM 1978 CENSUS AND ADJUSTED TOTAL FERTILITY RATES FROM 1967 CENSUS AND 1973 NDS*

Region	Adjusted rate from		Recorded from
	1967 Census ^a	1973 NDS ^b	1978 Census
Pemba North	- (-)	-	8.3
Pemba South	- (-)	-	8.2
Rukwa	- (-)	-	8.0
Kilimanjaro	7.9 (8.9)	7.0	7.5
West Lake	7.1 (7.5)	6.8	7.4
Kigoma	5.9 (6.6)	5.9	7.3
ZANZIBAR	6.5 (7.3)	-	7.2
Mwanza	6.9 (8.1)	6.6	7.1
Zanzibar North	- (-)	-	7.1
Arusha	7.1 (7.5)	6.5	7.0
Mara	7.1 (8.0)	6.9	7.0
Shinyanga	7.5 (8.7)	6.4	6.9
Morogoro	6.0 (6.2)	6.0	6.5
MAINLAND	6.6 (7.3)	6.3	6.4
Iringa	8.4 (7.8)	6.9	6.3
Mbeya	7.6 (8.1)	7.1	6.3
Zanzibar South	- (-)	-	6.2
Tanga	6.9 (7.7)	7.0	6.2
Dodoma	6.9 (7.6)	6.7	6.2
Zanzibar West	- (-)	-	6.1
Coast	4.9 (5.8)	5.1	6.1
Ruvuma	6.7 (7.1)	6.4	6.1
Tabora	5.5 (6.7)	5.4	6.0
Singida	6.1 (6.3)	5.5	5.9
Dar es Salaam	4.3 (5.0)	4.7	5.4
Lindi	- (-)	-	5.4
Mtwara	5.0 (5.7)	5.2	4.9

*Figures in brackets refer to recorded total fertility rates.

^aSource: B. Egero and R.A. Henin(eds.), *ibid.*

^bSource: D.C. Ewbank in R.A. Henin et al(eds.), *ibid.*

A close examination of Table 12.2 reveals that fertility has been steadily declining in the case of Mainland Tanzania and Tanzania as a whole. From 6.6 that was estimated in the 1967 census, total fertility rate for Mainland Tanzania dropped by 4.5 percent to 5.3 in 1973. Ewbank argues that the main reason for the drop was that the age-specific fertility schedule provided by the 1967 census data on current births frequently led to higher mean ages of childbearing⁵. However, as it will be discussed later, the mean age of childbearing for Mainland of 28.8 for females compared to that of 29.0 observed from the 1967 census seems to be on the low side. Again a recorded total fertility rate of 6.4 for Mainland Tanzania appears to be on the low side, being possibly due to understatement of current births. In the case of Zanzibar, there is a rise in fertility of about 11 percent from 6.5 in 1967 census to an observed rate of 7.2. There is, however, no evidence that indicates that fertility is rising in the Islands. This rise may possibly be due to overstatement of births from the 1978 census.

On the other hand, regional estimates from which Mainland's estimates are derived show an interesting pattern. For example, there is little difference between the recorded total fertility rates from the 1978 census and those from the 1967 census and 1973 National Demographic Survey in the case of Mtwara and Mara regions. Fertility appears to be rising in Kigoma, Morogoro, Coast, Tabora and Dar es Salaam, while in Iringa, Mbeya, Tanga, Dodoma and Ruvuma it is observed that fertility is declining. For Arusha, Shinyanga, Singida, Mwanza and West Lake, fertility rates have

⁵Ewbank, *ibid.*

fluctuated by showing a decline in 1973 and a rise in 1978. No comparative data are available for Rukwa, Lindi and Zanzibar regions.

Since the comparisons with other available information do not throw light on the types of errors in the 1978 census data, another attempt will be made to examine and compare the current and retrospective data.

AGE-SPECIFIC FERTILITY RATES AND AVERAGE PARITY

Current and retrospective data are usually used to detect and allow for errors in both types of data because of the logical relationship between them. The mean number of children born alive per woman at each age obtained from the current data can be compared with the corresponding retrospective data, since it is expected that the average number of children ever born (P_i) at each age will be equal to the cumulative total age-specific fertility rates (F_i) to that age. If the two sets of indices agree at each age the evidence for accuracy is strong.

However, Brass observed that the application of this procedure to data from many African populations have revealed systematic discrepancies⁶, which are caused by two factors:

- (a) the number of births in the twelve-month period preceding the census or survey is affected by imprecision in the reference

⁶Brass, et al., The Demography of Tropical Africa (Princeton: Princeton University Press, 1968).

period, and this causes fertility rate based on these data to be wrong so as to be unusable, mostly because the level is too low or is grossly inflated, and

- (b) the reported mean numbers of children ever born are often high at younger ages but decrease gradually with the age of the woman due to the omission of children as women get older.

Of course, each of the two sets of data may be deficient, but the nature of the errors definitely differ. Comparison of the average number of everborn live births with the average value of cumulated current fertility at corresponding age groups may reveal the direction of errors. Table 12.3 shows the average number of children ever born (P_i) and the average value to the cumulated current fertility (F_i) for Mainland Tanzania and Zanzibar while Appendix XII.1 shows the values for regions.

TABLE 12.3.-- AVERAGE NUMBER OF CHILDREN EVER BORN (P_i), THE CUMULATED CURRENT FERTILITY (F_i) AND THE CORRESPONDING RATIOS (P_i/F_i) FOR MAINLAND TANZANIA AND ZANZIBAR

Age Group	Mainland Tanzania			Zanzibar		
	P_i	F_i	P_i/F_i	P_i	F_i	P_i/F_i
15-19	0.430	0.338	1.272	0.867	0.672	1.291
20-24	2.036	1.594	1.277	2.892	2.519	1.149
25-29	3.657	3.107	1.177	4.511	3.953	1.142
30-34	5.103	4.414	1.156	5.727	5.427	1.056
35-39	5.926	5.454	1.087	5.980	6.273	0.954
40-44	6.190	6.085	1.017	5.791	6.817	0.850
45-49	6.069	5.923	1.025	5.649	6.716	0.842

Table 12.3 shows that in the case of Mainland Tanzania, the P_i values lie above the F_i values for all age groups confirming beyond doubt the fact that the current data were certainly underestimated judging from the exceptionally high P/F values for particularly the first four age groups. With regard to Zanzibar the P_i values seem to be higher than the F_i values for the three youngest age groups implying understatement of current fertility. The two values become almost equal for age groups 30-34 and 35-39, that is P_4/F_4 and P_5/F_5 respectively. After this age group, values for P drop from 5.980 for age group 35-39 to 5.791 age group 40-44 and 5.649 for age group 45-49 indicating some signs of recall lapse at old ages. The F values, however, rise from 6.273 for age group 35-39 to 6.817 for age group 40-44 and drop slightly to 6.716 for age group 45-49.

Regions present similar patterns of behaviour, as shown in Appendix XII.1. In Kilimanjaro, Kigoma, West Lake, Mwanza, Pemba North and Pemba South, the P_i values for the first two age groups are higher than the corresponding F_i values indicating an understatement of current data. There is evidence of accuracy in age groups 25-29 and 30-34, where the P/F ratios are close to unity. For the older ages, the P values drop and tend to lie below the F values indicating the strong influence of recall lapse. The P values seem to lie well above the F values for all ages in Dodoma, Tanga, Coast, Mtwara, Ruvuma, Iringa, Mbeya, Singida and Mara, showing weaknesses in the current data. In Arusha, Morogoro, Dar es Salaam, Lindi, Tabora, Shinyanga, Zanzibar North, Zanzibar South and Zanzibar Town/West regions, the P/F ratios lie above unity for almost the

first five age groups and tend to drop to below unity for the last two age groups indicating errors in the current data in the first instance and effect of recall lapse in the retrospective data for the older ages.

To conclude, while effects of recall lapse seem to appear in some regions, there is a general feeling that the retrospective data are considered to be fairly reliable. On the other hand current data on fertility are grossly understated.

APPLICATION OF THE BRASS TECHNIQUE

In the previous sections it was shown that the current data on fertility were understated while the retrospective fertility data were fairly reliable. In this section, Brass's technique will be applied fully in order to show more evidence of the direction of errors in the current data and later on try to adjust the level of reported current fertility⁷. The basic assumptions are that while the number of births in a year preceding the survey or census is affected by imprecision in the reference period, the shape of the fertility distribution can be accepted as approximately correct, though the level may not be, and that the number of children everborn is reported with good accuracy by younger women. The P/F ratio for the age group 20-24 years is used to adjust the level of reported current fertility rates "unless there is evidence that the ratio at 20-24 is distorted or inconsistent with the trend of the values at later

⁷Demographic Estimation, A Manual on Indirect Techniques, prepared by Staff of the Committee on Population and Demography, Assembly of Behavioral and Social Sciences, National Academy of Sciences, March, 1979, chapter 3.

ages"⁸. As the P/F ratios for the age groups 20-24, 25-29, 30-34 and 35-39 have been given in Table 12.3 as well as in Appendix XII.1, about four different ratios, that is, the P/F values for the age groups 20-24, 25-29, 20-29 and 25-39 will be used in order to adjust the recorded current fertility rates⁹. Table 12.4 shows the recorded and the adjusted total fertility rates.

Table 12.4 shows, the adjusted total fertility rates using the Brass technique (P_{20-24}/F_{20-24} or P_2/F_2) brings about an increase of almost 30 percent in the total fertility rate for Mainland Tanzania, 15 percent for Zanzibar and an overall increase of 28 percent for Tanzania. The adjusted total fertility rates for regions lie well above the recorded rates by not less than 20 percent except for Arusha (14 percent), Kilimanjaro (11 percent), Rukwa (16 percent), West Lake (12 percent) and Pemba North (8 percent). These drastic increases in the total fertility rate make the adjusted rates rather implausible.

⁸W. Brass, *et al*, *ibid.*, p.96

⁹The derivation of the P_{20-29}/F_{20-29} requires special treatment. Since age group 20-29 combines age group 20-24 and 25-29, a method which combines F_2 and F_3 on the one hand and P_2 and P_3 on the other has to be devised. P_{20-29} from P_2 and P_3 is derived from the total number of children ever born to women in age group 20-29 (i.e. 20-24 and 25-29) divided by the total number of women in age group 20-29. Since a Brass multiplier cannot be found for age group 20-29, F_{20-29} was derived by using the following equation:

$$F_{20-29} = \frac{\text{women in 20-24} \times F_2 + \text{women in 25-29} \times F_3}{\text{women in 20-29}}$$

Similar approach is used for P_{25-39}/F_{25-39} .

When P_{25-29}/F_{25-29} (or P_3/F_3) is used, the total fertility rate rises for Mainland Tanzania and Zanzibar by 19 percent and 14 percent, respectively. As for the regions, the rise in the adjusted total fertility rates is not as drastic as in the previous case. In most regions there is an increase of not more than 20 percent except in Tanga(31 percent) Lindi(22 percent), Mtwara(39 percent), Ruvuma(23 percent), Iringa(25 percent), Mbeya(22 percent), Singida(27 percent) and Zanzibar South(29 percent). Again these increases in the total fertility rate do not provide plausible rates.

Since P_2/F_2 and P_3/F_3 ratios do not yield acceptable results, an attempt has been made to use adjustment factors using P_{20-29}/F_{20-29} adjustment factor, as well as P_{25-39}/F_{25-39} . Using P_{20-29}/F_{20-29} adjustment factor, the situation is similar to that observed when applying the P_{25-29}/F_{25-29} ratio. This implies, therefore, that the adjusted rates are not plausible. On the other hand, the adjusted rates obtained by using the P_{25-39}/F_{25-39} adjustment factor lie slightly above the observed rates. The rise in total fertility rate for Mainland Tanzania is 13 percent and Zanzibar only 3 percent. While the adjusted rates for Tanga (21 percent), Dodoma(19 percent), Mtwara(33 percent), Iringa(22 percent), Mbeya(18 percent), Zanzibar North (16 percent) and Zanzibar South(19 percent) look high, the rise in the remaining regions is low. It can be said that the adjusted rates using P_{25-39}/F_{25-39} seem to be more plausible than the rates using the other P/F values, as the percentage changes are comparatively low and are nearest to the estimates

TABLE 12.4.-- RECORDED AND ADJUSTED TOTAL FERTILITY RATES (TFR)

Region	Recorded TFR	Adjusted TFR based on P/F values			
		20-24	25-29	20-29	25-39
Dodoma	6.2	8.4	7.3	7.3	7.4
Arusha	7.0	8.0	7.8	7.8	7.5
Kilimanjaro	7.5	8.3	7.9	8.0	7.6
Tanga	6.2	8.5	8.1	8.2	7.5
Morogoro	6.5	7.8	7.3	7.3	6.9
Coast	6.1	8.9	7.0	7.6	6.5
Dar es Salaam	5.4	6.8	6.4	6.0	5.7
Lindi	5.4	6.8	6.6	6.8	6.1
Mtwara	4.9	7.0	6.8	6.8	6.5
Ruvuma	6.1	8.2	7.5	7.7	7.4
Iringa	6.3	8.0	7.9	7.8	7.7
Mbeya	6.3	8.3	7.7	7.8	7.4
Singida	5.9	8.2	7.5	6.0	6.2
Tabora	6.0	7.5	7.1	7.2	6.6
Rukwa	8.0	9.3	9.5	9.2	8.7
Kigoma	7.3	8.8	7.8	8.1	7.3
Shinyanga	6.9	8.7	8.2	8.3	7.7
West Lake	7.4	8.3	7.7	7.8	7.6
Mwanza	7.1	9.5	7.7	8.2	7.4
Mara	7.0	8.6	8.2	8.3	7.8
MAINLAND TANZANIA	6.4	8.3	7.6	7.7	7.2
Zanzibar North	7.1	9.6	8.5	9.1	8.2
Zanzibar South	6.2	9.4	8.0	8.5	7.4
Zanzibar West	6.1	8.0	7.0	7.9	6.6
Pemba North	8.3	9.0	8.4	8.6	7.9
Pemba South	8.2	9.5	8.8	9.0	7.9
ZANZIBAR	7.2	8.3	8.2	8.3	7.4
TANZANIA	6.5	8.3	7.6	7.7	7.2

arrived at by Eggero and Henin for the regions. However, they can, at least, be considered as first approximation of the level of fertility for the country and the regions.

At this stage, it can be pointed out that the Brass technique has failed to arrive at plausible estimates. As was noted by the United Nations Economic Commission for Africa, the technique in some cases "has given satisfactory results. The two curves of the cumulative fertility and average partly correspond closely for the younger age group of women and the adjustments implied have been small and entirely plausible. In other cases, however, the results have been far from satisfactory, not only have the overall numbers of births reported as having occurred during the twelve months preceding the enquiry have been grossly understated, but the whole shape of the fertility distribution has been seriously biased; the rates for the younger women being too high. Thus large discrepancies have been recorded between the figures of cumulative fertility and average partly and the implied corrections have been so great as to be unacceptable"¹⁰.

The results from the 1978 population census obtained from the application of the Brass technique are not completely satisfactory not only because of similar factors rendering the shape of the fertility distribution implausible but also because it is evident

¹⁰"Demographic Surveys in Africa, 1950-1970: Some results and conclusions", prepared by the Economic Commission for Africa for International Workshop on Methodology of Demographic Sample Survey. p.7.

that the data on current fertility were grossly misreported and in most cases underestimated.

FERTILITY ESTIMATION BASED ON AGE DISTRIBUTION

From the previous sections, it has been observed that the current data on fertility are defective. However, in this section, the recorded cumulative age distribution under ages 5, 10, 15, 40 are used together with the level of mortality arrived at in Chapter 10 and the mean age of fertility schedule ($\bar{m}$) to arrive at a number of stable populations from which crude birth rates and gross reproduction rates will be derived for the country¹¹. Table 12.5 presents gross reproduction rates (GRR's) of a stable population based on the estimated mortality level for Tanzania, Mainland Tanzania and Zanzibar.

TABLE 12.5.-- ESTIMATES OF GRR BASED ON C_x FOR TANZANIA, MAINLAND AND ZANZIBAR

	C_5	C_{10}	C_{15}	C_{20}	C_{25}	C_{30}	C_{35}	C_{40}
Tanzania($\bar{m}=28.8$)	3.238	3.464	3.360	3.278	3.225	3.288	3.250	3.225
(Level North 11)								
Mainland($\bar{m}=28.8$)	3.251	3.472	3.373	3.262	3.333	3.266	3.247	3.378
(Level North 11)								
Zanzibar($\bar{m}=27.5$)	3.232	3.737	3.428	3.375	3.250	3.188	3.121	2.988
(Level North 13.4)								

¹¹A.J. Coale and P. Demeny, Regional Model Life Tables and Stable Populations (Princeton: Princeton University Press, 1966).

The above table shows fluctuations of the gross reproduction rates for each area. For example, in the case of Mainland Tanzania a peak is reached at age 10 which is followed by a drop at ages 15 and 20 and rises at age 25, drops at ages 30 and 35 and obtains another peak at age 40. For Zanzibar the peak is at age 10, followed by a continuous decline to age 40. Looking at Tanzania, the peak is again observed at age 10 and drops up to age 30 where there is a slight rise before it continues declining.

Making use of the same level of mortality, and the mean age of fertility schedule ($\bar{m}$), the child/woman ratio provides gross reproduction rates of 3.371 for Mainland Tanzania, 3.471 for Zanzibar and 3.356 for Tanzania. When adjustment factors derived by Coale and Demeny¹² are applied to the gross reproduction rates observed at ages 10 and 35, the results seem to lie above those based on child/woman ratio.

FERTILITY LEVELS

Before definite levels of fertility for the country and the regions are determined, total fertility rates derived after the application of the P_{25-29}/F_{25-29} ratio are compared with the average parity for women 45-49 (P_7) and the values of $(P_3)^2/P_2$ (Coale-Demeny method) and $P_2(P_4/P_3)^4$ (i.e., Brass method).¹³

¹²United Nations Methods of Estimating Basic Demographic Measures from Incomplete Data, Manual IV (New York: United Nations, 1967), Annex III.

¹³Brass formula used here was taken from: Asian Population Studies Series, No.44.

In observing the estimated total fertility rates based on P values and the average number of children ever born to women 45-49, as shown in Table 12.6, one is faced with a set of figures encompassing a wide range.

While the average number of children born alive to women 45-49 are lower than the adjusted total fertility rates (P_{25-39}/F_{25-39}) possibly as a result of nonsuitability of the adjustment factors, it appears that there is a problem of omission of children ever born by these women for Tanzania, Mainland and Zanzibar. However, the estimated total fertility rates based on C_{10} and child/woman ratio¹⁴ tend to lie very close to the adjusted total fertility rate. For Tanzania the rate is 7.0, Mainland 7.0 and Zanzibar 7.5 while the adjusted rates are 7.2 for Tanzania and Mainland and 7.4 for Zanzibar.

The average number of children born alive to women 45-49 for regions also seem to be less than the adjusted total fertility rates except for Iringa where the two are close to each other. It must be borne in mind that the average parity figures usually suffer from two main limitations. Firstly, old women tend to omit some of their children who either died at infancy or grew up and left the home. Secondly, even if reported correctly, the figures reflect fertility of women which prevailed twenty or thirty years before the census. Therefore, these data do not help to establish the level though they indicate

¹⁴The estimated total fertility rates are obtained by multiplying the gross reproduction rate by 2.02.

TABLE 12.6.-- ESTIMATED TOTAL FERTILITY RATES AND AVERAGE PARITY BY WOMEN 45-49(P_7)

Region	Total Fertility Rate based on			
	$\frac{(P_3)^2}{P_2}$	$P_2 \frac{(P_4)^4}{P_3}$	P_{25-39}/F_{25-39}	P_7
Dodoma	6.2	10.3	7.4	6.3
Arusha	6.9	7.4	7.5	6.1
Kilimanjaro	7.6	7.4	7.6	6.9
Tanga	7.1	6.6	7.5	6.0
Morogoro	6.3	8.4	6.9	5.8
Coast	5.3	6.0	6.5	4.6
Der es Salaam	5.7	5.2	5.7	4.4
Lindi	5.9	6.1	6.1	4.8
Mtwara	6.2	5.9	6.5	5.7
Mvuma	6.2	10.1	7.4	6.4
Iringa	7.3	8.2	7.7	7.3
Mbeya	6.9	5.5	7.4	6.8
Singida	6.9	6.6	6.2	6.0
Tabora	6.2	7.2	6.6	5.1
Rukwa	8.8	8.5	8.7	6.9
Kigoma	7.1	6.9	7.3	6.1
Shinyanga	7.1	8.0	7.7	6.3
West Lake	6.6	11.5	7.6	6.4
Mwanza	5.9	9.8	7.4	6.3
Mara	7.4	7.3	7.8	6.6
MAINLAND	6.6	7.7	7.2	6.1
Zanzibar North	7.0	9.8	8.2	6.1
Zanzibar South	6.6	8.0	7.4	5.6
Zanzibar West	6.2	5.9	6.6	4.2
Pemba North	7.8	7.7	7.9	6.3
Pemba South	7.5	6.7	7.4	6.0
ZANZIBAR	7.0	7.5	7.4	5.6
TANZANIA	6.6	7.7	7.2	6.1

fertility rates, the estimated total fertility rates based on the $(P_3)^2/P_2$ and P_{25-39}/F_{25-39} appear to lie close to those obtained in the 1967 census. For this reason, it is safe to assume that fertility levels for the regions lie somewhere between the two

TABLE 12.7.-- ESTIMATED TOTAL FERTILITY RATES AND CRUDE BIRTH RATES

Regions	Total Fertility rate	Crude birth rate
Dodoma	7.4	52
Arusha	6.9	48
Kilimanjaro	7.6	48
Tanga	7.1	47
Morogoro	6.3	45
Coast	5.3	35
Dar es Salaam	5.7	48
Lindi	5.9	43
Mtwara	6.2	47
Ruvuma	6.4	47
Iringa	7.3	53
Mbeya	7.4	55
Singida	6.9	47
Tabora	6.2	45
Rukwa	8.7	62
Kigoma	7.1	52
Shinyanga	7.1	49
West Lake	7.6	49
Nwanza	7.4	51
Mara	7.4	53
MAINLAND	6.9	49
Zanzibar North	7.0	46
Zanzibar South	6.6	41
Zanzibar West	6.2	47
Pemba North	7.8	53
Pemba South	7.5	48
ZANZIBAR	7.0	48
TANZANIA	6.9	49

sets of data. Likewise, the fertility levels for the Mainland, Zanzibar and Tanzania lie between 6.6 and 7.2 for the Mainland and Tanzania and between 7.0 and 7.4 for Zanzibar.

To sum up the discussion about the levels of fertility for Tanzania, Mainland and Zanzibar, total fertility rates arrived at using the model age distribution, of 6.6 for Tanzania, 6.6 for the Mainland and 6.3 for Zanzibar which had been obtained from the cumulative age distribution under age 35 are probably on the low side, due to overstatement of female ages. Using the child/woman ratio, the total fertility rates of 6.8 for Tanzania and Mainland and 7.0 for Zanzibar come close to the expected levels. From the previous observations it can be assumed that the level of fertility for Tanzania and Mainland is 6.9 while that for Zanzibar is 7.0. Table 12.7 gives the estimated total fertility rates and crude birth rates for Tanzania, the Mainland, Zanzibar and all regions.

PATTERN OF FERTILITY

The reproductive period is usually considered to extend over a span of about 35 years, from about 15 to age 50. A proportion of women may be sterile throughout the entire span, but most women are sterile during some parts of the reproductive age span. The proportions of women who are sterile at different ages are unknown but a hypothetical model age specific fertility curve shows a general low rate below 15 and then rises reaching a maximum at ages between

20 and 29, and sometimes between 25 and 34, and then falls at first gradually then steeply at older ages, until it reaches the lowest level at age 50.

In the previous section of this chapter, fertility levels for regions were determined and these levels differed between one region and the other. However, the annual number of births is not only determined by the level of fertility but also by the shape of fertility distribution. It is possible that two populations may have the same total fertility rate, yet the annual number of births is higher in one than in the other on account of early procreation. This section examines the shapes of fertility distribution of Tanzania, the Mainland and Zanzibar.

Table 12.8 shows the age-specific fertility rates for Tanzania, the Mainland and Zanzibar.

TABLE 12.8.-- RECORDED AGE-SPECIFIC FERTILITY RATES

Age Group	Tanzania	Mainland	Zanzibar
15 - 19	0.138	0.135	.239
20 - 24	0.307	0.305	.353
25 - 29	0.296	0.295	.320
30 - 34	0.239	0.239	.236
35 - 39	0.183	0.183	.166
40 - 44	0.093	0.093	.078
45 - 49	0.039	0.039	.044
$\bar{m}$	28.8	28.8	27.5

With the exception of Zanzibar, the other two populations show a regular pattern with relatively low rates for age group 15-19, then a sudden rise in the three populations for age groups 20-29, then a decline thereafter.

In order to study the pattern of the age specific fertility distribution, it is usually preferred to discuss it in terms of the degree of concentration of fertility in age groups at or near the peak. For the purpose of studying this aspect of the shape of the fertility distribution, the percentage distribution of each age group to total fertility is given in Table 12.9.

TABLE 12.9.-- RELATIVE AGE-SPECIFIC FERTILITY RATES

Age Group	Tanzania	Mainland	Zanzibar
15 - 19	10.6	10.5	16.6
20 - 24	23.7	23.7	24.6
25 - 29	22.9	22.9	22.3
30 - 34	18.5	18.5	16.4
35 - 39	14.1	14.2	11.6
40 - 44	7.2	7.2	5.4
45 - 49	3.0	3.0	3.1

The pattern of the age specific fertility distribution for Tanzania, Mainland and Zanzibar is similar with very minor differences. While the contribution of women by age 25 is less than 35 percent for Tanzania and Mainland, the contribution of women of same age is about 41 percent for Zanzibar. However, the peak is at age group 20-24 and drops very slightly at age group 25-29. It can be said that

the three populations are characterised by a broad-peak fertility curve, as can be observed in Figure 12.1. This pattern is also observed for 52 countries that were studied by the United Nations for the purpose of estimating future population¹⁵. Table 12.10 shows the standard weights for the 52 countries and the corresponding weights for the three populations under study.

TABLE 12.10.-- STANDARD WEIGHTS FOR 52 COUNTRIES AND FOR TANZANIA, MAINLAND AND ZANZIBAR

Age Group	Standard weights(a)	Tanzania	Mainland	Zanzibar
15 - 19	1	3	3	4
20 - 24	7	6	6	6
25 - 29	7	6	6	6
30 - 34	6	5	5	4
35 - 39(b)	4	4	4	3
40 - 44	1	3	3	2

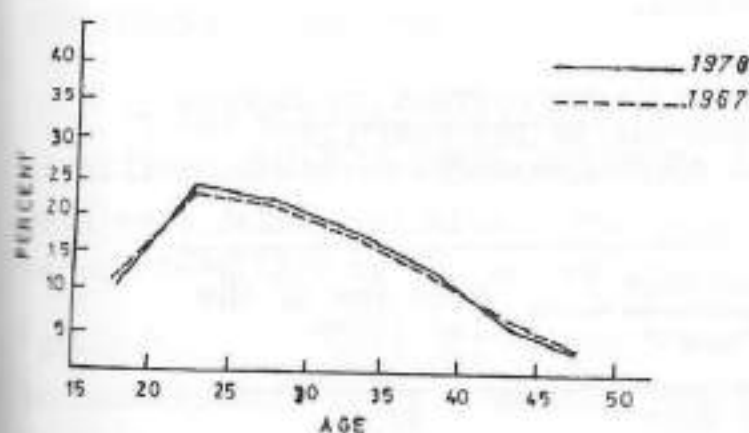
(a) Source: UN Manual III, p.42.

(b) Includes births to mothers aged 45 and over.

The fertility pattern of the three populations resemble very closely with that observed for the 52 countries. Though the distribution of weights do not seem to correspond with that of the 52 countries, the three populations show once again that they have a broad peak at age group 20-29.

¹⁵United Nations, Methods for Population Projections by Sex and Age, Manual III (UN Department of Economic and Social Affairs, New York, 1956), p.42.

FIGURE 12.1.....OBSERVED RELATIVE AGE SPECIFIC
FERTILITY RATES FOR MAIN LAND
TANZANIA.



The fertility patterns for the regions are now compared with those observed by the United Nations in other population groups¹⁶. Table 12.11 shows regions in early peak group and in broad peak group and their mean age of fertility schedule.

TABLE 12.11.-- RECORDED FERTILITY PATTERN CLASSIFIED BY TYPE OF PATTERN, AND MEAN AGE OF THE FERTILITY SCHEDULE ($\bar{m}$) BY REGION (IN ASCENDING ORDER OF VALUE OF $\bar{m}$)

Fertility Schedule		Mean age of the fertility schedule
Early Peak	Broad Peak	
	Zanzibar West	27.1
Pemba North		27.1
Zanzibar North		27.5
	Pemba South	27.7
	Zanzibar South	28.0
Dar es Salaam		28.0
Tabora		28.0
Lindi		28.1
	Mbeya	28.4
	Mwanza	28.4
	Mara	28.4
	Morogoro	28.5
	Singida	28.5
	West Lake	28.7
	Kigoma	28.8
	Mtwara	28.9
	Ruvuma	28.9
	Shinyanga	28.9
	Coast	29.0
	Dodoma	29.1
	Tanga	29.2
	Rukwa	29.3
	Arusha	29.4
	Iringa	29.5
	Kilimanjaro	29.6

¹⁶Population Bulletin of the United Nations, No.7, (New York: Department of Economic and Social Affairs, United Nations, 1965), chapter 7.

Out of 25 regions, five regions have an early peak pattern of fertility, while the remaining twenty regions are characterized by broad peak pattern of fertility.

CONCLUDING OBSERVATIONS

It has been observed that the current data on fertility were not trustworthy while the retrospective data were fairly reliable. The Brass technique to adjust fertility by the use of P_2/F_2 , P_3/F_3 and P_{20-29}/F_{20-29} ratios has raised the level of fertility to unacceptable level. However, the adjusted fertility by using P_{25-39}/F_{25-39} ratio has given indices which were comparable with those obtained by the Coale-Demeny formula, that is $(P_3)^2/P_2$, as well as those by Henin and Egero from the 1967 Census.

The three values together with those obtained by the use of the stable population models helped to give some indication of the level of fertility. However, it has been established that a total fertility rate of 6.9 for Tanzania and Tanzania Mainland, and 7.0 for Zanzibar and a crude birth rate of 49 for Tanzania and Mainland and 48 for Zanzibar were considered to be plausible.

APPENDIX XII.1. -- MALE FINGER OF CHILDREN EVER BORN (P1), THE CUMULATED CURRENT FERTILITY (F1) AND THE $P1/F1$ RATIOS

	15 - 19			20 - 24			25 - 29			30 - 34			35 - 39			40 - 44			45 - 49		
	P1	F1	P1/F1	P1	F1	P1/F1	P1	F1	P1/F1	P1	F1	P1/F1	P1	F1	P1/F1	P1	F1	P1/F1	P1	F1	P1/F1
Dadara	0.418	0.341	1.228	2.036	1.503	1.355	3.544	3.204	1.170	5.330	4.125	1.290	6.217	5.157	1.206	6.310	5.816	1.086	6.316	5.660	1.116
Arunha	0.331	0.276	1.199	1.758	1.538	1.143	3.494	3.132	1.116	5.002	4.577	1.093	6.173	5.813	1.062	6.000	6.577	0.912	6.092	6.377	0.955
Kilianjaro	0.187	0.138	1.355	1.568	1.411	1.111	3.443	3.245	1.061	5.074	4.888	1.038	6.300	6.264	1.006	7.112	7.073	1.006	6.929	6.848	1.012
Tanga	0.470	0.319	1.473	2.008	1.459	1.376	3.789	2.912	1.301	5.094	4.147	1.228	5.763	5.149	1.119	5.862	5.766	1.017	5.966	5.655	1.055
Morogoro	0.420	0.411	1.022	2.007	1.653	1.214	3.550	3.180	1.116	5.085	4.490	1.133	5.711	5.549	1.029	5.974	6.164	0.969	5.797	6.002	0.966
Coast	0.511	0.320	1.597	2.194	1.513	1.450	3.411	2.970	1.148	4.390	4.135	1.062	5.133	5.057	1.015	5.233	5.723	0.914	4.618	5.525	0.836
Der es Saleem	0.554	0.384	1.443	2.019	1.602	1.260	3.400	2.870	1.185	4.309	3.910	1.102	4.520	4.649	0.972	4.491	5.067	0.856	4.368	5.004	0.873
Lindi	0.531	0.386	1.376	2.019	1.612	1.252	3.449	2.851	1.210	4.541	3.860	1.176	4.976	4.636	1.073	4.930	5.113	0.964	4.836	5.005	0.966
Mtwara	0.457	0.284	1.609	1.838	1.272	1.445	3.376	2.400	1.407	4.326	3.240	1.397	5.277	4.009	1.316	5.454	4.537	1.202	5.663	4.405	1.286
Ruvuma	0.370	0.323	1.146	2.035	1.500	1.357	3.549	2.860	1.241	5.024	4.143	1.278	6.089	5.124	1.188	6.723	5.758	1.168	6.399	5.545	1.154
Iringa	0.307	0.232	1.323	1.704	1.343	1.269	3.529	2.914	1.254	5.231	4.116	1.271	6.339	5.143	1.233	7.279	5.680	1.238	7.297	5.634	1.292
Manyara	0.445	0.335	1.328	2.190	1.657	1.322	3.879	3.201	1.212	4.872	4.473	1.089	6.424	5.440	1.181	6.753	6.001	1.125	6.804	5.860	1.161
Singida	0.286	0.235	1.217	2.091	1.505	1.389	3.767	2.972	1.267	5.022	4.140	1.213	5.598	5.062	1.106	5.952	5.569	1.069	6.028	5.479	1.100
Tabora	0.580	0.462	1.255	2.156	1.701	1.267	3.655	3.067	1.192	4.937	4.291	1.151	5.501	5.200	1.058	5.606	5.696	0.984	5.084	5.570	0.913
Rukwa	0.495	0.349	1.418	2.209	1.895	1.166	4.414	3.699	1.193	6.180	5.326	1.160	6.799	6.531	1.041	7.347	7.376	0.996	6.934	7.151	0.970
Kigoma	0.361	0.288	1.254	1.998	1.652	1.210	3.772	3.512	1.075	5.137	5.085	1.011	6.007	6.238	0.963	6.094	6.932	0.880	6.001	6.720	0.905
Shinyanga	0.441	0.372	1.186	2.111	1.675	1.261	3.861	3.265	1.183	5.395	4.710	1.146	6.108	5.950	1.045	6.807	6.857	0.993	6.325	6.351	0.996
West Lake	0.342	0.368	0.930	2.029	1.809	1.122	3.660	3.507	1.044	5.647	5.088	1.110	6.240	6.945	0.904	6.026	7.057	0.854	6.285	6.854	0.917
Mwanza	0.592	0.447	1.325	2.427	1.811	1.341	3.770	3.473	1.086	5.346	4.954	1.080	6.273	6.120	1.025	6.381	6.732	0.948	6.298	6.607	0.954
Kara	0.508	0.442	1.150	2.228	1.821	1.224	4.064	3.447	1.179	5.459	4.863	1.125	6.535	6.002	1.089	6.731	6.632	1.015	6.574	6.489	1.015
Zibar North	0.990	0.714	1.387	3.112	2.290	1.359	4.658	3.875	1.202	6.208	5.169	1.203	6.345	6.169	1.029	6.113	6.702	0.912	6.028	6.436	0.908
Zibar South	0.707	0.550	1.286	2.726	1.827	1.492	4.227	3.311	1.277	5.537	4.497	1.232	5.666	5.321	1.065	5.338	5.853	0.913	5.579	5.737	0.973
Zibar Town/West	0.719	0.536	1.338	2.525	1.945	1.299	3.965	3.490	1.137	4.896	4.710	1.040	4.994	5.520	0.905	4.587	5.919	0.775	4.228	5.839	0.725
Peeba North	0.930	0.711	1.309	3.061	2.846	1.076	4.899	4.876	1.006	6.174	6.332	0.976	6.466	7.356	0.880	6.532	7.962	0.821	6.338	7.816	0.811
Peeba South	0.914	0.782	1.169	2.990	2.575	1.162	4.724	4.436	1.065	5.749	5.951	0.970	6.332	7.112	0.891	6.251	7.747	0.807	6.040	7.652	0.790

CHAPTER 13

FERTILITY DIFFERENTIALS

by

S.A.M. Ngallaba*

INTRODUCTION

In Chapter 12, the fertility levels for the country and regions were determined, and it was shown that there are differences among regions. This chapter will look at the patterns of fertility differences.

