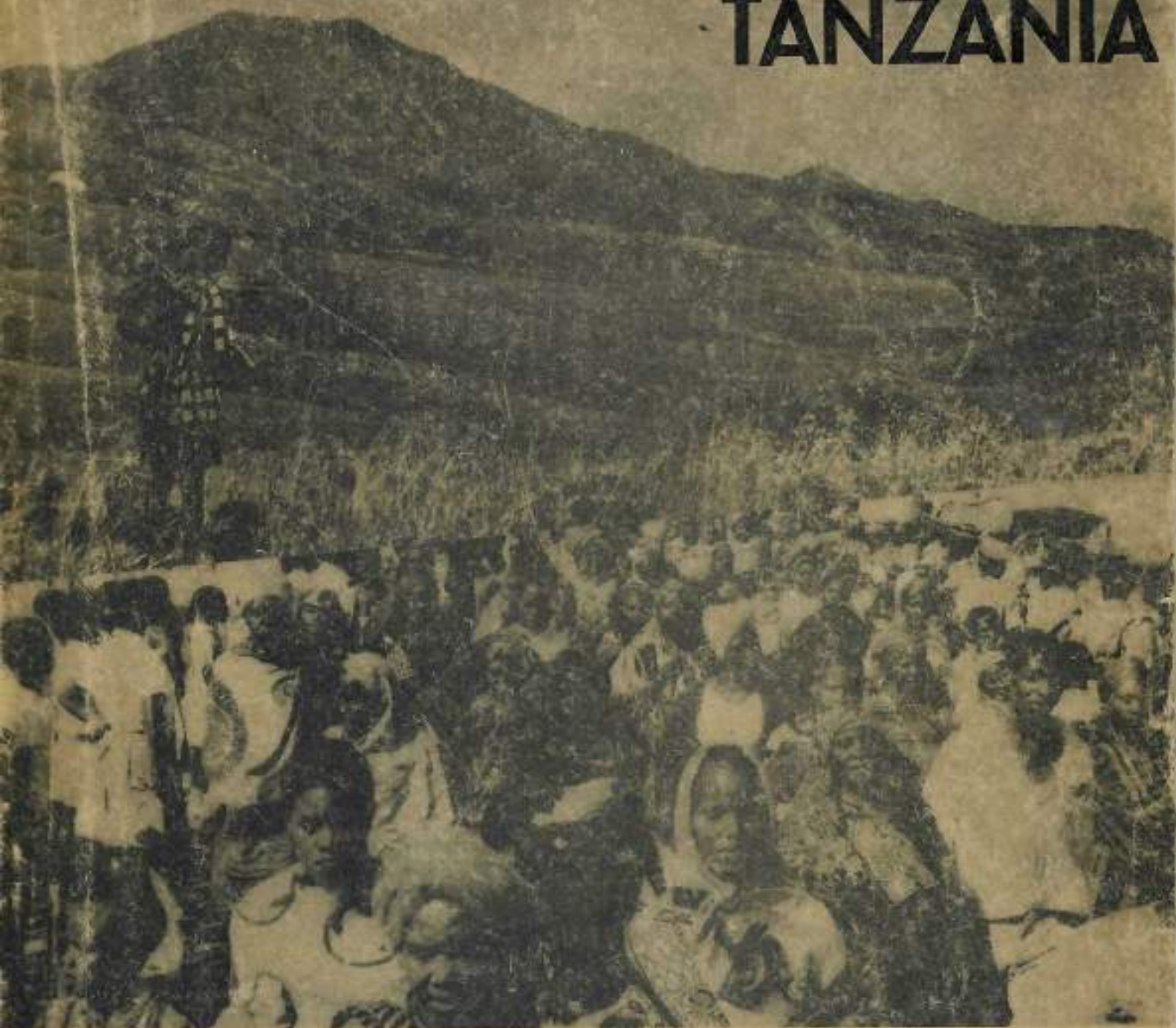


THE POPULATION OF TANZANIA



An analysis of the 1967 population census
edited by Bertil Egero and Roushdi A. Henin

CENSUS VOLUME 6

Jointly published by
BRALUP
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Dar es Salaam 1973

FOREWORD

The 1967 Population Census was the first census to be taken in independent Tanzania. As such it presented a challenge to the institutions of our society to show their ability for cooperation in this truly gigantic task. That this cooperation was successful is now a fact that no more needs to be pointed out; the results of the census are themselves proof enough.

The information provided by the Population Census about our people is a very important contribution to the basic knowledge required in development planning. The four volumes of data from the Census have proven of immense value to the Second Five Year Development Plan and especially to the growing regional planning organisation. A further important contribution is the present volume, which assesses the accuracy of published results, makes interregional comparisons and adds the dimension of time to the study of trends and levels.

The volume is the outcome of increasing cooperation between the Bureau of Statistics and Bureau of Resource Assessment and Land Use Planning. This pooling of resources offers prospects for radical improvements in the collection and utilisation of statistical data. It is our hope that this cooperation will take on a permanent character to the benefit of economic and social development of Tanzania.

The publication of this volume was made possible through a generous grant from the Population Council Inc. We would also like to thank the editors for initiating and editing this volume and the authors for their excellent contributions.

A. C. Mascarenhas
BRALUP

J. J. Mpogolo
Bureau of Statistics

Dar es Salaam, December 1973.

PREFACE

by Bertil Egero and Roushdi A. Henin

This volume on the population of Tanzania is the result of a joint effort of thirteen persons whose task was to analyse the data from the 1967 Population Census of Tanzania. In this volume they present their findings and interpretations.

The need for this analytical volume is apparent, judging from the mass of data contained in earlier census volumes. The aim of this volume is therefore twofold; firstly to analyse and translate this data into a comprehensive and more accessible form for those involved in shaping the economic and social future of Tanzania, and secondly to point out the limitations of the data and to attempt as much as possible to improve the accuracy of the recorded information.

A population census is a major undertaking. A variety of data is collected by thousands of field personnel whose understanding of the procedures and whose general performance must vary in quality, resulting in various errors in the data. Further, the type and pattern of errors vary from one set of data to another. While attempts at improving the quality of data have been made for some characteristics, it is not possible - for a variety of reasons - to adopt a similar procedure with all data, and the different authors have therefore taken pains to at least emphasize the shortcomings not only of the published data but also of their own analysis based on this data.

The need for a multi-disciplinary approach to analyse the information collected was clear from the outset. Inquiries about possible contributors from the relevant Government Departments were not completely successful, but there was a good response from the University of Dar es Salaam.

It was considered important to find contributors who not only were qualified in their fields, but who also had first-hand experience in Tanzania and could in a very concrete sense discuss the problems raised by this type of data. And, though the contributions differ to some extent in thoroughness and academic detail, we feel that we have generally succeeded in this respect.

The editorial policy, further expressed in the introduction, has been to give each individual contributor comparatively much freedom in approaching the subject. No attempt was made - nor would it have been very easy - to define a common platform from which to study the population in socialist Tanzania. The result is a collection of studies for which each contributor takes prime responsibility - views or statements are not necessarily those of the editors or the two Bureaux.

Similar reasons explain the lack of a discussion on population and economic development in Tanzania. Though the volume provides a fair amount of data relevant to such a topic, it was decided to leave it to individual exploration and concentrate on the extraction of population data required for this and other studies.

Several chapters are produced jointly by students of different disciplines. This is indeed a great advantage. In this connection it may be added that, in order to avoid a series of editorial problems, names for shared contributions have been shown alphabetically in this preface as well as in the main body of the volume.

The introduction by Bertil Egero is followed by a chapter devoted to the errors in the census results. The first part which covers non-sampling errors is written by Bertil Egero, based partly on his experience in the Census Office and partly on the findings of later chapters in this volume. The second part, dealing with sampling errors, was written by Warren McGillivray who developed the methods and procedures in consultation with Sven Felme, the census programmer.

John Moore undertook the study of population distribution (chapter 3), an important subject in the overall appraisal of the population situation in Tanzania. Closely related to this topic is the presentation of data on migration (chapter 4), which was jointly written by Claes-Predrik Claeson and Bertil Egero.

The contributions on urbanization and housing, chapters 5 and 6, have both been prepared by Adolfo Mascarenhas. The first of these partly goes beyond the data from the census by presenting information on a larger number of agglomerations in the country, useful for a possible reconsideration of the urban definition. The chapter on housing gives the other side of the question of urban growth, that is, the characteristics of the dwellings for the fast-growing urban population.

A first draft of chapter 7 on education and chapter 8 on economic characteristics was written by Ajoy K. Dey. He was later joined by Normal Mogil, producing together the final text.

Chapter 9 deals with agricultural conditions as seen through census data. This chapter was prepared by Chinmoy Koley of the Bureau of Statistics, presently involved in the agricultural census and with first-hand experience of the methodological problems usually encountered in this field.

Data on ethnic origin, including 'tribe', were added to the census form at a rather late stage in the preparations, and then only as a household characteristic. This ambivalence in relation to the value of including the topic at all is confirmed by the analysis in chapter 10 written by Stephen Lucas and Gerard Philippon. The vagueness of the concept and its application is well illustrated in this chapter.

The demographic analysis of the census presented in the last four chapters has been carried out jointly by Bertil Egero and Roushdi Henin. In fact, although the writing up of the chapters was divided between them, Bertil Egero taking chapters 11 and 14 and Roushdi Henin chapters 12 and 13, the preceding analysis was so closely shared that the responsibility for any limitations has to be jointly shared by both of them.

We are glad to have the opportunity of publishing, as a separate section, some results from a survey undertaken by Afrika-Studiecentrum in Rungwe during the census. The authors, Klaas de Jonge and Jan Sterkenburg, have studied both

the census fieldwork and the information collected, giving a most important micro-perspective on the findings reported in the rest of the volume.

Most of the chapters are presented together with a summary by the individual authors. Concluding comments on the whole volume have been written by Roushdi Henin and Adolfo Mascarenhas.

Some of the contributions to this volume have already appeared in other contexts. Chapter 4 on Migration by Claes-Fredrik Claeson and Bertil Egero has been published under the title of Migration in Tanzania, BRAIUP Research Notes No. 11.3, Dar es Salaam 1972. Similarly, a slightly shortened version of the last four chapters, by Bertil Egero and Roushdi Henin, was presented in The 1967 Population Census of Tanzania: a Demographic Analysis, BRAIUP Research Papers No. 19, Dar es Salaam 1972. Finally, some background material to John Moore's chapter on Population Distribution has been published as Rural Population Carrying Capacities for the Districts of Tanzania, BRAIUP Research Papers No. 18, Dar es Salaam 1971.

Many people besides the authors have been involved in the production of this volume. Ceinwen Thomas was the editors' principal assistant in preparing the chapter drafts for publication. Angele Hathout handled the tedious task of getting the material offset-typed and proofread. Venus Secretarial Services, who did the typing, produced the right-hand margin by simple manual adjustment throughout the book. Madi Gray did the final layout, page by page. She prepared the work for printing and handled all contacts with the printer up to the final publication. Maps and diagrams were drawn by Maclean M. Mwanjoka, Francis A. Msuya and Kasian M. Ulaya, cartographers in BRAIUP. The efforts of these people is worth all our appreciation, for it is clear that without them no volume would ever have seen the light of day.

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1 INTRODUCTION

by Bertil Egero

1.0 Introduction

Since the beginning of modern census-taking in Tropical Africa a quarter of a century ago, an increasing number of countries have experienced one or more population censuses. Today only a few countries remain without the type of comprehensive knowledge of their populations gained through a national census. The most advanced countries have an accumulated experience of up to three censuses to draw on. This provides substantial advantages not only in the amount of information available but also in the administrative know-how required for a successful census.

The famous 1960 Ghana census, thoroughly prepared and ambitiously carried through the field phase, has become a model for African census takers. It reported meticulously and honestly all obstacles, mistakes, and solutions in all phases of the census work, providing an invaluable blueprint of census techniques (1). The detailed results of the general census were also made available in a series of volumes which are of great value for planners and students of the Ghanaian population.

In one respect, however, this census did not manage to fulfil initial expectations. No comprehensive analysis of the census, which also incorporates all the results of the important post-enumeration survey, has been published. And it shares this fate with a number of other censuses. In general, there seems to be an almost inevitable set-back in the census work when the enumeration itself is over, a kind of national fatigue following upon the all-embracing effort of its implementation. The need for an immediate resumption of ordinary duties, the request for the return of officers seconded to the census, the general feeling that "the census is over", all contribute to the drain of interest and resources from remaining census work (2).

Understandable as this is in a situation of general scarcity of manpower resources, it nevertheless entails a risk of jeopardizing the entire census effort. All too often the outcome seems to be dependent on the commitment and determination of one or of a few persons in the census organization. Only through their efforts is work carried through the post-enumeration phases and the results made available in published form. This was the case with, for instance, the censuses of East Africa 1948, Tanganyika 1957, and Malawi 1966 (3). Were it not for the success of such individual efforts, the final

(1) 1960 Population Census of Ghana, Volume 5, General Report, Accra, 1964.

(2) Once more, refer to the Ghana census for an excellent presentation of the difficulties encountered in the post-enumeration survey preparations Census Volume 5, *op.cit.*, p. 313 ff.

(3) No official reports from the 1948 East African censuses were ever produced, but the census administrator presented methods and results in "The East African Population Census, planning and enumeration", *Population Studies*, Vol. 3, 1949, and "Some estimates of the general age distribu-

assessment of the census results might be only on a general and superficial level or might be delayed for a substantial time after the census.

Thus, in general, the census in an underdeveloped country runs the risk of being incompletely reported, with only crudely assessed statistical results published. Considerable delays may occur in the completion of crucial parts, such as the estimation of vital rates. And this, paradoxically, in a situation with a general dearth of information and where every piece of evidence is used far beyond its worth. Furthermore, the data collected are often of so poor quality that grossly incorrect judgements might result from their indiscriminate application.

It therefore appears as if time has now come to switch attention from the preparatory to the concluding stages of the census operation, to try to raise the latter to a level which would balance the achievements in the former. To a large extent this is a matter of education within the departments concerned with budget and manpower resources for the census. But parallel to this, planning of the post-enumeration work must be integrated with the planning of all other census operations, carefully assessing the resources needed for an efficient presentation of the collected data. Undoubtedly, much remains to be done in this respect.

The Tanzania 1967 census was no exception. As has been described elsewhere (4), the time-consuming processing of census data met with a multitude of obstacles, which delayed or hampered the work and sometimes required emergency-type solutions. Through the whole period of processing, the shortage of skilled staff was so pronounced and the time-schedule so uncertain that the publication of results could follow only one line: that of making available the data that were ready, irrespective of minor deficiencies and irrespective of the lack of an assessment of the quality and trends of the data. This led to the publication of four volumes of statistical data, of undoubted value for planning and research but lacking interpretation to facilitate their application.

The present volume is intended to fill this gap. The original publication plans included "a set of monographs" dealing with census topics, but it had long been felt that this could be realized only as a result of individual efforts in population research. With study of the data made available from the computer (5), it became increasingly clear that a good deal of research would be required to put the information to proper use. Firstly, the data were often seriously distorted, with systematic errors affecting interpretations of

tion, fertility and rate of natural increase of the African population of British East Africa", *Population Studies*, Vol. 7, 1953. J.G.C. Blacker was personally responsible for the *African Census Report 1957*, Dar es Salaam 1963, which analyses the results of the 1957 Tanganyika census. The 1966 Swaziland census also to a large extent depended on the initiative of one man, H.M. Jones, who wrote the *Report on the 1966 Swaziland Population Census*, Mbabane, 1968.

(4) *1967 Population Census, Volume 5, Census Methodology*, Bureau of Statistics, Dar es Salaam 1971.

(5) During the processing, a variety of queries from different institutions were dealt with and answered within the scope of available data. Also vital rates estimates were produced on the basis of a subsample of the population. See *Provisional estimates of fertility, mortality and population growth for Tanzania*, Bureau of Statistics, Dar es Salaam 1968.

the findings. Secondly, many of the inquiries to the Census Office were of a kind that would require fairly elaborate investigations to be properly answered. The logical response seemed to be detailed study of all the population characteristics covered in the census.

The multitude of characteristics covered led to the establishment of a collaborative effort whereby students of the Tanzanian society could interpret data close to their specific fields of interest. The general orientation was towards individual freedom in the study of topics. A minimum degree of uniformity was to be achieved through the adherence to three rules, namely that each study should (a) examine the type and magnitude of errors in recorded data; (b) analyse regional, rural-urban and other differentials in the distribution of characteristics; and (c) assess trends over time, both past and future.

Though by no means completely successful, this approach has led to a number of valuable contributions, covering virtually all information collected in the census. One exception was unavoidable; the data on religion did not find a writer. Whereas the Mainland has been studied in depth in all chapters, this is not always so for Zanzibar. The main problem is the lack of data for the Island together with limited personal experience of the contributors of the situation there. For, although the union is close to a decade old, the exchange of information between the two parts is still severely restricted in many fields.

1.1 On the contributions

1.1.1 Errors in census data

One feature of African population censuses is their increasing reliance on modern sampling techniques for the collection of a larger amount of data than would be possible in the general enumeration. Disregarding the instance where no universal count is made, the practices of sampling vary from a built-in sample exploited simultaneously with the general census to a sample drawn from the census and subjected to a separate field inquiry. Sample sizes within these different approaches vary from a very small to a substantial proportion of the total population. Sampling is usually based on geographical units, often with only limited information about the characteristics of the areas from which the sample is to be drawn.

Despite this variation, very little information is available on the cost-return of the different sample designs. The interest in development of sample procedures has been accompanied by a noticeable lack of attention to the means of assessing the outcome of the procedures. It may be a significant sign of this trend that the Tanzanian sample size, originally set at 10% of the population, later in the preparations was doubled to reduce sample errors for the districts. (6). No comprehensive evaluation of this step in relation to its effects on other aspects of the census was ever made.

Recently, however, work within U.N.E.C.A. has opened the field of development

(6) See Volume 5, *op. cit.* p. 50.

of formulas for estimation of sample errors (7). The work is carried further with empirical studies of censuses and surveys, notably the 1969 censuses of Uganda and Kenya. Warren McGillivray's work on the Tanzanian sampling provides a slightly different method for the estimation of sample errors, tested on a selected set of characteristics. The results are illuminating both for recording the difficulties in achieving these estimates and for noting the undoubtedly high levels of sample errors resulting from the design of the sample.

Sample error is only one of two aspects of the quality of recorded data, and perhaps also the less important. Several contributions over recent years have explored the field of non-sample errors. Techniques have been devised for estimating the often very substantial distortions found in data from the underdeveloped countries (8). Estimates of vital rates by these techniques are often imprecise, and the models or standards used are open to constant criticism and revision.

The relative importance of sample and non-sample errors, and especially their interdependence, should be investigated. The case of Tanzania might be illustrative. As previously mentioned, the sample size was raised to 20% with an undoubtedly substantial cut-down in the sample errors as a result. But this decision also meant a doubling of the number of qualified enumerators required for the sample interviewing. It meant heavier strains on census education, supervision and control of the fieldwork. Finally, the processing had to adjust to twice as heavy a task, with corresponding demands on recruitment, training and supervision. Even disregarding the cost of delayed publication of the results, these factors might have led to overall quality reductions due to the effects of the non-sample type of errors.

The Tanzanian data do not lend themselves to any more precise estimate of the net effects of the sample size chosen. Doubtless most or all data recorded are distorted; in some cases one might question the value of publication. In most chapters of the present volume, the authors have had to pay considerable attention to these aspects, pointing out the limitations of the data and of conclusions. The errors discovered are summarized in Bertil Egero's section on non-sample errors in Chapter 2. He also draws attention to those aspects of the census organization which might have contributed to these errors. The section supplements Warren McGillivray's analysis of sample errors by pointing out apparent deficiencies in the sampling procedure which might have introduced bias in the sample estimates.

The Census Office was fortunate to have the opportunity for cooperation with an inter-disciplinary research project in Rungwe, run by a team from the Afrika-Studiecentrum, Leiden, Holland. The cooperation started on the local level during the census preparations, and continued with a field check of recorded information for selected areas within the district. The method of

(7) A Manual on Demographic Sample Surveys in Africa, joint ECA/UNESCO document, E/CN.14/CAS.7/17, Addis Ababa 1971. See also Sampling for Demographic and Housing Surveys and Civil Registration, ECA; E/CN.14/SN/3, Addis Ababa 1968.

(8) See for instance W.Brass et al., The Demography of Tropical Africa, Princeton 1968; A.J.Coale & P.Lemery, Methods of estimating basic demographic measures for incomplete data, U.N. Population Studies No 42. New York, 1968; H.Carrier & J.Hoberaft, Demographic estimation for developing countries, Population Investigation Committee, London 1971.

the field check was such as to give very reliable information which could be compared with census data on an individual basis.

While detailed results of this part of the Rungwe project have been reported elsewhere (9), included in this volume is a specially written paper with some new observations. The general comments on census organization in chapter 2 are here substantiated and exemplified, supplemented by useful recommendations for forthcoming censuses. A second part compares recorded data from the two sources and points at rather significant differences. So, for instance, about two thirds of the population falls in the same five-year age groups in the two sets of material. This is a better result than that achieved in the Ghana 1960 census (10), but still far from acceptable. Valuable insights are also given on the classification of economic activity. They support the generally critical attitude towards the inclusion of economic characteristics in a census inquiry, expressed elsewhere in this volume.

One aspect generally neglected in the census has been given special attention in the Rungwe report, namely marital status and its relation to fertility. A commonly held view among demographers is that fertility is lower in polygynous than monogamous marriages, and that therefore a "modernization" of marriage customs resulting in monogamous unions might lead to an increase in fertility rates. The findings of the survey show the expected relation between fertility and marital status, but also confirm earlier findings that the differentials are small, especially between one- and two-wife unions. As these two account for the vast majority of all marriages, it seems unlikely that any noticeable changes in fertility level will occur as a result of a predicted decline in polygynous marriages, compared to the effects of changes in marriage frequency, improvements in health etc. which might accompany development.

1.1.2 Population distribution

The pattern of distribution of a country's population over available land, and the factors leading to this pattern, are questions of great importance to all development planning. The often fairly uneven distribution observed can be seen as reflecting primarily ecological conditions and economic opportunities, but also social and political relations prior to the period of observation.

For Tanzania, the concentration of people in mountain areas is a direct response to the more favourable conditions there for agricultural production. On the other hand, potentially useful parts of the Masai steppe have only recently been brought under cultivation; pre-colonial political patterns have left a strong and lasting impact on the pattern of land use in the area.

The relation of population and environment is, however, one of reciprocal impact and response. Changing relations may have direct implications for economic development; it has for instance been argued that in certain circumstances increasing population pressure on land is conducive for development

(9) J.J. Sterkenburg and K. de Jonge, Evaluation of the 1967 Population Census in Rungwe (Tanzania), Afrika-Studiecentrum, Leyden 1971.

(10) See Ghana 1960 Census, Volume 5, op. cit., p. 388.



Figure 1.1 Districts and regions of Tanzania

through more intensive land use (11). Very low densities, on the other hand, are in most cases detrimental to development because of the high per capita effort required in the extension of infrastructure and overall production. Again, the number of people that can make their living from the land - the predominant economic activity in Tanzania - also depends on the character of soil and climate. Crude density rates say little or nothing about this complex relation between population and land.

John Moore has tried to overcome these problems by applying to Tanzania the concept of 'land-carrying capacity' introduced by W.Allen (12). Using an

(11) E. Rosserup, The Conditions of Agricultural growth, London 1965.

(12) W. Allen, The African Husbandman, Edinburgh 1967.

admittedly long series of assumptions on yields and needs, Moore produced a set of estimates of the maximum possible population for the rural districts, given a certain minimum standard of living. Summarizing Moore's estimates, we find that the country could carry approximately 80% more people than the population of 1967, with the level of agricultural technology of that year.

Such a statement requires qualification, quite apart from the approximate nature of the figure based on so many assumptions. Firstly, Moore's work indicates a wide variation in the local man-land relation, with some districts capable of supporting a far larger population than at present and others showing signs of over-population already now. The larger number of people could find a decent standard of living only with an optimal distribution of population over the country. Secondly, an equally crucial requirement is that the wealth from land be shared equally, with a uniform standard of living for everybody. Neither of these two conditions can very easily be satisfied.

One way of easing pressure of population on land is migration. Historically, this specific form of migration can be observed in parts of Tanzania, for instance in the regions south of Lake Victoria. Claes-Fredrik Claeson's and Bertil Egero's study of migration before the start of the "Ujamaa" policy of rural resettlement (13), also shows, however, patterns of migration of a very different kind; labour migration from the backward regions in the east and south to the areas of large-scale plantation agriculture. Together, the different forms of migration have led over 40% of the population to leave their place of birth. Most movements, however, take place within the region itself, and Moore's data confirm the impression that migration has a comparatively minor net effect on the redistribution of population between administrative areas.

Nevertheless, the movements that have taken place have had some important repercussions on the population distribution, perhaps most notably so in the case of urban growth. One estimate puts the contribution of urban migration to roughly two thirds of the growth of towns, the rest being the effect of natural increase of the urban population (14). The characteristics of urban growth are examined by Adolfo Mascarenhas, who, in an expose of the history of urbanization, shows the arbitrary nature of the present administrative classification. Examining the discrepancy between *de jure* and *de facto* urbanization, the study regards the national policy of decentralized urban growth (15) as still too narrow, as it concentrates only on the larger urban centres.

Major factors in the movements to towns, which also lead to a selective drain

(13) Since the publication of the TANU declaration on "Socialism and Rural Development", in September 1967, the formation of ujamaa villages has spread rapidly all over the country. Although statistical information on the number and nature of these movements is hard to acquire, estimates for mid-1973 indicate that over fifteen percent of rural households now participate in the transformation to a socialist rural organisation (H. Napulu, Dpt of Sociology at the University of Dar es Salaam, personal communication).

(14) C.F. Claeson & B. Egero, Migration and the Urban Population, a Demographic Analysis of Population Census Data for Tanzania. HRAIDP Research Notes No 11.2, Dar es Salaam 1972.

(15) Tanzania Second Five-year plan for Economic and Social Development, 1969 - 1974, Volume 1, Dar es Salaam 1969.

of qualified people from the rural areas (16), are the opportunities for employment, education, health and social services offered in the towns, and the expected higher standards of living. While these expectations may be correct in a general sense, the living conditions for large numbers of the urban population are far from satisfactory. Unemployment or underemployment make economic strains a common experience in the life of many urban households, without the buffer against food shortage provided by the family "shamba". Social life may be less rich than in the rural areas, not least because of a possible lower standard of housing.

The last statement is subject to qualifications, as the study by Mascarenhas shows that certain categories of urban households have decent accommodation with access to piped water and other amenities. In fact, with due appreciation of the remarkable absence of social and physical slums in the Tanzanian towns, the pattern of spatial segregation along socio-economic lines set by the colonial administration remains largely intact. It ranges from squatter areas with largely self-made houses and no permanent roads to extremely well-to-do villa suburbs with large gardens and tiny servants' quarters.

Town planning efforts are at present directed towards a recognition and general uplift of the squatter areas as part of the programme of improving urban housing. Desirable as this step may be, it inevitably carries the risk of stimulating further urban migration. Demands on the housing and welfare sectors would increase, tying even more investment resources to the already favoured urban areas. The development in Zanzibar after the 1964 revolution appears to have been the opposite; following the models of China and Cuba, incentives for growth of the major urban centre were removed and all efforts directed towards rural development (17). How far this will or ought to be the policy on Mainland is still an open question; the information in this volume will hopefully contribute to a better analysis of urban development.

1.13 Socio-economic data

The general scarcity of information available on a national scale in countries like Tanzania makes the population census a rare and attractive opportunity to fill the most conspicuous gaps. Naturally, then, a variety of requests are usually made. Undesirable strains on census operations can therefore result with consequent reductions in quality and increase in time expended. No proper assessment has yet been made of the costs and benefits of extensive use of the census, but there are signs of a trend towards increasing strictness in the selection of topics for inclusion.

The arguments behind a more stringent selection of topics may run as follows: a national census is a large-scale operation, requiring the mobilization of large numbers of semi-skilled people for the fieldwork, with far from perfect means for their training and supervision. To introduce topics basically alien to the social system (e.g. questions on economic activities) or extremely difficult to measure by simple questions (e.g. literacy) makes demands on the

(16) C.F. Claeson & B. Egero, *op. cit.*

(17) This may no longer be true; recent years have witnessed large investments in housing in Zanzibar town.

enumerator which might harmfully effect the field operation in a number of different ways. Thus, not only may the quality of this information be too low to warrant publication but a negative effect might occur even in the basic demographic data that are the primary aim of the whole exercise (18).

To the above could be added other objections such as the extra demands made on the processing organization by the inclusion of these topics, or the very substantial delays in census publication that are likely to follow. These considerations can weigh in favour of removing certain topics altogether from the census. In this case, other and more convenient ways of securing the information might be available, such as special labour force surveys or household budget surveys. These types of surveys can be far better tailored to the specific needs at hand, and must be preferable whenever available resources permit.

The contributions in this volume on educational characteristics, economic activities, agricultural data and ethnic characteristics all tend to support a more critical attitude towards extensive use of the census. For example, one might conclude from the analysis by A.K.Dey and N.Mogil that little has been achieved by the inclusion of a question on literacy. The proportion literate is so close to the proportion with education that replies to the two questions must have had a high degree of interdependence. Furthermore, the distribution of pupils across grades has been compared with data from the Ministry of National Education. The results show such local variations that one would suspect fairly serious errors in the census results.

This last point leads to a general question about the use of information from sources outside the census, for purposes of error estimation or for broadening the value of census data. This practice has a high potential value in accumulating evidence, specifying conditions or marking out areas of ambiguity, and generally in providing a firmer basis for conclusions. But there are risks involved in the procedure, especially where lack of information tempts one to "over-use" available pieces of evidence. In the case of education, registration data are used as a standard against which to evaluate census results. In the chapter on economic activities an earlier manpower survey is similarly used as a yardstick for the census. But how far are these standards correct? How similar are the concepts used, how far can the intervening years account for the discrepancies? The labour force survey in particular raises a number of questions on comparability due to methods of collecting the data, sample errors etc. The reader is well advised to keep these questions in mind when reading the chapters.

C.Koley uses secondary sources for a different purpose: to estimate the total acreage of different crops from the census information on the number of households growing these crops. The same sources have been used in an earlier attempt to estimate land use for the districts of Tanzania (19), the results

(18) J.G.C.Blackler in a recent paper argues against the inclusion of questions on economic activities in census inquiries, particularly stressing the problem of applying to a rural economy a set of concepts developed for use in an industrialized society. See his "Some unsolved problems of census and demographic survey work in Africa", International Population Conference, London, 1969, Volume 1. I.U.S.S.P. 1970.

(19) L.Berry & E.Berry, Land Use in Tanzania by Districts, BRAHMP Research Notes No 6, Dar es Salaam, 1969.

of which were used by, among others, John Moore in the study described above. Koley has the advantage of access to more precise information about the farming practices of individual households. This may lead to greater accuracy in the resulting estimates. Again, the methods of collecting and processing census data on agricultural practices must have led to erratic variations in the results, and the ultimate value of the whole operation must be judged with great caution.

The study of ethnic origin, emphasised in all pre-independence censuses, still has a certain value in development planning. It seems useful in this context to distinguish between two different areas of investigation. One relates to the existence of alien ethnic communities like "Asians" or "Europeans" in the country; the other to the internal division of the "Africans" into ethnic groups or "tribes". The former is an important topic for at least two reasons. Firstly, these alien elements tend to concentrate in certain sectors of the economy where, despite their small overall numbers, they can have a very significant impact. Secondly, the combination of professional and social isolation with economic privileges makes these groups especially vulnerable to official measures to change their numbers or position in society. The two examples of Ghana and Uganda demonstrate the instability of such minorities in society.

The main object of an analysis of alien groups should thus be to show their relative importance in different sectors of the economy. Ideally, in this context, alien should mean non-citizen; this is the approach chosen both in earlier volumes of the census and in relevant chapters of the present. As shown in the case of Uganda, however, ethnic diversities might come to override legal citizenship, and even where they do not, expulsion of non-citizens could lead to an exodus of many of their naturalized ethnic fellows as well.

In certain situations there may be reasons to take a more direct demographic interest in the behaviour of the alien groups. John Blacker has demonstrated, in an analysis of Zanzibar census data, that the low overall fertility levels could be traced to very low fertility among the urban Afro-Arab group, whereas the Asian minority had the highest fertility levels on the island (20). This identification of fertility differentials is a valuable tool not only in estimating future levels of fertility but also in the planning of health and social services. It is less clear what purpose was served in studying the low and declining fertility of Asians on the Mainland, where they make a demographically insignificant proportion of the total population (21). Obviously the fluctuations in migration have a far wider impact on the size of this minority.

Stephen Lucas and Gerard Philippon, in their paper on ethnic characteristics, pay comparatively little attention to the alien minorities, largely limiting their analysis to overall and regional trends in size. The two authors concentrate on a study of the tribal divisions of the "African" population. This is a difficult task because of the large number of recognized tribes in Tanzania and the absence of a valid classification into tribal clusters.

To these difficulties was added the complication caused by the almost 300 new

(20) J.G.C. Blacker, "Population growth and differential fertility in Zanzibar Protectorate", *Population Studies*, Vol. 15, No 3, March 1962.

(21) J.G.C. Blacker, "Fertility trends of the Asian population of Tanganyika" *Population Studies*, Vol. 13, No 1, 1959.

"tribal" names found on the census forms. As the authors show, the addition of these names to the original list has not always been satisfactorily done. The unreliability of the whole attempt at a tribal classification is well demonstrated in the often incredibly wide fluctuations in tribal growth rates between the two intercensal periods 1948-57 and 1957-67.

Behind these results are clearly not only problems of measurement but - primarily - of the social reality to which 'tribe' is supposed to refer. Originally, the concept defined political unity and common descent. The demands of colonial governments in favour of indirect rule led to a wider application of the concept with a concomitant ambiguity in its meaning (22). Today, the political reference of the word 'tribe' is lost in all but a few cases, and where cultural criteria fail to assist in the definition the inevitable result is confusion and subjectivity. The 300 new names discovered in the census processing is perhaps the most explicit symptom of this confusion.

Not the least for these reasons, regional development planning can only rarely pay attention to the tribal distribution and must direct itself to the predominant social, economic and physical conditions of an area. Tribe would have a value only in so far as it could provide meaningful information on such aspects. In the light of what has been said above, this may be true only for parts of Tanzania. On the other hand, it would appear that relevant patterns of economic and social behavior often follow rather closely the ecology of natural resources. Thus, a functional spatial presentation of data would seem the most fruitful way of satisfying the requirements of development planning.

1.1.4 Demographic data

The last decade or two have witnessed remarkable progress in the development of techniques for estimating vital rates from incomplete data. The two major sets of model life tables and stable population models now available (23), and the steadily growing number of techniques for the estimation of fertility and mortality parameters (24), have provided the demographer with powerful tools for the manipulation of defective data. At the same time, the application of these tools in censuses and surveys shows they are far from perfect, and the resulting estimates are still subject to a varying degree of error.

The necessity for a thorough examination of recorded data is now widely recognized. New approaches to the types of data and the means for their collection are being sought. One of these is intended to improve the estimates of adult mortality, a field where at present knowledge is very scanty in Africa. The method, which uses data on orphanage primarily for the estimation of female adult mortality, has been apparently successfully applied in a few recent cen-

(22) See for instance A. Mafeje, "The ideology of 'tribalism'", Journal of Modern African Studies, Vol. 9, No 2, 1971, p. 254.

(23) A.J. Coale & P. Demeny, Regional Model Life Tables and Stable Populations, Princeton 1966. N. Carrier & J. Hobcraft, op. cit.

(24) A.J. Coale & P. Demeny, op. cit. footnote 8, W. Brass et al, op. cit., W. Brass, "On the scale of mortality", in W. Brass (ed), Biological Aspects of Demography, London 1971.

suses (25).

In the preparations for the Tanzania 1967 census no account was taken of these developments. On the whole the planning was characterized by a fairly rigid application of the U.N. census recommendations. Little attention was paid to the experiences from other censuses or even to the special conditions of the country itself. With regard to fertility and mortality, earlier experiences were felt to be so disappointing that the Bureau of Statistics only reluctantly agreed to include any questions at all.

These expectations proved overly pessimistic; recorded vital rates information is distorted but not to the degree of being virtually useless. The distortions, however, have led Bertil Egero and Roushdi Henin to give most of their attention to an assessment of the errors, using a variety of techniques to narrow the range within which the rates are likely to be found. Their approach is therefore primarily methodological. Comparatively little space is given to the explanation of levels and patterns of vital rates, or to their implications for planning or policy considerations.

Such aspects certainly deserve more attention than could be given in the present context. Of special importance is the relation between regional development policies and future trends in population growth. Examination of the estimates shows wide geographical variations in fertility and mortality, which can be partly related to differences in social customs, but which also bear a clear relationship to economic development and access to health and social services. The present policy of the Tanzanian Government to reduce regional differences in these respects will therefore very likely effect demographic trends in a similar direction. Comparatively high mortality levels will be reduced at a faster rate, making for a more rapid national decline in mortality. Fertility levels kept down by infertility and other factors related to health might show an upward trend, further adding to the accelerated natural increase of the population.

The information required for projections such as the above are among the basic type of data which can be gained through a census. It could, therefore, be seen as a matter of high priority in the census organization to make estimates of present and future population available with shortest possible delay. Experiences from the 1967 census show that this can be done without very high costs, i.e. that rough estimates can be made available at comparatively short notice. At the start of the processing, a very small but well distributed subsample of households was drawn from the records, and the necessary tabulations produced in what was also a very valuable trial run of computer programs. The results were analysed and published, together with a set of tentative projections, as early as one year after the census (26). Although only national estimates could be made from this subsample, it is instructive to note that the results are remarkably close to those presented in this volume. Further experimentation along these lines would seem well worth attempting in future census operations.

(25) W.Brass, Table for converting proportions of children with mothers still alive into life table survivorship ratios. Unpublished paper, J.G.C.Blackler, The estimation of vital rates from census data in Kenya and Uganda, paper presented to the African Population Conference, Accra, December, 1971. K.H.Hill & J.G.C.Blackler, Some problems of African demographic analysis, Unpublished paper, London 1971.

(26) See Bureau of Statistics, op.cit., footnote 5.

1.2 Concluding comments

The 1967 census of Tanzania was an ambitious operation, intended to compensate for neglect during the colonial period and to show the remarkable changes that have taken place since then. Critical observers may regard the census plans as somewhat over-ambitious; certainly census demands sometimes came critically close to the limits of available resources and to some extent sacrificed quality for extended range of data. The next census is due in 1977, a long period to wait for more information in a stage of rapid economic and social development.

The emphasis on the breadth of the survey could, however, be justified only on condition that an appropriate organization was available for the rapid handling of large amounts of data and the communication of results in a form suitable for those most in need of them; planners and administrators. This appears to be the least recognized and therefore most crucial aspect of the whole census operation. For what is the census worth if the results disappear in the stores at the census office or are presented in a form incomprehensible to most potential users?

The present volume, the last in a series of six, tries to make up for the admirable efforts put into the 1967 census by the people of Tanzania, by turning the vast amounts of statistical figures from the census into a comprehensive understanding of the social and demographic realities of the country. To the extent that this has succeeded, the volume will have contributed to a development policy which, in the words of the Arusha Declaration, sees 'people and their hard work as the foundation for development.'

2 ERRORS IN THE CENSUS

by Bertil Egero and Warren McGillivray

Part 1 Non - Sampling Errors

by Bertil Egero

2.1.0 Introduction

All types of investigations are liable to give in some way or other imperfect information about the object or event under study. This is particularly so for the social sciences with their problems of measurement and interpretation. Statistical surveys aiming at behavioural data only may be in a more favourable position than other social surveys, but nevertheless often have to face formidable distortions in the data collected.

The problem of errors in the data is of course more crucial in the developing countries, with lower levels of education and less experience in the type of communication represented by social surveys. A special aspect of this problem is the field of scientific sampling and the requirements on a sample design allowing for the estimation of errors in the generalization of findings to the total population. This aspect is dealt with more fully in the second part of this chapter, and will here be mentioned only in relation to possible deviations from the sample design, causing errors of a non-random character.

The first part of the chapter thus concentrates on the non-sample errors, i.e. errors due to deficiencies in the survey process leading to systematic errors or other non-random distortions in the final results. Some of these distortions may be insignificant in the sense that they tend to cancel out in a large material, others are easily distinguished as significant deviations from empirically expected distributions.

The study of non-sample errors in census data, though not confined to the developing countries, has been largely directed to finding ways and means of improving organizational aspects of large-scale surveys, and to estimate the size and shape of the still very frequent distortions. Generally, this work has been directed to the quality of demographic data, while data on economic and other characteristics still appear to be collected on more of a routine basis of experience from surveys in the industrialized world ⁽¹⁾. In the demographic field, however, the last

(1) See for instance the criticism on this point by J.G.C. Blacker, "Some Unsolved Problems of Census and Demographic Survey Work in Africa." Paper presented to International Population Conference, London, September, 1969, Volume 1, IUSSP, 1970.

twenty years have witnessed a remarkable development especially in the analysis and estimation based on incomplete data. Several of the methods developed over recent years have also been put to use in the present work, especially in the last four chapters dealing with vital rates and projections.

What follows is a brief summary of the experience during the different phases of the 1967 census work, of potential sources of error and where possible also the direction of the errors detected. A more thorough examination of the deficiencies in the census would be beyond the scope of the present work, and has in fact partly been dealt with already in Census Volume 5 (2). Similarly, estimates of the character of different errors have largely been left to the individual chapters of the present volume, where they form an integral part of the analysis of the findings. The basic traits of the census organization have already been outlined elsewhere and need not be repeated here.

The knowledge of a census administrator concerning the way things operated in the field, or the resulting type of bias in the data, is often fairly sketchy and superficial. In the present case however, the evaluation rests also on the more exact information from an intensive study of one district in Mbeya region, the Rungwe Agro-Socio Economic Research Project, undertaken by a team from Afrika-Studiecentrum, Leyden, Holland. Apart from directly assisting in the census preparations, this project also undertook to make a micro-level analysis of recorded census data, in close cooperation with the Bureau of Statistics. A special report on the findings has been prepared for publication in this volume, and many of the statements below find direct support in the experiences reported there. No special reference is made in these cases; the reader is advised to consult the report in full for more details on the findings.

2.1.1 Shortcomings in the census organization

2.1.1.1 Coverage and distribution of population

The one outstanding finding of the census, perhaps in one sense the most important, was the size of the population. Soon after the census, preliminary results gave a figure approximately one million above the old estimate (3). The discrepancy appears to be due mainly to poor coverage in the 1957 census, with consequent low estimates of population growth (4), and would seem a strong indication of an almost complete coverage in 1967. Nevertheless, there are reasons to suspect that even the last census

(2) Census Volume 5, Census Methodology, Bureau of Statistics, Dar es Salaam, 1971.

(3) Preliminary Results of the Population Census taken on the night of 26-27th August 1967, Central Statistical Bureau, Dar es Salaam, 1967.

(4) Provisional Estimates of Fertility, Mortality and Population Growth for Tanzania, Central Statistical Bureau, Dar es Salaam, 1968. See also Ch. 14 of the present volume.

failed to reach the desired level in this respect, and one study puts the maximum loss to as much as 2% of the population (5).

Parts of such a loss are due to almost insurmountable difficulties in the fieldwork, under given conditions and limitations in manpower. Other parts can be referred to features in the organization which in principle could have been avoided without too much cost, although the overall lack of experience of the requirements of a census naturally led to a series of obstacles in optimum utilization of accessible resources.

A good coverage depends on whether the census organization can find the people beforehand, convince them of the value of participating in the census, and reach them during the enumeration itself. The geographical fieldwork preceding the enumeration, which was responsible for the first of these problems, undoubtedly suffered from a series of shortcomings. In the first place, map coverage varied greatly between different parts of Tanzania and was almost non-existent in certain areas. Secondly, geographically trained staff in enough numbers were not available, and far from sufficient time was given to the training and guidance of new staff for the work. Thirdly, a direct effect of the unusually compressed time schedule for the preparations, most of the field work was done under pressure of time and during the rainy season of the year. The implications became evident during the enumeration, when in some cases the description of enumeration areas (EA's) showed little resemblance to the real conditions, in others whole areas were found to have been left uncovered in the geographical work (6). Reported incidents of this type are few, but point to the existence of an unknown number of possible omissions in the enumeration.

The publicity aspect is generally regarded as important in a country with limited experiences of national polls and surveys. In the present case, manpower shortage precluded a more comprehensive effort at publicizing the census. Mass media, campaigns and local meetings were used and undoubtedly raised the level of understanding in general. But perhaps the most important step in securing cooperation from the public was the inclusion of local party representatives, Ten Cell Leaders, in the census work. These leaders were important in the delineation of EA's, and later took active part in the enumeration by guiding the enumerators to the Cell households. The party organization could however be expected to be weakest in the same areas where people were difficult to reach for other reasons, i.e. in very remote rural areas or in the parts of urban areas characterized by temporary residence and lack of social organization. These areas would be the ones most liable to poor coverage.

One particular problem in the enumeration itself was the coverage of the floating population, i.e. persons lacking a fixed residence. Among these are the nomadic people such as the Masai, the urban population lacking a permanent accommodation, and all the people travelling between different

(5) Census Volume 5, *op.cit.*, p. 258. See also Recorded Population Changes 1948-67, Tanzania, Central Statistical Bureau, Dar es Salaam 1968.

(6) The latter for instance happened in certain parts of Songea district, while Kibondo district with extremely poor map coverage is one example of the former.

parts of the country. Results presented in Ch. 10 below indicate that the first of these categories has been well covered, a confirmation of the positive impressions reached of the way preparations for the enumeration were made in Arusha region. A number of steps were taken to cover the floating urban population during the census night itself; nevertheless there could be little doubt that omissions occurred. This would be true even more for the category of travellers, spending census night on trains, in simple accommodations along the bus routes or along the road while travelling on foot. The numbers in this category are not expected to be very large, and would have a very minor impact at least on the overall population estimate.

21.1.2 Errors in the sampling procedure

The sampling plan, which is described in more detail in the second part of this chapter, has in principle fulfilled the requirements for a cluster sample. The EA's created in the geographical work were numbered serially within each division of the district. An EA was then selected randomly among the first five, and the systematic selection of every fifth EA gave a random sample of approximately 20% of the population.

Though simple in principle, the plan was difficult to put into effect partly through lack of adequate instructions and guidance, and partly through two important additions to the plan. Firstly, the Census Headquarters issued instructions that so-called non-typical EA's should be listed separately. These EA's could be "very large areas with very few people", or "large schools, large hospitals, army camps, prisons, large institutions etc." (7). The non-typical EA's should be separated before the sampling, and enumerated using the sample questionnaire.

Secondly, the systematic random sample was to be systematic not according to serial numbering, but in the geographical distribution of EA's. Thus, local administrators were asked to draw the first sample EA "at random (by chance) from the five EA's at the northern end of the division. This random choice should be made by throwing a die and noting which number was shown (1, 2, 3, 4 or 5)". Starting from this first sample EA the selection "should follow a serpentine path through the division so that there is an equal spread of sample areas through the division".

Doubtless, instructions of this type must lead to problems in their execution, even with people somewhat acquainted with the ideas of sampling. The definition of non-typical EA's is vague enough to permit very different interpretations, especially with no explanation given about the purpose of this procedure. Thus later examination of all census material in the processing stage disclosed a variety of responses to the instructions. One, not infrequent, was to include relatively sparsely populated areas among the non-typical EA's. This could lead to a rather large number of EA's being included in this category, sometimes at the expense of sample EA's which then numbered far less than the expected 20%. Another was to use the sample questionnaire only for the institution found in an EA, the remaining population being enumerated with the general questionnaire. Subsequent reclassification of such cases was carried out

(7) Census Volume 5, op.cit., p.69.

in the light of all available information on the character of the EA's. Frequently this had to be done in a fairly arbitrary way and the desired randomness of the sample was in no way guaranteed.

The idea about a serpentine type of systematic sampling meant that the serial numbering of EA's was discarded as a basis for sampling. The size and location of EA's usually varied substantially even within the not so large divisions, and the special account to be taken of pre-selected non-typical EA's added to the difficulties in finding a pattern for selection on the EA maps. In some districts the instructions were simply ignored and a straight-forward systematic sample drawn using the EA numbers. Other deviations from the instructions are not known, but the variations in resulting proportions of sample and non-typical EA's in the final material (cf table 2.1) certainly do not eliminate the possibility of still other ways of coping with these problems.

The net effects of these deviations from the sample plan are, very likely, systematic errors or bias in the sample estimates. An overrepresentation of sparsely populated EA's converted from non-typical to sample EA's, would be likely to have such consequences, as would the non-random inclusion of special groups such as school children or hospital patients.

2.1.13 Crucial points in data collection

In the brief review below of aspects of the collection of required information in the census, a convenient distinction is the one between the enumerator, the questionnaire, and the respondent. The interaction between these three parts is what largely determines the quality of the census data.

The general questionnaire was little more than a schedule for the counting of people and need not be dealt with here. The sample questionnaire on the other hand was what would be regarded as unusually elaborate in the context of African censuses. Its most predominant feature was the inclusion of a large number of items, referring to three different units of measurement and with arrangement for notification of replies in the form of codes suitable for later processing. Thus the task of the enumerator was certainly not very easy.

The questionnaire started with a series of questions referring to each individual member of the household, with membership defined in relation to the head of household. Immediate problems here were the definition of a household and the selection of a head among those present during the census night. The vague instructions on the first point seem to have led to different practices in the 1957 and 1967 censuses resulting in an apparently smaller household size in 1967. Most of the difference seems to be related to the treatment of polygamous households, which were not even mentioned in the census instructions (a). The second part of the questionnaire contained questions referring to either the head of household or the household itself. The third, for urban households only,

(a) Census Volume 5, *op.cit.*, p.64.

referred to the dwelling occupied by the household, often part of a house but not clearly distinguished from the house as such. *

Several of the concepts used in the different questions were alien to the culture of the country and consequently presented formidable problems in the translation from English to Swahili. Examples of these are "household" and "boarder". Even "tribe" in its Swahili version appears to be ambiguous, as seen from the discussion in Ch. 10 below. The most crucial problems were however encountered in the translation of economic concepts such as "economic activity", "economic status", "occupation" and "industry".

Pre-coded replies in the questionnaire assisted in the interpretation of these concepts, but generally the enumerator had to resort to the instruction booklet issued by Census Headquarters. Unfortunately, this booklet surpassed even the questionnaire in general abstraction and ignorance of practical problems. Drawn up basically on the U.N. recommendations for population censuses, the booklet gave very general definitions of concepts and categorizations and rarely contained any references to the specific social and economic conditions of the country.

The enumerators using these devices were mainly secondary school students, assisted by their teachers or other adult supervisors. The students were trained during week-long courses preceding the census, in the theory and practice of the enumeration. The tutors, who were their supervisors, also largely lacked any former experience of formal interviewing. The courses were the last in a sequence of four levels, starting with a central course run by census headquarters in Dar es Salaam and with intermediate steps on regional and district levels respectively.

Unavoidably, the many links between centre and periphery meant a multitude of opportunities for misinterpretation and invention, especially as the only combining element, the instruction booklet, was so completely devoid of any specific guidance on local problems.

Local variations in the interpretation of concepts and methods were probably very common, and may account for parts of the variation in results from the census. Economic data perhaps provide the best example. The economic classification of women apparently presented many difficulties due to their double role as home-maker and agricultural worker, and the instructions offered little guidance in their heavy reliance on conditions in an industrialized type of society. The direction of solutions chosen also varied strongly; in some districts the vast majority, in others only a small proportion of the women were classified as economically active. The concept (gainfully) "employed" similarly caused problems in interpretation. In Mafia district only persons employed for wages were classified in this category, and peasants and fishermen were regarded as "others not working". All sample EA's in this district had to be re-enumerated to correct for this error.

The unusual demands thus put on the enumerator inevitably must have affected his way of stating the questions to the respondents and their report in general. Nevertheless, the overwhelming evidence is in the direction of good cooperation from the respondents. Reports to the

contrary deal with instances of a general reluctance to participate, as in the case of the farmer fearing fiscal measures following the "registration", or the unemployed urban dweller risking transfer to a rural project (9). But apart from these, cooperation generally seems to have been good and only clearly delicate questions like the one on employment or on persons deceased in the last year seem to have led to possibly deliberate falsification of replies.

2.1.1.4 Shortcomings in the data processing

The processing of the vast amount of census documents - over two million people in the sample - required the establishment of a separate unit for all the work of sorting, editing, coding and punching. Shortage of trained staff characterized this phase of the census work at least as much as any of the earlier with consequent difficulties in reconciling output with accuracy of the work. As the main part of the sample questionnaire was pre-coded, the two most important stages were editing and punching, both done by completely new staff with limited supervision, with comparatively low levels of remuneration and with a, by all standards, pretty boring task ahead of them.

Coding was done for four questions; "occupation", "industry", "agricultural produce" and "tribe". In all four cases serious problems were encountered. Information on economic activities was very often vague and/or ambiguous, resulting in a coding under main groups only rather than the more detailed classification devised. The agricultural procedures mentioned were often as many as to make the choice of a "main" and "secondary" produce very difficult. And the heading "tribe" turned out to cover over 400 different names, which to be approximately allocated to recognized tribes would have required a fairly extensive period of inquiries into available anthropological and other evidence.

The coding difficulties reflect the weaknesses in the earlier stages of the census. The enumerators, without access to a classification of occupation and industry, naturally had many problems in describing properly, in Swahili, the economic activities of respondents. A precise classification in Swahili and adjusted to the characteristics of the labour market in Tanzania, would probably have gone far in improving the quality of data. Similarly, a simple listing of 130 odd tribal names as was done in the Census Introductions could hardly be expected to have very much impact on the enumerators' work. It appears that to be of value, the collection of data on an item like tribe would have to be preceded by fairly thorough investigations and classifications of the existing and socially relevant ethnic distinctions.

All punching work was checked by independent verification. This normally safe method did not work so well in the present case, partly due to the introduction of a system of payment per work-load without a functioning control device. The not very thorough editing of the documents plus the

(9) A few months before the census, one of the directives of the Arusha Declaration was put into effect by a general call to all unemployed and idle persons in the towns to go back to the country and work on rural development.

fact that punching was done directly from the questionnaires undoubtedly put great strain onto the punching staff. The result was a sometimes rather high frequency of errors in the material punched and fed into the computer.

Various tests of consistency and range of values were performed in the computer. Several rounds of test runs were made with subsequent detailed examination of error printouts. The examination led to a classification of errors into three groups: those originating in the field and often not possible to correct, those produced in the coding-editing, and those resulting from faulty punching. Apart from attempts at reducing the errors in the manual processing, serious efforts were made to classify occurring errors in such a way that automatic corrections could be made by the computer, without at the same time introducing new and unknown errors. The complete eradication of all data inconsistent with one or two variables, e.g. age, was also considered.

However, none of the above attempts was found to be really satisfactory, the variety of errors making universal automatic corrections impossible and the reliance on one variable such as age hardly justified on grounds of the frequency of misstatements in this variable as well. The resulting procedure used retained some automatic corrections of inconsistencies of a more undisputable character, plus the replacement of "illegal" values with "not stated". But the major part of the consistency checks was used to detect the EAs impaired by high frequencies of errors. These EAs were revised completely, but the inconsistencies reported in other EAs were left unattended, leading to perhaps healthy warnings to the data consumer in the form of very apparent inconsistencies in some of the tables published.

21.2 Summary of errors in the data ⁽¹⁰⁾

Generally, inconsistencies and other errors in the data are examined and reported in the later chapters of this volume. Only a brief summary of the deficiencies is therefore deemed necessary.

Of the *demographic variables* none could be said to be completely free from errors. Evidence on underreporting points to sex-selectivity; young men being the most difficult category to cover ⁽¹¹⁾. Age distortions are heavy, a combination of digital preference and systematic over-estimation where the use of an event calendar with about ten events only added further to the otherwise fairly regular age-heaping pattern. Under-reporting of young children seems also to have affected the distribution.

The question on current fertility appears to have resulted in over-reporting of children born due to misconceptions about the reference period. Retrospective fertility, on the other hand, would seem to be underreported, a common error due to memory lapse and exclusion of children deceased soon after birth. One question was, optimistically,

⁽¹⁰⁾ See also Census Volume 5, especially Ch. 6 with appendices.

⁽¹¹⁾ See 'The Runge Survey' in the present volume.

directly inquiring into the number of persons deceased in the household during the last year; for many the best way to evade the question appears to have been a simple denial of any deaths.

Of the *educational questions* the one on literacy gave results remarkably similar to that on formal education. In the population at large, schooling however short, meant that the person was literate and absence of formal education that he was illiterate. Attempts to test the level of literacy a bit more accurately in a subsequent household budget survey also failed, and it can therefore truly be stated that we have no useful estimate of the level of literacy in Tanzania.

Questions on *economic activities* gave the same very unreliable results. This is evidenced by the widespread confusion as to the classification of women in "economic activity" and "economic status". The gross differences in classification principles used led the census office at some stage in the processing to institute a rule recognizing adult women in rural households as economically active. Exactly how and where this rule was applied remains unknown, but it would seem clear that no value whatsoever can be attached to the resultant findings on the economic activities of women. In fact the results for men may not be so much better; as seen in the second part of this chapter (para. 2.2.8.), the only variables for which no reliable conclusions could be reached on the size of the sample errors were the two related to economic activity.

Household data on *agricultural activities* proved quite difficult to interpret, partly due to the uncertainties as to how polygamous households have been treated, but mainly related to problems in the translation. Firstly, the distinction between what was called "main" and "secondary" agricultural produce was never really clear; secondly, these headings were both translated into plural form in Swahili with the result that rarely as few as two crops appeared on the questionnaire. Arbitrarily, the two first recorded crops were chosen for coding in the processing of data.

The housing questions required a sudden shift over to the house as the focus for attention. The relation between the premises occupied by the household and the entire house was easily confused. Further, the translation of such terms as "kitchen" or "bath-shower" proved very difficult, as did the interpretation in relation to the variety of ways of living of the urban population of Tanzania. A sign of the difficulties encountered perhaps lay in the fact that no definition of these concepts was ever attempted by the Census Headquarters.

2.1.3 Priorities in error reduction

In the foregoing, the type of errors in the census data have been outlined, and some ideas have been given as to where in the census process they were likely to appear. In any census, perhaps the most crucial question is the allocation of limited resources to phases of the work so as to achieve optimum output. This question is however rarely mentioned

in the rich methodological literature, which sometimes gives the impression of being a collation of the efforts of individual specialists rather than a comprehensive account of the whole census operation.

The allocation of resources should be done so as to maximize the accuracy of information given, in terms of coverage, distortions and sample errors. Of course, the planning stage must also involve an unprejudiced evaluation of the type of information requested, in the light of limited resources and their application. Regarding the three types of errors, however, it appears that the problem of coverage is relatively independent of the other two. A good coverage is the result of careful preparations in the field, far-reaching census publicity and education, and the installment in all staff of a strong motivation to achieve a complete - but not more - coverage of the population. These measures are universal for the field and independent of the size of a sample or the type of questions asked.

The latter types of error, sample and non-sample, are however intimately connected. Resources allocated in one direction are thereby automatically withdrawn from use in the other. The sample error is directly related to two aspects, sampling technique and sample fraction, which for the present purpose can be subsumed under the most important aspect of sample fraction. In the early stages of the census preparations, a fraction of 10% was suggested, fairly high in African experiences. Later consideration of this fairly arbitrary figure in relation to the administrative levels for which results would be requested led to a doubling of the fraction to 20% of the total population, to which should be added the effect of special selection of non-typical rural EA's and of a 100% sample in all urban areas.

This decision appears to have been taken in comparative isolation from the other aspects of the census operation. Numerically, it meant a doubling of the skilled enumerators required and an extra strain on the training and supervisory capacity within each district. A doubling of the amount of material to be processed could be seen in an almost proportional reduction in the thoroughness and accuracy of that part of the work, besides a no less important delay in the publication of final census results.

The increase in sample fraction was paralleled by an increasingly elaborate census form, developed in response to demand from government departments suffering from lack of information. The resulting form, perhaps unique in tropical Africa, put extremely high demands on the census organization through the number and difficulty of questions asked, the pre-coding of most questions, and the general lack of suitable written guidance and specification of the questionnaire.

These two factors, sample size and census form, combined into a pressure on the census resources which could well have led to a partial or complete breakdown in the operations. This did not happen, but it will probably be recognized that the quality of data collected are out of all proportion with the costs, in manpower and money, of the census. If this is so, the consideration of resources in relation to quality requirements must have failed to find the optimum allocation. But which allocation would be

better?

The second part of this chapter gives an idea of the errors on district levels for different characteristics and with the sample fraction given. Despite the unusually high proportion in the sample, sample errors are still fairly large, and would consequently be far larger with a reduction to the 10% suggested originally. At the same time, the districts of Tanzania are historically well set, reasonably homogenous and therefore natural units of regional planning. To discard them altogether in favour of the much larger regions would mean a heavy loss for the consumers of census data.

The questionnaire was detailed and elaborate. The many questions included represented a situation of extreme lack of data compared to the needs of an expanding planning sector. The precautions in the form of pre-coding were inevitable if the mass of information should ever reach beyond the census form itself. Still, reductions in the number of items could well have been defended not the least in view of the recognized inability of a census to produce useful information on these items. The whole set of questions on economic activities is a case in point. These questions were excluded from the 1969 censuses in Kenya, Uganda and Zambia on exactly those grounds. Similarly, questions related to agricultural practice or the consumption of housing can never be either very completely or accurately answered in the context of a population census.

But again, with a smaller sample more attention could have been given to the selection and training of sample enumerators, who would then be able to work with more complicated types of census forms. Thus we have the case of a dialectical process with a continuous adjustment of both the two components in the search for an optimum. The 1967 census experience clearly states that isolated consideration of one component obstructs the improvements sought, and that only an integrated play on all the components will bring the results anywhere near the possible optimum level.

Experiences from African censuses now date back around 25 years. Progress has been made and experiences accumulated in a variety of different ways. The problem appears to be to communicate these experiences to the individual country in such a way that they can be used with maximum benefit. In the case of Tanzania, lack of this type of experience was a common feature among expatriate as well as local staff. The effects were unrealistic assumptions about the capacity of different elements and, consequently, too high levels of aspirations in virtually all respects. Perhaps the hard-won experience of Tanzania, if communicated in time and space, will lead to a greater caution and a more thorough examination of different factors in the preparation of future censuses; if so, the effort may still have been worth making.

Part 2 Sampling Errors

by Warren McGillivray

2.2.0 Introduction

The use of sampling methods in conjunction with a population census in order to obtain additional demographic data at reasonable cost has been a feature of recent population censuses throughout the world. The application of sampling techniques introduces sampling errors in addition to those errors which may already exist in the data if there were a complete enumeration. It is essential to identify, and to the extent possible, analyze these sampling errors. This section briefly outlines the sampling methodology, discusses the bias present in the estimates, and illustrates the precision of certain estimates for several census districts.

2.2.1 Sampling frame

The administrative units of mainland Tanzania consisting of regions; districts or towns; and divisions, wards or former townships, were further subdivided into Enumeration Areas (EA's) to facilitate the census enumeration. The subdivisions in Zanzibar differ in name from those on the mainland, however the various levels can be related. The lowest level formed the frame for the sampling aspect of the census where the EA's (clusters) were the primary sampling units. Fig. 2.1 illustrates this hierarchy of units and gives the number of units at each level.

Table 2.1 lists the districts and towns within each region and gives the number of divisions (or wards or former townships) in each district. The total number of EA's in each division is split according to the type of questionnaire used for the EA's.

2.2.2 Completely enumerated areas

Urban EA's were not sampled and the Q12 (Urban) questionnaire was used in all urban areas. In Table 2.1, mainland towns may be identified by noting that all the EA's fall in the Q12 column. Other mainland districts with EA's in both the Q12 and Q10S columns are those which include a Former Government Township (including Mwadui Mining Settlement). The five urban areas in Zanzibar are those with EA's entered in the column headed Q12.

In mainland rural districts, non-typical EA's were identified and completely enumerated using a Q10 questionnaire. Non-typical EA's were

Table 2.1 Information on Enumeration Areas by district

Table 2.1 Information on Enumeration Areas by district										Average # per E.A.	
Code	Region District or Town	No. of Divi- sions (1)	No. of Enumeration Areas					No. (2)	r (3) %	House holds	Total Popl.
			Total	Sampled (Q102)	Non- Sampled (Q11)	Non- Typical (Q10M)	Urban (Q12)				
01 ARUSHA REGION											
Q11	Arusha Town	8	69				69	1	22	116	636
Q12*	Arusha District	6	265	61	222	1		6	21	149	278
Q13*	Masai/Monduli	7	165	31	142			3	20	149	774
Q14*	Mbulu	6	374	73	297	1					
02 COAST REGION											
Q21*	Bagamoyo	7	186	32	128	12	14		20	147	632
Q22	Kisarawe	10	266	62	207	17			23	168	631
Q24	Mafia	2	25	5	20				20	194	670
Q25	Mtwara	3	126	26	96	4			21	162	400
Q26	Mufiji	6	300	61	200	6		13	17	81	318
03 DODOMA REGION											
Q31	Dodoma Town	6	54				54				
Q32*	Idioha	6	323	35	270	8			17	209	893
Q33*	Imbo	6	315	72	290		13		20	134	566
Q34	Mpungwa	6	227	43	178	1	5		19	148	776
04 IRINGA REGION											
Q41	Iringa Town	9	39				39				
Q42	Iringa	9	268	43	192	33			18 a (4)	179	861
Q43	Mufindi	5	128	29	90	9			24 a	205	920
Q44	Njombe	3	451	83	336	32			20 a	166	707
05 KIGOMA REGION											
Q51	Kasulo	5	260	47	196	17			19 a	170	799
Q52	Kibondo	4	189	34	153			2	18 a	162	724
Q53	Kigoma/Ujiji Town	8	47				47				
Q54	Kigoma	5	165	29	117	13		4	20 a	149	652
06 KILIMANJARO REGION											
Q61*	Kilimanjaro	7	679	133	524	22			20	139	701
Q62	Moshi Town	6	51				51				
Q63*	Dungu/Pare	6	281	37	222	1		1	20	106	333
07 MARA REGION											
Q71	Musoma Town	6	28				28				
Q72	Musoma	7	401	62	321	18			16	141	848
Q73	North Mara	9	283	53	215	15			20	107	666
08 MBEYA REGION											
Q81*	Shinyanga	4	116	19	75	11	4	7	20 a	105	462
Q82	Mbeya Town	5	25				25				
Q83*	Mbeya	2	288	50	215	15			21 a	128	626
Q84*	Mbosi	6	143	27	122				18 a	180	390
Q85*	Mnge	8	561	127	514	11	9		20	118	545
Q86*	Mtambwe	5	107	19	72	16			21 a	414	2,012
09 MOROGORO REGION											
Q91*	Kilosa	8	262	48	193	6	15		20	161	740
Q92	Morogoro Town	6	49				49				
Q93*	Morogoro	5	387	67	296	24			17	185	752
Q94	Olanga	5	168	50	133			5	27	199	930
10 MTWARA REGION											
101	Kilwa	6	115	34	89	2			21 a	218	852
102	Lindi Town	6	31				31				
103	Lindi	15	324	54	220	50			20 a	136	704
104	Masasi	7	281	58	213	10			21 a	207	760
105	Mtwara-Mikindani	7	30				30				
106	Mtwara	6	140	27	107	6			20 a	216	817
107	Mtwara	7	138	38	100	3	7		22 a	150	583
108	Nachingwea								19 a	167	640
109	Nevula	5	426	82	342	2					
11 MWANZA REGION											
111	Solta	7	435	60	370	25			14	139	816
112	Malya/Kwinba	7	520	102	411	7			20 a	107	588
113	Mwanza Town	8	73				73				
114	Mwanza	5	313	54	248	13			18 a	118	750
115	Ukerewe	5	105	18	77	1	9		19 a	197	1,041
12 MVOHIA REGION											
121	Mbinga	2	202	38	142	22			21 a	154	713
122	Songea	5	258	43	177	28	10		20 a	147	583
123	Tunduru	6	127	9	97	21			8 a	237	768
13 SHINYANGA REGION											
131	Kahama	6	267	44	192	1	8	2	19 a	125	598
132	Maswa	7	658	130	527			1	20 a	104	655
133	Shinyanga	8	478	87	362	4	23	2	19 a	125	671
14 SINGIDA REGION											
141	Irembo	7	273	55	214	8			20 a	180	664
142	Ruvuani	3	105	21	83	1			20 a	192	763
143	Singida	7	263	41	188	8	26		18 a	163	737

Table 2.1 (continued)

Table 2.1 (continued)		No. of Enumeration Areas							Average per E.A.		
Code	Region District or Town	No. of Divi- sions (1)	Total	Sampled (Q108)	Non- Sampled (Q11)	Non- Typical (Q109)	Urban (Q12)	PO ^a (3)	r (3) %	House holds	Total Popl.
15 TAZARA REGION											
151	Mpanda	5	117	22	92	5			19	119	520
152	Kwaga	4	475	128	342	5			27	153	636
153	Tabora Town	0	44				44				
154	Tabora	7	258	59	192	7			24	169	694
16 TANGA REGION											
161	Kandola	9	205	34	163	8			17	153	650
162	Korogwe	5	211	40	161	1	9		20	183	665
163	Lushoto	7	325	59	259	3	2		19	137	542
164	Pongani	4	45	7	32		9		18	106	532
165	Tanga Munic.	9	113				113				
166	Tanga	5	352	83	277	6			25	171	561
17 WEST LAKE REGION											
171	Biharamulo	5	123	24	99				20	142	665
172	Mukoba Town	6	16				16				
173	Mukoba	5	599	109	415	5		10	19	169	626
174	Karagee	4	215	36	159	10		11	10	104	451
175	Ngora	2	196	38	156	2			20	121	491
18 DAR ES SALAAM CITY											
		17	492				490	2			
MAINLAND TOTALS		409	17,781	3,112	12,699	563	1,343	70	19.7		
19 ZANZIBAR & PATEA											
191	Zanzibar Town	6	148				148		2 ⁽¹⁾		
192	Magherib Area	2	57			31	26		7		
193	South Region	2	90			58			7		
194	North Region	2	119			119			7		
195	Chake	3	104			82	22		7		
196	Mkomini	3	94			85	9		7		
197	Wete	3	134			114	20		7		
ZANZIBAR TOTALS		21	734			529	225				
TANZANIA TOTALS		430	18,515	3,112	12,699	1,092	1,568	70			

(1) includes wards and former townships where applicable.