Again, in the previous chapter, it was found that though both current and retrospective data were defective, the latter were shown to be more reliable than the former. For the purpose of studying fertility differentials, which is the subject matter in this chapter, what is required is the order of magnitude of the difference between two fertility levels rather than the exact levels. This implies that the analysis rests on the assumption that these data are more or less equally affected by recall lapse and other sources of error. The study will, however, be confined to rural/urban differentials, differentials among educational groups and economic characteristics. The retrospective data are used to determine the differences in fertility among regions and between rural and urban areas.

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RURAL-URBAN DIFFERENTIALS

One of the questions of principal interest in fertility studies is the pattern of fertility differences among population groups such as the inhabitants of rural and urban areas. The most generally applicable index of rural-urban fertility differentials is the ratio of children aged 5-9 years to women of reproductive age (20-49 years)¹. Studies carried out in some countries have shown that the child-woman ratios are significantly higher in rural than in urban areas. Table 13.1 shows the child-woman ratios **and the mean parity** for age group 20-34 -- P_{20-34} (i.e., the average number of live born children to women 20-34 years old) **for the country and regions**².

Table 13.1 shows a systematic pattern whereby the child-woman ratios for rural areas are greater than those for urban areas except Zanzibar North region which shows that the urban ratio exceeds that of rural areas by about six percent. Likewise, the number of children ever born alive to women in 20-34 years age group for rural areas lies above that for

¹United Nations Population Bulletin, No. 7, (New York: United Nations, 1965), p.122.

² P_{20-34} , the mean number of children ever born to women 20-34 years is obtained by dividing the total number of children ever borne by women in age groups 20-24, 25-29 and 30-34 by the total women in the same age groups. Only women in age group 20-34 have been chosen because these are not affected very much by the problem of recall lapse and that their fertility shows the most recent pattern.

TABLE 13.1.-- CHILD-WOMAN RATIOS AND P_{20-34}

Region	Child-woman ratios		P_{20-34}	
	Rural	Urban	Rural	Urban
Dodoma	0.490	0.399	3.018	2.678
Arusha	0.503	0.353	3.199	2.757
Kilimanjaro	0.560	0.370	3.110	2.787
Tanga	0.515	0.413	3.581	3.158
Morogoro	0.433	0.367	3.408	3.008
Coast	0.440	0.420	3.328	3.208
Dar es Salaam	0.398	0.372	3.439	2.804
Lindi	0.381	0.371	3.306	2.898
Mtwara	0.382	0.364	3.141	2.747
Ruvuma	0.455	0.376	3.399	2.921
Iringa	0.478	0.413	3.177	2.923
Mbeya	0.448	0.396	3.660	3.180
Singida	0.439	0.373	3.501	3.174
Tabora	0.445	0.354	3.503	3.182
Rukwa	0.482	0.422	3.896	3.406
Kigoma	0.424	0.421	3.416	3.473
Shinyanga	0.525	0.385	3.625	3.120
West Lake	0.476	0.303	3.521	2.874
Mwanza	0.500	0.355	3.652	3.137
Mara	0.507	0.421	3.682	3.609
MAINLAND	0.471	0.378	3.411	2.980
Zanzibar North	0.646	0.687	4.614	4.466
Zanzibar South	0.598	0.537	4.075	3.957
Zanzibar West	0.563	0.500	3.901	3.512
Pemba North	0.662	0.564	4.728	4.021
Pemba South	0.679	0.575	4.441	4.132
ZANZIBAR	0.644	0.522	4.442	3.863
TANZANIA	0.475	0.387	3.435	3.116

urban areas in all regions except in Kigoma where the value for the urban areas is 17 percent above that for rural areas.

A look at the Mainland, Zanzibar and Tanzania reveals that the average parities as well as the child-woman ratios for the rural areas are well above those for the urban areas. This, therefore, confirms the fact that fertility is generally higher in rural Tanzania than in the urban part of the country.

EDUCATIONAL STATUS

Previous studies on the relationship between fertility and level of education have shown that there are fertility differentials among women of different educational level. For example, the 1967 census has shown that women with no formal education or with very low education had higher fertility than those with high education. Fertility differentials among women of different educational level observed from the 1978 census are shown in Table 13.2 as well as in Appendix XIII.1. The mean number of children ever born to women aged 20-34 is used to determine the magnitude of differences in fertility among women of different educational level.

Table 13.2 shows that there is a marked difference between women who had no formal education and those who had only primary education. The most striking phenomenon is that the mean number of live births for Mainland, Zanzibar and Tanzania decreases with the rise in education level. There is, however, a slight increase of fertility among women who had completed or were attending courses in other institutions. Fertility of women with primary education lies 17 percent below that of women with no formal education, while for women

TABLE 13.2.-- MEAN NUMBER OF CHILDREN EVER BORN TO WOMEN 20-34 BY EDUCATIONAL STATUS FOR RURAL AND URBAN AREAS IN THE MAINLAND, ZANZIBAR AND TANZANIA, AND FERTILITY INDEX USING NO FORMAL EDUCATION AS BASE (100): 1978

	No formal education	Comp./ Attend. Prim ^a sch.	Comp./ Attend. Sec. ^b sch.	Comp./ Attend. other ^c inst.
Mainland	3.46	2.87	1.74	1.83
Rural	3.46	2.87	1.75	1.82
Urban	3.36	2.87	1.68	1.96
Zanzibar	4.47	3.71	2.16	e
Rural	4.62	3.63	2.15	e
Urban	4.17	3.87	2.16	2.53
Tanzania	3.49	2.90	1.73	1.83
Rural	3.50	2.90	1.74	1.82
Urban	3.38	2.89	1.69	1.96
(Index No formal education = 100)				
Mainland	100	83	50	53
Rural	100	83	51	53
Urban	100	85	50	58
Zanzibar	100	83	48	e
Rural	100	79	47	e
Urban	100	93	52	61
Tanzania	100	83	50	52
Rural	100	83	50	52
Urban	100	86	50	58

The abbreviations used stand for:

^a"Completed/attending primary school".

^b"Completed/attending secondary school".

^c"Completed/attending other institution".

"e" means the sample is very small.

with secondary education and education in other institutions mean number of live births of each of the two lies about 50 percent below that of women with no formal education. The big drop is possibly due to the fact that most of the women particularly those aged 20-24 are still in secondary schools or in other institutions like teacher training centres where they are not supposed to get pregnant or bear children.

A look at the rural-urban differentials among women of different educational status reveals an almost similar pattern. The mean number of live births of women with primary education lies 17 percent lower than those with no formal education in the rural Mainland Tanzania. Again, the fertility of women with secondary education is about 50 percent lower than that of women with no formal education; and that of women in other institutions lies about 47 percent below that of women with no formal education. This pattern is also observed for rural Tanzania. Zanzibar rural shows also that the mean number of live births for women with primary education is 21 percent less than that of women with no formal education and drops even further for women with secondary education to about 50 percent below that of women with no education.

The pattern observed in Mainland Urban and Tanzania Urban shows once again that fertility of women with primary education is lower than that of women with no education by about 15 percent, drops to 50 among women with secondary education for Mainland and Tanzania and rises slightly to 42 for women in other institutions. In Zanzibar Urban, fertility of women with primary education is 93 percent of that of women with no formal education, 52 and 61 for women with

secondary education and in other institutions, respectively.

On the other hand, rural-urban differentials present a very interesting pattern. The mean number of live births for women with no formal education in Mainland urban is 3 percent less than that of women in rural Mainland. In the case of Zanzibar the fertility of women in urban areas lies 10 percent below that of rural women with no education. Fertility of women with primary education shows no difference between rural and urban women in the Mainland and Tanzania, but fertility of urban women in Zanzibar is 7 percent above that of rural women. In the case of women with secondary education, the mean number of live births among urban women is 3 percent below that of rural women of Mainland and Tanzania, and is almost equal for urban and rural women of Zanzibar. Fertility of urban women in other institutions is 8 percent above that of rural women in Mainland and Tanzania.

Differences among women in the regions show more or less a similar pattern as those observed for the Mainland and Zanzibar. In Pemba South region fertility of women with primary education lies above that of women with no formal education. However, rural-urban differentials among women of different educational status show that fertility of rural women is higher than that of urban women in almost all regions except in few cases like Kigoma region where fertility of rural women with no formal education and those with primary education is lower than that observed for urban women in the same educational groups. In all, fertility is lower in urban areas compared to the rural areas among women of different educational status.

OCCUPATION OF WOMAN

The mean number of live births per woman in age group 20-34 by occupation of woman is given in Table 13.3.

TABLE 13.3.-- MEAN NUMBER OF CHILDREN EVER BORN TO WOMEN 20-34 BY OCCUPATION OF MOTHER FOR MAINLAND, ZANZIBAR AND TANZANIA, AND FERTILITY INDEX USING CULTIVATORS AS BASE (100): 1978

	Culti- vators	Other Agric- ultu- re	Craft- smen and Opera- tors	Profe- ssional Manager- ial and Sales	Lab.and other workers	Studen- ts and Unoccu- pied
Mainland	3.50	3.33	e	1.97	2.83	2.08
Rural	3.51	3.33	e	1.96	2.83	2.07
Urban	3.21	3.20	2.44	2.37	2.55	2.88
Zanzibar	4.36	4.00	e	3.23	3.36	3.81
Rural	4.51	4.04	e	3.12	3.24	4.06
Urban	4.06	3.90	e	3.37	3.61	3.31
Tanzania	3.52	3.33	e	1.99	2.85	2.14
Rural	3.52	3.33	e	1.99	2.85	2.15
Urban	3.40	3.27	2.44	2.40	2.64	2.89
Index: (cultivator = 100)						
Mainland	100	95	e	56	81	59
Rural	100	95	e	56	81	59
Urban	100	100	76	74	79	90
Zanzibar	100	92	e	74	77	87
Rural	100	90	e	69	72	90
Urban	100	96	e	83	89	82
Tanzania	100	95	e	57	81	61
Rural	100	95	e	57	81	61
Urban	100	96	72	72	81	82

Table 13.3 shows that there is little difference between fertility of women who are cultivators and those engaged in other agriculture. There is a marked difference between the fertility of women in professional, managerial and sales group and those who are cultivators. The fertility of women in the former group is only 56 percent that of cultivators in Mainland rural, 74 percent in Mainland urban and Zanzibar total, 69 and 83 percent in Zanzibar rural and Zanzibar urban respectively, 57 percent in Tanzania total and rural while that for Tanzania urban is 74 percent. Fertility of women in labourers and other workers' group also lie below that of women in agriculture. Similarly, unoccupied women and students have a lower fertility than women engaged in agriculture by about 41 percent in rural Mainland, 18 in Zanzibar urban and 39 in rural Tanzania.

The results of the 1978 census seem to confirm the earlier findings by Egero and Henin³ that women in agricultural sector have the highest mean number of live births. However, while in 1967 it was found out that the socio-economic group A, "professional, technical administrative and executive", had a surprisingly high fertility, it is observed that now the same group appears to have the lowest mean number of live births. This is because the data collection method during the 1978 census was very much improved

³B. Egero and R.A. Henin, "Fertility" in B. Egero and R.A. Henin (eds.) The Population of Tanzania (Dar es Salaam: BRALUP and Bureau of Statistics, 1973), p. 199.

compared to that of 1967 census.

A look at the regions in Appendix XIII.2 reveals a similar pattern. The mean number of live births of agricultural women is the highest when compared to women in the other occupational groups. However, in Shinyanga, Zanzibar West, Pemba North and Pemba South regions, the mean number of live births for agricultural women is almost equal to that of women in "Students and unoccupied" group. There is no reason to show why this is only happening in these regions. Apart from Zanzibar West which is predominantly urban, the other regions are basically rural.

In the previous section, it has been established that there are fertility differentials among women of different educational status, and that fertility of rural women of any given education is higher than that of urban women of same education. In this section a comparison is made between rural and urban women in each of the six occupational groups. Taking the rural index as the base (i.e. equal to 100), fertility of urban women in Mainland Tanzania is lower than that of rural women among those in "Cultivators" "other agriculture", by 4 percent and "Labourers and other workers" group by 9 percent (Table 13.3). The same can be observed among women in Tanzania. In the other two occupational groups, that is "professional managerial and sales" and "students and unoccupied", fertility of urban women is higher than that of rural women by 21 and 39 percent respectively. In the case of Zanzibar, fertility of urban woman is higher than that of rural women in "professional, managerial and sales" and "labourers and other workers" groups by 8 and 11 percent respectively. However, fertility of urban women in the two agricultural groups and among students and unoccupied is lower than that of rural women by

10, 3 and 18 percent. It is obvious that there are very few women who belong to the "craftsmen and operators" group since this appears to be male's occupation.

From the above analysis, fertility of women in the agricultural sector lies well above that of women in the other occupational groups. It is also clear that fertility of rural women in the agricultural sector is higher than that of their counterparts in urban areas both in the Mainland and Zanzibar. On the other hand, fertility of rural women among professionals, managers and sales is generally lower than that of urban women in the same occupational group. While in Zanzibar fertility of rural women among Labourers and other workers is lower than that of urban women and fertility of rural women in "Students and Unoccupied" group is higher than that of urban women, fertility of rural women in the Mainland is higher than that of urban women in the former group and that of rural women is lower than that of urban women in the latter.

OCCUPATION OF HEAD OF HOUSEHOLD

Though the occupation of women has a direct influence on fertility, it is also proper at this stage to examine fertility differentials among women by occupation of head of household. In this section the fertility of women among the occupational groups of head of household are compared to determine the magnitude of differences among them. Table 13.4 shows the mean number of children ever born to women (20-34) by occupation of head of the household for Mainland, Zanzibar and Tanzania total. Again Appendix XIII.3 shows values for the regions as well as rural and urban areas.

TABLE 13.4.-- MEAN NUMBER OF CHILDREN EVER BORN TO WOMEN (20-34) BY OCCUPATION OF HEAD OF HOUSEHOLD FOR RURAL AND URBAN AREAS IN THE MAINLAND, ZANZIBAR, AND TANZANIA, AND FERTILITY INDEX USING CULTIVATORS AS BASE (100): 1978

	Culti- vators	Other Agric- ultu- re	Craft- smen and Opera- tors	Profe- ssional Manager- ial and Sales	Lab.and other workers	Studen- ts and Unoccu- pied
Mainland	3.47	3.34	3.33	2.94	3.28	2.64
Rural	3.49	3.35	3.35	2.96	3.31	2.57
Urban	3.21	3.25	3.08	2.68	2.94	2.74
Zanzibar	4.20	4.02	4.15	3.83	4.02	3.61
Rural	4.29	4.01	4.23	3.84	4.11	3.63
Urban	4.02	4.05	3.98	3.80	3.84	3.56
Tanzania	3.49	3.35	3.34	2.97	3.32	2.66
Rural	3.52	3.39	3.37	2.99	3.35	2.60
Urban	3.26	3.27	3.12	2.71	3.00	2.77
Index: (Cultivators = 100)						
Mainland	100	96	96	85	95	76
Rural	100	96	96	85	95	74
Urban	100	101	96	83	92	85
Zanzibar	100	96	99	91	96	86
Rural	100	93	99	90	96	85
Urban	100	101	99	95	96	89
Tanzania	100	96	96	85	95	76
Rural	100	96	96	85	95	74
Urban	100	100	96	83	92	85

Table 13.4 once again shows that for Mainland Tanzania the mean number of live births of women in the homes of cultivators lies above those of women in the households engaged in other occupations. For example, fertility of women in the "Professional/Managerial and Sales" group is about 15 percent below that of women in "Cultivators" group. Likewise, fertility of women under "Students and Unoccupied"

group is 24 percent lower than that of "Cultivators". The mean number of live births of women in the three groups, namely "Other agriculture", "craftsmen and operators" and "labourers and other workers", lies about five percent below that of "cultivators". There appears to be only slight difference among women in these three occupational groups.

While the fertility differentials for Tanzania seem to be similar to those observed for Mainland Tanzania, it is interesting to note that Zanzibar also provides an identical pattern. There is no difference between women under the "cultivators" group and those under "craftsmen and operators". It also appears that the fertility of women in "professional, managerial and sales" group is lower than that of women in "cultivators" group by about 9 percent. Again fertility of women in "students and unoccupied" group lies well below that of cultivators by 14 percent.

The rural-urban differentials provide another interesting pattern. For the Mainland's rural-urban differences in all occupational groups, except the last group, the mean number of live births of rural women is higher than that of urban women by as much as 13 percent in the case of "labourers and other workers". The last group shows that the fertility of rural women is lower than that of urban women by about six percent. In Zanzibar it also shows that fertility of rural women is higher than that of urban women **except among women in "other agriculture" group** where fertility of urban women is almost equal to that of rural women. Rural-urban differentials as observed in Mainland Tanzania and Zanzibar appear also for most of the regions with few variations in some of the

APPENDIX III.1. — MEAN NUMBER OF CHILDREN EVER BORN TO WOMEN 20 - 34 BY EDUCATIONAL STATUS AND BY REGION FOR RURAL AND URBAN AREAS: 1978

COUNTRY	TOTAL					RURAL					URBAN				
	No formal education	Comp./Attend Prim. School	Comp./Attend Sec. School	Comp./Attend other Inst.	No formal education	Comp./Attend Prim. School	Comp./Attend Sec. School	Comp./Attend other Inst.	No formal education	Comp./Attend Prim. School	Comp./Attend Sec. School	Comp./Attend other Inst.	No formal education	Comp./Attend Prim. School	Comp./Attend other Inst.
doma	3.50	3.12	a	1.36	3.50	3.12	a	1.23	3.36	3.13	1.28	2.15	3.36	3.13	1.28
uaba	3.34	2.68	1.57	1.25	3.42	2.68	1.53	1.17	2.12	2.66	2.22	2.56	2.12	2.66	2.22
liamjaro	3.72	2.94	0.87	1.42	3.72	2.95	0.83	1.40	3.71	2.79	1.59	1.74	3.71	2.79	1.59
nga	3.67	3.19	1.96	2.01	3.68	3.22	1.99	2.03	3.63	3.01	1.81	1.90	3.63	3.01	1.81
rogoro	3.66	3.49	1.35	1.99	3.69	3.53	1.35	1.99	3.19	2.54	1.36	2.06	3.19	2.54	1.36
mat	3.55	2.81	2.09	1.53	3.55	2.81	2.10	1.52	3.59	2.88	1.86	1.89	3.59	2.88	1.86
r as Salnam	3.33	2.77	1.54	1.61	3.57	2.84	1.40	1.40	3.20	2.73	1.64	1.75	3.20	2.73	1.64
ndi	3.55	2.74	a	1.93	3.56	2.74	a	1.92	3.25	2.62	1.71	2.22	3.25	2.62	1.71
vava	3.40	2.82	a	1.41	3.41	2.83	a	1.38	3.13	2.64	1.57	2.17	3.13	2.64	1.57
vava	4.01	3.05	a	1.25	4.03	3.06	a	1.22	3.47	2.77	2.11	1.85	3.47	2.77	2.11
inga	3.17	2.70	a	a	3.16	2.70	a	a	3.36	2.69	1.52	2.07	3.36	2.69	1.52
aya	3.88	3.05	1.47	a	3.89	3.05	1.47	a	3.71	2.96	1.46	1.75	3.71	2.96	1.46
ngida	3.62	3.18	a	2.55	3.62	3.19	a	2.57	3.57	2.88	1.90	2.03	3.57	2.88	1.90
bora	3.32	3.11	2.48	2.73	3.53	3.11	2.50	2.75	3.39	3.13	1.85	2.14	3.39	3.13	1.85
kva	4.06	3.01	a	a	4.07	3.01	a	a	3.76	3.01	2.02	1.92	3.76	3.01	2.02
gona	3.55	2.61	1.88	1.79	3.54	2.56	1.90	1.77	3.75	3.31	1.59	2.01	3.75	3.31	1.59
inyanga	3.65	3.12	a	2.19	3.65	3.12	a	2.20	3.47	3.09	1.80	1.98	3.47	3.09	1.80
st Lake	3.65	3.41	1.82	2.71	3.66	3.43	1.83	2.73	3.47	2.87	1.55	1.96	3.47	2.87	1.55
ansa	3.63	3.15	a	1.28	3.64	3.16	a	1.24	3.50	3.01	1.73	2.25	3.50	3.01	1.73
ra	4.08	2.93	1.70	2.05	4.10	2.91	1.70	2.04	3.77	3.24	1.79	2.10	3.77	3.24	1.79
ILIAND	3.46	2.87	1.74	1.83	3.46	2.87	1.75	1.82	3.36	2.87	1.68	1.96	3.36	2.87	1.68
zibar North	4.73	3.62	2.30	a	4.77	3.50	2.32	a	4.60	4.09	2.22	-	4.60	4.09	2.22
zibar South	4.42	3.73	1.87	a	4.38	3.79	1.84	a	4.51	3.60	1.93	-	4.51	3.60	1.93
zibar West	3.97	3.74	2.30	2.05	4.26	3.81	2.26	1.95	3.84	3.71	2.31	2.09	3.84	3.71	2.31
zba North	4.63	3.68	2.20	a	4.75	3.57	2.30	a	4.23	4.05	1.86	2.41	4.23	4.05	1.86
zba South	4.59	3.76	2.05	a	4.65	3.63	2.02	a	4.38	4.24	2.18	4.04	4.38	4.24	2.18
IZIBAR	4.47	3.71	2.16	a	4.62	3.63	2.15	a	4.17	3.67	2.16	2.53	4.17	3.67	2.16

1978	3.19	3.00	1.74	1.83	3.19	3.00	1.74	1.83	3.19	3.00	1.89	1.98	3.19	3.00	1.89
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URBAN

RURAL

TOTAL

Region	Culti- vator	Other agri- culture	Crafts- men and operators	Prof. Manag. and sales	Lab. and other workers	Students and un- occupied	Culti- vator	Other Agr.	Crafts- men and operators	Prof. Manag. and sales	Lab. and other workers	Students and un- occupied	Culti- vator	Other Agr.	Crafts- men and operators	Prof. Manag. and sales	Lab. and other workers	Students and un- occupied
Dodoma	3.51	4.00	-	1.56	2.56	1.53	3.51	4.04	-	1.47	7.57	1.48	3.37	2.90	2.00	2.22	2.36	2.90
Arusha	3.46	2.96	a	1.84	2.64	2.89	3.47	2.94	a	1.83	2.64	2.91	3.35	3.21	1.79	1.92	2.71	2.65
Kilimanjaro	3.44	2.58	a	1.54	2.56	1.62	3.45	2.87	a	1.52	2.56	1.57	3.26	3.06	1.65	1.95	2.51	2.40
Tanga	3.66	3.22	1.95	2.33	3.19	3.18	3.69	3.23	1.89	2.33	3.30	3.23	3.52	3.18	2.27	2.36	2.64	2.94
Morogoro	3.55	3.69	a	1.90	2.06	2.51	3.56	3.72	a	1.89	2.03	2.49	3.34	3.22	1.94	2.07	2.57	2.82
Coast	3.50	2.37	a	1.90	2.54	2.71	3.51	2.29	a	1.89	2.55	2.71	3.33	4.60	2.63	2.15	2.23	2.67
D'Salman	3.41	2.87	a	2.09	2.75	2.71	3.48	3.42	a	2.08	3.50	2.54	3.37	2.49	2.23	2.09	2.24	2.82
Lindi	3.27	2.66	-	1.90	a	1.60	3.28	2.67	-	1.88	a	1.60	3.09	2.43	1.88	2.39	1.69	1.58
Mtwara	3.15	a	a	2.45	a	1.45	3.16	a	a	2.46	a	1.42	3.00	2.79	2.51	2.10	2.30	2.42
Ruvuma	3.41	2.98	a	1.83	2.87	0.87	3.42	3.00	a	1.81	2.88	0.81	3.22	2.43	2.62	2.30	2.58	2.24
Iringa	3.29	2.82	a	1.76	2.03	2.52	3.30	2.79	a	1.74	2.04	2.50	3.21	3.35	1.56	2.14	1.82	2.99
Mbeya	3.68	4.26	a	1.71	2.93	0.97	3.71	4.27	a	1.67	2.94	0.89	3.00	4.05	2.40	2.45	2.69	2.69
Singida	3.58	3.58	a	a	4.26	2.28	3.58	3.57	a	a	4.32	2.26	3.43	3.91	2.70	2.37	2.58	2.72
Tabora	3.48	3.85	-	2.22	a	2.49	3.48	3.87	-	2.20	a	2.48	3.38	3.22	2.77	2.71	2.45	2.77
Rukwa	3.88	3.05	-	7.96	3.75	2.47	3.89	3.00	-	1.94	3.80	2.46	3.55	4.10	1.90	2.34	2.72	2.79
Kigoma	3.48	3.03	-	2.12	3.11	1.78	3.47	2.95	-	2.09	3.11	1.66	3.68	4.04	3.67	2.55	3.12	3.38
Shinyanga	3.59	3.66	a	2.38	3.18	3.23	3.59	3.67	a	2.38	3.19	3.23	3.44	3.21	2.23	2.45	2.64	3.10
West Lake	3.65	3.14	-	1.63	2.45	1.48	3.66	3.15	-	1.61	2.44	1.44	3.37	2.84	2.59	2.35	2.61	2.60
Mwanza	3.61	3.13	-	2.36	2.28	2.45	3.62	3.14	-	2.36	2.26	2.43	3.47	2.84	2.46	2.38	2.87	2.87
Mara	3.59	3.87	a	2.43	3.26	2.75	3.59	3.90	a	2.39	3.28	2.73	3.55	3.35	3.42	3.13	2.87	3.07
MAITLAND	3.50	3.23	a	1.97	2.83	2.08	3.51	3.33	a	1.96	2.83	2.07	3.21	3.20	2.44	2.37	2.55	2.88
Zanzibar } North)	4.63	4.12	a	a	3.09	3.16	4.65	4.20	a	a	3.21	3.75	4.57	8.83	a	3.06	2.63	0.92
Zanzibar } South)	4.20	a	a	3.69	3.84	3.47	4.19	3.97	3.25	3.96	3.72	3.59	4.21	a	a	3.06	4.11	3.20
Z/Bar West	3.91	3.89	3.59	3.48	3.36	3.59	4.12	3.90	3.73	3.44	3.14	3.94	3.82	3.88	3.53	3.49	3.46	3.44
Pesha North	4.63	3.85	a	2.95	2.65	4.63	4.75	3.53	a	2.82	2.22	4.67	4.24	4.92	4.88	3.37	4.11	4.50
Pesha South	4.40	3.13	a	2.93	3.94	4.13	4.51	4.43	a	2.76	3.92	4.13	4.00	3.00	4.72	3.58	4.01	4.10
ZANZIBAR	4.36	4.00	a	3.23	3.36	3.81	4.51	4.04	a	3.12	3.24	4.06	4.06	3.90	4.03	3.37	3.61	3.31

Region	TOTAL					RURAL					URBAN							
	Culti- vator	Other Agr.	Crafts- men and operators	Prof. Manag. and sales	Lab. and other workers	Students and un- occupied	Culti- vator	Other Agr.	Crafts- men and operators	Prof. Manag. and sales	Lab. and other workers	Students and un- occupied	Culti- vator	Other Agr.	Crafts- men and operators	Prof. Manag. and sales	Lab. and other workers	Students and un- occupied
Dodoma	3.42	3.60	3.11	2.26	3.20	2.39	3.43	3.62	3.11	2.24	3.21	2.37	3.28	3.11	3.04	2.76	2.98	2.94
Arusha	3.82	3.04	3.52	2.58	2.99	2.53	3.86	3.03	3.57	2.60	3.01	2.54	3.28	3.26	2.81	2.32	2.70	2.36
Kilimanjaro	3.16	2.99	3.17	2.66	3.17	2.11	3.16	2.98	3.19	2.67	3.20	2.10	3.11	3.23	2.88	2.46	2.65	2.34
Tanga	3.59	3.62	3.54	2.92	3.54	3.01	3.63	3.65	3.62	2.95	3.62	3.03	3.36	3.46	3.14	2.79	3.09	2.92
Morogoro	3.50	3.39	3.06	2.74	3.23	2.54	3.52	3.39	3.06	2.75	3.25	2.53	3.12	3.33	3.04	2.66	2.95	2.73
Coast	3.46	2.86	3.14	2.76	3.15	1.53	3.46	2.83	3.14	2.77	3.16	1.48	3.45	3.69	3.21	2.57	3.01	2.86
D/Salaam	3.22	2.90	3.12	2.71	3.25	2.69	3.46	2.93	3.32	2.97	3.82	2.86	3.05	2.88	2.99	2.53	2.86	2.58
Lindi	3.30	3.30	3.00	2.85	3.29	2.58	3.31	3.30	3.00	2.86	3.31	2.58	3.02	3.21	2.95	2.67	2.85	2.55
Mtwara	3.12	3.34	3.20	3.07	2.49	2.14	3.13	3.36	3.22	3.09	2.48	2.13	2.79	2.72	2.65	2.50	2.74	2.42
Ruvuma	3.43	2.67	3.04	2.74	3.46	2.76	3.44	2.69	3.05	2.74	3.48	2.78	3.21	2.27	2.83	2.65	2.87	2.23
Iringa	3.33	2.89	3.03	2.54	2.77	2.27	3.34	2.84	3.03	2.54	2.78	2.24	3.11	3.75	2.96	2.51	2.69	2.33
Mbeya	3.65	3.91	3.16	2.97	3.59	2.79	3.66	3.91	3.16	2.98	3.40	2.78	3.41	4.01	3.12	2.70	3.14	3.05
Singida	3.47	3.59	3.88	3.22	3.48	3.21	3.47	3.59	3.90	3.24	3.50	3.23	3.34	3.64	3.26	2.73	3.03	2.70
Tabora	3.53	3.22	3.16	3.57	3.60	2.59	3.54	3.23	3.15	3.59	3.62	2.59	3.27	2.96	3.36	3.08	3.06	2.65
Rukwa	3.84	3.78	3.95	3.09	4.11	3.31	3.86	3.75	3.97	3.10	4.15	3.33	3.47	4.46	3.40	2.88	3.24	2.93
Kigoma	3.44	3.31	3.62	3.01	3.38	3.14	3.44	3.27	3.62	2.99	3.38	3.10	3.48	3.88	3.55	3.22	3.38	3.61
Shinyanga	3.61	3.61	3.44	3.40	3.56	2.20	3.62	3.62	3.44	3.41	3.57	2.18	3.37	3.37	3.40	2.87	3.06	2.87
West Lake	3.47	3.59	3.60	3.22	3.49	3.21	3.47	3.59	3.61	3.24	3.50	3.23	3.34	3.64	3.26	2.73	3.03	2.70
Mwanza	3.61	3.25	3.46	3.08	3.02	3.25	3.62	3.25	3.47	3.09	3.02	2.26	3.40	3.29	3.14	2.90	3.03	2.98
Mara	3.64	3.80	3.89	3.17	3.73	3.52	3.65	3.80	3.92	3.17	3.76	3.55	3.48	3.75	3.40	3.26	3.24	3.03
MAITLAND	3.47	3.34	3.33	2.94	3.28	2.64	3.49	3.35	3.35	2.96	3.31	2.57	3.21	3.25	3.08	2.68	2.94	2.73
E./bar North	4.35	4.07	4.34	3.93	3.98	3.24	4.38	4.03	4.42	3.87	3.96	3.12	4.25	4.26	4.02	4.16	4.06	3.67
E./bar South	4.20	3.97	4.20	4.00	4.08	3.42	4.16	3.87	4.29	4.04	4.18	3.39	4.31	4.22	3.99	3.91	3.86	3.48
E./bar West	3.88	3.88	3.90	3.55	3.80	3.52	4.02	3.82	4.00	3.81	4.06	3.78	3.82	3.91	3.86	3.44	3.69	3.41
Panba North	4.31	4.00	4.20	3.93	4.05	3.82	4.39	3.95	4.23	3.92	4.10	3.84	4.03	4.16	4.12	3.96	3.88	3.76
Panba South	4.04	4.16	4.11	3.77	4.13	3.97	4.18	4.19	4.08	3.63	4.24	4.01	4.11	4.04	4.20	4.31	4.01	3.82
UNION TOTAL	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88

CHAPTER 14

POPULATION PROJECTIONS: MAINLAND AND ZANZIBAR

by

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H. Mbaruku

INTRODUCTION

Population projections, though an indispensable input for planning, are invariably subject to some degree of uncertainty. Bourgeois-Pichat underlines this aspect of projections in a statement which is difficult to improve upon: "Population projections, in fact, may be obsolete as soon as they are published, so unpredictable is demographic behaviour of populations and so much does it challenge the wisdom of demographers"¹. The uncertainty applies to developed as well as developing countries, though perhaps not for identical reasons. One major factor contributing to the uncertainty in the context of Tanzanian projections is that the knowledge of basic parameters can at best be described as scanty. The projections by age and sex for the Mainland and Zanzibar presented in this chapter are built around evidence which appears plausible in the light of the existing knowledge of demographic conditions of the country. Needless to add that these projections be evaluated and revised as and when additional information becomes available. The projections have deliberately been restricted to a twenty-year period because it is

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¹ Jean Bourgeois-Pichat, "The economic and Social Implications of Demographic Trends in Europe up to and beyond 2000", Population Bulletin of the United Nations, No. 8 (1976), p.34.

felt that long before year 2000 Tanzania would be able to work out a more tenable set of assumptions for new projections guided by an accentuated level of consciousness of her demographic conditions. The usual general assumption, namely, absence of war, famines, epidemics, economic cycles, natural disasters and the like over the projection period, also applies to the projections presented here. It may also be noted that since the Mainland and Zanzibar constitute two separate entities for planning with separate ministries entrusted with the task, this chapter provides separate projections for them.