(2) "0" indicates uninhabited areas such as game reserves or forest reserves.

(3) $x = \frac{\text{No. of Q108 E.A.'s in the district}}{\text{No. of Q108 + Q11 E.A.'s in the district}} \times 100$.

(4) * indicates oversampling occurred in the district.

(5) P indicates the single stage sample taken in Zanzibar.

* indicates districts included in the analysis of coefficients of variation.

those wherein a large institution (such as a school, hospital, or prison) with more than 300 inhabitants comprised more than one-half of the population of the EA. Large, virtually uninhabited EA's were also classified as non-typical EA's. These EA's are listed under the column headed Q109 in Table 2.1.

2.2.3 Sampled enumeration areas

The remaining mainland rural EA's were sampled systematically. The procedure followed was to connect all the EA's which could enter the sample in a division by a serpentine path beginning at the northern end of the division. The first sample EA was selected by a chance throw of a die from the five EA's at the northern end of the division. Thereafter every fifth EA was included in the sample (1). This procedure yielded a

(1) Census Volume 5, Census Methodology. Bureau of Statistics, Dar es Salaam, 1971, p. 50 and p. 69.

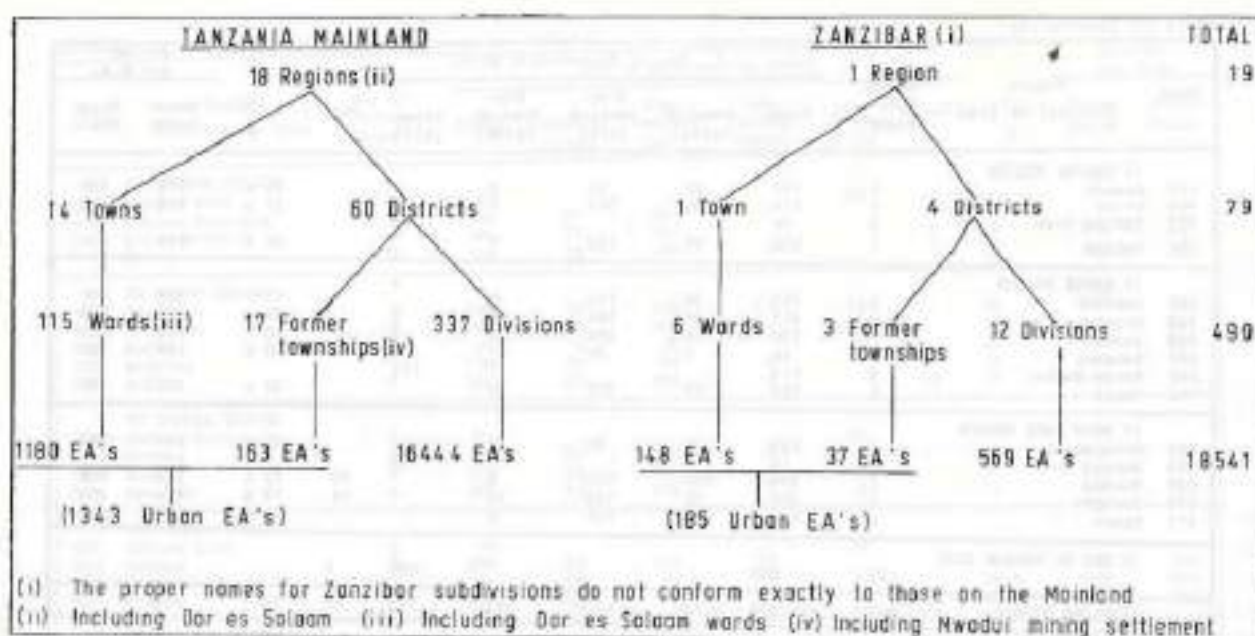


Figure 2.1 Administrative units, Tanzania 1967

20% systematic sample with deviations from 20% occurring wherever the total number of potential sample EA's in a division was not divisible by five. The element of geographical stratification introduced by the systematic sampling should serve to somewhat reduce the sampling error. The number of sampled EA's in each district is listed in Table 2.1 under the column headed Q10S. The number of EA's which did not enter the sample is listed under the column headed Q11. The actual percentage sampling fraction in each sampled district is given under the column headed f; where, for each sampled district,

$$f = \frac{\text{number of Q10S EA's in the district}}{\text{number of Q10S + Q11 EA's in the district}} \times 100$$

2.2.4 Subsampling (2)

In the course of preparing the data for processing, in order to expedite the card punching of the data and reduce the computer time required, a one-third systematic subsample of the sampled (Q10S) EA's was taken in certain districts. Every third private household and every third person in collective households entered the subsample. Districts wherein subsampling occurred are designated in the column giving the (first stage) sampling fraction, f, in Table 2.1.

For Zanzibar, where no field sampling was conducted, a sample of every fifth household was taken from the data. This single stage sample (denoted P in the column headed f in Table 2.1) was taken from the complete enumeration for the reasons noted above.

(2) Ibid., p. 20.

2.2.5 Sample estimates

It is evident from Table 2.1 that there is considerable variation in the number of EA's in each division and that in the districts the EA's vary greatly in average population and number of households size. Hence multiplication of the sample estimate by the reciprocal of the sampling fraction (proportion of EA's sampled in a division) would produce a high sampling error in the estimate of the division total. The availability of an auxiliary variable from the census enumeration permitted the use of ratio estimates for division totals. This auxiliary variable (M) is the number of persons or, in the case of an economic variable, the number of households, in the appropriate level.

In the description of the method of estimation and the calculation of standard errors, the following notation will be used:

N_i = total number of EA's in division i

n_i = number of EA's in the sample from division i

n = number of divisions in the district

M_{ij} = census total of characteristic M in the j^{th} EA of division i

$M_{i.} = \sum_{j=1}^{N_i} M_{ij}$ = census total of characteristic M in division i

$M_{..} = \sum_{i=1}^n M_{i.}$ = census total of characteristic M in district

$M_{i.}^s = \sum_{j=1}^{n_i} M_{ij}$ = census total of characteristic M in EA's sampled in division i

y_{ij} = sample total of characteristic Y in the j^{th} EA of division i

$y_{i.} = \sum_{j=1}^{n_i} y_{ij}$ = sample total of characteristic Y in division i

$y_{..} = \sum_{i=1}^n y_{i.}$ = sample total of characteristic Y in district

x_{ij} , $x_{i.}$, $x_{..}$ and m_{ij} , $m_{i.}$, $m_{..}$ are defined as y_{ij} , $y_{i.}$, $y_{..}$ for characteristics X and M respectively.

The Census Office then computed estimates in the following manner:

$$\hat{Y}_{ij} = \frac{M_{ij}}{m_{ij}} y_{ij} \quad = \text{estimated total of characteristic Y in EA } ij.$$

$$\hat{Y}_{i.} = \frac{M_{i.}}{M_{i.}^s} \sum_{j=1}^{n_i} \hat{Y}_{ij} \quad = \text{estimated total of characteristic Y in division } i; \\ \text{except for non-typical EA's where the weight } M_{i.}/M_{i.}^s \\ \text{is taken to be 1. In urban areas (where there was} \\ \text{no sampling) this weight is also equated to 1.}$$

$$\hat{Y}_{..} = \sum_{i=1}^n \hat{Y}_{i.} \quad = \text{estimated total of characteristic Y in district.} \\ \text{Regional and national estimates were obtained by} \\ \text{adding the appropriate district estimates.}$$

For all but the two-stage sampled mainland EA's, the weight M_{ij}/m_{ij} is approximately equal to 1. Deviations from 1 arise due to non-response and mispunching of the data. For mainland subsampled EA's, this weight is approximately 3. The weight $M_{i.}/M_{i.}^s$ is approximately equal to 5 for mainland rural divisions except, as noted above, when $\hat{Y}_{ij}$ is the response for a non-typical EA.

The data produced in 1967 population census volumes 3 (3) and 4 (4) may be used to calculate estimates of ratios at district (and higher) levels of the form: $\hat{R} = \frac{\hat{Y}_{..}}{\hat{X}_{..}}$ = estimated ratio in district.

At the division level the estimate would be $\hat{R}_i = \frac{\hat{Y}_{i.}}{\hat{X}_{i.}}$.

The estimates of ratios for which standard errors and coefficients of variation were calculated differ from $\hat{R}$ in the following ways:

- Non-typical EA's have been excluded. Since these EA's were not sampled, they do not contribute to the error arising from sampling.
- Urban EA's and Former Government Townships (which were not sampled) are included and the standard errors computed as though a 20% sample had been selected from them. In Table 2.1 it can be seen that there are few such EA's in the districts selected for analysis.

(3) Census Volume 3: Demographic Statistics. Bureau of Statistics, Dar es Salaam, 1971.

(4) Census Volume 4: Economic Statistics. Bureau of Statistics, Dar es Salaam, 1971.

- District estimates of ratios have been calculated using separate ratio estimates (defined $\hat{R}$ below), which are weighted averages of the division estimates of the ratios.

The ratios to be investigated are of the form:

$$\hat{R} = \sum_{i=1}^n \frac{N_i}{N} \hat{R}_i = \text{estimated ratio in district, where}$$

$$\hat{R}_i = \frac{\sum_{j=1}^{n_i} \hat{Y}_{ij}}{\sum_{j=1}^{n_i} \hat{X}_{ij}} = \text{estimated ratio in division } i, \text{ and}$$

$$N = \sum_{i=1}^n N_i = \text{total number of EA's in district.}$$

The ratios $\hat{R}^*$ and $\hat{R}$ differ due to the different treatment of the non-typical EA's, and at the district level due to the different methods of calculation. $\hat{R}^*$ is a combined ratio estimate whereas $\hat{R}$ is a separate ratio estimate (5).

Table 2.2 gives both ratios for the characteristics and districts studied.

Table 2.2 Ratios and coefficients of variation for selected districts

Table 2.2. Nation and coefficient of variation for selected districts																									
Dist. Code*	Popul. '000s	(1)			(2)			(3)			(4)			(5)			(6)			(7)			(8)		
		$\hat{R}^*$	$\hat{R}$	cv %	$\hat{R}^*$	$\hat{R}$	cv %	$\hat{R}^*$	$\hat{R}$	cv %	$\hat{R}^*$	$\hat{R}$	cv %	$\hat{R}^*$	$\hat{R}$	cv %	$\hat{R}^*$	$\hat{R}$	cv %	$\hat{R}^*$	$\hat{R}$	cv %	$\hat{R}^*$	$\hat{R}$	cv %
081	476	878	882	1	516	521	2	404	558	2	801	818	2	382	372	3	448	446	2	***	11	13	***	152	12
085	360	721	724	1	407	407	2	554	410	3	625	622	2	206	206	5	263	266	4	3	0			69	10
032	237	793	796	2	414	419	3	281	370	4	614	680	4	129	120	9	171	163	9	2	0			27	22
093	291	784	791	3	383	384	3	276	348	5	716	716	4	236	237	8	292	292	6	10	50			91	14
014	289	866	878	1	479	466	3	310	438	4	481	445	6	123	131	12	184	185	9	12	39			100	15
086	215	757	753	3	472	469	5	359	428	8	551	558	6	86	75	25	202	193	18	1	31			32	6
055	212	848	854	1	440	437	3	375	451	4	686	684	3	168	188	7	250	267	7	3	0			31	17
091	194	783	792	1	405	403	2	324	432	4	508	505	7	172	196	12	235	256	11	10	14			291	9
010	182	914	917	1	486	490	3	340	429	5	607	610	7	188	185	7	276	275	6	32	23			286	13
093	180	710	711	2	418	424	4	334	385	7	719	631	6	308	197	12	262	254	9	8	33			120	16
063	150	882	883	1	523	524	5	393	496	4	722	726	4	307	401	3	451	455	3	11	18			162	21
084	147	717	714	2	490	491	4	342	387	7	837	838	3	113	111	15	181	178	11	1	86			32	19
001	110	822	821	2	395	404	2	295	368	6	553	572	6	148	154	11	295	308	14	7	39			91	21
013	107	912	918	1	435	438	5	366	476	7	596	615	8	166	162	23	310	308	18	12	81			71	33
081	54	687	678	8	442	444	4	300	341	10	604	633	9	257	260	20	359	367	17	6	40			55	14

* Districts selected for analysis are ranked in order of population.

** Ratios $\hat{R}^*$ and $\hat{R}$ have each been multiplied by 1000 in the Table.

*** Data not published at the district level.

- (5) A thorough exposition of these estimates, their standard errors, and their properties may be found in W.G.Cochran, Sampling Techniques, 2nd Ed. New York, Wiley, 1963.

2.2.6 Calculation of standard errors

Ignoring the EA level weights (M_{1j}/m_{1j}) which are approximately equal to 1 and have little effect on $\hat{R}_1^*$ and $\hat{R}_1$, then at the division level,

$$\hat{R}_1^* \doteq \hat{R}_1 = \frac{\sum_{j=1}^{n_1} y_{1j}}{\sum_{j=1}^{n_1} x_{1j}} = \frac{\bar{y}_{1.}}{\bar{x}_{1.}} = \hat{R}_1^* \quad (6)$$

Since both $\bar{y}_{1.}$ and $\bar{x}_{1.}$ vary from sample to sample, an approximate formula for the true variance of $\hat{R}_1^*$ is required.

$$\begin{aligned} \text{Var}(\hat{R}_1^*) &= E(\hat{R}_1^* - R)^2 = E\left(\frac{\bar{y}_{1.}}{\bar{x}_{1.}} - R\right)^2 = E\left(\frac{\bar{y}_{1.} - R\bar{x}_{1.}}{\bar{x}_{1.}}\right)^2 \\ &= E\left(\frac{\bar{y}_{1.} - R\bar{x}_{1.}}{\bar{x}_{1.}}\right)^2 = \frac{E(\bar{y}_{1.} - R\bar{x}_{1.})^2}{(\bar{x}_{1.})^2} \\ &= \frac{(N_1 - n_1)}{N_1 n_1 (\bar{x}_{1.})^2} \sum_{j=1}^{n_1} \frac{(y_{1j} - Rx_{1j})^2}{(N_1 - 1)} \end{aligned}$$

where X and R are the true population values.

The sample estimate of the variance is then,

$$\text{var}(\hat{R}_1^*) = \frac{(N_1 - n_1)}{N_1 n_1 (\bar{x}_{1.})^2} \sum_{j=1}^{n_1} \frac{(y_{1j} - \hat{R}_1^* x_{1j})^2}{(n_1 - 1)}$$

Where $\bar{x}_{1.}$ is unknown, the sample estimate $\bar{x}_{1.}$ is substituted for it. In the previous equation this substitution yields:

$$\text{var}(\hat{R}_1^*) = \frac{(N_1 - n_1)}{N_1} \frac{n_1}{\left\{ \sum_{j=1}^{n_1} x_{1j} \right\}^2} \sum_{j=1}^{n_1} \frac{(y_{1j} - \hat{R}_1^* x_{1j})^2}{(n_1 - 1)}$$

(6) The first approximation arises since $\hat{R}_1^*$ is calculated including the responses from non-typical EA's while $\hat{R}_1$ excludes these responses.

Expansion of the numerator of this expression will lead to a practical computation formula for $\text{var}(\hat{R}_1^*)$.

At the district level, again ignoring the weights at the EA level,

$$\hat{R} = \sum_{i=1}^n \frac{N_i}{N} \hat{R}_i \doteq \sum_{i=1}^n \frac{N_i}{N} \hat{R}_i^*$$

and the sample estimate of the variance is given by

$$\text{var}(\hat{R}) = \sum_{i=1}^n \frac{(N_i)^2}{N^2} \text{var}(\hat{R}_i) \doteq \sum_{i=1}^n \frac{(N_i)^2}{N^2} \text{var}(\hat{R}_i^*)$$

The standard error is then the square root of $\text{var}(\hat{R})$, and the coefficient of variation is the ratio of the standard error to the estimate.

2.2.7 Properties of the estimates

(a) Estimates of population totals

The use of the auxiliary variable, M , can produce a more precise estimate of the population total than would be achieved by the use of the reciprocal of the sampling fraction as an inflation factor. To achieve this

increased precision $\sum_{j=1}^{n_1} Y_{1j}$ and $M_{1.}^s$ must exhibit strong positive correlation and the coefficients of variation of these variables must not differ greatly. This result will be achieved if the ratio $\sum_{j=1}^{n_1} Y_{1j} / M_{1.}^s$ is relatively stable from one sampled division to another.

The ratio estimate is biased. This bias is approximately proportional to $1/n_1$ and hence diminishes as the sample size, n_1 , increases. The summing of the biased division estimates, $\hat{Y}_{1.}$, can lead to a significant bias in the district estimate, $\hat{Y}...$, particularly if the bias in the $\hat{Y}_{1.}$'s is generally in one direction.

(b) Estimates of population ratios

These estimates are actually ratios of ratio estimates. Again both $\hat{R}_i^*$ and $\hat{R}$ are biased estimates, however the bias diminishes as the sample size

increases. At the district level, the combined ratio estimate, $\hat{R}^*$, is less subject to bias than is the separate ratio estimate, $\hat{R}$. However the former estimate generally has greater variance. The same considerations apply to the estimates at higher levels.

2.2.8 Coefficients of variation for selected ratios

The ratios selected for investigation of their coefficients of variation at the district level are listed below. Ratios of demographic (including migration), education, and economic characteristics were selected for analysis. The ratios investigated are utilized in other chapters of this volume. Districts included in the analysis were selected in an arbitrary manner with the objective of including districts of various sizes from the largest to the smallest. Hence (as may be observed in Table 2.2), the district with the greatest population, Kilimanjaro, and one of the smallest districts, Chunya, were included. The reference at the end of each ratio gives the table from which the data were extracted in 1967 Census Volumes 3 and 4. Data for items 7 and 8 have not been published at the district level.

1. Proportion children still alive of those ever born per female 20-24 years. (Vol. 3 Table 204).
2. Proportion 0-4 years to 15-44 years, females. (Vol. 3 Table 202).
3. Children born last 12 months per female 20-24 years. (Vol. 3 Table 204).
4. Proportion of the population born in the same locality. (Vol. 3 Table 211).
5. Proportion attending primary school among females 5-14 years. (Vol. 4 Table 303).
6. Proportion attending primary school among males 5-14 years. (Vol. 4 Table 303).
7. Proportion of employees among females 15 years and over. (Vol. 4 Table 310).
8. Proportion of employees among males 15 years and over. (Vol. 4 Table 310).

Standard errors and coefficients of variation of the above ratios were calculated for the 15 mainland districts marked with an asterisk* in Table 2.1. It was not possible to extend the analysis to publish other ratios and coefficients of variation and to include other districts because of limitations on the computer time available and the volume of data involved. The estimates $\hat{R}^*$ and $\hat{R}$ and the coefficient of variation of $\hat{R}$, cv, are listed in Table 2.2. The effect of systematic subsampling in districts 081, 083, 084, and 086 has been ignored in the calculations of standard errors for these districts. Hence the standard errors and coefficients of variation are slightly underestimated in these districts.

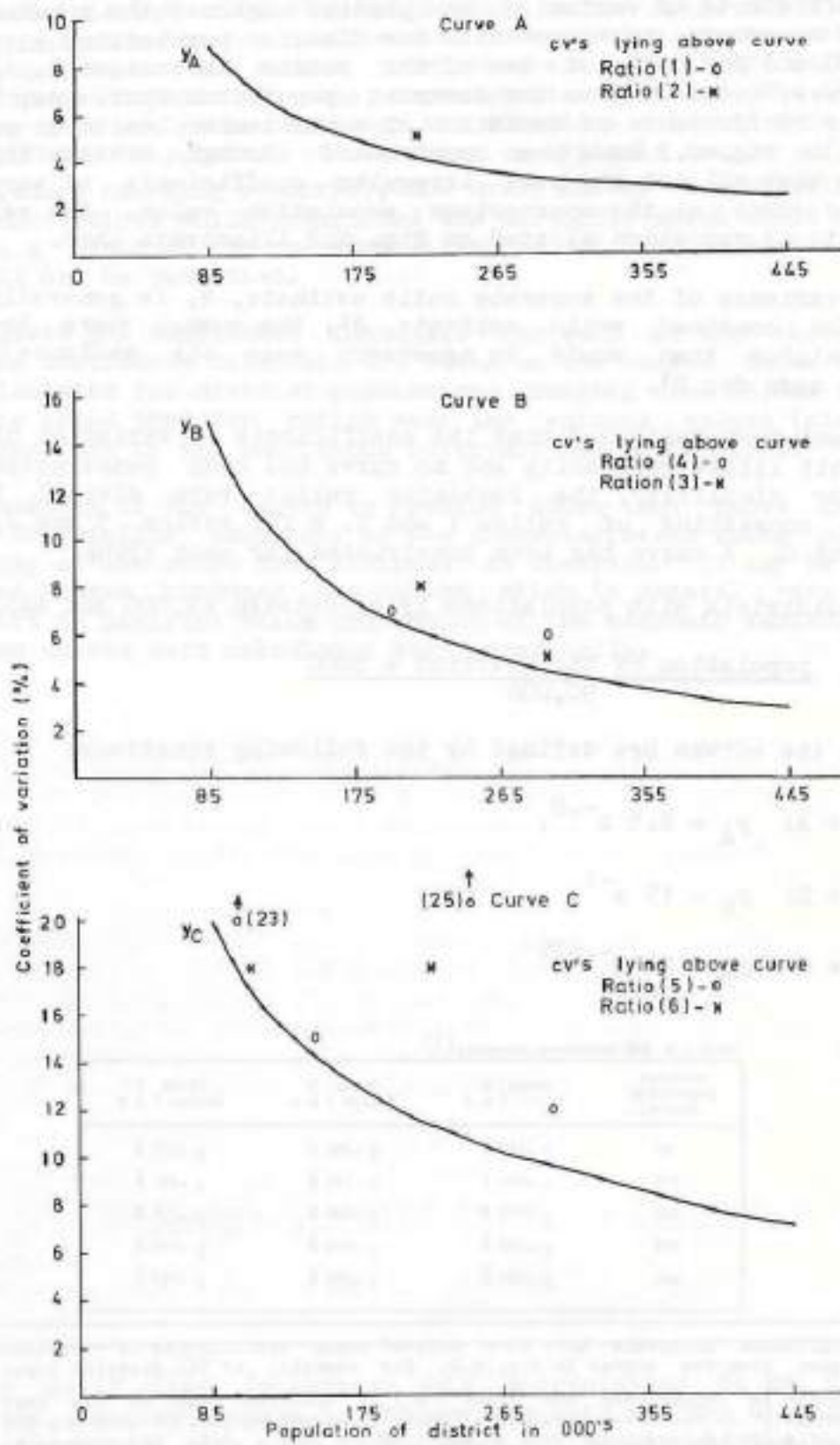


Figure 2.2 Illustrations of coefficients of variation by size of district

If the coefficients of variation are plotted against the population in the respective districts, it is possible for district populations between 85,000 and 445,000 and for all but two of the ratios investigated, to construct smooth curves, decreasing as the district population increases, below which most of the coefficients of variation of a particular ratio or ratios fall. The curves in Fig. 2.2 have been constructed through arbitrarily selected points so that all but the most irregular coefficients of variation fall beneath the curve at the appropriate population value. The values of the coefficients of variation plotted on Fig. 2.2 illustrate this.

Since the variance of the separate ratio estimate, R , is generally less than that of the combined ratio estimate, R^1 , the curves have been located somewhat higher than would be necessary were the variance estimates originally made for R^1 .

It is evident from Table 2.2 that the coefficients of variation of ratios 7 and 8 exhibit little regularity and no curve has been constructed for these ratios. For simplicity, the remaining ratios were divided into three groups; A consisting of ratios 1 and 2, B for ratios 3 and 4, and C for ratios 5 and 6. A curve has been constructed for each group.

For districts with populations lying between 85,000 and 445,000, if:

$$x = \frac{\text{population of the District} + 5000}{90,000}$$

then the curves are defined by the following equations:

$$\text{Curve A: } y_A = 8.5 x^{-.8},$$

$$\text{Curve B: } y_B = 15 x^{-1},$$

$$\text{Curve C: } y_C = 20 x^{-.625}$$

Table 2.3 95% Confidence Intervals (7)

District Population (000's)	Group A Ratios 1 & 2	Group B Ratios 3 & 4	Group C Ratios 5 & 6
85	$\pm .167 \hat{R}$	$\pm .294 \hat{R}$	$\pm .392 \hat{R}$
175	$\pm .095 \hat{R}$	$\pm .147 \hat{R}$	$\pm .255 \hat{R}$
265	$\pm .069 \hat{R}$	$\pm .090 \hat{R}$	$\pm .198 \hat{R}$
355	$\pm .055 \hat{R}$	$\pm .074 \hat{R}$	$\pm .165 \hat{R}$
445	$\pm .046 \hat{R}$	$\pm .059 \hat{R}$	$\pm .143 \hat{R}$

- (7) Confidence intervals have been derived using coefficients of variation taken from the curves in Fig. 2.2. For example: if the district population is 265,000 and the ratio ($\hat{R}$) of children born in the same locality to the total population (Ratio 4 - Group B) is .700 then the 95% confidence interval is $.700 \pm .098 (.700) = .700 \pm .069$. Adjustments to the confidence interval will be required whenever the ratio is near 0 or 1 particularly when the coefficient of variation (and hence the standard error of $\hat{R}$) is large.

For the districts and ratios investigated, curves A, B, and C demonstrate the relationship between the coefficients of variation of the ratios and the district population. The extent to which these curves are applicable to other districts depends on the representativeness of the 15 districts selected for this analysis. Although the districts selected were purposely chosen with the objective of obtaining a typical sample of the rural districts (where sampling occurred), the small number of districts included and other constraints which restricted the districts which could be selected meant that a claim of the representativeness of the 15 districts in the sample would not be justified.

Table 2.3 gives 95% confidence intervals for each of the three groups of ratios. The confidence intervals are based on the curves shown in Fig. 2.2 and are calculated for district populations ranging from 85,000 to 445,000. It should be noted that for ratios near the extreme values (plus or minus one) modifications in the confidence intervals may be required.

The applicability of the curves to ratios other than those investigated depends on the similar behaviour of the characteristics being compared and the stability of the ratio from district to district. It may be noted that curves A and B were produced for ratios which in general vary moderately from district to district while the ratios of the economic variables 7 and 8 for which no curves were calculated vary erratically.

3.1 The nature and significance of dispersion and density

The author would like to express his appreciation to Mr. S. Felme for preparing the computer program to produce the data and for his many helpful comments. Thanks are also due to Misses Y.A.J. Bhatia and Y.A.P. Lallani who performed the manual calculations. I am grateful to J.G.C. Blacker, B. Egero, E. Henin and C. Scott whose helpful criticisms and suggestions I have largely incorporated into this chapter.

3 POPULATION DISTRIBUTION AND DENSITY

by John E. Moore

3.0 Introduction

Published results of the 1967 population census of Tanzania comprise total population by sex, number of households and areal extent for regions, districts, divisions and subdivisions, and total population and number of households for Enumeration Areas (EA's). For major urban and rural areas more diverse social and economic data are available.

These results allow a much more detailed analysis of the geographical distribution and density of population than has been possible after previous censuses. In addition, with the publication of EA maps for each district and urban area, the Tanzania population can now be located within 18,541 relatively small, clearly defined unit areas averaging some 650 persons and 50 square kilometres (sq.km.) each. The areal extent of the EA's is not known and hence their density cannot be calculated. However, the number and range of such areas is so great that density values would have little meaning.

The EA data are of most value in the description of the geographical distribution of population. The limitations of map scale in this volume does not permit full use to be made of these data, but for analysis at the district level the EA statistics, used in conjunction with the relevant maps, are invaluable, for example, in administration, project evaluation or the allocation of regional funds.

Although, in general the EA's appear to have been accurately defined, errors do occur both in their location and in the definition of their boundaries. Such errors derive mainly from the lack of sufficiently detailed large scale maps (1). In mountain areas, also, enumerators seem to have experienced difficulty in identifying boundaries, especially where the terrain was rugged. Unfortunately no estimate of the magnitude of these errors can be given.

3.1 The nature and significance of distribution and density

Population distribution, in general, is the way in which people are found within the area available to them for exploitation and settlement. Population density is a more specific expression of distribution, being the ratio of a given number of people to a given area of land. It is normally stated in the form of a number of persons per sq. km. and is an average value applied to an administrative or census enumeration area.

(1) I.D.Thomas, 'Geographical Aspects of the Tanzania Population Census, 1967'. *East African Geographical Review*, Vol. 6. April 1968, pp. 1-12

In order to analyse distribution and density of population three types of data are required: absolute numbers, defined territory, and areal location (2). The first two of these are satisfied by the 1967 census, but areal location is not precisely known. Most of Tanzania's population lives in scattered homesteads whose exact position cannot be identified on existing maps. However, if the defined territory is sufficiently small the absence of exact areal location is not a serious drawback. The EA's used in the 1967 census fulfil that condition as compared with previous censuses in which the average census enumeration area was considerably larger (see Table 3.1).

Table 3.1 Census enumeration areas 1921-1967

Table 1.1 Census enumeration areas 1941-1967				
Census Year	Enumeration area	Number of units	Average per unit	
			Population Area(sq.km.)	
<u>Tanganyika</u>				
1921*	District	22	185,682	402.53
1928*	Province	9	526,745	980.75
1931*	District; 10 towns	56	89,690	157.79
1940*	Chiefdom; location	468	15,834	1000
1957*	Census area; township	543	25,391	1569
1967	Enumeration Area	17787	672	30
<u>Zanzibar</u>				
1924	?	?	?	?
1931	Shahia; township	130	1811	20.3
1940	?	?	?	?
1950	Shahia	197	2510	13.4
1967	Enumeration Area	794	471	3.5

* Excluding non-Indigenous population

Sources

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Explanatory tables for census 1957. G.P. Dar es Salaam, 1957.

The United Republic of Tanzania. 1967 Population census. Volume 1. Statistics for Enumeration Areas. Dar es Salaam, 1969.

Report on the Census Enumeration of the Whole Population on the night of 20-29th March 1931. Zanzibar, G.P., 1931.

Report on the Census of the Population of Zanzibar Protectorate (taken on the night of the 19th and 20th March, 1958). Zanzibar, G.P. 1958.

The significance of distribution and density derives from the nature of population itself. Firstly population is a resource, an integral part of the nation's productive forces. Secondly populations demand services such as education, health, water supply and transport. To be effective these services need to be located where they can be of most benefit to the greatest number of people. Finally the population needs to be administered, that is, law maintained, national ethic promulgated, elections held and so on. For all three aspects of population it is clearly necessary to

(2) B.Gill, & E.M.Ombao. 'Population Censuses and National Sample Surveys in Developing Countries'. International Labour Review, Vol. 92 (1965), pp. 169-183.

know where people are and how many of them there are. This is particularly the case in the planning and implementation of development programmes.

Distribution and density of population are closely related in that density is the most commonly used numerical expression of geographical distribution. As such it reflects the areal variation in other factors such as soils, rainfall and disease. The tendency for populations to cluster in a few, particularly well-endowed, areas poses problems in planning. Although such areas usually form core zones of development they also give rise to marked regional inequalities in economic well-being. The planner is faced with the question of whether to stimulate further development in the high-density, high-potential areas or to create a more even distribution of development.

Density of population assumes significance in a further way. Within a given area and at a given level of technology resources may limit the size of the population which can be supported at an adequate standard of living. Where the population exceeds this limit problems of population pressure may arise in which case adjustments need to be made such as the resettlement of the excess population or improvements in production methods which will increase the capacity of the resources. These inevitably involve policy decisions on the part of planners and administrators.

3.2 The population of Tanzania: general distribution

In 1967 the total population of Tanzania was 12,313,469 occupying a land area of approximately 886,250 sq.km. Of these totals 354,815 persons resided in Zanzibar on an area of 2644 sq. kms.

There is a marked unevenness in the distribution of the population. Some areas, such as most of Ruvuma and Tabora regions and Nachingwea district are virtually uninhabited, while large numbers of people are concentrated in a few small areas, including Kilimanjaro and Mwanza districts and Zanzibar. This geographical pattern will be considered in a later section.

The degree to which the population is unevenly spread over the Republic may be seen from Table 3.2 and App. 3.1. In the former the regions and in the latter the districts (3) are arranged in order of density from highest to lowest and the cumulative percentage contributions to the total population and total area respectively of the United Republic have been computed.

From App. 3.1, it can be seen that nearly two-thirds of the total population (63%) occupy only 25% of the total area. When the administrative divisions are similarly listed the concentration of population becomes even more obvious with 65.5% occupying 18.8% of the total area.

(3) After the census, Mbulu district was divided into Hanang and Mbulu districts. For the analyses in this chapter the former Mbulu district is used.

Table 3.2 Total population and area by region, 1967

Region	Population	accumulated % of total pop.	Area (sq. km.)	accumulated % of total area	Density (persons per sq. km.)
Dar es Salaam	272,821	2.2	88	0.01	3100.2
Gelelebar	354,815	5.1	2644	0.3	134.2
Mwanza	1,095,893	13.7	49664	2.5	22.6
Ililimajaro	652,792	19.0	12209	4.0	49.4
Tanga	771,060	25.2	26607	3.0	28.8
Mara	544,129	29.7	21797	9.5	25.0
West Lake	456,712	35.0	28749	12.7	22.9
Shinyanga	459,458	42.3	50784	18.5	17.7
Shirima	709,260	46.1	41311	23.1	17.2
Coast	511,506	52.2	32719	26.9	15.2
Ligoni	473,443	56.1	37029	31.1	12.8
Kilimanjaro	1,041,148	64.5	22751	40.5	12.6
Irishu	609,900	70.1	26845	46.9	10.1
Shirima	969,053	78.0	83139	56.3	11.7
Karanga	685,104	83.6	73038	64.5	9.4
Shirima	457,938	87.3	49340	70.1	9.3
Arusha	610,474	90.2	82098	79.3	7.4
Arusha	393,043	95.4	61254	86.2	6.4
Sabara	562,871	100.0	121989	100.0	4.6
TANZANIA	12,313,469	100.0	866265	100.0	13.9

Source: 1967 Population Census, Volume 1, pp. 111.

The accumulated percentages of population and area may be graphed against each other as in Fig. 3.1. The result is a Lorenz curve of distribution (4) (5). On this graph a straight line diagonally from A to C would represent a completely even distribution of population. At the other extreme, a line coinciding with the axes A-B-C would represent a population wholly concentrated at one point. All national populations have curves somewhere between the two extremes. It should be noted, however, that the shape of the curve depends on the number and sizes of the areal units used for calculation. The three curves in Fig. 3.1 all represent the 1967 population of Tanzania, but at regional, district and divisional levels of breakdown respectively. Regional totals clearly obscure the considerable local variations which occur within the regions themselves. This is important in considering intercensal changes of distribution and in comparisons between Tanzania and other countries.

Fig. 3.2 compares the Lorenz curve for Tanzanian districts with that for the 40 districts of Kenya in 1969 and the 106 counties of Uganda in 1959. While Tanzania and Uganda are very similar in their distributions, the population of Kenya is considerably more concentrated as a result of the large, virtually unoccupied north-eastern territory.

In Fig. 3.3 Lorenz curves have been plotted for the Tanzanian population in 1948 and 1967, adjusted to the 1967 district boundaries. The two curves are almost indistinguishable suggesting that there has been no significant intercensal change in distribution.

The same absence of change is apparent in Fig. 3.4 on which curves for the 1948 and 1969 and the 1948 and 1959 populations of Kenya and of Uganda

(4) J.K. Wright 'Some Measures of Distributions'. *Annals of the Association of American Geographers*, Vol. 27 (1937), pp. 177-211.

(5) Kenya Population Census 1962. Vol. III. African Population Statistics Division, Ministry of Economic Planning and Development, Nairobi, 1966. pp. 21-23.

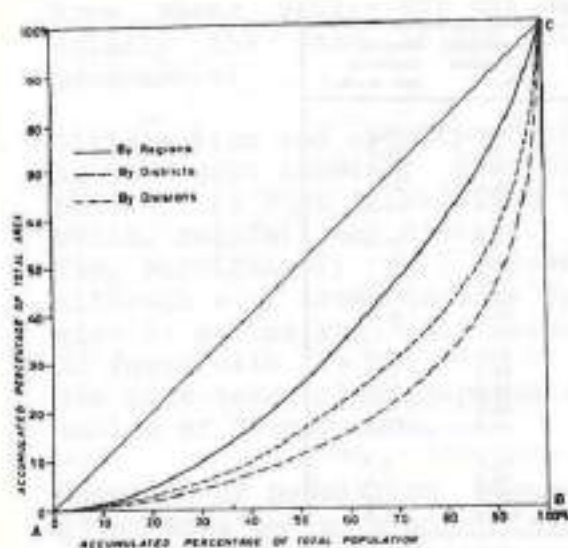


Figure 3.1 Tanzania: Lorenz curves 1967 by administrative level

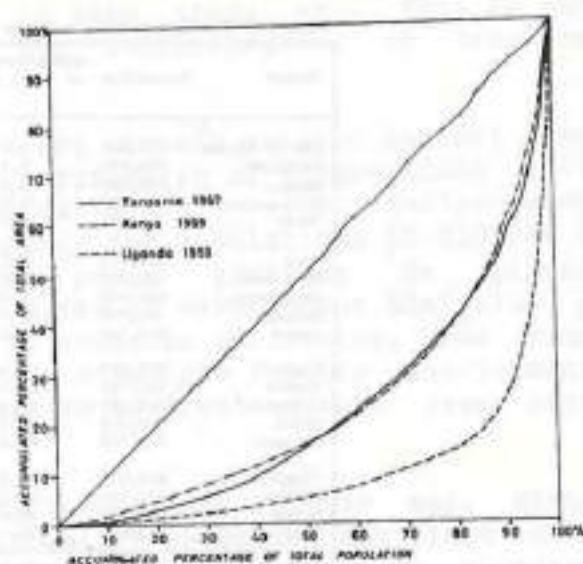


Figure 3.2 East Africa: Lorenz curves for census years

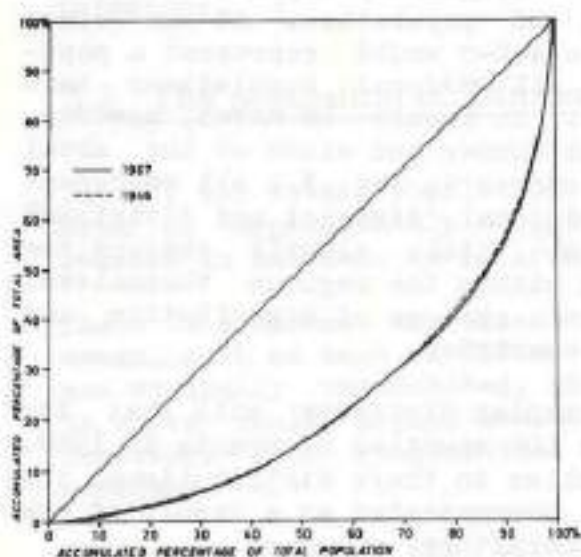


Figure 3.3 Tanzania: Lorenz curves by district 1948-1967

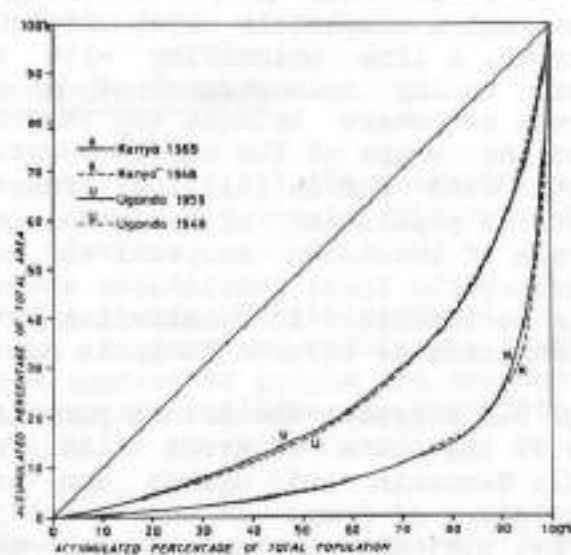


Figure 3.4 Kenya, Uganda: Lorenz curves for various census years

respectively are plotted. A greater degree of change might have been expected in Kenya in view of resettlement policies between the two census years.

While the Lorenz curve gives a general expression of the overall distribution of population it does not indicate anything of its areal pattern nor of regional adjustments in the distribution.

3.3 The geographical distribution of population

The most common method of showing how a population is spread over its national area is by means of a map. Of the mapping techniques available the most visually effective is the dot map on which dots are used to represent a given number of people, often in conjunction with larger proportional symbols to represent towns (6) (7). There are drawbacks in the compilation of this type of map, particularly in relation to the realistic location of dots and the size of population to be represented by each dot.

The technique has been used in a number of cases for earlier censuses of Tanzania, most notably by C.Gillman, (8), P.W.Porter (9) and in the Atlas of Tanzania (10).

The nature of the pattern of population distribution and its underlying causes have been discussed elsewhere especially by Gillman (11), and need not be elaborated upon here (12).

The variables of greatest significance in explaining the pattern may be summarised as: *rainfall*, its reliability as well as mean annual total; *soil fertility*; *altitude and topography*; *ecological factors*, especially vegetation and the distribution of tsetse fly; *historical and political factors*, including the establishment of forest and game reserves. Some of the past migrational history of the major ethnic groups is especially significant. Major physical boundaries are shown in Fig. 3.5 while the Atlas of Tanzania (13) may be referred to for more detailed information (14).

A further element of the distribution which should be noted is the distinction between the urban and rural populations. Some 747,000 people, or 6.1% of the total population, now live in towns whose populations exceed 5,000, while if all former townships and town planning areas are included the total is 786,500. Of the former figure 650,000 are in Tanzania Mainland and 97,200 in Zanzibar, representing 5.4% and 27.4%,

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- (6) C.B.Fawcett, "Population maps". Geographical Journal, Feb. 1935.
- (7) P.J.Monkhouse, and H.R.Wilkinson, Maps and Diagrams. London, 1963. Ch. V.
- (8) C.Gillman, A Population Map of Tanganyika Territory. G.P.D., Dar es-Salaam, 1936.
- (9) P.W.Porter, "East African Population as of Aug. 1962." Map supplement No. 2, Annals of the American Association of Geographers. Vol. 56, No. 1. March, 1966.
- (10) Atlas of Tanzania. Surveys and Mapping Division, Ministry of Lands, Settlement and Water Development, Dar es Salaam, 1967.
- (11) C.Gillman, Op. cit.
- (12) See also L.Berry, 'Tanzania's Population'. Chapter 2 in A.Rweyemamu Nation-Building in Tanzania. Nairobi, 1970.
- (13) Atlas of Tanzania. Op. cit.
- (14) See also L.Berry, Ed. Tanzania in Maps. London, 1971.

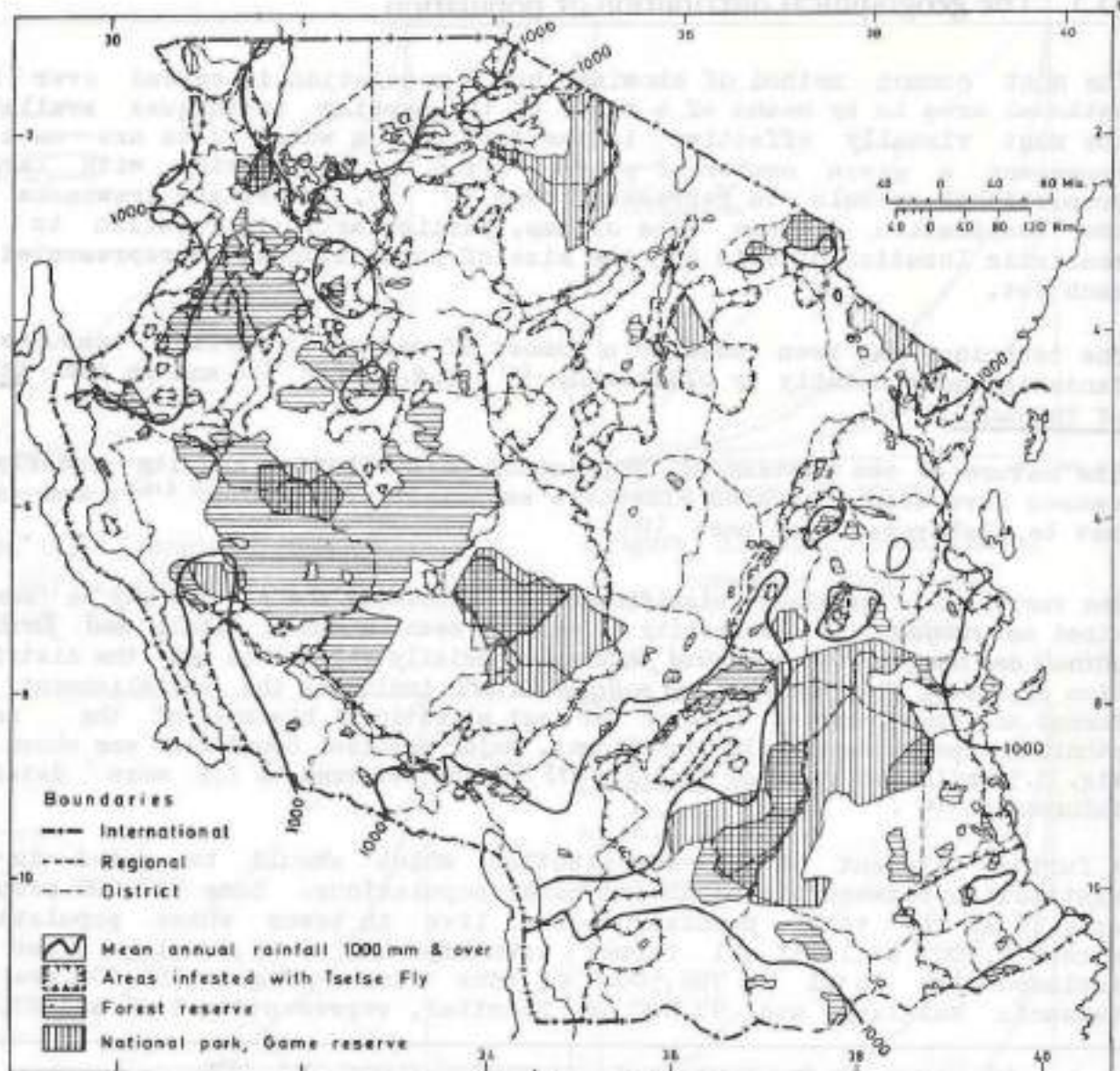


Figure 3.5 Tanzania: factors influencing population distribution

respectively, of their total populations. The phenomenon of urbanization, however, is considered in detail in Ch. 5, while much of the analysis in this chapter will centre on the rural population (15).

3.4 Intercensal changes in population distribution

The dot map does not readily lend itself to the analysis of changes which are taking place in the distribution of population. For this purpose it

(15) The rural population in this chapter is the total population excluding Dar es Salaam, the 15 mainland towns with Town councils, and Zanzibar, Chake, Wete, and Mkoani along with their respective town planning areas. The last mentioned are included to give a greater degree of differentiation in the population of Zanzibar.

is necessary to revert to aggregate figures for administrative areas. In Fig. 3.6 the distribution of the rural population, by districts, is expressed by an index, and in Fig. 3.7 the distribution index for 1948 is compared with that for 1967 (16). In summary the index in Fig. 3.6

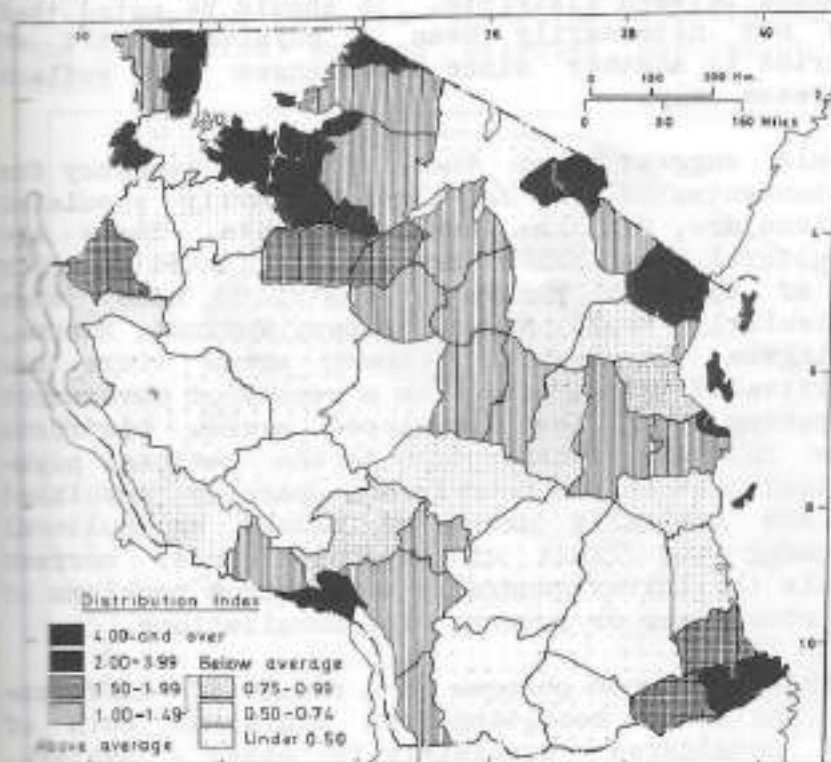


Figure 3.6 Tanzania Rural:
relative distribution
by district, 1967

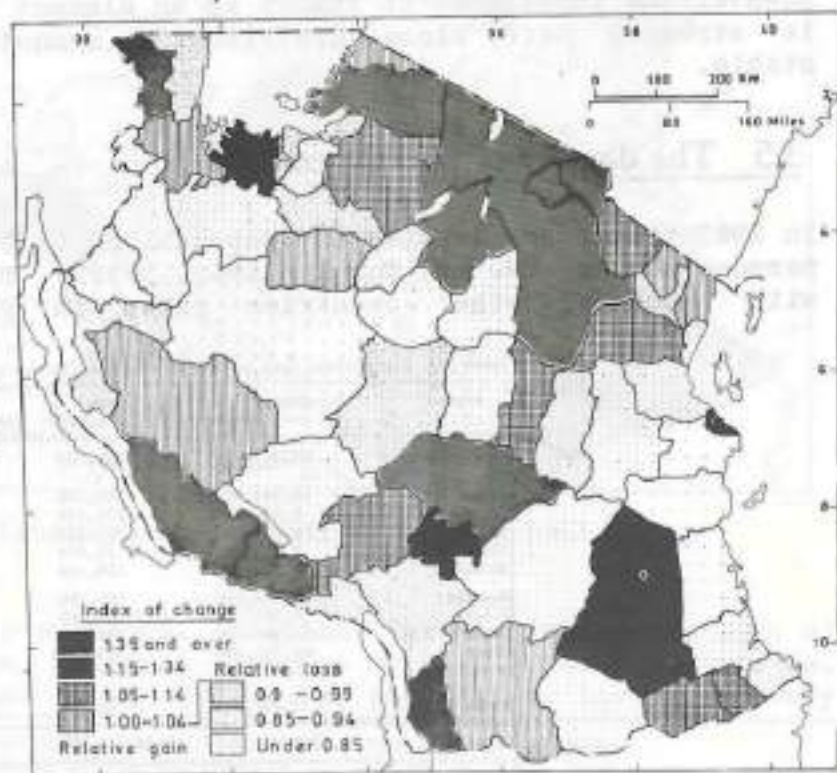


Figure 3.7 Tanzania Rural:
change in relative distribution
by district, 1948-1967

(16) Details of the derivation of these indices may be found in App. 3.2.

represents the contribution of each district to the total national population relative to its area. The ratios plotted in Fig. 3.7 indicate whether the district's contribution to the total population has increased or decreased relative to its contribution in 1948 and, therefore, what redistribution is taking place between districts. It should be noted that redistribution, here, does not necessarily mean a physical shift of population from one district to another since the changes may reflect differences in natural increase only.

The pattern in Fig. 3.7 would suggest that there is some tendency for population to become more concentrated in a few already heavily populated districts, especially Kilimanjaro, Mzizima, Newala and Geita. These are either areas of high agricultural potential or are closely linked to major urban centres. A number of sparsely populated districts also show relative increases, particularly Mbulu, Masai, Iringa, Mufindi, Musoma, Mbozi, Sumbawanga and Nachingwea. In several of these areas there has been expansion of the cultivated area, often as a result of Government stimulus aimed at the opening up of less developed areas. Districts showing a relative decline in their contribution to the national population are similarly divided between the densely and sparsely populated categories. The former are generally areas of modest agricultural potential which are reaching the limit of expansion under current agricultural practices, while the latter generally suffer from problems of low potential coupled with remoteness or poverty of communications.

This map does not discriminate between changes as a result of differentials in natural increase and those resulting from migration, both of which characteristics are considered separately in other chapters. However the importance of change as an element of population distribution is stressed here, since distribution cannot be regarded as fixed and stable.

3.5 The density of population

In 1967 the gross density of population in Tanzania Mainland was 13.5 persons per sq. km. and for Zanzibar, 134.2. These values may be compared with those of other countries given in Table 3.3. Crude national

Table 3.3 Population, area and population density for selected countries

Region	Population (1969 mid-year estimate)	Area (sq. km.)	Density (persons per sq. km.)
Tanzania 1967	12,313,469	886,250	14
Kenya	10,943,000	569,249	19
Uganda	9,526,000	236,036	40
Zambia	4,208,000	752,614	6
Burundi	3,475,000	27,834	125
Malawi	4,798,000	118,484	37
Nigeria	63,870,000	923,768	69
U.A.R.	32,501,000	1,001,449	32
India	534,984,000	3,286,030	164
Japan	102,321,000	369,881	277
Brazil	90,840,000	8,511,965	11
Netherlands	12,873,000	40,844	315
Africa	345,000,000	30,215,000	11
World	3,552,000,000	135,772,000	26

Source: *Demographic Yearbook, 1969*, United Nations, New York, 1970

averages, however, have little significant meaning because of the wide variation in natural conditions, and hence density, over the country.

Fig. 3.8 shows the average densities of rural population in Tanzania by divisions or, in a few cases, by subdivisions (17). The distribution of the population between selected population density groups is given in Table 3.4.

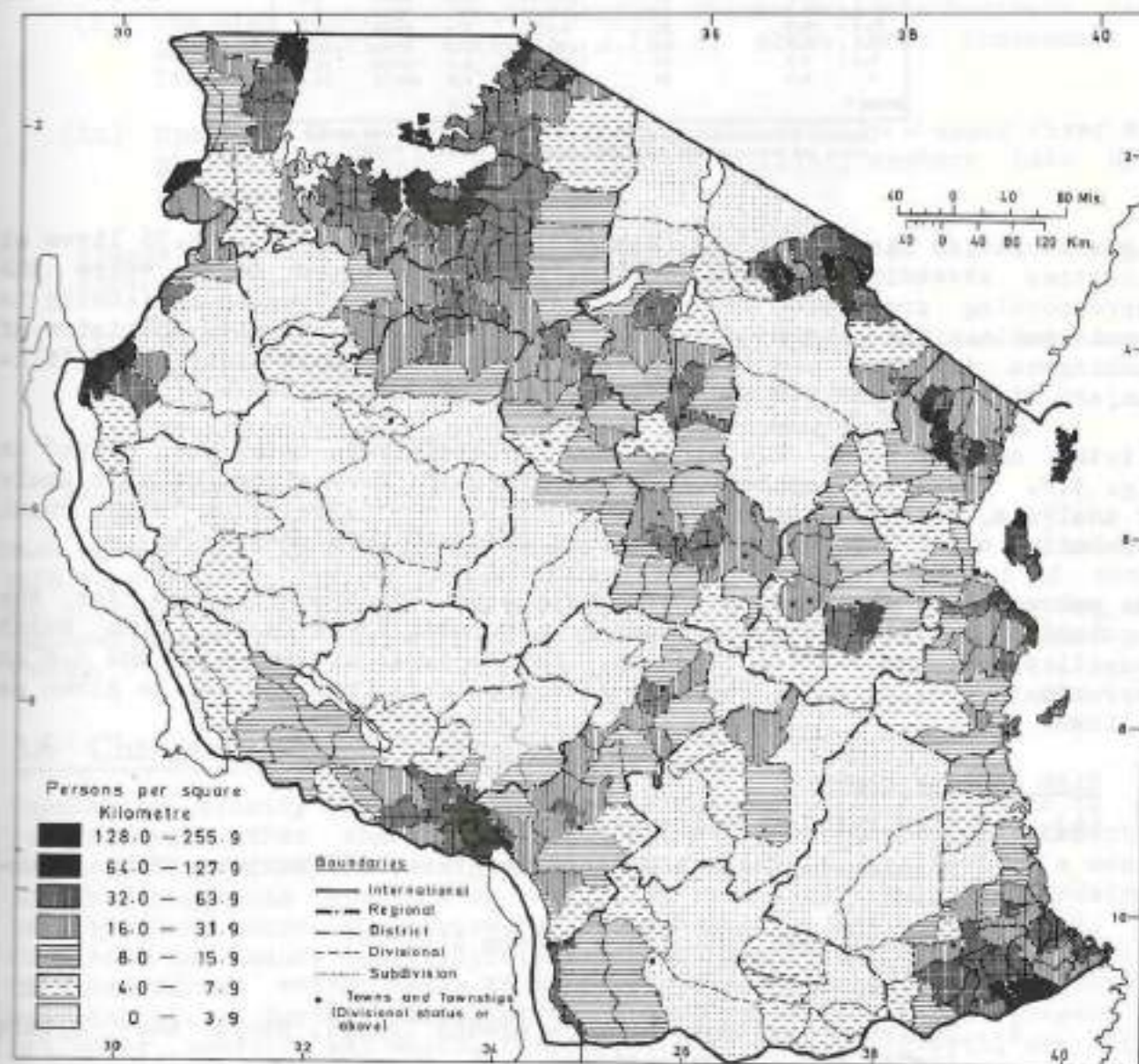


Figure 3.8 Tanzania Rural: density by division, 1967

Some 77.4% of the total population, including urban residents, live at densities higher than the national average of 13.9 persons per sq. km. occupying 28.4% of the land area. The rural population living at very

(17) The measurement of divisional and subdivisional areas was undertaken by I.D. Thomas and students of the University of Dar es Salaam. See: I.D. Thomas, *Population Density in Tanzania, 1967*. Research Notes No. 5b. HRAUP, University of Dar es Salaam, 1967.

Table 3.4 Tanzania: density of population by divisions, 1967.

Density classes (persons per sq. km.)	Number of Divisions in class	Population		Area	
		Total	Percent	Total (sq. km.)	Percent
150.0 and over	11	460,515	3.7	2590	0.3
100.0 - 149.9	15	584,026	5.6	5805	0.7
75.0 - 99.9	15	744,024	6.0	8705	1.0
50.0 - 74.9	30	1,332,879	10.9	21229	2.4
40.0 - 49.9	24	1,045,637	8.5	23705	2.7
30.0 - 39.9	46	1,665,405	13.6	40410	4.5
20.0 - 29.9	50	1,575,037	12.8	75307	7.4
15.0 - 19.9	30	899,418	7.3	53888	6.0
10.0 - 14.9	41	1,241,753	10.1	97949	11.1
5.0 - 9.9	40	1,018,009	8.3	138138	15.6
0 - 4.9	51	836,545	6.8	420718	47.5
Urban *		786,367	6.4		

* Because divisions are being considered here, Urban is defined as all towns and town planning areas with divisional status or higher.

high densities is small as compared with Kenya (16). 9.3% lives at densities exceeding 100 per sq. km. in contrast to Kenya where the corresponding proportion is approximately 50%. The range in density is considerable. The lowest density occurs in the Mlembwe division of Nachingwea district and the highest in the Vunjo East division of Kili-manjaro district with 0.2 and 220.8 per sq. km. respectively.

A total of 362 rural divisions and subdivisions have been mapped in Fig. 3.8. The urban population is not discussed here since, at this scale of analysis, density assumes most significance in relation to the rural population which derives its livelihood directly from the land.

The pattern of distribution is complicated by the tendency for the population to be found in densely populated core areas from which densities decrease rapidly outwards. On the basis of Figs. 3.5 and 3.8 an approximate breakdown of Tanzania into population regions may be given as follows:

A. High density zones

(i) The high rainfall "Islands"

- a. Northeastern group - Usambara, Pare, Kilimanjaro, Meru Mountains
- b. Western Lake Victoria - Bukoba district
- c. Uluguru mountains
- d. Southern Highlands group - around Iringa, Mbeya and Njombe towns, and Rungwe district
- e. Western Rift Valley Highlands - Western Kigoma, Kasulu, Kibondo and northern Ngara
- f. Zanzibar and Pemba Islands

(ii) Lake Victoria Plains - North Mara, Musoma, Mwanza, Geita and Malya Kwimba districts and extending south and southeast along the railway into Shinyanga and Nzega districts

(16) V.T.W. Morgan, and N.W. Shaffer, Population of Kenya, Nairobi, 1966.

(iii) Coastal Zone - intermittent areas of high density

- a. Around major towns - Tanga, Dar es Salaam, Lindi, Mtwara
- b. Extending inland along the northern and central railway lines and the Ruvuma, Lukuledi and Rufiji rivers

B. Moderate to high density zones

- (i) The high plateau - Mbulu, Kondoa, Iramba and the Southern Highlands, excluding areas in A.(i) d. above, from Sumbawanga to Iringa
- (ii) Special areas of higher than normal density - upper river Wami plains, Kilombero valley, central Kilosa, eastern Lake Nyasa shores; central Dodoma

C. Sparsely populated zones with occasional pockets of higher density, especially around major towns

- (i) Miombo woodlands and bushland of the Central Plateau and southwestern Tanzania
- (ii) Miombo woodlands and bushlands of southeastern Tanzania
- (iii) Masailand

Each group of zones outlined has conditions peculiar to it in relation both to population characteristics and to the broader context of social and economic development. The approach adopted towards the planning and implementation of development will, therefore, tend to differ between the zones.

3.6 Changes in population density 1948-1967

Population density assumes greater importance when considered in conjunction with other characteristics (19) (20). Of particular importance is the factor of population growth. Density may be regarded as a measure of the demographic pressure on resources, but with population growth the density, and hence the pressure, increases. On the other hand, high densities may induce only moderate rates of population growth as a result of outmigration which tends to relieve population pressure, at least to some degree. A further alternative arises in areas which at present are not under pressure but which, because of high rates of growth, are likely to become so in the future.

Fig. 3.9 shows the changes in density by districts between 1948 and 1967. The 1948 census has been used in preference to that of 1957 since it is generally considered that the former is more reliable. Also the longer time interval allows more distinct long-term trends to be identified. Changes have been expressed as percentages of the 1948 densities and thus show relative change.

(19) L. Berry, *op.cit.*

(20) F.J. Monkhouse and H.R. Wilkinson, *op.cit.*

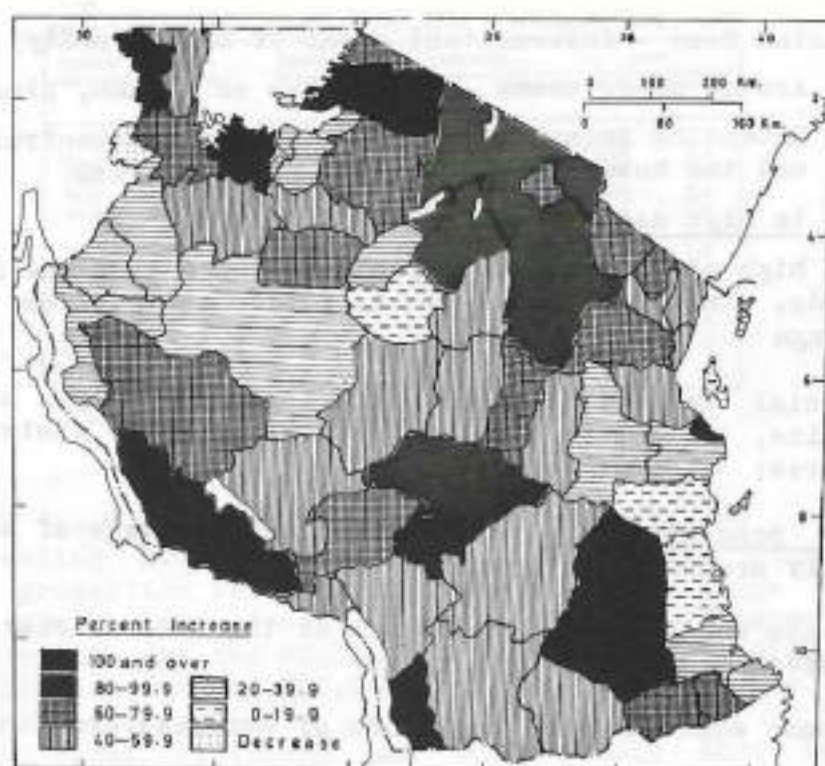


Figure 3.9 Tanzania Rural: percentage change in density by district 1948-1967

Only one district, Ngara, records a decrease in density. All other districts have recorded increases with a maximum absolute increase in Pemba at 43.3 persons per sq. km. The highest relative increase is in Geita district where the density has increased by 166.2%.

The pattern which emerges is basically similar to that discussed above since the change in density is an alternative expression of the change in distribution. However, the main points may be reiterated. In general the greatest absolute increases have occurred in those areas which already carry high densities. Most notable of these are Arusha, Kilimanjaro, Mzizima, Newala and Rungwe districts and most of Mwanza region. All of these areas have a high agricultural potential due to fertile soils, well established cash crops or to proximity to a major urban market. Other high density areas have recorded only modest increases, especially Tanga and West Lake regions and Zanzibar Island. These are generally areas whose cash crop economy has been adversely affected by world prices and where rates of outmigration tend to be high. The low rate of increase in Zanzibar, however, probably reflects the unusually low rates of natural increase in population (21).

The relationship between density and change in density is shown in Fig. 3.10. Here the relative change has been used since this is more meaningful in relation to the areas of lower density. Of particular significance on this map are the extreme values represented by the four

(21) T.R. Smith, and J.G.C. Blacker. Population Characteristics of the Commonwealth Countries of Tropical Africa. Institute of Commonwealth Studies, London, 1963.

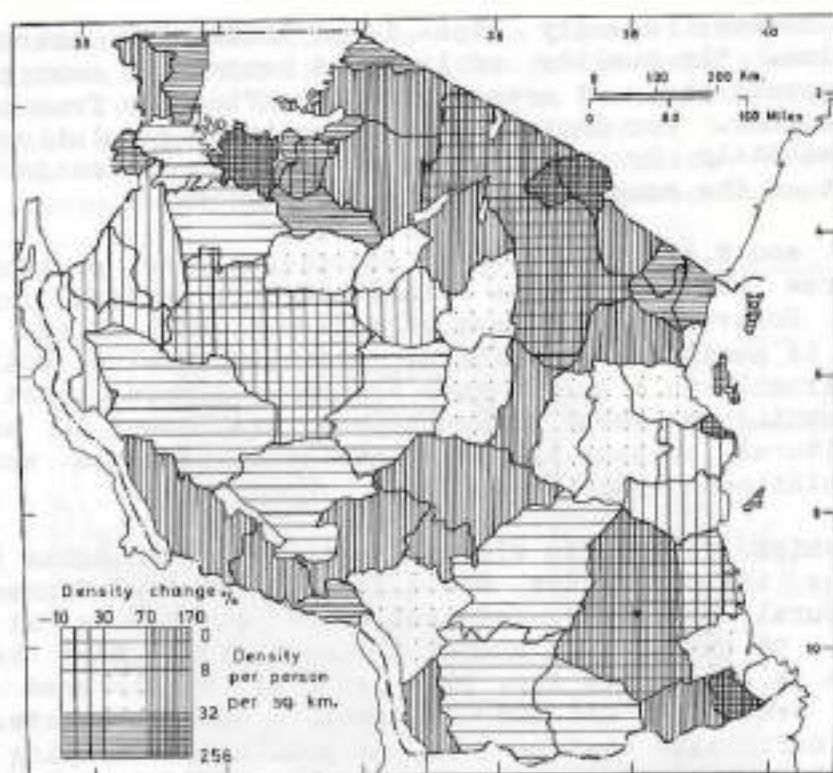


Figure 3.10 Tanzania Rural: comparison of density and density change by district, 1948-1967

former combinations of the key. Table 3.5 lists the districts which record such extreme values

Table 3.5 Summary table of districts by density and absolute change in density, 1948 - 1967

High density (over 32.0 per sq.km)		Low density (under 8.0 per sq.km.)	
Small increase (under 30%)	Large increase (over 70%)	Small increase (under 30%)	Large increase (over 70%)
Ngara	Arusha	Tabora	Mwali
Ukara	Kilimanjaro	Kileleshwa	Moshi
Malya/Kibaha	Geita		
Sandiba	Mwanza		
	Mtanga		

Other districts which in 1948 had moderate densities show large relative increases in density. Many of these have experienced considerable agricultural expansion as happened in much of Mbeya and Iringa regions and in Shinyanga and Handeni districts.

3.7 Population and resources

Besides acting as a quantitative expression of distribution, population density also gives a crude measure of the relationship between a population and its land resources. In Tanzania this is particularly important since the great majority of the population derives its livelihood directly

from the land. However density alone is an inadequate measure of land shortage or surplus. The quality of land and hence the number of people which it will support per unit area varies significantly from one part of the country to another. For instance, the density of population which can be supported adequately by one sq. km. of land on Kilimanjaro is much greater than that on the same amount of land in Dodoma.

E.A.Ackerman (22) and W.Allan (23) have considered the problem of the population-resource balance in some detail and have devised formulae for its expression. However, in the case of Ackerman many of the variables involved cannot be assigned a meaningful numerical value, while Allan's work is most applicable to a subsistence economy. A more direct approach is that of G.L.Cunningham whose calculations are based on assumptions about the agricultural economy in each district of Tanzania according to its dominant vegetational type (24).

The discussion which follows is similar to that of Cunningham in that it attempts to assess the population which each district of Tanzania, under current agricultural practices, is capable of supporting at adequate levels of income. To this end a number of assumptions must be made, a summary of which is given in App. 3.3. It must be stressed that the results are only tentative, and the assumptions open to debate. The aim is not to give a definitive statement of the population carrying capacity of Tanzania. Rather the intention is to stimulate interest in the problem of the population-resource balance as an issue in development planning and policy making.

3.8 Population carrying capacity in rural Tanzania

The population carrying capacity of each district of Tanzania has been calculated on the basis of the assumptions and example outlined in App. 3.3. These assumptions probably err on the side of overestimation as regards crop yields, crop prices and expected income levels (25). The income adopted is Shs. 2500.00, gross p.a. per standard household of five members, which compares with an estimated per capita national income from monetary agriculture in 1967 of Shs. 110.00 and a gross domestic product of Shs. 478.00 per capita (26).

Following a similar procedure to that in the example given in the Appendix a figure was derived for each district which expresses the total population which that district may be expected to support by agriculture at

(22) E.A.Ackerman, 'Population and Natural Resources', in F.M.Hauser, & O.D.Duncan; The Study of Population, Chicago, 1959.

(23) W.Allan, The African Husbandman. Edinburgh, 1967.

(24) G.L.Cunningham, 'Agriculture and Population in Tanzania', Mbioni, Volume V. No. 3. pp. 35-51. 1968.

(25) A more detailed statement of the assumptions is available in J.E. Moore, Rural population carrying capacities for the districts of Tanzania, ERALUP Research Paper No. 18, Dar es Salaam 1971.

(26) District Data 1967. Ministry of Economic Affairs and Development Planning, Dar es Salaam, 1968.

the given level of income and diet. This figure is then compared with the actual population recorded in 1967. The results are shown in Fig. 3.11 in which the value for each district is the ratio of the computed population capacity to its actual population. Values greater than 1.0 suggest under-population or surplus land, while values tending towards zero suggest population pressure or land shortage, if the given income level is to be achieved.

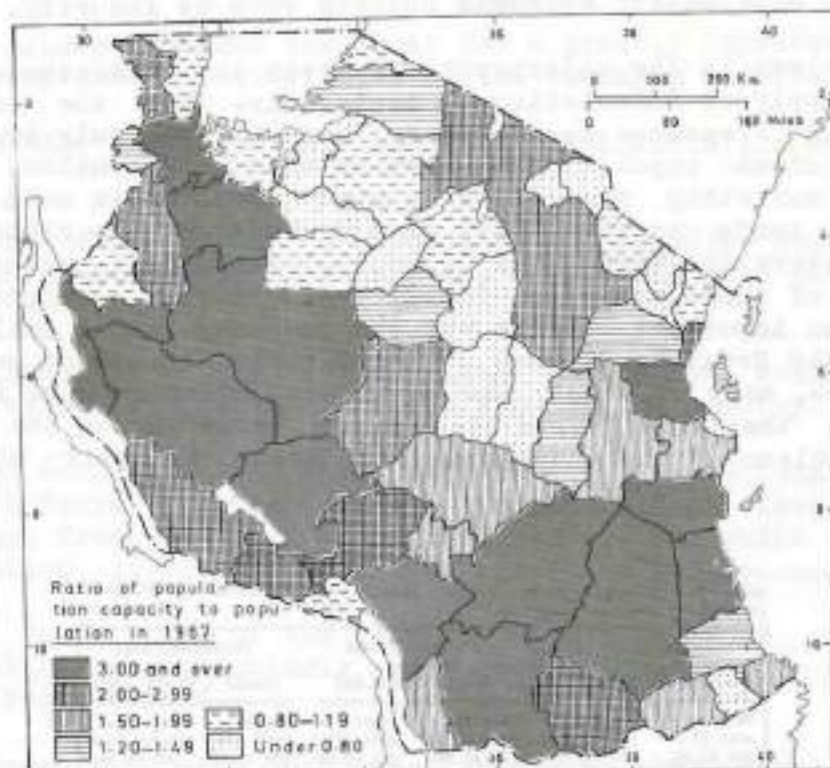


Figure 3.11 Tanzania Rural: population-land balance by district, 1967

It must be stressed that these values do not express an absolute limit either to population number or to income levels. As technology in agriculture improves so too will the productivity of each unit area of land so that the population and income level can rise beyond those given here (27). In addition, increased industrialisation can further modify the balance.

Table 3.6 summarises the pattern given in Fig. 3.11. Districts have been classified according to their density in 1967 and their computed population-land ratio.

The map and table suggest that areas which are apparently overpopulated are not necessarily those with the highest densities although many of them are so. Districts such as Dodoma, Kondoa and Mpwapwa do not carry especially high densities of population, but their low agricultural potential results in a low population carrying capacity.

Although these results must be treated circumspectly due to the nature of

(27) E. Boserup, *The Conditions of Agricultural Growth: the Economics of Agrarian Change under Population Pressure*. London 1955.

restricted, the allocation of funds must depend on a set of priorities in which one of the important variables to be considered is the population itself.

3.9 Summary and conclusions

1. The 1967 census provides the basis for a greatly improved knowledge of the distribution and characteristics of the Tanzania population.
2. This knowledge should be invaluable for administration and in planning processes.
3. The pattern of population distribution and density should be a major variable in the formulation of priorities for development planning and the allocation of investment.
4. The population is highly concentrated into a few, small, core zones separated by extensive tracts of sparsely populated country.
5. Population densities in Tanzania are not exceptionally high when compared with Kenya or Uganda. At the divisional level ⁽²⁸⁾ rural densities range from 0.2 to 220.8 persons per sq. km. while less than 10% of the population lives at densities exceeding 100 persons per sq. km.
6. Zanzibar forms part of the densely populated group of areas of the United Republic. A particularly high concentration of population is recorded for Pemba Island.
7. Little overall change has taken place in the general distribution between 1948 and 1967. There is, however, some tendency towards expansion of settlement outwards from the core zones into the surrounding sparsely populated areas.
8. Changes in density suggest an increasing tendency towards the concentration of population despite the expansion into sparsely populated areas noted above.
9. The distribution of agricultural potential and actual levels of economic development is closely correlated with the distribution of population.
10. Although Tanzania as a whole has surplus land under present agricultural conditions there are some areas, particularly the densely populated core zones, which suffer problems of population pressure.
11. In Zanzibar the population would appear to be in balance with land resources on Zanzibar Island but in excess of resources on Pemba.

(28) For more detailed information on divisions see: I.D.Thomas, and C.J.Thomas, Comparative Population Data for the Divisions of Tanzania. Research Notes No. 10 BRALUP, University of Dar es Salaam, February 1971.

4 MIGRATION

by Claes-Fredrik Claeson and Bertil Egero

4.0 Introduction

4.0.1 Source of information

Knowledge about the movement of the population is fundamental for the understanding of social change, economic development and political organization. It is an important element in the history of a nation and an essential component in the planning for its future.

Migration, having a great number of aspects - social, economic, spatial etc. - and being a matter of cause as well as effect of societal processes, has been and remained a topic of much theorizing and research, and is now also an issue of increasing importance among national, regional and local planners. It is of particular significance for manpower and regional planning. Further, migration across borders for refuge is becoming an urgent concern of international agencies.

In spite of its importance, information about the movement of population is not easily accessible for description and analysis. Few countries have registration of change of residence that allows insight into the process of migration. Also where such a source of information exists, the knowledge to be gained is limited and does not contain immediate answers to the important question regarding the causes of migration. The latter must then be derived from combinations of migration and other (regional) socio-economic data. A large part of our knowledge of migration, especially of its behavioural side, is therefore gained through field research, often of considerable depth but small geographical range.

In countries without running population registers indicative of population movement - which is the normal case - the population census (where taken) is the major source for enquiries into migration on the national level. And in most cases census data on 'place of birth' are used as indicators of amount and direction of population movements ⁽¹⁾. In the text that follows, the birthplace data in the 1967 population census will be presented and interpreted in terms of migration.

The census also gives information on citizenship and major ethnic groups. This information, though not directly convertible into migration data, gives some important clues to the history of immigration and should for this reason not be omitted from the present review. Following upon some necessary comments on the character of the data and their classification, the next paragraph will be devoted to an analysis of this information and its relation to birthplace data as an indicator of the international migration.

(1) Principles and Recommendations for the 1970 Population Censuses, United Nations 1969.

4.0.2 Classification of data

The data on ethnic origin collected in the census permitted classification into four groups: Africans, Arabs, Asians and Europeans. Of these, 'Asians' refer to people of Indian or Pakistan origin who form an easily distinguishable minority in the country.

The census classification of 'citizenship' follows that of 'country of birth' in distinguishing the most important individual countries - African countries, United Kingdom, India/Pakistan - and the major world regions. This permits a study of the contribution of the neighbouring countries, individually and as a group, and a cross-comparison with birthplace data using the same classification.

The birthplace classification in the census was comparatively detailed, using the system of administrative regions within the country and the international classification described above. The classification made no use of the district level, but moved straight from the category 'Same Locality' to 'Same Region'. The birthplace categories found most useful for the present purpose were:

A	Same Locality	-	born in the locality of residence
B	Same Region	-	born in the region of residence, but outside the locality of residence
C	Other Regions	-	born in Tanzania, but outside the region of residence
D	Neighbouring Countries	-	born in one of the countries bordering on Tanzania ⁽²⁾
E	Other African Countries	-	born in Africa, but not in countries bordering on Tanzania
F	Countries outside Africa	-	born in non-African countries

'Same Locality' indicates in the present context the non-migrants. Category B (intraregional movers) and category C (interregional movers) make up the internal migrants, while the remaining categories, D-F, refer to the immigrants. The internal migration is studied both as outmovement (from an area), and as inmovement (to an area). The distribution of the regional population by birthplace categories is shown in App. 4.1 and 4.2.

While the area of origin (identical with the area of birth, or 'birth-place') is region or country, the area of destination (identical with the residential area at the time of enumeration) is district or town - apart from region. This means greater detail in the study of in-migration than in the study of outmigration. Assessment of interchange between areas on the same level can accordingly not go below regions.

(2) Countries sharing a border with Tanzania are Kenya, Uganda, Rwanda, Burundi, Zaire, Zambia, Malawi and Mozambique (Fig. 4.2).

4.0.3 Problems of interpretation

Much could be said about the vaguenesses and ambiguities in the census data resulting from inadequacies in various phases of the census conduct. However, beside referring the reader to other accounts of this problem (3) only a brief mention will be made here of the most immediate cases relevant to analysis and interpretation.

'Ethnic origin' was noted only for the 'head of household'. In the census tabulation, all members of the household were assigned the ethnic status of this person. This procedure seems acceptable in an overall context, as the proportion of ethnically mixed marriages is low in Tanzania, but its effects on subgroups is more difficult to estimate. Thus the Arab population, especially on Zanzibar, has shown a tendency to integrate with the African population to an extent which might lead to rather biased estimates of their numbers in the above procedure. And, following the same lack of adjustment to social reality, the census did not allow for a classification in terms of "mixed" ethnic origin.

The information on 'citizenship' has similar problems of interpretation, resulting mainly from uncertainties as to the meaning of the concept itself. To an illiterate population, not yet profoundly affected by the decisions at the centre of the society, such a concept may carry very little meaning. The problem here is not related to those born in Tanzania, but to immigrants who, in the absence of administrative or fiscal arrangements, are lacking in information as to their own and their children's legal status. For these immigrants, as well as for stateless persons or persons holding two passports - not uncommon in the Asian community - the reply given at the census may therefore be guided by different considerations, largely of a political nature.

As for the birthplace data, it is important to be aware of the shortcomings of this rather crude indication of migration. A few instances will be mentioned. It should, for instance, be understood that the places of birth and residence are only terminals of a movement which may very well consist of a number of steps; thus, successive migration is not revealed. For the same reason the analysis fails to disclose movements, when places of origin and destination are the same, that is when a movement or a number of movements end up at the place of birth; such movements may be of considerable length and cover a long period of time.

Further, there is no direct indication of the time when a movement occurred; a migrant may have moved to the area of residence any time between birth and enumeration. A consequence of these circumstances is that net migration can not be satisfactorily determined for specified periods of time.

Attention should also be drawn to the effects on the definition of 'migrant' and 'non-migrant' caused by a lack of distinction in the census between place of enumeration and place of usual residence. For this reason, temporary visitors to a place outside their place of birth have been classified as migrants, and those visiting their original home area appear as non-migrants. The net effect of this in comparison with a classification

(3) Census Volume 5. Census Methodology. Bureau of Statistics, Dar-es-Salaam, 1971.

based on "usual residence" is hard to assess, and it is not immediately clear that the latter would have been preferable.

4.4 Data reliability

Apart from the comments in the above paragraph, very little can be said about the size and direction of likely errors in the census data used for migration analysis. As for the birthplace data, it may be mentioned that the regional division used in the census is of a rather recent date and not necessarily well known among all census enumerators and respondents. Though the term region replaced that of province already in the 1957 census report, the present set of administrative regions was not established until 1963. In contrast to this, the districts are of old date and probably well known to the total population (4). It is, however, not possible to specify any systematic error in the areal classification as a consequence of possible lack of information regarding regional origin.

One might also point at the vagueness of the concept Same Locality. Owing to the difficulty of spatially distinguishing the villages in large parts of rural Tanzania, local interpretation of Same Locality may have varied, leading in some cases to wrong proportions between migrants and non-migrants. The effect of such an error can not be estimated, but is certainly not of a magnitude that has any significance in the present context.

4.1 Immigration

4.1.1 Ethnic groups

The historical immigration in Tanzania, with its profound effects also on today's society, is reflected in the census statistics for aliens. To the extent that they can still be distinguished, the earliest non-African group to settle in Tanzania, the Arabs, amounted in 1967 to around 30,000 on the Mainland and around 57,000 in Zanzibar.

Table 4.1 Population by ethnic origin and country of birth

Ethnic origin	Total number	Country of birth, % of total			
		Tanzania	Neighb. country	Other African country	Country outside Africa
Mainland					
African	11481595	97	1	0	0
Arab	29775	84	1	1	10
Asian	75015	71	1	1	21
European	16884	28	4	2	66
Zanzibar					
African	275620	99	1	0	0
Arab	56832	96	0	1	3
Asian	13552	85	2	1	12
European	188	8	2	1	89

Table 4.1 shows the relation between ethnic origin and country of birth. Of the non-Africans only the European population has a substantial proportion

(4) I.D. Thomas, *A Survey of Administrative Boundary Changes in Tanganyika/Tanzania, 1957 to 1967, for Use in Intergenerational Comparisons*. BRADUP Research Notes No. 3, University of Dar es Salaam, 1969.

of its members born outside the country. For the others, immigration has declined to such an extent that the majority of the present community were born in Tanzania.

The Asian population, growing in number particularly during the early years of the colonial era, has since independence experienced emigration large enough to outbalance the natural increase from births and deaths. The 1967 population stood at 75,000, which means a slight reduction since the census ten years earlier. In Zanzibar, after a peak figure of 18,000 in 1958, the Asian population has decreased to 13,500 (5).

The European population has been the most heterogeneous one and has also been subjected to high turnover. The Germans at the beginning of the century were replaced by the British, who grew in number to more than 20,000 shortly before independence. They in turn are presently being replaced by Europeans of various nationalities, whose number, however, remains at 17,000 in 1967. In Zanzibar the European community has always been small; in 1967 it numbered less than 200, which means a decrease by 300 since 1958.

4.1.2 Citizenship

Citizenship as a legal status or as a matter of personal identification is an important issue in population analysis. It is a measurement of the size of the alien element in the population, an unstable group of which considerable numbers may sooner or later leave for their home country.

In 1967 there were around 230,000 non-citizens on the Mainland and 3,500 on Zanzibar (Table 4.2). Most of the former are citizens of neighbouring countries, especially Mozambique, Kenya, Burundi and Rwanda. The character of the movement behind these figures is to some extent disclosed by the sex ratios of the populations referred to. In the case of Mozambique 111 males per 100 females signify the pre-dominantly refugee character of this population, whereas for the Kenya and Burundi citizens in Tanzania the sex ratios 143 and 188 are evidence of labour migration (Table 4.2).

Table 4.2 Mainland residents with alien citizenship

	Male	Female	Both	%	Sex ratio
Mozambique	31,985	28,930	60,915	27	111
Kenya	23,337	16,338	39,675	17	143
Burundi	19,380	10,383	29,763	13	188
Rwanda	14,307	11,105	25,412	11	134
Other African countries	17,060	10,526	27,586	12	162
United Kingdom	8,791	7,963	16,754	7	110
India and Pakistan	5,900	5,147	11,047	5	115
Other countries	10,328	6,992	17,320	8	140
All	131,694	97,284	228,978	100	135

As has been said earlier, for the majority of the population in Tanzania citizenship is a matter of personal identification with a country rather than a comprehension of a legal status. This is especially true for immigrants from neighbouring countries who may settle and turn into permanent residents of Tanzania. Table 4.3 shows that 246,000, or more than 60% of the Mainland population born in neighbouring countries, regard

(5) For the years after 1967, various reports estimate a substantial emigration of Asians both from the Mainland and the Islands.

Table 4.3 Population by citizenship and country of birth*

Citizenship	Country of Birth		
	Tanzania	Neighbouring Countries	Other Countries
Mainland			
Tanzania	11,442,609	245,743	12,901
Neighbouring Countries	30,809	147,955	428
Other Countries	14,548	3,195	31,671
All	11,487,962	256,903	45,000
Zanzibar			
Tanzania	345,749	1,362	2,984
Neighbouring Countries	82	1,055	11
Other Countries	16	39	1,808
All	345,827	1,054	4,803

* Citizenship and/or place of birth is not stated for about 20,000 persons on the Mainland and 1,100 persons on Zanzibar.

themselves as citizens of Tanzania. On the other hand, the magnitude of temporary residence in Tanzania is indicated by the 30,800 people who were born here - probably to immigrants - but regard themselves as citizens of a neighbouring country.

4.1.3 Country of birth

In discussing international migration, census data provides only one side of the coin, namely the stream into the country. Emigration is more difficult to estimate as long as it is recorded only in the receiving country. In the case of Tanzania, large-scale labour migration both before and after independence has passed unregistered by the authorities, and the now recurring official reports on current migration are of little use in estimating either level or geographical origin of earlier movements. The few data available suggest that perhaps up to 140,000 persons born in Tanzania now live outside its borders. Undoubtedly, the majority of these have emigrated from the fringe areas of the country (6).

The immigration into Tanzania as shown by country of birth amounts to around 444,000 people for the Mainland and about 8,000 for Zanzibar (Table 4.4).

Table 4.4 Immigrants by country of birth, absolute and per cent of total population*

	Neighb. Countries	Other African Countries	Europe	Asia	Other Countries	Total
Mainland Total	390,514	6,770	13,310	22,601	2,646	445,841
	3.33	0.06	0.11	0.19	0.02	3.71
Mainland Rural	368,749	4,316	8,763	7,421	1,676	390,925
	3.25	0.04	0.08	0.07	0.01	3.44
Mainland Urban	29,765	2,454	4,547	15,180	970	52,916
	4.93	0.41	0.75	3.75	0.16	8.77
Zanzibar Total	3,090	1,178	397	3,509	30	7,904
	0.87	0.33	0.08	0.93	0.01	2.23

* The data on which Table 4.4 is based are more complete than the data in Table 4.3, which explains the discrepancy between the two.

- (6) Most of the emigration from Tanzania is likely to go to neighbouring countries, especially since the closing down at independence of labour migration to the minority regimes in Southern Africa. At the time of the preparation of this report, the following estimates of Tanzania-born residents in neighbouring countries are available: Kenya (1969) 39,200; Malawi (1966) 11,200; Uganda (1969) 51,900; and Zambia (1969) 22,700. The Zambia census also recorded about 3,300 persons as having moved from Tanzania during the year preceding the census.

The rates, 3.7% and 2.2% respectively of the total population, are not high when compared with for instance Ghana's 8.3% or Uganda's 7.9%, but higher than the corresponding rate for Kenya, 1.5% (7).

The bulk of the rural immigration consists of movements from the eight countries neighbouring on Tanzania. Even for the urban areas, the majority of the immigrants come from neighbouring countries, although a substantial proportion is from Asia, notably India and Pakistan. As border-crossing movements tend to go to fringe areas of the country, the immigrants are very unevenly spread over the regions (App. Table 4.2 and Table 4.6). Some regions in the periphery, such as Mtwara, Kigoma, West Lake and Mara, have immigrant groups making up almost one tenth of the regional population. On the other hand, central regions such as Dodoma, Iringa and Singida, have received only a few thousand immigrants each (8).

The immigrants are not proportionately distributed over the whole age range. This is true especially for the long-distance immigrants who to a large extent are in the active adult ages. The immigrants from neighbouring countries display a similar, though less extreme pattern (Fig. 4.1 and App. Table 4.3).

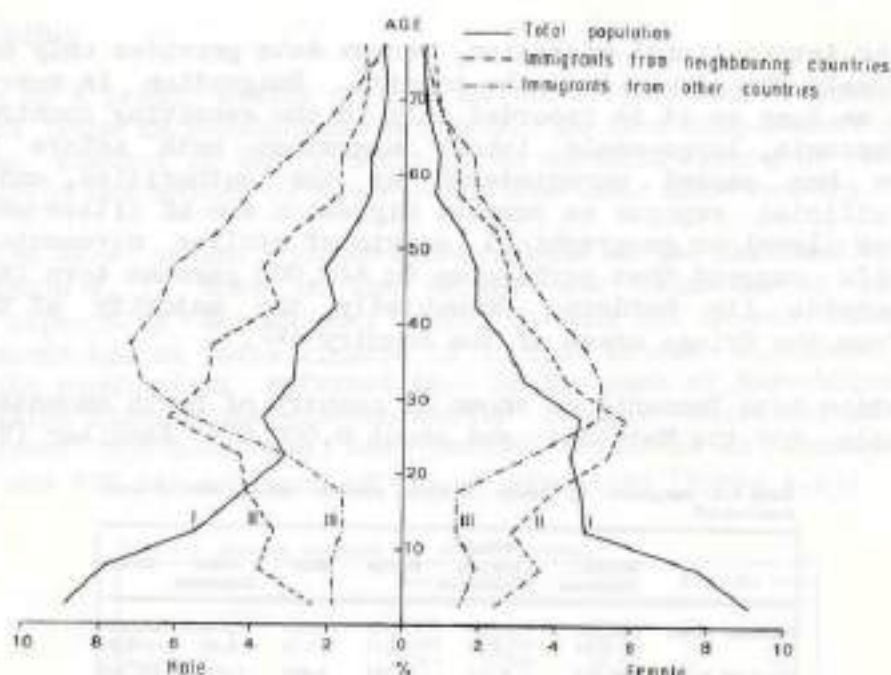


Figure 4.1 The age distribution of the total population and two immigrant categories

(7) W. Birmingham et al. (eds.), *A Study of Contemporary Ghana, Vol. 2, some aspects of Social Structure*. London, 1967. *Kenya Population Census 1969, Volume III*. Nairobi, 1971. Uganda, personal communication.

(8) The immigration figures should ideally be compared with emigration figures for the same area. The net result for border areas would be of particular interest. In the case of West Lake region, the age/sex distribution as well as the rate of growth seems to be considerably affected by emigration. This is true especially for Ngara district, which experienced an absolute decline in population over the years 1948-1967. See further S.B. Jensen & P. Mirandola, *Regional Planning Survey: Case Study, West Lake Region*. Ministry of Lands, Settlement and Water Development, Dar es Salaam, 1968 (mimeo).

4.1.4 Border-crossing migration

The immigrants from neighbouring countries are partly individuals looking for temporary work, partly individuals, families or groups having the intention to settle more permanently in Tanzania, partly refugees. Of around 400,000 immigrants, some 40,000 were in 1967 registered and known as refugees by the Government. Another 10-15,000 refugees were believed to live in the country, unregistered. The rest, 350,000 people, would then belong to the latter categories.

Because of the arbitrary character of the term 'refugee' and the limited knowledge about international migration, it is difficult to assess the extent to which the refugee status is applicable. It is for instance doubtful whether the immigrants to Kigoma region, 36,400 from Burundi and 6,300 from Zaire, are largely refugees or primarily seeking better economic conditions. As for the over 100,000 Mozambiquans in Mtwara and Ruvuma, probably many more than the recognized 25,000 had actually fled from the Portuguese colony at the time of the census.

Mozambique contributes about one third of the border-crossing migrants, Kenya about one fourth and Burundi about one fifth. The rest is distributed rather equally between remaining countries. Most of the immigrants settle in the region - or rather the district - just across the border, with the main exception of Tanga, which has attracted over 30,000 immigrants from different countries (App. Table 4.4). Fig. 4.2 shows all regional streams exceeding 5,000 immigrants from Neighbouring Countries (the total volume of immigrants is given in brackets for each country). Table 4.5 contains the main receiving districts.

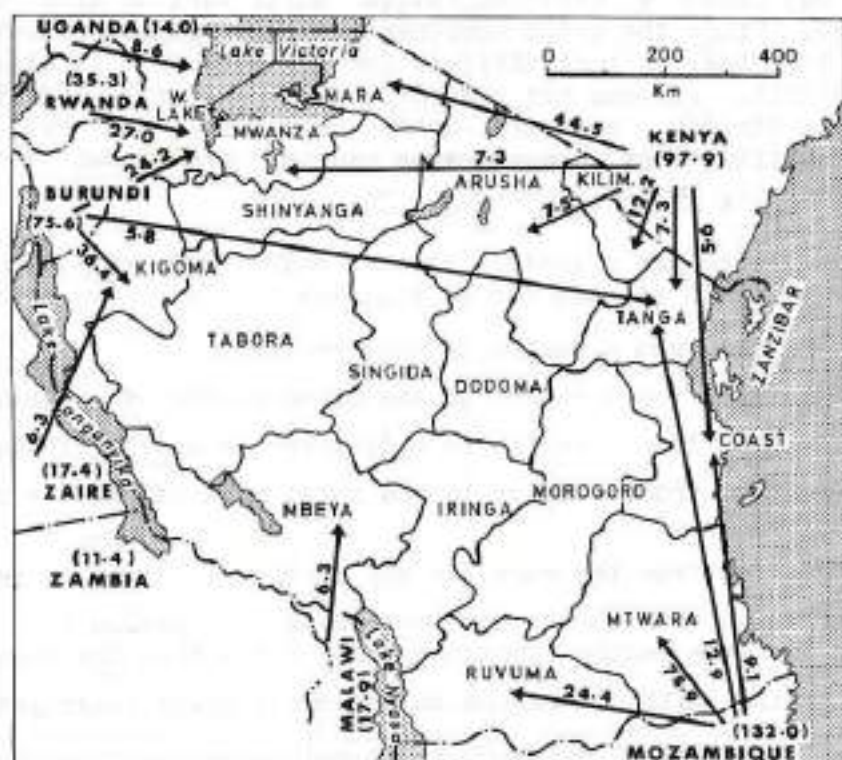


Figure 4.2 Immigration streams exceeding 5000 persons

Table 4.5 Major receiving districts for immigrants from neighbouring countries

Sending country	Number of immigrants	Receiving Districts; and percent of all immigrants				
Mozambique	132,027	Manica:25	Newala:14	Lindla:11	Others:50	
Kenya	97,063	Masoma:20	N. Nara:10	Kilim:11	Others:43	
Burundi	75,644	Kibondo:29	Ngara:16	Bakoba:13	Others:42	
Uganda	35,309	Karagwe:35	Bakoba:25	Ngara:15	Others:25	
Malawi	17,916	Bungwe:15	DSM:9	Kilosa:8	Others:64	
Congo	17,444	Kigoma:36	Sumbwa:24	Mpenda:4	Others:36	
Tanzania	13,900	Bakoba:33	Karagwe:26	Mwanza:5	Others:36	
Zambia	11,419	Bungwe:21	Mboni:11	Tanga:10	Others:67	

4.2 Internal migration

4.2.1 Migration streams

In the migration analysis of the census material the place of birth is the area of origin (or the source area), and the place of residence the area of destination (or the receiving area). Owing to the organization of the census data, the area of origin for the internal migration can be defined only in terms of region (with the exception of the city of Dar es Salaam; stream S_9 in Fig. 4.3), while the area of destination can be defined in terms of district and town - apart from region. The basic data thus identify migration streams from individual regions to individual districts and towns. Out of these basic migration units various kinds of aggregates can be formed. Since the urban component in the regional outmoving streams, because of its size, is insignificant for the purposes in this review, the region-to-district streams are regarded as rural-rural migration, and the region-to-town streams as rural-urban migration. One real rural-urban stream is constituted by the migrants moving from rural to urban areas within a region (S_5 in Fig. 4.3).

Fig. 4.3 Illustrates the migration streams which have been identified in the census material. The streams are as follows:

- S_1 - migration from a region to another region
- S_2 - migration from a region to the urban centre of another region
- S_3 - migration from a region to a district in another region
- S_4 - migration from a region to the rural part of another region (aggregate of S_3)
- S_5 - migration from the rural to the urban area within a region
- S_6 - migration from rural and urban areas of a region to a district in the same region (including movement within the district)
- S_7 - migration within a region to the rural areas (aggregate of S_6)
- S_8 - migration within a region ($S_5 + S_7$)
- S_9 - migration from Dar es Salaam

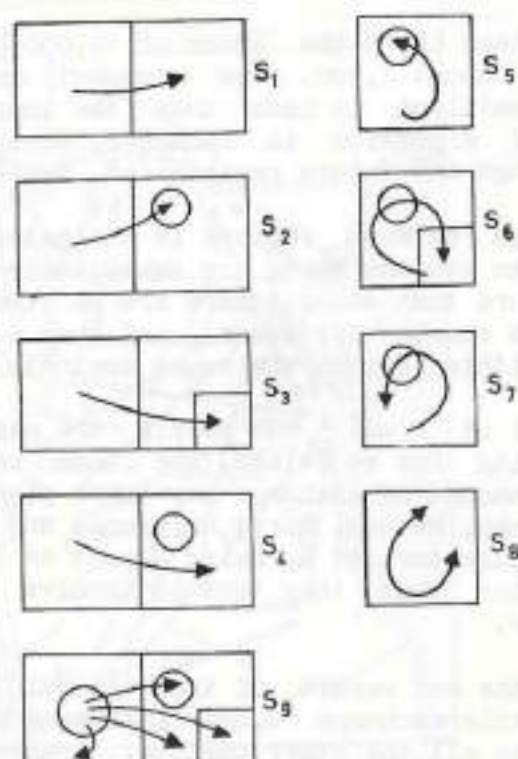


Figure 4.3 Internal migration streams

4.2.2 Regional exchange

Of the total number of residents in Tanzania, about 39% were born in the country but were outside their place of birth at the time of the census; they are the internal migrants, of whom about 30% are intraregional and about 9% interregional movers (Table 4.6) (9). The exchange between

Table 4.6 Regional population by birthplace category, per cent

	Same Locality	Same Region	Other Regions	Neighb. Countries	Other Countries	Total
Mainland Total	58	30	9	3	-	100
Mainland Rural	59	30	8	3	-	100
Mainland Urban	54	27	30	5	4	100
Zanzibar	51	42	5	1	1	100
Arusha	52	32	14	2	1	100
Cowet	61	25	12	2	-	100
Dar es Salaam	33	24	35	4	5	100
Dodoma	67	27	5	-	-	100
Iringa	78	19	3	-	-	100
Kigoma	57	33	2	9	-	100
Kilimanjaro	76	14	6	3	-	100
Mara	51	34	7	9	-	100
Mbeya	63	30	4	3	-	100
Morogoro	58	30	10	1	1	100
Mtwara	58	34	3	8	-	100
Mwanza	76	12	10	1	-	100
Ruvuma	50	39	4	7	-	100
Shinyanga	39	47	14	1	-	100
Singida	69	44	6	-	-	100
Tabora	34	40	24	2	-	100
Tanga	57	27	11	4	1	100
West Lake	51	32	7	9	-	100

(9) The Mainland figures in Table 4.6, 58 (Same Locality), 30 (Same Region), and 9 (Other Regions) may be compared with the corresponding figures for Ghana (1960), 58, 21 and 13.

Zanzibar and the Mainland is in the order of 15,000 people, with a net gain for the islands of about 2,400. The movement in absolute figures to Zanzibar from the Mainland is less than the immigration to most other regions. The internal migration in Zanzibar, on the other hand, is surpassed only by Shinyanga and Tabora regions (cf. Table 4.8).

The pattern of exchange between regions is indicated in Figs. 4.4 and 4.5. The differences between men and women are immediately apparent from the maps. Men generally move more than women (there are 34 streams of more than 5,000 men as against 20 such streams for women), and they cover longer distances. But in the movement within regions the women dominate.

Unilateral streams of at least 5,000 people are mainly directed towards Coast region (including Dar es Salaam) and Tanga region. In contrast to this, a considerable amount of exchange has taken place between regions near Lake Victoria: West Lake, Mwanza, Mara, Shinyanga and Tabora. These latter movements are also characterized by being almost as common among women as among men, an indication that they tend to involve families rather than individual job-seekers.

App. Table 4.5 gives the net result of the regional exchange between each pair of regions. In this exchange Coast (including Dar es Salaam) makes a net gain with regard to all the other regions. Arusha, Shinyanga and Kilimanjaro follow with net gains in the interaction with 14-15 regions. Ruvuma loses to all regions. Kigoma, Mtwara and Iringa experience net loss in the majority of interactions.

If attention is turned to the overall net results of the interregional migration (Table 4.7 based on App. Table 4.6), Coast retains its leading position, followed by Arusha, Tabora and Tanga. Kilimanjaro is among the losers in the overall net statistics.

Table 4.7 Regional net migration, absolute and per cent of Tanzania residents 'Born in the Region' ('000)

	Net Migration			Born in the Region			Net migration % of Born in the Region		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Coast*	69.5	44.3	113.8	312.3	319.3	631.5	22.3	13.9	36.0
Arusha	30.8	18.9	49.7	265.4	272.7	538.1	14.6	6.9	21.2
Tabora	24.6	27.6	52.2	242.7	255.8	498.5	10.1	10.8	20.5
Tanga	29.3	4.8	34.1	341.4	356.6	698.0	9.6	1.4	4.9
Mara	1.3	6.5	7.9	237.7	251.0	488.7	0.5	2.6	3.6
West Lake	3.9	5.3	9.2	275.6	309.3	584.9	1.4	1.7	3.6
Shinyanga	6.8	6.7	13.6	424.4	452.4	876.9	1.6	1.5	3.5
Zanzibar	3.2	-0.8	2.4	169.6	175.9	345.5	1.9	-0.5	0.7
Morogoro	6.2	-2.9	3.3	326.5	342.5	669.0	1.9	-0.9	0.5
Dodoma	-7.6	-4.7	-12.3	348.2	358.4	706.6	-2.2	-1.3	-1.7
Kilimanjaro	-6.9	-4.2	-11.0	312.3	328.7	641.0	-2.2	-1.3	-1.7
Mtwara	-17.9	-6.1	-24.0	473.1	499.7	972.8	-3.9	-1.2	-2.5
Mwanza	-34.2	-13.6	-47.8	485.6	509.3	994.9	-5.0	-2.7	-3.8
Musoma	-21.4	-29.2	-50.6	539.2	549.9	1089.1	-4.0	-5.3	-4.6
Iringa	-25.4	-32.4	-57.7	346.6	371.5	718.1	-7.3	-8.3	-7.8
Kigoma	-29.2	-11.7	-40.9	227.3	241.8	469.1	-12.9	-4.8	-9.7
Ruvuma	-23.6	-11.2	-34.7	196.9	209.5	406.4	-12.1	-5.4	-8.7
Singida	-27.6	-17.5	-45.0	240.8	259.3	500.2	-11.5	-6.7	-9.0

* Dar es Salaam included

The relative net migration, i.e. number of movers per one hundred born in the region and still living in Tanzania (10), has Coast on the top followed

(10) The population 'Born in the Region' seems more satisfactory as denominator than the residential population, the size of which is affected by the past movements.

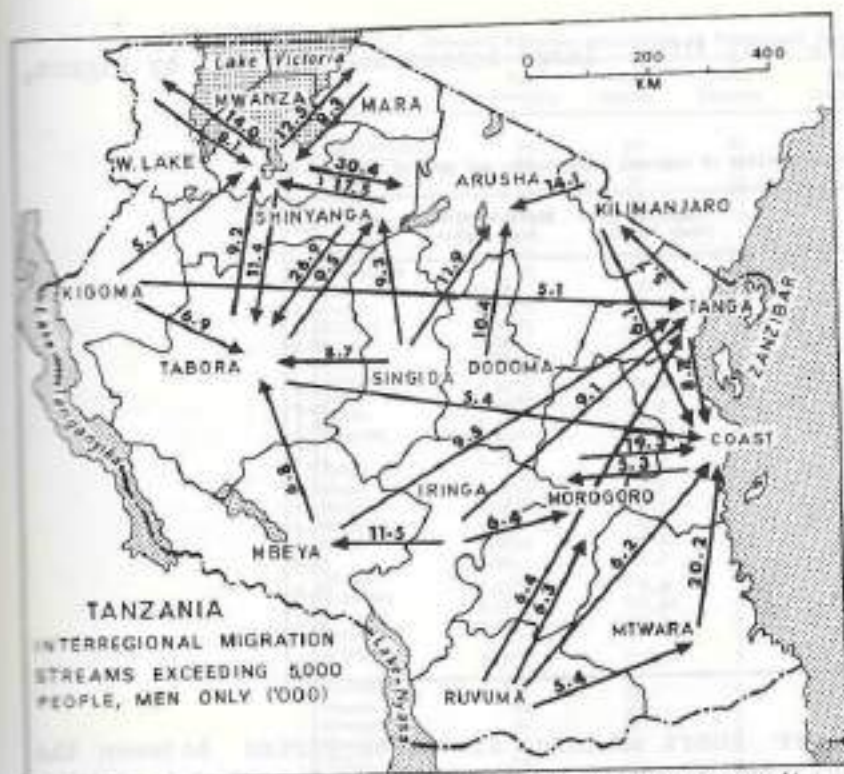


Figure 4.4 Interregional migration streams exceeding 5,000 people, men ('000)



Figure 4.5 Interregional migration streams exceeding 5000 people, women ('000)

by Tabora and Arusha (Table 4.8) (11). Large losses are suffered by Kigoma, Ruvuma and Singida (12).

Table 4.8 Relative mobility of regional populations; per cent of those born in the region

	Migrants to Other Regions	Migrants within Same Region	All
Tabora	16.9	45.0	61.9
Shinyanga	12.3	47.9	60.2
Singida	14.8	40.4	55.2
Ruvuma	12.7	36.1	50.8
Zanzibar	4.1	43.2	46.3
Mara	6.5	37.3	43.8
West Lake	4.1	36.1	42.2
Kigoma	11.0	31.5	42.5
Mtwara	5.8	36.0	41.8
Arusha	4.7	36.4	41.1
Morogoro	9.8	30.6	40.4
Coast (incl. Dar es Salaam)	7.1	30.2	37.3
Tanga	7.7	29.6	37.3
Mbeja	8.7	30.2	36.9
Dodoma	7.1	26.8	33.9
Iringa	6.3	17.9	26.2
Mwanza	14.1	12.1	26.2
Kilimanjaro	8.1	14.2	22.3
All	8.8	30.0	38.8

The tendency to migrate over short or long distances varies between the regions. The regional mobility, measured by the number of regional within- and outmigrants in relation to the number of people born in the region and still residing in Tanzania demonstrates the great disparity among the regions in this respect; the percentages 61.9 (Tabora) and 22.3 (Kilimanjaro) indicate the range (Table 4.8).

4.2.3 Migration to districts: Tanzania Mainland

The data for the distribution of the district population among the birth-place categories contain considerable information on the population movement in Tanzania. The present account, however, is restricted to a comparison between districts of the relative figures for the birthplace categories. These figures are given in Table 4.9, in which the districts are listed according to the percentage for migrants born in Other Regions.

There is a great variation among the districts regarding the impact of migration. In four districts the interregional migrants amount to more than 20% of the district population; Biharamulo (West Lake), Pangani (Tanga), Mzega (Tabora), Mzizima (Coast). Fifteen districts have interregional migrants who make up between 10% and 20% of the population. The variation within regions is usually not very great, especially where the regional average is low. Notable exceptions to this rule appear in the case of Biharamulo, Pangani and Mzizima. While the principal reasons for the latter exceptions appear to be sisal (Pangani) and the proximity to the national capital (Mzizima), the movement to Biharamulo is part of the continuing

(11) Coast Region excluding Dar es Salaam still retains a net gain, though near zero, while Dar es Salaam city has made a gain of over 100% of its local-born population.

(12) Note that the results refer only to the internal migration. As has been shown above, border regions like Kigoma and Ruvuma have large numbers of immigrants, who may balance the net loss to other regions.

Table 4.9 Mainland district population by birthplace category, per cent

	Same Locality	Same Region	Other Regions	Other Countries	Total
Biharani	28	26	42	4	100
Fungai	51	23	32	14	100
Harare	34	35	30	1	100
Harare	30	33	30	7	100
Harare	61	17	19	3	100
Kahama	51	50	18	1	100
Shinyanga	35	47	18	-	100
Toboro	51	51	17	1	100
Tanga	42	32	17	9	100
Kilosa	51	29	17	3	100
Myinda	38	39	16	7	100
Korogwe	48	30	16	6	100
Woodi	50	24	14	2	100
Geita	64	-	14	2	100
Mungoni	44	42	13	1	100
Mafia	43	44	11	2	100
Mtanga	62	27	11	-	100
Mtanga	42	40	10	8	100
Ngwenya	55	33	10	2	100
Mtanga	45	40	9	-	100
Tanga	46	41	9	2	100
Kilosa	68	20	9	3	100
Ngwenya	50	40	8	2	100
Mtanga	46	45	7	1	100
Irishia	48	45	7	-	100
Harare	54	30	7	1	100
Chanya	60	30	7	3	100
Ngwenya	70	22	7	1	100
Same (Pure)	72	18	7	3	100
Rufiji	76	17	7	-	100
Harare	52	34	6	8	100
Korogwe	72	22	5	1	100
Kilimanjaro	80	12	5	3	100
Ngwenya	95	1	5	1	100
Songea	40	43	4	5	100
Harare	57	36	4	3	100
Dodoma	66	30	4	-	100
Irishia	73	23	4	-	100
Siungu	52	44	3	1	100
Kilimo	42	39	3	16	100
Harare	35	39	3	3	100
Mtanga	51	38	3	8	100
Korogwe	69	28	3	-	100
Kilima	57	27	3	13	100
Mtanga	85	11	3	1	100
Harare	46	45	2	7	100
Kilima	50	40	2	-	100
Harare	45	38	2	17	100
Mtanga	58	34	2	6	100
Harare	63	34	2	1	100
Harare	56	27	2	15	100
Mtanga	81	17	2	-	100
Mtanga	82	16	2	-	100
Mtanga	50	39	1	10	100
Mtanga	67	29	1	3	100
Harare	57	24	1	18	100
North Mara	68	22	1	9	100
Mtanga	84	14	1	1	100
Harare	88	11	1	-	100
Mtanga	68	29	-	7	100

expansion of cotton cultivation beyond Sukumaland proper (13).

As for the immigration from other countries this seems to bear no relation to the attractiveness of the districts in the internal movement; the immigrants tend to settle in districts near the border. Neither is there any relation between the mobility within regions and the immigration from other regions. This may be interpreted as a sign that most movements within regions are short-distance moves, taking place within the district itself.

(13) J.C. de Wilde et al., *Agricultural Development in Tropical Africa*. Vol. II, The case studies. Baltimore 1967.

4.2.4 Urban destination (14)

The growth of the urban population, recorded as around 6% annually for the period 1957-1967 (Ch. 5 and 14), is a sign of considerable immigration. Since the natural increase can be assumed to be about 2% per year, the above growth figure means that two thirds of the urban growth is the result of migration.

Of the total urban population approximately one third are born in the town of residence and slightly fewer in Same Region and Other Regions respectively, leaving about 10% for Neighbouring together with Other Countries (Table 4.10). Significant exceptions from the general trend are Zanzibar town, where, despite a very low recorded growth over the last ten years (2.2% annually) more than two thirds of the population are born in the rural parts of the region; Mwanza town, which has experienced an extremely low inflow from the rest of the region; and Kigoma/Ujiji, where well over half of the population were born in the town.

Table 4.10 Urban population by birthplace category, per cent

	Same Locality	Same Region	Other Regions	Neighb. Countries	Other Countries	Total
Arusha	30	13	46	6	5	100
Dar es Salaam	29	40	17	10	4	100
Dar es Salaam	33	24	35	4	4	100
Dodoma	27	26	41	3	3	100
Iringa	40	35	21	2	2	100
Kig/Ujiji	60	18	11	10	1	100
Shinyanga	31	54	10	2	3	100
Mbeya	32	33	26	5	4	100
Morogoro	32	42	21	2	3	100
Moshi	30	31	27	8	4	100
Mtwara	38	44	11	6	1	100
Musoma	27	41	18	12	2	100
Mwanza	41	3	43	9	4	100
Tabara	40	23	26	6	3	100
Tanga	35	38	19	4	4	100
Zanzibar	15	70	10	1	4	100
All	32	31	28	6	3	100

The important role of the distance factor has been studied by grouping the sending regions according to Same Region, Neighbouring Regions and Remaining Regions. With all material aggregated, the movement to urban areas from each of these categories, relative to their population, was shown to decline in the proportion 46 : 3 : 1. Thus, the region surrounding each town is by far the most important source for recruitment; the neighbouring regions send around three times as many people relative to their population as do more distant regions.

The great attractiveness of Dar es Salaam, as compared with other urban centres in Tanzania, is clearly demonstrated by the various streams of regional outmigration. For all such streams the capital of the country is among the three largest recipients of migrants; and from no less than nine of the regions, apart from the Coast, does Dar es Salaam attract more migrants than the regional centre.

(14) The data in paragraph 4.2.4 are taken from C.-F. Claessens & B. Eggero, Movement to Towns in Tanzania: Tables and Comments. BRAINP Research Notes No. 12:1, University of Dar es Salaam, 1971.

4.2.5 Age and sex characteristics of migrants

Migration means spatial redistribution of the population in a given area. Inherent in this process is also a structural change with regard to sex and age in the residential population of the supplying as well as the receiving areas. The structural redistribution has lasting demographic consequences. The demographic aspect of migration is therefore an important issue, which has been the subject of much concern. Only a short note on the nature of the demographic impact with reference to the Tanzanian material is possible at the present stage of the analysis of the census data (15).

Population movement, largely consisting of labour migration, tends to be selective as regards sex and age. It is naturally dominated by men in the working ages. However, to the extent that they settle at their place of work, their move may lead to subsequent migration of women and children. Male dominance and the excess of young adults are particularly typical for the rural-urban migration; the rural-rural migration, usually in search of new land, involves, more than the former, the whole family. The difference in sex selectiveness in migration is disclosed by the sex ratios in Table 4.11.

Table 4.11 Sex ratio by birthplace category

Birthplace Category	Mainland Total	Mainland Rural	Mainland Urban	Islands
Same Locality	98	97	99	114
Same Region	81	80	112	78
Other Regions	134	131	148	224
Neighbouring Countries	114	115	131	166
Other Countries	147	150	130	175
All	95	94	116	102

The demographic impact of migration on the urban areas is rather obvious, since urban centres generally have positive net migration, and receive migrant populations with surplus of males from 'Same Region' as well as 'Other Regions'.

The effect of migration on the rural areas is more complicated to appreciate since the net results in an area depends on firstly the relative importance of the different destinations of the outmigrants, (urban destination reduces the number of men more than the number of women; rural destination reduces the number of women more than the number of men), and secondly, the relative importance of the different categories of source areas for the immigrants (Same Region provides more women than men, Other Regions provide more men than women).

The age selectivity in migration is demonstrated in Fig. 4.6 and 4.7 below (see also App. Table 4.7 and 4.8). Those born in Same Locality are dominated by young people and the migrants by adults, more so the longer the distance of the move. It should be stressed however that the first category is rather specific in its composition, containing all children born to the migrants after the move took place. This category therefore consists of a mixture of first and older generations of settlers in a way which makes it

(15) See: C.-F. Claesson & B. Egero, Migration and the Urban Population: Demographic Analysis of Population Census Data for Tanzania. BRAIUP Research Notes No. 11:2, University of Dar es Salaam, 1972. -Also published in Geografiska Annaler, Ser. B. Stockholm, 1972.

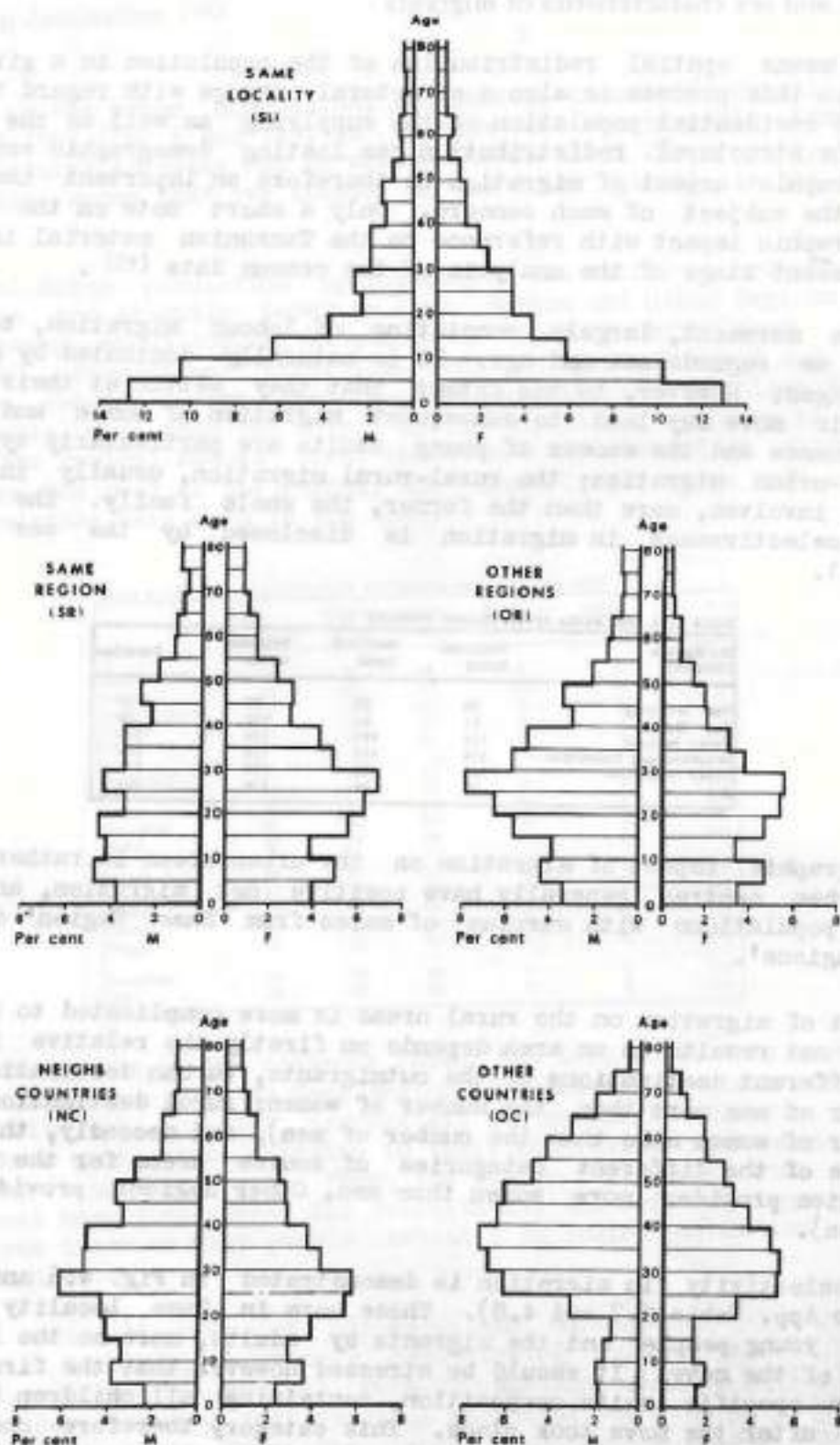


Figure 4.6 Age distribution of birthplace categories for the rural population

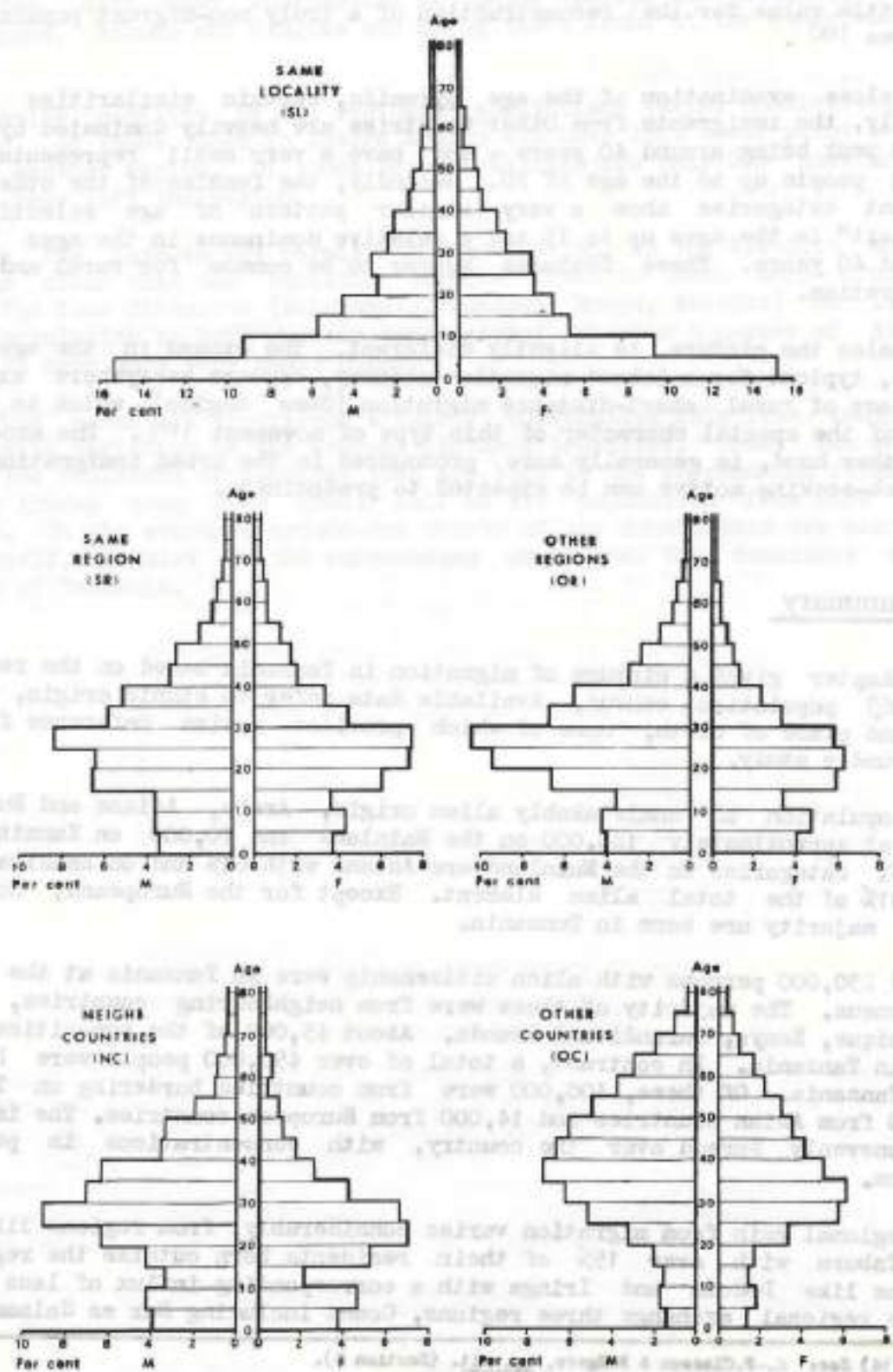


Figure 4.7 Age distribution of birthplace categories for the urban population

of little value for the reconstruction of a truly non-migrant population of an area (16).

At a close examination of the age pyramids, certain similarities appear. Firstly, the immigrants from Other Countries are heavily dominated by adults - the peak being around 40 years - and have a very small representation of young people up to the age of 20. Secondly, the females of the other three migrant categories show a very similar pattern of age selectivity; a "deficit" in the ages up to 15 and a relative dominance in the ages between 30 and 40 years. These features appear to be common for rural and urban immigration.

For males the picture is slightly different. The excess in the ages 20-30 years, typical for a labour-migration economy, appears everywhere except in the case of rural short-distance migration (Same Region), which is a clear sign of the special character of this type of movement (17). The excess, on the other hand, is generally more pronounced in the urban immigration where the job-seeking motive can be expected to predominate.

4.3 Summary

The chapter gives a picture of migration in Tanzania based on the results of the 1967 population census. Available data refer to ethnic origin, citizenship and place of birth, none of which provides a time reference for the topic under study.

The population of unmistakably alien origin, Arabs, Asians and Europeans, stood at approximately 120,000 on the Mainland and 70,000 on Zanzibar. The largest categories on the Mainland are Asians with 61% and on Zanzibar Arabs with 81% of the total alien element. Except for the Europeans, however, a clear majority are born in Tanzania.

Around 230,000 persons with alien citizenship were in Tanzania at the time of the census. The majority of these were from neighbouring countries, notably Mozambique, Kenya, Burundi and Rwanda. About 45,000 of the non-citizens were born in Tanzania. In contrast, a total of over 450,000 people were born outside Tanzania. Of these, 400,000 were from countries bordering on Tanzania, 25,000 from Asian countries and 14,000 from European countries. The immigrants were unevenly spread over the country, with concentrations in peripheral regions.

The regional gain from migration varies considerably, from regions like Arusha and Tabora with over 15% of their residents born outside the region, to regions like Dodoma and Iringa with a corresponding influx of less than 5%. In the regional exchange three regions, Coast including Dar es Salaam, Tabora

(16) See: C.-F. Classon & B. Egere, *op. cit.* (Section 5).

(17) The short-distance migration with rural destination has a strong female dominance; cf. sex ratio 81 for Same Region, Table 4.11. Since the great majority of moves fall within this category, the total internal migration in Tanzania involves more women than men; cf. sex ratio 95 for all categories, Table 4.11.

and Arusha, have made substantial net gains whereas less attractive regions like Kigoma, Ruvuma and Singida are among those found at the other end of the scale.

The relative mobility of the regional populations varies considerably; for instance, of those born in Tabora Region 62% have left their place of birth, 7% for another region. Of those born in Kilimanjaro only 22% have moved, of whom 8% have left the region.

Although the data do not permit the same detail in the district analysis, it seems clear that the variation on this level is even more pronounced. Thus, for four districts (Biharamulo, Pangani, Nzega, Mzizima) at least 30% of the population is born outside the district, whereas a number of districts appear to have made very small gains.

In urban areas all experience a fairly substantial gain from immigration, though with variation in the average distance travelled. Thus, for instance, 15% of the residents of Zanzibar town are born in the surrounding rural areas, whereas Arusha town gets about half of its population from more distant regions. On the average, around one third of the inhabitants are born in the town itself, a third in the surrounding region and the remainder in other regions of Tanzania.

Tanzania: Regional Migration, 1967-72	
Region	% of population born outside region
Arusha	45.0
Dar es Salaam	35.0
Iringa	15.0
Kilimanjaro	22.0
Kigoma	10.0
Lindi	12.0
Morogoro	18.0
Mt. Meru	14.0
Mwanza	20.0
Nzega	30.0
Pangani	30.0
Rovuma	8.0
Singida	5.0
Tabora	62.0
Zanzibar	15.0

5 URBAN GROWTH

by Adolfo Mascarenhas

5.0 Introduction

According to the 1967 population census, the urban population of Mainland Tanzania was 685,092; in other words, 5.7% of the people live in urban areas (1). This figure is raised to 6.2% if the 83,541 people living in the towns of Zanzibar are added to the Mainland urban population. The annual intercensal urban growth 1948-57 was 7.4% for Tanzania as a whole and 6.4% including Zanzibar (2). The growth of the urban population during 1957-67 therefore has been more than double the population growth for the rural areas which during the census decade was recorded as 3% (3). While the urban population has nearly doubled since 1957, the total number of towns has not changed much. The distribution of the towns is shown on map 5.1. However, compared to other countries, even African countries, the proportion living in the urban areas in Tanzania is very low (see table 5.1). Despite the low figure the significance of the urban areas to the development of the country is considerable.

Table 5.1 Percentage of people living in urban areas in Tanzania and other selected countries

Country	Per cent in Urban areas
Tanzania including Zanzibar	6.2
Tanzania (Mainland only)	5.7
Uganda*	7.0
Kenya*	8.0
Burundi	2.2
Malawi	5.0
Malagasy	15.7
Zambia	20.0
Morocco	32.3
U.A.R.	46.4
Hungary	44.5
Cuba	53.3
Japan	60.1
United Kingdom	64.1

SOURCE: UN Demographic Yearbook, Table 5; Population by Urban/Rural Residence 1955-65, New York 1970.
1967 Population Census, Volume 2, Statistics for Urban Areas, Bureau of Statistics 1970.
Economic and Statistical Review, Nairobi 1970.

The concern of this chapter is with urban growth rather than urbanization. Although it is difficult to come to a precise definition of, or to completely isolate, the two terms, the former is generally considered to be numerical growth while the latter has a sociological connotation and implies a way of life. This distinction is not academic only, for the confusion between the two has in Tanzania understandably led to a negative attitude towards towns. Administratively, this is reflected in the absence of the declaration of any new towns since independence (4).

- (1) 1967 Population Census, Vol. 1, Statistics for Enumeration Areas, Central Statistical Bureau, Dar es Salaam, 1969.
- (2) Recorded Population Changes 1948-57, Tanzania, Central Statistical Bureau, Dar es Salaam, 1968, Table 5 pp. 13-14.
- (3) Recorded Population Changes 1948-57, op.cit.
- (4) The last town to be so designated was Machingwa (1952). Other towns created because of the groundnut scheme were Mtwara (1949) and Longwa (1951).

The 1967 census reports give population figures for both Zanzibar and Mainland Tanzania, but it is very difficult to compare the relative urban growths of the two areas as they were separate political entities up to 1964. Consequently, Zanzibar held its own population censuses in 1948 and 1958 along different lines so that comparison with the 1967 census is at times difficult. Areas which were designated rural in the one were classified urban in the others. However, to give an overall picture of urban development in Tanzania, a special section has been included on Zanzibar but these comments are of necessity brief.

5.1 Zanzibar and Pemba

One of the distinctive features of Zanzibar is the relatively high degree of urbanization. In 1967 nearly a quarter of the inhabitants of the two islands lived in the four areas designated as urban. Zanzibar town on Zanzibar island is the only town, while Chake Chake, Mkoani and Wete are former townships and centres of administrative regions on Pemba Island.