BASE POPULATION (Mid-1980)

The base population for the Mainland for mid-1980 was obtained by multiplying the smoothed age composition arrived at by Procedure III described in Chapter 2 (Table 2.14), by independent estimates of male and female population derived from the intercensal (1967-1978) rate of growth. Other methods of smoothing the reported 1978 population did not necessarily provide better results than Procedure III². Selection of Procedure III has the theoretical advantage that except for ages 0 - 6 it is based on the reported age distribution.

For Zanzibar, the reported 1978 population was subjected to the United Nations five-term formula³ to obtain the smoothed population between ages 10 - 74. (Population under 10 and 75 and over was taken as reported.) The smoothed age distribution was multiplied by independent estimates of male and female population for mid-1980 using the intercensal rate of growth to obtain the base population. Since Zanzibar is an out migration area, smoothing was restricted to the simple procedure described here. It was feared that any additional smoothing might distort "true" characteristics of the population.

²For details see Chapter 2.

³United Nations, Methods for Population Projections by Sex and Age (New York: United Nations, 1956), p.12.

MORTALITY ASSUMPTIONS

There is fairly conclusive evidence that mortality has been declining in Tanzania for some time. Since mortality level is still moderately high it has been assumed that it will continue falling linearly over the projection period. The mortality assumptions are summarized in Table 14.1. The survival ratio were obtained from the United Nations Far Eastern Model Life Tables. (Rationale for using these tables appears in Chapter 2.)

TABLE 14.1.-- MORTALITY LEVELS AT THE BEGINNING AND END OF PROJECTION PERIOD (1980 - 2000): MAINLAND AND ZANZIBAR

Area	Expectation of life	
	1980	2000
Mainland		
Male	46	55
Female	49	58
Zanzibar		
Male	51	58
Female	54	62

FERTILITY ASSUMPTIONS

There is some indication that fertility may have increased slightly over the last decade or so. There is also some evidence that, in general, the age structure of fertility indicated by the 1967 and 1978 censuses has essentially remained unaltered (Chapter 12). It has been assumed that after 1980 no further increase in fertility is likely to take place. The initial values of the total fertility rate are assumed to be 7.0 and 7.1 for the Mainland and Zanzibar respectively. The sex ratio at birth has been taken as 102. The age structures of fertility for the Mainland and Zanzibar have been assumed to be identical.

High variant: In the Mainland fertility will remain unchanged over the projection period. In Zanzibar it will remain unchanged until 1990; afterward it will decrease by a factor of 0.05 over each projection cycle.

Medium variant: In the Mainland, fertility would remain unchanged until 1990; after 1990 it will decrease by a factor 0.05 in each projection cycle. In Zanzibar, fertility would decline by a factor of 0.03 over each projection cycle⁴.

Low variant: It is assumed that both in the Mainland and Zanzibar, fertility would decline by a factor of 0.05 over each projection cycle.

MIGRATION ASSUMPTIONS

For the Mainland net immigration has been assumed to be negligible. For Zanzibar, a net outmigration area, it has been assumed that there would be a net loss of 14000, 14000, 12000 and 12000 in the successive projection cycles. The age and sex distribution of net out-migrants (emigrants) has been assumed to follow the pattern observed in Argentina during 1950 - 1955⁵.

SELECTED IMPLIED DEMOGRAPHIC INDICATORS

Tables 14.2 and 14.3 provide selected demographic indicators implied in the various projection cycles. All indicators refer to the mid-point of respective cycles. As may be expected, all variants indicate that in general population of the Mainland as well as Zanzibar is likely to witness high rate of growth for some time to come.

⁴The overlap between "High" and "Medium" variants for the Mainland is deliberate. It is felt that until 1990 no substantial decrease in fertility in the Mainland can be expected.

⁵United Nations, Methods for Population Projections by Sex and Age, Manual III (New York: United Nations, 1956), Table 48. The age group 70-74 has been assumed to contain 400 males and 300 females in Table 48.

TABLE 14.2.-- SELECTED DEMOGRAPHIC INDICATORS IMPLIED
BY THE POPULATION PROJECTIONS FOR DIFFERENT PROJECTION
CYCLES: MAINLAND

Indicator and cycle	Variant		
	Low	Medium	High
Crude birth rate			
1980-85	47.9	49.1	49.1
1985-90	45.1	48.1	48.1
1990-95	43.2	46.5	47.7
1995-2000	42.0	44.7	47.7
Crude death rate			
1980-85	17.6	17.7	17.7
1985-90	14.9	15.1	15.1
1990-95	12.6	12.7	12.8
1995-2000	10.8	10.8	11.0
Rate of growth			
1980-85	3.03	3.14	3.14
1985-90	3.02	3.30	3.30
1990-95	3.06	3.38	3.49
1995-2000	3.12	3.39	3.68
Total fertility rate			
1980-85	6.82	7.00	7.00
1985-90	6.48	7.00	7.00
1990-95	6.16	6.82	7.00
1995-2000	5.85	6.48	7.00

TABLE 14.3. -- SELECTED DEMOGRAPHIC INDICATORS IMPLIED
BY THE POPULATION PROJECTIONS FOR DIFFERENT PROJECTION
CYCLES: ZANZIBAR

Indicator and cycle	Variant		
	Low	Medium	High
Crude birth rate			
1980-85	44.5	44.9	45.6
1985-90	44.7	45.9	47.8
1990-95	45.9	47.7	49.3
1995-2000	45.4	47.7	48.1
Crude death rate			
1980-85	13.9	13.9	13.9
1985-90	11.8	11.9	12.0
1990-95	9.9	10.0	10.1
1995-2000	8.3	8.4	8.4
Rate of growth			
1980-85	2.61	2.66	2.72
1985-90	2.84	2.95	3.13
1990-95	3.26	3.44	3.60
1995-2000	3.42	3.65	3.71
Total fertility rate			
1980-85	6.92	6.99	7.10
1985-90	6.58	6.78	7.10
1990-95	6.25	6.58	6.92
1995-2000	5.94	6.38	6.58

PROJECTIONS: 1980 - 2000

A summary of projected population totals appears in Table 14.4. Even the low variant indicates that the population of the Mainland

TABLE 14.4. -- TOTAL PROJECTED POPULATION BY VARIANT:
MAINLAND AND ZANZIBAR^a

Area and variant	Year			
	1985	1990	1995	2000
Mainland				
High	21161776	24972263	29745627	35765073
Medium	21161770	24972256	29585189	35062804
Low	21048332	24486549	28550032	33384360
Zanzibar				
High	573189	670586	803271	967314
Medium	571388	662532	787233	945541
Low	570187	657237	773754	918369

Source: Tables 14.5 - 14.16.

^aBase population, 1980: Mainland - 18079725; Zanzibar - 500218.

would be almost twice as large in year 2000 as it was in 1978 (17,036,499). Zanzibar, in spite of net out-migration, would also be growing at a very high rate. Detailed projections by age and sex for the Mainland and Zanzibar have been presented in Tables 14.5 - 14.16.

TABLE 14.5.-- POPULATION PROJECTIONS BY AGE, 1980-2000, FOR THE MAINLAND:
HIGH VARIANT, MALES

Age	1980	1985	1990	1995	2000
0-4	1680621	2142314	2501834	2981426	3620069
5-9	1332539	1612013	2066764	2427591	2909712
10-14	1115387	1309970	1588241	2040823	2402461
14-19	791522	1094955	1288892	1566231	2017107
20-24	704856	769363	1067910	1261319	1537923
25-29	535606	679951	745321	1038920	1232276
30-34	545718	513765	655392	721891	1011149
35-39	434659	518104	490636	629566	697522
40-44	391370	405598	486976	464507	600369
45-49	280310	356479	372713	451459	434446
50-54	275165	246271	316552	334519	409544
55-59	201540	230641	209008	272020	291061
60-64	157098	157520	182928	168219	222169
65-69	114874	110003	112348	132895	124481
70-74	88174	70031	68598	71665	86714
75+	221410	139957	97081	78321	72493
Total	8870849	10356934	12251193	14641375	17669497

TABLE 14.6.-- POPULATION PROJECTIONS BY AGE, 1980-2000, FOR THE MAINLAND:
HIGH VARIANT, FEMALES

Age	1980	1985	1990	1995	2000
0-4	1676551	2125821	2474728	2939803	3558251
5-9	1323394	1612658	2055049	2404324	2870475
10-14	1168963	1305316	1593470	2034224	2384211
15-19	837999	1148991	1285902	1573303	2013001
20-24	803743	813031	1119240	1257643	1544917
25-29	646917	772993	785896	1087377	1228044
30-34	629973	618326	742984	759631	1056944
35-39	458321	598354	590806	714163	734533
40-44	397083	431904	567344	563642	685528
45-49	269725	369545	404581	534928	534913
50-54	256649	245439	338841	373802	498011
55-59	216591	225532	217725	303431	337912
60-64	148814	181083	190796	186378	262827
65-69	109216	116125	143355	153235	151858
70-74	81406	77219	83564	104992	114223
75+	183531	162505	126791	113376	119926
Total	9208876	10804842	12721070	15104252	18095576

TABLE 14.7.--- POPULATION PROJECTIONS BY AGE, 1980-2000, FOR THE MAINLAND:
MEDIUM VARIANT, MALES

Age	1980	1985	1990	1995	2000
0-4	1680621	2142314	2501834	2900646	3344892
5-9	1332539	1612013	2066764	2427591	2830876
10-14	1115387	1309970	1588241	2040823	2402461
15-19	791522	1094955	1288892	1566231	2017107
20-24	704856	769363	1067910	1261319	1537923
25-29	535606	679951	745321	1038920	1232276
30-34	545718	513765	655392	721891	1011149
35-39	434659	518104	490636	629566	697522
40-44	391370	405598	486976	464507	600369
45-49	280310	356479	372713	451459	434446
50-54	275165	246271	316552	334519	409544
55-59	201540	230641	209008	272020	291061
60-64	157098	157520	182928	168219	222169
65-69	114874	110003	112348	132895	124481
70-74	88174	70025	68594	71663	84713
75+	221410	139957	97078	78318	72490
Total	8870849	10356928	12251186	14560589	17315480

TABLE 14.8.-- POPULATION PROJECTIONS BY AGE, 1980-2000, FOR THE MAINLAND:
MEDIUM VARIANT, FEMALES

Age	1980	1985	1990	1995	2000
0-4	1676551	2125821	2474728	2860151	3287773
5-9	1323394	1612658	2055049	2404324	2792702
10-14	1168963	1305316	1593470	2034224	2384211
15-19	837999	1148991	1285902	1573303	2013001
20-24	803743	813031	1119240	1257643	1544917
25-29	646917	772993	785896	1087377	1228044
30-34	629973	618326	742984	759631	1055944
35-39	458321	598354	590906	714163	734533
40-44	397083	431904	567344	563642	685528
45-49	269725	369545	404581	534928	534913
50-54	256549	245439	338841	373802	498011
55-59	216591	225532	217725	303431	337912
60-64	148814	181083	190796	186378	262827
65-69	109216	116125	143355	153235	151858
70-74	81406	77219	83564	104992	114223
75+	183531	162505	126791	113376	119926
Total	9208876	10804842	12721070	15024601	17747325

TABLE 14.9.--- POPULATION PROJECTIONS BY AGE, 1980-2000, FOR THE MAINLAND:
LOW VARIANT, MALES

Age	1980	1985	1990	1995	2000
0-4	1680621	2085373	2312730	2617859	3011406
5-9	1332539	1612013	2011832	2244098	2554891
10-14	1115387	1309970	1588241	1986580	2220868
15-19	791522	1094955	1288892	1566231	1963494
20-24	704856	769363	1067910	1261319	1537923
25-29	535606	679951	745321	1038920	1232276
30-34	545718	513765	655392	721891	1011149
35-39	434659	518104	490636	629566	697522
40-44	391370	405598	486976	464507	600369
45-49	280310	356479	372713	451459	434446
50-54	275165	246271	316552	334519	409544
55-59	201540	230641	209008	272020	291061
60-64	157098	157520	182928	168219	222169
65-69	114874	110003	112348	132895	124481
70-74	88174	70031	68598	71665	86714
75+	221410	139957	97081	78321	72493
Total	8870849	10299993	12007156	14040072	16470807

TABLE 14.12.-- POPULATION PROJECTIONS BY AGE, 1980-2000, FOR ZANZIBAR:
HIGH VARIANT, FEMALES

Age	1980	1985	1990	1995	2000
0-4	48127	55206	67600	83406	98583
5-9	46029	46730	53792	66145	81923
10-14	30820	45467	46199	53290	65637
15-19	23559	30307	48825	45647	52758
20-24	19899	22879	29538	43950	44885
25-29	16527	19077	22008	28661	42938
30-34	13344	15646	18129	21124	27730
35-39	10755	12470	14689	17231	20231
40-44	5419	9878	11506	13770	16300
45-49	7839	8476	8887	10559	12787
50-54	6272	6864	7436	7936	9564
55-59	5028	5311	5837	6461	6973
60-64	4601	4071	4319	4867	5470
65-69	3574	3533	3120	3395	3898
70-74	2352	2503	2499	2246	2496
75-79	4250	4152	3552	3293	3060
80+					
Total	252395	292569	343938	411979	495234

TABLE 14.13.-- POPULATION PROJECTIONS BY AGE, 1980-2000, FOR ZANZIBAR:
MEDIUM VARIANT, MALES

Age	1980	1985	1990	1995	2000
0-4	46648	55107	65482	80688	97315
5-9	44350	45236	53634	63999	79168
10-14	31870	43698	44617	53021	63380
15-19	22487	31255	42958	43962	52356
20-24	16864	21643	30235	41879	42963
25-29	14245	15759	20361	28943	40459
30-34	12203	12963	14337	19018	27482
35-39	10461	10822	11447	12980	17588
40-44	9464	8964	9196	10003	11531
45-49	8389	7846	7273	7698	8513
50-54	6966	6729	6156	5822	6262
55-59	5829	5378	5123	4777	4529
60-64	5482	4252	3862	3774	3531
65-69	4339	3685	2783	2586	2559
70-74	3128	2585	2177	1654	1553
75+	5098	3789	2949	2410	1924
Total	247823	279713	322591	363213	461114

TABLE 14.14.-- POPULATION PROJECTIONS BY AGE, 1980-2000, FOR ZANZIBAR:
MEDIUM VARIANT, FEMALES

Age	1980	1985	1990	1995	2000
0-4	48127	54312	64476	79375	95643
5-9	46029	46730	52919	63084	77960
10-14	30820	45467	46199	52423	62594
15-19	23559	30307	44825	45647	51897
20-24	19899	22879	29538	43950	44885
25-29	16527	19077	22008	28661	42938
30-34	13344	15646	18129	21124	27730
35-39	10755	12470	14689	17231	20231
40-44	9419	9878	11506	13770	16300
45-49	7839	8476	8887	10559	12787
50-54	6272	6864	7436	7936	9564
55-59	5028	5311	5837	6461	6973
60-64	4601	4071	4319	4867	5470
65-69	3574	3533	3120	3395	3898
70-74	2352	2503	2499	2246	2496
75+	4250	4152	3552	3293	3060
Total	252395	291675	339941	404021	484427

TABLE 14.15.-- POPULATION PROJECTIONS BY AGE, 1980-2000, FOR ZANZIBAR:
LOW VARIANT, MALES

Age	1980	1985	1990	1995	2000
0-4	46648	54503	63404	76514	90319
5-9	44350	45236	53044	61966	75068
10-14	31870	43698	44617	52437	61363
15-19	22487	31255	42958	43962	51777
20-24	16864	21643	30235	41879	42963
25-29	14245	15759	20361	28943	40459
30-34	12203	12963	14337	19018	27482
35-39	10461	10822	11447	12980	17588
40-44	9464	8964	9196	10003	11531
45-49	8389	7846	7273	7698	8513
50-54	6966	6729	6156	5822	6262
55-59	5829	5378	5123	4777	4529
60-64	5482	4252	3862	3774	3531
65-69	4339	3685	2783	2586	2559
70-74	3128	2585	2177	1654	1553
75+	5098	3789	2949	2410	1924
Total	247823	279108	319924	376421	447421

TABLE 14.16.--- POPULATION PROJECTIONS BY AGE, 1980-2000, FOR ZANZIBAR:
LOW VARIANT, FEMALES

Age	1980	1985	1990	1995	2000
0-4	48127	53715	62431	75269	88767
5-9	46029	46730	52337	61080	73922
10-14	30820	45467	46199	51845	60602
15-19	23559	30307	44825	45647	51324
20-24	19899	22879	29538	43950	44885
25-29	16527	19077	22008	28661	42938
30-34	13344	15646	18129	21124	27730
35-39	10755	12470	14689	17231	20231
40-44	9419	9878	11506	13770	16300
45-49	7839	8476	8887	10559	12787
50-54	6272	6864	7436	7936	9564
55-59	5028	5311	5837	6461	6973
60-64	4601	4071	4319	4867	5470
65-69	3574	3533	3120	3395	3898
70-74	2352	2503	2499	2246	2496
75+	4250	4152	3552	3293	3060
Total	252395	291079	337314	397333	470948

CHAPTER 15

SUBNATIONAL AND OTHER PROJECTIONS

by

M. Rafiq*

One of the major and persistent problems besetting subnational projections in developing countries is the choice of viable input parameters and assumptions. The general paucity of basic information which to a large extent accounts for uncertainty in the national projections for developing countries, mars the credibility of subnational projections more severely because such information at subnational level suffers from more serious gaps than at the national level.

This chapter provides projected regional totals, projection of regional population by age in three broad age groups, projected urban and rural totals at the regional level, and projected population by sex and age in single years for the Mainland and Zanzibar separately.¹ The chapter also provides headship rates and work force participation rates.

*The author is working as United Nations Chief Technical Advisor at the Central Census Office. He is solely responsible for the views expressed in this chapter.

¹Regional projections are restricted to the Mainland regions only. Since basic data for Zanzibar regions are available for only one point in time, no regional projections have been undertaken for Zanzibar.

To enhance readability and accessibility of the material in this chapter, it was decided to divide the material into five sections (Sections 15.I - 15.V).

It is felt that further details and refinements can be worked out without much difficulty by following the methodology for subnational projections used in this chapter.

SECTION 15.I PROJECTIONS OF REGIONAL TOTALS

The projected total population at the regional level was obtained by the application of a ratio technique. The technique assumed that the rate of change in percents for a given region between 1967 and 1978 would fall linearly to zero in 100 years. The projections were manipulated by single year up to 1995, and the percents were adjusted to bring their totals to 100 in years 1985, 1990 and 1995. The reported and projected percents by region appear in Table 15.1. The application of projected percents to the three variants of the Mainland projected population in Chapter 14 provides the projected regional totals appearing in Tables 15.2 - 15.4. Projected regional populations by age in three broad age groups are presented in Section 15.II. Only the data appearing in Table 15.3 (Medium Variant) have been used in Section 15.II.

TABLE 15.1.-- REPORTED AND PROJECTED PERCENTS OF
TOTAL POPULATION BY REGION: MAINLAND

Region	Reported		Projected		
	1967	1978	1985	1990	1995
Arusha	5.1049	5.4367	5.5932	5.6783	5.7401
Coast	3.5793	3.0322	2.7316	2.5381	2.3604
Dar es Salaam	2.9793	4.9487	6.5887	7.9448	9.4432
Dodoma	5.9319	5.7054	5.5327	5.3996	5.2594
Iringa	5.7691	5.4298	5.1996	5.0321	4.8629
Kigoma	3.9590	3.8091	3.6946	3.6062	3.5130
Kilimanjaro	5.4582	5.2971	5.1635	5.0569	4.9417
Lindi	3.5109	3.0970	2.8562	2.6957	2.5443
Mara	4.5501	4.2487	4.0733	3.9301	3.7870
Mbeya	6.3031	6.3385	6.3075	6.2629	6.2001
Morogoro	5.7088	5.5132	5.3589	5.2383	5.1099
Mtwara	5.1953	4.5304	4.1504	3.8998	3.6653
Mwanza	8.8294	8.4723	8.2046	8.0000	7.7857
Rukwa	2.3087	2.6525	2.8517	2.9813	3.0982
Ruvuma	3.3068	3.2963	3.2635	3.2294	3.1875
Shinyanga	7.5215	7.7688	7.8517	7.8772	7.8746
Singida	3.8293	3.6037	3.4508	3.3395	3.2270
Tabora	4.1985	4.8009	5.1471	5.3713	5.5722
Tanga	6.4477	6.0914	5.8460	5.6660	5.4829
West Lake	5.5082	5.9271	6.1344	6.2527	6.3445

TABLE 15.2.-- PROJECTED TOTAL POPULATION IN THOUSANDS
BY REGION, FOR THE MAINLAND HIGH VARIANT: 1985, 1990
AND 1995

Region	1985	1990	1995
Arusha	1183	1418	1707
Coast	578	634	702
Dar es Salaam	1394	1984	2809
Dodoma	1171	1348	1564
Iringa	1100	1257	1447
Kigoma	782	901	1045
Kilimanjaro	1093	1263	1470
Lindi	604	673	757
Mara	862	981	1126
Mbeya	1335	1564	1844
Morogoro	1134	1308	1520
Mtwara	878	974	1090
Mwanza	1736	1998	2316
Rukwa	603	744	922
Ruvuma	691	806	948
Shinyanga	1662	1967	2342
Singida	730	834	960
Tabora	1089	1341	1657
Tanga	1236	1415	1631
West Lake	1298	1561	1887
Total	21159	24971	29744

TABLE 15.3.-- PROJECTED POPULATION TOTALS IN THOUSANDS BY REGION, FOR THE MAINLAND, MEDIUM VARIANT: 1985, 1990 AND 1995

Region	1985	1990	1995
Arusha	1183	1418	1698
Coast	578	634	698
Dar es Salaam	1394	1984	2794
Dodoma	1171	1348	1556
Iringa	1100	1257	1439
Kigoma	782	901	1039
Kilimanjaro	1093	1263	1462
Lindi	604	673	753
Mara	862	981	1120
Mbeya	1335	1564	1834
Morogoro	1134	1308	1512
Mtwara	878	974	1084
Mwanza	1736	1998	2303
Rukwa	603	744	917
Ruvuma	691	806	943
Shinyanga	1662	1967	2330
Singida	730	834	955
Tabora	1089	1341	1649
Tanga	1236	1415	1622
West Lake	1298	1561	1877
Total	21159	24971	29585

TABLE 15.4.-- PROJECTED POPULATION TOTALS IN THOUSANDS BY REGION, FOR THE MAINLAND, LOW VARIANT: 1985, 1990 **AND** 1995

Region	1985	1990	1995
Arusha	1177	1390	1639
Coast	575	621	674
Dar es Salaam	1387	1945	2696
Dodoma	1165	1322	1502
Iringa	1094	1232	1388
Kigoma	778	883	1003
Kilimanjaro	1087	1238	1411
Lindi	601	660	726
Mara	857	962	1081
Mbeya	1328	1534	1770
Morogoro	1128	1283	1459
Mtwara	874	955	1046
Mwanza	1727	1959	2223
Rukwa	600	730	885
Ruvuma	687	791	910
Shinyanga	1653	1929	2248
Singida	726	818	921
Tabora	1083	1315	1591
Tanga	1230	1387	1565
West Lake	1291	1531	1811
Total	21048	24485	28549

SECTION 15.II PROJECTION OF REGIONAL POPULATION BY BROAD AGE GROUPS

Section 15.I of this chapter provided the regional projected totals for the Mainland for 1985, 1990 and 1995. The present section presents projected regional population by age in three broad age groups (0-14, 15-44 and 45 years and over). More detailed projections by age, though feasible, could not be undertaken because of lack of time at the disposal of this author. (The Central Census Office would be in a position to extend these projections to cover further details at a later date.) The basic procedure for obtaining the projections presented in this section was to make the marginal totals appearing in Table 15.3 and those appearing in Chapter 14 for the age groups under study agree by iteration. Usually two to three iterations were found sufficient to achieve the desired level of accuracy. Table 15.5 provides projected regional population by broad age groups for 1985, 1990 and 1995 for the Mainland.

TABLE 15.5.--- PROJECTED POPULATION IN BROAD AGE GROUPS (IN THOUSANDS) BY REGION FOR THE MALI: 1985, 1990 AND 1995^a

Region	1985				1990				1995			
	0-14	15-44	45+	Total	0-14	15-44	45+	Total	0-15	15-44	45+	Total
Arusha	581	468	134	1183	717	555	146	1418	868	662	170	1700
Coast	259	209	110	578	295	228	111	634	328	250	119	697
Dar es Salaam	565	711	118	1394	830	1002	152	1984	1181	1404	208	2793
Dodoma	567	451	154	1172	673	514	161	1348	785	590	181	1556
Iringa	561	423	115	1099	660	478	119	1257	764	544	132	1440
Kigoma	386	296	99	781	460	338	103	901	536	388	116	1040
Kilimanjaro	558	395	140	1093	665	451	147	1263	778	520	165	1463
Lindi	262	247	94	603	302	275	95	672	342	307	103	752
Mara	445	312	105	862	521	352	108	981	601	400	120	1121
Mbeya	648	523	164	1335	782	608	174	1564	927	710	198	1835
Morogoro	517	463	153	1133	616	530	161	1307	720	610	181	1511
Mtwara	382	367	130	879	438	404	131	973	493	448	142	1083
Mwanza	845	692	199	1736	1002	788	208	1998	1167	904	233	2304
Rukwa	302	237	64	603	384	288	72	744	478	353	86	917
Ruvuma	332	272	88	692	399	314	93	806	472	365	106	943
Shinyanga	827	641	194	1662	1008	750	209	1967	1206	884	241	2331
Singida	345	269	116	730	408	305	121	834	472	347	135	954
Tabora	503	432	153	1088	641	528	171	1340	797	647	204	1648
Tanga	600	473	164	1237	708	536	171	1415	820	611	190	1621
West Lake	617	485	196	1298	767	579	214	1560	933	694	250	1877
Total	10102	8366	2690	21158	12276	9823	2867	24966	14668	11638	3280	29586

^aMarginal totals can be off by less than one percent. Medium Variant in Table 15.3 formed the basis for further calculations.

SECTION 15.III PROJECTIONS OF REGIONAL URBAN-RURAL POPULATION TOTALS

This section provides urban-rural projections for the Mainland regions and for the whole of Zanzibar. Table 15.6 presents the observed urban-rural growth difference (URGD) based on the inter-censal (1967-1978) period. Table 15.7 consists of selected demographic indicators as implied by the three projection variants presented in Table 15.8. The urban and rural populations appearing in Table 15.8 were derived using the following relationship:

$$U_1 = \frac{(T_1 + d R_0)}{T_0} U_0$$

where,

U_1 = Urban population one year after the base year

U_0 = Urban population for the base year

T_1 = Total population one year after the base year

R_0 = Rural population of the base year

d = Urban-rural growth difference

The relationship was applied to successive years taken at an interval of one year using the Medium Variant of Chapter 14 as starting point for interpolating total population for each year between 1978 and 1995. The three variants of urban and rural projected totals presented in Table 15.8 for the Mainland were obtained by assuming URGD as 6.77948, 4.50000 and 3.00000.

Projections of urban and rural totals for Zanzibar were obtained using the procedure already outlined in the context of the Mainland. However, because of substantial differences in the level and tempo of urbanization between the Mainland and Zanzibar², it was felt that only two variants, namely medium and low, would most probably bracket the reality. The URGD for medium variant was assumed to be 1.67925 percent. The corresponding figure for the low variant was assumed to be 1.00. Zanzibar projected urban and rural totals appear in Table 15.9

The regional urban population estimates for the Mainland were obtained in a rather indirect fashion. Two factors gravitated against the direct use of the urban intercensal (1967-1978) growth rate. Firstly, the recency of urbanization in most regions made the rate unacceptably high. Secondly, state-sponsored programmes of development providing strong impetus to the rural sector of the economy, are likely to have some effect on the observed intercensal growth. The procedure used for arriving at regional urban projections can be designated as a ratio estimation procedure. The rate of change in the percent distributions of urban population observed over the 1967-1978 period was assumed to fall linearly to zero after a certain period for each region. The duration of the period varied from region to region³ and was based on subjective judgement in

²For details see Chapter 7.

³Duration was assumed to be 100 years for: Arusha, Dar es Salaam, Dodoma, Kilimanjaro, Mbeya and Mwanza. It was assumed as 75 years for: Iringa, Kigoma, Morogoro, Mtwara, Shinyanga, Tabora, Tanga and West Lake. For Lindi, Mara, Rukwa, Ruvuma and Singida it was assumed as 50 years. For Coast region it was taken as 30 years.

consultation with local expertise familiar with various regions.

The reported and projected percent distributions of urban population by region for the Mainland appear in Table 15.10. These distributions are applied to regional totals in Table 15.8 to obtain regional projections presented in Table 15.11. It is important to note that these projections should be revised as soon as some additional data on urbanization become available. For reasons already mentioned, the projections in Table 15.11 are restricted to the Mainland regions only.

TABLE 15.6.-- URBAN AND RURAL POPULATION, THE RATE OF GROWTH, AND URBAN-RURAL GROWTH DIFFERENCE (URGD) DERIVED FROM 1967 AND 1978 CENSUS DATA: MAINLAND AND ZANZIBAR^a

Area/year/ URGD	Population		Growth rate 1967-1978	
	Urban	Rural	Urban	Rural
Mainland				
1967	808162	11150492		
1978	2257921	14778578	9.34034	2.56086
URGD			6.77948	
Zanzibar				
1967	101475	252925		
1978	154979	321132	3.84979	2.17054
URGD			1.67925	

^aFor 1967, adjusted urban figures from Table 7.1 have been used.