Zanzibar town is by far the largest urban centre of the two islands and indeed the second largest town in the United Republic. The 68,490 inhabitants during the 1967 census constituted nearly 82% of the urban population of the islands. Recorded growth rate per annum is remarkably low, 2.5% per annum for 1948/58 and 1.9% in 1958/67. Although the population of Zanzibar island has increased by 15% since the last census the proportion living in urban areas has not changed much. Thus, in 1958, 35% of the people lived in Zanzibar town and the equivalent figure in 1967 was 35.9%.

Around Zanzibar town are four satellite urban centres called township planning areas. In the 1948 and 1958 censuses, these areas (Bububu, Kimara, Mbwani and Mombasa) were designated as urban, and a total population of 4713 was recorded in 1958 for these four towns referred to as Magharib townships (5). In 1967 however, only aggregate figures were made available and it is not known whether the 12,098 inhabitants of Magharib Planning area consisted of the four centres named above or whether there were additions to the number of centres.

Like its mainland counterparts, Zanzibar town was characterized by a large proportion of non-Africans. In 1958 Asians comprised nearly a quarter of the inhabitants and the proportion of non-Africans would have been very much higher had it been possible to identify the Arab element which was jointly enumerated with the African population; this latter category made up 72% of the population. Comparison with the 1967 population is difficult because in this latter census the figures are available only by heads of household and Arabs are treated as a separate group. But even given this data, major changes are evident. For instance the proportion of Asians in 1967 had declined to 13%. The African/Arab group had risen to 84%, 12% of which was made up of the Arab component. Although in comparative terms there seems to be some stagnation in urban growth, there is evidence of other changes. For instance the sex ratio is stabilizing; for the periods 1958 and 1967 the ratio was 116 and 101 males

(5) Report on the Census of the Population of Zanzibar Protectorate, Zanzibar, 1960, p. 21.

Note also that the 1967 Population Census Vol. 2, does not give a breakdown of the Magharib Town Planning Area (p2).

per 100 females respectively (6).

The urban pattern is different on the island of Pemba. During the 1967 census there were three urban centres referred to as "town planning areas" and treated as equivalent to the 'former townships' of the mainland. These were Wete, Chake Chake and Mkoani. Each of these former townships has a planning area surrounding it and, during the 1958 census only the aggregate population (town + town planning area) of these three centres were given. Therefore, while comparison can be made between 1948 and 1967 this exercise is unsatisfactory for 1958 and 1967 (see chapter 14, App. table 14.1).

In the last census, 9% of the population of Pemba island was found in 'towns'. Compared with Zanzibar - which has 36% living in urban areas - Pemba is more rural in character. The percentage of Pemba island's population in each of the three towns was: Wete 5%, Chake Chake 3%, and Mkoani 1%.

A significant feature of the population of the Pemba towns has been the large numbers of non-African people. In 1958 the Asian element accounted for 15%, 14% and 5% of the population of Wete, Chake Chake and Mkoani respectively. By 1967, using the head of the household as a basis for the different ethnic groups, the equivalent figures were 4%, 8% and 4%. It is not known how many people considered themselves Arabs in 1958 but the 1967 figures still revealed a very large proportion of Arabs: Wete 29%, Chake Chake 22% and Mkoani 27%.

5.2 Evolution of urban centres in Mainland Tanzania

Despite emphasis on the policy of rural development in Mainland Tanzania, urban growth (that is increase in the population of existing towns and also in the number of towns) is necessary both for development and administration. Because of the anomalies inherited from the colonial era, it is necessary to look at urban growth in Tanzania from an historical point of view.

Although the tradition of towns goes back for nearly a thousand years the best expressions and developments were not long-lived (7). A limited population, constrained economic exchange, internecine rivalry, the arrival of the Portuguese, slave trading and other exploitative forms of trade were some of the reasons why most of the towns degenerated, at times after a chequered existence. The distribution of the early towns was confined largely to the coastal areas. In the nineteenth century a few towns in the interior, notably Tabora, Mpwapwa and Ujiji came to prominence partly as a result of the westward penetration of Arab trading activities in East Africa. The major effects of the precolonial towns of the coast and the interior were the evolution and dissemination of the Swahili language and to a more minor extent the spread of Islam.

During the German period the establishment of an administrative structure, the evolution of a communications network and some social services, the develop-

(6) Recorded Population Changes 1948-67, *op.cit.* p. 11.

(7) The tradition of towns is well documented - for example see: R. Coupland, *East Africa and its Invaders*, Oxford, 1965; R. Oliver and G. Mathew, (ed) *History of East Africa*, Vol. 1, Oxford, 1963; G.S.P. Freeman-Grenville, *The East African Coast: select documents from the first to the earlier nineteenth century*, Oxford, 1962.

ment of commerce and a monetary economy all contributed to laying the foundation of an urban network and to making towns more widespread. Since the establishment of the administration was often associated with 'pacification', the *hona* or office of the administration was the largest, most strategically sited and most important physical structure of many of the towns of the German period. Because of the importance of the overseas connection to the colonial governments the precedent was set emphasizing port towns. At Dar es Salaam and Tanga there was an attempt to define a form of local government and to grant it the power to levy taxes and to manage land (8).

Since Britain acquired Tanganyika as a mandate under the League of Nations, after World War I, a cautious policy was adopted towards further land alienation. However, registered German land holdings were vested in the Custodian of Enemy Property, who auctioned off most of the land (9). Property so disposed of was purchased by non-Africans - Asians and Europeans - and after 1926 even by German nationals. Therefore, most of the large towns represented areas where non-African ownership of land was considerable.

A township ordinance was passed early during the British rule. The provision and application of these regulations, or gazettment of towns was brought about on the suggestion of the administration and legalized with the approval and proclamation of the governor. Townships so proclaimed had boundaries, could fix and levy rents and had comprehensive laws pertaining to health and government (10). In the initial stages, former German settlements with large non-African populations were proclaimed as towns by the early 1930's (11).

Thereafter other towns were created as centres became important for European agriculture and settlement e.g. Mbeya in 1935 (12), or for mining, as was the case with Chunya in 1938 (13). The depression of the early 1930's and World War II took their toll and several towns were demoted. After World War II there was a last spate of proclaiming towns, notably Mtwara (1949), Kongwa (1951) and Nachingwea (1952). Despite these few additions, out of over 50 towns that had been created during the British period, only 32 were considered urban areas for the 1967 census (14). By the end of the British period only 15 of these had been granted distinct local government authorities. These 15 are called towns and during the census were considered as urban areas of the first order. Those that failed to qualify for this rank are known as 'former townships', but the same type of data was collected for both, though in the case of the former townships not all of it was processed in the same detail.

(8) J. Iliffe, Tanganyika Under German Rule, Cambridge 1969, p. 88.

(9) Enemy Property Department, Report on the liquidation, 1917-33. Dar es Salaam, 1933, p. 13.

(10) Sir A. Russell, Tanganyika Territory Vol. III, Revised Edition, Township Rules Cap. 29, p. 188-224.

(11) Between 1920-30 nearly 56 towns were proclaimed. The majority of them were proclaimed by 1923.

(12) Tanganyika Territory, Ordinances 1935, Dar es Salaam, 1936 p. 172.

(13) Tanganyika Territory, Ordinances 1938, Dar es Salaam, 1939, p. 311.

(14) Actually data for 15 towns and 16 former townships was collected. With the inclusion of Mwendu (a former minor settlement) there is data available on 32 centres.

Situations did arise, especially related to trading activities, when it became necessary to create another administrative category of towns. Therefore, in 1932, another category of 'township' was created and was known as a 'minor settlement' (15). Generally these settlements were much smaller than towns, and in many cases measured less than 500 acres. The focus of the settlement so designated could be a trading centre, a traditional village, a mine, a railway station or a market. As in the case of towns, the minor settlements were proclaimed and had many similar laws pertaining to sanitation, building and taxation. In time they attracted rudimentary services. Because they attracted Africans from diverse backgrounds, the local customary laws did not apply, so that once again, the settlements were regarded as an alien creation by local people. Minor settlements could be upgraded to towns but more frequently towns were demoted to minor settlements.

The various settlements were, therefore, to a varying degree non-African enclaves because of the concentration of non-Africans or simply because the rules and regulations governing them in such matters as market dues, land rights or building standards were determined by the colonial administration.

With few exceptions, no attempt was made in the 1967 census to enumerate the population within the boundaries of the minor settlements. The major exception is Nwadu. From the original census returns it is possible to extract the information of the population size for some of the minor settlements.

The legal status of the different urban forms in Tanzania was not consistently implemented but depended on the enthusiasm of and pressure on and from the provincial administration. In some instances the anomalies were great so that a small centre such as Kilwa Masoko (1957 population 512) was designated a town, while on the other hand Muheza or Nwadu (to give two examples) were important centres and had larger populations but failed to qualify as towns. During the national census there was little time or pressure to change the anomalies. The 1967 census for the towns only considered the *de jure* urban areas not the *de facto* urban types of settlements. Viewed against this background, the inadequacies of the present definition of an urban area, both for administrative and for planning purposes become sharply focused.

5.3 Changes in the size of Towns

During the 1948 census there were only four towns - Dar es Salaam, Tanga, Tabora and Mwanza - with populations in excess of 10,000 inhabitants (see table 5.2). Arrayed in size there was a sharp break between the first two towns; Dar es Salaam (69,227) had a population more than three times larger than Tanga (20,619). The third (Tabora - 12,768) and fourth (Mwanza - 11,296) towns were similar in size. The next four towns, Dodoma, Lindi, Morogoro and Moshi were grouped together by the fact that they had over 8,000 but less than 10,000 inhabitants. Together, the eight towns served as capitals for the seven Provinces of the colonial administration (16). Iringa and Arusha, both

(15) Tanganyika Territory, Ordinances, etc. 1932, Dar es Salaam, 1933. Minor Settlement Ordinance pp. 173-183.

(16) The eight provinces, capitals in brackets, in 1957 were Central (Dodoma), Eastern (Dar es Salaam), Lake (Mwanza), Northern (Arusha), Southern (Mtwara), Southern Highlands (Mbeya) and Tanga (Tanga).

Table 5.2 Tanzania Mainland: population and rank order of towns and former townships

townships						
Position	1948		1957		1967	
	Towns	Population	Towns	Population	Towns	Population
1	Dar es Salaam	69,227	Dar es Salaam	128,742	Dar es Salaam	272,821
2	Tanga	20,619	Tanga	30,053	Tanga	61,050
3	Tabora	12,768	Mwanza	13,077	Mwanza	34,861
4	Mwanza	11,296	Kig/Ujiji	16,255	Arusha	32,452
5	Dodoma	9,414	Tabora	15,561	Moshi	26,864
6	Idodi	8,577	Mtwara/Mik	15,266	Morogoro	25,262
7	Morogoro	8,173	Morogoro	14,507	Dodoma	23,559
8	Moshi	8,048	Moshi	13,726	Iringa	21,746
9	Iringa	5,702	Dodoma	13,435	Kig/Ujiji	21,269
10	Arusha	5,320	Idodi	10,315	Tabora	21,012
11	Bukoba	3,247	Arusha	10,038	Mtwara/Mik	20,413
12	Mbeya	3,179	Iringa	9,587	Musoma	15,412
13	Musoma	2,962	Musoma	7,207	Idodi	13,358
14	Kigoma/Ujiji	-	Mbeya	6,332	Mbeya	12,479
15	Mtwara/Mik	-	Bukoba	5,297	Bukoba	8,141
Total		160,359	324,598		610,801	
Former townships		Population	Former townships		Population	
1	Bagamoyo	4,162	Korogwe	4,223	Singida	9,478
2	Kilwa Kivinje	2,915	Singida	3,930	Moshi	7,838
3	Kilwa	2,626	Bagamoyo	3,861	Korogwe	6,675
4	Shinyanga	2,596	Kilwa	3,743	Songea	5,430
5	Pangani	2,490	Tanga	3,563	Bagamoyo	5,312
6	Korogwe	2,008	Kilwa/Kiv	2,978	Shinyanga	5,135
7	Chunya	1,716	Shinyanga	2,907	Kondoa	4,514
8	Kahama	1,507	Pangani	2,543	Kilwa	4,458
9	Tukuyu	1,149	Korogwe	1,962	Machingwa	4,069
10	Kimamba	1,060	Kahama	1,856	Tanga	4,069
11	Lushoto	662	Machingwa	1,693	Mandlo	3,607
12	Songea	612	Chunya	1,664	Kahama	3,211
13	-	-	Songea	1,401	Pangani	2,955
14	-	-	Kimamba	1,330	Mpembeni	2,429
15	-	-	Lushoto	1,270	Chunya	2,328
16	-	-	Kilwa Musoko	512	Kimamba	1,863
17	-	-	-	-	Lushoto	1,803
Total		23,503	39,474		74,746	
Total towns and former townships		183,862	364,072		685,547	

Source: *Recorded Population Changes 1948-1967*, Op. Cit.
Population Census, Vol. 2, Dar es Salaam, 1970.

with over 5,000 inhabitants were important centres for non-African settlement. Bagamoyo with over 4,000 inhabitants had a larger population than Bukoba, Mbeya and Musoma. These last three towns were important centres for export crops. In a statistical sense, Kilwa Kivinje (2,915) was linked with four other towns with a population of over 2,000 people. Among these four, Kilwa and Pangani persisted as important coastal ports while Kilwa and Korogwe, as well as Kimamba (1,060) were important satellite centres for the large sisal towns of Tanga and Morogoro. Chunya (1,716) still showed its importance as a former gold town. Trailing the list of 27 towns for which data was collected were two towns of less than 1,000 each; Lushoto (662) and Songea (612).

By the time of the 1957 census the administrative structure had not changed much but two sets of twin towns, absent in the 1948 census, were added to the list. Along with Arusha, these centres constituted the eleven towns which now had over 10,000 inhabitants. The common aspect of the twin towns of Mtwara/Mikindani and Kigoma/Ujiji was the combination of small modern centres and large pre-colonial indigenous settlements (17). In the former case Mtwara was,

(17) Kigoma, the port and administrative centre, was proclaimed a town in 1921. (*Tanzania Gazette* Vol. 2 p. 319). Ujiji was declared a minor settlement in 1933 (*Tanganyika Ordinances Etc.* Vol. XII, p. 22, App. GN35)

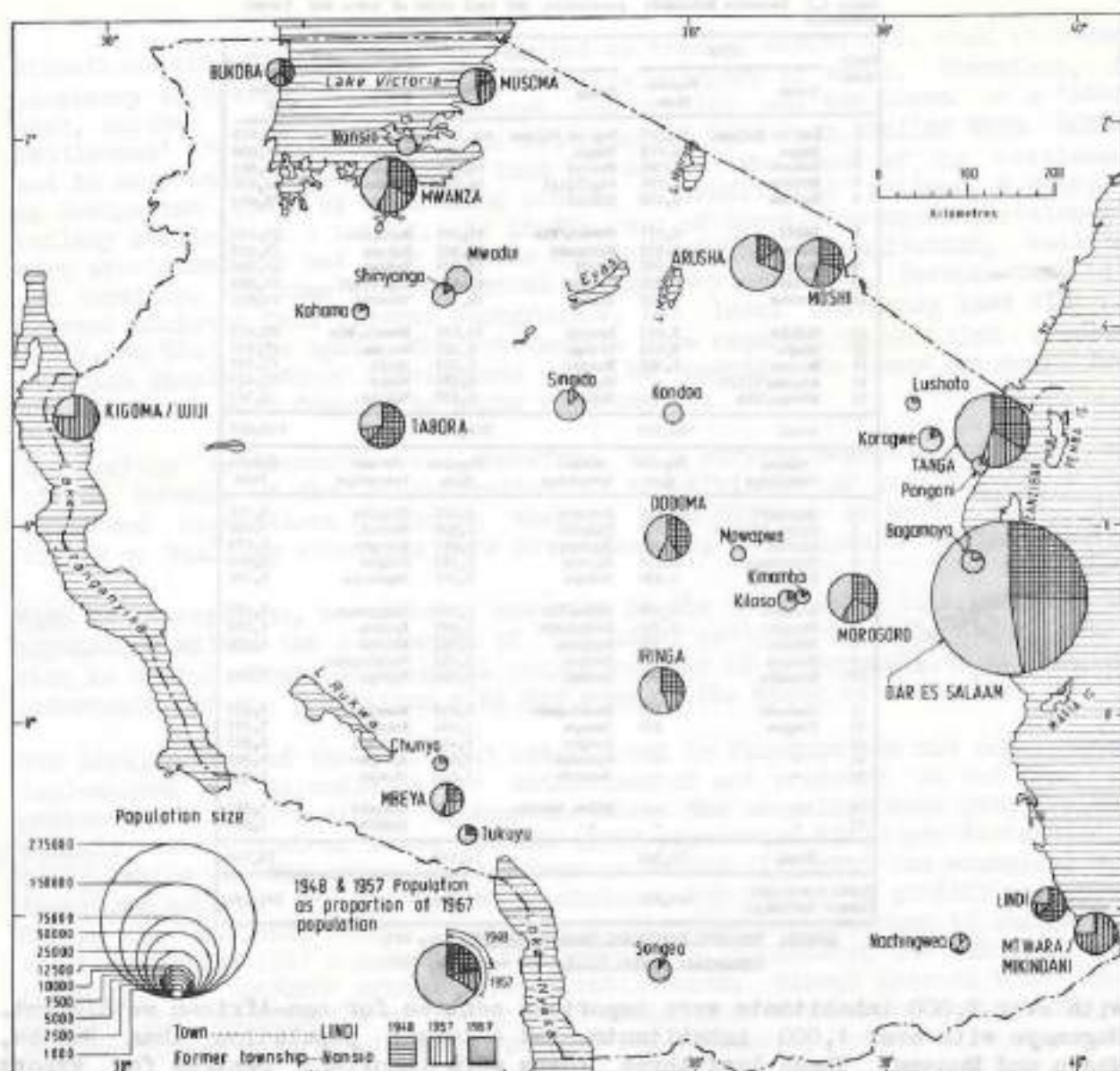


Figure 5.1 Tanzania Urban Areas

a newly created port-town for the groundnut scheme; Kigoma, dating back to the German period, grew as a terminus of the central railway line. Mikindani and Ujiji respectively were the two indigenous settlements added to the new towns.

Iringa, Musoma, Mbeya and Bukoba, which had all grown in population to over 5,000 but less than 10,000 inhabitants, continued to retain their former importance. Dar es Salaam and Tanga continued to occupy the first two places, Mwanza displaced Tabora for the third position and the latter lay at the fifth position between the twin towns of Kigoma/Ujiji and Mtwara/Mikindani. Although Lindi had grown to be a town of over 10,000 growth was slow, reflecting competition from the better and more modern port of Mtwara. Two towns showed a decline from the 1948 figures. The population of Bagamoyo fell from 4,162 to 3,861, and that of Chunya from 1,716 to 1,564. Similarly, some of the old centres, beginning with Tabora at the top and including Kilwa Kivinje and

Tangani, showed very small increases. However, the number of towns in 1948 with over 1,000 inhabitants had increased to 30 by 1957; only the town of Kilwa Masoko (512) had less than 1,000 people. New additions to the list were Singida, Kongwa, Kilwa Masoko, Nachingwea and Mtwara.

During the 1967 census the administrative structure had altered drastically in that the large provinces of the colonial era were subdivided into 17 regions plus the city of Dar es Salaam. As has already been stated, the status of the towns was frozen but the administrative influence on town growth was considerable. For census purposes the number of towns was similar to 1957 but local administrators ceased to look upon Kongwa, Kilwa Masoko and Kilwa Kivinje as urban centres. However, Kondo, Nansio and Mpwapwa were enumerated as urban areas in the 1967 census. Mwadui, because of its importance, was also considered an urban area, though in fact legally it is a minor settlement. In 1967 there were 32 urban areas compared to 31 in 1957.

Without exception, during the 1967 census, all the designated urban areas were towns of over 1,000 inhabitants. The primacy of Dar es Salaam, with 272,821 inhabitants, was greater than before; and the city was more than four times larger than Tanga with 61,658. Mwanza and Arusha had grown to a population in excess of 30,000; there were 7 towns with over 20,000 but only three, Musoma, Madi and Mbeya which fell in the 10,000 - 20,000 range. Bukoba was the only town with less than 10,000. Among the former townships, Singida, Korogwe, Rungwa, Shinyanga and Bagamoyo had over 5,000 but less than 10,000 inhabitants.

5.4 Urban area growth rates: population changes

Because the application of legal status to urban areas is inconsistent there is little of significance that one can say about the number of urban areas. More can be said about the size of the towns. The changing pattern in the population size of the urban areas between 1948-67 is summarized in table 5.3.

Table 5.3 Number and size of urban areas in Tanzania Mainland

Size by category	1948	1957	1967
less than 1,000	2	1	0
1,000-2,500	7	7	4
2,500-5,000	8	8	8
5,000-10,000	6	4	6
10,000-15,000	2	5	2
15,000-20,000	1	4	1
20,000-25,000	-	-	5
25,000-30,000	-	1	4
30,000-100,000	1	-	1
Over 100,000	-	1	1
Total	27	31	32

SOURCE: *Recorded Population Changes 1948-67* op.cit.
Population Census Vol. 2 op.cit.

In 1948 most of the towns were clustered in the 2,500 and 5,000 categories (7 and 8 respectively) and there was a complete absence of towns in the 20,000 to 30,000 categories. Towns with over 10,000 but less than 15,000 were nearly as common as those between 2,500 and 5,000. By 1957, the clustering around the 2,500 and 5,000 categories was still present but there was a notable increase in the towns of up to 15,000 and 20,000 inhabitants. There were 3 towns in this category in 1948 but 9 in 1957.

Although there was no appreciable change in the total number of towns by 1967,

there was a noticeable decline in the number of urban areas with populations below 2,500. Secondly, in the towns with up to 10,000 inhabitants there was a rise (there were 6 towns in this category in 1948 but their number had declined to 4 by 1957) to the 1948 level. Thirdly, major shifts had occurred in the towns with over 20,000 and less than 50,000 inhabitants; compared to the sole example in 1957 there were 9 such towns in 1967.

Closely related to the pattern of the size of towns is the pattern of the growth rate. Between 1948 and 1957 the annual average growth rate for the 25 urban areas was 7% and more than half of them experienced above average growth rates (see Table 5.4). Kigoma and Tukuyu with annual rates of 16% and 13% respectively experienced the fastest growth. Other urban areas with a high annual growth rate were Musoma (10%), Songea (10%), Mbeya (9%) and Korogwe (9%). Signs of stagnation were more apparent among the former townships and these were reflected by very low rates of growth e.g. Pangani (0.3%) and Kilwa Masoko (0.2%). Both Bagamoyo (-0.8%) and Chunya (-0.3%) experienced a decline of population.

Table 5.4. Recorded annual growth rates for Mainland towns and former townships 1948-57 and 1957-67, per cent

Towns	Av. annual growth rate		Former townships	Av. annual growth rate	
	1948-57	1957-67		1948-57	1957-67
Arusha	7.3	12.4	Bagamoyo	0.8	2.8
Bukoba	5.6	4.4	Chunya	0.3	5.7
Dar es Salaam	7.1	7.8	Kahama	2.4	6.1
Dodoma	4.0	5.6	Kilosa	4.0	7.8
Iringa	5.9	8.5	Kilwa Kivinja	0.2	-4.4
Kigoma	16.1	7.1	Kisumu	2.4	5.5
Moshi	-	0.7	Korogwe	8.6	4.8
Mtanga	2.1	2.6	Madiba	7.5	3.6
Mbeya	9.1	6.0	Nachingwea	-	9.4
Morogoro	6.6	5.7	Pangani	0.3	1.4
Moshi	6.1	7.0	Shinyanga	1.5	5.0
Musoma	10.4	7.9	Songea	9.7	14.4
Mtwara	-	2.5	Singida	0.0	9.3
Mtindani	1.7	3.9	Tukuyu	15.4	1.4
Mwanza	6.5	5.6			
Pabara	2.1	3.2			
Tanga	7.0	4.8			
Average	7.2	6.5		5.9	5.5
Average, towns and former townships				6.5	6.0

Source: Recorded Population Changes 1948-67, pp.211, Table 5 pp.13-14.

Between 1957 and 1967, the overall annual growth rate of urban areas had declined from 6.5% in the former decade to 6%. Towns still grew more rapidly than former townships though there was a slight decline in the overall difference. Six towns experienced above average growth compared to only four former townships. Because the latter are generally smaller even modest absolute increases give large annual increments so that of four urban areas with the highest increase three are former townships. Songea heads the list with a growth rate of 14% per annum, Nachingwea experienced 9% and Singida 9%. Because of its small original size the most spectacular increase is that of Arusha with 12% per annum.

Only about a third of the urban areas experienced above average growth, implying that there were a few urban areas experiencing abnormally high rates of growth but also a few with extremely low growths. There were deviations

which merit attention. Mention has already been made of Arusha, but among three of the largest towns (Dar es Salaam, Tanga and Mwanza) only the capital, the largest urban area in Tanzania, experienced above average growth. Tukuyu which topped the list of growing towns in 1948-57, was relegated to the last position in 1967. There were no urban areas with declining population, though stagnation is apparent because of low growth rates at Kigoma/Ujiji (3%), Lindi (3%), Kilosa (2%), Pangani (1%), and Tukuyu (1%).

55 Rank of towns

The rank of the towns depends on the size of the towns and the rate of growth. Dar es Salaam and Tanga have maintained their leading positions during the last three censuses (see table 5.2). Mwanza which replaced Tabora for the third position during the 1957 census retained this rank during the 1967 census. The twin towns and Tabora which were in the upper half of the list in 1957 were unable to hold to these positions and slid to the lower half in 1967. Musoma, Mbeya and Bukoba have interchanged their ranks but continue to occupy the bottom positions of the list. Lindi has continued to decline from the 6th position in 1948 to the 10th in 1957 and 13th in 1967. In contrast, the fortunes of Arusha are striking, moving from 10th position to the 11th and then leaping to the fourth position by the 1967 census. The movement of Iringa to 8th position, though not spectacular, is also important.

In most cases the increase in the population of the towns has been due less to the extension of town boundaries than to natural increase or to an influx of migrants. For instance the boundary of Dar es Salaam did not change between the 1957 and 1967 census, and in Tanga there was only a slight addition along the southeastern boundary. However, there were substantial boundary changes and increases in the urban areas of Arusha (1959 and 1964/65) and at Mbeya (1957 and 1966) (18).

Among former townships the change in rank order during the three censuses has been even more remarkable. Bagamoyo, which led the list in 1948, moved to the third and fifth place in 1957 and 1967, respectively. Other towns, notably Kilosa, Chunya, Pangani, Kahama, Kimamba and Lushoto, have also suffered from a similar decline. Kilwa Kivinje has moved from the second position in 1948 to sixth place in the next census and was excluded from the 1967 census. Upward trends have also been experienced. During the 1957 census, Korogwe moved to the first position and previously unranked Singida occupied the next place. During the 1967 census these two former townships exchanged positions; Singida with 9,540 inhabitants was now larger than Korogwe and even Bukoba. Others which have experienced an upward trend are Songea, Shinyanga, Kondoa, Machingwea and Mansio.

56 Regional variation

Regional variations in urban concentration is considerable, though in only two of the regions is the percentage of population in urban areas in excess of the national average of 6%. The Coast region with the capital city of Dar-es-Salaam has 35% of its population dwelling in urban areas. Tanga has over 7%, in contrast with for example, Shinyanga, which trails the list and has less

(18) Information obtained from Town Planning Division, Ministry of Lands, Housing and Urban Development.

than 1% living in towns (see table 5.5). The number of regions is too small to make any statistically significant generalizations. However, it would seem that regions with large populations - Mwanza, Mtwara, Mbeya and Shinyanga - have on the whole a low percentage living in urban areas. In the case of Mwanza region, little impact seems to have been made on the total relative figure living in towns despite the fact that the region has the third largest town on the Mainland. At the other extreme, regions with small regional populations, such as Singida and Ruvuma, trail the hierarchy with the least number living in urban areas; but Kigoma region with the relatively large town of Kigoma/Ujiji is an exception. Tanga, Dodoma, and Morogoro which have medium sized regional populations have relatively more people living in towns.

Table 5.5 Percentage of regional population of Mainland Tanzania living in urban areas

Region	Total population of region	Urban population as % of total regional population
Coast	784,527	35.4
Tanga	771,060	7.9
Arusha	610,474	5.3
Morogoro	685,104	4.6
Kigoma	473,443	4.5
Dodoma	709,380	4.3
Kilimanjaro	652,722	4.1
Tabora	562,871	3.7
Mwanza	1,055,885	3.6
Mtwara	1,041,146	3.6
Iringa	689,705	3.2
Mara	544,125	2.8
Singida	457,938	2.1
Shinyanga	899,468	1.8
Mbeya	949,053	1.7
Ruvuma	395,043	1.4
West Lake	658,712	1.2

Source: *Population Census*, Vol. 1 & Vol. 2, *op. cit.*

The regions are too large a unit and internally too varied in resources for any rigorous detailed relationship to be established between towns and regional development. However, even at this level, the top position of Coast, Tanga, Arusha and Morogoro regions among areas with a high percentage of town-dwellers is indicative of the developmental advantages of these areas. The relationship between towns and development in districts is more relevant, though its discussion is limited by many difficulties including lack of more accurate data.

While not ignoring the fact that a number of inter-related factors account for the growth of towns, for the purpose of analysis, reference will be made only to three aspects. First, the influence of the administrative structure on town growth will be discussed. Secondly, the mechanism of urban population growth through migration will be examined. Finally, the livelihood of the people in the major towns will be elaborated on. These three aspects simultaneously represent aspects of the creation of towns, the manner in which towns are populated and finally how the towns perpetuate themselves through the livelihood of their inhabitants.

5.7 Administration and urban areas

The administrative set up of the country will remain an important aspect of the continued existence and growth of towns. The former provincial headquarters had a head start and were assured of growth because the colonial

administration was the main source of wage employment in the non-agricultural sector. Towns which grew from this impetus include Arusha, Dar es Salaam, Dodoma, Lindi, Mbeya, Morogoro, Mtwara, Mwanza, Tabora, Tanga and Kigoma/Ujiji. The average size of the regional capitals in 1967 was 36,325 (21,542 if Dar es Salaam were excluded). Among the towns listed, only Mbeya and Lindi had populations below 20,000. The latter was displaced by Mtwara which has taken over most of the functions once performed by Lindi (19). Insofar as that, with the exception of Lindi, all former provincial headquarters are now capitals of regions, one can expect a sustained, if only a moderate, growth for all these towns. The administrative structure of the national government is even more important as a generator of employment than was the colonial administration (20). In the changed situation it is particularly relevant to note that the administrative aspects are more comprehensive and less passive than during the colonial administration. To the list of former provincial headquarters which grew rapidly one must add the following towns: Bukoba, Mwanza, Shinyanga, Songea, Iringa and Singida, all of which are new capitals of regions. All these new centres reflected growth tendencies in the 1967 census. Fourteen of the fifteen townships are capitals of regions; Lindi was the sole township which was not a capital of a region during the 1967 census. In addition, three regions, Shinyanga, Ruvuma and Singida, have the former townships as capitals.

The next level of hierarchy of the regional administration comprises districts, of which there were 60 during the population census (21). The *de facto* situation is that each district has a capital which may be a town, a former township, or a settlement with a recognizable cluster of population and services. Regional capitals also function as district capitals. Thus, Arusha town is the capital of both Arusha region and Arusha district. With the exception of Mtwara most of the townships and former townships are district capitals. Therefore, the 31 urban areas are capitals of as many districts, and for them considerable data was collected during the 1967 census. However, for the capitals of the remaining 29 districts no comparable information was collected during the census. Yet, in function, and often in size, these 29 capitals are as important as some of the others included in the 1967 census. To remedy this inconsistency, in a separate exercise, population was ascribed to the 29 centres (22). The range in size of the 60 district headquarters is summarized in table 5.6.

Most of the district headquarters are located in centres having a population between 1,000 and 5,000 people. 35% of the centres have between 2,500 and 5,000 inhabitants and the remaining 25% have more than 1,000 inhabitants but less than 2,500 inhabitants. If towns and former townships were excluded from the calculations, then the average size of district capitals during the 1967

(19) In 1971, Mtwara region was divided to create two regions. Lindi was made capital of the new region and Mtwara continued to function as the capital of the old but smaller Mtwara region.

(20) D. Brokensha, "Handeni Revisited," in *African Affairs*, London, Vol. 70, April 1971, pp. 159-168. Seven years after independence a former D.O. notes that in a small and comparatively poor district, the supporting staff of the agricultural officer had increased by 50% to 47 men and council expenditure had doubled to £100,000.

(21) Soon after the census, Hanang was added as a new district to Arusha region.

(22) A.C. Mascarenhas & S.B. Jensen: *Central Places in Tanzania*, forthcoming BRAU publication.

Table 5.6 Number and size of district headquarters in Mainland Tanzania 1967

Size of Centres*	Number	Comments
Less than 1,000	2	
1,000-2,500	15	
2,500-5,000	21	A size of 5,000 is the lower
5,000-7,500	6	limit of regional capitals
7,500-10,000	2	(Songea = 5,450 inh.) and
10,000-15,000	2	the upper limit of con-
15,000-20,000	1	gazetted centres which act
20,000-25,000	5	as district headquarters
25,000-30,000	2	(Mtwara = 3,200 inh.)
30,000-50,000	2	
50,000-100,000	1	
more than 100,000	1	
Total No. of dist. headquarters	60	

* Includes all towns, former townships, and minor settlements which are capitals of districts

Source: A.C. Macarenhas, *The Inadequacy of the Gazetted Towns for Planning and Development in Tanzania*. Paper presented to the African Regional Population Conference, Accra, December 1971.

census would be 1,974 inhabitants.

With the process of decentralization, it is most likely that the district headquarters will gain in importance and size (23). In the pursuit of this policy there is a possibility that the population growth of the district headquarters will be accelerated because of the location of services there, justified on the grounds that they will be within easy reach of the district population. For example the presence even of one secondary school can considerably boost the population of a district town.

5.8 Town growth and in-migration (24)

On the basis of birthplace data, crude as this information is, it is obvious that the growth of the population of the 15 towns, has largely been due to in-migration. The ratio of the immigrants to those born within the towns is of the order of 2:1. It is only in Kigoma/Ujiji that the majority of the inhabitants, almost 60%, were born in the town itself. In contrast, for example, 73% of Dodoma's population was born outside the town (see table 4.10).

Two types of immigrants can be distinguished, those from within the region in which the town is located and those coming from other areas. The proportion of the two types of immigrants varies with the different towns. For example, at Lindi, Mtwara, Musoma and Bukoba, those from within the region constitute the majority of the immigrants to the respective towns. In contrast, in Mwanza and Arusha immigrants from within the region comprise only 13% and 3% respectively of the population of the towns. In both these towns immigrants from other regions (and countries) form a high proportion of the population and thus reflect the importance of these towns within the wider context of the East African Community. Arusha, with 57% of its inhabitants coming from outside Arusha region, is the headquarters of the East African Community. Mwanza, with 56% of its inhabitants coming from other regions, is one of the nodes of the lake transport system of the three East African countries.

(23) On 28th January 1972, plans for effecting decentralization were announced by President J.K. Nyerere. The head of all ministries in a region will be the Regional Development Director. And since developmental decisions are taken at a district level, each district will also have a Development Director.

(24) Migration to urban areas is elaborated in Chapter 4.

Related aspects of immigration are the source areas of the migrants and how they distribute themselves. One must attempt to ascertain the relationship of out-migration from the regions and its contribution to the total urban migration flow. On average each region contributes 5.5% of the total migration stream to the urban areas. With some exceptions, variation between the regions is not great. Thus there are only five regions which contribute above the average number of migrants to the urban areas (see table 5.7). The coast region with close to 19% leads; other regions with many migrants are Tanga (10%), Morogoro (9%), Mtwara (8%) and Kilimanjaro (7%). The number of out-migrants is very low from Shinyanga (0.8%), Singida (1%), Arusha and Mwanza (2%).

Table 5.7 Contribution of each region to total urban migration

Region	Contribution of region to total urban migration in %	Regional population as % of national population
Coast	18.8	6.3
Zanzibar	14.0	2.9
Tanga	9.9	6.3
Morogoro	9.2	5.6
Mtwara	8.2	6.5
Kilimanjaro	6.8	5.3
Tabora	4.7	4.6
Sodoma	3.7	5.0
Iringa	3.7	5.6
Mbeys	3.7	7.9
West Lake	3.1	5.5
Uru	3.0	4.4
Morona	2.6	3.2
Kigoma	2.4	3.8
Arusha	1.9	5.0
Mwanza	1.9	8.6
Singida	1.4	3.7
Shinyanga	0.8	7.3
Total	100.0	100.0
Average	5.5	5.6

SOURCE: C.F. Clasen and B. Egoro, *Migration to Towns in Tanzania, Tables and Comments*. ILMUP Research Notes No. 11, Dar es Salaam 1971.

No pattern emerges if one compares the number of immigrants who remain within the towns of the region. Thus, three of the five regions, Coast, Morogoro and Tanga, which contributed above the average number of migrants to urban areas were also the three major regions in which more than 50% of the migrants moved to the town of the region. Mtwara and Kilimanjaro which also provided above-average percentage of urban immigrants retain only a few of them (only 27% of the population of Mtwara town comes from the region, similarly Moshi has 30%), within the township of the region (see table 5.8). In contrast, Arusha region contributed a very low number of urban immigrants most of whom remained within Arusha town. Shinyanga and Singida regions provided the fewest number of immigrants and only a minority of these remained within the towns of the region.

One of the major conclusions which arises from the above analysis is that, contrary to popularly accepted views, migration to the urban areas may not be random or indiscriminately oriented. The following relationship seems significant. First, in regions where the possibility for rural employment is low or declining and where urban employment is possible, the majority of urban immigrants tends to remain within the major town of the region. Tanga and Morogoro (because of the closure of the sisal estates) are good examples of the former and Dar es Salaam, with 85% of immigrants from the Coast region going towards the city, is an example of the latter case. Secondly, in regions where possible income from rural employment is high, the contribution of the

Table 5.8 Proportion of total urban migrants from each region going to the regional capital and other urban areas

Regional capital	% of regional migrants in regional capital	No. of migrants from the region to the regional capital	No. of migrants* from the region to all urban areas	Region
Dar es Salaam	85.4	63,190	73,962	Coast
Tanga	57.6	22,307	38,858	Tanga
Arusha	53.1	4,044	7,613	Arusha
Iringa	52.3	7,625	14,593	Iringa
Mwanza	52.2	6,160	11,805	Mwanza
Kigoma	40.8	3,829	9,305	Kigoma
Dodoma	40.5	3,226	14,691	Dodoma
Moshi	30.7	8,245	26,864	Kilimanjaro
Morogoro	28.7	10,537	35,980	Morogoro
Mbeya	27.6	4,065	14,734	Mbeya
Mtwara	27.2	8,828	35,980	Mtwara
Dakawa	26.1	3,155	12,070	W. Lake
Tabora	25.8	4,798	18,565	Tabora
Lindi*	21.8	7,066	32,426	Mtwara
Mwanza	14.3	1,087	7,611	Mwanza

* Lindi has been included in the list although at the time of the census it was not a capital of a region. Because Singida, Songea and Shinyanga were not considered as towns, comparable figures are not available for these.

Sources: C.F. Clever and E. Nguro *op.cit.* pp. 45-59.

region to urban migration is low and the number of migrants remaining in the urban areas of the region is also small. A good example of this is Mwanza where the rural income is to a large degree based on peasant-grown cotton. Finally, in areas where opportunities for rural employment are small and where urban employment is limited, migrants from that region tend to go to the towns of other regions. Singida, West Lake, Tabora and Mbeya are examples of regions not able to attract labour to their own towns. (see Table 5.8).

5.9 Non-African migrants

A special category of immigrant is the non-African group. There is need to elaborate on this. In the introductory statement it was implied that one of the problems of urban development was the attitude that towns were enclaves of non-African development. Because the numbers of non-Africans were relatively large, many of the laws in the past aimed at perpetuating these imbalances. One of the most significant aspects of the urban population of the 1967 census has been the decline in the relative numbers of non-Africans (see Table 5.9).

Table 5.9 Ethnic composition of the population of major towns in Tanzania Mainland

Towns	1957					1967				
	Africans	Asians	Arabs	Europeans	Other including E.S.	Africans	Asians	Arabs	Europeans	Other including E.S.
Arusha	51.4	34.8	0.7	8.7	4.3	54.9	11.2	0.3	1.4	2.2
Dakawa	71.0	24.8	1.0	2.3	0.9	75.9	15.6	0.5	0.9	1.1
Dar es Salaam	72.5	21.3	1.9	3.5	0.7	83.9	10.7	1.5	1.3	2.5
Dodoma	77.3	19.8	2.0	2.6	1.2	87.2	8.1	1.7	0.7	2.2
Iringa	61.3	12.9	1.7	3.2	0.9	90.7	5.3	1.5	0.5	2.0
Kig/Ujiji	61.7	15.4	0.5	1.6	0.8	55.8	2.4	1.2	0.3	2.3
Lindi	81.1	17.5	0.3	0.9	0.1	87.0	10.7	0.3	0.1	1.9
Mbeya	61.4	12.9	0.2	3.8	1.7	87.4	7.9	0.4	1.2	3.0
Morogoro	85.8	10.5	1.5	1.9	1.3	89.6	5.7	1.0	0.3	3.4
Moshi	68.5	26.4	0.5	3.2	1.2	83.6	12.4	0.4	0.9	2.7
Mtwara/Mik	91.9	5.7	0.0	1.9	0.4	94.1	3.8	1.4	0.3	1.3
Mwanza	84.1	13.2	0.3	0.8	1.6	88.7	6.5	1.4	0.3	4.1
Mwanza	76.7	19.9	1.2	1.8	0.4	80.3	14.7	1.1	0.9	2.9
Tabora	78.1	15.9	2.0	2.2	1.7	87.9	7.6	1.1	0.5	2.8
Tanga	75.5	19.5	3.7	2.0	1.3	82.0	12.4	2.6	0.8	2.2

Sources: Data for 1957 is based on Report on the Census of the Non-African Population, *op.cit.* The 1967 figures have been made available by the Census Office from unpublished sources. For Singida, Songea, Shinyanga, the ethnic distribution is not available from the 1957 census.

Thus, during the 1957 census, non-Africans made up more than a quarter of the urban population of the following towns: Arusha (46%), Moshi (31%), Dar es-Salaam (28%) and Tanga (27%). Only at Mtwara/Mikindani did Africans comprise over 90% of the urban population. In the 1967 census, there were no towns in which the non-Africans composed more than 16% of the total urban population. The largest percentages of non-Africans were located at Tanga (16%), and Mwanza (16%); Arusha followed closely with a non-African population of 13%.

Residential segregation, indicated by a very marked cluster of non-Africans in specific urban enumeration areas, still persists, especially among the Asians, but this is a problem outside the scope of this chapter. More pertinent is the fact that the towns of Tanzania are becoming largely African and the proportion of non-Africans will decline further. Comparative figures are available only for the large towns but the proportion of Africans in the former townships is even higher. Therefore, now, more than in the past, the whole problem of town development must be looked at in a new positive perspective.

5.10 Sex ratios

A noticeable feature of the urban areas is the preponderance of males. For the towns the average sex ratio is 119 males to 100 females. The former townships with their comparatively slow rate of growth have a more normal sex ratio i.e. 105:100 (table 5.10).

Table 5.10 Sex ratios in towns of Mainland Tanzania

Town	Males per 100 females	Former townships	Males per 100 females
Arusha	132	Bagenyo	112
Dakota	119	Chunya	100
Dar es Salaam	123	Kidoma	58
Dodoma	115	Kilosa	107
Eranga	102	Kilen Kivinje	-
Kig/Ujiji	105	Kilen Masoko	-
Kigoma	120	Kimuba	103
Ujiji	96	Kombo	96
Ilindi	109	Korogwe	115
Mbeya	101	Iushoto	110
Morogoro	110	Mwanga	101
Moshi	109	Nachingwea	134
Mwanza	107	Narivo	91
Mwa/Mikindani	121	Pangani	106
Mtwara	128	Shinyanga	124
Mikindani	107	Songea	112
Mwanza	120	Singida	101
Dabara	101	Tukuyu	88
Tanga	119		
Total	119	Total	105

Source: *Recorded Population Changes 1946-1967 Tanzania* pp. 13-14.

One would expect that the ratio would be higher for the rapidly growing towns and indeed Arusha with 132 males, clearly falls in this category. However, there is generally a weak correlation between a rapid growth rate and a high male/female ratio. It is generally true that ratios are more normal closer to stability in the older towns, as is well demonstrated by the twin towns. Ujiji, the older part of the complex, has the lowest male/female ratio of 96:100, in contrast to the newer Kigoma with 120:100. Similarly, for Mikindani and Mtwara the ratio is 107 and 128 per 100 females respectively. For reasons

difficult to explain both towns of the southern highlands, Iringa (102) and Mbeya (101) exhibit low ratios.

In their pattern of sex ratios the former townships are similar to the towns, almost normal ratios are found among the older former townships e.g. Mpwapwa with 101, and very high ratios among the newly established centres such as Nachingwea with 134. There is also a deficit of males in former townships experiencing a decline e.g. Kahama 88, Tukuyu 88, Nansio 91 and Kondoa 94. Generally the ratios in the former townships when compared to the towns are lower.

5.11 Urbanization and sources of employment

In 1967 the wage labour force consisted of 346,710 workers of which 140,910, or 40%, were concentrated in the 18 urban areas (25). There is a great deal of variation in the regional distribution of wage labour which reflects inequalities in regional development. Coast and Tanga regions dominate with 23% and 18% respectively of the national wage labour. Regions with more than 5% of the nation's wage labour are Morogoro, Kilimanjaro, Arusha and Iringa. Since the concern of this chapter is with the urban areas, emphasis will be laid on the urban distribution of the wage labour and the pattern of sectoral distribution of this form of employment. The former identifies the main location of urban employment while the latter helps to examine whether some sectors of the wage labour have an affinity to urban areas.

Labour in the wage sector is not necessarily concentrated in the 18 towns. These towns in fact account for about 40% of this labour. The secondary role of the urban areas is best exemplified in the case of Tanga region and Tanga town; the former claims 18% of the national wage labour but the contribution of the urban areas is only 3%. However, Dar es Salaam with 18% of the national labour and 46% of the total urban labour is obviously the main focus of wage employment in Tanzania. The 65,270 workers represent 81% of the wage labour in Coast Region. The implications of this high concentration of workers in the urban areas of Coast region have yet to be fully appreciated. For instance, rapid urban growth need not necessarily bring about rural development. Indeed, in the Coast region the village surveys carried out in 1961 showed marked rural poverty despite the high degree of urban growth (26). Unfortunately it is not known whether living conditions have improved or whether the villages are still representative of the Coast. More research is called for but the 9 towns policy of the Second Five Year Plan need to be examined

(25) S.B.Jensen & J.Mkame, *District Data 1967*, Ministry of Economic Affairs and Development Planning, Dar es Salaam, 1968. Although questions on employment were asked during the Population Census, there are constraints in using them in this chapter. It would seem that the data by Jensen and Mkame are only valid for all establishments with 10 and more employees. Despite this major limitation, preference was still given to the above source rather than Population Census, Volume 4, because it was possible to easily distinguish rural/urban differences.

(26) A pilot household budget survey was carried out at Bagamoyo in 1961. The average monthly income per household was Shs.20/60. See *Household Rural Surveys in Tanganyika: Pilot Survey in Bagamoyo June, 1961*, Economics and Statistics Division, The Treasury, Dar es Salaam, n.d.

more critically⁽²⁷⁾. The value of the policy may be more effective for industrial rather than for rural development.

Apart from Dar es Salaam, there are only two other towns, Tabora (60%) and Mwanza (54%), which claim more than half of their respective regional wage labour. Mbeya, Tanga, Morogoro and Iringa represent other extremes and less than 20% of the workers of the regions are located in these towns.

Turning to the distribution of the labour force among urban areas, two aspects seem striking. First, Dar es Salaam accounts for 46% of the urban labour force. Secondly, the decline in numbers employed in the other urban areas is gradual, so that at one extreme Tanga has 7% while Singida accounts for only 0.8% of the total urban employed. (See table 5.11).

Table 5.11 Urban employment,* Tanzania Mainland

Towns	Urban employed as % of national total employed	Urban employed as % of regional total employed	% of national urban employed	Total number employed in urban areas
Dar es Salaam	18.8	81.2	45.3	65,270
Tanga	2.8	16.0	7.0	9,860
Arusha	2.7	35.4	6.6	9,250
Mwanza	2.3	53.9	5.7	8,040
Moshi	2.1	38.0	5.3	7,460
Tabora	1.8	60.0	4.5	6,320
Morogoro	1.7	19.3	4.1	5,790
Dodoma	1.7	41.1	3.9	5,360
Bodoma	1.2	48.7	3.0	4,160
Iringa	0.9	16.2	2.3	3,180
Mtwara	0.9	36.0	1.8	2,520
Shinyanga	0.7	27.9	1.7	2,520
Musoma	0.7	41.9	1.6	2,470
Kigoma	0.7	47.9	1.4	2,260
Mbeya	0.6	19.0	1.4	2,040
Idadi	0.6	33.8	1.4	1,960
Songea	0.5	36.5	1.2	1,640
Singida	0.3	34.5	0.8	1,170
Total			100.0	140,850

* The calculations by Jensen & Mwanza only considered firms with 10 or more employees.

Source: S.B. Jensen & J. Mwanza, *Op. Cit.*

In order to see which sectors of the economy have tendencies to concentrate in the 18 towns, it is necessary to see what percentage of the regional employment by sector is located in those towns. On an average the 18 towns account for the following percentages for each sector: mining 20%, agriculture 20%, services 36%, construction 38%, manufacturing 54%, commerce 67%, transport and communication 74% and public utilities 82% (see table 5.12).

The percentage of agricultural labour may seem to be unduly high for urban areas. This is largely brought about as a result of the location of a very high percentage of agricultural wage labour in the following towns: Musoma 61%, Mwanza 43%, Songea 38%, Tabora 38% and Kigoma 36%. This pattern occurs when regional agriculture is well developed on family homesteads and labour does not enter in the wage bracket or when the wage employment sector is small. In these cases even a small absolute figure can distort the picture. Conversely, in areas where estate agriculture is well developed the percentage of agricultural employment in the urban areas is very low as is evidenced by

(27) In the nine town policy, it was envisaged that all new industries planned for Dar es Salaam should be located in the eight urban areas scheduled for rapid urban development. The towns were: Arusha, Moshi, Tanga, Mtwara, Mbeya, Morogoro, Dodoma, and Tabora. See Tanzania, *Second Five Year Plan, Vol. I, op.cit.* pp. 180-81, para.31 and 41.

Table 5.12 Percentage of regional wage labour employed in urban areas, by sector

Towns	Agric.	Mining	Manufacturing	Construction	Elect. & water	Commerce	Transp. & comm.	Other & services	All sectors
Arusha	8.4	66.7	79.1	55.9	100.0	96.1	62.2	45.1	34.4
Dar es Salaam	27.5	0.0	73.8	21.5	100.0	54.0	82.6	51.8	41.1
Dodoma	26.7	7.8	86.1	16.9	84.5	99.4	85.7	84.1	81.2
Iringa	20.7	85.7	94.9	49.8	97.0	66.7	58.5	42.4	46.7
Kigoma	4.0	0.0	55.9	2.3	100.0	86.4	89.2	30.0	16.2
Kigoma	36.5	0.0	85.3	75.8	100.0	89.0	96.5	25.9	47.9
Lindi	0.4	-	14.6	30.2	11.5	35.5	25.7	8.8	14.3
Mbeya	4.4	0.0	41.7	3.7	72.7	91.4	77.5	25.5	13.0
Morogoro	2.3	60.0	65.5	61.0	77.8	61.8	38.5	36.2	19.3
Moshi	2.0	4.0	71.4	49.3	100.0	70.1	89.1	53.2	28.0
Mtwara	3.4	-	29.3	32.0	80.9	34.2	66.5	15.0	22.5
Mwanza	61.5	0.0	85.9	20.7	100.0	43.6	85.7	36.8	46.0
Mwanza	43.9	100.0	49.5	66.0	100.0	70.7	89.5	37.2	55.9
Shinyanga	16.7	0.0	8.5	32.6	100.0	48.5	50.9	38.0	27.9
Singida	25.0	50.0	8.5	42.2	100.0	75.0	16.7	25.5	34.8
Songea	36.9	0.0	7.1	50.2	0.0	77.8	100.0	24.4	36.5
Tabora	36.4	-	64.6	75.1	100.0	50.6	99.1	36.9	60.0
Tanga	0.6	0.0	61.6	85.5	94.0	79.0	70.2	45.7	16.0
Average	20.1	2.1	54.5	36.7	82.1	67.6	74.0	35.9	35.7

Source: S.B. Jensen and J. Munn 1983a.

Tanga 1%, Morogoro 2%, Iringa 4% and Mbeya 4%. The agricultural sector then is not significant as a source of urban employment but its supportive role must not be underestimated.

The relatively high percentage for mining is also not very significant. This sector tends to be selective in its location and distortion is great. Shinyanga, for instance, is one of the major mining regions in Tanzania and the town of Mwadui has mining as its main economic base. Yet this has little impact on Shinyanga town.

Public utilities tend to have a great affinity for the urban areas, altogether accounting for 82% of the regional labour of this sector. In absolute numbers, however, this sector is not important in providing urban employment.

In total numbers the 18 towns claim a large section of the labour in manufacturing (24,610), construction (22,610) and transport (22,310) (see table 5.13). There is a disparity in the distribution of the manufacturing sector. The towns of Dodoma, Musoma and Dar es Salaam claim over 80% of the total from their respective regions. In contrast, Shinyanga, Singida and Songea account for less than 10% of their regional totals in this sector (see table 5.12). Overall, similar trends are also exhibited by the labour in the construction sector. Regionally the towns of Tabora, Kigoma, Mwanza and Morogoro all claim over two-thirds of their regional labour from this sector. For the commercial sector the following towns dominate their regions: Dar es Salaam (99%), Arusha (96%), Mbeya (91%), and Kigoma (89%). Only Lindi has less than 36% but with Mtwara the two towns control 92% of the commerce of their region.

As has been stated earlier, the service sector is the most important component in absolute numbers in the wage labour of the urban areas (see table 5.13). Yet, when this sector is examined closely, it reveals one of the major anomalies. Although the sector accounts for over 29% of those employed in the urban areas, the overall contribution from 18 towns to the regional total is comparatively low. The 18 towns on an average account for only 35% of the regional total in this sector (see table 5.12). The implication of this is

Table 5.13 Total number employed by sector in urban areas (1967)

Town	Agric.	Mining	Manufacturing	Construction	Elect. & water	Commerce	Transp. & comm.	Other & service	Total urban employment
Arusha	1,160	20	1,930	1,390	450	1,720	710	1,870	9,250
Dukoba	530	-	310	560	110	270	360	2,200	4,360
Dar es Salaam	1,300	70	15,200	6,600	2,300	7,500	13,200	18,900	65,270
Dodoma	190	180	370	750	320	300	210	1,840	4,160
Iringa	460	-	330	60	60	570	660	1,040	3,180
Kigoma	190	-	50	720	40	170	580	510	1,990
Lindi	10	-	60	840	30	270	360	510	2,260
Moshi	260	10	1,470	1,380	950	1,170	410	1,810	7,460
Mtwara	160	-	790	60	20	240	248	960	2,470
Mtanga	360	-	100	100	80	520	310	770	2,040
Mtengene	430	60	670	2,130	70	420	180	1,830	5,799
Mtwara	90	-	120	890	210	260	670	800	3,120
Mwanza	610	10	900	1,080	260	1,160	1,090	2,140	6,040
Songea	140	-	10	450	-	490	120	440	1,660
Shironga	60	-	40	290	20	140	500	1,470	2,250
Singida	70	10	10	270	140	120	50	500	1,170
Tabora	530	-	310	2,960	170	220	1,060	1,270	6,320
Tanga	270	-	1,940	1,280	540	1,470	1,560	2,780	9,850
Total	6,800	360	24,610	22,610	5,770	16,810	22,310	41,780	140,910

Source: S.B. Jensen & J. Mwanza, *op.cit.*

that two-thirds of labour in this sector is located in areas other than 18 towns. Labour employed in this sector would be involved in administration, education and health. One could deduce, for instance, that some of the administrators would be located in district towns or other administrative centres. The service sector draws attention to the fact that the main reason for development of urban centres is because of the services (in the widest sense of the word) that they provide to rural areas.

5.12 The need for re-definition of towns

The unaltered application of a colonial definition of what is a town severely limits an analysis of the *de facto* urban areas in Tanzania. There seem to be three ways, not mutually exclusive, of solving this problem:

- administratively, by re-defining and up-dating the whole process of the gazetting of towns or settlements
- defining settlements on a functional basis
- defining settlements or towns on the basis of population size

The three solutions complement each other. For instance, ujamaa villages could be registered and on the basis of the size of population and on their influence on the surrounding areas, they could be defined as towns. Alternatively, since the major purpose of towns or similar urban forms is to provide services, a functional approach could be taken and the size and number of these functions could indicate whether a settlement should be called a village or a town.

In a separate exercise elaborated in a forthcoming paper (28) service centres with two or more services were identified. The population for the place iden-

(28) A.C. Mascarenhas and S.B. Jensen, *op.cit.*

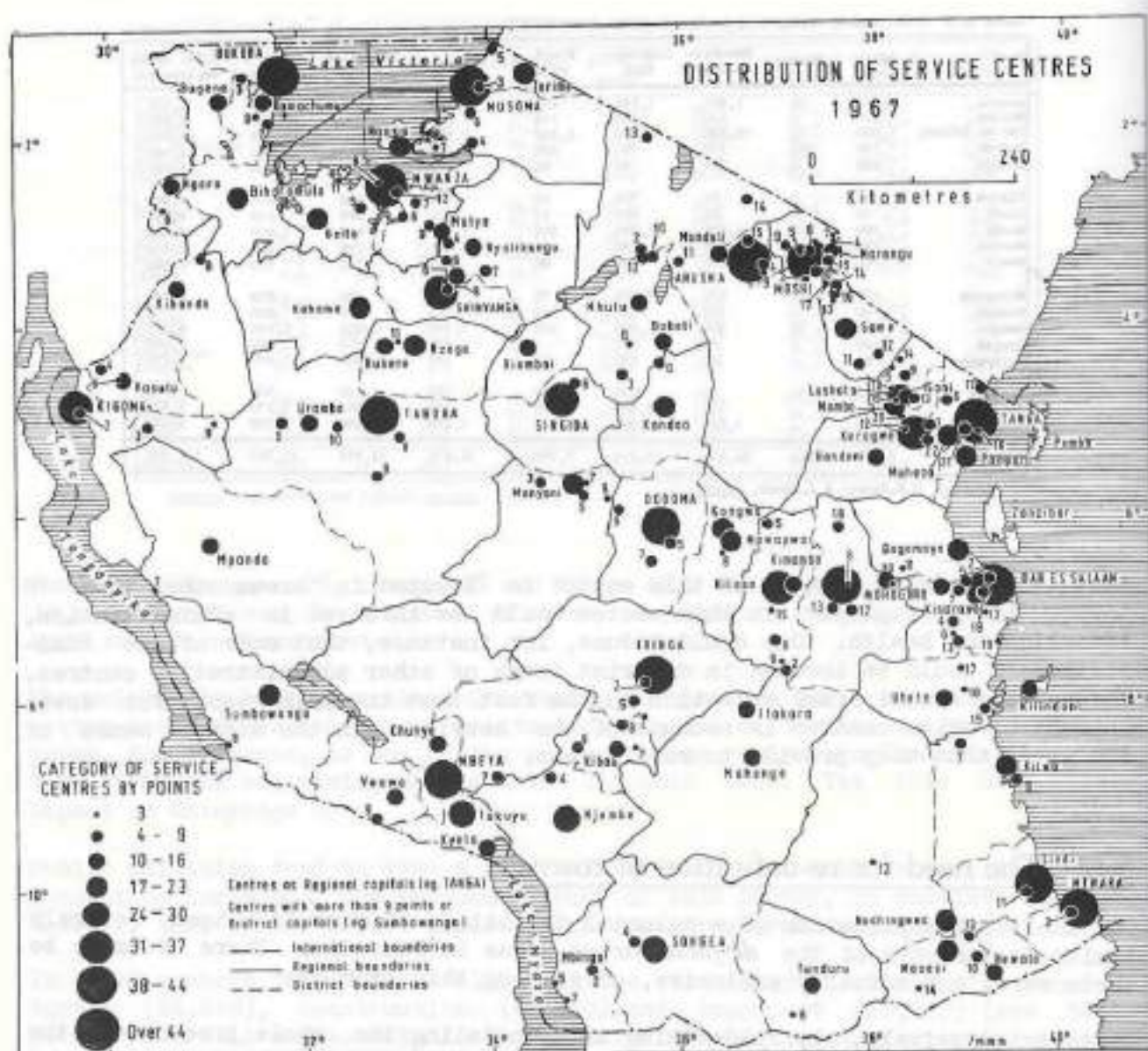


Figure 5.2 Tanzania Mainland, distribution of service centres

tified was calculated by overlaying a circle with a radius of one mile over the field enumeration maps. The population ascribed to the centres was the total population for those enumeration areas which completely or over halfway lay within the circle. This procedure is crude but it is the only way in which an estimate could be obtained for the population size of the centres.

On the functional basis described above, 204 centres were identified. These included all the towns and former townships. Their distribution is plotted in Fig. 5.2. The map provides a more realistic picture of the centres potentially able to provide the very minimum services to the rural areas. At the other extreme the de jure towns, in relative terms provide the maximum services (Fig. 5.1).

Table 5.14 shows the number and size of all the centres, which are listed in App. 5.1 with the identification numbers appearing in Fig. 5.2.

Table 5.14 Tanzania Mainland, service centres by size and number 1967

Size category	No. of centres	% of all centres	Population		
			absolute	% of Total	cumul. % of Total
Less than 1,000	27	13.2	20,359	1.9	1.9
1,000 - 2,500	101	49.5	176,203	16.7	18.6
2,500 - 5,000	45	22.1	155,204	14.5	33.1
5,000 - 7,500	15	7.4	80,567	7.5	40.6
7,500 - 10,000	5	2.5	25,613	2.4	43.0
10,000 - 15,000	4	1.9	52,149	4.9	47.9
15,000 - 20,000	1	0.5	12,412	1.2	49.4
20,000 - 25,000	4	1.9	87,686	8.2	57.6
25,000 - 30,000	2	1.0	52,122	4.9	62.5
30,000 - 50,000	2	1.0	67,343	6.3	68.8
50,000 - 100,000	1	0.5	61,058	5.7	74.5
more than 100,000	1	0.5	272,821	25.5	100.0
Total	204	100.0	1,068,742	100.0	

Source: A.O. Maccoerichas and S.B. Jensen, *op.cit.*

An indication that there exists a lower level of urban development than the district town is the cluster of 101 centres within the population range of 1,001 - 2,500. In comparison, the district towns were clustered in the 2,501 - 5,000 range (see table 5.6).

This part of the exercise has helped to identify the *de facto* centres many of which would qualify for an urban designation. Despite the relative profusion of these incipient town forms their contribution to the total population living in urban areas is not substantial. For the 31 centres with the status of towns and former townships the total population was 677,780; the inclusion of 173 other centres adds another 345,943 people so that 8% of the population of Tanzania Mainland live in the 204 population clusters (table 5.14).

In the Second Five Year Plan it was stated that:

'A firmly defined and energetically implemented long term policy towards urban development is necessary if urban development is to act as a stimulus and complement to rural development' (29).

The 31 *de jure* urban areas alone are unlikely to achieve this.

5.13 Conclusion

In the 1967 census urban areas of two types, towns and former townships, were defined to some extent on the existing *de jure* situation. While this did give a true picture of the medium (10,000+) and large towns, it failed to uniformly identify a fairly large cluster of centres with a population in the range of 1,000 to 10,000. Therefore, administratively there is need to up-date the definitions of towns and to implement these definitions. Such a re-appraisal of urban forms is urgently called for to assist in planning and as a strategy for rural development.

(29) Tanzania, Second Five Year Plan for Economic and Social Development, 1st July 1969 - 30th June 1974, Vol. 1, General Analysis, Dar es Salaam, 1969, p. 176.

6 URBAN HOUSING IN MAINLAND TANZANIA

by Adolfo C. Mascarenhas

6.0 Introduction

During the 1967 population census a comprehensive range of questions were asked on housing. The data gathered were related to the types of houses, number of rooms, amenities, tenancy and rents ⁽¹⁾. The quality of data varied with the type of questions asked. At the one extreme, the questions were specific and yielded precise data and where variables were quantifiable, as in the case of house rents, very fine distinctions could be made. At the other extreme, best exemplified by the question on house types and amenities, considerable ambiguities were inherent in the question itself. Therefore, although occasional statements have been made relating to possible policies the chapter pretends to do no more than to highlight and sometimes explain the emergence of housing patterns in the main urban areas of Tanzania.

Had there existed a proper appreciation of the situation in the field much could have been done to solicit more specific and useful data. Furthermore, questions related to housing were only asked in the urban areas. It is thus not possible to gauge the dichotomy or similarity between housing in the urban and rural areas. Such comparative data would have made it possible to note any permeation of rural housing conditions into urban areas or vice versa. However, it could be argued that problems relating to housing are generally most severe in the urban areas. Because of the confusion which may arise, it is worth mentioning that the question on housing was asked of all rather than only those living in private dwellings. Institutions where the normal 'households' did not exist, as in schools and prisons, were excluded ⁽²⁾.

6.1 House types

The question on type of housing was ambiguous. It certainly did not yield precise information on whether the type of house was a bungalow, an apartment, a Swahili house, or semi-detached unit. Neither was there any information about the age of the building. "Type of housing" as defined here was taken to mean the type of material used for construction and hence whether the house was permanent or semi-permanent. A third category, 'others', included all

* The pattern of housing in Zanzibar has been changing considerably since the Revolution of 1964. For this reason and the difficulty of verifying information it was considered best to account for urban housing only for Mainland Tanzania.

(1) See census questionnaire No. Q 12, Census Vol. 2, Statistics for Urban Areas, Bureau of Statistics, Ministry of Economic Affairs and Development Planning, Dar es Salaam, 1970.

(2) Collective 'households' (camps, colleges, hospitals) were specifically mentioned for exclusion. See: Population Census 1967, Instructions for Enumerators and Supervisors, Central Statistical Bureau, Ministry of Economic Affairs and Development Planning, Dar es Salaam, June, 1967. pp. 25-27.

structures which are roughly built of waste material such as scrap iron or old boxes or branches of trees or straw; also included are places like barns, mills, garages, warehouses, trailers, tents, boats etc., which are not intended to be used for living but which were occupied at the time of the census.

Attempts were made to define the permanent and semi-permanent houses (3), but despite these attempts at clarification there were still ambiguities and it is extremely doubtful whether enumerators could be consistent in the classification of houses in the different categories. Thus, according to the instructions to supervisors and enumerators, permanent houses were to be considered (as) "a house which is constructed completely of hard manufactured material" (walls made of bricks, concrete etc. and the roof covered with tiles, concrete, iron sheets, etc.) (4). It is not known to what extent the 'and' in the sentence was considered. It is probable that more weight was given to the material from which the wall was made, than to the other characteristics such as tiles or iron sheets. The more serious problem of classification arises because in many urban areas in Tanzania there is incorporation of permanent material into semi-permanent buildings as the structures are improved (5). Thus mud and wattle structures are subsequently reinforced with gravel or plastered with a cement mixture, or the supporting structure of the houses is reinforced and the roofing is made permanent. The instructions did caution that the semi-permanent houses may be partly made of hard manufactured material (cemented floor, iron roof, etc.). The dividing line between the two categories was too fine to expect the enumerators, whose abilities varied greatly, to classify house types consistently (6). Finally there is the formidable problem that the boundaries of the urban areas have not been adjusted so that development on the periphery has been excluded from calculations. The inclusion of structures outside the boundaries would have altered the pattern and may have accentuated the preponderance of semi-permanent types of structures and in some cases even the category 'others'. The information on house types must therefore be considered only as approximate. (See table 6.1).

Average conditions within town and former townships were fairly similar for all categories of structures, but variations among individual towns and former townships are great. Generally the smallest number (or less than 10%) of households dwelt in the category 'others' and the majority lived in semi-permanent structures. Apart from averages there are a few variations in the pattern of a greater proportion of households living in semi-permanent structures than in permanent structures. The major exceptions are Mwadui, Moshi, Mkwinda, Mpwapwa, Dodoma and Iushoto.

The Mwadui situation in which 97% of the households live in permanent structures is unique and this largely arises because under the rigidly company-controlled situation, the infra-structure, including housing, is the responsibility of the mining company. It is unlikely that such a situation will easily replicate itself. Moshi and Bukoba represent centres where compara-

(3) Instructions for Enumerators and Supervisors, *op.cit.* pp. 25-26.

(4) *ibid.*

(5) A.C. Mascarenhas, *Urban Development in Dar es Salaam*, unpublished M.A. Thesis, Los Angeles, 1965, pp. 99-104.

(6) The author was involved in training supervisors in the Dar es Salaam area. During the exercise in which an area of varied house types was used, it was apparent that supervisors had great difficulty in quickly assessing the quality of houses and the materials from which they were constructed.

Table 6.1 Percentage of households in towns and former townships by type of structure

	Total No. of Households	% living in permanent structures	% living in semi-permanent structures	% living in other structures	% sta- ted	% not stated
Towns:						
Arusha	9255	58.9	49.1	3.8	97.8	2.3
Dukoko	2342	51.8	40.9	5.2	97.9	2.1
Dar es Salaam	83431	34.8	57.4	5.7	97.9	2.1
Dodoma	6107	48.2	42.1	6.1	96.5	3.5
Eranga	5112	29.1	65.4	3.7	98.2	1.8
Kig/Ujiji	5208	16.0	51.2	34.7	97.2	2.8
Lindi	3465	36.5	67.2	1.2	98.9	1.1
Mbezi	3057	37.1	35.1	7.0	97.9	2.1
Mwanga	7305	31.5	59.2	11.8	96.6	3.4
Mwani	7726	26.0	26.9	3.3	98.5	1.5
Mwanga/Mk	5951	36.5	56.2	6.0	98.7	1.3
Mwanga	3735	25.7	69.7	6.6	98.0	2.0
Mwanga	3699	41.0	55.1	3.5	97.1	2.9
Isiboro	3666	25.3	54.6	17.8	97.7	2.3
Tanga	17500	38.8	55.2	6.3	98.4	1.6
Average		33.7	52.6	8.6	97.8	2.2
Former townships:						
Bugumbe	1194	38.6	74.2	4.4	97.5	2.5
Chungi	520	21.9	74.1	2.7	99.2	0.8
Kibona	713	32.6	72.4	13.9	98.9	1.1
Kilwa	1226	35.1	59.7	4.4	99.2	0.8
Kinsho	590	43.4	50.2	6.1	99.7	0.3
Kondoa	357	13.6	61.8	20.5	98.1	1.9
Korogwe	1791	25.4	65.7	7.9	98.9	1.1
Lushoto	383	46.3	32.1	17.7	96.1	3.9
Mwanga	474	49.8	38.6	11.2	99.6	0.4
Mwadi	1930	97.8	1.2	0.1	99.1	0.9
Nachingwea	1095	24.0	40.1	-	76.6	23.2
Nzalo	576	13.4	66.0	20.0	99.3	0.7
Parigi	954	37.8	50.4	8.9	99.2	0.8
Shinyanga	1583	44.2	53.4	2.2	99.8	0.2
Singida	2646	13.7	80.9	4.8	99.4	0.6
Songea	1366	36.0	60.0	0.8	98.8	1.2
Tukuyu	948	19.4	42.0	37.5	98.9	1.1
Average		33.3	54.8	9.0	97.8	2.2
Average for all urban areas	6080	33.5	52.7	6.0	97.5	2.5

Source: Census Vol. 2, Statistics for Urban Areas (Tables 118 & 119a), Bureau of Statistics, Dar es Salaam 1970.

tively more affluent rural communities have invested in better housing, over a longer period of time. The former township of Lushoto, also with a high percentage dwelling in permanent housing, reflects that the boundary of the former township incorporates most of the resort section and excludes the larger community outside the boundary of the town. In Dodoma, re-development of low income housing in the core of the town and the exclusion of peripheral development is responsible for the deviation (7). The pattern at Mpwapwa probably reflects a government experiment in the early 1950's to improve and provide comprehensive housing and to attempt to establish the town as a service centre (8).

Table 6.2 shows extreme conditions for towns and former townships. It is noteworthy for the frequency in which Kigoma/Ujiji, Lindi and Mwadi appear in the list. The low incidence of those dwelling in permanent housing reaches an extreme case in townships only at Kigoma/Ujiji. The majority of inhabitants

(7) Evident to the author during the census fieldwork and training for supervisors at Dodoma.

(8) Tanzania National Archives, Minor Settlements, File 32513 For 1A Mpwapwa Minor Settlement etc.

Table 6.2 Average and extreme conditions of households living in different types of structures

Type of structures/ conditions	Percentage of households living in		
	Permanent	Semi-Permanent	Others
Towns			
Highest proportion in permanent structures, (Dar es Salaam)	51.8	46.9	5.2
Highest proportion in semi-permanent structures, (Iringa)	36.5	67.2	1.2
Highest proportion in 'others' structures, (Kigoma/Ujiji)	10.0	51.2	34.7
Average for all townships	33.7	52.6	8.4
Former townships			
Highest proportion in permanent structures, (Mwadui)	97.8	1.2	0.5
Highest proportion in semi-permanent structures housing, (Singida)	13.7	80.9	4.6
Highest proportion in 'other', (Korogwe)	27.4	41.9	27.5
Average for all former townships	33.3	53.7	5.7
Average for urban areas	33.5	53.7	5.7

Source: Adapted from table 6.1

live in the traditional settlement at Ujiji and this, aggravated by the absence of major economic development, explains only 10% of the households dwelling in permanent structures (9). Because of past commercial and administrative backwardness some former townships such as Kahama, Kondoa, Nansio and Singida have less than 15% of the households living in permanent structures. The relative decline of Bagamoyo from a centre of importance is also reflected in the low proportion of the households living in permanent structures (10).

It has been noted that with a few exceptions semi-permanent structures are in the majority in most towns. The variation among the towns is considerable. The atypical case of Mwadui has already been noted; there less than 2% live in semi-permanent structures. At the other extreme over 80% of the structures in Singida are classified as semi-permanent. The former townships generally stand out with their preponderance of semi-permanent houses. In descending order they include Chunya (75%), Bagamoyo, Kahama, Nansio, Korogwe and Kondoa (64%). Most of the towns in the list represent areas where the influence of modernisation and economic development has been weak. In the 6 towns mentioned above, there has been a shift from traditional and makeshift type of houses to the semi-permanent type but little improvement beyond that to the more expensive permanent structures. A similar process seems to be occurring in the large town trying to ward off decline (Iringa 67%). Since semi-permanent structures can be put up rapidly and with comparatively little capital, towns experiencing rapid growth, exemplified by Musoma, Iringa and Dar es Salaam, have a high percentage of structures in the intermediate category.

Because of special circumstances in which housing is provided by an institution, Arusha is an important exception to the pattern described above. First, arising from its responsibilities as the capital of the East African Commu-

(9) J. Wayne, *The Development of Backwardness in Kigoma Region*. Seminar July 13, 1971, University of Dar es Salaam, Sociology Dept., Dar es Salaam.

(10) For the decline of Bagamoyo see: W.T. Brown "Bagamoyo: An Historical Introduction", in *Dar es Salaam City Port and Regions, Tanzania Notes & Records*, Dar es Salaam, 1970, pp. 69-83.

nity, there was an influx of low income workers and an acute shortage of housing which meant that at the time of the census a relatively high proportion (9%) lived in temporary structures. Many in the high and middle income groups did not move to Arusha until much later. However, the East African Community is an institution which has a comprehensive housing policy. Therefore most of the eventual housing will be of material which will categorize the structures as permanent. The figures for housing for Arusha, therefore, represented a changing situation.

Structures classified as 'others' were ostensibly those not intended to be used for living, but which were occupied at the time of the census (11). Unfortunately because of the materials used for the construction of this type of structure, there was much leeway for the mistaken inclusion of traditional houses in this category. Strictly, these are not temporary in the sense of structures put for example in the squatter areas of Dar es Salaam and which are 'roughly built' of cardboard and other waste material. It is only in this context of ambiguity that there are extremely high proportions of houses classified as 'others' at Kigoma/Ujiji (34%) and Tukuyu (27%). Other towns also with a high proportion are Kondoa (20%), Nansio (19%), Iushoto (17%), Tabora (17%), Kahama (13%).

Variation in the internal pattern of the urban areas can be even more extreme. The better quality or permanent houses are clustered in the larger towns and while the category 'others' is more frequent in the older towns or in former townships, they also occur in the large towns. These wide variations have to be looked at in the context of *de facto* racial segregation which existed in towns during the colonial period and of the closely related racial basis of economic opportunities (12). Thus, taking Dar es Salaam as an example, permanent structures tended to be constructed in the past by the affluent, non-African communities, and this feature is still reflected in the distribution of house types (see table 6.3). These historical features, though rapidly changing, have a bearing on such aspects as amenities, level of congestion, and house rents.

TABLE 6.3 Variation in types of structures and occupants in selected wards in Dar es Salaam

	Percentage of households by type of structure							
	Ward 1	Ward 3	Ward 4	Ward 5	Ward 8	Ward 9	Ward 11	Ward 15
Permanent	54.0	95.1	85.1	84.6	11.0	3.9	9.0	71.7
Semi-Permanent	42.4	2.7	5.5	11.0	84.8	82.7	82.9	23.6
Others	1.4	0.0	2.0	1.5	2.9	11.5	6.5	2.6
Total No. of Structures	254	1275	1540	1214	3042	9532	9406	9666
	Percentage of households by ethnic origin							
	Ward 1	Ward 3	Ward 4	Ward 5	Ward 8	Ward 9	Ward 11	Ward 15
African	77.1	3.6	3.7	36.3	95.1	95.7	97.4	97.6
Asian	2.6	95.6	91.7	35.0	1.2	0.1	0.1	0.2
Arab	1.0	0.5	1.5	1.7	2.6	0.3	0.5	0.5
European	16.2	0.6	0.3	21.5	0.0	0.0	0.3	0.1
Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Not stated	3.2	1.7	2.8	2.4	1.1	3.9	1.8	1.6

Source: Census Vol. 2, *op.cit.*, Table 115 and Table 116.

(11) Instructions for Enumerators and Supervisors, *op.cit.* p. 26.

(12) A.C. Mascarenhas, *op.cit.*

6.2 Tenure

The majority of house occupants in the towns are tenants. In contrast, most of the structures in the former townships were owner occupied (see table 6.4). The only three towns in which tenants are in the minority are Kigoma/Ujiji, Mtwara/Mikindani and Lindi. Of these three exceptions, the first two pairs comprise in part former traditional settlements in which owner occupants dominate. When Lindi was over shadowed by Mtwara there was also a decline in the number of tenants, and owner occupancy increased, thereby also making Lindi an exception.

Table 6.4 Households by tenure

Urban area	Total number of households	Type of tenancy in percentage			Stated
		Owner	Tenant	Others	
Towns:					
Arusha	9255	19.1	68.5	9.9	97.5
Dar es Salaam	2342	22.3	61.1	13.9	97.3
Dar es Salaam	43430	21.6	69.5	6.5	97.6
Polono	6107	19.8	64.5	12.6	96.3
Livinge	5112	23.2	57.2	11.4	97.9
Kig/Ujiji	5208	52.4	28.2	24.2	96.8
Lindi	3405	49.1	31.9	17.7	96.1
Mbeya	3057	20.1	62.1	15.5	97.6
Morogoro	7503	27.9	60.8	7.5	96.2
Moshi	7726	15.1	74.5	8.7	98.3
Mtwara/Mik	5951	50.9	34.9	12.5	98.3
Musoma	3755	23.1	61.7	12.8	97.6
Mwanza	9059	17.2	67.6	11.3	96.8
Tabora	5666	52.7	30.5	14.3	97.4
Tanga	17580	25.7	65.4	9.1	98.1
Average	11721	28.3	52.4	12.5	97.5
Former Townships:					
Begweye	1194	46.0	35.0	15.8	96.8
Chunya	520	56.2	31.2	11.2	98.5
Luhosa	713	51.3	38.1	9.4	98.0
Kilosa	1227	34.1	51.4	13.4	99.0
Kisumu	590	36.1	62.2	1.4	99.7
Londan	957	46.7	37.3	10.9	97.9
Forogwe	1791	27.7	46.1	23.0	98.8
Lushoto	389	37.3	49.1	11.1	97.4
Spwanya	478	24.5	55.8	21.1	99.4
Mwadui	1350	0.1	27.6	71.0	98.7
Mushingwa	1005	38.6	23.2	6.8	70.3
Kusalo	576	55.6	38.5	5.4	99.3
Pongani	864	48.5	39.0	12.3	99.8
Shinyanga	1583	16.6	69.4	13.7	99.7
Singida	2647	37.3	57.0	4.9	99.3
Songea	1366	23.8	55.0	19.8	98.6
Ching'a	948	52.4	32.9	13.5	98.8
Average	1104	37.4	43.9	15.8	97.1
Average all urban areas					
	6081	33.2	47.8	14.3	97.3

Source: Census Vol.2, pp.CII- Table 123.

The characteristics of the remaining twelve towns are fairly consistent, especially in that there is a larger proportion of tenants than of owners. The growth of towns by the influx of immigrants rather than by natural increase, the high cost of putting up structures, the ease with which structures can be rented and the difficulty of acquiring land contributes to the pattern in which tenants outnumber owners by nearly 2 to 1. Only at Tabora is the ratio significantly lower, reflecting the relative decline of the town from its former importance. An interesting aspect of tenancy in some towns is the relatively high percentage of tenants falling in the category 'others'; the relevant buildings are structures probably occupied by relatives, refugees and

others who may also not pay rent. Unfortunately the category 'not paying rents' was excluded from the questionnaire during the census. As is to be expected, the older towns lead in the 'other' tenancy category. At Kigoma/Ujiji over 24% fell in the category 'others' but, rather peculiarly, less than 5% paid minimum rents or were in the 'not stated' category. Also significantly high in the 'others' category are Mbeya, Bukoba and Tabora.

The forces operating in the former townships are very different from those influencing towns so that the overall picture is varied. But half of the former townships reflect characteristics similar to the towns in the sense that tenants constitute the majority of households. Former townships in this category are those which in some form or other have had a preponderance of migrants as in the sisal centres. Therefore, a large percentage are tenants as is reflected in the figures for Kilosa 51% and Kimamba 62% (see table 6.4). Iushoto, similarly, is important not only as an agricultural centre but as already noted, as a resort town. The former townships of Shinyanga, Singida and Songea, which are now regional capitals of Shinyanga, Singida and Ruvuma regions respectively, exhibit many of the characteristics of towns, so that both Dar es Salaam and Shinyanga have the same proportion, 69%, of the occupants as tenants.

Owners dominate in many former townships. Most of these former townships are those which have suffered a relative decline of importance, such as Bagamoyo and Pangani, or are merely minor administrative centres such as Mnsio, Kondoa, or Kahama. Chunya and Mwadui form good cases for comparison. Chunya is a former mining town which has declined sharply in importance since the late 1930's while Mwadui, since the 1940's, has been the most important mining town in the country. In Chunya owners dominate (56%), while in Mwadui less than 1% are owners. In the tenancy category 'others', Mwadui has 71% of the households in this group because of the policy of free housing for the low income workers. The proximity of sisal estates at Korogwe also introduces a high element of tenants in the 'other' category. For related reasons, Mpwapwa, important as a veterinary and educational centre, has a relatively large number in the 'other' category.

6.3 Tenants by rent

Although information on rents was collected in terms of absolute values from 1 sh. to 999 shs. and more per month, in the published data the values were grouped into 9 different categories, (see table 6.5). The data published thus gives a detailed picture of those occupying low rent accommodation.

The distribution of rents by the different categories is skewed and there are fairly major differences between the towns and the former townships. Thus while in the towns less than 2% of the households fell in the category paying less than Shs. 10 rent per month, there were more than 7% in this category in the former townships. By far the largest group, 28% and 34% in towns and former townships respectively, consisted of those who paid between 10 shs. and 19 shs. There was a similar clustering, 27% and 19% respectively, in the next category. In the former townships there was generally a decline in all classes as the rents increased except for the 50 Shs. to 99 Shs. group.

Table 6.5 Tenants by rent in shillings per month

	Total	Percentage of household paying the.								% Stated
		1-9	10-19	20-29	30-39	40-49	50-99	100-199	200+	
Towns:										
Arusha	6342	0.2	19.9	35.5	13.5	7.9	10.9	4.4	7.1	99.4
Dar es Salaam	57977	0.7	25.8	15.0	15.0	5.7	11.2	8.4	9.0	99.6
Dodoma	3942	0.3	27.3	25.9	22.9	3.3	8.3	5.8	6.4	99.2
Iringa	1996	0.9	26.2	34.7	16.7	2.3	7.7	5.3	4.3	99.9
Kigoma/Ujiji	1054	5.9	37.8	25.0	8.8	4.1	7.0	4.6	5.7	99.4
Lindi	1054	4.7	35.3	25.9	9.6	6.5	8.0	6.5	5.3	97.0
Mbeya	1104	3.5	30.4	24.4	6.8	2.4	5.0	11.2	8.0	99.0
Morogoro	1901	0.5	23.3	35.8	13.8	4.4	9.2	5.2	5.3	99.4
Moshi	4442	1.2	45.7	23.5	13.3	4.6	4.1	2.9	5.5	98.6
Mtwara	5790	1.0	15.1	21.9	18.1	8.7	15.9	5.1	6.9	98.7
Namata	2075	2.6	47.4	29.3	6.4	1.6	4.4	3.5	4.3	99.5
Narok	2317	2.4	36.7	29.4	10.5	3.7	5.9	4.6	4.0	99.1
Nzara	6869	0.4	13.1	31.1	20.1	7.7	9.9	5.6	11.0	99.9
Tabora	3859	0.3	26.9	18.9	4.3	2.0	2.0	5.0	4.5	93.6
Tanga	11137	0.7	37.9	27.6	12.6	4.4	4.4	5.2	6.0	98.9
Average	7529	1.7	30.3	26.6	12.7	4.7	7.4	5.6	6.2	96.8
Former townships:										
Bagamoyo	418	51.2	20.1	9.8	4.3	2.6	2.2	1.9	1.0	93.1
Chunya	162	52.1	20.4	17.3	5.6	5.6	6.2	2.5	1.2	98.8
Kahama	272	3.5	24.9	19.1	5.5	5.5	8.9	7.4	2.9	85.7
Kilosa	430	1.1	55.8	25.1	10.0	3.2	4.6	9.2	3.7	97.6
Kimamba	367	2.3	10.6	46.0	3.0	2.5	6.3	4.9	0.3	99.5
Kondoa	358	5.2	37.7	20.1	5.3	4.7	6.4	4.5	1.7	89.7
Korogwe	825	0.1	45.9	27.5	6.9	3.5	4.9	4.9	4.6	99.3
Lushoto	191	0.0	41.9	11.0	15.6	11.5	6.7	6.8	4.7	95.8
Mpwapwa	255	0.4	29.8	36.9	5.5	9.0	6.3	0.8	2.7	98.4
Moshi	532	0.0	2.1	10.6	1.5	22.7	29.7	10.0	20.9	98.1
Mtshingwe	233	0.4	62.7	14.6	3.9	3.4	5.2	6.9	2.6	99.6
Narok	222	2.3	14.9	17.1	6.8	10.4	10.5	11.7	7.7	89.2
Pangani	359	10.6	54.6	11.2	4.7	2.4	7.7	5.6	6.9	97.1
Shinyanga	1099	0.1	6.7	30.1	32.2	8.8	8.1	5.6	7.6	99.3
Singida	1513	4.2	41.1	26.8	6.3	2.0	2.0	4.7	4.4	93.5
Songea	751	10.0	35.8	22.2	4.0	5.1	5.1	6.4	8.0	98.5
Tuluyu	512	0.4	21.5	31.5	7.8	5.0	10.9	7.2	8.1	92.5
Average	450	7.7	34.7	19.9	7.5	9.3	8.2	5.9	4.9	95.6
Average for all urban areas	3794	4.9	32.6	23.0	10.0	7.2	7.0	5.7	5.5	96.2

Source: Census Vol 2, op.cit., Table 1266

There were interesting patterns in each of the categories which merit attention. Remarkable in this context is the extremely high percentage, 51% of the households in Bagamoyo, and 31% at Chunya, who pay rents of as low as 9 Shs. per month. Pangani, Songea, and Kondoa similarly have a fairly large percentage (around 10%) of the households paying the lowest amount of rent. Neither Moshi nor Lushoto have any households paying these amounts. The towns generally have a small minority paying the lowest rent; the highest percentages paying this amount are in Iringa (6%), Kigoma/Ujiji (5%) and Lindi (4%). Most of the towns had less than 1% of the households paying less than 9/- per month.

With certain notable exceptions, the largest category of tenants in most towns are households with rentals of 10 - 19 Shs. per month. Kimamba (70%) and Mshingwea (62%) lead in this category. The exceptions seem to occur in those towns either having new low cost housing, or experiencing housing shortages on a large scale. Thus, in Arusha (20%), Dodoma (26%), Mbeya (28%), Moshi (15%), Mwanza (13%), Mpwapwa (30%), Narok (15%), Shinyanga (7%), Tuluyu (21%), the majority of tenants fall in a higher category of rent, i.e. 20-29 shs.

The greatest difference between tenants in the towns and those in former townships is in the number of households in the category paying 20-29 shs. While

development also seems to have had a similar influence at Iushoto, Tukuju and, to some extent, at Mpwapwa.

6.4.2 Access to piped water

A wide range of information is for the first time available on access to piped water in urban areas. In contrast to the information processed for other facilities, data were tabulated not only by households but also by total population affected.

In this analysis one of the major questions of interest is the extent to which water is conveniently available within the plot of the structures occupied by the households. On an average, just over a quarter of the households in the towns and nearly a third in the former townships did not have water on the site of the building. However, the pattern of development is very uneven (see table 6.7). At one extreme, Morogoro seemed very adequately served, for less than 5% of the households did not have water, in contrast to Mtwara/Mikindani where the proportion of households without water was over 10 times higher (57%). Based on sheer numbers of households without water, close attention will have to be paid to Dar es Salaam (36% or 30,176 households), Mwanza (42% or 4,110 households), Mtwara/Mikindani (58% or 3439 households), Arusha (37%

Table 6.7 Population with access to piped water

	Total	% of Pop. with Access to Piped water				Stated
	Population	In Private	Shared	Outside	None	
Towns:						
Arusha	31549	19.9	17.9	23.3	36.4	37.5
Dakota	7465	28.1	25.5	0.1	40.4	34.2
Dar es Salaam	263776	18.7	11.4	33.9	33.7	37.7
Dodoma	20654	22.2	14.2	32.9	26.9	36.2
Iringa	30717	20.3	10.1	34.0	13.4	37.8
Kig/Ujiji	30522	14.0	5.4	59.3	19.5	38.2
Lindi	12600	21.2	3.8	46.3	27.6	38.8
Mbeya	11636	26.2	28.0	31.0	12.7	37.8
Morogoro	24231	16.9	16.3	55.9	5.0	34.2
Moshi	25390	27.3	43.2	9.0	18.8	38.2
Mtwara/Mik	19750	11.1	5.3	23.0	50.4	30.4
Musoma	14715	16.3	21.0	43.5	14.5	37.3
Mwanza	33560	26.7	26.3	7.2	39.5	35.8
Tabora	20119	30.3	15.1	37.8	15.8	37.1
Tanga	38704	29.5	21.6	41.8	9.1	38.0
Average		21.8	17.5	33.4	28.0	37.3
Former Townships:						
Dagweyo	4803	1.4	0.5	6.6	89.2	37.7
Chunya	2144	15.1	5.3	46.6	31.6	38.6
Idhama	3038	16.7	4.1	28.8	48.7	38.3
Illoke	4302	31.5	3.4	30.0	4.3	39.2
Kisumu	1825	18.7	0.4	34.2	20.4	39.7
Kondea	3800	17.3	3.6	3.1	71.4	38.0
Kirugwe	6037	15.4	8.8	62.9	11.9	33.1
Lushoto	1665	25.3	13.3	10.8	49.0	30.5
Mwanjini	2004	46.4	11.9	18.7	22.8	38.9
Mwali	6836	33.4	3.4	34.4	0.0	33.2
Mchingwe	3371	4.6	1.7	36.7	29.0	71.9
Mpingo	3578	35.2	4.9	85.9	12.4	38.3
Mungwi	2892	14.7	2.9	22.1	60.3	33.9
Mungwa	4790	30.3	19.4	47.3	3.1	35.9
Mungwa	8582	17.9	13.3	20.3	46.1	33.6
Tongwe	4368	24.6	14.8	36.9	2.7	38.9
Tukuju	3043	19.9	5.0	47.5	26.2	38.6
Average		20.6	7.9	37.7	31.1	37.4
Average for all urban areas						
		21.2	17.4	33.7	28.0	37.3

Source: Census Vol 2, op.cit., Table 121, pp. 239.

at 3,416 household) and Bukoba (52% or 1,272 households). Similarly for the former townships, attention will have to be paid to Bagamoyo, Kahama, Kondoa, Lushoto, Mpwapwa, Pangani and Singida.

Over a third of the households in both types of urban areas have a source of piped water outside the living quarters. The majority of households derive their water supply from piped water away from the site of the structure of the households. Of all towns and former townships there were 10 urban areas in which the majority of the households had access to piped water outside their dwellings. In Kigoma/Ujiji over two-thirds of the households neither share nor have a private source.

The variation amongst the former townships of households without water was great: Mwanui 1%, Songea 2% and Shinyanga 4% in contrast to Bagamoyo 89% Kondoa 74% and Pangani 62%. No question was asked concerning whether sources other than piped water were available within the plots. Wells, for instance, are an important source of water in the coastal settlements (i.e. Bagamoyo and Pangani).

Only a small minority living in the urban areas have private access to piped water and this includes Mwanui where about a third of the households fall in this category. Some of the towns with the best private water supply were Tabora (23%), Mbeya (21%), Bukoba (19%) and for the former townships Mpwapwa (39%), Mwanui (29%), Lushoto (24%) and Kilosa (23%). The extremes are once again illustrated by the former townships so that only 1% of the households at Bagamoyo and 4% at Nachingwea have a private source of piped water.

If accessibility to piped water were considered on the basis of the total population served rather than households served, the situation in most cases is relatively better. Out of a total of 32 urban areas, 17 of them are better off than the household statistics indicate and in 8 the change percentage-wise is insignificant, (less than 1% difference). In the extreme case provided by Bukoba, 51% of the households did not have access to piped water but when the total population was considered the percentage without piped water fell to 40%. Mwanza also showed a relative improvement of 6%. The ratio did not change significantly for Arusha, the difference being less than 0.5%. Worse off, and then only by slightly over 10%, were Iringa, Morogoro and Mtwara/Mikindani. In the former townships Mpwapwa with 4% had the greatest variation, (see table 6.7).

Similarly, variation was considerable if the relation of household or population to private access to water was analyzed. In towns in all cases, a greater percentage of the population than households had private access to water.

6.5 Size of households and occupancy of rooms

The census data was tabulated by size of households in nine categories at four levels of occupancy (i.e. 1, 2, 3, and 4 or more rooms).

Before examining the details of the size of the households and the occupancy of rooms it is necessary to give some idea of the contribution of each cate-

gory to the total number of households. With one exception, (Nansio with 26% in nine person households and this is probably an error in the data), all the urban areas have more households in the single person category than in any of the others (see table 6.8).

Table 6.8 Percent of people by size of household

	Number of Members in Households									Total %
	1	2	3	4	5	6	7	8	9 and more	
Towns:										
Arusha	24.9	22.7	14.3	11.4	8.5	6.6	3.9	2.7	5.0	100.0
Dakota	34.5	20.0	13.8	9.8	7.4	5.1	3.1	2.2	4.0	99.9
Bar ee Salama	29.7	20.6	15.0	11.5	8.4	5.4	3.6	2.3	3.5	99.9
Botoma	28.4	20.5	12.8	11.0	8.5	7.1	4.2	2.8	4.6	100.0
Eranga	21.8	18.5	13.6	11.0	10.7	8.4	5.8	4.2	8.0	99.9
Kig/Ujiji	24.6	15.7	12.5	11.7	9.4	7.4	5.8	4.0	8.3	99.9
Lindi	24.2	17.6	14.0	12.8	10.4	6.9	4.1	3.9	5.4	100.0
Mbeya	25.4	16.5	12.7	11.5	9.3	7.4	5.5	3.9	7.1	99.9
Morogoro	29.9	18.9	14.7	11.3	8.2	6.2	4.0	2.3	4.4	99.9
Moshi	27.4	20.6	14.8	11.8	8.8	5.6	3.8	3.0	4.2	99.9
Mtwara/Mik	23.8	20.9	16.0	14.0	10.0	5.8	4.0	2.1	3.2	100.0
Mwanza	22.6	19.1	13.3	12.3	9.4	7.4	4.5	3.8	7.6	99.9
Mwanza	28.2	21.2	13.9	10.1	8.3	5.7	4.2	2.9	5.4	99.9
Tabora	28.8	18.0	12.9	11.0	9.0	6.4	4.4	3.4	6.0	100.0
Tanga	33.4	17.3	12.5	9.9	8.1	5.9	4.1	2.9	5.8	100.0
Average	27.2	19.1	13.0	11.4	9.0	6.5	4.3	3.1	5.6	99.9
Barer townships:										
Bagamoyo	21.7	18.6	14.2	12.2	8.6	8.5	4.5	3.3	10.2	100.0
Chagga	18.1	17.5	15.0	13.5	12.3	8.2	5.5	3.5	8.4	100.0
Kalene	18.8	16.7	13.1	12.5	9.5	7.5	7.5	4.0	9.2	99.9
Kilosa	28.2	18.6	12.0	12.0	7.8	7.5	5.8	3.4	4.6	100.0
Kinshaba	24.4	19.8	13.9	9.2	7.0	4.9	4.3	3.1	3.7	100.0
Kondoa	19.1	10.7	15.0	10.9	10.3	10.2	4.6	4.1	7.2	100.0
Korogwe	30.4	19.5	12.3	9.4	9.2	6.0	4.7	2.8	5.8	99.9
Lushoto	19.2	13.4	12.9	10.8	12.9	3.7	6.8	6.8	7.6	100.0
Mwanza	22.2	34.4	11.2	13.5	7.2	10.0	7.0	5.9	6.7	100.0
Mwani	24.5	15.9	15.2	14.6	9.6	8.1	5.3	3.9	33.0	100.0
Mtchingwe	24.4	18.8	16.7	12.3	10.3	6.9	3.7	3.1	4.8	100.0
Nansio	6.4	12.8	11.0	12.8	11.4	8.4	6.6	4.4	26.2	99.2
Pongwe	30.5	20.8	13.2	10.7	8.7	7.3	3.1	2.6	3.1	100.0
Shinyanga	36.4	20.6	12.9	8.8	6.6	4.1	3	2.5	4.4	99.9
Singida	23.2	20.8	15.0	11.6	9.5	7.2	4.7	3.4	4.5	100.0
Tongwe	23.9	18.7	14.8	11.3	10.8	6.5	5.1	3.3	6.2	100.0
Tungu	21.9	14.2	14.4	12.5	10.9	8.5	3.5	4.5	8.5	100.0
Average	23.7	17.0	13.7	11.6	9.5	7.6	5.2	3.7	7.4	100.0
Average for all urban areas	25.1	18.0	13.8	11.5	9.2	7.1	4.8	3.4	6.4	99.9

Source: Census Vol. 2, Ch. C11, Table 229, pp. 205-252.

Overall there is an inverse relationship between size of households and the contribution to the total number of households. Thus single person households account for nearly a quarter of all households but two person households constitute only 17% of the total number and the eight person household category is at the bottom of the list contributing to only 3% of the total number of households. Since the nine and more households represents an accumulated group, there is generally not a decline but a slight increase in the total percentage belonging to this class. This is best reflected in the case of Bagamoyo and Mwanza. In the former, the nine and more persons category comprises 10% of the households. In contrast the pattern at Mwanza is a straight line regression with 24% (single person households) at one extreme and 3% (9 person households) at the other.

One more major generalization can be made and that is that with an increase in the household size one is probably incorporating more and more of the households with large nuclear and extended family structures. Migration for

such large numbers is unlikely and it is probable therefore that they constitute households who have been caught in situ in the process of urbanism. Such households would tend to retain buildings with four or more rooms rather than rent them to individuals. This statement excludes the few who migrated, have large families and who could still afford to pay rent for the entire house or structure.

Occupancy of rooms is influenced by rents, availability of housing, migration patterns and family structure. In addition, the architecture is an important consideration. With two exceptions, Kigoma/Ujiji and Lindi, the towns have the largest number of households occupying one room (see table 6.9). The greatest concentration occurs in Dar es Salaam where 65% of the households fall in the single room category of occupancy. Large absolute numbers of in-migrants (see Ch. 4), the relatively high cost of rents and the inability of the low cost housing to keep up with demand are some of the reasons for this concentration.

Table 6.9 Percentage of private households by number of rooms occupied.

	Total No. of households	1 room	2 rooms	3 rooms	4 and more	State
Towns:						
Arusha	9254	61.9	30.3	9.4	8.3	97.8
Bukoba	2342	58.1	30.3	10.0	11.6	98.0
Dar es Salaam	83431	65.5	26.3	8.3	7.6	97.7
Dodoma	6107	64.2	29.2	6.8	8.3	96.5
Eranga	5113	43.0	25.9	15.0	14.3	98.1
Kig/Ujiji	5205	28.1	16.8	33.2	38.4	96.4
Lindi	3465	26.2	17.4	23.5	31.8	99.0
Mbeya	5096	55.7	20.2	9.7	12.3	97.9
Morogoro	7505	54.9	23.2	10.9	7.4	96.6
Moshi	7726	44.9	17.6	6.7	9.0	98.3
Mtwara/Mik	5952	38.2	27.1	20.6	12.5	98.7
Mwanza	3735	64.3	17.3	9.1	7.0	97.7
Shamba	9059	59.2	17.9	8.7	11.3	97.0
Tabora	2567	43.7	22.9	12.0	18.9	97.5
Tanga	17580	60.0	17.3	9.7	11.1	98.1
Average		50.5	19.7	11.6	15.9	
Former Townships:						
Bugando	1194	36.9	22.8	16.0	21.4	97.1
Chunya	920	24.4	32.3	19.6	22.3	96.7
Kahama	713	35.6	23.3	18.7	20.3	98.5
Kilosa	1226	44.0	30.0	11.3	15.8	99.0
Kilamba	590	57.5	27.9	9.3	10.0	99.7
Kondon	957	34.4	28.9	18.9	15.9	98.1
Korogwe	1791	51.7	26.5	10.0	10.7	98.5
Matete	389	42.2	25.0	8.2	18.9	97.9
Mwanja	474	37.6	23.4	20.5	18.1	99.6
Mwafu	1950	42.3	32.5	13.4	10.7	98.9
Nachingwea	1005	21.5	27.3	12.3	9.8	10.8
Narain	576	17.2	25.7	12.5	42.2	97.0
Pwani	864	35.1	18.4	19.3	26.3	99.7
Shinyanga	1583	64.6	19.3	8.7	6.3	99.0
Singida	2646	46.4	27.7	15.0	10.4	99.5
Songea	1366	51.0	16.8	10.9	13.8	98.3
Tukuyu	948	30.2	33.1	17.9	17.0	98.1
Average		39.9	25.9	14.3	17.0	
Average for all urban areas		45.8	23.0	11.0	15.5	

Source: Census Vol. 2, pp. 211, Table 126.

But the large size of a town alone is not directly related to a higher proportion of single roomed occupancy.

At Kigoma/Ujiji most of the households occupy four or more rooms though the number of those occupying single rooms is still fairly large (20%). There are several reasons for this. First, the mode of living has not been altered by migration and the family structure is intact. Secondly, the houses were architecturally designed to accommodate families rather than tenants. Therefore a large proportion (38%) of the households occupy four or more rooms. In Lindi a different pattern prevails for different reasons. The growth of Mtwara has retarded the development of Lindi and this has meant that there are comparatively fewer migrant tenants looking for single room dwellings. Secondly, with the decline in the demand for housing occupants can afford to rent more space rather than crowd in one or two rooms. Thus, a comparatively small proportion, 26% live in single rooms and a correspondingly larger number, 31% live in four or more rooms.

The pattern of two-room occupancy by households is fairly uniform for most of the towns. Extreme cases at either end of the scale are provided by Mtwara/Mikindani (27%) and Dar es Salaam (16%). Among the former townships similar extremes are provided by Mwadui (32%) and Songea (16%). The fact that most institutional housing is two roomed accounts for a number of former townships and a few of the towns having a sizeable proportion of the households living in two rooms. The best examples of this are Mwadui with 32%, Chunya with 32%, Kilosa, Lushoto, Nachingwea and Korogwe. Similarly, the importance of Tabora and Morogoro in the railway system give these two towns an appreciably larger number of households dwelling in two rooms.

Architecturally, three roomed houses are not as common as the two roomed, or four and six roomed Swahili type houses. Therefore seven of the towns and nine of the former townships have the lowest proportion of households residing in three rooms. Three room occupancy is influenced strongly by the number of six roomed houses. In the coastal towns where the six-roomed Swahili houses are common, different pressures have resulted in two patterns, one peculiar to Dar es Salaam and Tanga while Lindi and Mtwara/Mikindani show other characteristics.

In the Dar es Salaam and Tanga situations where demand for housing is great and rents are high, the six-roomed house tends to be sub-divided to a maximum. Landlords sometimes opt to occupy half the house and a large part of the 8% in this category in Dar es Salaam and 10% in Tanga is probably accounted for by owner occupancy⁽¹³⁾. Conversely in the Mtwara/Mikindani and Lindi situation, where demand for housing is not great, the Swahili house tends more frequently to be divided along the central passage into two halves. Hence Mtwara/Mikindani have 20% and Lindi has 23% of the households living in three rooms.

In the former townships three-room occupancy is generally slightly higher, 17% as compared to 14% in the towns. A few of the former townships, notably Kimamba, Korogwe, Lushoto and Shinyanga, like their larger counterparts, have less than 10% of the households in the category of three room occupancy. In more than half of the towns and former townships four and more room occupancy tends to be higher than three-room occupancy. For the towns three-room occupancy accounts for 12% compared to 14% in 'four' rooms. For the former townships the percentages are 14 and 17 respectively. The figures for the four roomed category are slightly inflated because they include households with four and more rooms.

(13) Population Census Vol.2, op.cit. Table 125, pp 266-269.

Considerable variations exist between the towns in the occupancy of four rooms. Thus, in the case of Kigoma/Ujiji and Lindi, a high proportion (39% and 32% respectively) of the households live in 'four' roomed houses. The only other urban area with a comparably high percentage living in 'four' rooms occurs at Nansio (42%). The lowest proportion in this category occurs at Dodoma (6%) and Musoma (7%). Of the former townships, Shinyanga with 7% exhibits similar characteristics.

6.6 Occupancy of rooms by single person households

While it would be interesting to carry out an analysis of all households by size (1 to 9 and more person households) such an exercise is beyond the scope of this chapter. Therefore, only three categories, single person, eight persons, and nine and more person households will be considered. The justification for choosing single persons is that in the majority of cases movement in urban areas first takes place by individuals normally unaccompanied by families. The other extreme represents urban dwellers with large nuclear families and perhaps even extended families. To compensate for the deficiency of examining only single, eight, and nine and more person households, the overall density per room of the four room categories (one, two, three and four rooms) will be examined in a later section.

Single persons, on an average constitute just over a quarter of all the households in the urban areas as compared to 18% for households with two persons. Among the towns, Bukoba (34%) and Tanga (33%) have the highest number in this category, while the lowest is represented by Iringa (21%). Among the former townships Shinyanga (36%) and Kimamba (34%) stand above the others. (see table 6.5).

The overwhelming majority of single person households occupy one room. The average difference between towns (80%) and former townships (70%) is appreciable. Among the towns the most extreme forms of single room occupancy by individuals occur at Dar es Salaam (90%) and Kigoma (61%). Dodoma (89%), Musoma, (89) Tanga 88% and Moshi (87%), in that order, are also fairly close to Dar es Salaam. The range among the former townships is considerable; at the one extreme are Kimamba (88%), Shinyanga (86%) and Songea (84%), while at the other extreme are Chunya (50%), Nansio (50%) and Nachingwea (54%), (table 6.10).

There is a sharp fall in the number of individuals occupying two and more rooms in the towns. Thus on average only 11% occupy two rooms, 4% three rooms and 5% four or more rooms. The prevailing income distribution, relatively by high rents, scarcity of housing and pattern of migration all account for this. There is a similar, though less pronounced, decrease in the former townships, the percentages being 19%, 6% and 6% respectively. The number of individuals occupying two rooms reaches comparatively high proportions at Mtwara (19%) and Lindi (15%). Because of the differing nature of their development there is a departure between the two towns in the percentage of individuals occupying three and four or more rooms; Mtwara conforms with the other towns while Lindi with 15%, 16% and 14% of the individuals occupying 2, 3 or 4 and more rooms respectively, exhibits similar characteristics to those of Kigoma (12%, 7%, and 20%).

Table 6.10 Single person households by occupancy of rooms

	Percentage occupying				One person households % of total
	1 Room	2 Rooms	3 Rooms	4 and more	
Townships:					
Arusha	85.6	11.4	3.3	1.6	24.9
Dar es Salaam	84.8	11.8	1.8	2.5	34.5
Dodoma	80.4	5.8	1.8	1.9	29.7
Ilala	89.1	8.0	1.4	1.5	28.4
Morogoro	76.9	16.8	4.2	2.3	21.8
Mt. Meru	60.8	12.3	7.4	19.5	24.6
Moshi	85.1	15.1	15.8	14.0	34.2
Mt. Kilimanjaro	83.1	10.9	3.2	2.9	25.4
Mt. Meru	83.2	12.7	2.8	1.4	29.9
Mt. Meru	89.6	8.2	1.3	3.9	27.4
Mt. Meru	72.1	19.6	5.3	2.9	29.8
Mt. Meru	89.0	6.5	2.4	2.1	22.6
Mt. Meru	81.0	7.2	2.3	5.6	28.2
Mt. Meru	75.8	13.0	4.2	6.0	28.8
Mt. Meru	88.4	7.5	1.9	2.2	33.6
Average	80.3	11.1	3.9	4.7	27.2
Former townships:					
Bagamoyo	77.4	13.1	7.5	2.0	21.7
Chunya	49.5	29.0	14.0	7.5	38.1
Kibaha	85.9	20.5	5.3	2.3	28.6
Kilosa	77.5	15.5	1.8	5.3	28.2
Kisumu	87.6	8.9	0.3	2.5	24.4
Korogwe	68.9	20.6	6.1	4.4	19.1
Korogwe	78.2	13.6	4.7	3.5	30.4
Lushoto	74.0	12.5	2.7	11.0	19.2
Mt. Meru	71.4	17.1	4.8	5.7	22.2
Mt. Meru	65.0	20.9	5.2	5.0	24.3
Mt. Meru	53.5	28.7	9.3	8.6	24.4
Mt. Meru	56.0	38.9	2.8	8.3	5.4
Mt. Meru	59.3	14.8	9.1	16.7	30.5
Mt. Meru	85.9	10.8	2.1	1.2	36.4
Mt. Meru	76.8	14.1	4.7	4.4	23.2
Mt. Meru	84.3	7.0	4.0	4.0	23.9
Mt. Meru	51.9	28.4	11.3	8.3	21.9
Average	69.5	18.9	5.7	5.9	23.7
Average for all urban areas	74.6	15.2	4.8	5.1	25.3

Source: Census Vol. 2, op.cit., Table 119, pp 204-252.

Among the former townships the occupancy of single rooms by single person households is not as high as for the towns i.e. 69% compared to 80%. Variations among the former townships in the percentage of individuals occupying single rooms is partly a result of differing migration patterns and probably partly because of a persistence of local types of houses. A relatively high percentage occupy single rooms in those former townships which are still important for in-migration due to agricultural or administrative development. The first category is exemplified by Kimamba (87%), Korogwe (78%) and Kilosa (77%) while Shinyanga (85%), Songea (84%) and Singida (76%) are important administrative centres. In contrast a relatively low percentage of individuals live in single rooms at Chunya (49%), Nansio (50%) and Tukuyu (51%). As in the towns the number of single persons occupying one room are in the majority in all former townships; those occupying two, three or four or more rooms are relatively few. Only Lushoto and Pangani have more than 10% of single person households living in four or more rooms.

6.7 Eight and more person households

Eight and more person households represent the opposite of the spectrum of household size. To begin with, they constitute only a minority of households.

The only exception is Nansio where single person households make up 6% of the households while nine and more person households make up 26%!

An interesting pattern emerges for the two categories. If attention is first focused on the eight person households it will be noticed that generally single room occupancy is not common, only 13% and 10% of the households in towns and former townships respectively are crowded into single rooms (table 6.11). However, the range is wide and the extreme congestion in the towns occurs in poor regions (Dodoma with 23%), in areas of comparative affluence (Moshi 26%) and areas of development (Musoma 30%). In fact, in these three cases the large households in the category occupying one room exceed those who occupy four or more rooms. Above average figures are also found for the first four largest towns: Arusha (19%), Dar es Salaam (16%), Tanga (14%) and Mwanza (14%) but generally, the larger proportion of households of eight persons occupy four or more rooms. Nearly a third of all households in the towns occupy four or more rooms compared to 29% and 24% who dwell in two and three rooms respectively. In towns where development is not so conspicuous the number of households occupying four and more rooms is very high as reflected in Kigoma (63%), Lindi (54%), Bukoba (41%) and Tabora (41%).

Table 6.11 Households of eight and more persons by occupancy of rooms

	Eight persons				8+ person households % of total	Nine and more persons				9+ person households % of total
	Percentage occupying 1 Room	Percentage occupying 2 Rooms	Percentage occupying 3 Rooms	Percentage occupying 4 and more		Percentage occupying 1 Room	Percentage occupying 2 Rooms	Percentage occupying 3 Rooms	Percentage occupying 4 and more	
Towns:										
Arusha	18.9	25.3	25.1	20.6	8.6	8.5	22.5	28.4	40.6	4.9
Bukoba	9.0	21.9	27.9	41.2	2.2	5.4	12.9	25.7	56.1	6.0
Dar es Salaam	15.9	34.0	23.7	26.3	2.2	8.2	23.5	29.1	39.2	3.4
Dodoma	23.4	27.1	22.8	16.8	2.7	12.0	27.9	26.0	34.1	4.4
Geita	4.3	11.0	31.0	53.7	4.1	4.2	16.2	27.0	52.6	7.9
Kigoma/Ujiji	3.9	16.7	19.8	69.5	4.0	2.9	7.6	16.1	73.4	0.6
Lindi	6.7	11.9	25.9	55.5	3.9	2.2	6.5	19.4	71.9	5.4
Moshi	10.3	22.8	20.7	46.2	3.8	7.5	23.0	21.5	48.1	7.0
Musoma	9.8	25.4	27.4	37.4	2.2	4.8	21.4	24.0	49.8	4.3
Nansio	25.7	34.3	18.3	21.7	3.0	9.3	26.5	24.0	40.2	4.2
Tanga	3.2	18.3	42.9	35.7	2.1	2.1	14.8	28.6	54.5	3.2
Mwanza	25.0	31.9	18.4	19.9	3.7	11.6	31.0	29.3	28.1	7.4
Mtwara	14.0	34.8	22.6	28.7	2.8	11.3	22.4	22.4	44.0	8.8
Dukwa	6.9	20.3	4.3	41.5	3.3	4.2	21.9	21.9	51.1	5.3
Geita	14.4	31.1	25.9	28.7	2.0	5.9	25.5	29.3	40.3	3.7
Average	13.1	29.0	23.7	34.2	3.0	6.7	24.0	24.0	46.3	5.7
Former Townships:										
Daguerre	12.3	19.3	32.3	37.5	3.4	4.2	16.9	25.4	53.4	8.9
Chunya	11.1	5.6	58.9	24.4	3.5	6.0	19.6	20.9	53.5	8.3
Kilimo	14.4	28.6	35.7	21.4	3.9	6.2	7.7	23.1	63.1	9.1
Kilimo	9.8	29.3	22.0	39.0	3.3	1.7	28.6	19.6	50.0	4.6
Kilimo	5.6	22.2	22.2	50.0	3.1	9.1	22.7	18.2	50.0	3.7
Kilimo	3.1	23.1	23.1	50.7	4.1	0.0	17.6	30.8	51.6	7.1
Kilimo	8.2	26.5	25.5	40.3	2.1	7.8	20.6	22.9	48.7	5.7
Kilimo	19.2	11.5	11.5	57.8	1.8	5.1	22.6	24.1	48.2	7.5
Kilimo	0.0	25.0	25.0	50.0	3.9	2.4	17.1	22.0	58.5	0.6
Kilimo	2.7	30.7	30.7	35.6	3.9	10.3	36.5	38.6	14.6	3.0
Kilimo	0.0	25.7	25.7	48.6	6.7	2.9	38.2	11.7	47.1	3.4
Kilimo	8.0	20.0	20.0	52.0	4.1	4.1	8.8	10.2	76.9	25.6
Kilimo	10.0	31.8	31.8	26.4	2.5	0.0	22.2	40.7	37.0	3.1
Kilimo	10.0	25.0	25.0	40.0	2.5	1.1	21.4	18.6	59.9	6.8
Kilimo	20.0	23.3	23.3	33.3	3.4	2.5	17.6	22.7	57.1	4.5
Kilimo	15.6	27.3	27.3	29.8	3.3	8.3	17.8	20.7	53.2	6.1
Kilimo	7.1	40.5	40.5	11.9	4.4	6.3	27.8	21.6	44.3	8.3
Average	10.0	27.2	27.2	35.6	3.7	5.7	25.1	25.1	44.1	7.4
Average for all urban areas	11.0	28.4	25.6	34.9	3.4	5.6	24.1	24.1	46.2	6.5

In general there is not much difference in the occupancy of rooms by eight person households between the towns and former townships. Only a small number

(11%) dwell in single rooms and over a third of the households in this category occupy four and more rooms. However, there is considerable variation among the former townships. Thus, while no households dwell in single rooms in Mpwapwa and Nachingwea the proportion in Singida, Lushoto and Kahama/Songea is 20%, 19% and 14% respectively. Mwadui and Korogwe, functioning more as company towns, have the majority of households dwelling in two roomed structures. Kahama and Tukuyu probably have a higher proportion of traditional housing and three-room occupancy is the pattern for 35% and 40% of the households respectively. In the majority of the former townships eight person households tend to occupy four or more rooms but nowhere is the percentage as high as for the town of Kigoma/Ujiji (64%).

There are almost twice as many households with nine and more persons than there are of eight persons. In comparison with eight person households two major differences are found in the occupancy pattern. First, single-room occupancy is about half of that found among the eight person households. Secondly, the majority both in towns and former townships occupy four and more rooms. In Kigoma/Ujiji, Lindi and Nansio nearly three quarters of the households occupy more than four rooms, but the proportion of occupants is low at Mwadui (24%), Musoma (33%), Dodoma (36%) and Dar es Salaam (39%).

6.8 Density of the occupancy of rooms

The density of the occupancy of rooms is defined as the number of people per room. This has been calculated for each of the four categories of occupancy differentiated in the published census groupings. It is worth recording two shortcomings in the data. First, while the category of "number of rooms" represents absolute figures for one, two and three rooms, the last grouping represents an average number of rooms and one can generally assume that 'four' rooms means 'five' rooms. The justification for this is that in Dar-es-Salaam, Tanga, the other coastal towns as well as in some of the inland towns six-roomed houses are more prevalent than four-roomed houses. Secondly, while the number of people in each category, from one to eight person households represent absolute values, the last category of nine person households is an accumulated category. However, the 'nine' person households constitute only a small fraction (less than 6% see table 6.11) of the total urban household population. Within these two constraints it is possible to calculate the density of occupancy in the urban areas. Obviously, calculations for one, two and three roomed occupancy will be more reliable than those for 'four' roomed occupancy.

The average density (i.e. calculated by adding occupancy of all categories of households and dividing by the total number of rooms available) of 1.8 person per room is generally high for all the urban areas. An overall density of two persons and over is found at Musoma (2.3), Dodoma (2.1), Arusha (2.0) Mbeya (2.0) and Mwadui (2.0), while the lowest densities occur at Lindi (1.2) and Pangani (1.2). The difference in densities between towns (1.8) and former townships (1.7) is not very great (see table 6.12).

The density of persons per room without exception is highest in households occupying single rooms. On an average, single rooms have more than two persons and this average applies to the towns as well as the former townships.

Table 6.12 Persons per room

	Persons per room in households with				Average ratio
	1 Room	2 Rooms	3 Rooms	4 & More	
Towns:					
Arusha	2.6	2.2	1.7	1.2	2.3
Bakoba	2.1	1.7	1.6	1.1	1.6
Tour de Salama	2.3	2.1	1.7	1.1	1.9
Dodoma	2.5	2.2	1.9	1.2	2.1
Iringa	2.4	2.1	1.6	1.4	1.8
Kig/Ujiji	2.2	1.9	1.5	1.0	1.3
Idindi	2.0	1.7	1.3	1.0	1.2
Mbeja	2.6	1.3	1.8	1.3	2.0
Morogoro	2.3	2.0	1.6	1.3	1.8
Moshi	2.6	2.1	1.8	1.1	2.0
Mtwara/Mik	2.1	1.7	1.5	1.0	1.3
Musoma	2.9	2.5	1.9	1.3	2.3
Mwanza	2.4	2.2	1.7	1.1	1.8
Tabora	2.1	1.9	1.6	1.1	1.5
Tanga	2.2	2.1	1.8	1.2	1.6
Average	2.3	2.0	1.7	1.2	1.8
Former Townships:					
Bugando	2.4	2.0	1.7	1.2	1.4
Changa	2.4	1.9	1.5	1.1	1.3
Kahem	2.8	1.9	1.6	1.3	1.7
Kilosa	2.2	1.9	1.7	1.1	1.7
Kimamba	1.9	1.9	1.8	1.2	1.7
Kondoa	2.4	1.9	1.7	1.2	1.7
Korogwe	2.3	2.0	1.7	1.2	1.8
Lushoto	2.9	2.5	2.2	1.1	1.9
Mtwapa	2.4	2.2	1.7	1.3	1.8
Moshi	2.6	2.1	1.6	1.6	2.0
Nachingwea	1.6	1.2	1.2	1.0	1.2
Nusio	1.5	1.2	2.0	1.5	1.7
Pungwi	2.0	1.6	1.4	0.7	1.2
Shinyanga	2.1	1.9	1.7	0.9	1.7
Singida	2.4	2.0	1.5	1.2	1.8
Songea	2.6	2.1	1.8	1.2	1.9
Tukuyu	2.7	2.0	1.6	1.1	1.7
Average	2.4	2.0	1.7	1.2	1.7
Average for all urban areas	2.4	2.0	1.7	1.2	1.7

Source: Census Vol. 2 op.cit. Table 119, pp.204-230

Moshi with 3.5 has the highest density of persons occupying single rooms. Other towns and former townships notable for high densities are Lushoto 2.9 persons, Musoma 2.9, Tukuyu 2.7, Songea 2.6, Arusha 2.6 and Moshi 2.6. Kimamba with an occupancy of 1.9 persons per room has the lowest density.

Overall, the density of two-room occupancy is lower than single-room occupancy and there is a significant decline in the density for the former townships in contrast with the towns. Most of the towns still have two or more persons per room compared to more than one in the former townships. Among the towns Bakoba, Idindi and Mtwara/Mikindani are the least crowded with 1.7 persons per room, while Musoma with 2.5 persons is crowded. Similarly Lushoto with 2.5 persons also has a high density.

Density per persons occupying three rooms is generally lower than for one or two room occupancy. Generally none of the urban areas have a density exceeding two. The only exception is Lushoto where the density of three-room occupancy is 2.2 persons.

Generally densities are lower in households with 'four' rooms than in any of the other categories. However, with a few exceptions densities are seldom

less than one person (exceptions include Pangani and Shinyanga with 0.7 and 0.9 person per room respectively). Mwanua with 1.6 persons and Iringa with 1.4 persons have the highest densities in this category.

6.9 Conclusion

Despite the limitations in the data on housing collected during the census, some important features are revealed. First, contrary to popular beliefs, the quality of life in urban areas in Tanzania is far from satisfactory or desirable. Second, the picture one gets is that the people in the households are crowded and the quality of amenities available to them range from poor to appalling. Third, if provision of amenities is already proving a strain then very careful planning, and in some sectors a change in planning, is necessary if the maximum is to be obtained from investment or if improvements are to benefit the maximum number of people. Finally, if the popular myth of superior conditions in urban areas is to be dispelled, there is need for a study to demonstrate the disparity of conditions between the urban areas and the rural areas.

7 LITERACY AND EDUCATION

by Ajoy K. Dey and Norman Mogil

7.0 Introduction

Of paramount importance to the development effort in any country is to raise the level of functional literacy as rapidly as possible. Historically, this view is supported by the experience of western Europe during the earlier part of the nineteenth century when growing literacy rates were associated with rapid modernization of agriculture and overall industrialization. Advance in literacy and advance in economic development are considered to be inter-dependent and reinforce one another. Undeniably, efforts to organize local planning and to foster the growth of cooperative movements are critically dependent on the extent to which functional literacy is diffused through all sectors of rural and urban life. Literacy is the pre-requisite for developing skills and, more importantly, to the adoption of rational attitudes in the face of modern technology and government administration. The complex changes in agriculture and industry are supported by a high degree of literacy, since all changes in society that are accomplished by education are related to gains in literacy.

7.1 Definition of literacy

The Census adopted the UNESCO definition of literacy, defining a literate person as one 'who can with understanding both read and write a short simple statement on his everyday life in any language' (1). Accordingly, all persons were to be divided into two groups: persons who can read and write and persons who can not read and write. The latter group contained all persons who can neither read nor write, those who can only write, and those who can read and write figures and their name only.

The definition of literacy used is vague and thus includes persons with only a modicum of reading and writing ability as literate. In the absence of a specific literacy test applied at the time of enumeration, literacy results can be misleading. Even when a criterion of literacy is adopted, one has no assurance that the census enumerators have correctly understood and interpreted it; they first accept the word of the interviewee. As a result, the reliability of the literacy data could vary from region to region in any one census and could also vary from census to census. The problems in measuring literacy were made clear in an attempt to evaluate the census data on literacy through a literacy test added to a nationwide household budget survey. In this survey the quality of returns was so poor that the survey data were virtually of no use.

(1) Manual of Educational Statistics, UNESCO, Paris, 1961, p. 40.

This factor - the lack of a specific literacy test - suggests that literacy rates as presented in the census are inflated. For some there is reluctance to admit to illiteracy and that would put an upward bias in the returns; for others, literacy is a status symbol and a person may proclaim his literacy unjustifiably. Additional errors may arise from the general census enumeration of population size and distribution by age and sex etc. - all of which determine the denominator of various literacy rates and can be prone to a considerable margin of error.

The correlation between literacy and school attendance can provide some insight into the reliability of the literacy data. In the absence of a literacy test at the time of enumeration, almost everyone who has received an education of any duration would claim literacy. This hypothesis is borne out by the data presented in Table 7.1 which shows a remarkably high correlation between literacy and education.

Table 7.1 Regional population 10 years and over by literacy and by school attendance

Region	Literate (per cent)	Attending or have attended school (per cent)
Dar es Salaam	60	58
Kilimanjaro	56	57
Rorua	41	42
Tanga	40	41
West Lake	40	42
Zanzibar	39	31
Morogoro	37	36
Mara	35	36
Iringa	31	31
Mtwa	29	31
Mtara	28	26
Singida	27	30
Tabora	27	27
Arusha	26	26
Coast	26	25
Mwasa	25	26
Dodoma	24	24
Kigoma	19	19
Shinyanga	16	17

The essence of the data concerning the present level and structure of literacy in Tanzania are presented in Tables 7.2 to 7.5. Although these figures must be interpreted with care, bearing in mind the above stated reservations on the quality of the data, several clear patterns do emerge.

7.2 Distribution of population by literacy

Literacy rates for Tanzania Mainland and Zanzibar, among the population aged 10 and over, are given in Table 7.2. While only 31% are literate in the Mainland, 39% are literate in Zanzibar. As expected, for the Mainland, the urban areas have a relatively high literacy rate (61%) compared to the rural areas (29%).

Table 7.2 Distribution of population 10 years and over by literacy

Area	Literate (%)	Illiterate (%)	Total
Mainland Total	31	69	100
Mainland Urban	61	39	100
Mainland Rural	29	71	100
Zanzibar Total	39	61	100

Throughout the census data Zanzibar has higher literacy rates than the Mainland. Aside from the reservations stated in section 7.1, this difference could be explained by the fact that the island is relatively small and literacy and educational programme, would be relatively easier to administer than on the Mainland. Another possible explanation is the more widespread Koranic Schools.

7.3 Literacy by sex and age

The number of literates per 100 population by age and sex is presented in Table 7.3 for the Mainland and Zanzibar. A few general observations seem pertinent and useful. The general fall of the figures reveal how the level of literacy has advanced exclusively through the medium of formal education. Literacy decreases, almost uniformly, from 49 per 100 population in the age groups of 10-14 to 8 per 100 in the age group 65 and over. The one irregularity, males age group 15-20, may be explained by late entry into school or misstatement of age. The sharp decline for the female age groups reflects the bias against both formal and informal education for females. The bias is quite substantial since female literacy never exceeds 47% in the Mainland, whereas the four youngest male age groups have 49% or more literate. The sex differential is equal for both the Mainland and Zanzibar. As stated earlier, Zanzibar has higher literacy rates than the Mainland; however, the very high rates in age groups 45-54, 55-64 and 65+, a priori suggests that adult education has had outstanding success on the island. However, there is no evidence that adult education programmes were successfully operating prior to 1967; and Zanzibar data should be viewed with caution.

Table 7.3 Per cent literate per sex and age group, Tanzania Mainland and Zanzibar

Age	Mainland			Zanzibar		
	Male	Female	Total	Male	Female	Total
10-14	56	43	49	70	65	67
15-19	62	35	48	74	47	60
20-24	57	23	37	63	28	45
25-34	49	14	30	52	17	33
35-44	39	8	24	50	12	32
45-54	29	4	17	49	9	31
55-64	24	2	13	46	6	29
65+	14	1	8	37	3	25
10 & above	45	19	31	55	23	39

7.4 Urban Rural differentials in literacy

Rural literacy rates by sex and age conform very closely with comparable rates for the total population. Again, the steeply declining rates reveal the advantages the younger generation have in acquiring literacy. Urban males are a select group with 74% literate; at the other end of the scale rural females barely exceed 17% literate.

Table 7.4 Per cent literate per sex and age group, Mainland Rural and Urban

Age group	R U R A L			U R B A N		
	Male	Female	Total	Male	Female	Total
10-14	55	41	48	83	76	79
15-19	61	34	47	84	64	75
20-24	54	21	34	83	50	67
25-34	47	12	28	76	37	59
35-44	37	7	22	68	30	54
45-54	28	4	16	58	19	43
55-64	23	2	13	51	13	36
65+	14	1	8	33	5	20
10 & above	43	17	29	74	45	61

7.5 Literacy at regional levels

The variation in literacy rates in the regions, presented in Table 7.5 may be explained by a combination of factors. The ranking of literacy rates corresponds closely to ranking by economic level (e.g. G.D.P. per head). The difference in literacy rates prevailing in regions such as Kilimanjaro (56%) and Shinyanga (16%) also reflect the unequal earlier impact of missionary work; this is especially true in the Kilimanjaro areas where a long tradition of missionary education has produced very high literacy rates. The sex differential diminishes as total literacy rates increase suggesting that as illiteracy falls females make relatively greater advances than males.

Table 7.5 Mainland regions, per cent literate by sex among population 10 years and over

Region	Per cent literate			G.D.P. per capita (Shs.)
	Males	Females	Total	
Dar es Salaam	73	43	60	4,152
Kilimanjaro	67	47	56	660
Duvuma	58	28	41	262
Panga	55	24	40	657
West Lake	55	27	40	354
Morogoro	49	24	37	452
Mara	54	19	35	345
Iringa	46	18	31	347
Mbeys	45	15	29	279
Mtwara	41	16	28	299
Shigida	40	16	27	227
Tabora	39	15	27	304
Arusha	36	16	26	534
Coast	41	10	26	427
Mwanza	38	13	25	406
Dodoma	34	14	24	278
Njombe	32	9	19	267
Shinyanga	25	6	16	422

Note: Data for the last column has been taken from District Data 1967, Ministry of Economic Affairs and Development Planning, Dar es-Salaam, 1968. No such data are available for Zanzibar.

7.6 Education and functional literacy

Although a person may have a minimum ability to read and write, he may not have sufficient ease with the language to put it to practical use. Hence, the notion of 'functional literacy' is often introduced into discussions concerning literacy and education. It is a difficult concept to define. The definition usually conveys the idea that one is a functional literate

if one has the ability to read and write sufficiently for one's own practical needs; however, this again is too imprecise a definition to have any operational use. In addition to the concept of 'verbal literacy', vital for economic development, is the concept of 'arithmetic literacy'. Facility with numbers is essential to rationally organized agriculture, commercial enterprise and local level economic planning. That this ability is ignored in any census analysis is a serious deficiency.

Because of deficiencies in statistically measuring the extent of functional literacy as defined, census enumerators assume that a specific minimum of formal education produces functional literacy. UNESCO defines functional literacy as being 'normally reached at the end of four or more years of schooling' (2). This indirect method of measuring functional literacy has severe limitations. Given that the quality of primary education is low in developing countries it may take more than four years of primary education to achieve functional literacy. Continual dropping out of school from one grade to another radically affects the rates of functional literacy as measured by educational attendance. Moreover, the quality of educational instruction varies from region to region in the country. Also, measuring functional literacy by the number of years of attendance is deficient because school attendance is highly irregular.

These reservations are stated in order to suggest that statistics on educational attainment should not be unquestionably used to determine the level and demographic characteristics of functional literacy in Tanzania. The following statistical analysis on educational attainment will, if anything over-estimate the actual level of functional literacy. Nevertheless, the analysis will provide an insight into the demographic nature of functional literacy in the country.

7.7 School attendance

The population has been categorised into the following three classes according to school attendance in Table 7.6. For the Mainland, 9% are attending school, 22% have attended and 69% have never attended school.

Table 7.6 Percentage distribution of population according to school attendance, by age group

Area	Age group	Attending school	Having attended school	Never attended school	Total
Tanzania Mainland	5-9	13	1	86	100
	10-14	41	10	49	100
	15-19	18	31	51	100
	20-24	2	34	64	100
	25+	0	21	79	100
	5 and over	9	22	69	100
Zanzibar	5-9	28	1	71	100
	10-14	62	4	34	100
	15-19	33	22	45	100
	20-24	4	31	65	100
	25+	0	20	80	100
	5 and over	11	20	69	100

(2) World Illiteracy at Mid-Century, UNESCO, Paris 1967, p. 57.