TABLE 15.7.-- SELECTED IMPLIED DEMOGRAPHIC INDICATORS IN
THE PROJECTION OF URBAN AND RURAL POPULATION: MAINLAND AND
ZANZIBAR

Year/ period	Variant					
	High		Medium		Low	
	Urban	Rural	Urban	Rural	Urban	Rural
MAINLAND						
<u>Percent of Total Population</u>						
1980	14.8	85.2	14.3	85.7	13.9	86.1
85	19.3	80.7	17.1	82.9	15.7	84.3
90	24.8	75.2	20.4	79.6	17.8	82.2
1995	31.4	68.6	24.1	75.9	19.9	80.1
<u>Rate of growth</u>						
1980-85	8.5	2.1	6.8	2.5	5.6	2.7
1985-90	8.3	1.9	6.8	2.5	5.7	2.8
1990-95	8.0	1.6	6.7	2.4	5.7	2.8
ZANZIBAR						
<u>Percent of Total Population</u>						
1980			33.4	66.6	33.0	67.0
85			35.2	64.8	34.0	66.0
90			37.1	62.9	35.0	65.0
1995			38.8	61.2	36.0	64.0
<u>Rate of growth</u>						
1980-85			3.7	2.1	3.2	2.4
1985-90			4.0	2.4	3.6	2.7
1990-95			4.3	2.9	4.0	3.1

TABLE 15.8.-- URBAN AND RURAL POPULATION (IN THOUSANDS)
 UNDER THREE VARIANTS OF URBAN RURAL GROWTH DIFFERENCE (URGD)
 USING MEDIUM VARIANT OF CHAPTER 14, 1980-1995: MAINLAND

Year	High variant URGD=6.77948		Medium variant URGD=4.5		Low variant URGD=3.0	
	Urban	Rural	Urban	Rural	Urban	Rural
1980	2677	15403	2581	15499	2519	15561
81	2917	15741	2763	15895	2665	15993
82	3177	16078	2957	16298	2819	16436
83	3458	16413	3164	16707	2981	16890
84	3762	16744	3385	17121	3152	17354
1985	4091	17071	3620	17542	3333	17829
86	4452	17422	3877	17997	3529	18345
87	4842	17769	4151	18460	3737	18874
88	5263	18109	4443	18929	3956	19416
89	5717	18442	4755	19404	4188	19971
1990	6205	18767	5087	19885	4433	20539
91	6735	19098	5445	20388	4695	21138
92	7305	19419	5826	20898	4972	21752
93	7917	19728	6232	21413	5265	22380
94	8573	20026	6664	21934	5575	23024
1995	9276	20309	7124	22461	5902	23683

TABLE 15.9.-- URBAN AND RURAL POPULATION (IN THOUSANDS)
 UNDER TWO VARIANTS OF URGD USING MEDIUM VARIANT OF
 CHAPTER 14: ZANZIBAR

Year	Medium variant URGD=1.67925		Low variant URGD = 1.0	
	Urban	Rural	Urban	Rural
1980	167	333	165	335
81	173	340	170	343
82	180	347	176	351
83	187	354	182	359
84	194	362	188	368
1985	201	370	194	377
86	209	379	201	387
87	218	388	208	398
88	227	398	216	409
89	236	407	224	419
1990	246	417	232	431
91	257	429	242	444
92	269	441	252	458
93	280	455	262	473
94	292	468	273	487
1995	305	482	284	503

TABLE 15.10.-- REPORTED AND PROJECTED PERCENTS OF URBAN POPULATION BY REGION: MAINLAND^a

Region	Reported		Projected		
	1967	1978	1985	1990	1995
Arusha	4.669	3.261	2.553	2.141	1.800
Coast	0.735	1.651	2.291	2.659	2.889
Dar es Salaam	39.250	34.078	30.266	27.607	25.139
Dodoma	4.388	3.772	3.331	3.026	2.746
Iringa	3.129	3.724	3.959	4.065	4.131
Kigoma	3.074	2.854	2.639	2.474	2.313
Kilimanjaro	3.865	2.994	2.489	2.173	1.898
Lindi	1.921	2.356	2.528	2.600	2.636
Mara	2.217	2.339	2.319	2.273	2.212
Mbeya	2.729	4.279	5.355	6.141	6.936
Morogoro	4.544	5.992	6.747	7.191	7.562
Mtwara	3.476	4.090	4.320	4.417	4.472
Mwanza	5.534	6.545	6.955	7.151	7.288
Rukwa	1.439	2.351	2.932	3.306	3.627
Ruvuma	0.781	1.923	2.974	3.823	4.694
Shinyanga	2.263	2.478	2.514	2.501	2.472
Singida	1.364	2.569	3.451	4.072	4.645
Tabora	3.023	4.761	5.924	6.737	7.519
Tanga	10.429	6.464	4.763	3.854	3.148
West Lake	1.171	1.517	1.691	1.790	1.871

^aUrban population in Rukwa region was assumed to be 10,000 in 1967.

TABLE 15.11.-- PROJECTED URBAN POPULATION (IN THOUSANDS) BY REGION, THREE VARIANTS, SELECTED YEARS FOR THE MAINLAND: 1985, 1990 AND 1995

Region	High variant			Medium variant			Low variant		
	1985	1990	1995	1985	1990	1995	1985	1990	1995
Arusha	104	133	167	92	109	128	85	95	106
Coast	94	165	268	83	135	206	76	118	171
Dar es Salaam	1238	1713	2332	1096	1404	1791	1009	1224	1484
Dodoma	136	188	255	120	154	196	111	134	162
Iringa	162	252	383	143	207	294	132	180	244
Kigoma	108	154	215	96	126	165	88	110	137
Kilimanjaro	102	135	176	90	111	135	83	96	112
Lindi	103	161	245	92	132	188	84	115	156
Mara	95	141	205	84	116	158	77	101	131
Mbeya	219	381	643	194	312	494	178	272	409
Morogoro	276	446	701	244	366	539	225	319	446
Mtwara	177	274	415	156	225	319	144	196	264
Mwanza	285	444	676	252	364	519	232	317	430
Rukwa	120	205	336	106	168	258	98	147	214
Ruvuma	122	237	435	108	194	334	99	169	277
Shinyanga	103	155	229	92	127	176	84	111	146
Singida	141	253	431	125	207	331	115	181	274
Tabora	242	418	697	214	343	536	197	299	444
Tanga	195	239	292	172	196	224	159	171	186
West Lake	69	111	174	61	91	133	56	79	110
Total	4091	6205	9275	3620	5087	7124	3332	4434	5903

SECTION 15.IV PROJECTED POPULATION BY SINGLE
YEARS OF AGE: MAINLAND AND ZANZIBAR

This section provides projected population by single year of age. Tables 15.12-15.17 deal with the Mainland while Tables 15.18-15.23 provide projection for Zanzibar. Single year distributions were obtained from Chapter 14 by the application of Beers' "ordinary" formula.

TABLE 15.12.-- PROJECTED POPULATION BY AGE IN SINGLE YEARS FOR THE MAINLAND: HIGH VARIANT, MALES

Age	1980	1985	1990	1995	2000
0	361782	488184	534760	642675	797127
1	351427	454710	514749	620843	756933
2	338061	425033	499779	597214	720609
3	322758	398786	483397	572654	687690
4	306593	375601	467150	548039	657710
5	290697	355105	450555	524293	630187
6	276144	336933	433159	502289	604658
7	263832	320734	414606	482747	580694
8	254371	306187	394703	466130	557939
9	247493	293053	373741	452132	536234
10	242013	281187	352529	439629	515639
11	235913	270519	332329	426778	496400
12	226839	261016	314598	411429	478844
13	213422	252547	300240	392303	463071
14	197201	244701	288545	370683	448506
15	179784	238355	277553	348561	435450
16	164335	231931	266590	328150	422260
17	153088	222597	256756	310165	406588
18	147721	209113	248023	295607	307266
19	146594	192959	239970	283748	365544
20	147513	175574	233309	272518	343254
21	147352	160044	226506	261243	322588
22	144541	148685	216966	251154	304414
23	137578	143173	203528	242265	289768
24	127873	141887	187601	234139	277899
25	117175	142606	170507	227394	266683
26	108307	142267	155208	220513	255412
27	102874	139406	143994	211023	245339
28	102250	132568	138493	197798	236470
29	105000	123104	133120	182192	228372
30	109206	112709	137707	165483	221643
31	112180	104078	137272	150521	214795
32	112560	98715	134394	139497	205400
33	109035	97925	127657	138771	192349
34	102737	100338	118362	132419	176963
35	95493	104137	108179	132753	160512
36	89312	106758	99693	132105	145761

TABLE 15.12.-- CONTINUED

Age	1980	1985	1990	1995	2000
37	84767	106894	94300	129106	134802
38	82711	103289	93242	122392	129140
39	82376	97027	95221	113210	127308
40	82789	89864	90504	103180	127276
41	82403	83712	100665	94740	126299
42	80362	79089	100482	89282	123099
43	75924	76801	96772	87895	166379
44	69892	76131	90553	89380	107316
45	63119	76144	83503	92094	97471
46	57263	75412	77399	93745	89154
47	53474	73185	72687	93194	83539
48	52621	68789	20108	89326	81719
49	53833	62949	69016	83100	82563
50	55859	56455	68525	76111	84537
51	57120	50792	67368	70017	85541
52	56941	46959	64933	65198	84546
53	54583	45729	60633	62339	80537
54	50663	46336	55092	60854	74383
55	46334	47663	49012	59902	67567
56	42586	48328	43658	58362	61577
57	39451	47764	39856	55762	56708
58	37298	45329	38258	51598	53564
59	35871	41557	38223	46396	51634
60	34624	37458	38815	40786	50189
61	33170	33872	38873	35806	48256
62	31603	30793	37928	32075	45500
63	29813	28526	35444	30117	41510
64	27888	26870	31869	29434	36714
65	25987	25452	27989	29181	31821
66	24245	23960	24470	28634	27440
67	22738	22223	21703	27358	23949
68	21480	20234	19762	25241	21455
69	20424	18134	18425	22480	19816
70	19503	16117	17375	19374	18807
71	18637	14408	16229	16280	18152
72	17742	13241	14592	13580	17557
73	16740	12839	12082	11633	16749
74	15551	13426	8321	10798	15449
75+	221410	139657	97081	78321	72493

TABLE 15.13.-- PROJECTED POPULATION BY AGE IN SINGLE YEARS FOR THE MAINLAND: HIGH VARIANT, FEMALES

Age	1980	1985	1990	1995	2000
0	361698	485745	525841	633414	782801
1	381800	450664	500436	611860	743642
2	337846	420762	495092	588723	708292
3	321356	395263	479602	564824	676301
4	303852	373388	463756	540982	647215
5	286938	354333	447325	518069	620571
6	272137	337321	430098	496905	595915
7	260713	321657	411930	478163	572834
8	253510	306785	392779	462271	550977
9	250096	292561	372917	448916	530179
10	248683	279284	352949	436996	510478
11	246296	267639	333774	424733	492087
12	239447	258476	316467	410033	475294
13	226096	252176	301546	391653	460175
14	208441	247741	288785	370807	446177
15	188987	245468	276293	349648	433587
16	172148	242554	264230	330084	420838
17	160764	235266	254581	312319	405675
18	157108	221714	247826	297131	386977
19	158992	203998	242773	284120	365923
20	163214	184469	240150	271313	344479
21	165797	167430	236642	258849	324541
22	165138	155808	229005	248850	306506
23	159408	151870	215446	241833	291202
24	150186	153453	197997	236798	278189
25	139729	157339	178822	233780	265428
26	131057	159626	162059	230098	252992
27	125479	158815	150572	222448	242984
28	124363	153128	146549	209083	235893
29	126290	144085	147895	191968	230747
30	129570	133886	151492	173212	227590
31	131387	125431	153564	156817	223818
32	130031	119935	152659	145533	216208
33	124079	118700	147054	141469	203057
34	114907	120374	138214	142600	186271
35	104488	123343	128277	145912	167907
36	95351	124926	120027	147759	151841

TABLE 15.13.-- CONTINUED

Age	1980	1985	1990	1995	2000
37	88573	123501	114601	146744	140721
38	85327	117714	113242	141203	136586
39	84582	108870	114659	132544	137478
40	84553	98850	117306	122840	140471
41	84182	90047	118632	114754	142046
42	81730	83466	117105	109249	140870
43	76608	80217	111437	107804	135339
44	69710	78325	102864	108895	126801
45	62206	79381	93186	111148	117273
46	55810	78549	84656	112143	109287
47	51422	76062	78196	110432	103812
48	49879	71090	74845	104797	101959
49	50408	64463	73687	96408	102582
50	51585	57276	73420	86986	104287
51	52213	51111	72319	78649	104810
52	52248	46781	69721	72231	102813
53	51224	45053	64868	68703	97160
54	49379	45219	58513	67232	88940
55	47552	45989	51660	66544	79780
56	49920	46258	45740	65130	71637
57	43823	45967	41470	62400	65257
58	41165	44682	39539	57688	61531
59	38131	42636	39315	51659	59707
60	34893	40602	39650	45211	58601
61	31811	38774	39548	39611	56844
62	29176	36593	38938	35456	54003
63	27200	33993	37426	33351	49495
64	25734	31121	35234	32745	43885
65	24506	28195	32795	32700	38130
66	23288	25409	30463	32416	33050
67	21951	22898	28486	31411	29141
68	20485	20726	26670	29573	26532
69	18986	18898	25001	27135	25006
70	17586	17392	23161	24443	24233
71	16440	16178	20855	21913	23811
72	15711	15220	17778	19983	23317
73	15552	14486	13636	19068	22351
74	16117	13943	8134	19585	20511
75+	183531	162505	126791	113376	119926

TABLE 15.14.-- PROJECTED POPULATION BY AGE IN SINGLE YEARS FOR THE MAINLAND: MEDIUM VARIANT, MALES

Age	1980	1985	1990	1995	2000
0	361782	488184	534760	615751	718308
1	351417	454710	516749	599883	691674
2	338061	425033	499779	581672	667161
3	322758	398786	483397	561918	644466
4	306593	375601	467150	541423	623284
5	290697	355105	450555	521029	603303
6	276144	336933	433159	501538	584218
7	263832	320734	414606	483619	565755
8	258371	306187	394703	467729	547683
9	247496	293053	373741	453675	529917
10	242013	281187	352529	440575	512520
11	235913	270519	332329	426940	495689
12	226839	261016	314598	411025	479676
13	213422	252547	300240	391818	464574
14	197201	24471	288545	370465	450002
15	179784	238355	277553	348561	436373
16	164335	231931	266590	328150	422418
17	153088	222597	256756	310165	406193
18	147721	209113	248023	295607	386793
19	146594	192959	239970	283748	365331
20	147513	175574	233309	272518	343254
21	147352	160044	226506	261243	322588
22	144541	148685	216966	251154	304414
23	137578	143173	203528	242265	289768
24	127873	141887	187601	234139	277899
25	117175	142606	170507	227394	266683
26	108307	142267	155208	220513	255412
27	102874	139406	143994	211023	245339
28	102250	132568	138493	197798	236470
29	105000	123104	137120	182192	228372
30	109206	112709	137707	165483	221643
31	112180	104078	137272	150521	214793
32	112560	98715	134394	139497	205400
33	109035	97925	127657	133971	192349
34	102737	100338	118362	132419	176963
35	95493	104137	108179	132753	160512
36	89312	106758	99693	132105	145761
37	84767	106894	94300	129106	134802

TABLE 15.14.-- CONTINUED

Age	1980	1985	1990	1995	2000
38	82711	103289	93242	122392	129140
39	82376	97027	95221	113210	127308
40	82789	89864	98504	103130	127276
41	82403	83712	100665	94770	126299
42	80362	79089	100482	89282	123099
43	75924	76801	96772	87895	116379
44	69892	76131	90953	89380	107316
45	63121	76144	83503	92094	97471
46	57263	75412	77399	93745	89154
47	53474	73185	72687	93194	83539
48	52621	68789	70108	89326	81719
49	53833	62929	69016	83100	82563
50	55859	56455	68525	76111	84537
51	57120	50792	67368	70017	85541
52	56941	46959	64933	65198	84546
53	54583	45729	60633	62339	80537
54	50693	46336	55092	60854	74383
55	46334	47664	49012	59902	67567
56	42586	48328	43658	58362	61577
57	39851	47764	39556	55762	56708
58	37298	45329	38258	51598	53564
59	35871	41556	38223	46396	51644
60	34624	39159	38815	40786	50189
61	33170	37652	38873	35806	48256
62	31603	33944	37928	32075	45500
63	29813	27266	35444	30117	41510
64	27888	19499	31869	29435	36714
65	25987	13419	27989	29181	31821
66	24245	11487	24470	28634	27440
67	22738	15423	21703	27358	23949
68	21480	26101	19761	25241	21455
69	20424	43600	18425	22480	19816
70	19503	67736	17374	19374	18807
71	18637	98166	16229	16280	18151
72	17742	134495	14591	13580	17557
73	16740	176378	12081	16632	16748
74	15551	223474	8319	10797	15449
75	221410	1399570	97078	78318	72490

TABLE 15.15.-- PROJECTED POPULATION BY AGE IN SINGLE YEARS FOR THE MAINLAND: MEDIUM VARIANT, FEMALES

Age	1980	1985	1990	1995	2000
0	361698	485745	525841	606866	705374
1	351800	450664	510436	591190	679519
2	337846	420762	495092	573398	655755
3	321356	395263	479602	554238	633790
4	303856	373388	463756	534459	613335
5	286938	354333	447325	514851	594089
6	272137	337321	430098	496164	575761
7	260713	321657	411930	479024	558085
8	253510	306785	392779	463848	540840
9	250096	292561	372917	450437	523928
10	248683	279284	352949	437931	507389
11	246296	267639	333774	424892	491384
12	239447	258476	316417	409635	476120
13	226096	252176	301546	391175	461663
14	208441	247741	288785	370592	447655
15	188987	245468	276293	349648	434497
16	172148	242554	264230	330084	420994
17	160764	235266	254581	312319	405286
18	157108	221704	247826	297131	386511
19	158992	203998	242973	284120	365713
20	163214	184469	240102	271313	344479
21	165797	167430	236534	258849	324541
22	165138	155808	228915	248850	306506
23	159408	151870	215482	241833	291202
24	150186	153453	198207	236798	278189
25	139729	157339	179333	233780	265428
26	131057	159626	162779	230098	252992
27	125479	158815	151076	222448	242984
28	124363	153128	146261	209083	235893
29	126290	144085	146447	191968	230747
30	129570	133886	148666	173212	227590
31	131387	125431	149604	156817	223818
32	130031	119935	148231	145533	216208
33	124079	118700	143094	141469	203057
34	114907	110374	135388	142600	186271
35	104488	123343	126830	145912	167907
36	95351	124926	119739	147759	151841
37	88573	123501	115105	146744	140721

TABLE 15.15.-- CONTINUED

Age	1980	1985	1990	1995	2000
38	85327	117714	113962	141203	136586
39	84582	108870	115170	132544	137478
40	84853	98850	117516	122840	140471
41	84182	90047	118668	114754	142046
42	81730	83466	117015	109349	140870
43	76608	80217	111329	107804	135339
44	69710	79325	102815	108895	126801
45	62206	79381	93186	111148	117273
46	55810	78549	84656	112143	109287
47	51422	76062	78196	110432	103812
48	49879	71090	74845	104797	101959
49	50408	64463	73697	96408	102582
50	51585	57276	73420	86986	104287
51	52213	51111	72319	78649	104810
52	52248	46781	67721	72231	102813
53	51224	45053	64868	68703	97160
54	49379	45219	58513	67232	88940
55	47552	45989	51660	66554	79780
56	45920	46258	45740	65130	71637
57	43823	45967	41470	62400	65257
58	41165	44682	39539	57688	61531
59	38131	42636	39315	51659	59707
60	34893	40602	39650	45215	58601
61	31811	38774	39548	39611	56844
62	29176	36593	38983	35456	54003
63	27200	33993	37426	33351	49495
64	25734	31121	35234	32725	43885
65	24506	28195	32795	32700	38130
66	23288	25409	30463	32416	33050
67	21951	22898	28426	31411	29141
68	20485	22726	26670	29573	26532
69	18986	18898	25001	27135	25006
70	17586	17392	23161	24443	24233
71	16440	16178	20855	21913	23811
72	15711	15220	17778	19983	23317
73	15552	14486	13636	19068	23351
74	16117	13943	8134	19585	20511
75	183331	162505	126791	113376	119926

TABLE 15.16.-- PROJECTED POPULATION BY AGE IN SINGLE YEARS FOR THE MAINLAND: LOW VARIANT, MALES

Age	1980	1985	1990	1995	2000
0	361782	469206	480718	552656	651854
1	351424	439934	471961	540107	623764
2	338061	414078	463043	525091	599263
3	322758	391218	453928	508556	577780
4	306593	370937	443379	491449	558745
5	290697	352805	431929	474772	541566
6	276144	336404	418942	459472	525674
7	263832	321349	404168	446329	510555
8	254371	307314	387505	435844	495800
9	247496	294141	369289	427681	481295
10	242013	281853	350325	420614	467245
11	235913	270633	331829	412636	454134
12	226839	260731	315190	401405	442565
13	213422	252206	301303	385528	432804
14	197201	244547	289595	366396	424119
15	179784	238355	278196	346347	416584
16	164335	231931	266700	327649	408270
17	153088	222597	256481	310767	396709
18	147721	209113	247694	296675	380606
19	146594	192959	239822	284793	361325
20	147513	175574	233309	273153	341068
21	147352	160044	226306	261351	322093
22	144541	148685	216966	250883	305008
23	137578	143173	203528	241939	290823
24	127873	141887	187601	233993	278932
25	117175	142606	170507	227394	267310
26	108307	142267	155208	220513	255520
27	102874	139406	143994	211023	245071
28	102250	132568	138493	197791	236148
29	105000	123104	137120	182192	228227
30	109206	112709	137707	165483	221643
31	112180	104078	137272	150521	214795
32	112560	98715	134394	139497	205400
33	109035	97925	127657	133971	192349
34	102737	100338	118362	132419	176963
35	95493	104137	108179	132753	160512
36	89312	106758	99693	132105	145761
37	84767	106894	94300	129106	134802

TABLE 15.16.-- CONTINUED

Age	1980	1985	1990	1995	2000
38	82711	103289	93242	122392	129140
39	82376	97027	95221	113210	127308
40	82789	89864	98504	103180	127276
41	82403	83712	100665	94770	126299
42	80362	79089	100482	89282	123099
43	75924	76801	96772	87895	116379
44	69892	76131	90553	89380	107316
45	63119	76144	83503	92094	97471
46	57163	75412	77399	93745	89154
47	53474	73185	72687	93194	83539
48	52621	68789	70108	89326	81719
49	53833	62949	69016	83100	82563
50	55859	56455	68525	76111	84537
51	57120	50792	67368	70017	85541
52	56941	46959	64933	65198	84546
53	54583	45729	60633	62339	80537
54	50663	46336	55092	60854	74383
55	46334	47663	49012	59902	67567
56	42586	48328	43658	58362	61577
57	39451	47764	39856	55762	56708
58	37298	45329	38258	51598	53564
59	35871	41557	38223	46396	51644
60	34624	37458	38815	40786	50189
61	33170	33872	38873	35806	48256
62	31603	30793	37928	32075	45500
63	29813	28526	35444	30117	41510
64	27888	26870	31869	29434	36714
65	25987	25852	27989	29181	31821
66	24245	23960	24470	28634	27440
67	22738	22223	21703	27358	23949
68	21480	20234	19761	25241	21455
69	20424	18134	18425	22480	19816
70	19503	16117	17374	19374	18807
71	18637	14408	16229	16280	18152
72	17742	13241	14591	13580	17557
73	16740	12839	12084	11633	16749
74	15551	13426	8320	10798	15449
75	221410	132957	97081	78321	72493

TABLE 15.17.-- PROJECTED POPULATION BY AGE IN SINGLE YEARS FOR THE MAINLAND: LOW VARIANT, FEMALES

Age	1980	1985	1990	1995	2000
0	361698	466912	472432	544796	640189
1	351800	436001	466155	532304	612816
2	337946	409891	458753	517592	588999
3	321356	387753	450133	501550	568180
4	303852	368760	440200	485071	549798
5	286938	352051	428843	469099	533277
6	272137	336796	415470	454528	518058
7	260713	322268	401540	442086	503637
8	253510	307904	385602	432237	489610
9	250096	293640	368471	424640	475856
10	248683	279945	350746	418093	462561
11	246266	267752	333274	410647	450176
12	239447	258193	317011	400028	439270
13	226096	251837	302608	384876	430084
14	208441	247389	289831	366512	421907
15	188987	245468	276932	347428	414793
16	172148	242554	264339	329583	406884
17	160764	235256	254308	312924	395809
18	157108	221704	247498	298203	380315
19	158992	203998	242825	285165	361696
20	163214	184469	240150	271945	342286
21	165797	167430	236642	258957	324046
22	165138	155808	229005	248580	307103
23	159408	151870	215446	241509	292261
24	150786	153453	197997	236652	279222
25	139729	157339	178822	233780	266054
26	131057	151626	162059	230098	253099
27	125979	158825	150572	222448	242717
28	124363	153128	146549	209083	235572
29	126290	144085	147895	191968	230602
30	129570	133886	151492	173212	227590
31	131387	125431	153564	156817	223818
32	130031	119935	152659	145533	216208
33	124079	118700	147054	141469	203057
34	114907	120374	138214	122600	186271
35	104488	123343	128277	145912	167907
36	95351	124926	120027	147759	151841
37	88573	123501	114601	146744	140721

TABLE 15.17.-- CONTINUED

Age	1980	1985	1990	1995	2000
38	85327	117714	113242	141203	136586
39	84582	108870	114659	132544	137478
40	84853	98850	117306	122840	140471
41	84182	90047	118632	114754	142046
42	81730	83466	117105	109349	140870
43	76608	80217	111437	107804	135339
44	69710	79325	102864	108895	126801
45	62206	79381	93186	111148	117273
46	55810	78549	84656	112143	109287
47	51422	76062	78196	110432	103812
48	49879	71090	74845	104797	101959
49	50408	64463	73697	96408	102582
50	51585	57276	73420	86986	104287
51	52213	51111	72319	78649	104810
52	52248	46781	69721	72231	102813
53	51224	45053	64868	68703	97160
54	49379	45219	58513	67232	88940
55	47552	45989	51660	66554	79780
56	45920	46258	45740	65130	71637
57	43823	45967	41470	62400	65257
58	41165	44682	39539	57688	61531
59	38131	42636	39315	51659	59707
60	34893	40602	39650	45215	58601
61	31811	38774	39548	39611	56844
62	29176	36593	38938	35456	54003
63	27200	33993	37426	33351	49495
64	25734	31121	35234	32745	43885
65	24506	28195	32795	32700	38130
66	23288	25409	30463	32416	33050
67	21951	22898	28426	31411	29141
68	20485	20726	26670	29573	26532
69	18989	18898	25001	27135	25006
70	17586	17392	23161	24443	24233
71	16440	16178	20855	21913	23811
72	15711	15220	17778	19983	23317
73	15552	14486	13636	19068	22351
74	16117	13943	8134	19585	20511
75+	183531	162505	126791	113376	119926

TABLE 15.18.-- PROJECTED POPULATION BY AGE IN SINGLE YEARS FOR ZANZIBAR: HIGH VARIANT, MALES

Age	1980	1985	1990	1995	2000
0	8936	12227	15590	18463	21447
1	9206	11791	14437	17719	20743
2	9411	11253	13533	16960	20053
3	9532	10665	12827	16198	19370
4	9560	10080	12267	15445	18693
5	9485	9554	11798	14714	18015
6	9296	9139	11369	14019	17334
7	8987	8878	10935	13369	16646
8	8557	8796	10463	12773	15949
9	8025	8868	9953	12230	15248
10	7430	9013	9447	11730	14554
11	6829	9105	9014	11254	13881
12	6286	8996	8741	10782	13246
13	5843	8597	8674	10302	12661
14	5481	7987	8742	9830	12119
15	5133	7319	8890	9339	11616
16	4779	6714	8968	8898	11131
17	4460	6164	8846	8613	10648
18	4180	5714	8436	8531	10157
19	3934	5344	7817	8581	9674
20	3711	4987	7139	8709	9172
21	3510	4622	6521	8766	8717
22	3340	4291	5960	8626	8415
23	3205	4000	5468	8203	8314
24	3098	3744	5117	7576	8344
25	3011	3510	4749	6889	8451
26	2933	3297	4372	6264	8438
27	2855	3118	4033	5697	8335
28	2769	2975	3734	5236	7909
29	2677	2859	3473	4857	7279
30	2592	2766	3234	4494	6597
31	2517	2682	3017	4122	5973
32	2442	2598	2833	3784	5408
33	2364	2507	2686	3483	4944
34	2287	2411	2567	3216	4561
35	2111	2324	2470	2971	4163
36	2140	2245	2383	2749	3818
37	2080	2166	2295	2561	3479

TABLE 15.18.-- CONTINUED

Age	1980	1985	1990	1995	2000
38	2033	2085	2200	2410	3180
39	1997	2002	2099	2288	2918
40	1965	1921	2006	2188	2678
41	1931	1846	1924	2097	2460
42	1896	1781	1841	2006	2275
43	1857	1729	1755	1908	2122
44	1815	1687	1670	1804	1996
45	1773	1649	1586	1709	1892
46	1732	1611	1509	1623	1799
47	1685	1572	1442	1539	1707
48	1630	1529	1389	1459	1608
49	1568	1485	1347	1372	1507
50	1507	1441	1309	1290	1414
51	1448	1398	1271	1216	1331
52	1390	1351	1233	1152	1258
53	1336	1298	1193	1102	1172
54	1285	1240	1151	1062	1095
55	1233	1183	1112	1028	1022
56	1184	1127	1073	993	954
57	1149	1073	1030	958	895
58	1133	1022	981	919	848
59	1130	975	927	879	810
60	1133	924	873	839	777
61	1131	876	821	802	744
62	1114	839	770	760	709
63	1078	814	722	712	671
64	126	799	676	661	630
65	968	786	632	609	589
66	912	769	591	560	549
67	862	745	553	513	510
68	818	713	519	471	474
69	778	672	488	433	438
70	738	623	462	397	401
71	694	573	442	363	361
72	640	518	428	331	317
73	571	462	422	298	266
74	484	407	423	264	208
75	5098	3789	2949	2410	1924

TABLE 15.19.-- PROJECTED POPULATION BY AGE IN SINGLE YEARS FOR ZANZIBAR: HIGH VARIANT, FEMALES

Age	1980	1985	1990	1995	2000
0	9175	11565	15493	18249	21006
1	9445	11472	14262	17436	20371
2	9685	11174	13301	16652	19726
3	9865	10743	12559	15897	19071
4	9956	10252	11985	15173	18409
5	9924	9780	11527	14480	17739
6	9740	9399	11135	13820	17064
7	9382	9169	10765	13194	16386
8	8840	9129	10382	12603	15705
9	8143	9254	9982	12048	15028
10	7361	9451	9594	11531	14361
11	6598	9565	9273	11053	13713
12	5973	9418	9089	10616	13093
13	5565	8904	9076	10221	12509
14	5323	8129	9166	9869	11961
15	5118	7269	9343	9506	11443
16	4887	6501	9444	9177	10955
17	4688	5871	9285	8980	10508
18	4512	5457	8765	8953	10105
19	4354	5209	7988	9030	9746
20	4224	4997	7125	9190	9376
21	4112	4758	6352	9273	9036
22	3994	4551	5717	9103	8829
23	3858	4368	5298	8579	8790
24	3711	4205	5047	7805	8854
25	3569	4069	4830	6946	9000
26	3438	3951	4588	6176	9071
27	3306	3828	4377	5543	8894
28	3173	3689	4190	5125	8371
29	3040	3539	4023	4872	7602
30	2911	3395	3884	4654	6750
31	2787	3262	3763	4411	5986
32	2665	3129	3637	4200	5359
33	2547	2996	3497	4013	4943
34	2434	2863	3347	3845	4691
35	2322	2735	3203	3706	4475
36	2217	2611	3071	3584	4233
37	2130	2491	2938	3458	4023

TABLE 15.19.-- CONTINUED

Age	1980	1985	1990	1995	2000
38	2067	2373	2805	3317	3834
39	2020	2260	2672	3166	3666
40	1982	2148	2543	3022	3524
41	1942	2044	2419	2888	3400
42	1895	1956	2298	2755	3272
43	1835	1890	2180	2620	3129
44	1766	1840	2066	2486	2976
45	1698	1798	1953	2355	2829
46	1633	1755	1847	2230	2693
47	1568	1705	1758	2108	2557
48	1503	1644	1690	1990	2422
49	1438	1574	1638	1876	2287
50	1374	1504	1593	1763	2156
51	1313	1438	1548	1658	2030
52	1253	1372	1496	1569	1908
53	1194	1307	1434	1500	1791
54	1138	1243	1365	1446	1679
55	1081	1180	1296	1400	1569
56	1028	1120	1231	1353	1466
57	990	1060	1167	1301	1378
58	969	1003	1103	1238	1308
59	961	948	1040	1169	1252
60	958	892	979	1100	1204
61	951	841	919	1036	1155
62	934	801	861	972	1102
63	901	776	806	910	1039
64	856	762	754	849	971
65	806	751	705	789	901
66	756	736	660	732	835
67	711	715	619	677	774
68	670	685	583	624	719
69	630	646	552	574	668
70	588	602	527	527	618
71	541	552	507	484	565
72	484	501	493	445	508
73	413	449	486	410	441
74	325	399	486	381	364
75	4250	4152	3552	3293	3060

TABLE 15.20.-- PROJECTED POPULATION BY AGE IN SINGLE YEARS FOR ZANZIBAR: MEDIUM VARIANT, MALES

Age	1980	1985	1990	1995	2000
0	8936	11924	14677	17624	22282
1	9209	11555	13683	16887	20794
2	9411	11078	12917	16136	19371
3	9532	10544	12331	15386	18040
4	9560	10006	11874	14655	16829
5	9485	9517	11493	13958	15767
6	9296	9131	11139	13311	14882
7	8987	8888	10768	12729	14194
8	8557	8814	10349	12220	13713
9	8025	8885	9884	11780	13412
10	7430	9024	9413	11390	13227
11	6829	9107	9006	11020	13064
12	6286	8992	8750	10633	12812
13	5843	8592	8690	10208	12401
14	5481	7984	8759	9769	11876
15	5133	7319	8900	9305	11363
16	4779	6714	8970	8890	10913
17	4460	6164	8842	8622	10464
18	4180	5714	8431	8547	10021
19	3934	5344	7815	8597	9595
20	3711	4987	7139	8719	9138
21	3510	4622	6521	8767	8709
22	3340	4291	5960	8621	8424
23	3205	4000	5498	8198	8330
24	3098	3744	5117	7574	8361
25	3011	3510	4749	6892	8461
26	2933	3297	4372	6267	8490
27	2855	3118	4033	5700	8330
28	2769	2975	3734	5234	7901
29	2677	2859	3473	4851	7277
30	2592	2766	3234	4481	6597
31	2517	2682	3017	4104	5973
32	2442	2598	2833	3764	5408
33	2364	2507	2686	3465	4944
34	2287	2411	2567	3203	4561
35	2211	2324	2470	2965	4193
36	2140	2245	2383	2748	3818
37	2080	2166	2295	2564	3479