The above figures indicate that of those born prior to 1942 only 21% had the privilege of attending school. In the course of 25 years the situation has undergone radical changes with 54% of the population born after 1952 either attending or have attended schools. This achievement is found to be comparatively better in Zanzibar than in the Mainland.

Some comparable figures for the neighbouring countries on the population aged 15 and over with no schooling (or with less than one year) are given below. The comparison cannot be very precise but it may give some idea of Tanzania's relative position in respect to the neighbouring countries. The Tanzania 1967 figures compare favourably with those of Kenya in 1962, the percentage of males with no schooling being found to be slightly lower and that of females slightly higher in Tanzania.

Table 7.7 Percent population 15 years and over with no schooling, by sex, in selected African countries

Country	Year	Percentage	
		Males	Females
Tanzania	1967	59	85
Kenya	1962	60	83
Uganda	1959	63	86
Ghana	1960	70	89
Sudan	1954	73	97

7.8 Level of education attained

Assuming that Table 7.8, in spite of the weakness of the data, gives a general picture of the situation, a few conclusions on overall educational attainment can be safely made. First, the position of females is decidedly worse than that of males; only 6% of the females have had primary education (5-8 years), compared to 14% for males. Second, the level of education is much higher in the cities; over 34% of the urban population has at least primary schooling, whereas, less than 10% have in the rural areas. Third, those with no education comprise the majority of the franchised population, moreover, those with less than full primary education comprise almost 90% of the population, most of whom are illiterate. Lastly, of those who are educated, the ratio of those who have had higher education (15 years and over) to those with secondary education is exceedingly small; about one in 25 has received some tertiary level education. The educational attainment of the population is mainly a result of the past performance of the educational system and the general colonial attitude towards education for the indigenous population.

Table 7.8 Percentage distribution of citizens aged 10 or over by sex and education, Tanzania Mainland

Years at School	RURAL			URBAN			TOTAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
None	58	61	59	29	58	42	57	80	68
1-4	29	14	21	26	19	24	29	14	21
5-8	11	4	7	30	17	24	11	4	8
9-14	2	1	2	11	5	9	2	2	2
15+	0	0	0	2	1	1	1	0	1
Total	100	100	100	100	100	100	100	100	100

If the analysis is limited to the economically active population it appears that in general those with the highest educational attainment are

in non-agricultural occupations. Further the sex differential is inversely related to the general level of educational attainment and this is highest in the agricultural population and lowest among relatively well-educated non-agricultural classes.

Table 7.9 Percentage distribution of economically active population by sex and education, Mainland

Years of schooling	Agriculture		Non-agriculture	
	Males	Females	Males	Females
None	69	89	25	38
1-4	24	10	29	17
5-8	6	1	30	30
9-14	0	0	14	11
15+	0	0	2	4
Total	100	100	100	100

7.9 Progress in primary education

Table 7.10 presents the recorded number of primary school students by sex in 1957 and 1967 along with corresponding figures from the Ministry of National Education. The average annual rate of growth in number of school children well exceeds the recorded growth rate of 3% for the total population, indicating the advances in providing universal primary schooling - a goal, however, set for 1989. The progress of female education is very impressive but still not enough to achieve a balanced sex ratio among the school children.

Table 7.10 Number of primary school students in 1957 and 1967, Tanzania Mainland

Source	Sex	Year		Average annual growth %
		1957 (1000)	1967 (1000)	
Census	Male	272.0	564.5	7.5
	Female	159.0	363.0	8.6
	Total	431.0	927.5	8.0
Ministry of National Education	Male	270.5	507.8	6.6
	Female	120.6	315.3	10.0
	Total	391.1	823.0	7.8

An evaluation of census data is necessary primarily for providing users of census statistics with an idea of the accuracy of the data and for improving the methodology in future censuses. In the case of education, the comparison with figures produced independently by the Ministry of National Education brings to light some methodological problems in the sampling procedure. Comparison of the two sets of data has not been made beyond the regional levels in view of the larger sampling error at the district level.

In the discussion, it will be assumed that the ministerial figures of student enrollment are more reliable, giving a reference point for estimates of over- and underreporting in the census respectively. This does not imply a complete faith in the former, which may suffer from defici-

encies in the recording or reporting from the local level. Table 7.11 presents the number of students attending primary schools by sex at the national and regional levels.

At the national level the census figure is found to be 13% higher than that of the figure compiled by the Ministry of Education. The figure for males is found to be over-reported by 11% and that for females by 16%. However, it must be noted that the data of the Ministry of Education do not include the students attending Koranic religious type schools.

Table 7.11. Primary school attendance by sex, as from the census and from the Ministry of Education, Tanzania Mainland ('000)

Region	Males			Females			Total		
	Census	Min.Ed.	Diff.% *	Census	Min.Ed.	Diff.% *	Census	Min.Ed.	Diff.% *
1. Arusha	23.8	24.1	-1.1	14.9	15.1	-1.4	38.7	39.2	-1.3
2. Coast (incl.DSW)	38.3	30.1	27.3	21.5	19.7	9.2	59.8	49.8	20.2
3. Dodoma	28.2	25.5	20.1	19.5	14.6	32.4	47.7	40.1	24.8
4. Iringa	34.0	35.2	-3.2	22.9	20.7	10.7	56.9	55.9	1.9
5. Kilimanjaro	17.1	16.2	5.7	9.9	8.2	8.1	26.9	24.4	6.5
6. Kilimanjaro	52.4	46.6	13.1	44.0	37.5	17.2	96.4	84.1	14.3
7. Mara	37.4	27.1	37.8	18.5	13.4	38.2	55.9	40.5	37.9
8. Mbeya	30.4	36.9	-26.3	20.6	22.2	-8.6	51.0	59.1	-35.8
9. Morogoro	35.1	27.2	21.6	25.0	18.1	31.5	60.1	45.3	29.5
10. Mtwara	41.1	40.9	.4	25.6	25.5	-.5	66.7	66.4	-.5
11. Mwanza	42.6	41.5	2.6	23.0	21.9	5.3	65.6	63.4	3.5
12. Ruvuma	19.3	19.2	.8	15.1	14.0	7.8	34.4	33.2	3.7
13. Shinyanga	25.6	25.2	1.7	12.9	11.7	9.2	38.5	36.9	4.1
14. Singida	21.3	20.6	3.5	14.5	13.0	10.9	35.8	33.6	6.4
15. Tabora	20.1	19.3	4.5	13.7	11.5	19.0	33.8	30.8	10.0
16. Tanga	59.7	57.8	4.9	34.5	29.9	17.0	94.2	87.7	7.5
17. West Lake	59.0	36.5	61.5	35.0	26.3	27.9	94.0	62.8	34.4
18. All regions	564.5	507.8	11.2	365.0	315.0	15.8	929.5	822.8	12.5

* The difference is expressed as per cent of Ministry of Education figures.

Wide variations are observed between the two sets of figures over the regions with Mtwara showing 1% underreporting and Mara 38% overreporting. The reporting in 5 regions, namely Arusha, Iringa, Mtwara, Ruvuma and Shinyanga is found to be within the 5% limit and 4 other regions have overreporting of between 5-10%. In Coast (including Dar es Salaam), Dodoma, Mara, Mbeya and Morogoro the divergence is found to be more than 20% with Mara showing the highest figures. In the case of Kilimanjaro and West Lake the divergence is found to be 15% and 17% respectively. The reporting appears to be comparatively better in educationally backward regions, which is rather surprising.

The census figures for males at the regional level is found to be comparatively closer than those for females. In 9 regions the divergence between the census and school enrollment figures for males is found to be less than 5% while in the case of females only one region shows divergence of less than 5%. Without the knowledge of the extent of sampling variation at the regional level, no conclusion can be drawn about the relative accuracy of the different regions.

Table 7.12 presents the comparative figures of the census and the Ministry of Education on the number of students attending secondary schools for

different regions of the Mainland. The census figure, as is seen from this table, overstates the number of students attending secondary schools by 40.8% at the national level. For males the overstatement is seen to be 42.5% and for females 35.8%. As in the case of primary schools, wide difference is seen between the census and school enrolment figures at the regional level. This is not unexpected in view of the deployment of secondary school students in the census enumeration work from one Region to another. The wide divergence observed in the case of Singida can partly be accounted for by this.

Table 7.12 Secondary school attendance by sex as from the census and from the Ministry of Education, Tanzania Mainland (1966)

Region	Males			Females			Total		
	Census	Min. Ed.	Diff. % *	Census	Min. Ed.	Diff. % *	Census	Min. Ed.	Diff. % *
Arusha	2.5	.8	192.8	.6	.2	182.1	3.0	1.0	190.8
Coast (incl. SSM)	6.5	4.5	50.6	2.9	2.1	27.7	9.3	6.6	40.3
Dodoma	1.3	1.4	- 8.5	.5	.4	6.1	1.8	1.8	- 5.1
Iringa	2.2	2.0	9.2	.3	.07	262.0	2.4	2.1	17.9
Singida	.9	.3	167.4	.07	-	-	1.0	.4	187.0
Kilimanjaro	4.6	2.6	77.2	1.7	1.3	36.2	6.3	3.9	63.6
Mara	1.7	.8	113.8	.3	.05	747.1	2.0	.8	141.9
Mbeya	1.8	1.2	51.5	.5	.4	24.8	2.3	1.6	44.7
Morogoro	1.6	1.1	45.7	.4	.5	-16.5	2.0	1.6	26.3
Mtwara	.8	1.0	-11.7	.9	.6	42.1	1.8	.6	7.9
Nwanza	2.0	1.8	12.5	.7	.9	-27.4	2.6	2.7	- 1.3
Savanna	.5	.8	-35.5	.2	-	-	.7	.8	-11.9
Sikinyanga	1.3	.5	169.8	.2	.05	626.7	1.4	.5	196.6
Singida	.3	.04	759.5	.1	-	-	.4	.04	1075.6
Tabora	1.2	1.3	- 8.2	.4	.5	-20.0	1.6	1.8	-12.0
Tanga	2.0	1.9	5.6	.7	.7	- 1.6	2.7	2.7	- 2.1
West Lake	2.2	.6	59.7	.4	.3	153.4	2.6	1.8	55.5
All regions	35.5	25.5	42.5	10.9	8.1	35.8	44.4	31.5	40.8

* See footnote, Table 7.11

Comparisons of the number of males in the lower and upper primary schools have been made in Table 7.13 to see the extent of divergence in the two cases. The divergence is found to be 9% in the lower primary (Standard I to IV) and 20% in the upper primary (V TO VII) at the national level. Wide variation in reporting is observed over the regions; Iringa shows 7% underreporting while Mara, overreports by 33% in the lower primary. In the case of upper primary variation is more marked with Arusha showing 17% underreporting and Mbeya 90% overreporting. The difference of as high as 90% in Mbeya could not be explained by sampling error and it suggests that closer scrutiny of the basic material is needed.

Table 7.14 shows the divergence between the census and school records of the female students in lower and upper primary schools in different regions. Female students are found to be overreported by 13.6% in the lower primary and by 25.6% in the upper primary in the census. Thus compared to the males, the education standard of the females is seen to be more overstated. In Mtwara the education level of females was understated by 0.5% in the lower primary and 20.3% in the upper primary. As in the case of males the variation over the regions in respect of lower primary is found to be less than that of the upper primary. The discrepancy between the census figures and school records for the regions of West Lake and Tabora is very marked and suggests deeper probing.

Table 7.13 Male primary school attendance by educational level as from the census and from the Ministry of Education, Tanzania Mainland ('000)

Region	Standards I - IV			Standards V - VIII		
	Census	Min. Ed.	Diff. %	Census	Min. Ed.	Diff. %
1 Arusha	13.3	10.0	3.6	4.6	5.5	-6.9
2 Coast (incl. DDM)	24.5	20.8	17.3	13.0	9.3	46.6
3 Dodoma	21.0	17.4	20.5	7.3	6.0	16.6
4 Iringa	27.8	29.0	-7.0	7.0	6.1	14.0
5 Kilimanjaro	12.3	12.9	- .1	4.2	3.2	20.6
6 Kilimanjaro	36.5	36.4	20.1	16.2	16.2	- .1
7 Mara	27.3	20.6	32.8	10.1	6.6	53.5
8 Mbeya	36.3	29.4	25.3	14.5	7.5	90.3
9 Morogoro	25.0	20.3	23.5	8.1	6.9	16.0
10 Mtwara	32.6	32.5	.4	8.5	8.4	.6
11 Mwanza	30.0	31.9	-6.0	12.6	9.6	31.2
12 Njombe	15.3	14.5	5.2	4.1	4.7	-5.1
13 Shinyanga	18.9	19.0	- .4	6.7	6.2	8.2
14 Singida	15.3	14.7	3.9	6.2	5.8	5.2
15 Tabora	15.6	15.0	3.9	4.6	4.3	5.8
16 Tanga	30.2	29.4	2.7	9.5	8.4	12.7
17 West Lake	29.7	26.2	5.2	9.9	6.5	19.5
18 All regions	417.2	364.7	6.5	147.3	123.1	19.6

* See footnote, Table 7.11

Table 7.14 Female primary school attendance by educational level as from the census and from the Ministry of Education, Tanzania Mainland ('000)

Region	Standard I - IV			Standard V - VIII		
	Census	Min.Ed.	Diff. %	Census	Min.Ed.	Diff. %
1 Arusha	12.1	11.1	9.0	2.8	2.0	37.7
2 Coast (incl. DDM)	16.0	14.4	11.2	5.5	5.3	8.9
3 Dodoma	15.3	12.0	27.7	4.0	2.6	54.2
4 Iringa	19.7	17.9	9.9	3.2	2.9	16.1
5 Kilimanjaro	7.5	7.1	5.6	1.3	1.1	24.5
6 Kilimanjaro	32.9	27.0	21.8	11.1	10.5	5.3
7 Mara	15.7	11.2	39.9	2.8	2.2	27.7
8 Mbeya	25.9	19.1	25.3	4.7	3.2	48.5
9 Morogoro	18.5	14.7	25.5	5.3	3.3	58.0
10 Mtwara	22.4	22.5	- .5	3.2	4.0	-19.7
11 Mwanza	18.2	17.9	3.2	4.8	4.4	10.7
12 Njombe	12.9	11.7	9.6	2.4	2.3	4.0
13 Shinyanga	10.6	10.0	6.1	2.3	1.6	25.8
14 Singida	11.5	10.2	12.8	2.8	2.7	3.9
15 Tabora	10.2	9.8	4.4	3.5	1.8	100.5
16 Tanga	20.1	18.8	6.7	4.4	4.1	8.1
17 West Lake	25.0	22.5	11.9	8.7	4.0	17.2
18 All regions	292.1	257.3	13.6	72.0	50.0	25.6

* See footnote, Table 7.11

The discrepancies between 'enrollment', as indicated by Government figures, and 'school attendance', as indicated by the census can be traced to a few basic factors. Generally parents have a tendency to report their children as attending school when in fact this is not true; this has been found to be the case in many countries. Moreover, students may have been or are attending school very irregularly and the parent considers this to be 'school attendance'. On a regional basis, the school attendance may vary considerably since children are obliged to help their family during seeding or harvesting periods. Also, there may have been some confusion between 'attending' and 'having attended' such that the enumerators may have classified former students as 'now attending'.

Although we believe that the census data on school attendance is generally overestimated - the Ministry of National Education's enrollment data are better estimates - it is still useful to analyse school attendance rates by sex and age. We define the attendance rate as the number of children attending school in the ages 7-14 as a percentage of the total number of children age 7-14. Although there are students less than 7 years and more than 15 attending primary school the bulk of the school population falls within the age 7-14 category. Given that the attendance rates are not perfectly equivalent to enrollment rates, they do, however, serve as a close approximation and the relative magnitude provides some insight into the extent of primary education in Tanzania.

Table 7.5 Population age 7-14, per cent attending school

	Males	Females	Total
Mainland Total	57	26	31
Mainland Rural	54	25	30
Mainland Urban	61	54	57
Zanzibar	55	48	52

From Table 7.15 it is obvious that urban rates are higher than rural; rural rates are only about 60% of urban rates. In both rural and urban areas, male rates are substantially higher; however, the sex differential does diminish with urbanization. Although the starting age for primary school is 7, peak attendance is usually reached later around the ages of 10-12 years; because of higher drop out rates the girls do not increase their attendance rates as much as the boys do.

7.10 The educational pyramid

The visualization of the educational pyramid will help to give a broad picture of educational problems in Tanzania. One way to represent the pyramid is to examine the proportion of age cohorts classified as attending school at the time of the census. These results are presented in Table 7.16 and Fig. 7.1.

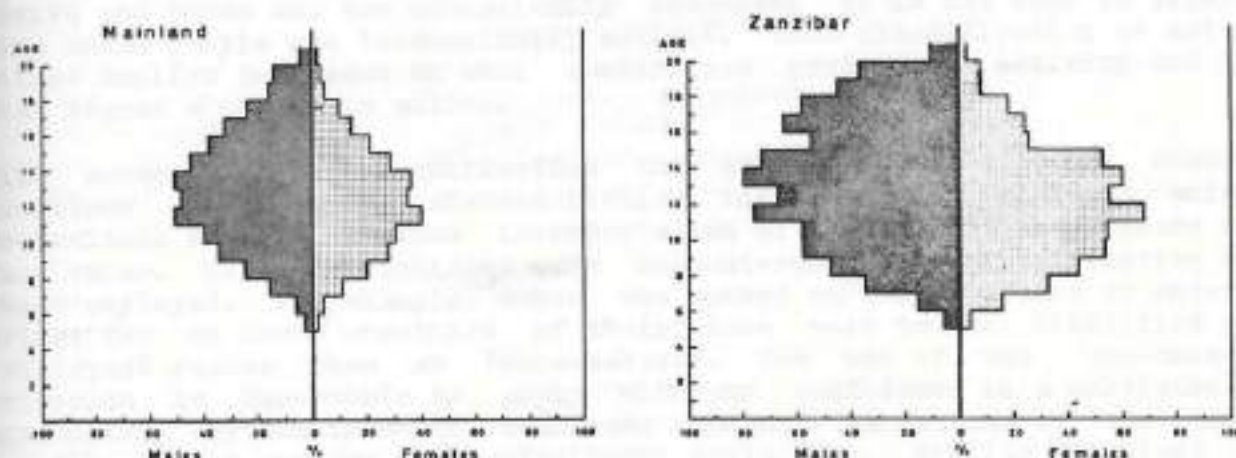


Figure 7.1 Percentage of age groups attending school

Table 7.16 Percentage of age groups attending school

Age	Malawi		Zambia	
	Male	Female	Male	Female
5	3.0	1.3	5.4	4.6
6	6.6	4.9	15.8	15.3
7	16.2	11.4	34.8	35.0
8	25.3	19.4	48.0	44.5
9	34.3	27.6	57.2	53.2
10	40.3	31.4	57.9	54.6
11	50.9	39.7	76.2	68.1
12	48.8	35.7	68.8	54.5
13	51.1	36.4	80.0	69.1
14	45.0	28.1	73.4	58.1
15	38.5	21.3	54.7	25.1
16	33.0	14.0	44.0	24.6
17	25.5	9.8	37.8	18.1
18	16.0	4.0	45.1	7.9
19	14.2	2.9	37.1	8.1
20-24	5.2	0.3	11.1	2.0
25+	0.1	0.0	0.8	1.8

The 'educational pyramid' is onion-shaped because not all children begin primary school at the same age. Peak enrolment, instead of occurring at age 7, occurs at age 11-12 for both boys and girls. In contrast, a developed nation will have a pyramid with a very broad base. Over 99% of children will be attending primary school, since compulsory primary education is widespread in the more economically advanced nations. Moreover, in the developed countries the tapering off of the pyramid past the primary school leaving age of 15-16 years is more gradual.

In Tanzania, the very small percentage of children over 15 years attending school is indicative of the relatively small percentage of primary school graduates who go on to secondary school. Overall, the sex inequality is apparent and is especially wide in the age group 15-25. As Tanzania moves towards the goal of universal primary entrance in 1989, the base of the pyramid will broaden.

ECONOMIC CHARACTERISTICS

by Ajoy K. Dey and Norman Mogil

8.0 Introduction

Every nation requires statistics about the distribution of economic activities of its population. Basic data on the size and composition of the working and non-working sections of the population illustrate the social and economic conditions prevailing at the time. The economic characteristics as revealed by the census should provide an adequate base for economic planning in several areas. First, the census should uncover the nature and extent of employment and unemployment for the formulation of employment policies. Second, manpower planning requires a detailed inventory of those employed by industry and occupation. And, third, the census can be used for the calculation of certain aspects of the national income accounts.

As with every census there are several conceptual problems and non-sampling errors which may impair the usefulness of many of the statistical results. Since the Tanzanian census is prone to these very difficulties, the first section of this chapter will be devoted to the problem of the quality of the data in order to prepare the reader when he is confronted with the actual data in subsequent sections of the chapter.

8.1 Quality of data

A major source of difficulty in conducting a census lies in the many arbitrary decisions that are made regarding economic characteristics. To start with, the arbitrary element enters into the analysis when a decision must be made to classify the population into those who are economically active and those who are economically inactive. It is not easy to determine which people are 'economically active'. Such classification of activities implies judgement on what constitutes productive activity and to what degree a person is active.

With successive sub-classification the arbitrariness of the census questions on economic characteristics introduce new elements which necessitate a more cautious interpretation of the data than appears on face value. Often difficulties were encountered in the classification of those employed. For example, women who worked on family farms or enterprises for at least one-third of their time were to be classified as 'employed' rather than as 'home-makers'. The use of the 'one-third' criterion is impossible to apply with any confidence in a subsistence agriculture system in which there are seasonal variations in the time spent by family workers on agricultural activities. Similar problems of classification were encountered in measuring the number of students according to the census definition.

In determining the occupational and status classification for each worker, the enumerator must exercise great discretionary judgement. The categories are artificial and often do not correspond to distinct groups in the population. Since these classifications may require arbitrary decisions, there is no reliable way of assessing the adequacy of these statistics. Furthermore, mis-classification is evident by the fact that there was a certain amount of misunderstanding of the relationship between activity and status. For example, many women were classified as homemakers under employment and as unpaid family workers under status (1).

In addition to the limitations presented by arbitrary classification of the population, there is the more general problem of applying a set of concepts more applicable to a developed country than to a subsistence economy such as in Tanzania. One concept that is used inadequately is that of 'employment'. The terms employed and working are often more applicable to an industrially advanced nation than to one with a large subsistence economy. The term employed was ambiguous to many in the census partly from the fact that the first alternative to employed in the questionnaire was unemployed.

The wide divergence between the unemployment rates in rural and urban areas testifies to the difficulties in making the distinction between employed and unemployed. The term employed could easily be associated with wage employment, which would apply to a large sector of the urban situation. Hence, the distinction between employed and unemployed is more appropriate in urban areas than in rural areas where wage employment is a very small portion of the total employment. The difficulty in classifying workers becomes very apparent when considering casual workers, again a large number in the urban areas.

A related problem is the interpretation of the questionnaire. For example, there is no direct Swahili translation of 'own-account worker' or of 'family worker'. In dealing with the occupational and industrial classification, the enumerators were faced with a similar problem since there is no suitable translation to distinguish 'occupation' from 'industry'.

In relating the census data to its major uses, it is apparent that the planning value of the data is very limited. The inadequate definition of employment and especially unemployment does not permit conclusions to be reached about the nature and extent of unemployment in Tanzania. Equally, manpower planners' use of the data is limited; less aggregated occupational classification is required for manpower projections and national accounting; in addition, mis-classification will further impair the usefulness of the data.

These cautionary preface remarks are presented in order to set out the limitations of the census results. However the data on economic characteristics shall not be considered as totally unreliable, although our conclusions reached on the basis of the results must take into account their plausibility in view of the limitations presented.

(1) In the census processing, where information was given on economic status, occupation and industry, the person was classified as economically active.

8.2 A comparison between the 1965 Survey and the 1967 Census, Tanzania Mainland

8.2.0 Introduction

One means of illustrating the problems of data quality is to use an independent study as a foil to the census. The following discusses some of the broad results on economic activity of the population, obtained from the Labour Force Survey in 1965 (2) and from the Population Census in 1967. Strictly speaking, these results are not comparable as they refer to two different time periods. Moreover, there are some differences in methodology. But within these limitations it would be worthwhile to examine the results of the 1967 Census against the background of the 1965 Survey.

8.2.1 Survey methodology

Broadly speaking, the basic difference in the two sources is related to the reference period used for collecting the information. In the Survey, information on economic activity was collected with reference to the seven days prior to the day on which data were collected; there was no such specific time reference in the Census, except in the case of the unemployed. Another important difference was the use in the Survey of a detailed questionnaire with built-in checks. This was aimed at improving the quality of the data on economic activity. Information collected on labour time disposition during the seven days prior to the date of the Survey was another important feature of the Survey. (For more details on methodological differences see App. 8.1 and App. 8.2).

8.2.2 Population by sex and economic activity

The estimated population by sex and economic activity is shown in table 8.1 for the 1965 Survey and 1967 Census. The results presented relate to

Table 8.1 Mainland adult population by sex and economic activity, 1965 Survey and 1967 Census, per cent

Economic Activity	1965 Survey *			1967 Census **		
	M.	F.	Total	M.	F.	Total
1. Employed	75	55	65	86	71	78
2. Unemployed	5	1	3	3	1	2
1+2 Labour force	79	56	67	88	72	80
3. Home-makers	1	29	14	0	18	10
4. Students	13	7	10	5	2	3
5. Others	7	8	8	5	9	8
3-5 Not in labour force	26	45	35	12	29	21
6. Total	100	100	100	100	100	100

* Non-institutional population aged 14 and over

** Population aged 15 and over

(2) Labour Force Survey of Tanzania, Ministry of Economic Affairs and Development Planning, Dar es Salaam, 1966.

the population aged 14 and over in the case of the 1965 Survey and 15 and over in case of the 1967 Census. The population sizes under different categories of economic activity are not strictly comparable as there is a gap of more than two years between the Survey and the Census, but their proportions are not expected to have undergone any radical change in the intervening period. In the Census while the percentages of the employed and unemployed are found to be 70% and 1% respectively, the corresponding Survey figures are 65% and 3%. With the usual work approach used in the census questionnaire, the percentage of the employed is expected to be higher and the percentage of the unemployed lower as is reflected in table 8.1. A wide divergence in Survey and Census results is observed in respect of home-makers and students.

There is some indication from the regional figures that there was misclassification of women home-makers into the employed category in the Census; the results of the Survey suggest that the percentage of home-makers in the Census should be higher and may be around 15%. Thus it appears that the census figure for the employed was overreported to the tune of 6%. As regards the students, the Survey and Census figures are found to be widely divergent, the percentages being 10 and 3 respectively (3). Considering the level of school enrollments, the Census figure appears to be more consistent (cf. Ch. 7). In the report of the Labour Force Survey of Tanzania the student proportion was admitted to be high.

An over-statement of the ages of those attending school has been suggested as a possible explanation. (See: Labour Force Survey, op. cit., p. 16.) If this explanation is correct then the proportion of other categories of workers will go up. The divergences observed from table 8.1 are rather similar in respect of males and females. In the case of the employed the divergence between the Survey and Census figures is found to be wider for females than for males. The inclusion of home-makers into the category of the employed in the census may be one of the reasons for this. Both the Survey and Census showed higher percentages of the unemployed among the males than the females: the percentages of the unemployed were found to be 7 and 1 for males and females respectively in the Survey, the corresponding Census figures being 3% and 1%.

8.23 Labour force population by age, in rural and urban areas

In order to locate the possible sources of the divergence between the Survey and Census results, the employed and the unemployed are examined by rural and urban residence under three broad age groups (15-44, 45-64 and 65 and over). These are presented in table 8.2. It may be noted that the definition of urban areas used in the Survey was slightly different from that of the Census, but this is not expected to affect the percentage figures to any appreciable extent. The percentages employed in the rural and urban areas as per 1967 Census were 80 and 53 respectively against the Survey figures of 65% and 35%. The divergence in respect of urban areas is rather large and may not be due to the conceptual differences alone. The Survey figures are on the low side if population under 14 years is included under the category of student as suggested in the labour force Survey report.

(3) The Census estimate of number of students is further discussed in Ch. 7.

Table 8.2 Mainland labour force population by age group and residence, 1965 Survey and 1967 Census, per cent of total adult population

Activity Status	Age Group	1965 Survey			1967 Census		
		Rural	Urban	Total	Rural	Urban	Total
Employed	15-44	64	45	63	81	52	79
	45-64	76	64	76	86	80	85
	65+	45	25	45	63	37	62
	15+over	65	39	69	80	58	78
Unemployed	15-44	3	3	3	2	5	2
	45-64	1	3	1	1	2	1
	65+	0	0	0	0	2	0
	15+over	3	3	3	1	4	1
Labour force	15-44	67	49	66	83	57	80
	45-64	77	67	77	86	82	85
	65+	45	25	46	63	39	62
	15+over	68	37	67	81	57	80

While the Survey disclosed unemployment to be 3% for each of the rural and urban sections of the population, the Census revealed 1% and 4% respectively. The trend of the population of unemployed over all ages is found to be the same in both the Census and the Survey.

8.2.4 Home-makers by age and residence

Home-makers are studied by rural-urban categories and by three broad age-groups in table 8.3, to examine the extent of classification of a home-maker in the employed class. The proportion of home-makers is found to be higher in the urban areas compared to the rural counterpart. This is reflected in the Survey as well as in the Census data. It is seen from the Survey and also from the Census that the bulk of the home-makers comes from the population in the age-group 15-44. The divergence between the Census and Survey percentages is found to be highest in the age-group 15-44 in the rural areas, possibly because of classification of a sizable number of home-makers in the employed class in the Census and the use of a reference period in the Survey and not in the Census; that is, the Survey picked up some seasonal variation.

Table 8.3 Mainland home-makers by age group and residence, 1965 Survey and 1967 Census, per cent of total adult population

Age Group	1965 Survey			1967 Census		
	Rural	Urban	Total	Rural	Urban	Total
15-44	16	34	37	9	28	10
45-64	9	23	19	7	20	8
65+	6	0	6	8	12	8
15 and over	15	32	16	9	27	10

8.2.5 Home-makers by age and sex

Table 8.4 presents the distribution of home-makers by sex under three broad categories of age-group from the Survey and the Census. As expected,

Table 8.4 Mainland home-makers by sex and age group, 1965 Survey and 1967 Census, per cent of total adult population

Age Group	1965 Survey			1967 Census		
	Males	Females	Total	Males	Females	Total
15-44	1	32	17	0.4	19	10
45-64	1	21	10	0.1	15	8
65+	1	11	6	0.3	17	8
15 and over	1	29	16	0.3	18	10

the above table shows a small proportion of male home-makers in both Survey and Census, the percentages being 1 and 0.3 respectively. The percentage of female home-makers is found to be 29 in the Survey against the Census figure 18. While the proportion of female home-makers decreases gradually from 32% in the age-group 15-44 to 11% in the age-group 65 and above, the Census figures are found to be more or less stationary ranging between 15% and 19%. The lower proportion of females in the working age-group 15-44 in the Census suggests the inclusion of home-makers in the employed category. The comparatively higher proportion of home-makers beyond age 65 in the Census may be due either to an age-reporting error or to the inclusion of other categories of workers or both.

8.3 Data on economic activities

8.3.0 Introduction

Having presented the many sources for the distortion in the data and the limitations of these data in economic and social analyses, we present the statistical findings on the economic activities of the Tanzanian population as revealed in the 1967 census data.

8.3.1 Information collected on economic activity

The questions on economic activity that were asked in the census are given in App. 8.2 together with their concepts and definitions. In brief, information was asked whether a person is gainfully employed or currently unemployed, or home-maker, or student, or others not working. This last category included pensioners, rentiers, children not attending school, the aged unable to work, and the permanently sick persons. For those who were reported as employed, information on occupation, industry and economic status was recorded.

8.3.2 Total population by economic activity

The population sizes by economic activity for Tanzania Mainland and Zanzibar are presented in Table 8.5. Of the Mainland population, 47% are found to be gainfully employed, 1% unemployed, 6% engaged in household duties in their own houses and 8% attending educational institutions regularly, while among the Zanzibar population the corresponding figures are 46, 1, 4 and 12 per cent respectively. The percentage of the popu-

Table 8.5 Total population by economic activity Tanzania Mainland and Zanzibar

Economic Activity	Mainland		Zanzibar	
	Number	Per Cent	Number	Per Cent
1. Employed	5,577,366	47	171,036	48
2. Unemployed	109,952	1	2,964	1
1-2. Labour force participation	5,687,318	48	174,000	49
3. Home-maker	705,303	6	12,082	4
4. Student	979,545	8	42,674	12
5. Others	4,387,337	37	123,315	35
3-5. Not in labour force	6,072,185	51	178,011	50
6. Not stated	192,251	2	1,897	1
7. Total Population	11,951,794	100	354,130	100

lation others not working was 37 in the Mainland and 35 in Zanzibar. Thus the activity pattern of the two areas of Tanzania is found to be almost the same.

8.3.3 Population age 15 and over by economic activity

In many a country, the analysis of economic activity is restricted to the population aged 15 and over because of the comparatively lower participation in economic activities by children under fifteen. Although the exclusion of children under a specified age from the total population gives a refined measure of activity, this may exclude a considerable number of children in a predominantly agricultural economy, who participate in the labour force however small their contribution may be. In table 8.6, the economic activity of the population aged 15 and over is presented for Tanzania Mainland and Zanzibar separately. The percentage of the labour force population aged 15 and over is 80% in the Mainland and 84% in Zanzibar. This measure, often referred to as labour force participation rate, is useful in estimating to what extent the labour force might expand or contract through time.

Table 8.6 Population aged 15 and over by economic activity, Mainland and Zanzibar

Economic Activity	Mainland		Zanzibar	
	Number	Per Cent	Number	Per Cent
1. Employed	5,231,509	79	166,563	83
2. Unemployed	96,824	1	2,821	1
1-2. Labour force	5,328,333	80	169,434	84
3. Home-maker	642,680	10	12,027	6
4. Student	226,544	3	9,073	5
5. Others	192,711	6	10,861	5
3-5. Not in labour force	1,061,935	19	31,961	16
6. Not stated	108,885	2	1,058	1
7. Total population	6,699,153	100	202,453	100

8.3.4 Sex differentials in economic activity

The economic activity for males and females is presented in table 8.7 to highlight the sex differential. Home-keeping is traditionally known to be a female activity and that is reflected in the table. Among the male population aged 15 and over, 86% in the Mainland was found to be employed and 3% unemployed; in Zanzibar the corresponding figures are 87% and 2% respectively. The percentage of employed in the case of females is found to be lower than that of the males in the Mainland and Zanzibar, the percentages being 71 and 78 respectively. The monopoly of the women in home-keeping is observed from this table: in the Mainland 99% of the home-workers are females and in Zanzibar the figure is almost 100%. Among the population 'not in labour force' the females outnumbered the males in the Mainland and in Zanzibar, the proportion of females being 74% in the former and 65% in the latter.

Table 8.7 Population 15 years and over by sex and economic activity, per cent

Economic Activity	Mainland		Zanzibar	
	Males	Females	Males	Females
1. Employed	86	71	87	78
2. Unemployed	3	1	2	1
1-2. Labour force	88	72	89	79
3. Home-maker	0	10	0	12
4. Student	5	2	7	2
5. Others	5	6	4	7
3-5. Not in labour force	11	26	11	20
6. Not stated	1	2	0	1
7. Total	100	100	100	100
Abs. number ('000)	3,187	3,512	101	101

8.3.5 Labour force proportions in different countries

In table 8.8, the percentages of labour force population by sex for selected countries are presented. Strictly speaking, the figures are not comparable as the concepts and definitions differ from country to country. But these will give some broad indications of manpower resources available for the production of goods and services. It is seen from the table that the proportions of the male labour force are close, varying from 88% in Tanzania Mainland to 94% in Turkey. In the case of females, however, as wide divergence is observed among the countries, partly a reflection of different practices in reporting the economic activities of women. Thailand, with the highest percentage (81%) of economically active women, is followed by Tanzania, while Iran records the lowest (9%). The classification of female domestic workers with some participation in the household farming or other enterprises in the employed category may perhaps be the reason for such a wide divergence among the different countries. In some censuses, time or hours spent by such female members are used as criteria for classification in the employed class. In the 1967 census in Tanzania, the time criterion was one-third of full-time. It

Table 8.8 The percentages of male and female labour force in selected countries

Country	Male	Female
1. Ghana (1960)	89	57
2. Indonesia (1961)	89	51
3. Iran (1966)	93	9
4. Thailand (1960)	90	61
5. Turkey (1960)	94	65
6. Tanzania (1967)		
Mainland	80	72
Zanzibar	92	79

will be shown later while discussing results at the regional level, that this instruction was not uniformly followed. Without questioning at depth, the classification of such female workers into a proper category, is difficult.

8.3.6 Economically active population by age - group and sex

The higher percentage of employed males and females in Zanzibar may be due to the favourable age-structure. The effects of the differences in age structure can be removed by standardising the percentages of the economically active population in respect of age. Table 8.9 gives percentages of the active male and female population in different age groups for Tanzania Mainland and Zanzibar. On standardisation, the percentage of the economically active population in the Mainland is found to rise from 78% to 80%, yet it is less than that of Zanzibar. In the case of males, the standardised figures for the Mainland is still higher than in Zanzibar indicating a still higher participation in economic activity among the male population in the Mainland.

Table 8.9 Per cent economically active population per sex and age group

Age Group	Mainland				Zanzibar			
	M.	F.	Tot.	Abs. size ('000)	M.	F.	Tot.	Abs. size ('000)
15-19	60	67	64	1,042	42	66	55	23
20-24	85	75	79	881	84	83	83	25
25-29	94	77	84	391	96	84	90	29
30-39	96	79	87	1,371	97	85	91	45
40-49	96	81	89	897	97	85	91	30
50-59	96	80	88	542	95	83	90	21
60-69	91	57	74	356	88	64	78	16
70+	78	40	60	110	76	49	63	13
15 and over	89	73	80	6,590	87	70	82	201

Female participation in the labour force for Mainland and Zanzibar is higher than that of males in only the teenage group, possibly because more males than females attend school at these ages. In Zanzibar the percentage of employed males in the age range 25-39 is found to be higher while in the younger and older age-groups it is higher in the Mainland. The percentage of economically active females beyond teenage, is found to be higher in Zanzibar.

Table 8.9 Population 15 years and over by economic activity and sex, Mainland Rural and Urban

Economic Activity	Mainland Rural			Mainland Urban		
	Males	Females	Total	Males	Females	Total
1. Employed	86	74	80	79	17	52
2. Unemployed	2	0	1	6	2	4
1-2. Labour force	89	74	81	85	20	57
3. Home-maker	0	16	9	0	61	27
4. Student	5	2	3	6	5	6
5. Others	5	6	6	7	13	10
3-5. Not in labour force	10	24	17	14	78	42
6. Not stated	1	2	2	1	2	1
7. Total	100	100	100	100	100	100
Abs. number ('000)	2,933	3,271	6,204	219	167	386

8.3.7 Labour force proportions by age and sex in selected countries

The percentages of labour force population in different age-groups are presented in table 8.10 for males and females separately for some selected countries. The age-curve of the male labour force proportion observed in the case of Tanzania is found to be very much the same as in other countries. Males enter into the labour market at various ages, mostly before 20; nearly all are economically active by the age of 25 and remain as such until about 55 years, after which the proportion declines progressively. The female age-curve is rather flat compared to the males with the majority of the females entering the labour market before the age of 20. The percentages of females in the labour force fluctuate greatly over different ages as a result of their movements in and out of the labour market.

Table 8.10 Labour force population by age and sex, for selected countries, per cent of total population in age-groups

Age Group	Tanzania 1967				Ghana 1960		Iran 1956		Turkey 1960	
	Mainland		Zanzibar							
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
15-19	66	60	46	60	62	54	81	12	79	66
20-24	91	75	86	84	91	52	94	9	96	66
25-29	96	77	98	86	97	52	98	9	97	67
30-34	97	79	98	87	98	57			98	65
35-39	98	80	99	83	98	59	99	10	98	63
40-44	97	80	98	87	97	65			98	69
45-49	97	82	98	81	97	67	98	10	98	65
50-54	97	80	97	86	96	70			98	68
55-59	96	80	95	76	94	71	94	9	97	65
60-64	92	58	90	67	89	64			94	67
65+	81	44	79	50	72	43	74	5	86	60
15 and over	88	72	89	79	83	57	93	9	94	69

Sources: Methods of analysing census data on economic activities of the population, Population Studies No. 43, United Nations 1966.

8.3.8 Rural-Urban differentials in economic activity

Table 8.11 presents the economic activity of the rural and urban population aged 15 and over of the Mainland for males and females and both sexes. As should be expected, the female participation in the labour force

is much higher in the rural as compared with urban areas. The majority of economically inactive females are found to be engaged in house-keeping in both the rural and urban areas. The wide divergence between the rural and urban sectors appears to be due to the classification of large numbers of women in the employed class in the rural areas.

8.4 The economically active population by industry

8.4.0 Introduction

The industrial classification in the 1967 population census was made on the basis of Tanzania Standard Industrial Classification which was itself based on the U.N. International Standard Industrial Classification of all economic activities (ISIC). An abridged industry classification of 49 categories was used representing some details in the broad industrial divisions. Information recorded by the enumerators in some cases was so vague that post-census coding could be done only according to eight broad divisions.

Of significant importance are the four main sectors: agriculture, commerce, transportation, storage and communications, and manufacturing. Throughout this analysis the shifts in population structure as related to these four main activities indicate the direction of economic development. Economic development will entail a structural shift in the economy wherein the preponderance of agriculture will give way to a more equally balanced economy in the form of growing commercial, industrial and service sectors.

8.4.1 Population by sex and industrial classification

Table 8.12 presents the percentage distribution of the economically active population by sex in the eight broad industry divisions for Tanzania Mainland and Zanzibar and also by rural-urban sectors of the Mainland. Agriculture is found to be the main source of employment for an overwhelming majority, the percentage being 91% and 82% in the Mainland and Zanzibar respectively. Among the economically active males in the

Table 8.12 Economically active population by sex and industrial division, per cent

Industrial Division	Mainland Rural			Mainland Urban			Zanzibar		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
1. Agriculture, forestry, hunting and fishing	90	98	94	10	38	14	73	91	82
2. Mining and quarrying	0	0	0	0	0	0	0	0	0
3. Manufacturing	2	0	1	15	8	14	4	5	4
4. Construction	1	0	0	6	1	3	3	0	2
5. Electricity, gas, water and sanitary services	0	0	0	1	0	1	0	0	0
6. Commerce	1	0	1	16	10	15	6	1	4
7. Transport, storage and communication	1	0	0	15	1	13	3	0	1
8. Services	4	1	2	31	38	32	10	2	6
9. Activities not adequately described or not stated	1	1	1	6	5	6	1	0	1
Total	100	100	100	100	100	100	100	100	100
Abs. number ('000)	2,732	2,632	5,364	176	35	206	90	61	151

Mainland, 85% is found to be engaged in agriculture, 6% in services, 3% in manufacturing and 2% in commerce while the corresponding figures for Zanzibar are 73%, 10%, 4% and 7% respectively. The proportion of females in agriculture in both areas was seen to be higher than that of males: in the Mainland 97%, and in Zanzibar 91% of the active females were engaged in agriculture.

The industrial distribution of the economically active population in rural and urban areas is found to be quite different however. The rural economy is primarily agriculture-based with 94% of the total active population participating in agricultural activity. In the urban areas the three groups of industries - services, commerce and manufacturing - account for 60% of employment while the contribution from the above three industries in the rural areas is only 4%. This characteristic of the urban-rural split is more significant of the rural society than of the urban society. Key economic activities such as services and communications are greatly under-developed. This is characteristic of an agriculture based economy that is largely non-monetized.

In the urban areas the pattern of industrial distribution for males and females is somewhat different: the highest proportion of males was found to be in services, accounting for 31% of the employed males. Next to services, commerce accounted for 16%, with manufacturing and transport storage and communication following closely. For females, the principal field of employment was found to be equally shared by agriculture and services being 38% in both cases. The high percentage of urban females in agriculture indicates that urbanization has not changed the role of females as the major agricultural producers. Urbanization appears to have greater impact on male distribution. Males drop their role in rural agriculture and assume jobs in commerce, manufacturing and transportation and communications, i.e. occupations in the wage economy.

8.4.2 Industry structure in selected countries

Data from recent censuses of four developing countries and one industrialised country are presented in table 8.13 together with those for Tanzania Mainland and Zanzibar. The participation of the economically active popu-

Table 8.13 Economically active population by industrial division in selected countries, per cent.

Industry divisions	Tanzania 1987		Ghana (1960)	Ivory (1956)	Thailand (1960)	Turkey (1960)	Japan (1960)
	Mainland	Zanzibar					
1. Agriculture, forestry, hunting and fishing	91.1	81.6	37.9	56.3	82.3	74.9	32.3
2. Mining and quarrying	0.1	0.0	1.8	0.4	0.2	0.6	1.2
3. Manufacturing	1.6	4.3	8.6	13.8	3.4	6.8	21.7
4. Construction	0.5	1.6	3.3	3.7	0.5	2.2	6.1
5. Electricity, gas, water, sanitary services	0.1	0.2	0.5	0.2	0.1	0.1	0.5
6. Commerce	1.3	4.0	13.6	6.0	5.7	3.1	17.5
7. Transport, storage and communication	0.8	1.4	2.5	3.5	1.2	1.9	5.1
8. Services	3.5	6.4	5.7	11.1	4.8	8.5	14.8
9. Activities not adequately described or not stated*	0.9	0.5	6.0	3.0	1.8	1.8	0.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

* Includes unemployed persons in all countries except Tanzania

Source: As for Table 8.10.

lation in the agricultural and non-agricultural sectors in developing countries is strikingly different from that of the industrialised country. One of the objectives of economic policy in such countries is to switch over the manpower resources from agriculture to non-agriculture employment as a means of accelerating growth of output per head and tackling problems of under-employment in agriculture. A measure of the level of economic development and the degree of industrialisation is given in the degree of participation of the total economically active population in non-agricultural industries.

8.4.3 Urban industry structure by size of town

The effect of urbanization in industrial groups is, for the Mainland, examined in table 8.14 by population size of towns. The proportion of the economically active population engaged in agriculture declines sharply from 32% in towns with population below 25,000 to 5% in towns with population above 50,000. The transition from agriculture to non-agriculture is the normal feature associated with the degree of urbanization. The proportion under the category of services is found to be constant in the three categories of towns, thus showing urbanization has virtually no effect on this category of worker taken as a whole.

Table 8.14 Economically active urban population by sex, industrial division and size of town, Mainland, per cent

Industrial division	Population of towns									Total		
	- 25,000			25,000 - 50,000			50,000 +					
	M.	F.	Tot.	M.	F.	Tot.	M.	F.	Tot.	M.	F.	Tot.
1. Agriculture, forestry hunting and fishing	23	67	33	11	29	14	4	15	5	10	38	14
2. Mining and quarrying	1	0	0	1	0	1	0	0	0	0	0	0
3. Manufacturing	10	1	8	16	12	15	17	12	16	15	8	14
4. Construction	4	0	3	4	0	3	7	1	6	4	0	5
5. Electricity, gas, water and sanitary services	1	0	1	1	0	1	2	1	1	1	0	1
6. Commerce	13	5	11	17	11	16	17	13	17	16	10	15
7. Transport, storage and communication	13	1	10	9	1	8	17	3	16	15	1	13
8. Services	31	23	29	34	41	35	30	49	32	31	38	32
9. Activities not adequately described or not stated	4	3	4	6	6	6	6	7	6	6	5	6
Total	100	100	100	100	100	100	100	100	100	100	100	100
Abs. numbers ('000)	39	12	51	34	6	41	104	12	116	177	30	207

One must exhibit some caution in interpreting economic data by size of town. Tanzania is a highly ruralized country and hence the number of statistical observations falling into each of the three size classes is exceedingly small. Nevertheless, if we compare the growth of employment with increasing urban size we can gain an insight into the changing occupational distribution of labour that accompanies urbanization. In the case of manufacturing, employment increases rapidly from 8% of the population in the class of below 25,000 to 15% in the 25,000 to 50,000 category; however, the increase to the next level is smaller; only 16% of the population is employed in manufacturing in the above 50,000 size town. Similarly, employment in commerce does not appear to grow significantly with urbanization. These results are surprising since it would be expected

that with urbanization there should be a structural shift in industrial occupation in line with the growth of city size.

Of equal interest is the fact that employment in electricity, gas, water and sanitary services is not related to the growth of urban areas; one would expect that urbanization should make greater demand, quantitatively and qualitatively, on these public services. The larger proportion of the population involved in construction for the above 50,000 category probably reflects the different nature of housing and road construction undertaken in the relatively large urban areas. Transportation, storage, and communications employ a relatively higher proportion of the population in the class of below 25,000 compared to the class of 25,000-50,000; the large increases in employment as we move into the largest town size reflect the increased demand facing this sector in very large urban areas.

8.5 The economically active population by occupation

8.5.1 Occupational structure in selected countries

The occupational classification in the 1967 population census was outlined to suit the particular needs of Tanzania and at the same time provide international comparisons. The International Standard Classification of Occupations (ISCO) issued by ILO formed the basis for classification. Tabulation was done by 41 categories of occupations representing some details in the major groups of ISCO as information on occupation recorded by the enumerators did not permit more detailed classification. The occupational distribution of the economically active population of Tanzania is presented in table 8.15 together with those of some selected countries in terms of the ISCO major groups. This classification shows in general terms

Table 8.15 Economically active population by major occupation groups in selected countries, per cent.

Major occupation group	Tanzania 1967		Ghana (1960)	Iran (1956)	Thailand (1960)	Turkey (1960)	Japan (1960)
	Mainland	Kenya					
1. Professional, technical and related workers	1.1	1.4	2.2	1.6	1.3	1.6	4.9
2. Administrative, executive and managerial workers	0.4	0.5	0.5	0.5	0.2	2.6	2.2
3. Clerical workers	0.7	1.0	1.6	2.5	1.1		10.2
4. Sales workers	1.0	3.3	12.7	3.7	5.3	2.4	10.7
5. Farmers, fishermen, hunters, loggers and related workers	20.8	61.4	57.3	54.1	82.3	74.7	32.2
6. Miners, quarrymen and related workers	0.1	0.0	1.2	0.9	0.2	0.5	0.8
7. Workers in transport and communication	0.8	1.2	1.9	2.3	1.1	1.8	3.4
8. Craftsmen, production-process workers, labourers not elsewhere classified	2.8	7.5	14.5	19.9	5.8	9.5	25.4
9. Service, sports and recreation workers	1.7	3.6	2.0	7.5	2.0	2.9	6.0
10. Workers not classifiable by occupation or not stated.*	0.6	0.2	6.0	4.3	0.7	0.5	0.8
11. Armed forces**	-	-	-	0.8	-	3.3	0.5

* Includes unemployed persons in all countries except Tanzania.

** No estimates available for Tanzania.

Source: As for Table 8.10.

what kind of functions workers perform in the economy. By and large, the administrative, executive and managerial workers are decision makers, the clerical workers are record keepers, the sales workers and those in transport occupations are conveyors of goods and services from the producer to the consumer, while the producers of goods are mainly in the groups of farmers, miners, craftsmen and the like. The distribution of manpower among such functional categories shifts with industrialisation and as agriculture becomes more productive and releases resources for other economic activities. In Japan, one of the most intensely cultivated countries, just less than one third of the total economically active population is engaged in agricultural pursuits, while in the developing nations this percentage climbs from 54% in Iran to 91% in Tanzania Mainland. Among the workers in non-agricultural occupations in an industrialised country, such as Japan, the relative numbers of technical, administrative, clerical, and production process workers are found to be much higher than those in the developing countries.

8.5.2 Occupational structure of the rural and urban population

Table 8.16 presents the occupational structure of the population by sex and also by rural-urban sector. The urban occupational structure is found to be significantly different from that of the rural areas with 87% of the workers following non-agricultural occupations in the urban sector against 6% in the rural areas. Indicative of urbanization is the fact that the percentage of population in professional, administrative, clerical and secondary industries is relatively higher than in rural areas. However of greater interest is the distribution of occupations by sex. Over 22% of women in urban areas are engaged in skilled occupations-categories 1 to 3; in comparison, only 18% of the males are so employed. The relatively larger proportion of females in the professional, technical and related workers category reflects the predominance of females in teaching, nursing and medical services.

Table 8.16 Economically active population by sex and major occupation groups, per cent

Major Group	Mainland Rural			Mainland Urban			Zanzibar		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
1. Professional, technical and related workers	1	0	1	5	10	6	2	1	1
2. Administrative, executive and managerial workers	0	0	0	4	2	4	1	0	0
3. Clerical workers	1	0	0	9	10	9	2	0	1
4. Sales workers	1	0	1	11	7	11	5	1	3
5. Farmers, fishermen, hunters, loggers and related workers	90	90	94	9	38	13	72	91	81
6. Miners, quarrymen and related workers	0	0	0	0	0	0	0	0	0
7. Workers in transport and communication	1	0	0	11	1	9	2	0	1
8. Craftsmen, production-process workers, labourers not elsewhere classified	3	0	2	31	10	28	9	6	8
9. Service, sport and recreation workers	2	0	1	18	19	18	5	1	4
10. Workers not classifiable by occupation or not stated	0	1	1	2	4	2	0	0	0
Abs. number ('000)	2,700	2,635	5,335	177	30	207	90	61	171

8.5.3 Occupational structure by years of schooling

That non-agricultural occupation requires some minimum educational background is obvious from table 8.17 which presents the percentage distribution of the economically active population according to years at school in two broad occupation groups - agriculture and non-agriculture. Among the agricultural workers in the Mainland 69% have had no schooling and 24% have had between 1 and 4 years. Zanzibar also presents the same picture, the corresponding percentages being 79 and 15 respectively. In the case of non-agricultural workers the percentage of workers with more than one year of schooling is 75 in the Mainland and 62 in Zanzibar. In the rural and urban areas of the Mainland, the pattern is almost the same, as education is found to be associated with occupation.

Table 8.17 Economically active population by broad occupational group and education, per cent

Years in School	Mainland Rural		Mainland Urban		Zanzibar	
	Agric.	Non-Agric.	Agric.	Non-Agric.	Agric.	Non-Agric.
None	69	25	61	35	79	39
1-4	24	34	28	27	15	24
5-8	6	30	12	31	6	29
9 or more	0	11	2	15	0	8
Total	100	100	100	100	100	100
Abn. numbers (1000)	5,035	305	28	174	139	31

8.6 The economically active population by economic status

8.6.1 Economic status of the employed population

In Tanzania Mainland and Zanzibar the bulk of the employed population is found to be own-account workers, the percentages being 74 and 80 respectively. Family workers and the employees account for 16% and 9% respectively in the Mainland and 9% and 11% in Zanzibar. The economic status is found to be sex-selective, particularly for the employee category. Males outnumbered the females in this category, possibly because of the latter's preoccupation in domestic work. For the Mainland and Zanzibar the higher percentage of females in own-account (82% and 88% respectively) indicates there was some misclassification and many of the enumerated should have been counted as family workers.

8.6.2 Economic status by land residence

From table 8.18 it is evident that the pattern of economic status in the rural and urban areas of the Mainland is different: in the rural areas the majority, (76%), are found to be own-account workers while in the urban areas the majority (69%) are employees. Thus with urbanization, the number of workers in the employee category is expected to rise.

The proportionate difference in economic status between the rural and urban population reflects the very different economic organizational structure in these two broad categories. Urban areas are characterized by

Table 8.18 Economically active population by sex and economic status, per cent

Economic status	Mainland Rural			Mainland Urban			Zanzibar		
	M.	F.	Tot.	M.	F.	Tot.	M.	F.	Tot.
Employer	1	0	0	2	1	2	1	0	0
Own-account	59	53	16	22	50	27	72	68	80
Employee	12	1	7	74	44	69	18	2	11
Family workers	18	16	17	1	5	2	9	10	9
Not stated	0	0	0	1	1	1	0	0	0
Total	100	100	100	100	100	100	100	100	100
Abs. number ('000)	2,754	2,635	5,389	177	30	207	90	51	141

organized industry and hence the own-account - ers, (76% in rural areas and 27% in urban), give way to employee status which is only 7% in the rural parts and 69% in urban centres. The overall 74% in own-account is indicative of a large smallholder group.

The effect of urbanization on economic status is shown in table 8.19. The proportion of own-account workers decreases with the increasing size of towns: the percentage of own-account workers decreases from 40% in towns under 20,000 to 21% in towns with population above 50,000. In the case of employees, the proportion increases with the increasing size of the town.

Table 8.19 Economically active urban population by sex, economic status and size of town, Mainland, per cent

Economic status	Population of Towns								
	-20,000			20,000-50,000			50,000+		
	M.	F.	Tot.	M.	F.	Tot.	M.	F.	Tot.
Employer	3	1	2	3	1	2	2	1	2
Own-account	32	54	39	26	59	34	18	40	29
Employee	62	28	54	68	37	62	78	52	74
Family worker	3	7	4	1	3	2	1	6	2
Not stated	0	0	0	1	1	1	1	1	1
Total	100	100	100	100	100	100	100	100	100
Abs. numbers ('000)	12	4	16	51	14	75	120	19	140

The swelling of the employee category as the town size increases indicates a structural shift wherein the wage employment sector dominates the larger urban centres. In other words, the degree of monetization in the nation increases with urbanization. With regard to the employer category, it is interesting to note that its size is invariant to the degree of urbanization. This reflects a low level of individual entrepreneurship regardless of the level of monetization in the economy; this is not uncommon in low-income countries.

8.6.3 Economic status and occupation

The cross-classification of status with occupation is given in table 8.20. Among the workers in agricultural occupations the own-account workers and family workers together account for 97% in the Mainland and 99% in Zanzibar. Of interest is the different activity status structure of agricultural and non-agricultural. Agricultural activity is dominated by own-

Table 8.20 Economically active population by broad occupational group and economic status, per cent.

Economic status	Mainland Rural		Mainland Urban		Zanzibar	
	Agric.	Non-Agric.	Agric.	Non-Agric.	Agric.	Non-Agric.
Employer	0	3	1	2	0	1
Own-account	79	23	83	14	88	44
Employee	3	72	6	82	1	53
Family worker	18	3	4	1	11	2
Total	100	100	100	100	100	100
Abs. number ('000)	5,033	905	20	174	130	31

account workers, 79% in the rural areas and 89% in urban areas. Especially for rural Tanzania, the large own-account category is evidence of the large extent of subsistence agriculture.

8.7 Concluding comments

The chapter has dealt with one of the more complex sets of data from the census, that of economic characteristics. Two problems have faced the analysts; that of the degree of ambiguity of the concepts used, and that of the existence of systematic errors in the recorded results.

The most pertinent example of the first problem is that of classification of women. Traditionally regarded as those responsible for all domestic work, the women of Tanzania might often have been recorded as 'homemakers' despite their very significant contributions to the family economy. The various steps at 'correcting' mis-classifications said to have been performed during the processing of data could only serve to further blur the picture; of the economically active rural population women are proportionally more often than men classified as 'own-account workers' and less often as 'family workers'.

Systematic errors can have affected the data in many places, as seen from the comparisons with the 1965 Labour Force Survey. Although comparisons of this type have a limited value, their combined picture might bring the reader closer to the truth than only the one would. For instance, the Labour Force Survey, studying employment during a specific week, appears to have caught comparatively more of the un- and underemployed labour force. Neither of the two has, however, provided any direct information on the character of under-employment.

Worth mentioning as a specific feature of countries like Tanzania, is the extent of agricultural work in all parts of the country. Farming activities occupy a vast majority of the economically active in rural areas. Considerably lower in urban areas, agriculture still takes a significant proportion of the active population; it is even there the largest single occupation group among women.

The overall picture, crude in its details and not very different from general expectations, may still provide a basis for evaluation of the impact of later economic and social policies. The most important of these might come to be the Ujamaa policy of rural reorganisation, which over time could lead to significant changes in the pattern of economic activity.

9 AGRICULTURAL DATA

by Chinmoy Koley

9.0 Introduction

Among the surveys carried out so far in the country, the 1967 population census is the most extensive and exhaustive source of information on social and economic characteristics. The economy of a developing country such as Tanzania is basically agriculture-oriented. This is evident from the fact that about 90% of Tanzania Mainland's economically active population depend on agriculture for their livelihood; (the proportion of agricultural population in Zanzibar is about 80%). The agricultural population is almost entirely rural though there are traces of agricultural activity in urban areas also.

The agricultural data of the population census have been obtained from the detailed questionnaires operated in one-fifth of Enumeration Areas (EA's). Hence it may be borne in mind that the agricultural statistics available therein are estimates and not actual figures. But the major limitations in ascertaining the accuracy of the data lie not in sampling but in reliability of the source of information, i.e. the respondents themselves as well as the enumerators sometimes. The definitions such as "economic status", "main and secondary agricultural produce" were difficult for the census experts to convey properly to the enumerators, not to mention the difficulties in extracting the exact information from the normally reticent respondents. Hence, the statistics presented in this chapter should be handled with great caution. An attempt has been made to compare some of the findings of the census against similar information available from other sources such as Ministry of Agriculture. However, this sort of comparison has its obvious limitations due to the very nature of the data.

9.1 Agricultural population according to economic status

Table 9.1 shows the percentage distribution of agricultural population of the Mainland and Zanzibar respectively according to economic status, i.e. according to whether employer, employee, own-account worker or

Table 9.1 Distribution of agricultural population* according to economic status

Economic Status	Mainland		Zanzibar		Total	
	Population	percentage	Population	percentage	Population	percentage
Employer	15,405	0.3	235	0.2	15,640	0.3
Own-acc. worker	4,018,870	79.3	122,272	87.9	4,141,150	79.6
Employee	129,633	2.6	1,300	1.0	131,011	2.5
Family worker	896,472	17.7	15,269	11.0	911,681	17.5
Not stated	3,030	0.1	7	-	3,035	0.1
Total agr. pop.	5,063,346	100.0	139,117	100.0	5,202,517	100.0
Econ. active pop.	5,543,173	-	170,406	-	5,713,659	-
Per cent in agric.	91.3	-	81.5	-	91.1	-

* Defined as economically active population in agricultural occupations.

family worker. It may be observed that the bulk of the agricultural population i.e. 80%, are own-account workers and the rest are mostly family workers (18%). In Zanzibar, proportionally more people i.e. 88%, are own-account workers. This gives an indication of the predominance of peasant farming in the country.

9.2 Agricultural population according to sex

Table 9.2 shows the distribution of the economically active population among males and females. It is, however, to be mentioned here, that the data of economically active women in the country are extremely unreliable due to the confusion arising from the definition of economic activity, and hence uniformity in definition could not be maintained throughout the country. The number of employees (for both males and females) may be regarded as reliable, but a lot of confusion arose in classifying people, particularly women, into own-account or family workers.

Table 9.2 Distribution of economically active population in agriculture

Economic Status	Population			Percentage	
	Males	Females	Total	Males	Females
Employer	12,125	3,517	15,642	77.5	22.5
Own-account worker	1,902,483	2,238,667	4,141,150	45.9	54.1
Employee	125,129	5,882	131,011	95.5	4.5
Family worker	491,779	419,502	911,281	53.9	46.1
Total stated in agriculture	2,531,514	2,667,066	5,198,580	48.7	51.3
Per cent of agric. pop.	84.9	97.8	91.1		

This was due to the fact that in quite a few places a man can have more than one wife who independently cultivate separate shambas though the shamba may customarily belong to the head of household. Hence, it is not surprising that almost the entire economically active female population barring a few in urban areas are engaged in agriculture either as own-account or as family workers. Among economically active males also, agriculture is by far the most predominant occupation, keeping 85% of the population engaged. As a contrast, farm employment is dominated by males; among employers 77% are male and among employees 95%.

9.3 Agricultural population according to occupation

Table 9.3 shows the distribution of agricultural population according to occupation in the different sectors of agriculture. It is apparent that crop-husbandry is the predominant occupation comprising 97% of the agricultural population. About 6% of the population is engaged in coffee or tea farming, 1% in sisal, and 2% in livestock. The population in forestry, game propagation and fishing is insignificant, hardly 1% of the total agricultural population. Any further breakdown of the population in crop husbandry, though meaningful, is not possible at present, because of limitations of the tabulation programme.

Table 9.3 Distribution of agricultural population according to occupation

Occupation	Mainland		Zanzibar		Total	
	Persons	Per-cent	Persons	Per-cent	Persons	Per-cent
Riceal	54,606	1.1	15	-	54,621	1.0
Coffee, tea	290,055	5.7	17	-	290,070	5.6
Other crops	4,599,682	90.7	133,400	95.9	4,733,082	90.8
Subtotal: crops	4,934,341	97.5	133,432	95.9	5,067,773	97.4
Livestock	90,637	1.8	396	0.3	91,033	1.7
Fishing	32,453	0.6	5,152	3.7	37,605	0.7
Gene propagation	1,732	-	12	-	1,744	-
Forestry	4,103	0.1	179	0.1	4,282	0.1
Total agricultural occupation	5,063,265	100.0	139,171	100.0	5,202,436	100.0

9.4 Farming households according to agricultural produce

The total number of farming households in the country was observed as 2,345,000, i.e. 86% of the country's total households. The same proportion of the Mainland households are engaged in farming, whereas on Zanzibar the proportion is slightly lower or 80%.

Table 9.4 shows the distribution of farming households according to primary and secondary agricultural produce. An analysis of the table below shows that maize is most important among all crops in the Mainland, being grown as a main produce by 24% of the households and as secondary produce by 21%. Next comes cassava, grown by 11% as a main and 14% as a secondary produce. The third in importance is sorghum with 11% of households growing it as a main produce, and 10% as a secondary produce. Apart from these three, other crops of importance as a main produce are cotton (12% of households), coffee (10%) and cashewnuts (8%). The other crops important as secondary produce are bananas (8%) and beans (6%).

There is, however, a different cropping pattern in Zanzibar. The most predominant crop here is cassava grown by as many as 78% of households as

Table 9.4 Distribution of farming households by main and by secondary agricultural produce.

Agriculture	MAINLAND				ZANZIBAR			
	Main produce		Secondary produce		Main produce		Secondary produce	
	House-holds	Per-cent	House-holds	Per-cent	House-holds	Per-cent	House-holds	Per-cent
Maize	541,819	24	470,710	21	948	1	1,871	2
Cassava	255,774	11	310,520	14	62,536	78	7,355	9
Sorghum	251,002	11	231,711	10	1,315	2	3,250	4
Cotton	271,216	12	79,435	4	9	-	5	-
Coffee	234,079	10	19,914	1	5	-	12	-
Cashewnuts	184,460	8	41,109	2	5	-	17	-
Bananas	51,941	2	176,091	8	4,606	6	21,630	27
Paddy	115,653	5	15,836	3	3,804	5	17,596	22
Beans	17,038	1	137,925	6	6	-	5	-
Pigeon millet	70,307	3	71,895	3	3	-	-	-
Bulrush millet	50,867	2	23,861	1	25	-	221	-
Sweet Potatoes	3,207	-	44,519	2	188	1	14,743	18
Custile	50,527	2	65,498	3	324	-	153	-
Coccolute	16,370	1	17,262	1	2,209	3	327	1
Cloves	49	-	44	-	1,804	2	844	1
Others	142,286	7	256,719	11	2,026	2	5,687	8
No produce	-	-	214,354	10	-	-	5,868	7
Total stated	2,255,645	96	2,252,401	100	90,413	100	80,384	99
Not stated	7,362	-	12,326	-	350	-	361	-
Total	2,263,007	-	2,264,727	-	90,763	-	80,745	-

cotton, coffee, cashewnuts, paddy, millets, and beans. A little adjustment has been necessary for the derivation of coffee acreage and production, more than a fifth of which is grown on estates. Two important crops, namely, cassava and bananas, have been left out due to difficulties in obtaining reliable yield figures. It is worth noting that cash crops like cotton, coffee, and cashewnuts have, on an average, less acreage per household than food crops, like maize, sorghum, etc. This could be due to the reason that whereas the cash crops are normally grown pure, food crops are mostly grown in mixtures.