TABLE 15.20.-- CONTINUED

Age	1980	1985	1990	1995	2000
38	2033	2085	2200	2413	3180
39	1997	2002	2099	2290	2918
40	1965	1921	2006	2189	2678
41	1931	1846	1924	2097	2460
42	1896	1781	1841	2006	2275
43	1857	1729	1755	1907	2122
44	1815	1687	1670	1804	1996
45	1773	1649	1586	1709	1892
46	1732	1611	1509	1623	1799
47	1685	1572	1442	1539	1707
48	1630	1529	1389	1455	1608
49	1568	1485	1347	1372	1507
50	1507	1441	1309	1290	1414
51	1448	1398	1271	1216	1331
52	1390	1351	1233	1152	1251
53	1336	1298	1193	1102	1172
54	1285	1240	1151	1062	1095
55	1233	1183	1112	1028	1022
56	1184	1127	1073	993	954
57	1149	1073	1030	958	895
58	1133	1022	981	919	848
59	1130	973	927	879	810
60	1133	924	873	839	777
61	1131	876	821	802	744
62	1114	839	770	760	709
63	1078	814	722	712	671
64	1026	799	676	661	630
65	968	786	632	609	589
66	912	796	591	560	549
67	862	745	553	513	510
68	818	713	519	471	474
69	778	672	488	433	438
70	738	625	462	397	401
71	694	573	442	363	361
72	640	518	428	331	317
73	571	462	422	298	266
74	484	407	423	264	208
75	5098	3789	2949	2410	1924

TABLE 15.21.-- PROJECTED POPULATION BY AGE IN SINGLE YEARS FOR ZANZIBAR: MEDIUM VARIANT, FEMALES

Age	1980	1985	1990	1995	2000
0	9175	11267	14594	17424	20670
1	9445	11240	13520	16617	19869
2	9685	11002	12695	15841	19101
3	9865	10624	12070	15098	18360
4	9956	10179	11597	14395	17643
5	9924	9744	11226	13735	16944
6	9740	9390	10908	13123	16258
7	9382	9178	10600	12564	15583
8	8840	9147	10270	12058	14916
9	8143	9271	9914	11604	14260
10	7361	9461	9560	11196	13624
11	6598	9567	9266	10821	13020
12	5973	9414	9098	10468	12465
13	5565	8899	9092	10128	11967
14	5323	8127	9183	9809	11519
15	5118	7269	9353	9473	11109
16	4887	6501	9445	9169	10725
17	4688	5871	9281	8989	10362
18	4512	5457	8760	8970	10014
19	4354	5209	7986	9046	9687
20	4224	4997	7125	9200	9343
21	4112	4758	6352	9275	9029
22	3994	4551	5717	9099	8838
23	3858	4368	5298	8574	8806
24	3711	4205	5047	7803	8870
25	3569	4069	4830	6946	9010
26	3438	3951	4588	6176	9073
27	3306	3828	4377	5543	8890
28	3173	3639	4190	5125	8366
29	3040	3539	4023	4872	7599
30	2911	3395	3884	4654	6750
31	2787	3262	3763	4411	5986
32	2663	3129	3637	4200	5359
33	2547	2996	3497	4013	4943
34	2434	2863	3347	3845	4691
35	2322	2735	3203	3706	4475
36	2217	2611	3071	3584	4233
37	2130	2491	2938	3458	4023

TABLE 15.21.-- CONTINUED

Age	1980	1985	1990	1995	2000
38	2020	2373	2805	3317	3834
39	2020	2260	2672	3166	3666
40	1982	2148	2543	3022	3524
41	1942	2044	2419	2888	3400
42	1895	1956	2298	2755	3272
43	1835	1890	2180	2620	3129
44	1766	1840	2066	2486	2976
45	1698	1798	1953	2355	2829
46	1633	1755	1847	2230	2693
47	1568	1705	1758	2108	2557
48	1503	1644	1690	1990	2422
49	1438	1574	1638	1876	2287
50	1374	1504	1593	1763	2156
51	1313	1438	1548	1658	2030
52	1253	1372	1496	1569	1908
53	1194	1307	1434	1500	1791
54	1138	1243	1365	1446	1679
55	1081	1180	1296	1400	1569
56	1028	1120	1231	1353	1466
57	990	1060	1167	1301	1378
58	969	1003	1103	1238	1308
59	961	948	1040	1169	1252
60	958	892	979	1100	1204
61	951	841	919	1036	1155
62	934	801	861	972	1102
63	901	776	806	910	1039
64	856	762	754	849	971
65	806	751	705	789	901
66	756	736	660	732	835
67	711	715	619	677	774
68	670	685	583	624	719
69	630	646	552	574	668
70	588	602	527	527	618
71	541	552	507	484	565
72	484	501	493	445	508
73	413	449	486	410	441
74	325	399	486	381	364
75	4250	4152	3552	3293	3060

TABLE 15.22.-- PROJECTED POPULATION BY AGE IN SINGLE YEARS FOR ZANZIBAR: LOW VARIANT, MALES

Age	1980	1985	1990	1995	2000
0	8936	11723	14081	16578	19439
1	9209	11398	13189	15955	18705
2	9411	10962	12514	15309	18022
3	9532	10464	12005	14657	17381
4	9560	9956	11615	14016	16771
5	9485	9493	11291	13403	16181
6	9296	9125	10986	12835	15599
7	8987	8895	10657	12327	15018
8	8557	8826	10273	11888	14430
9	8025	8897	9837	11513	13840
10	7430	9031	9389	11184	13258
11	6829	9108	9001	10867	12707
12	6286	8989	8756	10525	12210
13	5843	8588	8701	10136	11782
14	5481	7983	8770	9724	11406
15	5133	7319	8907	9282	11073
16	4779	6714	8971	8885	10747
17	4460	6164	8839	8628	10394
18	4180	5714	8427	8558	9993
19	3934	5344	7813	8609	9570
20	3711	4987	7139	8725	9115
21	3510	4622	6521	8768	8704
22	3340	4291	5960	8618	8431
23	3205	4000	5498	8195	8341
24	3098	3744	5117	7573	8372
25	3011	3510	4749	6892	8467
26	2933	3297	4372	6267	8491
27	2855	3118	4033	5700	8327
28	2769	2975	3734	5234	7898
29	2677	2859	3473	4851	7275
30	2592	2766	3234	4481	6597
31	2517	2682	3017	4104	5973
32	2442	2598	2833	3764	5408
33	2364	2507	2686	3465	4944
34	2287	2411	2567	3203	4561
35	2211	2324	2470	2965	4193
36	2140	2245	2383	2748	3818
37	2080	2166	2295	2564	3479

TABLE 15.22.-- CONTINUED

Age	1980	1985	1990	1995	2000
38	2033	2085	2200	2413	3180
39	1997	2002	2099	2290	2918
40	1965	1921	2006	2189	2678
41	1931	1846	1924	2097	2460
42	1896	1781	1841	2006	2275
43	1857	1729	1755	1907	2122
44	1815	1687	1670	1804	1996
45	1773	1649	1586	1709	1892
46	1732	1611	1509	1623	1799
47	1685	1572	1442	1539	1707
48	1630	1529	1389	1455	1608
49	1568	1485	1347	1372	1507
50	1507	1441	1309	1290	1414
51	1448	1398	1271	1216	1331
52	1390	1351	1233	1152	1251
53	1336	1298	1193	1102	1172
54	1285	1240	1151	1062	1095
55	1233	1183	1112	1028	1022
56	1184	1127	1073	993	954
57	1149	1073	1030	958	895
58	1133	1022	981	919	848
59	1130	973	927	879	810
60	1133	924	873	839	777
61	1131	876	821	802	744
62	1114	839	770	760	709
63	1078	814	722	712	671
64	1026	799	676	661	630
65	968	786	632	609	589
66	912	769	591	560	549
67	862	745	553	513	510
68	818	713	519	471	474
69	778	672	488	433	438
70	738	625	462	397	401
71	694	573	442	363	361
72	640	518	428	331	317
73	571	462	422	298	266
74	484	407	423	264	208
75	5098	3789	2949	2410	1924

SECTION 15.V SOME ADDITIONAL
DATA RELEVANT FOR PROJECTIONS

- (i) HEADSHIP RATES
- (ii) WORK FORCE PARTICIPATION RATES

Tables 15.24-15.27 provide headship rates by age and sex by region for the rural and urban areas in the Mainland and Zanzibar. Tables 15.28-15.30 present work force participation rates.

TABLE 15.24.---

MALE HEADSHIP RATES IN RURAL AREAS BY AGE FOR REGIONS: 1978

REGION	AGE							
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
Dodoma	3.5	40.0	70.3	85.6	90.5	90.1	93.6	92.2
Arusha	3.7	28.5	54.1	71.8	80.4	51.0	82.8	83.0
Kilimanjaro	5.1	33.9	63.7	79.3	88.6	88.8	90.9	92.0
Tanga	7.2	38.1	65.3	77.1	83.2	84.4	85.8	85.8
Morogoro	5.1	44.2	74.0	85.6	88.8	90.6	90.5	93.3
Coast	7.9	42.8	63.0	75.9	83.7	89.3	86.1	92.9
Dar es Salaam	9.7	35.3	58.4	70.4	82.0	85.7	90.0	92.7
Lindi	4.4	31.4	60.2	78.0	79.8	87.8	91.0	91.8
Mtwara	6.1	40.0	67.6	85.9	84.9	90.0	91.6	94.9
Ruvuma	4.1	43.7	75.5	84.6	87.8	89.3	90.9	91.4
Iringa	7.9	42.3	65.2	71.8	79.2	84.1	80.4	85.3
Mbeja	4.2	43.5	73.5	84.0	89.5	92.2	92.1	92.6
Singida	1.8	24.3	62.6	77.3	69.3	86.1	85.8	93.6
Tabora	5.0	30.7	56.1	71.4	78.4	82.1	85.1	85.9
Rukwa	5.3	47.8	81.0	89.3	88.9	91.8	94.3	92.9
Kilesha	4.1	44.2	71.7	84.5	86.0	90.0	92.5	91.8
Shinyanga	2.3	18.7	47.1	69.4	78.8	82.6	87.9	82.7
West Lake	7.5	43.3	66.3	76.3	87.3	88.4	88.6	90.4
Mwanza	2.8	15.2	39.4	63.2	73.4	81.0	86.4	82.4
Mara	3.2	19.5	47.4	67.9	77.8	79.8	84.0	86.1
Zanzibar North	17.1	67.3	91.4	94.8	95.9	96.2	96.0	96.7
Zanzibar Central	10.8	51.7	79.3	87.7	96.1	94.6	97.3	96.5
Zanzibar West	8.7	48.5	79.3	89.5	92.9	94.2	94.3	94.5
Pemba North	5.6	56.5	85.1	93.2	96.5	94.9	94.0	96.9
Pemba South	8.4	60.4	89.4	92.1	94.0	95.2	96.3	97.5

TABLE 15.25.-- FEMALE HEADSHIP RATES IN RURAL AREAS BY AGE FOR REGIONS: 1978

REGION	AGE									
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60+
Dodoma	3.7	11.6	16.0	22.9	27.3	27.3	28.9	35.8	39.3	42.9
Arusha	2.5	8.4	11.6	16.0	19.5	26.8	28.2	35.6	29.1	23.2
Kilimanjaro	1.5	7.8	13.7	20.8	19.5	24.5	30.1	30.7	30.0	29.1
Tanga	2.1	7.6	7.2	8.7	10.6	14.0	17.4	20.3	27.1	29.5
Morogoro	4.0	12.3	11.6	10.3	12.3	15.7	17.0	21.1	17.6	21.9
Coast	2.4	11.8	10.1	11.2	14.3	12.5	19.8	19.8	21.7	25.8
Der es Salaam	1.5	4.4	5.5	10.0	15.3	20.8	19.9	16.9	19.8	31.2
Lindi	2.1	9.3	11.6	14.9	18.4	24.7	24.2	24.9	26.1	31.0
Mtwara	2.4	8.3	10.6	12.1	22.4	22.9	22.9	27.1	31.3	35.1
Ruvuma	2.0	7.7	7.9	11.8	14.4	14.0	16.7	21.0	18.9	24.6
Iringa	8.6	21.6	27.7	30.1	36.2	36.3	37.8	40.0	41.3	48.6
Mbeya	4.8	10.0	12.6	16.8	17.4	20.0	25.3	32.1	31.5	36.4
Singida	2.4	10.9	17.2	17.2	25.0	22.4	31.6	33.9	40.1	34.1
Tabora	1.9	6.5	8.6	11.2	11.6	22.5	18.3	25.9	26.9	28.0
Rukwa	2.1	5.0	5.8	10.0	12.4	12.9	11.3	11.5	19.5	24.1
Kigoma	2.4	7.5	8.9	10.7	12.2	11.0	11.9	14.2	14.5	15.6
Shinyanga	1.2	7.9	8.9	13.6	18.2	21.3	26.3	29.3	27.2	29.5
West Lake	2.3	9.1	13.5	19.3	19.9	20.6	27.7	30.0	36.0	38.9
Mwanza	1.2	5.0	8.1	10.0	12.7	14.6	18.5	20.8	24.8	24.1
Mara	2.6	7.6	11.4	13.7	50.7	21.1	29.0	29.0	28.5	24.5
Zanzibar North	10.2	16.5	21.4	19.1	25.1	24.0	34.2	34.6	34.8	53.7
Zanzibar Central	5.2	9.1	14.3	14.5	16.4	25.1	24.0	34.1	36.8	48.6
Zanzibar West	3.6	10.5	15.0	17.5	22.6	28.0	33.1	35.5	37.7	51.2
Pemba North	8.8	15.2	15.4	19.6	22.9	30.9	38.1	44.6	48.5	59.4
Pemba South	7.6	12.9	18.6	22.0	24.5	33.4	36.1	44.7	43.6	65.7

TABLE 15.26.--- MALE HEADSHIP RATES IN URBAN AREAS BY AGE FOR REGIONS: 1978

REGION	AGE							
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
Dodoma	5.9	41.1	69.4	79.0	81.2	82.9	82.4	84.8
Arusha	11.9	44.3	68.7	76.8	80.6	82.6	82.1	75.9
Kilimanjaro	12.2	44.9	69.2	79.4	82.7	82.8	84.6	84.2
Tanga	7.7	36.4	66.4	75.3	81.5	82.8	86.2	86.6
Morogoro	8.7	41.0	66.6	77.1	81.8	84.5	85.4	84.7
Coast	8.1	46.4	72.4	77.9	80.1	80.6	88.5	90.5
Dar es Salaam	9.2	43.6	72.2	84.4	87.6	86.0	88.7	85.6
Lindi	7.3	39.7	66.1	76.5	81.6	81.9	85.3	83.6
Mtwara	6.3	40.9	67.2	78.6	83.9	85.4	87.8	87.0
Ruvuma	7.4	36.9	65.0	75.5	79.0	79.5	84.1	81.1
Iringa	8.4	44.0	72.2	82.0	85.0	85.0	85.7	80.7
Mbeya	6.6	45.8	73.4	82.5	84.4	84.2	86.3	87.7
Singida	6.3	37.3	64.1	73.6	76.6	81.5	80.9	81.9
Tabora	7.6	40.9	65.3	74.6	79.1	81.5	83.0	82.7
Rukwa	5.2	38.6	69.0	78.4	83.0	85.1	87.2	89.4
Kigoma	6.6	39.9	62.7	75.1	78.5	79.5	82.6	82.6
Shinyanga	9.0	43.2	69.1	77.2	81.6	84.7	83.0	81.4
West Lake	11.1	44.9	69.7	78.7	79.7	82.3	82.1	80.9
Mwanza	7.5	36.2	61.1	71.3	76.0	76.8	77.8	76.6
Mara	8.6	38.2	61.4	73.6	74.4	78.1	81.0	77.1
Zanzibar North	11.3	57.6	87.6	92.7	94.9	95.5	95.5	95.0
Zanzibar Central	7.8	45.9	79.2	88.4	91.3	92.9	96.7	95.8
Zanzibar West	9.2	49.2	76.0	86.6	87.7	90.7	92.2	88.8
Penba North	8.9	54.2	80.6	87.5	91.0	89.6	93.5	87.6
Penba South	4.9	52.5	77.3	83.6	89.3	90.7	89.5	89.7

TABLE 15.27.--- FEMALE HEADSHIP RATES IN URBAN AREAS BY AGE FOR REGIONS: 1978

REGION	AGE									
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60+
Dodoma	5.2	17.7	22.2	26.4	29.8	30.8	36.1	39.1	36.7	40.8
Arusha	7.2	20.8	26.5	28.7	32.7	35.6	38.6	33.8	42.3	36.0
Kilimanjaro	6.0	20.9	27.0	34.3	31.2	38.7	35.3	34.8	38.4	35.7
Tanga	4.2	15.0	18.8	23.3	27.3	28.8	34.0	35.2	36.8	34.4
Morogoro	5.6	17.0	18.8	21.0	25.1	26.9	32.1	33.2	32.7	33.2
Coast	4.2	16.1	15.6	18.4	18.7	19.4	26.0	29.6	33.4	29.7
Dar es Salaam	3.2	11.0	15.7	17.0	17.7	21.2	24.1	23.5	28.9	21.0
Lindi	4.9	14.9	16.6	19.8	23.4	28.1	31.2	28.8	37.7	28.3
Mtwara	4.8	13.2	16.0	13.0	19.6	25.0	29.3	28.0	36.4	40.1
Ruvuma	4.6	15.5	19.5	20.3	23.8	24.9	23.3	25.0	23.9	28.1
Iringa	9.5	27.1	31.6	35.7	40.3	41.8	42.1	43.3	42.3	43.1
Mbeya	6.6	18.7	24.1	27.6	30.4	33.6	39.6	40.0	47.5	42.7
Singida	6.2	19.4	24.1	27.0	31.9	34.4	34.0	38.5	34.7	36.4
Tabora	6.7	16.6	20.6	24.4	26.1	27.0	31.9	38.3	37.2	50.9
Rukwa	4.4	17.2	21.7	24.8	26.0	29.1	26.3	30.8	31.3	36.2
Kigoma	4.2	13.7	16.4	17.9	20.9	25.1	25.0	31.4	32.9	29.8
Shinyanga	7.4	19.3	23.7	26.5	31.0	33.2	37.3	39.6	43.0	37.3
West Lake	8.3	24.7	32.0	34.4	38.0	37.4	48.9	48.1	45.5	49.3
Mwanza	5.1	13.6	17.8	21.2	22.4	29.4	29.4	33.8	36.3	57.5
Nara	6.0	17.4	23.7	26.2	30.7	37.8	29.8	40.3	41.8	38.8
Zanzibar North	4.8	10.0	12.4	12.1	13.6	19.1	28.8	34.9	40.4	52.4
Zanzibar Central	5.9	8.9	20.8	10.9	16.6	34.8	30.3	38.3	14.8	54.6
Zanzibar West	3.3	13.0	21.3	23.7	31.2	30.7	36.8	39.2	36.8	34.5
Pemba North	4.1	10.9	14.5	21.4	29.4	32.0	34.3	45.8	52.7	49.8
Pemba South	4.4	11.5	14.9	19.0	27.4	26.8	36.1	35.8	45.8	46.8

TABLE 15.28.-- WORK FORCE PARTICIPATION RATES (PER PERSON) BY AGE: TANZANIA, MAINLAND AND ZANZIBAR

AGE	TANZANIA	MAINLAND	ZANZIBAR
5 - 9	0.0004	0.0004	0.0000
10 - 14	0.0320	0.0325	0.0118
15 - 19	0.4330	0.4377	0.2647
20 - 24	0.8537	0.8587	0.6569
25 - 29	0.9289	0.9331	0.7549
30 - 34	0.9524	0.9568	0.7838
35 - 39	0.9636	0.9666	0.8250
40 - 44	0.9668	0.9716	0.8081
45 - 49	0.9690	0.9719	0.8367
50 - 54	0.9559	0.9613	0.7928
55 - 59	0.9470	0.9500	0.7956
60 - 64	0.8990	0.9061	0.7108
65 - 69	0.8493	0.8531	0.6822
70 - 74	0.7672	0.7749	0.5642
75 - 79	0.7130	0.7162	0.5740
80 +	0.5147	0.5219	0.3382

TABLE 15.29.-- WORK FORCE PARTICIPATION RATES (PER PERSON) BY AGE FOR MALES: TANZANIA, MAINLAND AND ZANZIBAR

AGE	TANZANIA	MALE	
		MAINLAND	ZANZIBAR
5 - 9	0.0005	0.0006	0.0000
10 - 14	0.0200	0.0203	0.0082
15 - 19	0.3277	0.3302	0.2377
20 - 24	0.8461	0.8466	0.8262
25 - 29	0.9585	0.9585	0.9584
30 - 34	0.9767	0.9768	0.9711
35 - 39	0.9855	0.9858	0.9751
40 - 44	0.9863	0.9869	0.9675
45 - 49	0.9890	0.9897	0.9635
50 - 54	0.9820	0.9834	0.9399
55 - 59	0.9806	0.9814	0.9413
60 - 64	0.9587	0.9624	0.8654
65 - 69	0.9321	0.9344	0.8399
70 - 74	0.8819	0.8879	0.7262
75 - 79	0.8350	0.8380	0.7213
80 +	0.6458	0.6524	0.4677

TABLE 15.30.-- WORK FORCE PARTICIPATION RATES (PER PERSON) BY AGE FOR FEMALES: TANZANIA, MAINLAND AND ZANZIBAR

AGE	TANZANIA	MAINLAND	ZANZIBAR
5 - 9	0.0002	0.0003	0.0000
10 - 14	0.0443	0.0451	0.0158
15 - 19	0.5338	0.5408	0.2900
20 - 24	0.8597	0.8683	0.5187
25 - 29	0.9032	0.9110	0.5690
30 - 34	0.9305	0.9387	0.6232
35 - 39	0.9420	0.9479	0.6624
40 - 44	0.9487	0.9574	0.6642
45 - 49	0.9485	0.9538	0.6767
50 - 54	0.0697	0.9396	0.6483
55 - 59	0.9078	0.9134	0.5834
60 - 64	0.8403	0.8509	0.5446
65 - 69	0.7604	0.7662	0.4495
70 - 74	0.6374	0.6472	0.3752
75 - 79	0.5655	0.5701	0.3034
80 +	0.3542	0.3608	0.2069

CHAPTER 16

HOUSEHOLDS AND HOUSING CHARACTERISTICS

by

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INTRODUCTION

Calculations, analyses and summaries in this chapter are based on 1978 Population Census, Volume VI, Private Households and Housing Characteristics. As already mentioned in Chapter 1, published tables in Volume VI on households and housing conditions are based only on "Private Households" enumerated using the Detailed Questionnaire served to a probability sample of the total population. These tables are based on the sample itself i.e., sample raising factors have not been used to bring the sample totals to the level of totals obtained through total enumeration.

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The definition of a "Private Household" in the present chapter covers two types of households. First, a private household is a group of persons who live together and share their living expenses. Usually this type of the household includes husband, wife, children, other relatives and brothers. Visitors and servants are also included as members of the household if they were present in the household on the census night. The second type of the households is the collective households that at the planning stage of the census had less than 300 persons. Collective households which had more than 300 persons have been placed in a separate category called the, "Institutional Households." These households and the persons staying in such households are excluded from the analysis in this chapter.

The sample has been overrepresented for rural households to some extent which have wage income from such institutions like coffee estates (Arusha, Kilimanjaro), sisal estates (Tanga, Morogoro), and tea estates (Iringa). This overrepresentation was done deliberately to know the economic conditions of the households in the specified rural areas who were wage earners. As far as the housing information is concerned, the overrepresentation mentioned here has not been compensated through the use of different weighting factors for different categories of households.

In many respects this overrepresentation of the "estate"¹ households will not affect the final results

¹The term "estate" households will be used by the authors in this chapter to refer to the overrepresentation of the households in rural areas of the specified regions working for wages in the estates.

very much, except in the rural areas in Arusha, Kilimanjaro, Morogoro, Tanga, Coast and Iringa regions where a lot of housing information diverge from the general pattern as compared to the other regions. For these six regions a number of comparisons have been made with the preliminary data from the 1976/1977 Households Budget Survey (HBS) conducted by the Bureau of Statistics. It may be added that the Household Budget Survey is another very important source of information on housing conditions. In this survey unequal representation from different income groups has been compensated by using a stratified sample.² In this chapter whenever a mention of 1976/1977 Household Budget Survey preliminary data will be made, it will be abbreviated as HBS and the reader is cautioned that the HBS data is preliminary. Furthermore, the definitions of household, and urban and rural used in the HBS and in the 1978 population census are slightly different. The HBS was conducted on Tanzania Mainland only.

METHODS APPLIED

The basic tables for each region in 1978 Population Census, Volume VI, Private Households and Housing Characteristics have been transformed into percent figures and only the transformed figures have been presented in this chapter. The "N.E.S. - Not Elsewhere

²It may, however, be noted that unlike the 1978 census HBS sample design was not expected to render independent reliable estimates for regions subdivided into urban and rural dichotomy mainly because the sample at this level was fairly small.

Specified^a households have been excluded in the calculations. These calculations have been made for rural and urban areas separately. The relevant tabulations in Volume VI, cover urban and rural areas by regions based on a sample. To get the total population estimates, these figures have to be raised independently for urban and rural areas and only then can they be added to get the regional total. This is the reason why the sample data from rural and urban areas in Volume VI have not been aggregated to get regional data. There are also no tabulations at national level in Volume VI because we donot have any raising factors at national level but only for rural and urban areas at the regional level. To get the national totals the "blown-up" regional figures by urban and rural areas have to be added up. These absolute national totals have been converted to ^{percentages} percentages and used in the anlysis in this chapter at the national level. Similar procedure has to be used to obtain figures for the Mainland and Zanzibar.

As an aid to obtain the absolute totals in any specific cell in a table for Tanzania, Mainland or Zanzibar, Table 16.2 was used as a reference table containing the marginals obtained from complete enumeration (i.e., the size of "Universe"). A few simple examples of the application of the technique are provided here to illustrate the relevance of Table 16.2 for obtaining absolute numbers in a given cell of a table. From Table 16.2 we know that Dodoma rural has 188,837 private households. From Table 16.4 which is based on sample data from Volume VI we know that 9.3 percent of the households had one person per household.

Therefore, the number of households for Dodoma rural with one person per household is 188,837 multiplied by 0.093. Similarly by using Table 16.2 and 16.4 for Arusha rural the number of households with one person per household is 156949 multiplied by 0.115 and so on for twenty regions on the Mainland and five regions for Zanzibar and Pemba. Adding the rural totals for twenty regions one would get an estimate of number of households with one person for Mainland rural and similarly by adding five regions for Zanzibar one would get an estimate for Zanzibar rural. Tanzania rural total is the addition of Mainland rural and Zanzibar rural. The percentage of households with one person per household for Tanzania Mainland rural is then the absolute total as calculated above divided by 2,918,270 (the total number of private rural households from Table 16.2) which would result in 0.117 or 11.7 percent as indicated in Table 16.4. Similar calculations for Zanzibar could be done and the divisor would be 76,186. For Tanzania total the calculated population estimates for the Mainland would be added to Zanzibar and then divided by 2,994,456. The same method could be applied to the other household size categories until all the remaining groups up to 10+ are exhausted in Table 16.4 for the rural areas and then start with the urban areas now using the urban information from Table 16.2 and 16.4. This type of calculation was done for all types of tabulations in this chapter wherever we have percentage of households for Tanzania total, Tanzania Mainland, Zanzibar by urban and rural. In all these computations Table 16.2 was used as a reference table providing the marginals for the "Universe".

SAMPLING FRACTION AND NUMBER OF HOUSEHOLDS AND PEOPLE BY REGIONS

As mentioned in the introduction, the data is based on the detailed Questionnaire which was served to a sample of households. The description on the sample selection is given in Chapter 17 and will not be discussed here. As a general reference in this chapter, we will only include the sample size and sampling fraction in percentages for each region (Table 16.1). This table also shows that the sampled household coverage is much higher for urban areas than for rural areas.

Table 16.2 shows the total number of private households, total number of persons staying in these private households and in institutional households. One use of this table was discussed in "Methods Applied". The table also shows that in terms of population and number of households, the Mainland regions are larger than Zanzibar regions. On the average, a region on the Mainland has about 172,000 private households and about 833,000 persons. The corresponding averages for Zanzibar are about 26,000 households and 94,400 persons per region.

TABLE 16.1.-- NUMBER OF PRIVATE HOUSEHOLD, NUMBER OF HOUSEHOLDS IN THE SAMPLE, AND SAMPLE FRACTION (In percents), FOR URBAN AND RURAL AREAS BY REGION: 1978

Regions	Total number of private households	RURAL	
		Number of households in the sample	Sample fraction in percent
Tanzania Total	2,994,456	134,177	4.48
Tanzania Mainland	2,918,270	107,581	3.69
Dodoma Region	188,837	4,003	2.12
Arusha "	156,949	6,329	4.03
Kilimanjaro "	153,189	5,414	3.53
Tanga "	187,488	18,798	10.02
Morogoro "	169,743	8,102	4.77
Coast "	111,267	3,837	3.45
Dar es Salaam "	19,129	2,395	12.52
Lindi "	107,037	4,100	3.83
Mtwara "	156,003	3,694	2.37
Ruvuma "	98,569	3,621	3.67
Iringa "	188,252	6,069	3.22
Mbeya "	195,649	5,755	2.94
Singida "	120,567	3,687	3.06
Tabora "	138,432	3,297	2.38
Rukwa "	76,845	3,132	4.08
Kigoma "	105,322	4,400	4.18
Shinyanga "	214,536	4,748	2.21
West Lake "	215,965	5,890	2.73
Mwanza "	208,382	4,894	2.35
Mara "	106,109	5,416	5.10
Zanzibar	76,186	26,596	34.91
Zanzibar North	18,399	4,945	26.88
Zanzibar South	11,847	5,086	42.93
Zanzibar West	7,722	5,941	76.94
Pemba North	19,302	5,619	29.11
Pemba South	18,916	5,005	26.46

TABLE 16.1.-- CONTINUED

Regions	Total number of private households	URBAN	
		Number of households in the sample	Sample fraction in percent
Tanzania Total	560,337	264,604	47.22
Tanzania Mainland	523,582	246,145	47.01
Dodoma Region	18,566	10,900	58.71
Arusha "	18,877	11,221	59.44
Kilimanjaro "	16,969	9,243	54.47
Tanga "	32,950	14,727	44.69
Morogoro "	31,645	22,199	70.15
Coast "	7,985	7,803	97.72
Dar es Salaam "	188,405	16,563	8.79
Lindi "	11,734	11,399	97.15
Mtwara "	21,715	15,099	69.53
Ruvuma "	8,940	7,941	88.83
Iringa "	18,810	10,501	55.83
Mbeya "	22,101	13,237	59.89
Singida "	12,872	12,489	97.02
Tabora "	24,721	15,674	63.40
Rukwa "	11,130	10,489	94.24
Kigoma "	12,219	6,833	55.92
Shinyanga "	12,741	12,310	96.62
West Lake "	8,328	7,949	95.45
Mwanza "	32,336	19,483	60.25
Mara "	10,538	10,088	95.73
Zanzibar	36,755	18,459	50.22
Zanzibar North	1,471	1,466	99.66
Zanzibar South	929	926	99.68
Zanzibar West	26,488	8,423	31.80
Pemba North	4,591	4,381	95.43
Pemba South	3,276	3,263	99.60

TABLE 16.2.-- NUMBER OF PRIVATE HOUSEHOLDS, NUMBER OF PERSONS IN PRIVATE HOUSEHOLDS, AND NUMBER OF PERSONS IN INSTITUTIONAL HOUSEHOLDS, BASED ON COMPLETE ENUMERATION ("UNIVERSE"), FOR RURAL AND URBAN AREAS, BY REGION: 1978

	RURAL + URBAN AREAS				RURAL AREAS				URBAN AREAS			
	Number of private house-holds	Number of persons in private house-holds	Number of persons in institutional house-holds	Number of private house-holds	Number of persons in private house-holds	Number of persons in institutional house-holds	Number of private house-holds	Number of persons in private house-holds	Number of persons in institutional house-holds	Number of persons in private house-holds	Number of persons in institutional house-holds	Number of persons in institutional house-holds
Tanzania Total	3554793	17139734	372876	2994456	14799279	300431	560337	2340455	72445			
Tanzania Mainland	3441852	16667943	368556	2918270	14482467	296111	523582	2185476	72445			
Dodoma Region	207403	961366	10639	188837	881192	5636	18566	80174	5003			
Arusha "	175826	900134	26089	156949	826499	26089	18877	73635				
Kilimanjaro "	170158	882712	19725	153189	815904	18934	16969	66808	791			
Tanga "	220438	967418	70349	187488	826090	65713	32950	141328	4636			
Morogoro "	201388	880475	58789	169743	768140	35819	31645	112335	22970			
Coast "	119252	504383	12203	111267	469646	9658	7985	34737	2545			
Dar es Salaam "	207534	829430	13660	19129	70992	2657	188405	758438	11007			
Lindi "	118771	518493	9131	107037	467523	6911	11734	50970	2220			
Mtwara "	177718	765448	6370	156003	673093	6370	21715	92355				
Ruvuma "	107509	556776	4779	98569	513353	4799	8940	43423				
Iringa "	207062	908305	16739	188252	829722	11246	18810	78583	5493			
Mbeya "	217750	1074780	5084	195649	978157	5084	22101	96623				
Singida "	133439	611380	2569	120567	555199	740	12872	56181	1829			
Tabora "	163153	767768	50139	138432	660311	50097	24721	107457	42			
Rukwa "	87975	447604	4293	76845	397231	1574	11130	50373	2719			
Kigoma "	117541	644399	4542	105322	582023	2480	12219	62376	2062			

TABLE 16.2.-- CONTINUED

	RURAL + URBAN AREAS				RURAL AREAS			URBAN AREAS			
	Number of private house-holds	Number of persons in private house-holds	Number of persons in institutional house-holds	Number of private house-holds	Number of persons in private house-holds	Number of persons in institutional house-holds	Number of persons in institutional house-holds	Number of private house-holds	Number of persons in private house-holds	Number of persons in institutional house-holds	Number of persons in institutional house-holds
Shinyanga Region	227277	1318473	5062	214536	1264493	3087	12741	53980	1975		
West Lake "	224293	980519	29248	215965	950530	24976	8328	29989	4272		
Nwanza "	240718	1432591	10788	208382	1288825	6782	32336	143766	4006		
Mara "	116647	715489	8338	106109	663544	7463	10538	51945	875		
Zanzibar	112941	471791	4320	76186	316812	4320	36755	154979	-		
Zanzibar North	19870	76610	407	18399	70809	407	1471	5801	-		
Zanzibar South	12776	50875	874	11847	47106	874	929	3769	-		
Zanzibar West	34210	139923	2118	7722	29417	2118	26488	110506	-		
Pemba North	23893	106227	63	19302	86642	63	4591	19585	-		
Pemba South	22192	98156	858	18916	82838	858	3276	15318	-		

HOUSEHOLD SIZE

For the description of household size, three types of tables have been included in this section.

Table 16.3 shows the average household size regionwise for urban and rural Tanzania, Tanzania Mainland and Zanzibar for 1967 and 1978. However, the average household size for 1967 census is based on all households including the collective households whereas the 1978 data are based on private households which had less than 300 persons at the planning stage of the 1978 population census. This means that the average household size by using the same definition for private households would be slightly smaller than the figures given within brackets in Table 16.3 for the 1967 population census.

Table 16.4 shows the percentage distribution of households by size for rural and urban areas by region. Figures 16.1 and 16.2 are an illustration of the summarized data for households for Tanzania Mainland and for Zanzibar based on Table 16.4. In addition, the percentage of persons by household size has been estimated and drawn in Figures 16.1 and 16.2. In this estimation the household size 10+ has been treated as having 11 persons. From Figures 16.1 and 16.2 it is obvious that the small household sizes in the range one to four are most frequent especially in urban areas despite the fact that the majority of the persons are staying in the household size between three and eight. The figures also indicate that the median household size is about one unit lower than the average household size for both rural and urban areas of Tanzania Mainland and for Zanzibar.

Table 16.5 is a summary of the average household size for Tanzania Mainland and for Zanzibar for rural and urban areas. For the purpose of comparison, the median and the regional maximum and minimum average household size are also given in this table. The median household size of the private household means that half of the private households are of this or smaller size. The median household size of the population means that upto half of the total population lives within and upto that specified household size.

Conclusion

The most striking feature is that the average household size in almost all the regions has increased between the 1967 and 1978 censuses. The only exception is Iringa region. The data in the sample for this region might be overrepresented in respect to number of small household sizes due to "estate" households and so the lower value might in part be a reflection of this. Direct comparison with HBS has not been made since the definition of the household in that survey was somewhat different than that of the 1978 census.

From Table 16.3 it can also be seen that the average household size of 4.96 in Tanzania Mainland rural is higher than that in Zanzibar (4.16). But for urban areas the situation is reversed, with Tanzania Mainland urban average household size being 4.17 compared to 4.22 for Zanzibar.

The largest average household sizes can be found in border regions towards south-west and north. Central regions have average household size of more moderate type while the regions on the east coast of Tanzania

and in Zanzibar have the smallest household sizes.

Average values shown in Figures 16.1 and 16.2, might not give a very clear picture of the housing conditions. If a single value were to be used for social description, it might be of greater interest to use the median value in relation to the number of persons i.e., half of the population staying upto the specified household size. Similarly the median value of the average household size would indicate half of all the households staying upto that household size. On the other hand the average or mean values are more useful for statistical analysis.

If we use median values in relation to population in private households as a reference for comparison in Table 16.5 then the following analysis can be made. For Tanzania Mainland rural, the regional median number of persons per household vary from minimum 5.08 (in Dar es Salaam) to a maximum 7.24 (in Mara). The total value for the median in Tanzania Mainland rural is 5.77 persons per household. Please note that the names of the regions have not been indicated on Table 16.5 and that by saying the regional minimum median value of 5.08 persons per household (in Dar es Salaam), means that half of the Dar es Salaam rural population is staying within 5.08 persons per household. The same applies to the rural maximum median value of 7.24 persons per household for Mara rural. The calculation was based on finding the median values of the persons per household for each of the regions and then locating the minimum and maximum of these median values between all the regions.

Similarly for Tanzania Mainland urban, the regional median number of persons per household vary from minimum 5.24 (in Morogoro) to maximum 6.01 (in Mara). The total median value for all urban areas is 5.35.

For rural areas in Zanzibar the regional median number of persons per household vary from minimum 4.90 (Zanzibar West) to maximum 5.22 (Pemba North) and the total median value for all rural areas is 4.93 persons per household.

For urban areas in Zanzibar and Pemba the regional median number of persons per household vary from the minimum 4.79 (Zanzibar North) to maximum 5.66 (Pemba South) with the overall median value for all urban areas being 5.24 persons per household.

TABLE 16.3.-- AVERAGE NUMBER OF PERSONS PER PRIVATE HOUSEHOLD, RURAL AND URBAN AREAS BY REGION: 1967 AND 1978

	RURAL AND URBAN		RURAL	URBAN
	Average number of persons per private house- hold 1978	(Average number of persons per house- hold 1967)	Average number of persons per private house- hold 1978	Average number of persons per private house- hold 1978
Tanzania Total	4.82	(4.4)	4.94	4.18
Tanzania Mainland	4.84	(4.5)	4.96	4.17
Dodoma Region	4.64	(4.4)	4.67	4.32
Arusha "	5.12	(4.8)	5.27	3.90
Kilimanjaro "	5.19	(5.0)	5.33	3.94
Tanga "	4.39	(3.8)	4.41	4.29
Morogoro "	4.37	(4.2)	4.53	3.55
Coast "	4.23	(3.9)	4.22	4.35
Dar es Salaam "	4.00	(3.3)	3.71	4.03
Lindi "	4.37	(3.7)	4.37	4.34
Mtwara "	4.31	(3.9)	4.31	4.25
Ruvuma "	5.18	(3.9)	5.21	4.86
Iringa "	4.39	(4.5)	4.41	4.18
Mbeya "	4.94	(4.8)	5.00	4.37
Singida "	4.58	(4.1)	4.60	4.36
Tabora "	4.71	(4.5)	4.77	4.35
Rukwa "	5.09	(4.5)	5.17	4.53
Kigoma "	5.48	(4.5)	5.53	5.10
Shinyanga "	5.80	(5.7)	5.89	4.24
West Lake "	4.37	(3.9)	4.40	3.60
Mwanza "	5.95	(5.7)	6.18	4.45
Mara "	6.13	(6.0)	6.25	4.93
Zanzibar	4.18	(3.5)	4.16	4.22
Zanzibar North	3.86	(3.2)	3.85	3.94
Zanzibar Central	3.98	(3.1)	3.98	4.06
Zanzibar West	4.09	(4.0)	3.81	4.17
Pemba North	4.45	(5.7)	4.49	4.27
Pemba South	4.42	(3.5)	4.38	4.68

Source for 1967: Central Statistical Bureau, 1967 Population Census Vol. 1, Statistics for Enumeration Areas (Dar es Salaam: Central Statistical Bureau, 1967), pp 1-4.

TABLE 16.4.-- PERCENT DISTRIBUTION OF HOUSEHOLDS BY SIZE OF HOUSEHOLD BASED ON THE SAMPLE FOR RURAL AND URBAN AREAS, BY REGION: 1978

Regions	RURAL AREAS									
	Persons per Household									
	1	2	3	4	5	6	7	8	9	10+
Tanzania Total	11.8	13.4	13.5	13.2	12.2	10.2	8.0	5.8	3.9	8.0
Tanzania Mainland	11.7	13.3	13.4	13.2	12.2	10.2	8.0	5.8	4.0	8.2
Dodoma Region	9.3	15.9	15.6	15.5	12.8	9.7	7.7	5.5	3.1	4.9
Arusha "	11.5	11.2	11.9	12.3	12.0	10.5	9.0	6.6	4.8	10.2
Kilimanjaro "	11.8	11.1	11.6	12.7	13.5	11.8	9.7	7.3	4.5	6.0
Tanga "	25.4	14.2	11.6	10.5	10.1	8.6	6.7	4.4	2.9	5.6
Morogoro "	19.7	15.0	12.0	12.9	11.2	9.0	6.9	4.9	3.0	5.7
Coast "	18.0	17.5	14.0	13.0	10.8	8.5	6.4	4.0	3.2	4.6
Dar es Salaam "	20.7	19.3	14.0	10.7	10.1	8.4	5.9	3.9	2.2	4.8
Lindi "	9.3	15.0	17.1	16.8	14.3	10.2	7.2	4.2	2.7	3.2
Mtwara "	10.2	15.6	16.4	15.8	13.8	10.9	6.3	4.3	2.6	4.1
Ruvuma "	6.7	11.9	15.2	14.6	13.1	10.8	8.4	6.1	4.6	8.6
Iringa "	13.3	16.4	16.2	15.2	12.7	9.0	7.0	4.2	2.8	3.2
Mbeya "	12.2	12.4	14.4	13.7	13.3	9.8	7.4	5.2	3.6	8.0
Singida "	6.8	14.9	14.7	14.7	14.9	10.8	8.4	6.3	3.1	5.4
Tabora "	12.1	14.2	12.7	11.2	11.1	9.7	7.5	6.3	4.2	11.0
Rukwa "	5.5	10.7	15.0	13.8	12.3	13.3	9.1	7.9	5.0	7.4
Kigoma "	6.0	11.4	11.7	13.2	12.0	11.7	9.7	7.4	5.8	11.1
Shinyanga "	6.4	10.5	11.4	11.4	11.7	10.7	9.5	7.4	5.0	16.0
West Lake "	14.2	14.4	14.7	14.0	11.3	10.0	7.1	5.2	3.6	5.5
Mwanza "	7.6	9.3	10.5	10.6	11.0	11.1	9.8	7.4	5.5	17.2
Mara "	6.2	9.9	9.4	11.1	11.7	9.9	9.9	7.6	6.8	17.5
Zanzibar	13.9	14.8	15.9	14.7	12.8	10.4	7.5	4.8	2.5	2.7
Zanzibar North	14.2	17.5	17.4	14.3	12.1	9.9	7.1	4.1	1.8	1.6
Zanzibar South	16.6	13.9	15.4	16.4	13.3	9.9	6.1	4.3	1.8	2.3
Zanzibar West	24.6	15.3	13.7	12.2	10.2	7.8	5.6	3.8	2.6	4.2
Pemba North	8.9	13.8	16.1	14.0	14.0	12.1	9.7	5.6	3.0	2.8
Pemba South	12.6	13.9	15.7	14.9	13.0	10.7	7.4	5.4	2.9	3.5

TABLE 16.4.-- CONTINUED

Regions	URBAN AREAS									
	1	2	3	Persons 4	per 5	Household 6	7	8	9	10+
Tanzania Total	21.3	15.3	13.3	12.0	10.0	8.2	6.1	4.4	3.1	6.3
Tanzania Mainland	21.3	15.4	13.2	12.0	10.0	8.2	6.1	4.4	3.1	6.3
Dodoma Region	19.5	15.0	12.7	12.0	10.6	8.7	7.1	5.2	3.3	5.9
Arusha "	23.4	18.9	13.8	11.0	9.4	7.0	5.5	3.9	2.5	4.6
Kilimanjaro "	26.0	16.5	12.6	11.1	9.3	7.7	5.6	4.1	2.6	4.5
Tanga "	22.6	14.0	11.6	10.8	9.3	8.4	6.7	4.9	3.6	8.0
Morogoro "	21.9	15.4	13.4	12.1	10.1	8.1	6.0	4.3	3.1	5.6
Coast "	21.4	14.7	12.4	11.2	9.8	8.8	6.2	4.8	3.2	7.5
Dar es Salaam "	22.6	15.6	13.5	11.8	9.5	8.4	6.0	4.1	2.9	5.6
Lindi "	20.1	14.3	13.0	12.9	10.5	8.6	6.3	4.5	3.1	6.7
Mtwara "	16.6	15.2	14.5	14.3	12.5	9.0	6.3	4.5	2.6	4.5
Ruvuma "	16.5	14.3	13.4	13.0	10.9	8.7	6.6	5.4	3.6	7.6
Iringa "	19.6	14.4	14.6	13.4	11.2	8.7	6.0	4.2	2.7	4.9
Mbeya "	19.8	14.7	13.4	12.3	10.5	8.9	6.5	4.7	3.3	5.9
Singida "	17.2	15.9	14.2	12.6	11.5	8.8	6.7	4.6	3.2	5.3
Tabora "	23.3	16.3	12.8	10.9	9.2	7.5	5.6	4.4	3.2	6.8
Rukwa "	15.1	14.6	13.6	12.7	10.8	9.1	7.5	5.6	3.9	7.1
Kigoma "	17.3	12.1	10.5	10.1	9.6	9.4	7.4	6.2	4.5	12.9
Shinyanga "	24.7	16.1	12.3	10.4	9.1	7.6	5.9	4.8	3.2	5.9
West Lake "	26.1	18.7	13.9	11.7	8.7	6.3	4.7	3.5	2.1	4.3
Mwanza "	19.9	16.3	13.4	11.2	9.5	7.8	6.0	4.5	3.3	8.1
Mara "	19.0	14.8	11.9	10.9	9.4	8.7	6.6	5.3	3.8	9.6
Zanzibar	21.0	13.6	13.8	12.9	10.8	8.5	6.1	4.7	3.0	5.6
Zanzibar North	15.6	15.2	15.9	15.6	12.2	7.9	7.2	5.2	2.6	2.6
Zanzibar South	16.3	13.3	16.4	16.3	13.8	10.0	5.7	3.6	2.1	2.5
Zanzibar West	22.6	13.7	13.7	12.6	10.3	8.2	5.7	4.5	2.9	5.8
Pemba North	16.9	12.9	13.8	13.8	12.3	9.2	7.1	5.8	3.3	4.9
Pemba South	16.7	12.3	14.0	12.1	11.2	10.1	7.4	5.2	3.9	7.1

TABLE 16.5.-- AVERAGE AND MEDIAN VALUES OF HOUSEHOLD SIZE FOR THE MAINLAND AND ZANZIBAR AS WELL AS VALUES FOR REGIONS WITH EXTREME AVERAGE HOUSEHOLD SIZE: 1978*

	RURAL			URBAN		
	Median values for the number of private households	Average household size	Median values for the population in private households	Median values for the number of private households	Average household size	Median values for the population in private households
TANZANIA MAINLAND						
Total Average	3.86	4.96	5.77	3.01	4.17	5.35
Regional average maximum	5.17	6.25	7.24	3.39	5.10	6.01
Regional average minimum	2.71	3.71	5.08	2.95	3.55	5.24
ZANZIBAR						
Total Average	3.37	4.16	4.93	3.12	4.22	5.24
Regional average maximum	3.80	4.49	5.22	3.52	4.68	5.66
Regional average minimum	2.74	3.81	4.90	3.06	3.94	4.79

*The figures show number of persons per household.

The median values for the number of private households means that half of all households have less than the given number of persons per household and half of all households have more than the given number of persons per household.

Average household sizes are the total number of persons in private households in a region divided by the given number of private households from the same region.

The median values for the population in private households means that half of the population in the private households in a region is staying in households with less than the given number of persons per household and half of the population is staying in households with more than the given number of persons per household.

NUMBER OF ROOMS PER HOUSEHOLD

Table 16.6 provides percent distribution of households by number of rooms. Only rooms used by the household for habitation whether they are in one or more houses are included. The rooms used for such purposes as keeping animals, storage, kitchen, bathroom, toilets, etc. are excluded. In the calculations, "9+ rooms" category has been assumed to have 10 rooms.

It should also be noted that there was no question in the census on the extent to which the households shared some of their rooms with the other households. According to HBS such conditions are not very common.

The overrepresentation of the "estate" households in the rural areas of Arusha, Kilimanjaro, Tanga, Morogoro, Coast and Iringa regions does not affect much the data on number of rooms per household from two rooms and onwards. The percentage of households using only one room for habitation in the rural areas of Arusha, Kilimanjaro, Tanga and Morogoro was respectively 40.8 percent, 31.5 percent, 43.5 percent and 38.9 percent and the corresponding figures from HBS were 16.5 percent, 11.4 percent, 10.6 percent and 21.6 percent. In addition Mbeya rural, **which** has not been treated in the "estate" households, also shows a high value of 42.1 percent of the households with one room compared with 16.6 percent from the HBS.

Conclusion

The main characteristics that can be discerned from Table 16.6 and Figure 16.3 is that the highest proportion of the households are using two rooms, followed by one room and then three rooms for habitat-

ion for both rural and urban areas. For rural areas the percentage of households using between one and three rooms is 83.5 percent and for urban areas it is 76.7 percent. This implies that the proportion of households using fewer number of rooms is higher in rural areas than in urban areas. Furthermore with the information that the average household size is bigger in rural areas than in urban areas, the inference would be that there is higher density of persons per room in rural areas than in urban areas. This point is further substantiated by the detailed analysis in the next section on "Number of persons per room".

Another characteristics pattern is that the proportion of households using only one room for habitation in Zanzibar is less than that of the Mainland. The same is also true for households using 6, 7, 8, 9 or more rooms. For further understanding of the conditions, number of rooms per household has to be combined with the data on household sizes, room sizes (in m²) and with the real use of indoor and outdoor space. So the available information of rooms per household only reflects more of the social conditions in the dwellings.

The average number of rooms per household

	Rural	Urban
Tanzania	2.42	2.56
Tanzania Mainland	2.43	2.58
Zanzibar	2.30	2.38

TABLE 16.6.-- PERCENT DISTRIBUTION OF HOUSEHOLD BY NUMBER OF ROOMS BASED ON THE SAMPLE, FOR RURAL AND URBAN AREAS, BY REGION: 1978

Regions	RURAL								
	1	2	3	4	5	6	7	8	9+
Tanzania Total	26.3	37.8	19.4	8.5	4.0	2.5	0.5	0.3	0.7
Tanzania Mainland	26.5	37.5	19.4	8.5	4.0	2.5	0.5	0.4	0.7
Dodoma Region	25.9	44.7	18.4	7.8	1.3	1.2	0.1	0.2	0.4
Arusha "	40.8	31.9	17.5	4.3	3.6	0.9	0.4	0.1	0.5
Kilimanjaro "	31.5	33.4	19.7	8.1	4.0	1.8	0.7	0.4	0.4
Tanga "	43.5	38.7	10.1	4.5	0.9	0.5	0.1	0.2	1.5
Morogoro "	38.9	34.0	17.0	6.5	2.1	0.7	0.3	0.1	0.4
Coast "	15.7	40.0	24.0	13.4	3.4	2.6	0.3	0.5	0.1
Dar es Salaam "	22.5	45.9	14.7	12.3	2.0	1.5	0.2	0.1	0.8
Lindi "	10.7	34.1	29.6	18.8	4.7	1.4	0.4	0.1	0.2
Mtwara "	21.0	37.0	26.0	12.3	2.4	0.7	0.3	0.2	0.1
Ruvuma "	13.7	38.5	26.6	11.4	5.3	2.1	0.9	0.6	0.9
Iringa "	16.7	45.0	26.0	4.6	3.9	1.5	0.8	0.3	1.2
Mbeya "	42.1	38.8	12.4	3.0	1.8	1.0	0.3	0.3	0.3
Singida "	19.2	47.9	19.8	8.6	2.2	1.4	0.4	0.3	0.2
Tabora "	31.3	43.2	14.8	5.7	2.3	1.6	0.6	0.2	0.4
Rukwa "	29.8	42.8	16.6	5.6	1.8	0.8	0.2	0.4	2.0
Kigoma "	13.0	27.6	29.0	15.6	5.4	7.1	0.5	0.8	1.0
Shinyanga "	26.3	41.6	18.6	8.0	2.4	1.5	0.6	0.4	0.6
West Lake "	12.3	18.1	15.5	16.7	19.7	14.8	1.4	0.7	0.8
Mwanza "	24.4	40.8	22.5	6.8	2.5	1.4	0.3	0.3	1.0
Mara "	30.3	37.4	16.3	8.0	2.7	2.1	0.9	0.8	1.5
Zanzibar	18.8	49.0	19.7	10.1	1.5	0.6	0.1	0.1	0.1
Zanzibar North	24.9	54.2	16.7	3.2	0.8	0.2	0.0	0.0	-
Zanzibar South	34.8	47.3	14.0	2.9	0.6	0.3	0.0	0.1	0.0
Zanzibar West	23.6	43.2	19.7	9.1	2.6	0.7	0.4	0.2	0.5
Pemba North	7.2	45.3	25.8	17.8	2.3	1.1	0.2	0.1	0.2
Pemba South	12.9	51.2	19.9	14.0	1.4	0.5	0.1	0.0	0.0

TABLE 16.6.-- CONTINUED

Regions	URBAN								
	1	2	3	4	5	6	7	8	9+
Tanzania Total	36.5	24.2	16.0	10.9	4.1	4.7	0.9	0.9	1.8
Tanzania Mainland	36.9	23.7	15.8	10.7	4.1	5.0	1.0	0.9	1.9
Dodoma Region	34.8	31.4	17.9	7.6	2.5	2.5	0.7	0.8	1.8
Arusha "	49.9	20.6	14.5	6.6	2.9	2.0	1.0	0.7	1.8
Kilimanjaro "	54.2	22.5	11.3	6.3	2.9	1.4	0.6	0.3	0.5
Tanga "	26.4	19.1	11.9	16.3	7.5	11.5	2.0	1.9	3.4
Morogoro "	33.8	27.1	17.5	10.7	2.9	4.2	0.7	0.8	2.3
Coast "	24.9	24.5	18.7	15.3	4.2	10.0	0.9	0.5	1.0
Dar es Salaam "	45.7	22.3	12.8	9.1	3.1	5.0	0.5	0.5	1.0
Lindi "	20.0	18.8	24.5	16.7	8.2	7.4	1.7	0.9	1.8
Mtwara "	16.8	23.3	26.7	18.2	6.9	4.4	1.0	1.1	1.5
Ruvuma "	15.8	23.7	17.6	15.0	7.5	8.3	2.7	2.2	7.2
Iringa "	22.9	23.3	22.6	8.4	6.1	4.9	2.2	2.6	7.0
Mbeya "	32.6	27.6	18.1	9.5	4.2	3.6	1.4	0.9	2.1
Singida "	24.4	32.2	23.4	7.7	4.1	3.8	1.3	1.5	1.6
Tabora "	24.4	26.9	13.8	18.8	4.9	6.3	1.5	1.4	2.0
Rukwa "	23.7	31.1	20.4	8.8	4.3	3.7	1.7	2.0	4.3
Kigoma "	19.9	18.3	20.5	20.6	5.3	8.7	1.7	1.8	3.2
Shinyanga "	42.9	24.2	17.0	8.8	3.4	1.7	0.6	0.4	1.0
West Lake "	42.8	17.3	11.9	10.1	6.0	5.9	1.0	0.6	4.4
Mwanza "	43.6	26.2	16.4	7.4	2.7	1.9	0.5	0.4	0.9
Mara "	40.0	23.7	12.7	9.1	3.5	4.6	1.7	1.6	3.1
Zanzibar	30.2	20.5	19.4	13.6	4.5	1.0	0.4	0.2	0.2
Zanzibar North	27.6	59.5	9.8	2.1	0.7	0.1	0.1	-	0.1
Zanzibar South	24.7	41.8	23.0	6.9	2.3	0.9	0.2	0.1	0.1
Zanzibar West	33.2	25.2	19.0	15.0	5.5	1.2	0.5	0.2	0.2
Pemba North	21.1	44.5	20.8	12.1	1.0	0.3	0.1	0.0	0.1
Pemba South	18.6	36.6	23.0	16.9	2.8	0.8	0.6	0.4	0.3

NUMBER OF PERSONS PER ROOM

There are two methods from which the number of persons per room can be estimated.

The first method, which estimates roughly the average number of person per room uses the average household sizes from Table 16.5 which are divided by the average number of rooms per household from the last paragraph of the previous section, for Tanzania, Tanzania Mainland, and Zanzibar. The same technique can be applied if desired for each of the regions.

Average number of persons per room by the first method

	<u>Rural</u>	<u>Urban</u>
Tanzania	2.04*	1.63
Tanzania Mainland	2.05	1.62
Zanzibar	1.81	1.77

$$\begin{array}{l} \text{*Average household size Tanzania Rural} \\ \text{Average number of rooms per household Tanzania Rural} \end{array} = \frac{4.96}{2.42} = 2.04$$

The second and more accurate method of estimation of persons per room uses the cross tabulations between household sizes and number of rooms. If all the figures within these tables are divided into the total number of households in the sample from the same region and then multiplied by a 100 then we have the same cross tabulation percentagewise and the total of all the cells within this cross-tabulation would be 100. Then it is possible to identify the critical sizes of the households and related number of rooms within each region and then compare the different regions. Also using a percentage cross-

tabulation each cell could be multiplied by the total number of households in that region and the total figures could thus be calculated instead of using sample figures for some types of analysis.

By multiplying each percent figure (i.e. each cell) in one table with persons per household i.e. row-wise and adding the result would give the number of persons in 100 households, and dividing the number of persons in 100 households by a 100 would give number of persons per household. Similarly, using the columns, the number of habitable rooms, each cell is multiplied by the number of habitable rooms added and divided by a 100 would give number of rooms used by one household (both for urban and rural areas). Then the number of persons per household can be divided by the number of rooms per household giving the average number of persons per room for each region by rural and urban.

In this summary Dodoma rural and urban will be used as an example to show the type of analysis discussed above. Refer to Table 16.7 where the percentage distribution for Dodoma rural and urban is given. The totals of all the cells for either urban or rural is 100. Also in Table 16.7 a line has been demarcated under 2 persons in one room, 4 persons in 2 rooms, 6 persons in 3 rooms and 8 persons in 4 rooms. The purpose of demarcating the Table 16.7 in steps of 2 persons, i.e., 2 persons in one room, 4 persons in two rooms and so on is because about two is the average size of persons per room in a household. So from Table 16.7 for Dodoma rural all the figures enclosed within the stepwise demarcation line to the left adds to 41.6 percent. This means that 41.6 percent of the households in Dodoma rural have more

than two persons per room irrespective of the number of rooms or persons within a household. All the figures outside the demarcation line to right i.e., the remaining 58.4 percent of the households for Dodoma rural have 2 persons or less per room per household. Similarly for Dodoma urban we have 36.1 percent of the households having more than 2 persons per room in a household and the remaining 63.9 percent of the households having 2 persons or less per room per household. Such analysis could be done for all the regions to see the urban/rural and regional differences of the occupancy of rooms per household.

Conclusion

The most striking information in relation to the number of persons per room is that there are more persons per room in the rural areas than in the urban areas. At the same time there is a greater variation in rural areas with an average of 1.19 persons per room in West Lake rural to an average of 2.50 persons per room in Mwanza rural. For urban areas the variation is less with an average of 1.22 persons per room in Iringa urban to 1.71 persons per room in Mara urban.

On the average, for rural areas there are more people per room on the Mainland than in Zanzibar, but for the urban areas the reverse is the case. Also on the average for rural areas about 60 percent of the population stays in households with more than two persons per room while for urban areas about 45 percent of the population stays in the households with more than two persons per room.

TABLE 16.7.-- PROPORTION OF HOUSEHOLDS OF DIFFERENT SIZES IN RELATION TO NUMBER OF ROOMS USED FOR HABITATION.

Region: DODOMA Area: RURAL

Household size (PERSONS PER Hh)		NUMBER OF HABITABLE ROOMS								
		1	2	3	4	5	6	7	8	9+
1		3.7	3.9	1.0	0.3	-	0.1	-	0.0	0.1
2	58.4	5.6	7.5	1.8	0.7	0.1	0.0	-	0.0	0.1
3		4.8	7.2	2.4	0.9	0.1	0.1	-	0.1	0.0
4	41.6	3.8	7.7	2.7	1.1	0.1	0.1	-	-	0.0
5		3.1	5.7	2.7	1.1	0.1	0.1	0.0	-	-
6		1.7	4.5	2.1	0.9	0.2	0.1	-	-	0.0
7		1.3	3.5	1.8	0.9	0.2	0.1	0.0	-	0.0
8		0.9	2.1	1.5	0.7	0.1	0.2	0.0	-	0.0
9		0.3	1.0	1.1	0.3	0.1	0.2	-	-	0.0
10+		0.6	1.5	1.3	0.8	0.2	0.3	0.1	0.1	0.1

Region: DODOMA Area: URBAN

Household size (PERSONS PER Hh)		NUMBER OF HABITABLE ROOMS								
		1	2	3	4	5	6	7	8	9+
1		12.4	3.8	1.6	0.6	0.2	0.3	0.1	0.2	0.4
2	63.9	7.6	4.2	1.8	0.6	0.2	0.2	0.1	0.1	0.3
3	36.1	5.1	4.3	2.0	0.6	0.1	0.2	0.1	0.1	0.2
4		3.7	4.4	2.5	0.8	0.2	0.2	0.0	0.1	0.1
5		2.7	4.2	2.1	0.8	0.3	0.3	0.1	0.1	0.2
6		1.5	3.6	2.1	0.8	0.3	0.2	0.1	0.0	0.1
7		0.9	2.7	1.8	0.9	0.3	0.2	0.0	0.0	0.1
8		0.5	1.8	1.5	0.7	0.3	0.3	0.1	0.1	0.1
9		0.2	1.1	0.9	0.5	0.2	0.2	0.0	0.0	0.1
10+		0.3	1.3	1.6	0.2	0.6	0.5	0.2	0.1	0.2

The presence of "estate" households in rural areas might also affect the figures on number of persons per room as it has affected the figures on number of rooms per household, with the result that the figures are slightly higher for some of the regions and for Tanzania Mainland. But at the same time the household size figures might also be lower by about the same rate as number of rooms per household and thus the final result may not be very different from the actual situation.

TABLE 16.8.-- PROPORTION OF THE PRIVATE HOUSEHOLDS AND OF THE POPULATION STAYING TWO PERSONS OR LESS PER HABITABLE ROOM*

(Median values, low and high extremes and the corresponding average number of persons per habitable room.)

(Estimates and extracts from the cross tabulations between household sizes and number of rooms used for habitation.)

	RURAL			URBAN		
	Median value	Lowest value	Highest value	Median value	Lowest value	Highest value
<u>Proportion of Private Households (in percent) having two persons or less per room</u>	59.0	44.9	84.5	70.2	59.9	80.2
<u>Corresponding proportion of Population (in percent) having two persons or less per room</u>	42.0	29.9	76.9	54.7	42.7	67.1
<u>Corresponding value for Average number of persons per room</u>	2.07	2.50	1.19	1.58	1.71	1.22

*The horizontal figures are all coming from different regions.

TYPE OF TENURE

The data has been classified into two main categories, owners, tenants and a third category, "others". Regarding others, the preliminary data from HBS indicates that the greatest proportion within this category might be households staying in houses owned by relatives and not paying rent. But also other types of ownership can be found in this category. Table 16.9 shows the percent distribution for each type of tenure by rural and urban by regions for Tanzania.

Conclusion

The overrepresentation in the sample of the "estate" households in the rural areas of Arusha, Kilimanjaro, Tanga, Morogoro, Coast and Iringa regions might have the greatest negative effect on this data on type of tenure.

For Tanzania Mainland rural the sampled households indicate that 81.5 percent of the households owned their dwellings, 14.2 percent were tenants and 5.3 percent had "other" type of tenure. However, the figure of 14.2 percent for rural tenants is notably high in comparison HBS. Also the proportion of tenants by regions for rural areas is quite high for some regions in relation to the remaining regions and also in relation to HBS. The figures for tenant household for these rural areas are Arusha 16.2 percent, Tanga 55.4 percent, Morogoro 37.8 percent, Coast 21.5 percent, Iringa 28.2 percent. According to HBS the corresponding figures for tenant households for rural areas are: Arusha 1.3 percent, Tanga 3.3 percent, Morogoro

6.7 percent, Coast 2.2 percent, and Iringa 0.2 percent and we have these types of small percentages for the remaining regions in the census. This means that excluding rural regions with "estate" households, the figures from the census and HBS are not very much different from each other. (The figure which do not compare well have been enclosed in brackets in Table 16.9.) The average figure for Tanzania Mainland rural and Tanzania total are more likely to be in the range of about 91-93 percent owner, 3-5 percent tenants and some 2-3 percent other households.