9.6 Reliability of the data

Population census is by far the most extensive source of information on household characteristics including agricultural occupation. Hence it was thought necessary to compare the findings against similar information. Unfortunately, there was no recent census of agriculture at a country-level which could have been conveniently for comparison of agricultural data. However, the Bureau of Resource Assessment and Land Use Planning of Dar-es-Salaam University (BRAUP) have compiled the farm area per household for small-holders at District level. The comparison of areas from the above source is shown against the total area for the main crop, in Table 9.7. However, it must be kept in mind that the acreages under crops are always in multiplicity of mixtures; hence it would not be worthwhile to attempt to arrive at total crop acreage on the basis of this limited information. Another way of comparison would be the relative percentages of farming households in regions growing the crop either as main or as secondary produce against the relative crop acreages in corresponding regions. Table 9.8 shows the comparative percentage distribution for the above-mentioned crops. It is observed that the general trend is maintained as expected, i.e. the region with more farming households involved in growing a crop normally has a higher percentage of acreage under particular crop. Some discrepancies, however, are noticeable and worth mentioning i.e., in case of cotton, Shinyanga has 50 percent of total acreage though only 23 percent have stated cotton as main or secondary produce; for millets in Mbeya, the proportion of households is 33 against 52 percent of acreage, in Dodoma the percentage is 28 against 3 percent of acreage; sorghum in Ntwaru has 3 percent of total acreage though it is cultivated by 20 percent of farming households.

Table 9.8 Percentage distribution of farming households with crop as main or secondary produce, and relative acreage for main crop

Region	Maize		Sorghum		Cotton		Coffee		Cashewnuts		Paddy		Millets		Beans	
	Households	Acreage	Households	Acreage	Households	Acreage	Households	Acreage	Households	Acreage	Households	Acreage	Households	Acreage	Households	Acreage
Arusha	7	10	3	5	-	-	2	7	-	-	-	-	1	-	5	2
Coast	2	1	3	4	4	4	-	-	25	34	18	7	-	-	-	-
Dodoma	8	4	12	3	-	-	-	-	-	-	-	-	28	3	1	-
Iringa	11	13	1	-	-	-	-	1	-	-	1	1	5	1	20	1
Kigoma	4	4	5	15	2	-	1	1	-	-	1	-	1	-	13	28
Kilimanjaro	4	8	-	-	2	2	27	39	-	-	2	4	2	5	4	2
Mara	3	1	2	2	8	6	1	1	-	-	1	1	11	13	-	1
Mbeya	9	6	1	-	1	-	14	7	-	-	14	15	33	52	16	14
Morogoro	7	10	9	17	8	2	3	2	-	-	23	36	-	-	8	7
Mtwara	2	1	20	3	-	-	-	-	62	58	9	3	1	2	-	-
Mwanza	6	4	3	3	39	29	-	-	-	-	7	9	2	-	1	-
Narok	4	3	1	-	-	-	5	6	11	7	5	1	5	3	2	1
Shinyanga	8	6	13	13	13	30	-	-	-	-	7	11	4	5	-	-
Singida	6	4	15	10	5	1	-	-	-	-	1	-	7	13	-	1
Tabora	7	13	8	14	4	9	-	-	-	-	8	10	1	3	-	-
Tanga	12	11	-	-	2	1	5	3	1	1	2	2	-	-	12	7
West Lake	-	-	9	10	2	1	42	33	-	-	-	-	-	-	17	30

9.7 Small-holder cultivation

Agriculture has two broad sectors; (i) estate sector, in which agricultural operation is carried on a large-scale basis with mechanised farming practices and regular paid employment; and (ii) peasant sector where agricultural operation is carried out mostly on a family basis, the paid employment, if at all, being only seasonal. Division of the total agricultural population into these two sectors may give an idea of the extent of mechanization. The number of employers and employees for estate agriculture for the mainland was available from 1967 Survey of Employment and Earnings by the Bureau of Statistics. The remaining agricultural population was assumed to be small-holding. The distribution of agricultural population of mainland into estate and small-holding sectors is shown in Table 9.9.

Table 9.9 Distribution of agricultural population into estate and smallholding sectors, Tanzania Mainland.

Occupation	Agricultural population			Percentage	
	Estate	Small-holding	Total	Estate	Small-holding
Sisal	53,000	1,591	54,591	97.1	2.9
Coffee, tea	98,755	271,106	369,861	6.5	93.5
Other crops	20,957	4,566,142	4,587,099	0.5	99.5
Sub-total crops	92,692	4,838,839	4,931,531	1.9	98.1
Livestock	5,209	85,275	90,484	5.8	94.2
Fishing	142	32,262	32,404	0.4	99.6
Game propagation	1,053	664	1,717	61.3	38.7
Forestry	1,809	2,295	4,104	45.2	54.8
Total agriculture	100,985	4,950,333	5,050,318	2.0	98.0

It may be observed that only 100,985 or 2 percent of the total agricultural population are engaged in large-scale farming. Occupation in sisal, game propagation and forestry are of mostly estate agriculture. About 7 percent of coffee and tea are engaged in estates, and 6 percent of livestock. Considering estate agriculture, on the other hand, sisal dominates the scene, occupying half (52 percent) of estate population; 19 percent of estate population are engaged in coffee and tea and 21 percent in other crops.

A point to be borne in mind here is that the source and method of collection of data for estate agriculture is different from Population Census. Hence the comparison between these two sets of data and subsequent division into estate and peasant sector has got its obvious limitations and can best be regarded as approximate.

10 ETHNIC CHARACTERISTICS

by Stephen Lucas and Gerard Philippon

10.1 Population of Tanzania : Africans

10.10 Introduction

Despite continued criticism, usually politically inspired but occasionally advanced on social scientific grounds as well, ethnic characteristics of most African countries are still largely expressed in terms of tribal affiliation.

As is shown below, definition of what is meant exactly by tribe varies greatly, so that the word - together with its derivative, tribalism - is really only usefully employed when the social situation giving rise to its expression is clearly described.

For example, in North Africa the word tribe, *qabila*, designated endogamous kinship units based on descent from a common ancestor and constituted as well-defined political entities (1). In the Sudan, the segmentary social organisation of the Nuer has been described by Evans-Pritchard in such terms that tribe does not include all Nuer people but rather the largest political segment "who, besides recognizing themselves as a distinct local community, affirm their obligation to combine in warfare against outsiders and acknowledge the rights of their members to compensation for injury" (2).

Both of the examples above were chosen from rural areas, but there is evidence that urban social situations also require the use of tribal categories for certain types of social interaction. Mitchell, writing about the Zambian Copperbelt, has thus described tribe as a kind of ranking system which measures social distance (3).

In Tanzania, a prime case is the *utani* ("joking") relationship which Leslie - and more recently, Vincent - present as a kind of mutual assistance alliance based on tribal affiliation (4), although current research at the University of Dar es Salaam indicates that this functionalist analysis is too simplistic an interpretation.

Use of tribe as a reference point in social interaction does not necessarily involve tribalism, here taken to have a negative connotation in so far as it

(1) G.Mardock, *Africa: Its Peoples and Their Culture History*, New York, 1959 pp 456.

(2) E.Evans-Pritchard, *The Nuer*, London, 1940 p.5.

(3) J.Mitchell, *The Kalala Dance*, Oxford, 1956.

(4) J.Leslie, *A Survey of Dar es Salaam*, London, 1963. pp.33-37.
J.Vincent, "The Dar es Salaam Townsman", in *Tanzania Notes and Records*, 1971, 1970. pp.149-156.

inspires ethnic chauvinism and unjustified localism in a day of nation-building. In a recent book, Gulliver has defended the continued use of the word tribe in social science analysis "partly because it is still the term used by East Africans themselves" (5). The danger in this, however, is the perpetuation of traditional tribal patterns at odds with development. Mafeje has tartly criticized the "ideology of tribalism" because "it oversimplifies, mystifies, and obscures the real nature of economic and power relations" (6), and he raises the issue of the utility in social science of the continued use of "tribe" and "tribalism" as concepts of worthy explanatory power.

It is therefore relevant to ask whether continued talk about tribe is or is not harmful to the development of a Tanzanian, as opposed to a local, consciousness. Indeed - although the question takes us far beyond the legitimate scope of this chapter - what effect on the national population will asking for "jina la kabila" (name of tribe) have? And of what use to government will millions of answers to that question be? It is in an attempted response to the latter question that the 1967 census data on tribal distribution in Tanzania is here presented.

First, however, a note on method is necessary. Census enumerators were instructed to record tribal affiliation for "heads of household of African ethnic origin" (7), by reference to a list of 130 names of tribes; if "other", the enumerator was to record as given so that responses could later be coded by the Central Statistical Bureau. As is shown below, this entire operation involves difficulties which place some serious limitations on interpretation of the final census data.

As a working definition, we understand tribe to mean a group of persons who share the same cultural system, including language, who claim a common origin and live on the same territory, very often with a common political system. Obviously, none of these criteria are totally unambiguous. Many large socio-linguistic units in Africa are fairly easy to discern, such as Bantu, Nilotes, Cushites, or Khoisan. Even so there is some notable confusion for the external observer: the Arusha are undoubtedly Nilotic-speaking, but their mode of life is more akin to that of their Bantu neighbours than to that of their other neighbours, the pastoral Masai.

On the other hand, for a development planner, the four units mentioned above are impossible to deal with, and anyway it can be seen that more manageable sub-units do exist, but distinguishing between the latter in a systematic way is a delicate task that requires careful analysis of extant ethnographic materials.

Needless to say, administrative definitions, groupings and mapping have been based on rough approximations, and these were often motivated by political convenience. Thus Wallerstein has been able to show how colonial administrators and anthropologists had a penchant for the tribe as the key unit

(5) P. Gulliver (ed), Tradition and Transition in East Africa, London, 1969, p.8.

(6) A. Mafeje, "The Ideology of Tribalism", Journal of Modern African Studies, vol.9 no.2, 1971.

(7) Population census 1967, Instructions for Enumerators and Supervisors; Central Statistical Bureau, Dar es Salaam, 1967, p.23.

of analysis, whereas African nationalists preferred by far to focus on the colony (8). In fact, his study provides a rather pertinent insight into the historical processes through which some tribes came into existence.

In some cases, colonisation "froze" certain groups which had a very fluid make-up as well as others which were fully engaged in the construction of larger political entities. In Tanzania, good examples are the peoples known as Ngoni, Nyamwezi, Hehe and Chaga; it is well-known in the first case that only a small proportion of the Ngoni are actually of South African Ngoni origin, the large majority being conquered/assimilated people. The word "wanyamwezi" is usually (though probably mistakenly (9) taken to mean "people of the moon" or "westerners" in relation to those with whom they trade on the Tanzanian coast (10). Hehe is a war cry; and no one knows what Chaga means, except that it is not even a Kichaga word!

Even if census enumerators were clear about what a tribe was, one cannot always be sure that the respondent answered within the same frame of reference; In 1967, the census interview schedules were printed in Swahili and the word *kabila* was used. This is of Arabic derivation, and as noted above, *qabila* means a politico-kinship group. Among the coastal Swahili - as Prins notes - this term must be "roughly translated" as clan (11). But oftentimes enumerators were obliged to translate *kabila* into a local language for non-Swahili speakers. An error of this type occurred in 1948, when 7,501 persons from Ugogo gave in response to the question of *kabila* the answer "Pangwa", the name of their Gogo clan in Makutupora. Census officials grouped them however with the Pangwa people of Njombe district, an error which was not discovered until later (12).

One further source of difficulty has been the inaccuracy of the Census Bureau's list of tribes. For 1967, the Bemba and the Hemba - two very different populations - are amalgamated as Bemba. And the Hadzapi (Tindiga), although not numerous, speak a distinctive language of their own and deserve a separate entry instead of being grouped with the Dorobo.

And finally, experience gained over the past three censuses in Tanzania indicates that there exists an unmeasured degree of shifting allegiance from one tribe to another, depending on the status of the tribes at a given time and also on the kind of group membership demanded by situations of social interaction. As intertribal marriages increase, offspring may well cite "upande wa mama" (mother's side) or "upande wa baba" (father's side) in view of advantages they might secure by allying themselves with mother's or

(8) I. Wallerstein, (ed) Social Change: the Colonial Situation, New York, 1966, pp.1-2.

(9) Socio-linguistic research currently undertaken by S. Lucas at the University of Dar es Salaam shows that the "nya" segment of wanyamwezi, or banyang wezi in their own language, does not correspond to "of" but is most likely related to "mother".

(10) R. Abrahams, The Political Organisation of Unyamwezi, Cambridge 1967, p.7.

(11) A. Prins, The Swahili-Speaking Peoples of Zanzibar and the East African Coast, London, 1967, p.80.

(12) Explanatory Tables for Census 1967; Central Statistics Bureau, Dar-es-Salaam, 1967, p.20.

father's tribe. One might suppose that the combined influence of both Western and Islamic religion and law would in general weigh in favour of the latter choice.

In this regard, 1967 census data is struck by a serious limitation: census-takers were instructed to register entire households as belonging to the tribe of the head of household, i.e. usually the father. This obviously biases data in those areas where migrant males take local women as brides but because of the predominance of local tradition and culture they "live" the tribal life of their wives while answering their own "jina la kabila" in the census. A similar bias might occur through inter-marriage of neighbouring tribes.

Thus, aside from the male bias of the census - as indeed is the case with most social science - there seems to be no general rule of thumb a government planner might follow in using the tables printed below, other than that of caution. There is, after all, no substitute for in-depth verification of these general statistics at the local level being planned for.

Our commentary on the first table will be accompanied by a short list of corrections thereto.

10.1.1 Mainland population distribution

Data is presented in order of tribe size (1967 figures), showing variation from 1948 through 1957 to 1967, average annual growth rates, 1967 averages of household size, and the percentage of males in each tribal population.

As can easily be seen, there was relatively little change of position among the top fifteen tribes on the mainland since 1957. The Makonde and the Chaga have moved from third and fifth places to second and third respectively. The Makonde increase, probably due in part to increased migration into Tanzania from Mozambique, is all the more marked when it is remembered that the 1957 total included the Matambwe (13), a closely related group who numbered 20,863 in 1967!

Another interesting case is that of the Nyamwezi, who have dropped from second to fifth in overall standing. But extreme care is necessary in the interpretation of this case; census data from the northern parts of Nyamwezi are particularly open to bias/error on linguistic grounds. In Kinyang'wezi (the Nyamwezi tongue), northerners are called Basukuma. Hence the possible inclusion in the Sukuma column (number one in ranking) of "northern" Nyamwezi!

There are also a certain number of errors in Table 10.1; we cite them below with no pretension that our list is exhaustive (14).

(13) African Census Report, 1957. Central Statistical Bureau Dar es Salaam, 1963, p.42.

(14) In most cases, the authors relied on their personal knowledge of Tanzanian ethnography which was then checked against extant studies. Thanks are due to H.F.Chale, second year sociology student at the University of Dar es Salaam, for library research and insight into these and other enigmas encountered by the authors.

Table 10.1: Tanzania Mainland, African population by tribe 1946-67

Tribe	Population			Average 46-57	Annual 57-67	Growth 46-57	Pygmoid 1947	Males
	1946	1957	1967					
Sukuma	888,600	1,093,757	1,529,917	2.3	3.4	2.9	6.0	49
Makonde	281,320	333,897	476,135	1.1	3.6	2.4	3.7	49
Chaga	239,215	318,167	440,239	3.2	3.9	3.3	4.9	49
Haya	275,586	325,559	412,556	2.3	3.4	2.9	3.7	47
Nyauweni	367,629	363,258	405,976	0.1	1.1	0.6	4.0	40
Ha	206,112	289,712	385,071	0.1	2.8	1.5	4.3	47
Hehe	197,153	251,614	360,686	3.0	3.7	3.4	4.6	48
Gogo	278,733	299,417	350,131	0.8	1.9	1.4	4.2	40
Nyakusoo	192,616	219,678	308,188	1.4	3.4	2.5	4.5	46
Shamba	151,154	193,802	271,536	1.3	3.4	3.1	4.3	49
Luguru	178,163	202,297	257,443	1.4	2.4	2.0	3.9	46
Bena	158,548	195,802	251,949	2.4	2.5	2.5	4.1	40
Turu	181,739	195,709	246,317	0.8	2.3	1.5	4.3	48
Saruma	173,518	183,260	227,741	0.5	2.2	1.4	3.5	49
Yao	126,741	144,198	204,399	1.4	3.5	2.5	3.4	48
Irwa	102,554	135,143	198,560	3.1	3.9	3.5	5.4	50
Irumbi	170,697	158,498	193,532	-0.9	2.1	0.7	3.7	47
Zigua	112,113	134,406	189,596	2.0	3.3	2.7	4.2	49
Pare	98,959	126,048	182,887	2.7	3.8	3.3	5.0	49
Mwera (L)	109,507	138,210	181,701	1.3	2.8	2.7	3.6	47
Piga	78,252	86,462	162,369	1.1	6.5	3.9	4.7	49
Mwera	95,454	123,516	161,689	2.9	2.8	2.0	3.4	50
Ngoni	95,432	110,290	150,200	1.5	3.1	2.4	4.1	50
Jita	71,433	86,712	149,766	2.2	5.6	3.3	6.2	48
Luo	58,644	82,678	134,649	3.3	5.0	4.4	3.4	50
Kuria	67,908	85,090	123,488	2.6	3.8	3.2	5.6	48
Rundi	90,312	127,232	158,605	3.4	-0.6	1.2	3.6	51
Kaguru	62,554	86,936	113,831	3.8	2.7	3.2	4.8	49
Ngindo	85,189	88,597	113,193	0.4	2.5	1.5	4.0	48
Ngoni	-	88,223	104,790	-	4.4	-	3.8	51
Pangwa	26,067	70,721	100,198	11.7	3.5	7.3	4.1	47
Matoro	58,360	58,647	96,246	-0.1	5.1	2.6	4.4	48
Kinga	61,500	65,467	95,553	0.7	3.8	2.3	4.0	47
Gushe	63,854	74,435	91,935	2.0	1.9	1.9	4.6	48
Pugoro	65,042	74,047	91,688	1.4	2.1	1.8	4.6	49
Aruha	53,688	68,770	89,834	2.6	2.8	2.7	6.5	48
Niali	57,231	59,650	85,003	0.5	3.6	3.1	4.7	47
Nyika	48,898	54,384	83,005	-	-	-	5.0	47
Nafwa	49,585	63,027	80,416	2.7	2.4	2.4	4.9	48
Masai	60,231	62,180	79,649	0.4	0.5	1.5	4.0	47
Bafiji	71,331	73,498	77,956	1.2	-0.2	0.3	3.7	48
Niengereko	54,804	43,443	87,877	-2.5	4.6	1.1	3.5	49
Ngui	43,254	52,877	64,980	1.7	2.1	1.9	4.1	49
Nyasa	36,346	65,514	62,733	6.8	-0.2	2.9	3.7	48
Mabushi	41,050	44,717	60,585	0.8	3.1	2.0	4.1	49
Kerehe	34,329	40,824	54,922	1.9	3.0	2.6	5.3	49
Zinza	62,794	55,187	52,723	-1.4	-0.5	-0.9	4.8	50
Maro	35,515	35,814	51,729	3.9	3.7	3.6	5.5	50
Harungu	54,588	59,916	51,612	1.0	-1.5	-0.3	3.8	44
Rongo	24,799	52,721	49,087	8.7	-0.7	3.6	3.4	48
Sabi	74,052	61,384	48,987	-2.1	-2.8	-2.2	4.1	47
Kwere	33,494	39,199	48,132	1.8	2.0	1.9	4.2	49
Dondoi	29,525	32,118	47,944	0.9	4.1	2.6	3.7	51
Nanda	20,263	35,175	47,107	6.3	3.0	4.5	5.6	55
Nienleule	-	31,713	44,783	-	3.5	-	4.3	46
Nyamunga	26,392	34,706	44,383	3.0	2.5	2.7	4.9	47
Ngi	31,822	34,417	41,703	0.9	2.0	1.4	5.0	49
Digo	32,027	35,134	40,104	1.0	1.4	1.2	3.2	50
Soggu	21,658	29,689	39,563	3.7	2.8	3.2	4.0	49
Sogoru	23,091	31,609	38,056	3.5	1.9	2.6	4.3	44
Nyika	15,104	34,760	37,371	9.7	0.8	4.9	4.4	49
Darubaga	21,618	30,499	35,826	3.9	1.6	2.7	6.0	49
Zuruki	23,237	24,864	35,430	0.8	5.6	2.2	5.8	47
Wanjil	15,381	24,283	33,269	2.6	3.2	2.9	4.0	47
Niambo	19,306	21,951	32,748	1.4	4.1	2.6	4.5	48
Kimbu	14,873	31,149	30,760	8.5	-0.1	3.9	4.0	50
Sandawe	27,599	28,309	30,003	0.3	0.5	0.4	3.5	49
Mugu	13,454	11,682	39,871	-4.0	9.8	4.3	4.4	48
Makila	17,512	20,745	38,495	1.9	3.4	2.7	4.9	48
Konongo	18,639	20,479	28,731	1.0	2.7	1.9	4.2	49

Table 10.9 cont.

Tribe	Population		1967	Average Annual Growth			Household size 1967	% Males
	1948	1957		48-57	51-57	48-57		
Kamba	2,340	10,895	15,271	18.5	8.8	13.3	4.6	51
Kwaka	55,318	41,501	23,584	1.8	-5.5	-2.1	6.4	47
Taita	29,486	28,138	25,002	-0.5	-2.0	-1.5	4.5	48
Kisumu	17,453	18,085	22,822	0.4	2.4	1.4	3.9	49
Kisumu	18,470	26,878	21,895	4.1	-2.0	-1.3	3.1	49
Kisumu	11,923	12,968	20,917	0.9	4.9	3.0	4.7	48
Kisumu	-	6,097	20,863	-	13.1	-	3.6	49
Kisumu	27,489	19,906	20,830	-3.5	0.4	-1.4	3.7	49
Kisumu	11,144	13,751	20,437	1.3	4.0	3.2	4.5	48
Kisumu	12,243	12,964	20,355	0.6	4.6	2.7	4.4	48
Kisumu	14,499	14,224	20,204	-0.2	3.6	1.7	3.8	44
Kisumu	10,590	12,771	19,505	2.1	4.4	3.3	4.5	50
Kisumu	12,046	11,575	18,688	-0.4	4.9	2.3	3.5	50
Kisumu	13,773	13,165	17,653	-0.5	3.0	1.3	3.8	47
Kisumu	17,705	11,973	17,597	-4.3	3.8	-0.1	4.4	57
Kisumu	9,162	11,372	16,640	1.3	3.9	3.2	5.6	30
Kisumu	17,146	23,691	16,123	4.3	-4.6	-0.3	3.9	48
Kisumu	12,513	13,996	15,744	1.2	1.2	1.2	4.2	50
Kisumu	14,049	7,176	15,439	-7.1	7.9	0.5	3.7	51
Kisumu	6,753	7,100	14,951	0.6	1.8	4.3	5.0	48
Kisumu	3,025	4,653	14,957	4.9	12.3	8.7	4.5	47
Kisumu	5,706	5,291	14,922	-0.6	10.9	5.2	4.2	51
Kisumu	-	25,115	13,994	-	-4.1	-	4.5	50
Kisumu	7,701	5,754	13,889	2.6	3.6	3.1	4.4	49
Kisumu	13,137	11,479	13,775	-1.5	1.8	0.3	4.4	47
Kisumu	9,644	11,436	12,932	1.9	1.3	1.8	3.5	52
Kisumu	8,513	8,746	12,851	0.3	3.9	2.2	4.0	49
Kisumu	3,593	4,593	12,438	2.7	10.4	6.7	4.1	46
Kisumu	7,677	5,477	12,008	2.4	2.4	2.4	5.8	47
Kisumu	7,467	15,803	11,847	8.7	-2.8	2.5	4.9	48
Kisumu	13,454	11,688	10,957	-1.6	-0.6	-1.1	3.8	52
Kisumu	4,410	2,066	10,931	-8.1	18.1	4.9	3.9	51
Kisumu	9,305	11,229	10,229	2.1	-0.5	0.7	5.0	45
Kisumu	9,551	9,459	9,664	-0.1	0.2	0.1	3.6	53
Kisumu	9,718	12,400	9,286	2.7	2.9	-0.2	3.8	50
Kisumu	-	2,832	9,875	-	12.6	-	5.4	45
Kisumu	-	8,131	8,566	-	3.4	-	4.8	45
Kisumu	8,836	7,792	8,289	-1.4	0.4	-0.4	4.4	47
Kisumu	3,918	855	8,249	-15.6	25.3	4.0	3.7	56
Kisumu	4,186	11,590	7,721	11.9	-4.0	2.3	3.9	50
Kisumu	-	1,917	7,356	-	14.4	-	5.2	48
Kisumu	3,572	7,158	7,144	8.1	-0.1	3.8	4.7	51
Kisumu	4,828	7,578	7,037	1.6	-0.3	2.0	4.2	48
Kisumu	4,029	4,135	6,898	0.3	3.2	2.9	3.9	48
Kisumu	8,458	3,395	4,926	-9.9	3.8	-1.9	3.7	53
Kisumu	7,913	6,463	4,280	-2.3	-4.0	-3.2	3.2	53
Kisumu	-	-	4,004	-	-	-	4.2	56
Kisumu	1,264	1,297	3,674	0.2	10.9	5.7	4.3	52
Kisumu	6,374	1,724	3,420	-13.5	7.1	-6.7	3.6	54
Kisumu	1,408	1,267	2,861	-1.2	8.5	3.8	3.7	47
Kisumu	890	1,868	1,038	8.5	0.9	4.4	3.6	53
Kisumu	351	951	1,866	11.7	7.0	9.2	3.8	52
Kisumu	-	-	1,487	-	-	-	3.5	56
Kisumu	579	453	1,321	-2.7	11.3	4.4	5.5	42
Kisumu	-	-	1,202	-	-	-	4.3	45
Kisumu	1,099	145	903	-20.2	20.3	-0.9	4.1	42
Kisumu	-	-	598	-	-	-	3.9	48
Kisumu	-	-	531	-	-	-	4.2	48
Kisumu	-	-	517	-	-	-	4.0	47
Kisumu	-	-	194	-	-	-	4.3	58

Mbugu, Wungu and Wangu. The first error concerns the marked 1957-1967 average annual growth of the Mbugu, 9.8, which we believe to be linked to the disappearance of the Wungu (who numbered 14,926 in 1956 (15)) from the list of tribes, and the new addition of Wangu, population 531.

(15) African Census Report, 1957. Central Statistical Bureau Dar es Salaam, 1963, p.52.

The reasons for the error are complicated, but can be explained on linguistic grounds as a failure of enumerators to record "Wungu" correctly (w is halfway between phonetic W and B, thus leading to a probable sound shift by non-Wungu speaking enumerators of w-b/mb), then compounded by a statistical grouping error which lumped together the Mbugu of Lushoto district with the Wungu of Chunya district. The Wungu (16) should not be entered at all.

b) *Nyika-Mbeya and Nyika-Tanga*. Another grouping error has been committed as regards the Nyika of Mbeya region and the Nyika (sometimes called Mijikenda) of Tanga region, the latter being situated on both sides of the Tanzania-Kenya border (17). So that instead of a single Nyika entry, there should be one for the Nyika-Mbeya and one for the Nyika-Tanga.

c) *Kisi and Kisii (Gusii)*. Similarly to the above, the Kisi (a population living near Lake Nyasa and the Kisii (migrant/settled Gusii from Kenya who were censused in Mara region) are entered in the Table together as Kisii (18).

d) *Shubi and Subi*. Here is a case where enumerators and the Census Bureau excluded 2,334 Shubi on the basis that they had "unidentified names", i.e. could not be found to belong to any established Tanzanian/African tribe as defined in the Bureau's list of tribes. These Shubi are most probably Subi (19).

e) *Gorowa and Fiome*. Same case as d) above, where the Fiome, whose population is recorded by enumerators as 999 but not included in the Table because "unidentified", should be added to the Gorowa total (20).

f) *Bulungwe and Burungi*. The Bulungwe are listed by the Bureau as "tribes outside East Africa" (21), when in fact they should be counted as part of the Burungi (22).

g) *Hadzapi (Tindiga) and Dorobo*. Lastly, as we mentioned earlier, Hadzapi (Tindiga) do not appear in Table 10.1 as they have been grouped with the Dorobo. Although they number only 150-200, they are not Dorobo and as Tanzania's smallest tribal group deserve a place of their own (23).

Below in Table 10.2 we have reformulated the entries to Table 10.1 as they should read in the light of our corrections.

As for the growth rates, it is difficult to formulate general hypotheses for which the data would provide a test; government planners normally deal with

(16) Not to be confused with the Ngulu, sometimes called Nguu or Wanguu, of Morogoro region.

(17) G. Murdock, *op.cit.*, pp. 308 and 359.

(18) *Idem.*, pp. 348 and 360.

(19) This appears to be a simple recording error, s = sh.

(20) G. Murdock, *op.cit.*, p. 194.

(21) See under tribal classification, Vol. III of the Census Report.

(22) G. Murdock, *op.cit.* p. 194.

(23) *Idem.* p. 59.

Table 10.2 Tanzania Mainland, reclassification of certain tribes

As first entered		As corrected	
Name	Population	Name	Population
Mbugu	79,871	Mbugu	12,555
Mbugu	535	no entry	-
no entry	-	Mbugu	17,847
Byika	37,511	Byika-Mbugu	34,174
		Byika-Tarqa	3,497
Kisii	14,922	Kisii	2,215
no entry	-	Kisii	12,707
Sabi	48,907	Sabi	51,291
Gorowa	17,337	Gorowa	16,396
Burungi	9,108	Burungi	16,697
Dorobo	7,058	Dorobo	1,850
no entry	-	Ndindi (Tindiga)	180

administrative units such as the district or smaller where growth rates are useful to have, but established on a cross-tribal basis. When the reader has previous knowledge about the differential economic growth rates in Tanzania, then linking tribal affiliation to stagnancy or prosperity may be possible. This practice is unfortunately open to dangerous stereotyping, as Rigby so competently documents in the Gogo case (24). The data is, in its present form, therefore only suggestive; some of the larger increases or decreases in annual growth rates are certainly due to migration or to the kind of grouping error we have discussed above.

The next-to-last column in the Table gives average household size for each population. Again, it is necessary to comment on method. Firstly, as regards its definition, "household" is almost as unmanageable in Swahili as is "tribe". Census enumerators used "jamaa" but again how this may have been translated by local peoples into vernacular for purposes of the interview is not known. Cultural influence, we must assume, is here very important.

In order to ensure some uniformity of usage, the Tanzania Central Statistical Bureau did issue some instructions in both Swahili and English, which were to guide field personnel. In the English manual, household was defined as "group of persons who live together and share living expenses"; this group is usually "the husband, wife, and children" (25). The Swahili version differs significantly: "Jamaa ni mahali ambapo kikundi cha watu huishi pamoja", which literally says that the "jamaa" is a place where a small group of people live habitually together.

And further: "Kwa kawaida kikundi hiki kitakuwa na mwanamke, mume na watoto wao" (26) i.e. that in principle this little group is made up of a woman, her husband, and their children. The shift in emphasis from the husband in the English version to the wife in the Swahili version may be due to the fact that the author of the latter may belong to a matrilineal, possibly even matrilineal, tribe for whom a definition of household would necessarily key on a female referent.

(24) P. Rigby, "Pastoralism and Prejudice: Ideology and Rural Development in East Africa", mimeographed paper, Dept. of Sociology, Makerere University, 1968, p.21.

(25) Population Census 1967, Instructions for Enumerators and Supervisors, op.cit. p.5

(26) Hesabu za Watu 1967: Vieleso kwa Wenyewe kuhusu na Wasimamizi, Central Statistical Bureau, Dar es Salaam, 1967, p.7

Another complication arises in the matter of polygynous (one man with several spouses) social units, especially when wives live in separate residences with their offspring. Enumerators were instructed to consider as a "household" a wife and her children if the husband was not in the home at the time of the census; and in the case in hand, the wife's tribal affiliation is given to the entire household. In view of our earlier comments about obtaining accurate information about the respondents' tribe, it must be admitted here that the growing complexity increases the margin of probable error to a considerable extent.

Let us assume, however, that the calculation of average household size is roughly accurate in the sense that its biases are consistent in their effects on all tribal populations. Once obtained, what then is its utility?

It is obvious at the outset that Government knowledge about the different sizes of the household unit is important not only for housing planners, but also for those engaged in promoting economic and socio-political development. We wish to raise here a further consideration, concerning an issue which has a long tradition in African social science analysis, and that is the possibility that the average household size and the percentage of males in a population may be pertinent characteristics of "clusters" of tribes.

To our knowledge, the existing literature on the subject of tribal formations, or "clusters", does not refer to them (27). Below are examples of the way in which this data might be used.

Let us take two geographical areas on opposite sides of Tanzania, to be designated roughly as "Yao Cluster" and "East Lake Cluster" (Table 10.3). They are certainly not entirely homogenous, but many authors consider the tribes we list in each to be related culturally (28).

Table 10.3 Yao and East Lake Clusters - average household size and percent males.

Yao Cluster			East Lake Cluster		
Tribes	Average household size	Percent males	Tribes	Average household size	Percent males
Bakonde	3.7	49	Jita	6.2	48
Makua	3.4	50	Kereke	5.3	49
Makumbwa	3.8	49	Kuria	5.6	48
Mawia	3.7	49	Nata	5.2	48
Yao	3.4	48	Negi	5.0	49
Mwinda	3.8	47	Shandi	5.0	48
Mwera (L)	3.6	47	Suba	5.2	48
Nyinda	4.0	48	Dikou	5.2	45
Nachinga	3.8	48	Imaaye	5.4	45
			Kwaga	6.4	47
			Imasi	5.8	47
			Nguruni	4.7	48
			Shuma	4.8	45
			Luo	5.4	50

(27) One of the earliest anthropological attempts was made by H. Reumann and D. Westermann, *Les Peuples et les Civilisations de l'Afrique*, Paris, 1962 (French translation), p. 605; more recently, there is G. Murdock, *Africa: Its Peoples and Their Culture History*, op. cit.; and for a linguistic approach, M. Guthrie, *Classification of Bantu languages*, Oxford, 1948.

(28) With specific reference to Tanzania, P. Gulliver, "A Tribal Map of Tanganyika" in *Tanganyika Notes and Records*, 52, March, 1959. pp. 61-74 (with reference map).

When compared to the national average household size, 4.4, we see that Yao Cluster tribes fall consistently below it, while East Lake Cluster tribes are always above, and the overall difference between Yao and East Lake is almost two full units. The reason for this difference lies perhaps in social structure; the Yao Cluster tribes are matrilineal, but more importantly many are uxori-local i.e. they have marriage rules of that require of the new husband to join the new wife at her residence. On the other hand, the East Lake Cluster tribes are patrilineal and virilocal. So that with the former, a man's primary responsibilities lie towards his mother's lineage, outside the household as defined by the census, particularly in his role as maternal uncle to his sister's children; does this result in a smaller household unit? The East Lake tribes may thus have larger households because their residential units "fit" more closely to the patrilineage system and its rules of inheritance, where a man's primary loyalties are to the household he lives with, reinforced by virilocality.

As to the percentage of males in the two clusters, both are fairly close to the national percentage, 49: and the variations do not seem to be significant.

But it is doubtful that development planners will be thinking in terms of these clusters anyway; the region and the district are the administrative territories which they are obliged to consider. What happens when these two characteristics are scrutinized at the district level? From Table 10.3, a district like North Mara is an interesting example of one with an extremely high degree of tribal homogeneity since 88% of its population is composed of only two tribes, the Kuria and the Luo. The only other group worth mentioning is the Suba, with 7% of the district population. In the district itself, we find that the Kuria have an average household size of 6.0 and for the Luo it is 6.4; the Suba have 6.6, and what is interesting is that in all three cases the averages are higher, that is to say that the household is larger, when homogeneity is increased.

Let us consider now a district with a high degree of heterogeneity, Tanga. Table 10.4 presents a list of the nine most populous tribes of Tanga district, giving their household averages in the district as well as their overall tribal averages, and likewise the per cent male data.

Table 10.4 Tribes of Tanga district: average household size and per cent males

Tribes	District population	District household average	Overall tribal average	Percent males District	Percent males tribe
Bondei	51,629	3.8	3.7	49	51
Shambaa	50,234	4.0	4.3	54	49
Digo	26,471	3.5	3.2	45	50
Bagua	13,042	3.8	4.2	53	49
Segeju	11,010	3.3	3.5	50	50
Makonde	10,705	3.1	3.7	54	49
Ngoni	3,015	3.2	3.7	61	51
Rundi	4,565	2.0	3.6	71	52
Bena	4,540	2.7	4.1	70	48

The first thing to note is that although the household averages do not seem to have important differences, the census data does very clearly reflect Tanga district's plantation economy based on the labour of migrants. This is why the percentage of males is so high in some cases; the Bena, Rundi, Ngoni and to a lesser extent the Makonde most probably leave wives behind

when they migrate to Tanga for plantation work. Even the Shambaa and the Zigua (with 54% and 53% respectively as opposed to their tribal percentages of 49) show higher than average figures. Their quasi-migrant status as reflected in the census data is confirmed by Table 10.6 in that the Shambaa are to be found principally in Korogwe and Lushoto districts, while the Zigua live mainly in Korogwe district.

Let us move now from discussion of national population distributions to those for the three basic administrative units in Mainland Tanzania.

10.1.2 Distribution by region, district and town

In Table 10.5 below, we set out for each region the five main tribes together with their populations expressed as percentages of the total regional population. Comparison with previous census years, 1948 and 1957, is possible although we have not attempted it here. A series of local boundary changes have occurred between 1957 and 1967, so that readers interested in variations should consult I.D. Thomas' specialised study of this question (29). As can be seen immediately from the table, regions which show the greatest degree of tribal homogeneity are Kigoma (Ha and Rundi), Kilimanjaro (Chaga and Pare), Mwanza (Sukuma), Shinyanga (Sukuma and Nyanwezi), and West Lake (Haya). The least homogeneous are Mara and Ruvuma regions where no tribe has more than 21% of the total regional population.

Table 10.5 Tribes by region

Region	Tribes	Percentage	Region	Tribes	Percentage	Region	Tribes	Percentage
Arusha	Iraqe	35.3	Mara	Kuria	22.4	Shinyanga	Sukuma	76.4
	Arusha	14.7		Loe	21.0		Nyanwezi	11.2
	Masai	10.3		Jita	20.7		Sumbwa	4.1
	Muru	8.5		Zemba	5.4		Irasha	2.7
	Darabai	5.7		Sukuma	4.8		Ha	0.5
	Other	27.5		Other	24.7		Other	5.1
Coast	Sarimo	29.5	Morogoro	Nyakusa	50.2	Singida	Turu	47.4
	Rufiji	12.2		Piga	14.8		Irasha	29.3
	Mwengeko	11.5		Sdali	8.9		Gogo	6.5
	Swere	8.2		Kyika	8.0		Irasha	2.9
	Mtumbi	5.1		Rafwa	7.4		Nyanwezi	2.0
	Other	33.4		Other	24.9		Other	11.9
Dodoma	Gogo	45.3	Morogoro	Iguru	33.9	Tabora	Nyanwezi	50.0
	Bangi	20.0		Pogoro	15.1		Sukuma	12.5
	Hehe	6.6		Kaguru	10.3		Konongo	4.4
	Kaguru	6.3		Mwaka	4.9		Irasha	3.4
	Sandawe	3.5		Igou	4.7		Sumbwa	3.4
	Other	17.3		Other	35.1		Other	26.1
Iringa	Hehe	40.9	Mwanza	Makonde	40.3	Tanga	Shambaa	59.0
	Bena	30.9		Mwera-L	16.4		Bondai	5.9
	Kingo	11.3		Mwema	13.8		Piga	4.0
	Pangwa	7.1		Yeo	0.1		Pare	4.6
	Mwaji	2.8		Sigala	5.7		Sgou	3.2
	Other	7.0		Other	13.7		Other	46.9
Kigoma	Ha	72.1	Mwanza	Sukuma	66.5	West lake	Haya	62.5
	Rundi	14.9		Nyanwezi	4.2		Kangara	8.0
	Sarimo	2.1		Rungu	4.2		Subi	5.9
	Jiji	1.9		Jita	4.1		Runda	5.6
	Sogwe	1.6		Karwa	4.0		Rundi	3.8
	Other	7.4		Other	17.0		Other	14.1
Kilima- njaro	Chaga	64.0	Ruvuma	Mwanga	24.4			
	Pare	21.4		Yeo	22.7			
	Datta	1.5		Pangwa	12.4			
	Shambaa	1.0		Mwenda	10.5			
	Irasha	0.7		Sgou	7.8			
	Other	11.4		Other	22.2			

(29) I.D. Thomas, A Survey of Administrative Boundary Changes in Tanganyika/Tanzania, 1957 to 1967: for use in Intercensal Comparisons, BRAHUP Research Notes No.3. See also Bureau of Statistics, Recorded population changes 1948-1967, Tanzania; Dar es Salaam, 1968.

Table 10.4 Tribal distribution by district

Table 10.6 Tribal distribution by district																																																																																																																																																																																																																																																																									
Region	District	Tribes	Percent	Region	District	Tribes	Percent	Region	District	Tribes	Percent																																																																																																																																																																																																																																																														
ARUNDA	Arusha	Arusha	42.9	MBITA	Gungu	Wungu	21.2	SUDANA (cont.)	Tunduru	Yao	56.2																																																																																																																																																																																																																																																														
		Muru	28.1			Sufwa	16.8			Makaa	8.7																																																																																																																																																																																																																																																														
		Other	29.0			Hyakya	11.2			Agani	7.3																																																																																																																																																																																																																																																														
	Masai	Masai	57.2		Mbaya	Kisumu	Pipa		5.6	SHINYANGA	Kabona	Ryanyeni	51.3																																																																																																																																																																																																																																																												
		Sonjo	10.5				Hyika		5.5			Sukuma	23.7																																																																																																																																																																																																																																																												
		Other	32.3				Other		74.1			Sukuma	13.6																																																																																																																																																																																																																																																												
	Mwali	Irawa	68.2			Mbaya	Sufwa		Sufwa		30.9	Mbaya	Mbaya	Other	31.4																																																																																																																																																																																																																																																										
		Korokag	11.6						Hyakya		17.5			Sukuma	94.9																																																																																																																																																																																																																																																										
		Sorokag	6.1						Malla		12.9			Other	5.1																																																																																																																																																																																																																																																										
		Other	13.9						Sangu		12.4			Sukuma	80.0																																																																																																																																																																																																																																																										
QASIT	Dagumoye	Sufwa	32.3	Mbaya		Mbaya	Hyika	49.0	SHINYANGA		Shinyanga	Ryanyeni	7.1																																																																																																																																																																																																																																																												
		Sigwa	17.8				Kyanyanga	21.1				Irumbi	5.8																																																																																																																																																																																																																																																												
		Sorokag	17.5				Kdali	11.5				Other	7.1																																																																																																																																																																																																																																																												
	Kisumu	Doo	8.2		Mbaya	Mbaya	Hyakya	5.9		SUDANA	Irumbi	Irumbi	69.7																																																																																																																																																																																																																																																												
		Jagura	5.4				Wanda	5.3				Turu	14.0																																																																																																																																																																																																																																																												
		Other	16.8				Other	7.2				Isakutu	7.1																																																																																																																																																																																																																																																												
	Mafie	Sorokag	53.7			Mbaya	Mbaya	Hyakya			66.3	Mbaya	Mbaya	Other	9.2																																																																																																																																																																																																																																																										
		Wongorokag	13.1					Kdali			17.8			Gogo	37.5																																																																																																																																																																																																																																																										
		Other	33.2					Other			15.3			Pipa	16.3																																																																																																																																																																																																																																																										
	Mbaya	Shirani	33.4				Mbaya	Mbaya			Pipa		64.5	Mbaya	Mbaya	Isakutu	10.3																																																																																																																																																																																																																																																								
Sorokag		13.3	Sangu	8.4					Kisba		8.5																																																																																																																																																																																																																																																														
Sukuma		11.3	Hyika	7.2					Ryanyeni		5.1																																																																																																																																																																																																																																																														
Other		5.3	Other	19.9				Other	22.3																																																																																																																																																																																																																																																																
MBITA	Mbaya	Hyika	23.1	MBITA	Kilosa			Kagura	35.3	SUDANA	Sungida		Sufwa		91.1																																																																																																																																																																																																																																																										
		Sorokag	34.6					Vakunda	10.0				Other		8.9																																																																																																																																																																																																																																																										
		Makunda	6.1					Sagwa	6.2				Mbaya		Mbaya	Pipa	16.9																																																																																																																																																																																																																																																								
	Other	58.5	Kagura		5.6	Korokag		14.6																																																																																																																																																																																																																																																																	
	Mafie	Mafie	43.4		Mbaya	Mbaya		Other	40.2		Ryanyeni	13.4																																																																																																																																																																																																																																																													
	Shirani	24.2	Kagura					49.3	Pipa		11.2																																																																																																																																																																																																																																																														
	Other	5.0	Agani				9.8	Wanda	9.8																																																																																																																																																																																																																																																																
	Mbaya	Ngido	6.5			Mbaya	Mbaya	Other	20.9		Mbaya	Mbaya		Sangu	8.9																																																																																																																																																																																																																																																										
		Pogoro	5.3					Pogoro	30.4					Other	23.0																																																																																																																																																																																																																																																										
		Other	11.2					Makaa	19.0					Kisba	42.7																																																																																																																																																																																																																																																										
SUDANA		Mbaya	Gogo	83.5			Mbaya	Mbaya	Sema	9.2		Mbaya		Mbaya	Ryanyeni	37.0																																																																																																																																																																																																																																																									
	Other		16.5	Ngido					9.1	Irumbi					6.5																																																																																																																																																																																																																																																										
	Korokag		65.4	Ngidi					5.5	Other			13.8																																																																																																																																																																																																																																																												
	Mbaya	Sukuma	9.8	Mbaya				Mbaya	Other	18.8			Mbaya	Mbaya	Ryanyeni	39.0																																																																																																																																																																																																																																																									
		Vakunda	6.1		Mbaya				Mbaya	Korokag					8.6																																																																																																																																																																																																																																																										
		Other	18.3							Mbaya					Mbaya	Kisba	7.2																																																																																																																																																																																																																																																								
		Gogo	35.7					Mbaya						Mbaya		Sukuma	6.9																																																																																																																																																																																																																																																								
	Kagura	24.3	Mbaya			Mbaya			Sukuma		5.0																																																																																																																																																																																																																																																														
	Isakutu	19.7							Mbaya		Mbaya				Other	33.3																																																																																																																																																																																																																																																									
	Sagwa	7.1												Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya	Mbaya

Another important fact to be taken into consideration here, is the category "Other"; for when the residual class contains percentages ranging from 20-35 as do nine of the seventeen regions, one sees that tribal heterogeneity is an outstanding characteristic of the regional unit.

As for the district level, we have included in Table 10.6 above all the tribes which total at least 5% of the district population. For purposes of quick identification, the list is ordered alphabetically by region. From the data, it can be seen that some districts are practically mono-tribal in composition; these are Dodoma (Gogo), Kasulu (Ha), Kilimanjaro (Chaga), Pare (Pare), Mtwara (Makonde), Newala (Makonde), Malya-Kwimba (Sukuma), Mwanza (Sukuma), Maswa (Sukuma), Singida (Turu), and Bukoba (Haya). On the other hand, the most heterogeneous are Chunya, Songea, Mpanda, Tanga, Biharamulo, Pangani, Musoma, Mbeya, Kilosa, Mafia, and Mzizima.

Towns are, as one would expect, much more heterogeneous than their district or regional environments. In fact, only three towns in Tanzania are populated by a single tribe whose size is greater than 50% of the population. These are Mtwara (61% Makonde), Bukoba (56% Haya), and lastly Morogoro (52%

Table 10.7 Mainland towns, population distribution by tribe

Town	Tribe	Percent	Town	Tribe	Percent
Arusha	Chaga	22.9	Morogoro	Iguru	52.5
	Arusha	18.7		Sigau	4.7
	Pare	7.1		Pugufu	3.2
	Rangi	6.4		Karimo	2.7
	Shambaa	2.9		Ngoni	2.7
	Other	42.0		Other	34.2
Bukoba	Haya	55.9	Moshi	Chaga	38.9
	Gusda	4.1		Pare	12.5
	Makonde	3.0		Shambaa	4.2
	Other	35.3		Rangi	3.3
Dar es Salaam	Karimo	27.4		Iao	2.7
	Iguru	6.6		Other	38.4
	Mafia	6.3	Mtwara	Makonde	60.7
	Mikongoro	4.7		Makua	9.9
	Ngindo	3.5		Tao	9.4
	Other	51.7		abawa (L)	5.2
Dodoma	Gogo	19.9		Nyasa	2.8
	Nyasa	9.3		Other	12.0
	Hehe	5.7	Mwanza	Jita	29.2
	Rangi	4.7		Kwaga	15.0
	Ngoni	3.9		Iao	14.7
	Other	56.5		Kuria	5.2
Eringi	Hehe	41.6		Kenki	3.3
	Nyasa	15.5		Other	32.4
	Nyakyusa	4.7	Mwanza	Sukuma	20.4
	Ngoni	4.4		Nyasa	9.3
	Kinga	4.0		Haya	9.1
	Other	29.8		Iao	5.6
Kigoma-Ujiji	Jiji	22.4		Jita	4.6
	Ha	18.6		Other	51.0
	Karimo	16.1	Tabora	Nyasa	24.9
	Makonde	9.0		Nyasa	11.2
	Hehe	5.7		Karimo	4.1
	Other	28.2		Sukuma	3.7
Lindi	Makonde	37.8		Pipa	3.1
	Hehe (L)	25.3		Other	53.0
	Tao	12.9	Tanga	Hehe	18.0
	Makua	8.1		Shambaa	13.9
	Nyasa	3.5		Bondai	10.7
	Other	34.4		Sigau	7.6
Mbeya	Nyakyusa	36.3		Sogaja	7.5
	Ngoni	4.4		Other	42.3
	Hehe	4.4			
	Safwa	3.5			
	Nyika	3.4			
	Other	45.8			

Luguru). The most heterogeneous towns are Tanga and Dodoma, in neither of which does any ethnic group attain 20% of the urban population.

Worthy of special mention is the core of Arusha town, which has a population of Chaga immigrants greater than the number of townsmen of Arusha, and where the Meru count is so low as to be insignificant!

10.13 Immigrants

It is quite difficult to arrive at a precise idea of what constitutes an immigrant tribe, particularly in the cases of the several groups who live on Tanzania's international borders, such as the Makonde, the Luo, the Holoholo, etc. In table 10.8 below, we have listed by order of size in 1967 the principal immigrant tribes we know of and we have listed - where available - their corresponding 1948 and 1957 population totals for comparison.

Table 10.8 Principal immigrant tribes

Tribe	Population totals		
	1948	1957	1967
Bundi (Burundi)	99,312	122,233	114,605
Bunda (Burundi)	29,263	35,175	47,167
Kamba (Kenya)	2,348	10,865	25,271
Manyema (Zaire)	10,670	25,678	21,895
Bena (Sambia)	9,644	11,430	12,932
Ganda (Uganda)	9,551	9,499	9,464
Kikuyu (Kenya)	3,918	896	8,749
Teita (Kenya)	8,650	3,395	4,936
Isioma (Kenya)	2,611	1,634	4,004
Arusha (Uganda)	1,284	1,297	3,474
Barotsi (Zaire)	1,408	1,267	2,861
Bojuni (Kenya and Somali)	751	951	1,666
Soja (Uganda)	1,099	145	921
Somali (?)	-	-	1,432
Taboot (Kenya and Uganda)	821	-	194

It should be pointed out that the designation "Somali" is very ambiguous, and does not necessarily refer to an inhabitant of the People's Republic of Somali; in fact, they were even classed as non-Africans in 1948 and 1957; (30). Furthermore, Manyema - although the correct name of a tribe in Zaire - is often used to designate any Zairian in Tanzania.

After each tribal name, we have given in parentheses the group's country of origin.

Variations in these populations over the years are due to diverse causes, but immigration and emigration account for the major changes and are often a function of internal political stability in the country of origin. A second important factor is inter-marriage, but we have no available data to indicate the degree to which this may affect the totals given in the table above.

Until now, our considerations have been for the Mainland of Tanzania; let us here comment on the census results for Zanzibar (includes both Zanzibar and Pemba Islands).

(30) J. Moffett, Handbook of Tanganyika; Dar es Salaam, 1958. p. 703.

10.1.4 Zanzibar

The most striking feature of Zanzibar's African composition is the overwhelming domination by two main groups, the Shirazi and the Tumbatu; the Shirazi at 159,303 being three times the Tumbatu population of 53,809. The average household size on Zanzibar, 3.3, and its percentage of males, 50%, are highly determined by the great weight of the Shirazi and Tumbatu figures: 3.5 and 3.3, and 50% and 40% respectively.

For all other tribes, we see that the rule is a much smaller-than-average household size, although some groups like the Kuria (5.1 as opposed to 5.6 on the Mainland) and the Doe (4.6 compared with Mainland 4.4) do not show great variation. As concerns the percentage of males, it is readily apparent that most tribes have a "migrant status" which we have already discussed earlier, reflected by the greater number of males than females.

In table 10.9, we present the main tribes of Zanzibar, in order of their

Table 10.9 Zanzibar population distribution by tribe

Tribe	1967 Population	Average household size (Zanzibar: 3.3)	per cent males
Shirazi	159,303	3.5	50
Tumbatu	53,809	3.3	40
Sarwa	8,105	2.9	50
Nyasa	4,902	2.9	47
Nyumbi	4,641	2.2	58
Yao	3,796	2.8	48
Makonde	3,687	2.7	55
Ngus	2,749	3.1	49
Sumbili	2,727	3.2	48
Laguru	2,723	3.8	53
Mtengereke	2,473	3.0	51
Bajuni	2,344	3.6	54
Eginda	2,283	2.8	49
Bafima	1,740	3.1	43
Sukuma	1,636	2.2	59
Nyanya	1,541	2.8	46
Nakoo	1,203	2.9	56
Digo	1,187	2.7	50
Weera (L)	1,060	3.0	53
Mtumbi	1,043	3.2	53
Dakawa	1,031	2.4	56
Nguni	870	3.1	59
Sunda	626	3.6	37
Seba	652	2.5	59
Pufiji	473	3.6	45
Koloholo	441	2.8	51
Gegeju	424	2.7	48
Safwa	382	4.1	48
Rundi	339	1.9	69
Ha	331	2.6	54
Shanba	291	2.8	59
Taturu	255	3.6	54
Isa	215	2.6	59
Kikuyu	212	2.6	60
Nyakyusa	195	2.7	62
Nyika	181	2.5	45
Doe	160	4.6	48
Pipa	152	2.6	59
Dasi	128	2.1	50
Gogo	125	2.2	60
Elima	123	1.9	65
Pare	123	3.4	39
Mtambwe	119	3.4	42
Turo	116	2.7	50
Kuria	113	5.1	53
Haga	112	2.7	51
Kamba	106	1.8	66
Tengwe	103	4.5	49
All Others	2,265	2.7	57

1967 population size, with corresponding average household sizes and percentages of males in each population.

10.2 Population of Tanzania : Minority groups

10.2.0 Introduction

Overall data for the three main minority groups; Arabs, Asians and Europeans is presented in Table 10.10 below. In subsequent pages a more detailed breakdown is provided for each, and attention is given to the salient characteristics of their population distributions.

Table 10.10 Tanzania Mainland, distribution of three minority groups, 1948-67

	Arabs			Asians			Europeans		
	1948	1957	1967	1948	1957	1967	1948	1957	1967
Mainland Urban	2,963	5,628	7,353	35,368	60,111	58,402	3,756	2,041	5,733
Mainland Rural	8,131	13,450	22,222	12,806	16,306	16,613	6,892	11,493	11,151
Mainland Total	11,094	19,078	29,575	48,174	76,417	75,015	10,648	20,534	16,884
Mainland Urban %	26.6	28.5	25.4	72.1	78.7	77.9	35.3	44.0	34.0
Mainland Rural %	73.4	70.5	74.6	27.9	21.3	22.1	64.7	56.0	66.0
Coast incl. Dar es Salaam	Abs. 2,433 % 21.9	4,240 22.2	5,577 18.7	16,777 34.3	26,425 37.2	25,907 34.9	1,980 17.9	5,126 25.0	4,312 25.5

Some introductory comments are however in order. Given the small size of these three groups in relation to the African population, one might suppose that any problems of establishing criteria for determining membership in a minority would hardly cause significant perturbations of the results no matter what was their eventual solution. Let us simply note that for us "Arab" seems dangerously wide; also that presumably "Asian" means a person with ancestry of Indian or Pakistani origin and would not ordinarily include, say, Japanese or Chinese; and finally that "European", despite protest from Americans, Australians, and perhaps even Russians, encompasses what is usually meant in Swahili by *wazungu*, the whites, even though the term is particularly inappropriate for the growing community of Afro-Americans in Tanzania.

Secondly, it is interesting to note that although the Arab population has more or less held its own with a steady if not spectacular growth and is distributed well in favour of rural areas, both Asian and European populations are in decline since 1957 and tend to be more clustered in urban centres or "urbanized areas".

It should be noted also that although the 1967 Arab figures for the Mainland as shown here still reflect accurately their current population, those for Asian are most certainly inaccurate, especially since recent Government of Tanzania decisions affecting the commercial sector of the national economy have resulted in considerable emigration by the latter group. Equally,

Swahili-ization of primary schools and considerable emphasis on Tanzanian secondary teacher education, coupled with a growing number of University trained Tanzanians now available as middle, and high-level manpower cadres, have resulted in a decline in white expatriate teachers and advisors, albeit not as dramatic as the Asian slump.

A final comment is necessary regarding the validity of comparison of the three census¹ results which we attempt below. We have not taken into account certain of the administrative boundary changes which affected some of the regions. Once again, readers are referred to the research of I.D.Thomas (31).

10.2.1 Arabs

Of 86,607 Arabs recorded in 1967, only 30,000 are on the Mainland; and of the 56,832 attributed to Zanzibar, a total of 41,893 are on the island of Pemba. It can be seen from the table below that in only one region, Kilimanjaro, was a negative average annual growth rate registered for the 1957-1967 period; elsewhere population increased. One of the more spectacular rates was that of Kigoma region, 13.4, due partly to a spurt from 20 to 246 individuals in Kigoma town. The overall distribution is such that one can still see the pattern established by traders early in the development of commercial routes from the coast to the interior. Thus proportionally higher Arab populations can still be found on the Tanzanian coast, at Tanga and at Dar es Salaam, and up-country stations Dodoma, Tabora, Shinyanga and Mwanza.

Table 10.11 Arab population by region 1948-67

Region	Population			Average Annual Growth %	
	1948	1957	1967	1948-1957	1957-1967
Arusha	46	110	212	9.7	6.5
Coast	1,346	1,695	1,734	2.6	0.2
Dodoma	649	927	1,622	3.9	5.6
Iringa	170	252	502	4.4	6.9
Kigoma	229	352	1,547	4.8	13.4
Kilimanjaro	196	327	277	5.6	-1.4
Mara	6	88	762	34.8	24.1
Mbeya	199	507	605	10.7	1.7
Morogoro	394	964	969	10.0	0.0
Mwanza	148	206	442	3.7	7.6
Nearctic	517	1,227	2,504	9.6	7.4
Ruvuma	3	2	14	-3.2	21.5
Shinyanga	1,123	2,074	3,000	6.8	3.7
Singida	662	857	1,752	2.6	4.0
Tabora	1,300	1,960	4,932	4.5	9.2
Tanga	2,453	3,800	4,151	4.9	0.8
West Lake	270	1,199	1,229	8.2	2.5
Zanzibar	44,560	-*	56,832	-	-
Dar es Salaam	1,067	2,545	3,043	9.6	4.1

* No information available from 1958 census

10.2.2 Asians

The most striking characteristic of the table of data regarding the Asian population is of course the negative, or very low, growth rates in all regions of Tanzania, except two - Coast and Ruvuma. It is further to be noted that the figures for the Coast do not include Dar es Salaam, where the population increased from 15,203 to 27,441 and again to 28,153 during 1948-1957 and 1957-1967 periods, respectively. This means that the influx of population

(31) I.D.Thomas, *op.cit.*

Table 10.12 Asian population by region 1948-67

Region	Population			Average Annual Growth %	
	1948	1957	1967	1948-1957	1957-1967
Arusha	2,380	4,116	4,204	6.0	0.2
Coast	1,091	964	1,754	-1.0	5.8
Dodoma	1,982	2,721	2,329	3.5	-1.3
Iringa	857	1,591	1,481	6.9	-0.7
Kigoma	516	959	810	6.9	-2.0
Kilimanjaro	2,542	4,153	3,972	5.4	-0.4
Mara	841	1,353	1,324	5.3	-0.2
Mbeja	1,592	1,985	1,428	2.5	-2.5
Morogoro	2,214	3,696	3,190	5.7	0.2
Mtwara	2,427	4,279	4,304	6.3	0.2
Mwanza	3,336	5,970	6,124	6.5	0.2
Narok	211	400	595	9.1	1.4
Shinyanga	1,061	1,404	1,101	3.7	-2.3
Singida	822	896	666	1.0	-2.3
Tabora	2,231	3,151	2,749	3.8	-1.2
Tanga	5,797	9,362	8,342	5.3	-1.0
West Lake	1,143	1,708	1,849	4.9	0.5
Zanzibar	75,892	18,334*	13,552	1.4*	-2.6*
Dar es Salaam	75,203	27,441	20,153	6.5	0.3

* The census was taken in March, 1958

in the Asian community on the coast did not occur in the capital as one might have imagined, but in Rufiji district and on the island of Mafia. In the case of Mwanza region, where all districts recorded losses of Asian population, it was only Mwanza town, with a growth from 3,956 persons in 1957 to 4,945 in 1967 that managed to tip the overall rate to a positive, though feeble, 0.2.

10.2.3 Europeans

As was the case with the Asian community, the table below shows for Europeans an overall negative annual growth for the 1957-1967 period, with the exception of three regions-Coast, Morogoro and Kilimanjaro. Once again, the Coast region figures do not include Dar es Salaam, where actually a decline was measured: population distribution for 1948, 1957 and 1967 was 1726, 4479 and 3430 respectively. This results in a -2.1 growth rate for 1957-1967. The main European increase therefore was likewise not in the capital, but rather in Kisarawe and Mzizima districts.

Table 10.13 European population by region 1948-67

Region	Population			Average Annual Growth %	
	1948	1957	1967	1948-1957	1957-1967
Arusha	1,352	2,348	1,579	6.1	-2.8
Coast	184	647	1,882	14.0	10.7
Dodoma	863	1,096	288	2.7	-5.3
Iringa	528	1,156	593	8.7	-4.0
Kigoma	141	309	79	4.4	-4.8
Kilimanjaro	708	1,362	1,961	6.1	3.6
Mara	153	280	184	6.7	-0.9
Mbeja	753	1,790	663	5.1	-3.9
Morogoro	578	1,058	1,611	6.7	4.2
Mtwara	538	796	321	4.8	-4.7
Mwanza	351	936	582	10.9	-3.2
Narok	215	296	127	3.8	-4.6
Shinyanga	234	725	503	11.6	-2.5
Singida	106	229	222	8.6	-0.3
Tabora	582	918	895	3.0	-0.2
Tanga	1,339	2,323	3,529	5.1	-0.9
West Lake	197	432	413	8.7	-0.4
Zanzibar	290	307*	388	5.4*	-5.4*
Dar es Salaam	1,726	4,479	3,430	10.6	-2.1

* The census was taken in March, 1958

And if one has recourse to a fairly time-worn saw about the predilection of

Europeans to populate areas of high altitude and economic potential, then the positive - though slight - growth in Kilimanjaro and Morogoro regions is explained. Let us note that this is not universally true, as the losses registered in Arusha, Iringa, and Mbeya regions will attest.

10.3 Conclusion

Description of Tanzania's population in terms of its ethnic and tribal characteristics should not be misconstrued to mean that the minority groups defined thereby somehow achieve status detrimental to national unity. It is in the abuse of this knowledge that the mystification of tribalism occurs.

For the plain fact of the matter is that for the present when Tanzanians are asked by their Government for these group affiliations as part of a national census, they respond with identifiable tribal labels. And these are not simply figments of the imagination.

We have already indicated that in part the continued use of these tribal labels is due to their heavy utilization by colonial administrators, missionaries and anthropologists who were attempting to come to terms with (i.e. understand, but also control) small-scale social units which were relatively autonomous in relation to one another and which had their material bases in subsistence agriculture or pastoralism. But we must also admit that census officials in 1967 have likewise contributed in part to the continuation of that traditional mode of classification. Let us emphasise the "in part", because were those tribal labels not rooted as well somewhere in the cultural and socio-economic institutions of Tanzanians, then there would not have been such ready and specific answers to the question of "Jina la kabila".

This question is clearly one which pertains to sociological development, i.e. to the realm of the development of Tanzanian consciousness and of national culture as opposed to a continuation of local cultures and their corresponding tribal consciousness. We should note, however, that historically the realization of a total national unity has rarely taken place anywhere, and indeed in those cases where it has, there has oftentimes resulted an unfortunate national tribalism and chauvinism severely endangering international peace.

Thus, policy is painfully difficult to determine, in that ideally a Government may wish to pursue the aim of achieving national integration while at the same time allowing some levels of local or regional particularism to continue their unique expressions of what man is.

In Tanzania, a decision regarding language has been taken and every effort is being made to encourage the use and growth of Swahili even when this may mean the ultimate loss of the other 130-odd languages in the country. And the authors of the most recent edition of the Atlas of Tanzania broke with their predecessors by not publishing a "Tribal Map" in its chapter on human geography, thus officially recognizing population distribution of "Tanzanians" rather than "Tribesmen living in Tanzania" (32).

(32) Ministry of Lands, Settlement, and Water Development, Atlas of Tanzania, Dar es Salaam, 1967, p.29.

Should, therefore, the Bureau of Statistics follow suit and abolish the census question on *kabila*? We believe that it should not. Information of this kind will continue to be of importance to development planning until the time comes when the peoples of Tanzania begin to identify more strongly with area, district, and region.

For the solution does not lie in abolishing tribes by administrative fiat; only when region, district, and area become economically functional and sociologically meaningful units, will people re-think their traditional system of classification and thereby re-categorize themselves in line with the modern entities.

11 MORTALITY

by Bertil Egero and Roushdi A. Henin

11.1 Levels and trends in mortality

Although at the present stage of development of demographic statistics in many developing countries the estimates of mortality are the least reliable of vital rates, two characteristics appear to have been generally accepted; that mortality in these countries is high and that it is declining. The expectation of life at birth is then a fairly good indicator of the level of economic development of a country, though neither this rate nor the crude death rate is as good to define 'developing' and 'developed' countries as is the level of fertility (1).

Comparatively speaking, the level of mortality is very high in Africa, higher than in any other world region. The crude death rate for the first part of the sixties has been estimated at 23 per thousand, significantly higher than the 19 per thousand in the next highest region, Asia. And the universal trend of decline in mortality expected for the future means that Africa will remain in the top position.

Within Africa, the north and south parts have the lowest mortality levels, 17-18 per thousand, whereas in tropical Africa the average level appears to be around 24-25 per thousand. Variation is large, however, between different countries in the area and without doubt also between different parts of the same country. So for instance, estimates of crude death rates for sub-units of the three East African countries give a variation from 13 to 31 per thousand (2).