If we exclude the overrepresented "estate" household regions mentioned above, the main characteristics in the remaining regions are that there is a very high proportion of households owning their own houses in rural areas with relatively small variations in this respect between the different regions. For urban areas there is a **higher** proportion of tenanthousehold with also high variation between different regions from 2.6 percent of households in Zanzibar South to 71.3 percent of tenant households in Shinyanga urban.

Households falling in the "other" category are more numerous in Zanzibar than in the Mainland for both rural and urban areas. The proportion of households owning their own houses in rural areas of Zanzibar is slightly lower than that on the Mainland. The urban areas proportion of owner households is higher in Zanzibar compared to the Mainland. The proportion of tenant household in Zanzibar urban is 29.9 percent compared to 56.3 percent in Mainland urban.

TABLE 16.9.-- PERCENT DISTRIBUTION OF HOUSEHOLDS BY TENURE STATUS BASED ON THE SAMPLE FOR RURAL AND URBAN AREAS, BY REGION: 1978

Regions	RURAL AREAS			URBAN AREAS		
	Owner	Tenant	Other	Owner	Tenant	Other
Tanzania Total	(81.7)	(12.8)	(5.5)	41.9	54.6	3.5
Tanzania Mainland	(81.5)	(14.2)	(5.3)	41.0	56.3	2.7
Dodoma Region	90.9	6.1	3.0	46.6	50.4	3.0
Arusha "	(67.5)	(16.2)	(16.3)	24.5	71.2	4.3
Kilimanjaro "	(71.4)	10.8	(17.8)	29.1	66.3	4.6
Tanga "	(23.2)	(55.4)	(21.4)	36.8	59.9	3.3
Morogoro "	(50.8)	(37.8)	11.4	42.2	54.6	3.2
Coast "	(75.4)	(21.5)	(3.1)	55.1	40.2	4.7
Dar es Salaam "	87.4	10.8	1.8	32.5	65.8	1.7
Lindi "	95.3	2.1	2.6	55.5	37.5	7.0
Mtwara "	94.0	2.8	3.2	69.4	25.4	5.2
Ruvuma "	94.3	3.7	2.0	53.7	43.7	2.6
Iringa "	(69.5)	(28.2)	(2.3)	47.2	50.0	2.8
Mbeya "	93.8	4.9	1.3	54.7	43.9	1.4
Singida "	95.0	3.7	1.3	59.8	36.7	3.5
Tabora "	95.3	2.3	2.4	50.9	45.5	3.6
Rukwa "	95.2	2.8	2.0	63.7	34.2	2.1
Kigoma "	93.7	4.9	1.4	60.4	35.8	3.8
Shinyanga "	94.8	4.6	0.6	27.5	71.3	1.2
West Lake "	90.0	7.6	2.4	33.6	62.9	3.5
Mwanza "	92.9	6.5	0.6	39.0	59.1	1.9
Mara "	92.0	6.1	1.9	41.2	55.7	3.1
Zanzibar	84.7	3.0	12.3	55.3	29.9	14.8
Zanzibar North	89.3	3.5	7.2	88.7	3.1	8.2
Zanzibar South	89.2	2.4	8.4	88.5	2.6	8.9
Zanzibar West	74.8	5.9	19.3	49.8	35.3	14.9
Pemba North	82.7	1.4	15.9	67.7	17.3	15.0
Pemba South	83.4	3.2	13.4	58.4	23.7	17.9

AGE OF BUILDING

All the class intervals for the age of building are unequal and so it is difficult to make comparison between different groups. Information for single years is given for 1977 and 1978 and 1978 would imply the coverage of about eight months before the census. Therefore the most useful information is for 1977 which covers a single complete year, but some interesting analysis can also be made by using the other groups. Table 16.10 shows the proportion of households in percent who were living in the houses built during the specified time periods. The information is given by urban, rural, regions and the whole country.

Conclusion

The overrepresentation of "estate" households in the rural areas of Arusha, Kilimanjaro, Tanga, Morogoro, Coast, and Iringa regions seems to have an effect on age of building figures in the sense that households staying in older houses are over-represented in the sample in these regions. The percentage of houses which are more than 12 years old in rural areas are Arusha 32.3 percent, Kilimanjaro 43.5 percent, Tanga 77.5 percent, Morogoro 43.2 percent, Coast 23.8 percent and Iringa 32.6 percent. The preliminary data from the HBS is not divided into the same class intervals and the closest category is of households more than 9 years old whose figures for the rural areas of the forgoing regions are Arusha 14.6 percent, Kilimanjaro 39.1 percent, Tanga 46.7 percent, Morogoro 8.3 percent, Coast 20.3 percent, Iringa 17.6 percent. The

nonconformity of figures between the census and the HBS have been put within brackets in Table 16.10.

The rural area of West Lake region also has a high proportion of 29.3 percent of the houses more than 12 years old. This might however, be related to the well established agriculture system in that area where people might prefer to stay in the same area in the same house for longer periods and repair and maintain their old houses. The resettlement of the households in relation to the villagization programme during 1967-1976 was relatively smaller in this region than in others. The preliminary data from HBS show that some 41 percent of the households were staying in houses more than 9 years old in West Lake rural.

Another interesting and somewhat puzzling feature is that 36.4 percent of Shinyanga rural and 27.1 percent of Mwanza rural households were staying in houses built in 1977.

The general characteristics related to age of building are that there are proportionately more old houses in urban areas than in rural areas and more older houses in Zanzibar compared to Mainland both for rural and urban areas. If we exclude the regions with the "estate" households for rural areas of Arusha, Kilimanjaro, Tanga, Morogoro, Coast and Iringa then about 14-15 percent of the households in the rural areas were living in houses more than 12 years old a the corresponding figure for Zanzibar is 44-45 percent. For urban areas of the Mainland 40-41 percent of the households stayed in houses older than 12 years and for Zanzibar urban it was 66-67 percent. These differences might reflect both the variation in how well the settlements are established and the availability of improved building materials.

Additional tables in the 1978 Population Census Volume VI, also indicate, as expected, that a higher proportion among tenants stay in older houses compared to owner households of the houses.

TABLE 16.10.-- PERCENT DISTRIBUTION OF HOUSEHOLDS BY AGE OF BUILDING BASED ON THE SAMPLE FOR RURAL AND URBAN AREAS, BY REGION: 1978

Regions	RURAL				
	1978	1977	1976- 1967	1966- 1961	1960-
Tanzania Total	7.9	15.0	53.2	8.7	(15.2)
Tanzania Mainland	7.9	15.1	53.7	8.5	(14.8)
Dodoma Region	6.5	12.4	67.8	7.2	6.1
Arusha "	6.6	14.2	46.9	9.4	(22.9)
Kilimanjaro "	4.7	9.1	42.7	(16.0)	(27.5)
Tanga "	2.4	4.3	15.8	12.5	(65.0)
Morogoro "	5.6	9.9	41.3	6.3	(36.9)
Coast "	6.6	9.3	60.3	(13.8)	(10.0)
Dar es Salaam "	9.9	16.1	60.6	8.4	4.9
Lindi "	9.0	14.3	68.2	5.2	3.5
Mtwara "	5.6	11.4	70.5	7.5	5.0
Ruvuma "	4.4	13.5	68.9	7.3	5.9
Iringa "	4.5	11.4	51.5	5.6	(27.0)
Mbeya "	10.6	19.3	56.6	8.7	4.8
Singida "	4.7	10.2	81.9	2.3	0.9
Tabora "	9.5	14.1	63.9	11.5	1.0
Rukwa "	11.5	15.2	65.2	5.4	2.7
Kigoma "	7.8	12.9	69.4	5.8	4.1
Shinyanga "	12.2	36.4	44.1	4.7	2.6
West Lake "	11.9	14.2	44.6	11.2	18.1
Mwanza "	13.2	27.1	47.2	8.3	4.2
Mara "	9.6	14.4	60.0	10.2	5.8
Zanzibar	9.3	10.1	36.2	15.6	28.8
Zanzibar North	10.3	12.1	41.9	14.0	21.7
Zanzibar South	6.9	9.3	33.3	13.5	37.0
Zanzibar West	12.8	12.0	40.4	14.3	20.5
Pemba North	10.8	9.1	34.9	15.7	29.5
Pemba South	6.9	8.8	32.2	19.1	33.0

TABLE 16.10.-- CONTINUED

Regions	1978	1977	URBAN		
			1976- 1967	1966- 1961	1960-
Tanzania Total	4.3	7.1	46.0	16.2	26.4
Tanzania Mainland	4.3	7.2	47.6	16.2	24.7
Dodoma Region	4.2	6.8	48.1	12.4	28.5
Arusha "	4.1	9.1	46.4	13.2	27.2
Kilimanjaro "	5.0	7.8	41.9	14.5	30.8
Tanga "	5.1	6.4	31.6	18.5	38.4
Morogoro "	4.3	8.0	43.8	16.2	27.7
Coast "	5.5	9.2	54.0	13.8	17.5
Dar es Salaam "	3.1	5.4	50.8	19.1	21.6
Lindi "	6.8	12.6	49.3	12.0	19.3
Mtwara "	7.0	9.9	58.6	13.3	11.2
Ruvuma "	4.1	8.2	61.8	12.7	13.2
Iringa "	4.9	8.0	50.1	13.0	24.0
Mbeya "	4.7	6.8	49.7	12.9	25.9
Singida "	3.7	8.7	52.1	15.1	20.4
Tabora "	5.2	8.0	45.6	16.6	24.6
Rukwa "	5.3	11.0	59.4	11.2	13.1
Kigoma "	3.9	5.6	43.2	15.6	31.7
Shinyanga "	4.0	7.0	40.6	13.8	34.6
West Lake "	3.4	4.4	36.1	18.5	37.6
Mwanza "	6.3	9.7	40.7	13.5	29.8
Mara "	8.3	9.3	39.9	13.4	29.1
Zanzibar	4.2	5.9	23.2	16.7	50.0
Zanzibar North	5.1	9.2	37.6	16.7	31.4
Zanzibar South	4.4	5.3	31.0	10.7	48.7
Zanzibar West	3.7	5.4	22.6	16.9	51.4
Pemba North	6.8	8.7	22.6	15.1	46.8
Pemba South	4.7	5.0	20.5	18.5	51.3

WALL MATERIALS

The description of the different wall materials used in the questionnaire covers very well the main types of the wall materials used in the country. Only one principal type of traditional wall construction namely insitu mud construction is missing. However, since the figures under "others" are quite small in all the regions, it can be assumed that such insitu mud constructions are included as part of mud bricks or block construction. The Table 16.11 shows the proportion of the households in percent staying in the houses where the main house has the specified wall material. The information is for the whole country, regionwise and by urban and rural.

Conclusion

The overrepresentation of "estate" households from rural areas of Arusha, Kilimanjaro, Tanga, Morogoro, Coast and Iringa is the most likely reason for higher percentage of households with more permanent materials like burnt bricks, concrete and stones for their wall material. According to Table 16.11 the sum of the percentage of the households staying in houses with walls of baked or burnt bricks and concrete, cement, stones for the rural areas of these regions are Arusha 22.0 percent, Kilimanjaro 28.6 percent, Tanga 66.2 percent, Morogoro 43.5 percent, Coast 14.7 percent, Iringa 18.3 percent. The corresponding figures from HBS are Arusha 1.1 percent, Kilimanjaro 12.1 percent, Tanga 5.6 percent, Morogoro 8.8 percent, Coast 3.1 percent, and Iringa

1.5 percent. Even if there might be some bias in the HBS data, the figures of the remaining regions in the census compare fairly well with HBS. So the figures within brackets in Table 16.11 are too high to reflect the average conditions due to the presence of the "estate" households.

Some of the main characteristics related to the wall materials are that mud and pole constructions are the most common followed by mud block walls and walls of poles, branches and grass. According to the HBS preliminary data walls of poles, branches, grass should be more common than the mud block walls. This pattern is not reproduced by the census. However, it is difficult to say whether the overrepresentation of "estate" households from rural areas of Arusha, Kilimanjaro, Tanga, Morogoro, Coast and Iringa has affected the figures for the more traditional wall materials resulting in the discrepancy mentioned above.

The geographical distribution of different wall materials shows one clear pattern namely, that there are very few walls of mud block houses in Zanzibar, Coastal regions, Kigoma and West Lake regions.

Wall materials such as cement stabilized walls and burnt brick walls are relatively more common in urban areas than in rural areas. Also cement stabilized walls are somewhat more common in Zanzibar than on the Mainland in both urban and rural areas.

TABLE 16.11.-- CONTINUED

Regions	URBAN					
	Poles bamboo bran- ches grass	Poles and mud plast- ered or un- plast- ered	Mus bricks or blocks plast- ered or un- plast- ered.	Baked or burnt bricks	Con- crete cement stones	Others e.g. tents boats
Tanzania Total	6.8	41.4	20.3	3.7	27.3	0.5
Tanzania Mainland	6.9	40.9	21.6	3.9	26.2	0.5
Dodoma Region	1.3	9.7	53.1	2.7	29.9	3.3
Arusha "	5.9	44.5	12.2	5.7	30.8	0.9
Kilimanjaro "	2.1	30.5	7.6	1.3	55.5	3.0
Tanga "	13.9	44.6	7.4	3.9	30.1	0.1
Morogoro "	11.2	42.1	9.5	6.4	30.3	0.5
Coast "	11.6	72.2	2.0	0.6	13.2	0.3
Dar es Salaam "	6.8	54.1	4.3	0.8	33.9	0.1
Lindi "	9.8	62.3	3.9	0.9	22.9	0.2
Mtwara "	7.9	71.5	2.1	0.3	18.1	0.1
Ruvuma "	7.0	36.2	30.7	14.6	11.3	0.2
Iringa "	2.8	8.1	64.3	22.0	2.3	0.5
Mbeya "	3.1	1.0	77.6	14.6	3.1	0.6
Singida "	1.2	16.3	73.8	2.6	5.9	0.2
Tabora "	12.5	43.0	32.6	0.7	10.8	0.4
Rukwa "	7.8	19.6	67.8	2.4	2.4	-
Kigoma "	7.4	75.0	5.0	5.4	7.1	0.1
Shinyanga "	0.6	2.3	44.4	4.7	47.4	0.6
West Lake "	4.4	43.9	9.2	27.3	14.4	0.8
Mwanza "	4.3	19.7	46.0	0.7	28.6	0.7
Mara "	7.2	11.9	53.0	4.2	23.5	0.2
Zanzibar	5.3	48.7	2.1	0.4	43.0	0.5
Zanzibar North	3.4	87.8	0.5	0.1	7.0	1.2
Zanzibar South	15.3	34.8	0.2	0.2	49.1	0.3
Zanzibar West	3.8	38.0	2.6	0.5	54.5	0.6
Pemba North	14.9	74.9	0.8	0.2	9.2	-
Pemba South	2.0	81.2	1.1	0.1	15.1	0.5

ROOF MATERIALS

The different types of roof materials are given in Table 16.12 and they cover very well the main types of roofing materials used in the country. The table shows the proportion of the households in percents staying in the houses where the main house had the specified type of roof material. The information is for the whole country by regions and by urban and rural.

Conclusion

The overrepresentation of the "estate" households in the sample in the rural areas of Arusha, Kilimanjaro, Tanga, Morogoro, Coast and Iringa may have affected the figures for roofing material because the modern materials like metal sheets, asbestos and tiles are much higher for these regions in rural areas. According to the census sample, the percent of households in rural areas of these regions using metal sheets, asbestos sheets or tiles for roofing material are Arusha 41.4 percent, Kilimanjaro 79.2 percent, Tanga 81.8 percent, Morogoro 53.8 percent, Coast 33.1 percent, Iringa 36.0 percent. The corresponding figures from HBS are Arusha, 21.8 percent, Kilimanjaro 66.6 percent, Tanga 26.3 percent, Morogoro 19.5 percent, Coast 12.8 percent, Iringa 9.5 percent. The difference in this respect between the two surveys is not as great as in the case of wall materials but it is still doubtful whether the census figures truly reflect the average conditions in the above mentioned regions and these figures have been put within brackets in Table 16.12.

Otherwise, some of the main characteristics of the roof material are that grass, leaves and bamboo are the most common roof materials in rural areas with the exception of Singida and Dodoma where mud roofs are dominating. Grass and leaves are also the most common roof materials in the urban areas of Zanzibar, but for the urban areas on the Mainland metal sheets are the most common. Notable also is the high proportion of metal sheets in the rural areas of West Lake region, the information which is also supported HBS.

TABLE 16.12.-- PERCENT DISTRIBUTION OF HOUSEHOLDS BY ROOF MATERIALS BASED ON THE SAMPLE, FOR THE RURAL AND URBAN AREAS, BY REGION: 1978

	RURAL						
	Grass leaves bamboo	Mud	Concrete cement	Metal Sheets	Asbestos Sheets	Tiles	Others e.g. tents boats
Tanzania Total	60.0	12.1	0.2	(24.0)	(2.1)	(1.5)	0.1
Tanzania Mainland	59.2	12.4	0.2	(24.4)	(2.1)	(1.6)	0.1
Dodoma Region	14.3	75.8	0.5	8.8	0.6	-	0.0
Arusha "	44.8	13.7	0.0	(40.7)	0.4	0.3	0.1
Kilimanjaro "	19.6	0.2	0.1	77.8	1.1	0.3	0.9
Tanga "	17.1	0.5	0.5	(48.4)	(14.9)	(18.5)	0.1
Morogoro "	43.6	1.7	0.9	(37.1)	(11.7)	(5.0)	0.0
Coast "	65.3	1.1	0.3	(30.0)	3.1	0.0	0.2
Dar es Salaam "	69.7	3.4	0.0	26.9	0.0	0.0	0.0
Lindi "	92.8	0.7	0.0	6.5	0.0	-	-
Mtwara "	83.7	0.2	0.0	16.1	-	-	0.0
Ruvuma "	90.8	0.7	0.0	8.5	-	-	-
Iringa "	62.4	(1.5)	0.1	(35.2)	0.3	0.5	-
Mbeya "	86.7	0.4	0.3	12.6	0.0	-	0.0
Singida "	2.0	94.2	0.5	3.3	-	-	0.0
Tabora "	74.0	19.0	0.1	6.9	0.0	-	-
Rukwa "	96.2	0.0	0.3	3.5	-	-	-
Kigoma "	88.8	2.3	0.0	8.1	0.4	0.4	0.0
Shinyanga "	69.4	19.3	0.3	9.6	1.3	-	0.1
West Lake "	56.7	0.3	0.2	42.5	0.3	0.0	0.0
Mwanza "	82.2	0.4	0.1	16.0	1.3	0.0	0.0
Mara "	83.0	0.3	0.0	16.0	0.6	-	0.1
Zanzibar	87.2	0.8	0.6	10.2	1.0	0.1	0.1
Zanzibar North	87.7	0.7	1.5	8.3	1.8	0.0	0.0
Zanzibar South	82.8	1.8	0.0	12.3	2.4	0.0	0.7
Zanzibar West	80.3	0.7	1.0	14.9	1.9	1.2	0.0
Pemba North	89.3	0.3	0.4	10.0	0.0	-	-
Pemba South	90.1	0.8	0.0	9.1	-	-	0.0

TABLE 16.12.-- CONTINUED

	URBAN						
	Grass leaves bamboo	Mud	Con- crete cement	Metal Sheets	Ashes- tos Sheets	Tiles	Other e.g. tents boats
Tanzania Total	17.7	2.6	2.8	71.7	2.2	2.5	0.5
Tanzania Mainland	15.4	2.7	2.6	74.2	2.2	2.5	0.4
Dodoma Region	8.0	17.3	2.6	66.5	1.5	2.0	2.0
Arusha "	9.9	0.5	2.5	76.9	3.5	5.1	1.6
Kilimanjaro "	4.2	0.5	1.0	89.1	1.5	3.4	0.3
Tanga "	31.8	1.4	0.5	60.2	2.7	3.4	0.0
Morogoro "	22.2	0.4	1.9	63.2	10.5	1.7	0.1
Coast "	44.8	0.9	1.2	47.2	4.9	0.6	0.4
Dar es Salaam "	1.7	2.1	5.1	85.5	1.9	3.4	0.3
Lindi "	50.3	0.5	0.3	46.9	0.9	0.6	0.5
Mtwara "	47.7	0.9	1.7	47.1	1.2	1.4	0.0
Ruvuma "	39.7	0.4	0.2	58.7	0.8	0.2	0.0
Iringa "	17.3	1.2	1.0	78.3	0.8	1.4	0.0
Mbeya "	21.7	0.2	0.6	75.9	0.9	0.3	0.4
Singida "	12.4	34.6	0.7	51.0	0.6	0.6	0.1
Tabora "	21.4	2.8	0.6	73.0	1.3	0.7	0.2
Rukwa "	48.7	0.5	0.5	50.0	0.1	0.0	0.2
Kigoma "	35.6	1.3	1.0	61.6	0.5	0.0	0.0
Shinyanga "	9.2	0.4	4.4	72.2	2.4	11.4	0.0
West Lake "	8.8	0.3	1.1	88.3	0.9	0.3	0.3
Mwanza "	12.2	0.3	1.5	80.7	1.3	2.4	1.6
Mara "	15.4	0.9	0.8	80.5	1.7	0.4	0.3
Zanzibar	51.5	0.8	5.7	36.7	2.6	1.7	1.0
Zanzibar North	89.7	0.3	0.0	6.8	1.3	0.8	1.1
Zanzibar South	79.7	0.1	5.0	13.9	0.6	0.6	0.1
Zanzibar West	44.2	0.7	6.4	43.0	2.9	1.9	1.3
Pemba North	69.0	1.6	3.7	21.9	1.6	2.2	0.0
Pemba South	62.9	0.6	5.9	27.0	3.0	0.6	0.0

ACCESS TO DRINKING WATER

The descriptions of the different types of access to drinking water supply are shown in Table 16.13. In the HBS some other types of accessibility to drinking water supply have been used which makes the comparison between two surveys difficult. However, the first two categories of piped water within the plot or house or village settlement and piped water outside the house or village settlement can be compared respectively with the piped water inside the plot and piped water outside the plot from the HBS.

The Table 16.13 shows the proportion of households in percent with the specified type of access to drinking water for the whole country by urban and rural.

Conclusion

The overrepresentation of the "estate" households from the rural areas of Arusha, Kilimanjaro, Tanga, Morogoro, Coast and Iringa have most probably caused a higher proportion of households with piped water in these areas and in particular with piped water within the plot or house or village settlement. If we combine households with piped water within, and households with piped water outside the plot or village settlement then the percentage of the rural households of these two categories are Arusha 54.8 percent, Kilimanjaro 60.9 percent, Tanga 71.4 percent, Morogoro 53.4 percent, Coast 36.8 percent and Iringa 32.6 percent. The corresponding figures for HBS are Arusha 64.2 percent, Kilimanjaro 16.9 percent, Tanga 17.8 percent,

Morogoro 20.2 percent, Coast 23.2 percent and Iringa 3.9 percent. Except for Arusha, all the census figures are much higher than the figures from the HBS and these figures have been put within brackets in the Table 16.13.

If we exclude the "estate" households and look at the proportion of the households which have some kind of easier and nearby accessibility of drinking water within plot or house we will find that this is more common in Zanzibar than on the Mainland.

TABLE 16.13.-- PERCENT DISTRIBUTION OF HOUSEHOLDS BY ACCESS TO DRINKING WATER BASED ON THE SAMPLE, FOR RURAL AND URBAN AREAS, BY REGION: 1978

Region	RURAL					
	Piped water within the plot or house or village settlement	Piped water outside the plot or house or village settlement	Well water within the plot or village settlement	Well water outside the plot or village settlement	Other within the plot or village settlement	Other outside the plot or village settlement
Tanzania Total	(11.6)	16.1	18.9	27.5	10.1	15.8
Tanzania Mainland	(11.6)	16.3	18.5	27.2	10.3	16.1
Dodoma Region	8.8	28.8	15.8	21.9	1.4	23.3
Arusha "	(24.9)	29.9	6.4	7.6	10.8	20.4
Kilimanjaro "	(40.1)	20.8	4.1	0.3	26.6	8.1
Tanga "	(20.0)	(51.4)	2.9	16.9	3.9	5.8
Morogoro "	(20.4)	(33.0)	12.9	20.2	5.0	8.5
Coast "	(25.8)	11.0	43.7	14.9	0.2	4.4
Dar es Salaam "	2.1	33.2	26.7	38.0	-	-
Lindi "	4.8	6.2	26.7	58.5	1.4	2.4
Mtwara "	4.9	28.3	16.5	33.7	2.5	13.9
Ruvuma "	1.4	13.2	19.8	37.7	20.9	7.0
Iringa "	(22.6)	(10.0)	23.6	18.4	12.1	13.3
Mbeya "	3.8	8.7	17.3	33.1	17.1	20.0
Singida "	6.2	7.5	32.0	33.8	6.6	13.9
Tabora "	4.7	1.0	39.1	39.9	0.2	15.0
Rukwa "	6.7	8.6	13.1	42.2	9.0	20.4
Kigoma "	6.5	8.7	11.1	11.6	20.8	41.3
Shinyanga "	5.0	4.6	27.3	27.4	13.9	21.8
West Lake "	2.4	6.2	8.0	26.7	28.6	28.1
Mwanza "	5.7	3.3	26.2	44.5	4.6	15.7
Mara "	2.1	13.4	13.9	48.4	4.7	17.5
Zanzibar	13.2	11.5	34.2	36.6	1.0	3.5
Zanzibar North	13.4	11.3	19.2	47.7	0.4	8.0
Zanzibar South	19.2	13.5	48.5	16.2	1.4	1.2
Zanzibar West	13.2	29.9	15.9	35.4	2.4	3.2
Pemba North	13.4	5.9	40.5	36.8	0.6	2.8
Pemba South	9.2	8.9	40.8	38.5	1.1	1.5

TABLE 16.13.-- CONTINUED

Region	URBAN					
	Piped water within the plot or house or village settlement	Piped water outside the plot or house or village settlement	Well water within the plot or house or village settlement	Well water outside the plot or house or village settlement	Other within the plot or village settlement	Other outside the plot or village settlement
Tanzania Total	34.0	54.1	2.6	5.7	1.2	2.4
Tanzania Mainland	32.2	55.8	2.6	5.7	1.2	2.5
Dodoma Region	38.8	47.8	1.1	6.7	0.8	4.8
Arusha "	41.7	50.6	1.3	3.1	0.7	2.6
Kilimanjaro "	56.3	40.7	0.5	1.0	0.5	1.0
Tanga "	47.0	46.8	2.4	2.6	0.6	0.6
Morogoro "	32.6	50.4	2.4	8.5	0.8	5.3
Coast "	44.2	48.1	3.8	3.7	0.1	0.1
Dar es Salaam "	31.4	66.7	0.0	0.8	0.9	0.2
Lindi "	27.0	56.8	1.9	13.0	0.1	1.2
Mtwara "	14.4	60.6	3.6	19.1	0.7	1.6
Ruvuma "	25.3	40.8	6.6	13.9	2.7	10.7
Iringa "	28.3	50.5	4.6	9.0	3.8	3.8
Mbeya "	27.9	54.1	2.6	7.4	2.3	5.7
Singida "	17.6	38.9	8.9	24.2	2.2	8.2
Tabora "	29.3	49.6	11.1	8.0	1.7	0.3
Rukwa "	22.1	50.5	6.3	15.6	1.4	4.1
Kigoma "	31.6	58.4	1.5	1.7	1.0	5.8
Shinyanga "	45.9	41.3	2.9	5.4	2.8	1.7
West Lake "	26.6	35.3	1.3	5.3	5.3	26.2
Mwanza "	26.6	55.7	6.1	9.2	1.4	1.0
Mara "	31.8	48.3	7.2	9.7	0.2	2.8
Zanzibar	59.2	30.7	3.4	6.2	0.1	0.4
Zanzibar North	12.3	0.1	33.9	52.3	0.0	1.4
Zanzibar South	18.3	66.1	5.4	10.2	-	-
Zanzibar West	66.4	33.4	0.1	0.0	0.1	-
Pemba North	40.9	22.1	10.4	23.6	0.2	2.8
Pemba South	59.1	24.8	5.4	10.1	0.6	-

ACCESS TO TOILET

The information collected in this respect covers only the access to the toilet. No information on the type of the toilet was collected. For such information the reader is recommended to the forthcoming report from the Bureau of Statistics related HBS.

The Table 16.14 shows the proportion of the households in percent, using the specified access to toilet. The table has information for the whole country regionwise and by urban and rural.

Conclusion

The overrepresentation of the "estate" households in Arusha, Kilimanjaro, Tanga, Morogoro, Coast and Iringa areas can to some extent be found in the low values households having no toilets. The figures in the Table 16.14 for households with no toilets for the rural areas are, Arusha 25.1 percent, Kilimanjaro 3.5 percent, Tanga 2.9 percent, Morogoro 3.1 percent, Coast 9.8 percent, Iringa 4.6 percent. According to HBS the corresponding figures are Arusha 42.6 percent, Kilimanjaro 7.0 percent, Tanga 25.4 percent, Morogoro 20.4 percent, Coast 15.6 percent and Iringa 1.8 percent. Except for Iringa, all the values are much higher for the HBS compared with the census sample. Therefore these regional rural figures have been put within the brackets in the table.

For rural Mainland and Tanzania Total the average value for households having no toilets might be around 17-19 percent and the two remaining categories of the toilets should be by about 3-4 percent less.

Excluding the "estate" households, the households with no toilets are more common in rural areas than in urban areas and are more dominant in Zanzibar than on the Mainland and particularly in the rural areas of Zanzibar. On the other hand shared toilets are more common in the urban areas than in the rural areas and also more common on the Mainland than in Zanzibar. The highest proportion (68.2 percent) of the households with their own toilets are in Mainland rural.

TABLE 16.14.-- PERCENT DISTRIBUTION OF HOUSEHOLDS BY ACCESS TO TOILET BASED ON THE SAMPLE, FOR RURAL AND URBAN AREAS, BY REGION: 1978

Region	RURAL			URBAN		
	Own	Shared	None	Own	Shared	None
Tanzania Total	67.0	17.7	(15.3)	46.9	48.7	4.4
Tanzania Mainland	68.2	18.1	(13.7)	46.1	50.4	3.5
Dodoma Region	58.7	30.6	10.7	48.3	48.1	3.6
Arusha "	41.6	33.3	(25.1)	32.6	64.1	3.3
Kilimanjaro "	67.0	29.5	(3.5)	31.4	66.8	1.8
Tanga "	46.9	50.2	(2.9)	48.3	48.8	2.9
Morogoro "	58.2	38.7	(3.1)	56.0	42.9	1.1
Coast "	70.5	19.7	(9.8)	58.1	36.5	5.4
Dar es Salaam "	69.1	11.6	19.3	35.9	63.2	0.9
Lindi "	88.1	2.3	9.6	69.7	25.1	5.2
Mtwara "	82.0	5.0	13.0	73.6	18.7	7.7
Ruvuma "	85.1	9.5	5.4	63.3	32.7	4.0
Iringa "	67.4	28.0	4.6	50.0	47.5	2.5
Mbeya "	84.5	7.7	7.8	64.6	32.4	3.0
Singida "	53.7	16.9	29.4	52.0	28.3	19.7
Tabora "	56.3	5.9	37.8	58.0	36.5	5.5
Rukwa "	85.9	5.5	8.6	57.7	36.2	6.1
Kigoma "	84.6	11.9	3.5	65.1	32.4	2.5
Shinyanga "	69.0	5.3	25.7	38.0	58.2	3.8
West Lake "	74.9	9.4	15.7	36.0	58.1	5.9
Mwanza "	74.9	7.4	17.7	42.4	48.2	9.4
Mara "	68.1	8.4	23.5	40.8	50.7	8.5
Zanzibar	21.0	2.7	76.3	58.2	24.8	17.0
Zanzibar North	22.5	1.6	75.9	20.1	4.8	75.1
Zanzibar South	44.2	3.8	52.0	60.2	8.4	31.4
Zanzibar West	54.5	4.5	41.0	64.4	30.1	5.5
Pemba North	5.5	2.5	92.0	44.8	11.0	44.2
Pemba South	7.0	2.7	90.3	43.8	14.5	41.7

ACCESS TO ELECTRICITY

The information on access to electricity was collected on the basis of the question, "do you have electricity" which had two alternative answers mainly, "yes" or "no".

In the Table 16.15 the figures show the proportion of the households in percents who had or did not have electricity. The information is given regionwise by urban and rural and for the whole country.

Conclusion

The bias due to the presence of the "estate" households in the rural areas of Arushs, Kilimanjaro, Tanga, Morogoro, Coast and Iringa regions is not so systematically reflected in this data on electricity as in the other preceding sections already discussed. But still some data from the rural areas of these regions are inordinately high in respect to households having electricity.

According to Table 16.15, the proportion (percent) of households having electricity in the specified rural areas are, Arusha 1.6 percent, Kilimanjaro 3.2 percent, Tanga 11.4 percent, Morogoro 11.5 percent, Coast 7.6 percent and Iringa 2.8 percent. The corresponding figures from HBS are Arusha 0.2 percent, Kilimanjaro 5.4 percent, Tanga 1.7 percent, Morogoro 4.7 percent, Coast 0.9 percent, and Iringa 0.7 percent. Except for Kilimanjaro, the census figures are quite high as compared to HBS figures and for this reason the rural figures for these regions have been placed within the brackets in the table.

Otherwise some of the main characteristics for electricity supply to the households are that the proportion of the households with electricity is very low for rural areas both in the Mainland and in Zanzibar. For urban areas a much higher proportion of the households has electricity and it is more common in the urban areas of Zanzibar than on Mainland urban.

TABLE 16.15.-- PERCENT DISTRIBUTION OF HOUSEHOLDS BY AVAILABILITY OF ELECTRICITY BASED ON THE SAMPLE, FOR RURAL AND URBAN AREAS, BY REGION: 1978

	RURAL		URBAN	
	Yes	No	Yes	No
Tanzania Total	3.1	96.9	23.5	76.5
Tanzania Mainland	3.1	96.9	22.6	77.4
Dodoma Region	0.7	99.3	20.1	79.9
Arusha "	1.6	98.4	21.9	78.1
Kilimanjaro "	3.2	96.8	30.4	69.6
Tanga "	11.4	88.6	30.2	69.8
Morogoro "	11.5	88.5	19.0	81.0
Coast "	7.6	92.4	13.9	86.1
Dar es Salaam "	1.8	98.2	31.8	68.2
Lindi "	0.6	99.4	17.0	83.0
Mtwara "	0.7	99.3	7.2	92.8
Ruvuma "	0.7	99.3	11.7	88.3
Iringa "	2.8	97.2	13.1	86.9
Mbeya "	1.2	98.8	10.8	89.2
Singida "	0.6	99.4	11.5	88.5
Tabora "	0.9	99.1	11.0	89.0
Rukwa "	0.7	99.3	1.4	98.6
Kigoma "	1.2	98.8	10.1	89.9
Shinyanga "	2.4	97.6	29.8	70.2
West Lake "	2.2	97.8	18.1	81.9
Mwanza "	2.8	97.2	18.6	81.4
Mara "	1.7	98.3	17.1	82.9
Zanzibar	2.3	97.7	36.3	63.7
Zanzibar North	3.2	96.8	1.0	99.0
Zanzibar South	2.6	97.4	5.6	94.4
Zanzibar West	6.7	93.3	42.9	57.1
Pemba North	0.7	99.3	17.9	82.1
Pemba South	1.2	98.8	33.4	66.6

CHAPTER 17
SAMPLING FOR THE CENSUS

by
P.O. Olofsson*

INTRODUCTION

During an early phase in the planning of the 1978 population census it was decided to collect extensive information on economic status, migration, fertility, mortality, housing conditions of the households and other items through a sample survey within the framework of the census.

Generally, in the context of a developing country like Tanzania several arguments are in favour of a sample approach as far as detailed statistical data of people, households and dwellings are concerned: Needs for information relate to statistics on fairly high levels, e.g., national and regional levels of the country. Capability for analysing and using the data is restricted. Presence of serious measurement problems, which should be kept under control, as far as possible, favour a limited amount of data being collected and processed. Reduced costs of collecting and processing the data as well as timeliness of the results are reasons for a sample survey. Furthermore management and other administrative aspects of the census operation make the sample approach most attractive.

*The author is working at Statistics Sweden. He is solely responsible for the views expressed in this chapter.

A preparatory study (consultancy) of the sampling methods was undertaken in 1977 and 1978. According to job description, the consultant was expected to work out the details for a circa 10 percent sample of Enumeration Areas in the census, for which a detailed questionnaire should be used.

Originally, the intention was to use sampling methods in rural areas only. The preparatory study showed, however, that sampling could advantageously be applied in certain major towns as well. Further, the average sampling ratio was proposed to be reduced to about 5 percent.

In the preparatory work different methods of sampling and estimation were discussed and evaluated. A rather detailed documentation of considerations and arguments is given in the report of the consultancy.¹ In the present chapter the discussions of alternative designs and the arguments for the solutions, which were eventually chosen, are not repeated. This chapter will give only a short description of the procedures which have been applied with some brief reference to the proposals of the just-mentioned report. Regarding estimation procedures, however, some discussion is called for in order to explain the methods that were implemented and their relations to considered methods. That discussion will also have some implications as far as sampling errors are discussed below.

FRAME OF THE SAMPLE

The mapping and listing work, carried out in 1977-1978, provided the basis for the enumeration. Through this operation the country was divided into enumeration areas (EA). The EA constituted the frame

¹P.O. Olofsson, Sampling methods for data collection and control in the 1978 Population Census of Tanzania, Bureau of Statistics, Dar es Salaam, 1978-06-01.

for the sample survey. In the sample planning stage it was decided that estimates should be made for each one of the 25 regions of Tanzania, and within these for urban and rural areas separately, i.e. in all 50 strata. The EA of urban and rural areas differed in size: On an average, the urban EAs were roughly only one third the population size of the rural EAs.

The total number of normal EAs in urban and rural areas of each region is given in Table 17.1, col. 2 and col. 6, respectively.

SAMPLING PROCEDURES

The following paragraphs will be a very brief summary of the sampling procedures which were used. Detailed descriptions of the procedures, including instructions to the Central Census Officers, who were in charge of the various procedures are given in Volume 1 of the Population Census Series². I am borrowing freely from this source.

Procedures used in the Mainland rural areas

For the Mainland rural areas, covering the dominant part of the population of the country, samples of clusters of households were drawn in two stages. It was concluded in the report on sampling methods that at least a sample of 50 clusters (each of approximately 80 households equivalent to about 400 persons) would be a minimum sample in the rural areas of each

²Bureau of Statistics, 1978 Population Census Volume 1, Methodology Report, (Dar es Salaam: Bureau of Statistics, Ministry of Planning and Economic Affairs, 1981)

TABLE 17.1.1. -- DISTRIBUTION OF TOTAL EAs, MINIMUM NUMBER OF RURAL CLUSTERS REQUIRED FOR SAMPLE, RURAL CLUSTERS ACTUALLY COVERED BY SAMPLE AND NUMBER OF EAs/CLUSTERS IN WHICH DETAILED QUESTIONNAIRE WAS USED, BY URBAN AND RURAL AREAS AND BY TYPE OF EA
BY REGION: MAINLAND AND ZANZIBAR

REGION	URBAN AREAS				RURAL AREAS					
	NORMAL EAs		SPECIAL EAs		NORMAL EAs			SPECIAL EAs		
	Total	Detailed Questionnaire used	Used	Not used	Total	Clusters required	Detailed Questionnaire used in EAs	Clusters	Used	Not used
1	2	3	4	5	6	7	8	9	10	11
MAILAND										
Dodoma	146	102	6	21	719	60	51	53	2	26
Arusha	154	95	5	5	579	60	51	52	18	15
Kilimanjaro	120	70	—	9	670	60	52	57	6	31
Tanga	331	171	10	25	736	60	46	51	69	18
Morogoro	152	102	31	17	577	60	49	61	39	31
Coast	63	68	—	8	458	50	36	45	5	8
Dar es Salaam	1275	134	9	52	69	50	24	30	2	4
Lindi	110	110	—	5	417	50	42	43	—	5
Mtwara	190	142	1	6	581	60	51	54	1	7
Ruvuma	78	78	—	1	405	30	46	49	1	7
Iringa	164	96	1	11	667	60	58	63	12	6
Mbeya	149	91	3	4	692	60	57	60	—	12
Singida	81	81	1	5	293	50	42	47	—	10
Tabora	250	168	—	15	585	60	52	54	—	5
Rukwa	105	106	1	9	337	50	41	44	—	12
Kigoma	134	77	1	7	384	50	45	51	—	5
Shinyanga	124	124	2	8	1009	70	61	64	1	6
West Lake	43	43	1	15	637	60	57	57	1	35
Mwanza	226	143	2	21	1030	70	70	70	5	14
Mara	71	71	3	8	315	60	61	61	—	15
Total Mainland	4072	2012	77	253	11461	1 150	992	1069	162	268
ZANZIBAR										
North	15	16	—	—	177	50	50	—	—	1
South and Central	8	7	—	—	116	50	50	—	—	8
Zanzibar West	245	80	1	8	64	50	47	—	—	9
Pemba North	34	34	—	—	166	50	49	—	—	—
Pemba South	37	37	—	2	185	50	49	—	—	2
Total Zanzibar	343	174	1	10	708	250	245	—	—	20
TOTAL(COUNTRY)	4415	2246	78	263	12169	1 400	1237	1069	162	288

* This table is a reprint, with a minor addition, of Appendix 4.1 of 1978 Population Census, Volume I. Methodology Report

region. The ultimate sampling units, namely clusters of households, were drawn in two stages.

First Stage: From lists of rural EA, ordered by districts and wards, a random sample of primary units (EA) was drawn in each region. The sample of EA was selected systematically with random starting point in each one of the regions. The EA had an equal probability of selection. The EA in the Mainland rural areas were in the preparatory work of the census designed to have the size of approximately 240 households or 1,200 persons. In reality, there was some variation in the size of the EAs.

Second Stage: Each EA selected in the first stage was divided into approximately equal-sized clusters on basis of preliminary estimates of number of households and population size, which had been made in the preparatory work. In general, an EA of about 240 households/1200 persons was divided into 3 clusters of approximately 80 households/400 persons. Because of the variation of the size of the EA the number of clusters of an EA had to vary as follows:

Est. no of household	Est. population	Number of Clusters
- 119	- 599	1
120 - 199	600 - 999	2
200 - 279	1000 - 1399	3
280 - 359	1400 - 1799	4
360 or more	1800 or more	5

In each selected EA, the number of clusters was determined, EA by EA, and the clusters were set up, listed and numbered. Finally, the required number of clusters was selected systematically with a random starting-point in each region. Like the EA in the first

stage, the clusters were drawn with equal probabilities of selection. The selection procedure did not guarantee that each EA falling in the sample of the first stage, would also be represented in the second stage. The outcome of the two sampling stages is given in Table 17.1, col. 8, that shows the number of EA selected and col. 9, that shows the number of clusters selected. It is seen, that usually the number of clusters exceeds that of the EAs. It indicates that in a certain number of EA 2 clusters (rarely 3) were selected.

Procedures used in the rural areas of the Islands

The EA of the Islands of Zanzibar and Pemba were designed to contain approximately 80 household/400 persons. In the rural areas a sample of about 50 EA was selected in each region. It was drawn in only one stage in the same way as the EA in the first stage for the Mainland rural areas.

Procedures used in urban areas

Initially, the urban areas were intended to be covered totally by the detailed questionnaire. However, according to the proposals of the preparatory study, sampling of EA was also applied in the towns of Dodoma, Arusha, Moshi, Morogoro, Mtwara, Iringa, Mbeya, Tabora, Kigoma, and Mwanza, where a sampling fraction of $\frac{1}{3}$ was used, in Zanzibar Town and in Tanga Town, where the sampling fraction was $\frac{1}{3}$ and in the City of Dar-es Salaam, where a $\frac{1}{10}$ sample was selected. In all urban areas, in the Mainland as well as on the Islands, the EA were designed to contain approximately 80 households/ 400 persons. In the just-mentioned towns and

in Dar es Salaam City simply every second, every third and every 10th EA, respectively, was selected in one stage. The procedure was systematic with random starting-point in each stratum.

Special categories in rural and urban areas

Besides the normal EA in urban and rural areas certain "special categories" of the population were defined and identified in the preparatory work of the census, viz. "collective households" such as boarding schools, hospitals, prisons, staff quarters, etc. The migratory and scattered populations were canvassed in their entirety, the general questionnaire only being used. The large collective households (more than 300 persons) were during the course of the enumeration split up into:

1. Special EA, where the detailed questionnaire was used (category 2 and category 8 below)
2. Special EA, where the general questionnaire only was used (category 3 and category 9 below)

Small collective households (less than 300 persons) were allocated to ordinary EA/clusters. In the case of large collective households sampling methods were not used. The just-mentioned split-up of large collective households was made purposively (although in an unknown way). The selection procedure has surely introduced biases into the results.

The number of special EAs is given in Table 17.1, col. 4 and 5 for urban areas and col. 10 and 11 for rural areas.

Comments on deviations from the sample design proposed

The sampling procedures were, throughout, performed by the Officers of the Central Census Office.

This arrangement guaranteed that the samples of EAs and clusters of households were under proper control. The suggested sample design was mainly adhered to. Thus the sampling procedures were closely followed in their details. They worked satisfactorily according to an evaluation by the Officers, who were in charge of the work.

One essential deviation from the proposals should be emphasized. As far as the "special categories" are concerned, it was suggested that major "migratory populations" in certain regions as well as military camps, populations of state farms, etc., should be covered by the detailed questionnaire, if possible on basis of a sample of clusters of households (or persons). In practice, the detailed questionnaire was used for part of the "special EA". As was mentioned above a procedure of purposive selection was applied.

Another crucial point in the sample design needs some comment. It was suggested that the demarcation of the clusters in the rural Mainland EAs should be based on lists of ten-cell leaders of the Party Organization ("Balozis") and households. It was assumed that every household was attached uniquely to a Balози. In practice, it turned out that clustering was rather based on lists of the heads of households than on lists of Balozis.

Proposals on sample size in terms of number of clusters were, at large, followed fairly properly. The most striking deviation is related to Dar es-Salaam Rural Areas, where only 30 instead of suggested 50 clusters were drawn. For the Mainland rural areas 1069 clusters were selected compared to 1150 according to the proposal. Implemented "average" sampling factors have been computed as ratios of

sample sizes and total population figures for each one of 20 age and sex groups, in each region, rural and urban areas being presented separately. The variations between the different groups are considerable, which is seen from Appendix I.1, Chapter 1 showing the sample raising-factors of age-sex categories in different strata.

The numbers of households in the Census (complete enumeration) and in the Sample are given by region in Table 17.2, rural and urban areas separately. On basis of these figures average sampling fractions have been computed (see cols. 6 and 7). It is seen that the average sampling fraction varies in rural areas in the range 2-5 percent in the Mainland regions except for Dar es Salaam, where the sampling fraction was 12 percent. A much higher sampling fraction was used on the Islands, ranging from 26 percent in Zanzibar North and Pemba South to 76 percent in Zanzibar West. The sampling fractions of urban areas varied considerably as well, ranging from 8 percent in the City of Dar es Salaam to 99 percent in three of the Islands regions. Urban areas of all regions, except the City of Dar es Salaam, Tanga Town and Zanzibar Town had average sampling fractions above 50 percent.

The average sampling fraction of the Mainland rural areas is 4 percent only, and the corresponding figure of the Islands is as high as 35 percent. The average sampling fraction of urban areas was 47 percent in the Mainland and 50 percent Islands. The overall coverage for Tanzania is 4 percent in rural areas and 47 percent in urban areas.

On basis of the figures of Table 17.2 the overall coverage by the detailed questionnaire is about 11 percent of the total population in terms of households. This figure is compared with the proposed average sampling fraction of about 5 percent. The difference

TABLE 17.2.-- NUMBER OF HOUSEHOLDS IN CENSUS AND SAMPLE AND AVERAGE SAMPLING FRACTIONS FOR RURAL AND URBAN AREAS BY REGION

Region (1)	Census		Sample		Sampling Fraction	
	Rural (2)	Urban (3)	Rural (4)	Urban (5)	Rural (6)	Urban (7)
Dodoma	188837	18566	4003	10882	0.02	0.58
Arusha	156949	18877	6326	11192	0.04	0.54
Kilimanjaro	153189	16969	5412	9243	0.03	0.54
Tanga	187488	32950	18753	14708	0.10	0.44
Morogoro	169743	31645	8100	22196	0.04	0.70
Coast	111267	7985	3835	7799	0.03	0.97
Dar es Salaam	19129	133405	2394	16546	0.12	0.08
Lindi	107037	11734	4100	11397	0.03	0.97
Mtwara	156003	21715	3693	15092	0.02	0.69
Ruvuma	98569	8940	3620	7937	0.03	0.38
Iringa	188252	18810	6066	10486	0.03	0.55
Mbeya	195649	22101	5753	13231	0.02	0.59
Singida	120567	12872	3686	12486	0.03	0.97
Tabora	138432	24721	3294	15666	0.02	0.63
Rukwa	76845	11130	3132	10476	0.04	0.94
Kigoma	105322	12219	4400	6829	0.04	0.55
Shinyanga	214536	12741	4748	12305	0.02	0.96
West Lake	215965	8328	5890	7941	0.02	0.95
Mwanza	208382	32336	4894	19481	0.02	0.60
Mara	106109	10538	5415	10085	0.05	0.95
Zanzibar North	18399	1471	4944	1465	0.26	0.99
Zanzibar South/ Central	11847	929	5085	926	0.42	0.99
Zanzibar Town/ West	7722	26488	5940	8416	0.76	0.31
Pemba North	19302	4591	5616	4379	0.29	0.95
Pemba South	18916	3276	5003	3255	0.26	0.99
Mainland	2918270	523582	107514	245979	0.04	0.47
Zanzibar	76186	36755	26588	18441	0.35	0.50
Tanzania	2994456	560337	134102	264420	0.04	0.47

is explained mainly by the fact that the average size of the clusters was much higher than expected in preparatory stage of the census.

DESCRIPTION AND DISCUSSION OF ESTIMATION PROCEDURES USED

This section is concerned with estimation procedures for totals and ratios (percentages). Estimation of sampling errors of ratios will be dealt with in a following section and in Appendix XVII.1.

In order to facilitate the processing and tabulation of the sample survey data, the rural sample of each region was designed as a self-weighting sample in each stratum, where sampling was to take place. It follows from the fact that each cluster was to have the same probability of selection. The same is true of those urban areas, where sampling was used. Other urban areas were subjected to total (100 percent) coverage.

In tabulations and analyses of sample data two main situation are faced:

- A. Sample returns were blown-up to population levels
- B. Sample returns were compiled and analysed directly, i.e. without being blown-up.

Situation A

Most sample data have been blown-up to the Census level. Consequently most analyses are based on blown-up aggregates. In some cases, for cost reasons the analyses were undertaken on basis of sample returns. This is true for the basic tabulations for fertility, mortality and housing characteristics.

The methods of estimation of ratios (percentages) and totals as well as procedures of raising the sample data to the census level are described in some technical

details in Appendix I.1. In the case where sample data were raised to the total population level, the procedure was: Sample raising-factors (weights) were computed as N/n , where N is the census number (total) of a certain age-sex category and n is the corresponding sample number of that age-sex category. There were 10 age categories (0, 1-4, 5-9, 10-14, 15-24, 25-34, 35-44, 45-54, 55-64, 65+) combined with males/females making in all 20 age-sex groups. Sample data and, to some extent, even non-sample data were blown-up separately for each region in each one of the categories described below:

Nine different population categories were defined in the Census material. Various ways of computing the raising factors (weights) will here be described and commented, up on, category by category.

Category 1: Normal rural EA. The weights were computed either as $w_1 = N_1/n_1$ or as $w_2 = N_1+N_2+N_3/n_1+N_2$ (see procedure 2 below). The weights, computed for each age-sex category in each region, are given in Appendix I.1, chapter 1. The weights are generally high as a consequence of the low sampling fractions of the rural areas. Exceptions are Dar es Salaam and the Islands, where the rural sampling-fractions were rather high. It is seen that the weights of the age-sex groups varied considerably both within and between the regions.

Category 2: Special EA in rural areas, in which the detailed questionnaire was used, and Category 3: Special EA in rural areas, in which the general questionnaire only was used. Both categories contained collective households larger than 300 persons.

Although sampling procedures had not been applied at all for the special EA, in most regions data for the

special EA were "blown-up" to the census level. Two different "blowing-up" procedures were used.

Procedure 1: If sufficiently large numbers in each age-sex category, "self-sustained" weights $w_3 = N_2 + N_3 / N_2$, where N_2 is the number of category 2 and N_3 is the number of category 3, were calculated. Serious biases might have been introduced into the census results in this case because of different structures of the two categories. This procedure was applied in 6 regions³.

Procedure 2: In 13 regions⁴ the data were not sufficient for "self-sustained" weights. In these, data of category 2 and 3 were pooled with data of category 1 before the weights were calculated. Formally, the weights were obtained as $w_2 = N_1 + N_2 + N_3 / n_1 + N_2$, where the indices refer to category 1, 2 and 3, respectively, where N refers to census numbers and where n_1 refers to category 1 sample numbers. This procedure introduced only negligible biases into the results because N_2 and N_3 throughout were very small compared to N_1 and n_1 .

In the remaining 6 regions, where the detailed questionnaire was not used in any special EA "zero weights" were applied.

³Arusha, Kilimanjaro, Tanga, Morogoro, Coast and Iringa.

⁴Dodoma, Dar es Salaam, Lindi, Tabora, Rukwa, Kigoma, Shinyanga, West Lake, Mwanza, Mara, Zanzibar Central, Zanzibar West and Pemba North.

Category 4: Urban areas, normal EA, 100 percent coverage. Although there was no sampling, the data emanating from the detailed questionnaire were "blown-up" on basis of census data on age-sex categories. In this case, of course, the weights generally were close to one and everywhere below 1.5 (see: Appendix I.1).

Differences between census data and sample data are assumed to depend mainly on losses of data, which were (or should have been) collected by the detailed questionnaire or too high census levels having been reported. Further, part of this phenomenon is explained by the fact that special EA of categories 8 and 9 (see below) in some cases were pooled with those of category 4 before weights were calculated.

Category 5-7: Urban areas, normal EA, $1/2$, $1/3$ and $1/10$ sampling fraction, respectively. In regions, where both category 4 and anyone of categories 5-7 occurred, weights were computed in the ordinary way separately in each one of the categories present.

Raising-factors for categories 4-7 are given in Appendix I.1. Generally, these weights are fairly low because of the high sampling fractions that were used in most urban areas. Like the weights of rural areas the weights of urban areas vary, although not that much. The overall raising-factors are seen to range from about 2 in Mwanza up to 12.5 in Dar es-Salaam City.

Categories 8 and 9 in urban areas correspond to categories 2 and 3 of rural areas, respectively. Similar raising procedures were used: In most regions⁵

⁵Exceptions are Kilimanjaro, Coast, Tabora, Zanzibar North and Zanzibar Central.

"self-sustained" weights for category 8 were computed according to procedure 1 above. Otherwise, category 8 data were pooled with either data on category 4 or 5 or 6 depending on the situation.

The biases introduced through the blowing-up procedures are geneally considered to be negligible, except for certain cases where procedure 1 was applied.

Blown-up data of the present categories were aggregated and analysed for rural and urban areas separately.

Situation B

As far as the anlysis was based on pure (non-blown-up) sample data the different categories were kept separately. No aggregation of data was made in that case.

SAMPLING ERRORS

The census data suffer from several kinds of errors. Errors of content and coverage have been discussed in Chapter 2. The most serious problems concerning the quality of the present census data are considered to relate to measurement errors arising in the fieldwork. Measurement errors, both systematic and random ones, have been thoroughly analysed and discussed in various chapters of the present volume. Measurement errors are generally considered to be the dominant factor in the reliability of the census data. However, the sampling errors should not be neglected. Especially, where the sampling fractions were rather small, there will be an interest in estimating the size of the sampling errors. This is primarily true of the

rural areas of the Mainland and the City of Dar es-Salaam.

Estimates of sampling errors

Estimating sampling errors of the census data presupposes information on the clusters, which were the particular ultimate sampling units. Unfortunately, by mistake the identification codes of the clusters of rural areas were not recorded in the questionnaires or on the tapes with the data sets. Therefore computations of sampling errors caused problems.

In order to get some measures of the size of the sampling errors, coefficients of variations were computed for certain ratios (percentages) in (1) Dar es Salaam City (urban area) and two rural areas, i.e., (2) Arusha Region and (3) West Lake Region. As a consequence of the one-stage design, the clusters were identical to EA in Dar es Salaam. The rural areas were chosen on basis of the simple fact that the number of clusters was almost equal to the number of EAs. **In these regions, EAs** containing 2 clusters could be easily discovered and excluded from the material.

A few extremely large EAs, comprising a population of more than 1000 persons, were excluded from the data material. Furthermore, extremely small EA, comprising less than 80 persons, were also sorted away. The number of EAs (clusters), which the computations were based on, is given in the first column of Table 17.3⁶.

⁶The details of the calculations are given in a separate memo: P.O. Olofsson, "Computations of coefficients of variation for certain ratios (percentages) in the 1978 Population Census of Tanzania", Memo 1983-04-11

A simplified (ultimate cluster) procedure for estimating coefficients of variation of the selected items was used and it is given in Appendix XVII.1, formulas (5) and (6a-c). These formulas presuppose unrestricted simple random sampling of clusters. In fact, the samples of clusters were systematically drawn, so the formulas imply some approximation. In Dar es-Salaam City the finite correction factor $(1 - f)$ was taken into account (put equal to 0.9). In Arusha and West Lake Regions it was neglected (approximately equal to 1). The estimates of coefficients of variation, of course, like the estimates of the ratios (percentages) themselves suffer from sampling errors and are valid with reservations. It should be noticed that estimates of ratios (percentages) according to formula (1) in Appendix XVII.1 are biased. The impact of this estimation bias is however considered to be negligible, because a fairly large number of clusters was drawn in each stratum.

When sampling errors are being computed, random measurement errors are taken into account as well. It means that estimators of standard errors, for example formulas (5) and (6a-b) in Appendix XVII.1, include random response errors and other random errors. On the other hand, systematic (correlated) errors are not taken into account.

The results of the computations are shown in Table 17.3. The estimates of the items and their coefficients of variation are given in terms of percentages. It is seen that the sampling errors are fairly small, especially for the demographic variables where the coefficients of variation generally are in the range 1-2 percent only. For socio-economic variables like literacy and main occupation, the sampling errors appear to be

TABLE 17.3.-- COEFFICIENTS OF VARIATION FOR CERTAIN ESTIMATES OF PERCENTAGES IN DAR ES SALAAM CITY AND IN THE RURAL AREAS OF ARUSHA AND WEST LAKE REGIONS.

Item/ Region	Number of clu- sters ¹	Estimat- ed per- centage	Estimat- ed coef- ficient of vari- ation, per cent	Design effect, ratio
Ratio population under 15 years of total population				
Dar es Salaam	122	40.7	0.9	1.2
Arusha Rural	46	49.2	1.5	1.5
West Lake Rural	51	46.7	1.1	1.1
Ratio of males				
Dar es Salaam	122	52.4	0.4	0.8
Arusha Rural	46	50.1	1.3	1.3
West Lake Rural	51	48.2	0.9	0.9
Ratio illiterates ²				
Dar es Salaam	122	44.4	2.0	2.7
Arusha Rural	46	74.5	3.1	6.4
West Lake Rural	51	63.3	2.1	3.3
Ratio married of population 15 years and over				
Dar es Salaam	122	61.3	1.1	2.0
Arusha Rural	46	64.2	2.0	2.1
West Lake Rural	51	64.1	1.9	2.3
Ratio occupied in Agriculture ³ of total population 15 years and over				
Dar es Salaam	122	15.2	7.7	5.9
Arusha Rural	46	75.6	4.6	6.9
West Lake Rural	51	80.9	1.6	3.3

¹The numbers are less than the corresponding number of clusters given in Table 17.1.

²Including babies.

³Including livestock rearing, fisherman and hunters, etc.

higher. These findings are expected and agree very well with considerations and computations which were made in the preparatory stage of the census. Regarding demographic variables the clusters are within themselves very heterogeneous, but rather similar to each other - each one constituting kind of a "miniature population". It means that the variation between clusters is small and that the sampling errors will be relatively small. However, this will not be strictly true for the socio-economic variables.

The estimates of ratios (percentages) in Table 17.3 refer to fairly large fractions of populations. Generally, the relative precision of estimates of small fractions will be less than the figures appearing in this table.

Totals were estimated by formula (4b) of Appendix XVII.1. No sampling errors of estimates of totals were computed because of the complexity of the variance of that estimator. It should be emphasized that the present estimates of coefficients of variation are not directly applicable to ratios (percentages) based on totals estimated by formula (4b).

Efficiency of sample design

The computations given in Table 17.3 also give some idea of the efficiency of the sample design. A convenient way of studying the design effects is to compare the applied sample design and simple random sampling of the analytical units. In the present context, ratios of the estimated coefficients of variation and corresponding estimates for simple random sampling of persons were computed. These ratios, named "design effect", are shown in the last column

of Table 17.3.

The ratios given there should be interpreted in the following way: Figures around 1.0 indicate that the present design is as efficient as simple random sampling of persons. Figures below 1.0 indicate that the design is more efficient and above 1.0 less efficient. High ratios show that the design is inefficient for given variables.

As would be expected the design effect appears to be low (sometimes even below 1.0) for demographic variables and higher, sometimes much higher, for socio-economic variables.

SUMMARY

For several reasons detailed information of the 1978 population census was collected on basis of a probability sample of the total population.

The sample was designed and implemented in the following way. Clusters of households were drawn for the rural areas of each region, for Dar es Salaam and for certain big towns. Other urban areas were subjected to total coverage. Enumeration Areas (EA), having been set up in the preparatory stage of the census, constituted the frame. Rural and urban areas of each region comprised strata. Two-stage sampling was applied in the rural areas of the Mainland, the EA being the first-stage units and clusters of households being the second-stage units. In those urban areas, where sampling was applied, as well as on the Islands, samples of EAs were drawn in one stage. Special categories of collective households, etc. constituted separate strata.

The proposed procedures were mainly followed and are considered, at large, to have worked well. However, some deviations occurred. Especially, probability sampling was not applied as far as the special categories are concerned. Instead, purposive selection was implemented. Regarding size of the sample an overall 5 percent sample had been proposed. The outcome was as much as about 11 percent. The sampling fractions varied widely: 4 percent as an average in the Mainland rural areas and 47 percent in urban areas. The difference between suggested and implemented sampling fractions is mainly explained by the fact that the average size of the clusters was much higher than expected.

The sample was designed as a self-weighting sample in each stratum. Mainly the data have been analysed on basis of data blown-up to the census level. Part of the analyses is based on sample returns directly. Basically, the sample data were blown-up by raising-factors N/n , where N is the census number and n is the sample number. Raising-factors were calculated in each one of 20 age-sex categories and separately in the different strata of the population. Even non-sample data for urban areas, where total coverage was applied, and for certain special categories were inflated using the same general procedure.

The estimation procedures were to some extent biased. The biases are considered to be negligible except for certain special categories.

Although sampling was considered to be a minor source of error in the present census there is an interest in estimating the size of the sampling errors, especially in regions where small sampling fractions were used. Therefore, a few coefficients of variation

were computed for ratios (percentages) in Dar es Salaam City and in the rural areas of Arusha and West Lake Regions. A simple (ultimate cluster) procedure of estimation was applied. It was found that the sampling errors were fairly small especially for demographic variables under study, where the coefficients of variations are in the range 1-2 percent. For socio-economic variables the sampling errors appear to be higher.

In order to get some idea of the efficiency of the present sample design, it was compared with simple random sampling of persons. As would be expected, the design effect seems to be low for demographic variables and higher, sometimes much higher, for socio-economic variables.

APPENDIX XVII.1

ESTIMATION OF RATIOS (PERCENTAGES), TOTALS AND SAMPLING
ERRORS IN THE 1978 POPULATION CENSUS OF TANZANIA

In the preparatory work of sampling methods to be used in the present Census, different estimation procedures were considered.¹ The estimation procedures used for ratios (percentages) and totals are here given quite shortly. The estimation method of sampling errors on the other hand is given in some detail.

1. Estimation of ratios (percentages)

Generally, as far as estimates of ratios (percentages) are based on self-weighting sample data, which is the present case, a straight-forward simple estimator is

$$r = \frac{x}{y} \quad (1)$$

where x and y are sample returns of two variables X and Y . $x = \sum_{i=1}^m x_i$ i.e. the sum of the x -values of all clusters, where $i = 1, 2 \dots m$ in a certain stratum, and $y = \sum_{i=1}^m y_i$ is the corresponding sum of the y -values.

2. Estimation of totals

A simple unbiased estimate of a total X would be

$$x^1 = \sum_{i=1}^m x_i / f \quad (2)$$

where f is the sampling fraction.

Remark: Because of the two-stage sampling procedure applied, the exact value of the fraction $f = m/M$ was unknown in rural areas, because the total number of clusters M was not known.

¹ Olofsson, Sampling methods for data collection and control in the 1978 Population Census of Tanzania, Bureau of Statistics, Dar es Salaam 1978-06-01, Appendix 9

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In the preparatory study the following two ratio estimators of a total X were considered:

$$x''_1 = rY \quad (3)$$

where r is given by formula (1) and where Y is the known total of the y -variate, and

$$x''_2 = \frac{\sum_a \frac{x_a}{y_a}}{\sum_a \frac{1}{y_a}} Y_a \quad (4a)$$

where x_a and y_a are sample values of a certain population category, e.g. an age-sex group, and where Y_a is the known total of the y_a -variate

Basically, the sample survey returns of the present Census were blown-up on basis of known Census totals of 20 age-sex categories. Thus, weights $N_a/n_a = w_a$ were computed for each one of 20 age-sex categories. Summing up overall these categories ($L = 20$) we have the estimator

$$x''_2 = \frac{\sum_a \frac{x_a}{n_a}}{\sum_a \frac{1}{n_a}} N = \frac{\sum_a w_a x_a}{\sum_a w_a} \quad (4b)$$

which is equal to the estimator (4a) above.

3. Estimation of sampling errors

An ultimate cluster estimate of the relative variance of the ratio estimate r , according to formula (1) above, is

$$v_r^2 = v_{x'}^2 + v_{y'}^2 - 2v_{x'y'} \quad (5)$$

$$\begin{aligned} \text{where } v_{x'}^2 &= (1-f) \frac{\sum_i (x_i - \bar{x})^2}{m(m-1) \bar{x}^2} \\ v_{y'}^2 &= (1-f) \frac{\sum_i (y_i - \bar{y})^2}{m(m-1) \bar{y}^2} \\ v_{x'y'} &= (1-f) \frac{\sum_i (x_i - \bar{x})(y_i - \bar{y})}{m(m-1) \bar{x} \bar{y}} \end{aligned} \quad (6a-c)$$

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The square root of v_r^2 , i.e. v_r , is an estimate of the coefficient of variation, which may otherwise be stated as s_r/r , i.e. the standard error of r over the estimate r itself.