However, despite the seeming exactness of such estimates, the point of departure for an analysis of current data as given by earlier censuses is rather weak. The level of confidence in those estimates is perhaps best described by direct quotations from earlier census reports:

Kenya:

"The proportion of children surviving to census date indicated a level of child mortality which corresponded with those contained in various model mortality tables with expectations of life at birth of between 40 and 45 years. These models indicated that the crude death rate among Africans (excluding Northern Province) should be somewhere between 18 and 23 per thousand". ... "it appears unlikely that the crude death rate in Kenya in the early 1960's was much in excess of 20 per thousand" (3).

(1) United Nations, World Population Prospects as Assessed in 1963. New-York, 1966.

(2) U.N. Economic Commission for Africa, Demographic Handbook for Africa. Addis Ababa, 1968. A.J.Coale & P.Lorimer, 'Summary of Estimates of Fertility and Mortality,' in W.Brass et al., The Demography of Tropical Africa, Princeton, 1968.

(3) Kenya Population Census 1962, Vol.III, African Population, Nairobi 1966, p.75.

Tanganyika :

"A life expectancy at birth of between 35 and 40 years and a crude death rate of some 24 or 25 per thousand may therefore be taken as the best estimates obtainable from the census data" (4)

Uganda :

"Mortality rates ... have been estimated from the estimated infant mortality rates." ... "The figure derived from the 1948 census was 'a minimum of 25', so that the present Uganda figure of 20 represents a decline of 20 per cent ..." (5) .

Zanzibar :

"For Afro-Arabs, ... Crude death rates of between 20 and 24 per thousand and life expectancies at birth of between 40 and 45 years in both islands may be accepted with a tolerable degree of certainty." "Mortality among the Asian population was undoubtedly appreciably lower than among the Afro-Arab. Life expectancy at birth was certainly over 50 years and perhaps even 55 years, while the crude death rate is probably in the neighbourhood of 10 per thousand" (6)

The low level of confidence in the estimates achieved is an expression of the unreliability of the basic data, leading to sometimes rather differing estimates from different types of data. In this respect the situation has not improved very much up to 1967, although the variety of information and techniques for their analysis tend to facilitate judgement on the composite picture of fertility and mortality.

11.2 Available information and required indices on mortality

The information related to mortality collected in the 1967 census was the same as ten years earlier; data on deaths during the last 12 months, and data on the number of children still alive out of those ever born for women 12 years or more. There were, however, a few important differences. For deceased persons, information was collected on sex and age, making a life table construction at least theoretically possible. And for the survival of children, although no question was asked as to the age at death of a child, individual ages were recorded for each mother rather than for only a small proportion as in 1957 (7) .

The current mortality data was collected through a question to the head of household about the number of deceased in the household during the last 12 months, and if any, the sex and age at death of each deceased. A number

(4) African Census Report 1957, Dar es Salaam 1963, p. 91.

(5) Uganda Census 1952, African Population, Statistics Branch. Ministry of Economic Affairs, Kampala, 1961, p.29.

(6) Report on the Census of the Population of Zanzibar Protectorate, Zanzibar, 1961, pp. 60-61.

(7) In the 1958 census of Zanzibar, the children who had died were further classified into 'still-born', 'died before weaning' and the 'remainders'. No such classification was used in 1967.

of problems in acquiring accurate data are immediately clear. Notwithstanding the common reluctance to speak about the deceased and even more to give details about them, the general problems of defining the reference period apply here as well as to current fertility. Further, some difficulties must have come from the question of what is meant by 'deceased in the household', for instance when a person dies while away from his or her household. A related problem is the omission of all deaths which lead to the dissolution of the household of the deceased. In addition to this, the construction of a life table from the census data requires the use of two different 'groups'; those deceased in the last 12 months, and those still alive at the time of census. The mechanisms behind distortions in the data may have a different impact on the two groups, thus reducing the comparability of the data.

As a result of this, the estimation of mortality by means of child survival may prove more reliable, despite its more indirect relation to the mortality indices looked for and the errors likely to appear even there. For instance, a common error in the survival data, discussed in the chapter on fertility, is the tendency to omit or forget children who died soon after birth. Such an error could be expected to affect the ever born and the still alive in different ways, tending to push the resulting proportion upwards.

In addition to the measures discussed above, data on fertility and age distribution will be used to estimate mortality by means of the stable population models now available for the analysis of incomplete data. With the general level of mortality established via the life tables underlying these models, more specific mortality indices for the population can be derived from selected model age distributions. The indices to be studied are:

- *crude death rate*, called 'CDR', defined as the average annual number of deaths per thousand of the population,
- *average life expectancy at birth*, labelled ' e ', which is the average number of years a newly born baby is expected to live, given the death rate at each age in the population,
- *infant and child mortality*, which is expressed either as a death risk (q_x) or as a survival rate (l_x). Generally, the infant mortality will be expressed as deaths before the age 1 (q_0) per thousand born, and the child mortality will be expressed as survivors to age 2 (l_2) or age 5 (l_5) per thousand born.

11.3 Death rates based on recorded deaths

The current mortality data have been used to calculate CDR's for administrative units of the country (8). The Mainland average of 24.4 is slightly on the high side, whereas for Zanzibar the recorded 13.7 must be

(8) The figures presented are based on the total number of deaths per household, up to an accepted maximum of 4 deaths. Thus they may differ from the age-specific death rates given later in this section and in Census Volume 3, as data on age and sex were recorded only for the first three deceased persons.

Table 11.1 Distribution of recorded crude death rates for administrative units (9).

Unit	Crude Death Rate						Total	Lowest recorded value	Highest recorded value
	-14	15-19	20-24	25-29	30-34	35+			
Region	2	1	5	7	7	2	18	15	39
District	7	16	11	12	10	10	66	9	65
Towns	4	6	5	1	-	-	16	10	29

regarded as far too low. And, despite the not extreme overall figure for Tanzania of 24.1, the variation between smaller units is too high to give credibility to the data.

A detailed presentation of recorded crude death rates for 1967 regions and 1957 provinces is given in table 11.2 below. With the regions being rather large heterogeneous areas, judgements concerning the recorded mortality order are by necessity uncertain. Nevertheless, a few observations can be made. Low mortality has been recorded for comparatively rich regions such as Arusha, Kilimanjaro and West Lake, and high mortality appears to be a characteristic of poorer regions such as Dodoma and Mtwara. But exceptions from this trend are not rare, with for instance a relatively low mortality in Ruvuma and Singida and a high mortality in Mwanza.

Table 11.2 Crude death rates for regions and provinces.

Region	Crude death rate 1967		Recorded crude death rate		
	Recorded	Estimated	Province	1957/58	1967
Kilimanjaro	15.1	15.6	Zanzibar	20.0	13.7
Zanzibar	15.7	20.8	Northern	19.1	15.6
West Lake	17.6	25.0	Tanga	26.7	21.8
Arusha	20.9	15.6	Lake	25.5	23.0
Singida	21.2	27.4	Western	19.2	23.7
Ruvuma	21.4	27.6	S. Highlands	21.8	24.9
Shinyanga	22.3	21.0	Eastern	21.3	25.7
Iringa	22.5	25.8	Central	28.7	27.0
Dar es Salaam	22.9	16.1	Southern	22.6	32.1
Tabora	25.0	18.8			
Tanga	25.3	17.0			
Mwanza	27.0	23.0			
Mara	28.2	27.9			
Morogoro	28.3	24.9			
Sigma	28.8	22.7			
Nbaya	29.9	30.7			
Coast	30.4	19.0			
Dodoma	31.1	22.9			
Mtwara	39.4	24.8			

The final estimates of mortality by region, achieved by methods described later in this chapter, have been included in table 11.2 for comparison with the recorded data. The two sets of death rates show a very low degree of agreement, and there is no doubt that the relative order of the regions given by the estimated data is more reasonable (10).

(9) 17 Mainland regions plus Zanzibar; 60 Mainland districts plus 6 rural areas in Zanzibar; 15 Mainland towns including Dar es Salaam plus Zanzibar Town.

(10) In fact, the rank correlation between crude death rates and available estimates of gross domestic product is much higher for estimated than for recorded death rates, 0.69 compared to 0.40. In view of the unreliability of available GDP estimates, the correlation is unexpectedly high. (GDP's are taken from District Data Tanzania 1967, Ministry of Economic Affairs and Development Planning, Dar-es-Salaam, 1968).

The comparison of crude death rates by province, the only administrative divisions for which data are available from the last census, tends to confirm the above observations. The correlation between the two sets of figures is very weak, which could be the effect of a low degree of accuracy in either or both sets. Although it might be argued that the relative order of the provinces is more reasonable in 1967, there is no doubt that the burden of distortion would have to be shared by both sets.

The distribution of recorded deaths with age has also, for Mainland Total, been studied by the construction of a female life table based on the number deceased and the recorded population in each age group. Comparisons of this life table with available model life tables (11) disclose an excess of reported deaths in ages 1-14, and a tendency towards under-reporting in higher ages which increases with age. The two tendencies balance each other to lead to a slightly high CDR, but are immediately disclosed by the high resulting e_0 of 51 years.

This finding, further confirmed in a more detailed analysis of the age-specific mortality rates (see App. 11.1) and added to the observations above, leads to the conclusion that the recorded current mortality data are seriously distorted. In fact, they appear too inaccurate to be used for the estimation either of age-specific or even of crude death rates, at least for the country as a whole.

11.4 Estimates from retrospective mortality data

The proportion of children ever born who are still alive at the time of the census is an index of mortality which can be converted into a useful form through a technique developed by W.Brass (12). The proportion of surviving children for each age group of mothers from 15-19 and subsequent age groups can be adjusted to form an estimate of l_x -values from age 1 to an upward limit given by the tabulation of survival data but not exceeding age 35. The values obtained can then be compared with available life tables for the estimation of level and pattern of mortality. They can also be graduated by means of fitting to the 'African Standard' life table constructed by Brass.

The general experience from the application of the Brass technique for converting survival proportions is that only a limited range of l_x -values can be trusted as accurate. The distortions in the retrospective data, which tend to increase with age of women, may also significantly affect the l_x -values derived from the higher ages. Similarly, the survival to age 1, which is based on child survival for women 15-19 years old, would have to be used with care. What remain then are the derived l_x -values referring to ages 2, 3 and 5, of which l_2 has come to be the most widely

(11) A.J.Coale and P.Demeny, Regional Model Life Tables and Stable Populations, Princeton, 1966.

(12) W.Brass and A.J.Coale, 'Methods of Analysis and Estimation', in W.Brass et al., The Demography of Tropical Africa, Princeton, 1968.

accepted indicator of the level of mortality (13).

This situation, which also applies to Tanzania, leads to a dependence on model life tables for the estimation of both general and age-specific mortality. For reasons further explained in App. 11.2, the Coale-Demeny set of model life tables was chosen, and of the four 'families' of life tables given, the North was selected for use throughout Tanzania.

The selection of a life table was made by means of best fit to the derived values of l_2 , l_3 and l_5 . As an aid in the selection, l_2 was used, adjusted for better consistency with the derived l_3 and l_5 (see App. 11.2) and occasionally l_x -values from current mortality data. The selected North life tables and the corresponding mortality estimates, for both sexes combined, are presented in table 11.3 below.

Table 11.3. Selected North life tables and corresponding mortality estimates for the total population by region

North life table level	Region	Crude death rate	Life expectancy at birth (years)	Infant mortality per 1000 born	Surviving to age 5 per 1000 born
15	Arusha	13.6	53	95	843
	Kilimanjaro	13.6			
	Mainl. Urban	14.5			
14	Dar es Salaam	16.1	51	104	829
13	Younga	17.0	48	115	808
12	Tabora	18.0	46	127	771
	Coast	19.0			
11	Lindi	20.0	43	140	762
	Shinyanga	21.0			
10	Kigoma	22.7	41	155	739
	Mainl. Total	22.8			
	Mainl. Rural	22.9			
	Dodoma	23.0			
	Mwanza	23.0			
	West Lake	23.0			
9	Mtwara	24.8	38	170	714
	Morogoro	24.9			
	Iringa	25.8			
8	Singida	27.4	36	186	688
	Buvumbi	27.4			
	Mara	27.9			
7	Mbeya	30.7	34	205	660

The estimation of crude death rates in table 11.3 was made by means of selection of a model stable population based on the estimated mortality levels and the recorded child/adult ratios. The procedure is more fully described in Ch. 13 and the mortality estimates for districts arrived at by the same method are presented in App. 14.2.

The order of the regions in terms of mortality may not conform exactly to expectations. So, for instance, doubts could be raised concerning the low mortality of Tabora and Coast regions as compared to the high mortality of Mbeya. Although the presented order can be supported by

(13) See for instance the revised version of the mortality estimates for tropical Africa from W. Brass et al, *op. cit.*, presented by H.J. Page and A.J. Coale in 'Estimates of Fertility and Child Mortality in Africa South of the Sahara', S.H. Ozinde & C.N. Ejiogu (eds), *Population Growth and Economic Development in Africa*, London 1972.

evidence of a non-demographic character (14), this points to the need for an intelligent application of the estimates, which have nothing of the seeming exactness with which they are presented above.

The method used for the estimation of mortality levels is mainly based on the survival rates up to age 5 derived from the proportion of children still alive. In App. 11.3 all available evidence is used to verify the level of child mortality (between ages 1 and 5) and the relation between infant and child mortality. The conclusions drawn are that in relation to the model life tables used, the mortality between, say, ages 1 and 5 appears to be rather high. Thus, while the overall mortality level as described above seems valid, the detailed pattern of child mortality may differ from the models chosen. Tentative estimates of survival to age 5 for Mainland Total are as follows: (15)

<u>Age</u>	<u>Proportion surviving</u>
1	0.84
2	0.79
3	0.76
5	0.74

The mortality estimates given above refer throughout to the total population, i.e. the average of males and females. In the analysis we have accepted and applied the assumption of the model life tables used, that males display a higher mortality than females. This assumption is tested in App. 11.4, and though evidence is weak and unreliable it nowhere contradicts this assumption. That overall mortality is higher among males than females does not imply very much about the age-specific differences. The crude death rate and life expectancy depend very much on the mortality for young age groups and we cannot exclude the possibility that adult mortality is higher among females, who do most of the agricultural work with frequent interruptions for child birth.

11.5 Mortality differentials

The differences in mortality between urban and rural areas have already been shown to be considerable. Similarly, the differential economic development and access to medical facilities between regions, and even more so between districts, are reflected in the varying mortality levels over the country (see table 11.3 and App. table 14.2).

Other differentials, which have been studied for the Mainland population, are educational and socio-economic levels. Although in higher educational

(14) See footnote (10).

(15) These values point to an overall mortality in Tanzania 1967 which is higher than in the rest of East Africa. Although no estimates immediately comparable to those above are as yet available, a recent study confirms that among the neighbouring countries Kenya has by far the lowest mortality. Next comes Uganda, closely followed by Zambia, then Tanzania, and - by a considerable margin - Malawi. See J.G.C. Blacker, The Estimation of Vital Rates from Census Data in Kenya and Uganda, paper presented to the African Population Conference, Accra, December, 1971.

Table 11.4 Mortality estimates for educational groups, Mainland

Education	Infant mortality per 1000	Survival to age 5 per 1000	Life expectancy at birth	Birth family
None	155	739	41	10
1-4	115	808	48	13
5 or more (16)	82	868	56	16

groups the female representation is rather small, the estimates from the proportion of surviving children appear to give a coherent picture of the mortality differentials.

The socio-economic grouping of the women was based on residence and occupation of head of household. Six occupational groups were distinguished, of which three were further subdivided into rural and urban. Despite the shortcomings inherent in the occupational grouping, rather substantial differences in mortality are evident from the data in table 11.5.

Table 11.5 Mortality estimates for socio-economic groups, Mainland

Socio-economic group	Infant mortality per 1000	Survival to age 5 per 1000	Life expectancy at birth	Birth family
Urban top-level white collar workers	67	904	61	18
Urban middle-level white collar workers	87	860	54	16
Rural top-level white collar workers; Urban blue collar workers	104	809	51	14
Rural middle-level white collar workers; Rural blue collar workers	115	800	48	13
Agricultural labourers; Persons without occupation	140	762	43	11
Farmers	191	739	41	10

The mortality differentials for ethnic groups have been studied, but data do not permit any conclusive comments for the non-African groups (see footnote (16)). However, in the case of Zanzibar with its larger non-African population it was felt necessary to present even the very tentative conclusions which might be drawn from available information.

The 1958 census report from Zanzibar divided the population into four racial groups; Afro-Arabs, Asians other than Arabs, Europeans, and Somalis and others. The two latter groups together comprised less than 1% of the population and may therefore be left outside the analysis. For the other groups, the Afro-Arabs have between 1958 and 1967 increased from 280,000 to 332,500, an annual growth of 1.9%, whereas the Asian group has increased from 18,300 to 13,500 during the same period.

The mortality situation in 1958 was quite different for the two groups.

- (16) An attempt was made to split this group into two, 5-8 and 9 or more years education. However, for the latter group the child survival proportions tended to increase rather than decrease with age. The same phenomenon has been observed for the non-African ethnic groups, and seems to be related to a different pattern of fertility. Thus the Brass method of mortality estimation does not seem applicable on groups which tend to control their fertility pattern.

Infant mortality was estimated to be around 160-170 for Afro-Arabs and 100 for the Asian population, and the life expectancy at birth, approximately 41-42 years for the former, was estimated to be ten years higher for the latter. In 1967, the relative differences remain on more or less the same level, but for each group there appears to have been some reduction in the level of mortality. The infant mortality of the Asian population is now estimated at 70-80 per thousand, and their life expectancy at birth may well be between 55 and 60 years. Similarly, for the combined African and Arab population the infant mortality may be as low as 140 per thousand and the life expectancy a few years higher than in the last census.

The above estimates should be surrounded by wide margins of error resulting from the combined effect of distortions in the data and changes in the population structure caused by migration and other events. Such changes may also explain the fact that the reductions in mortality are not reflected in the crude death rate, which is sensitive for changes in the age structure of the population.

11.6 Conclusions on mortality

The conclusions on mortality from the 1967 census could, in the light of the quality of available information, only be tentative, though perhaps less so than ten years earlier. The various pieces of evidence produced give a reasonably coherent picture of the basic traits of mortality, though some details in the picture, like adult mortality, remain vague.

The 1957 Mainland estimates of crude death rate and life expectancy were 24-25 per thousand and 35-40 years respectively. For 1967 we remain confident that the life expectancy is over 40, though probably close to 41 but certainly not higher than 43 years. The corresponding crude death rate is estimated to be between 21 and 23 per thousand. This points to a decreasing trend in mortality, though the speed of the trend is difficult to assess on the basis of two so vague estimates.

The pattern of mortality by age is extremely difficult to establish. The Mainland infant mortality in 1967 appears to be as low as 160 per thousand or less, a considerable reduction compared to the only figure given in the 1957 census report, 190 per thousand. On the other hand, there is little doubt of a relatively high mortality in the ages between 1 and 5, possibly connected with weaning. The survival rates obtained were 800 or less per thousand to age 2, and 740 per thousand to age 5. Expressed in a different way, this means that 1 out of every 6 children born dies within his first year of life, 1 out of every 5 before his second birthday and 1 out of every 4 before reaching the age of 5 years.

For Zanzibar, the picture is more or less the same as for the Mainland though possibly the overall mortality level is slightly lower. The estimated crude death rate of 20.8 is almost the same as the 1958 census result of around 20. This does not mean, however, that no decline in mortality should have taken place on the islands, as during the intercensal period migration and other events have led to a substantial redistribution of the ethnic groups. So, for instance, the infant mortality of both

the Afro-Arab and the Asian population may have declined by some 20 per thousand, though for reasons of redistribution in the age structure - or a too low estimate in 1958 - this is not reflected in the crude death rate.

A summary of the estimated mortality parameters from the two last censuses is given in table 11.6 below.

Table 11.6 Mortality estimates from 1957/58 and 1967

		CDB	%	q_0	L_5
Mainland	1957	24-25	35-40	190	1
	1967	21-23	41-43	160	740
Zanzibar	1958	20-21	42-43	160	1
	1967	20-21	43-44	140	710

The regional variations in mortality in Tanzania are high, to say the least. The extremes are represented by regions with a life expectancy at birth of around 33 and 53 years respectively, a difference of 20 years. In these extreme cases 20% as compared to less than 10% of the children die during their first year, and only around 65% as compared to 85% survive to their fifth birthday. Similarly the crude death rates vary from around 30 to around 13 per thousand.

These differences should not be regarded as an exact description of the situation, but as indicators of the wide variations that exist between districts in the country. There seems to be no doubt that they reflect similar large variations in educational, medical and economic standards between different parts of Tanzania.

12 FERTILITY

by Bertil Egero and Roushdi A. Henin

12.0 Introduction

Africa is still the region of the world in respect of which data on fertility as well as other demographic estimates are least comprehensive or reliable. Nevertheless it is now possible to draw up a provisional statistical picture of the levels of fertility in most parts of the continent, thanks mainly to the recent censuses and demographic sample surveys conducted in African countries where the vital rates were formerly unknown.

The most striking features of the birth rate in Africa were given by the Princeton team, which establishes an average crude birth rate of 47 per thousand and a range between 30 and about 60 per thousand. Thus fertility in Africa is high, if not quite uniformly so.

Little needs to be said here about the present level of fertility which - and this needs to be emphasized - is quite high. What is equally important is the future trend in fertility, that is whether fertility in the foreseeable future is likely to decline, remain constant or rise. To answer this question, we need to look at fertility differentials.

Fertility is much higher in some countries than in others. Further, these differences are even more pronounced between regions within the same country. During the 1966 First African Population Conference, at Ibadan, A.J.Coale presented a fertility map for most countries in Tropical Africa (1). In three countries (Nigeria, the Niger and the Sudan) differences between the lowest and highest crude birth rates were, for the various provinces, of the order of 25 per thousand. Four other countries showed differences varying between 15 and 18 per thousand. In six other countries, differences ranged between 5 and 18 per thousand.

It must, however, be remembered that part of the differences between these provincial birth rates may be due to differences in the quality of reporting. What is immediately relevant for our purpose is that fertility differentials within many African countries do exist, and the question arises as to how far these differences are the result of deliberate birth control or due to factors which are not the result of deliberate action by the population concerned. If the latter is the case, then with the removal of these factors - other things remaining equal - fertility would rise in the low fertility regions to match the higher fertility levels prevailing in other parts of the country.

With a crude birth rate of about 45 per thousand, East Africa seems to hold a middle position in the range of crude birth rates of between 30 and 60

(1) W.Brass et al., *The Demography of Tropical Africa*, Princeton, 1966. Ch. 4.

See also: J.C.Caldwell and C.Okonjo (eds), *The population of Tropical Africa*, London, 1968, Ch. 17.

referred to above. Looking further at available data, Tanzania seems to have a fertility which is lower than that of Kenya but higher than that of Uganda.

12.1 Available fertility data from the 1967 Population Census

The 1967 population census of Tanzania provided three sources from which fertility indices have been derived:

- A question was asked of all women aged 12 years and over, as to whether they had borne a child during the 12 months preceding the census, from which crude birth rates (and general fertility rates) could be calculated.
- The data on age distribution, enabled 'child-woman' ratios to be obtained.
- A question was asked of all women aged 12 years and over as to the total number of children born alive they had ever had, thus providing information on the average number of children born alive by age group of women and in the case of women who had passed reproductive age, the average size of completed families.

None of these sources can be regarded as entirely trustworthy. The data on births during the 12 months preceding the census were subject to all the errors due to 'recall lapse', 'boundary effect' and general misunderstanding which frequently beset the answers to questions of this kind. The child-woman ratios were affected not only by age mis-statement and possible under-estimation or overenumeration of children, but also by differential mortality. Wide experience gained both in Africa and elsewhere, has shown that the information on total live births provided by older women is frequently distorted by large scale omissions of children who have either died in infancy or grown up and left the home.

12.2 Crude birth rates (2)

The different regions of the country are shown in table 12.1 in descending order of the CBR together with the lowest and highest rates recorded for districts within each region.

The difference between the region with the lowest CBR namely Coast (or for that matter, the lowest but one, that is Mtwara) and Shinyanga, which has the highest recorded CBR is of the order of 17 per thousand. While this may reflect genuine regional fertility differentials, it is doubtful whether these differentials account for the whole difference. A part of this difference is certainly a result of errors in the data. A CBR of 65 per thousand for Shinyanga region is indeed on the high side.

Further, while differences in fertility between districts within the same region should be expected, it is doubtful that they could be as high as over 20 per thousand as is the case in Shinyanga, Zanzibar, and Tabora regions. In

(2) From now on the crude birth rate will be referred to as CBR.

Table 12.1 Recorded CBR by region (in descending order) and differences between districts within regions with highest and lowest recorded CBR

Region	CBR	CBR recorded at district level		Difference in CBR between highest and lowest recorded rates	Number of districts in region
		Lowest	Highest		
Shinyanga	65	51	71	20	3
Nirn	62	52	68	16	2
Burundi	62	54	63	9	3
Mbeya	62	51	65	14	5
Mwanza	62	54	69	15	4
Dodoma	61	56	72	16	3
Tanga	58	48	66	18	5
Iringa	58	56	61	5	3
Zanzibar	58	41	68	27	6
Kilimanjaro	57	56	59	3	2
Arusha	56	50	67	17	3
Telesia	55	45	66	21	3
Singida	55	51	56	5	3
Kigoma	54	51	57	6	3
West Lake	53	49	63	14	4
Morogoro	50	46	56	10	3
Mtwara	49	43	52	9	6
Coast excl.					
Dar es Salaam	48	43	52	9	5

six other regions, (Mbeya, Mwanza, Dodoma, Tanga, Arusha and West Lake), the difference between districts with the lowest recorded CBR and districts with the highest recorded CBR is about 15 per thousand.

While heterogeneity with regard to CBR could be expected at the regional level, some sort of homogeneity should prevail, at least, between divisions of the same districts. The following table shows the distribution of the 66 districts of the country by the magnitude of the difference between the division with the lowest recorded CBR and that with the highest CBR.

Table 12.2 Tanzania, recorded CBR differences at divisional level

Difference between lowest and highest division CBR within the district	Number of districts
Less than 10 per thousand	6
10-	16
15-	11
20-	11
25-	8
30-	5
35-	2
40 and over per thousand	6

While it is admitted that with smaller populations sampling errors become larger, the difference between divisions of the same districts are so large in some cases, that other errors must have been at work. In 8 districts the difference was as much as 35 or over per thousand. In fact in the case of exactly half the districts (33 out of 66), the differences between the division with the lowest CBR and that with the highest CBR were of the order of 20 or over per thousand. Less than 10% of the districts showed differences of below 10 per thousand.

The unreliability of the data on the CBR and consequently on all indices dependent on births during the 12 months preceding the census, is evident from the fact that for some divisions the recorded CBR was more than 100 per thousand. In the case of 116 divisions (out of a total 369, or about 32%), the recorded CBR was 60 or over per thousand.

To sum the discussion at this stage, there is little doubt - judging from a recorded CBR of 57 per thousand for the country as a whole, and from the above analysis - that at least the reference period must have been misunderstood by the respondents and has generally been inflated. There is in fact some evidence that this was the case judging from the way the question was asked. The following quotation (3) may throw some light on this:

'The number of children born alive during the last 12 months should include all children born alive between the 27th August 1966 up to the 26th August 1967..... In some cases it may be difficult to define the period of 12 months before the census and to find out all children born alive in this period. The enumerator may therefore take into account all children who cannot walk and add children born alive in the last 12 months who died before the census; or recall a local event which happened approximately at the end of August 1966 and count all children born alive after such an event, or take all children born alive one month and a half after Saba-Saba day 1966, etc., so that no child born alive in the last 12 months may be omitted.'

There are several inherent limitations in the above instructions and all lead to a bias in one direction and thus result in inflating the number of live births during the 12 months preceding the census. Firstly, there is no guarantee that all children who could not walk were in fact under one year. It is possible that under-nourishment may delay the age at which a child starts walking. Secondly, resort is made to the 12 months preceding the census for adding the number of children who could not yet walk to the children 'born alive in the last 12 months who died before the census'. There is some contradiction in the instructions, for while the census taker admits that the 12 months period may not be easily defined, it is resorted to, for the purpose of arriving at the number of dead infants. Thirdly, reference was made to 'Saba-Saba day' as being one and a half months before the beginning of the reference period. It is possible that children born since that event might also have been included.

12.3 Age-specific birth rates and total fertility rate

Data on births during the 12 months preceding the census were calculated by age group of mother which enabled age-specific birth rates and a total fertility rate to be produced. These are given in the following table for Tanzania Mainland.

The total fertility rate - which is defined as the average number of children born alive to a woman who lives to the end of her reproductive life i.e. to age 50 - as arrived at from the recorded current fertility data is about 7.3. This again, is relatively high. An attempt will therefore be made here to study the possible factors that might have contributed to this high figure.

In the face of it, the shape of the fertility distribution as it is shown in

(3) 1967 Population Census: Instructions to Enumerators and Supervisors.
Central Statistical Bureau, Ministry of Economic Affairs and Development
Planning, Dar es Salaam June, 1967.

Table 12.3 Yassania Mainland, recorded age-specific birth rates and total fertility rate

Age group	Absolute rates (births per thousand women)	Relative rates (per thousand)
15-19	169	136
20-24	334	229
25-29	316	217
30-34	260	179
35-39	201	138
40-44	115	79
45-49	60	41
Total	1,455	1,000
Total fertility rate	7.275	

column 3 of the above table looks plausible, with a broad peak at ages 20-24 and 25-29, which characterises the shapes of the fertility distribution of many African populations. A closer look however, shows that the contribution of age group 15-19 to the total is on the low side, bearing in mind the fact that procreation is known to start fairly early in Africa. On the other hand the contribution of age group 45-49 is rather high despite the fact that it is the general impression that African women menopause at a relatively early age.

The low contribution of age group 15-19 will be taken up later in this section. However some light will now be shed on the relatively high rate for age group 45-49.

There is evidence - as mentioned above - that the reference period was misunderstood by the respondents and has generally been inflated and thus included births which took place more than one year before the census. While this might have affected all age groups, it is possible that the effect of this factor was much more pronounced in the case of the older women, not only on account of misunderstanding of the true length of the reference period, but also because of deliberate falsification. Having a recent child would mean that a woman is still fertile which brings her prestige. This is quite common in many African societies. Evidence of this feature is seen from the following recorded age-specific birth rates for women who have passed the reproductive age.

Age	Rate per thousand
50-54	27
55-59	16
60 and over	6

The effect of the abnormally low rate for age group 15-19 and the excessively high rates for the older women is reflected in a high mean of the fertility distribution which was found to be 29.0 years (0.5 years deducted) (4). In fact if the births for women aged 50 and over were considered as belonging to women aged 45-49, the rate for this age group would rise to 99 per 1000 women, and the mean of the fertility distribution would rise further.

Further evidence of inclusion of births that took place before the 12 months preceding the census can be seen from a study of the proportion of women who were recorded as having given birth to more than one child during the 12 months preceding the census.

(4) W. Brass et al., *op.cit.*

Table 12.4 Proportion of recorded multiple births by age group of mothers, three selected countries

Age group	Kenya 1962	Tanzania 1967	England & Wales 1957-61
Under 20	0.50	0.96	0.65
20-24	0.60	1.36	0.91
25-29	1.16	1.64	1.21
30-34	1.52	1.71	1.54
35-39	1.99	1.98	1.60
40-44	3.05	2.36	1.27
45-49	3.89	2.91 (3.54)*	0.79

* The figure in brackets includes births to women 50 years and over.

Source: Kenya Population Census 1962, Vol. III, African Population, Nairobi 1965.

Bearing in mind the interpretation given in the source mentioned above that the proportion of pregnancies resulting in multiple births rises with age of mothers, the trend of the Tanzanian rates are not only higher than those for England and Wales but partly also for Kenya. In fact the behaviour of the Tanzanian rates indicates that the inflation of the reference period affected not only the higher age groups, but the younger age groups too. Further, as is shown in the table, the proportion of women with multiple births for age group 45-49 is higher when the births that have been recorded as having occurred to women over 50 are included (3.54), than when excluded (2.91), signifying that this phenomenon is more pronounced at older ages.

So far we have shown that there is evidence that data on current fertility were inflated, possibly as a result of differential misunderstanding of the reference period. An attempt will be made here to inquire into the reliability of the retrospective data. The following table shows the proportion of women who were childless as well as the proportion of women for whom no information on children could be obtained, that is, 'not stated'.

Table 12.5 Proportion with no child and with children not stated, by age group for Mainland Total, Mainland Urban and two selected regions

Age group	Mainland Total		Mainland Urban		Arusha		Coast	
	Childless	Not stated	Childless	Not stated	Childless	Not stated	Childless	Not stated
15-19	65.6	2.4	67.2	1.2	72.9	2.6	55.4	2.1
20-24	20.5	2.4	30.0	1.9	29.3	2.8	21.5	3.1
25-29	12.1	2.0	20.5	1.6	15.6	2.3	16.8	2.4
30-34	10.9	2.2	19.4	1.9	10.3	2.5	15.8	2.9
35-39	10.3	2.4	19.2	1.6	8.6	2.1	16.4	2.6
40-44	11.3	2.8	20.8	2.0	10.5	3.4	17.3	2.6
45-49	10.9	2.7	21.5	1.8	10.1	5.1	16.2	3.3

It needs to be pointed out at the outset, that while the figures for childless women are rather high, those for the 'unstated', are relatively low at least as compared with similar data for Kenya from the 1962 census which are given below.

Table 12.6 Percentage childless and 'not stated', Kenya 1962 and Tanzania 1967

Age group	Kenya			Tanzania total
	Childless	'not stated'	Total	
15-19	34.1	15.6	49.1	68.0
20-24	11.7	25.1	36.8	22.9
25-29	7.2	15.1	22.3	18.1
30-34	5.9	11.5	17.8	13.1
35-39	4.8	10.5	15.3	12.7
40-44	4.8	9.6	14.4	14.1
45-49	4.9	8.6	13.7	13.6

The above table shows that apart from the younger ages (i.e. 15-29), where the differences between the two countries are quite sizeable and which cannot be immediately explained, the values for ages 30-49 are roughly of the same magnitude. What is immediately relevant, however, is that according to the above figures, either the incidence of childlessness is high for both Tanzania and Kenya - about 15% by the end of the reproductive life - or there is a tendency for women of low parities from all age groups to either forget or omit the one or two children they have given birth to, thus deflating the retrospective values.

12.4 Application of Brass's method

An attempt will now be made to use both the available recorded current and retrospective data on fertility to arrive at an adjusted total fertility rate as suggested by Brass (5). The following table shows the retrospective, the current and the adjusted total fertility rates using Brass's method, for Tanzania Mainland and for the regions.

Table 12.7 Total fertility rates from recorded, retrospective and current data, and as adjusted by Brass's method*

Regions	Retrospective	Current	Adjusted by Brass's method	P_2/P_1
Arusha	5.3	7.5	8.1	1.082
Coast	3.7	5.8	5.5	0.956
Dodoma	5.3	7.6	6.0	1.053
Iringa	6.8	7.8	9.5	1.210
Kigoma	4.2	6.6	7.0	1.182
Kilimanjaro	6.6	8.9	9.4	1.059
Mara	6.0	8.0	8.5	1.047
Mbeya	6.4	8.1	9.7	1.198
Morogoro	5.0	8.2	7.4	1.185
Mwanza	4.5	5.7	6.4	1.124
Mwanza	5.5	8.1	8.4	1.035
Shinyanga	6.2	7.1	7.8	1.299
Singida	5.2	6.7	8.6	0.987
Singida	4.7	6.3	7.4	1.176
Tabora	4.0	6.7	7.0	1.059
Tanga	5.1	7.7	8.0	1.051
West Lake	5.1	7.5	8.2	1.097
Dar es Salaam	3.1	5.0	4.7	0.955
Zanzibar	4.5	7.3	7.0	0.966
Mainland Rural	5.3	7.4	8.1	1.094
Mainland Urban	5.3	5.1	5.0	0.980
Mainland Total	5.2	7.3	7.9	1.080

* For retrospective data the average number of children ever born by women aged 45-49 was used. P_2/P_1 stands for the ratio of the retrospective to the cumulative current fertility for age group 20-24.

The use of Brass's technique has resulted in a total fertility rate as high as 9.7 for Mbeya, 9.5 for Iringa, and 9.4 for Kilimanjaro regions. Further the total fertility rate reached between 8.0 and 8.5 in Arusha, Dodoma, Mara, Mwanza, Shinyanga, Tanga and West Lake. While fertility may be high in some of these regions, it is doubtful that it reaches these levels. For Tanzania Mainland the total fertility rate has been raised from the already high value of 7.3 to 7.9 live births.

As rightly pointed out in a recent E.C.A. paper (6), the technique in some cases 'has given satisfactory results: the two curves of the cumulative fertility

(5) Brass's 'P/P-method' is presented and applied to Mainland data in App.12.1.

(6) Demographic Surveys in Africa 1950-1970: Some Results and Conclusions, Prepared by the Economic Commission for Africa for the Inter-Regional Workshop on Methodology of Demographic Sample Surveys, p. 7.

lity and average parity correspond closely for the younger age groups of women, and the adjustments implied have been small and entirely plausible. In other cases, however, the results have been very far from satisfactory; not only have the overall numbers of births reported as having occurred during the 12 months preceding the inquiry been grossly understated, but the whole shape of the age-specific 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 parity and the implied corrections have been so great as to be unacceptable'.

In the case of the Tanzanian data, the results obtained from the application of Brass' method are equally unsatisfactory not only because of similar factors rendering the shape of the fertility distribution implausible but also because it is evident - as was shown above - that the average numbers of births reported as having occurred during the 12 months preceding the census, rather than being grossly under-estimated, were probably grossly over-estimated.

Brass also suggested analysing the current and retrospective data by birth order (7). Just as under constant conditions, the cumulated current age-specific fertilities give the mean number of children ever born, the sum of the age-specific rates for first, second, third births etc. to each age give the proportion of women who have borne at least one, two or three children etc. by that point respectively. The method used for comparing current and retrospective observations of births without regard to order can be applied to the component birth orders to extract further information on the pattern of errors. The method is explained further in App. 12.2. The general inflation of the reference period is well confirmed in the results, when P/F ratios indicate a proportion well over 100% of the women reaching both first and higher birth order.

12.5 Fertility levels

In view of the evidence already established that the recorded current fertility data are suspiciously high - possibly on account of an inflated reference period - and the retrospective fertility data are relatively too low - possibly on account of memory failure - and in view of the unsatisfactory results obtained from the use of Brass's method for adjusting the total fertility rate, two approaches which are based on the 'stability' of the age distribution were used. In Chapter 11 the mortality level and pattern were estimated for Tanzania Mainland, Rural, Urban and the different regions of the country. Two different parameters were used in combination with the mortality level to arrive at an estimate of the gross reproduction rates (8). The first

(7) W. Brass et al, *op.cit.* p.103.

(8) Strictly speaking, information on age composition and growth which permits the choice of a matching stable population model provides an estimate of the crude birth rate as a measure of fertility and does not enable us to estimate the GRR. The reason is that two populations with the same fertility in the sense of the same birth rate and with the same age composition can have quite different numbers of children per woman passing through the child-bearing span, depending upon whether on the average, births occur relatively early or relatively late in the span. The mean of the recorded fertility schedule was used to select the nearest $\bar{n}$ available in the Regional Model Life Tables, to determine the estimated GRR. See for example A.J.Coale and C.Tye, 'The Significance of Age Patterns of Fertility in High Fertility Populations', *Milbank Memorial Fund Quarterly*, Vol. 39, October, 1961 pp. 631-646.

is the cumulative age distribution under specified age (9), hereafter referred to as C_x , and the second is the female child/adult ratio.

The gross reproduction rates (GRR's) of a stable population based on the estimated mortality level, the recorded mean of the fertility distribution and the recorded C_x 's are shown in App. 12.3. For the country as a whole and for each region, eight GRR's based on C -values from 5 to 40 are available. These values are certainly affected by the patterns of age mis-statements (discussed in Ch. 13). While the proportion of children aged 0-4 was found plausible, the proportion in the age group 5-9 was shown to be inflated. Further the proportion of girls aged 10-14, 15-19 were deflated by systematic upward movement to older ages. This rate of upward movement continues beyond age 45. This pattern is reflected in the behaviour of the GRR's. They start by being high for C_{10} , then they drop for C_{15} , C_{20} , and C_{25} , then a mild rise for C_{30} and a levelling out for subsequent age groups. The general picture is summed up by the Tanzania Mainland GRR (for $\bar{m} = 29.0$) as follows:

Table 12.8 Estimates for GRR based on C_x for Tanzania Mainland (Level Birth 10).

C_x	C_{10}	C_{15}	C_{20}	C_{25}	C_{30}	C_{35}	C_{40}
GRR	3.39	3.05	2.95	2.94	3.12	3.13	3.12

In view of the fact that the over-estimation of age continues beyond age 40, the GRR of 3.13 (or a total fertility rate of 6.4), may still be on the low side for Tanzania Mainland.

From the recorded age distribution, the child/adult ratio (females aged 0-4/women aged 15-44) was calculated and used in combination with the mortality level and the mean of the fertility distribution to select a model age distribution. The case for using the child/adult ratio is discussed at some length in Ch. 13 which deals with the age distribution. It will be shown that the recorded proportions of the population aged 0-4 and 15-44 do not seem to be significantly distorted by age mis-statements. The selected model was then used to estimate the GRR and the total fertility rate for Mainland Total and the regions. The total fertility rates arrived at in this way are shown in the following table together with the corresponding birth rates arrived at from the same models.

To sum the discussion about the level of fertility it may be said that the recorded current rates were found to be too high, the retrospective values were shown to be too low, and Brass' adjustment generally raised the total fertility rates beyond the already high current rates. With regard to rates arrived at through using the model age distribution, a total fertility rate of 6.4 for Tanzania Mainland which has been arrived at from the cumulative age distribution under age 35, is probably on the low side, in view of the fact that the over-estimation of female ages continues beyond age 40. A total fertility rate of 6.6 for Tanzania Mainland, using the child/adult ratio is probably more plausible.

- (9) The effects of age mis-reporting on the cumulative age distribution are less than on the proportion in a particular five-year interval. The proportion under age x is affected only by those age mis-statements that cause a net transfer of persons across age x . The proportion under age 30 is not altered if children under 5 are reported as 6 or 7.

Table 12.9 Estimated total fertility rates and birth rates for Tanzania and for regions, based on the female c/a ratio

Tanzania and regions	Total fertility rates females	Birth rates		
		males	females	both sexes
Arusha	7.1	47.9	46.5	47.2
Coast (excl. Dar)	4.9	37.2	36.1	36.6
Dodoma	6.9	49.0	47.6	48.3
Iringa	8.4	55.9	54.3	55.1
Kigoma	5.9	43.4	42.1	42.7
Kilimanjaro	7.9	51.6	50.1	50.9
Mara	7.1	52.2	50.7	51.5
Morogoro	7.6	52.9	51.4	52.2
Mt. Meru	6.0	45.0	43.7	44.4
Mwanza	5.0	38.2	37.1	37.7
Njombe	6.9	49.4	48.0	48.7
Shinyanga	6.7	48.4	47.0	47.7
Singida	7.5	51.8	50.3	51.1
Tabora	6.1	45.8	44.6	45.2
Tanga	5.5	40.7	39.5	40.1
West Lake	8.9	46.8	45.5	46.2
West Lake	7.1	50.5	49.0	49.7
Dar es Salaam	4.3	35.1	32.1	32.6
Zanzibar	6.5	48.9	47.5	48.2
Mainland Rural	6.7	48.1	46.7	47.4
Mainland Urban	4.4	33.7	32.7	33.2
Mainland Total	6.6	47.6	46.2	46.9

(A sex ratio at birth of 1.03 was used.)

12.6 Fertility patterns

12.6.1 Fertility pattern for Tanzania Mainland

One of the main objects of the question on births during the 12 months preceding the census by age of mother, is to obtain an indication of the relative distribution of births between the various age groups of women within the reproductive period, or in other words to determine the shape of the fertility distribution. The importance of the latter stems from the fact that it effects - as mentioned earlier - the annual number of births.

Reference was made above to the shape of the fertility schedule and it was shown that the contribution of women aged 15-19 was suspiciously low. Resort was therefore made to graduating the fertility distribution for Tanzania Mainland, by a method advocated by Van de Walle (10), and by using an adjustment technique suggested by Brass (11). These are shown below.

Table 12.10 Tanzania Mainland, fertility distributions and their ratio

Age group	Recorded	Brass	Van de Walle
15-19	0.159	0.157	0.216
20-24	0.334	0.354	0.404
25-29	0.316	0.327	0.262
30-34	0.260	0.250	0.259
35-39	0.207	0.186	0.174
40-44	0.115	0.153	0.090
45-49	0.060	0.046	0.047
Σ	20.90	20.90	27.59

(10) E. Van de Walle 'Note on the Effect of Age Mis-reporting', in W. Brass et al. *The Demography of Tropical Africa*, op. cit. p. 143.

(11) W. Brass, 'The Graduation of Fertility Distributions by Polynomial Functions', *Population Studies*, Vol. XIV, No. 2, November, 1960, pp. 146-162.

The low contribution of age group 15-19, as mentioned earlier, cannot be accepted in view of what is known about African populations in that the age at marriage is low and procreation is known to start almost immediately after the age of puberty. Besides, cases of pre-marital pregnancies are probably quite common, although data on this aspect are still scanty. The singulate mean age at marriage as suggested by Hajnal (12) has been calculated for Tanzania Mainland and was found to be as follows for females.

Table 12.1: Singulate mean age at marriage for females

Mainland Total	Mainland Rural	Mainland Urban
17.2	17.2	18.1

The above ages at marriage are relatively low, and in societies where birth control is little known should contribute to higher fertility than is recorded for age group 15-19. Further, in view of what was said previously about age mis-statements, it is possible that the singulate mean age at marriage is itself affected by this factor. It is almost certain that married women aged 10-14 (13) must have been pushed up to age group 15-19 and some women belonging to age group 15-19 had their age estimated as 20-24, thus increasing the percentage of single between 10-19, and therefore the singulate mean age at marriage was fictitiously increased.

Brass's adjustment, apart from producing a broad peak between ages 20 and 30 and lowering the contribution of age group 45-49 to the total fertility, added little improvement to the shape of the fertility distribution. In fact the contribution of age group 15-19 to the total fertility, which was suspected to be low is now even lower. Further the mean of the age-specific fertility distribution remained unchanged and equally high as that for the recorded data (14).

Van de Walle's technique on the other hand, is meant to cater for possible effects of age mis-statements of the type encountered in African inquiries. While it produced a more plausible $\bar{m}$, raised the contribution of age group 15-19 and reduced that of age group 45-49, it produced a very high peak at age 20-24 followed by a sort of a broad peak which although lower than that at age 20-24, is rather high and extends between ages 25 and 35, which is not quite common in African experience.

None of the above adjustments was found satisfactory and a more plausible shape of the fertility distribution, the justification for which is given in App. 12.4, is presented below for Tanzania Mainland based on the corrected total fertility rate of 6.6.

- (12) J. Hajnal, 'Age at Marriage and Proportions Marrying', *Population Studies*, Vol. VII, No. 2, Nov., 1963. The singulate mean age at marriage is arrived at by finding the average number of years in single state lived by those marrying before the age of 50 years.
- (13) This age group should have been included in the computation of the singulate mean age at marriage, but was not, because of the low recorded proportion of married women in this age group.
- (14) Brass's method is primarily designed to smooth out random and pseudo-random erratic fluctuations and is constructed to leave the value of $\bar{m}$ unchanged.

Table 12.12 Adjusted fertility distribution for Tanzania Mainland

Age group	Age-Specific Fertility rates	
	Absolute rates	Relative rates
15-19	0.200	0.131
20-24	0.334	0.255
25-29	0.296	0.224
30-34	0.226	0.171
35-39	0.162	0.123
40-44	0.078	0.059
45-49	0.024	0.018
Total	1.320	0.999
Total fertility rate = 5.6		
Mean of the age-specific fertility distribution = 27.55		

12.6.2 Fertility pattern by region

The recorded age-specific birth rates for the regions have been studied in the light of the classification suggested by the United Nations Population Division (15), and the results are shown below.

Table 12.13 Recorded fertility pattern and mean of the fertility schedule $\bar{m}$ by region (in ascending order of the value of $\bar{m}$)

Fertility Pattern		Mean of the fertility schedule
Early Peak 'Type A'	Broad Peak	
Dar es Salaam		27.5
Zanzibar		27.7
Coast		28.2
Singida		28.7
Mtwara		28.8
Mara		28.9
Morogoro		29.1
Tabora		29.2
West Lake		29.3
Shiga		29.4
	Kigoma	29.6
	Dodoma	29.7
Mwanza		29.7
Shinyanga		29.7
Ruvuma		29.7
	Arusha	30.1
	Mbeya	30.3
	Kilimanjaro	30.4
	Iringa	30.6

Of the 19 regions listed above, 13 regions had an early peak pattern of fertility, that is, high fertility among women under 25 years of age. The remaining 6 belong to the so-called broad peak type in which age-specific birth rates for women 20-24 and 25-29 years of age differ only slightly while exceeding the rates for younger and older age groups.

The 19 regions have been listed in ascending order of the mean of the fertility schedule. Of the 13 regions that had an early peak pattern of fertility, 10 had a relatively low mean of the fertility schedule (between 27.5 and 29 years). These were followed by two broad peak regions, namely Kigoma and Dodoma. Then three early peak regions, namely Mwanza, Shinyanga and Ruvuma and finally four broad peak regions, namely Arusha, Mbeya, Kilimanjaro and Iringa with a value of $\bar{m}$ between 30 and 30.5 years.

In view of the effect of age mis-statement on the shape of the fertility

(15) Population Bulletin of the United Nations No. 7, 1963, with special reference to conditions and trends of fertility in the world, United Nations, New York, 1965, Chapter 7.

schedule, little can be said here about the relationship between the listed values of $\bar{m}$ and fertility in different regions. What is important for our purpose is that differences in the shape of the fertility schedule for different regions do exist, which to be fully understood require further demographic field enquiries.

12.7 Fertility differentials

Cross tabulations of the current and retrospective fertility data, by ethnic origin, education, socio-economic group, marital status and birth place have been produced. Attention will be confined in the following paragraphs to the tabulations by retrospective fertility. It would have been ideal to have used current rather than retrospective fertility as the former is more suited for describing the present situation with regard to the magnitude of the differentials. However, in view of the fact that data on current fertility were found to be distorted by differential misunderstanding of the reference period, it was decided to make use of retrospective data for studying fertility differentials.

12.7.1 Education

The mean number of live births per woman by age group, and number of years of education are given in the following table.

Table 12.14 Mean number of live births per woman by age group and number of years of education

Age group	0 and not stated	1-4 years	5-8 years	9 years and over
15-19	0.643	0.400	0.164	0.009
20-24	2.072	1.772	1.392	0.476
25-29	3.208	3.005	2.967	1.504
30-34	4.162	4.546	3.612	2.154
35-39	4.701	5.120	4.405	2.567
40-44	5.028	5.555	4.980	3.089
45-49	5.210	5.747	4.913	3.940
Age standardised mean number of live births (women aged 15-49)	3.250	3.317	2.846	1.792
Index (None & not st. = 100)	100	102	87	43

The above table shows that there is no difference between women who had no education and those who had 1-4 years of education. The table further shows that the mean number of live births decreases with the increase of the number of years of schooling. Fertility of women who had 5-8 years was about 87% of those who had no years of schooling while fertility of women who had 9 years or more was only 43% of the fertility of women who had no years of schooling.

12.7.2 Socio-economic group

It is not immediately clear why socio-economic group A, 'professional, technical, administrative and executive', which presumably comprises the highest income group should have a higher mean number of live births than socio-economic groups B, C, E, and F. On the other hand, socio-economic group D 'farmers

Table 12.15 Mean number of live births per woman by age group and socio-economic group*

Age group	A	B	C	D	E	F
15-19	0.308	0.475	0.618	0.540	0.696	0.449
20-24	1.647	1.715	1.839	2.033	1.932	1.765
25-29	3.105	2.949	2.835	3.251	2.945	2.885
30-34	4.151	3.681	3.542	4.263	3.559	3.724
35-39	4.442	4.337	3.894	4.911	4.032	4.250
40-44	5.092	4.517	3.964	5.159	4.330	4.485
45-49	4.846	4.395	4.027	5.313	4.580	4.054
Age standardised mean number of live births (women aged 15-49)	3.013	2.865	2.726	3.302	2.862	2.891
Index (A = 100)	100	95	90	110	96	96

* Socio-economic groups:

- A - Professional, technical, administrative and executive
- B - White collar
- C - Blue collar
- D - Farmers, own-account workers or family workers
- E - Agricultural labourers
- F - No occupation

working on own-account and family workers[†], have - as might be expected - the highest mean of live births.

In the following table socio-economic groups A, B, and C, have been broken down by rural and urban and the mean number of live births are shown below.

Table 12.16 Mean number of live births per woman by age group, socio-economic group and residence

Age group	Socio-economic groups					
	A		B		C	
	Urban	Rural	Urban	Rural	Urban	Rural
15-19	0.270	0.338	0.420	0.509	0.621	0.613
20-24	1.358	1.713	1.599	1.926	1.710	1.905
25-29	2.505	2.259	2.397	3.493	2.485	3.060
30-34	3.145	4.429	3.071	4.078	2.943	3.906
35-39	3.527	3.694	3.406	5.016	3.167	4.336
40-44	3.558	5.533	3.088	4.997	3.114	4.480
45-49	3.710	5.180	3.338	4.664	3.385	4.512

As can be seen from the above table, rural fertility is systematically higher than in urban areas for the three socio-economic groups under consideration. In the case of socio-economic groups A and C the difference in the mean number of live births for women aged 45-49 (who have almost completed their reproductive life) is higher by about 1.5 live births in rural than in urban areas.

12.7.3 Marital status

Table 12.17 Mean number of live births per woman by age group and marital status

Age group	Marital status			
	Never married	Married	Divorced	Widowed
15-19	0.065	0.944	0.939	1.106
20-24	0.486	2.137	1.722	2.247
25-29	1.120	3.280	2.451	3.093
30-34	1.603	4.269	2.956	4.196
35-39	1.757	4.904	3.236	4.816
40-44	2.014	5.017	3.345	4.920
45-49	2.371	5.407	3.605	5.270
Age standardised mean number of live births (women aged 15-49)	1.235	3.412	2.435	3.366
Index (married = 100)	36	100	71	99

The above table shows that there is little difference between the fertility of married and widowed women. This could mean that the incidence of widowhood takes place relatively late in the reproductive life of a Tanzanian woman. It is interesting however that the fertility of 'never-married' women is relatively high. This aspect, however, needs study of the type of marriage unions prevailing in Tanzania as related to fertility.

12.7.4 Ethnic differentials

The average number of children born alive per women by ethnic origin is given below for women aged 15-49.

Table 12.18 Mean number of live births per woman by age group and ethnic origin

Age group	Africans	Arabs	Asians	Europeans
15-19	0.537	0.627	0.067	0.078
20-24	1.991	2.204	0.590	0.392
25-29	3.902	3.718	1.773	1.317
30-34	4.179	4.218	2.775	1.843
35-39	4.000	3.380	3.819	1.725
40-44	3.062	4.994	4.402	1.876
45-49	3.227	4.909	4.980	1.750
Age standardised mean number of live births (women aged 15-49)	3.258	3.452	2.255	1.161
Index (Africans = 100)	100	107	70	36

On the basis of the age standardised mean number of live births, women of Arab origin seem to have the highest fertility, followed by women of African origin, then Asians where the mean number of live births is roughly 70% that of women of African origin. Europeans come last with a fertility which is roughly one third that of Africans. Looking closely at the mean number of live births by age group of women, it can be seen that the fertility of the older Asian women was only marginally lower than that of the Africans or the Arabs of similar age groups. The differentials are however much more pronounced at the younger age, which may mean that the fertility of the Asian women might have been declining in recent years, possibly as a result of birth control. This decline can be substantiated by data on current fertility which are shown below.

Table 12.19 Recorded cumulative current fertility for selected ethnic groups by age group of women

Age group	Africans	Arab	Asian
15-19	0.865	0.990	0.125
20-24	2.545	2.735	0.780
25-29	4.130	4.555	1.655
30-34	5.435	6.095	2.270
35-39	6.445	7.210	2.675
40-44	7.025	7.385	2.810
45-49	7.330	7.825	2.960
Age standardised mean number of live births (women aged 15-49)	4.752	5.208	1.872
Index (African = 100)	100	110	39

As can be seen from the above table, while the relation between African and Arab fertility is maintained when using current fertility data, the fertility of Asian women is now substantially lower than that of Africans.

12.8 Summary

Indices based on the number of live births during the 12 months preceding the 1967 census were found to be high, producing a crude birth rate of 57 per thousand and a total fertility rate (for Tanzania Mainland) of 7.3, as compared with 5.2 arrived at from the number of children given birth to by women aged 45-49, during their lifetime. Brass's technique which makes use of both current and retrospective data on fertility, produced a total fertility rate of about 8 live births.

Resort was therefore made to stable population models, and a total fertility rate of 6.6 and a birth rate of about 47 were arrived at which were considered plausible estimates for Tanzania Mainland.

An attempt was made to study fertility differentials by ethnic group, education, socio-economic group and marital status. However, the findings should be taken as tentative. Further research in these areas is certainly required.

13 DISTRIBUTION BY SEX AND AGE

by Bertil Egero and Roushdi A. Henin

13.1 Accuracy

13.1.0 Introduction

Data by age group may be affected both by errors in reporting of ages and by variations in the completeness of enumeration. On the other hand sex, unlike age, is seldom reported wrongly, but data by sex may be faulty because recording may be more complete for one sex than the other.

In most censuses and surveys in Africa, data on age are subject to substantial errors. The mistakes in the data may derive from various factors. One of these factors is the way the questions are asked. The following is an extract from 'Instructions for Enumerators and Supervisors' (1).

'If the actual age is not known, an estimate is to be given. To get a better age estimation, various generally known facts are to be used. For example children who cannot walk are usually under one year of age; children begin to lose milk-teeth at the age of 6; age at puberty is between 13 and 16 years for males and between 12 and 15 years for females ect. Some generally known historic events may also be very helpful in estimation of ages...' Ten such events were listed covering the years 1890-1964, that is, for persons between 77 and 3 years.

On the limitations of calendars of local events, a United Nations E.C.A. publication (2) states: 'It has frequently been found that the population being enumerated is totally unfamiliar with many of the events listed in the calendars. This is particularly true of political events which may have seemed of paramount importance to the educated persons drawing up the calendars, but which in fact had relatively little impact on the lives of the majority of the people, particularly those in rural areas'. In fact, in the case of the 1967 Tanzania census all 10 events were political events.

Apart from the limitations inherent in the use of calendars of local events, the type of mistakes that characterise the data could be the result of one of the following:

- Wrong assessment of age by the enumerator partly because the number of events that were made available to the enumerator were very few.

(1) Population Census 1967; Instructions for Enumerators and Supervisors, Central Statistical Bureau, Ministry of Economic Affairs and Development Planning, Dar es Salaam, June, 1967.

(2) C. Scott and G. Sabagh, 'The Historical Calendar as a Method of Estimating Age', Population Studies, March 1970.

- Wrong allocation of an event to the time of birth of an individual by the enumerator.
- Some events may have been more popular than others; it is possible that some respondents consciously or unconsciously linked their date of birth to a preferred event. In other words, the problem of bias is not absent but present in a different form.
- Finally there may be cases of deliberate falsification of age by the respondent either upwards or downwards.

13.1.1 Sex ratio by age

Sex ratios by age - in the absence of migration - provide a sensitive index of possible age mis-statement. Such sex ratios by 5-year age groups are given below for Mainland Total and Zanzibar populations.

Table 13.1 Mainland Total and Zanzibar, sex ratios by 5-year age groups

Age group	Mainland Total	Zanzibar
0-4	98	98
5-9	101	97
10-14	111	125
15-19	90	94
20-24	70	67
25-29	80	89
30-34	89	91
35-39	101	106
40-44	94	98
45-49	108	145
50-54	97	105
55-59	105	145
60-64	95	119
65-69	105	165
70-74	94	116
75-79	124	165
80-84	114	105
85-89	134	102
90-94	132	104
95+	127	81

The effect of age distortions is evident from the behaviour of the ratios in the above table. The Mainland Total population starts with a sex ratio of less than 100 for age group 0-4, then it rises to 111 for age group 10-14, producing an excess of males, then it declines sharply until it reaches 70 for age group 20-24, and rises again to reach 101 for age group 35-39. The fluctuations continue up to age 70-74, after which point the sex ratios systematically show an excess of males. This is contrary to the expected pattern of higher mortality amongst males and therefore indicates either a general underestimation of the ages of females or an overestimation of the ages of males or both.

Little needs to be said about Zanzibar. It follows the same pattern as that for the Mainland Total population, except that the amount of distortion is much greater.

13.1.2 Evidence of age heaping

One of the main reasons for the general inaccuracies inherent in the age distributions for African as well as other populations consists in rounding the ages to the nearest figures ending in 0 or 5. This type of digital preference results in heaping of populations at certain ages.

One method of measuring the extent of this digital preference is that referred to as Whipple's Index (3). This is obtained by summing up the age returns between 23 and 62 years inclusive and finding what percentage is given by the sum of returns of years ending with 5 and 0 to one-fifth of the total sum. The result would be between a minimum of 100, representing no concentration at all, and a maximum of 500, if no returns were recorded with any digit other than the two mentioned. Whipple's Index has been calculated and is shown below for the Mainland and Zanzibar populations as well as for regions of the country.

Table 13.2 Whipple's Index for regions of Tanzania

Region	Males	Females	Region	Females
Mainland Rural	180.4	194.4	Mara	185.7
Mainland Urban	188.9	210.7	Dodoma	185.9
Zanzibar	280.1	330.4	Tabora	203.7
			Morogoro	206.1
Singida		155.6	West Lake	207.2
Mwanza		160.0	Mtwara	208.4
Iringa		167.2	Kilimanjaro	209.4
Mbeya		168.9	Kigoma	210.2
Shinyanga		174.2	Arusha	214.2
Suswa		174.6	Tanga	240.8
			Coast excl DDM	251.2

Judging from the above table, it is evident that the recorded age data suffer from age heaping (4). It must however be added that Whipple's Index, as well as similar indices, have been confined to measuring only one feature of age mis-statement, namely the amount of heaping on certain ages. Such indices are of little value so far as the Tanzanian population is concerned, primarily because it has been shown that in many African censuses and surveys, age mis-statement is not simply confined to digital preference, but that more massive and deep-seated errors are frequently present.

Thus a more suitable index for our purpose is that provided by the United Nations Secretariat method based on sex ratios and age ratios. If the distributions are accurately recorded, sex ratios will change gradually from one age group to another, as a result of the sex differences in mortality and migration, but they should not normally fluctuate violently. The mean difference between sex ratios for the successive age groups, averaged irrespective of sign, gives what is called 'sex ratio score'. Age ratios are defined as the numbers reported in one age group per 100 of the mean number reported on the two adjacent groups; fluctuations indicate inaccuracies in age reporting or incomplete enumeration. The mean deviation of age ratios from 100, also irrespective of sign, gives the age ratio scores. A joint score is then derived by adding three times the sex ratio score to the sum of the age ratio scores for the two sexes (5).

The method used below has the advantage over Whipple's Index that the indices so obtained are affected by differential omission of persons in various age groups from the census count, by age mis-statement as well as

(3) Manual II, Methods of Appraisal of Quality of Basic Data for Population Estimates, Population Studies No.23, United Nations 1955, p.40.

(4) The more pronounced age-heaping among females for Tanzania Mainland is also connected to a tendency to prefer some ages ending with 0, which explains the systematic up-down variation of the adult sex ratios in table 13.1.

(5) United Nations, Population Bulletin No 2, ST/SOA/Serial M/2 United Nations, New York, October, 1952. pp 59-79.

Table 13.3 Mainland and Zanzibar, sex ratio and age ratio scores

Area	Sex ratio scores	Age ratio scores		Joint scores
		Males	Females	
Mainland Rural	11.5	16.0	15.1	55.6
Mainland Urban	16.0	15.2	16.5	85.7
Zanzibar	33.5	32.9	36.6	109.4

by digital preference, and are therefore more truly a reflection of the general accuracy of the age data (6).

While the higher joint score of 85.7 for the urban population may be partly explained by the possible effect of migration, it is not immediately clear why the score for Zanzibar is almost three times as high as that of the Mainland Rural population.

To show the order of magnitude of the above scores for the three populations under consideration, the following table gives the three scores for some other countries.

Table 13.4 Sex ratio and age ratio scores for various countries (7)

Country	Year	Sex ratio scores	Age ratio scores		Joint scores
			Males	Females	
Kenya	1962	16.0	11.2	13.3	59.5
Shona	1960	8.6	11.6	15.8	53.4
Guinea	1954	12.5	20.7	21.0	79.2
U.A.R.	1960	6.7	11.8	18.0	49.9
Pakistan	1961	9.1	11.4	15.2	52.6
Sweden	1960	1.5	4.5	1.2	10.3

With the exception of Guinea where the joint score is 79.2 the figures for the Tanzanian rural population are higher than those for all the listed countries.

13.1.3 Overall sex ratio for Tanzania Mainland

The sex ratio for the Mainland was equal to 95 in 1967, as compared with a sex ratio of 93 from the 1957 census and 92 from the 1948 census. A possible explanation for the rise in the sex ratio is that out-migration of males from Tanzania has probably been on the decline since independence.

With a sex ratio less than 100 the question is often asked why there are more females than males. A possible explanation is a relatively low sex ratio at birth. In African countries, it is observed that the sex ratio at birth is somewhat less than in West European, Asian and Latin American countries. Evidence, however, on this is not conclusive. Another factor which is quoted to explain this phenomenon is a higher mortality amongst African males as compared to females (8).

It is equally possible that males have been subjected to a greater degree of undercount than females and that the extent of this undercount was less pronounced in recent censuses. This, as well as the migration factor, may explain the rise in the sex ratio from 1948 to 1967.

(6) *Methods of Appraisal of Quality of Basic Data for Population Estimates*, Op. cit. pp 43.

(7) *Kenya Population Census, 1962 Vol. III, African Population*, Statistics Division, Ministry of Economic Planning and Development, March, 1966, page 27.

(8) This question is discussed in App. 11.4.

To sum up this discussion, the rise in the sex ratio for the country as a whole between 1948 and 1967, may be a combination of more accurate recording and less out-migration of males to the neighbouring countries. It is doubtful however, that it could be a sign of a steeper rise in the expectation of life for males than for females.

13.2 Graduation of the age distribution

13.2.1 Population models

Both Whipple's Index and the United Nations Secretariat method have been used to test the accuracy of the age distribution. They have indicated that the age data have been subjected to serious distortions. An attempt will be made in the following paragraphs to select a stable population model which will be used to show the direction of the errors in age data, and to graduate the age distribution.

A number of stable population models have been selected and are given in App. 13.1. The most suitable model - which is used for graduation purpose - was selected from the North family of the Regional Life Tables and Stable Populations (9) together with the recorded child/adult ratio as an additional parameter for selection purposes. Reasons for choosing the child/adult ratios are given in App. 13.1. The recorded and the graduated data are given for Tanzania Mainland.

Table 13.5 Tanzania Mainland, recorded and graduated age data (10)

Age Group	Percentages				Graduated absolute values	
	Males		Females		(10)	
	Recorded	Graduated	Recorded	Graduated	Males	Females
0-4	18.2	17.9	17.7	17.8	1,043,744	1,000,473
5-9	16.2	14.2	15.3	14.0	824,496	661,273
10-14	11.0	12.0	9.5	11.9	701,267	730,550
15-19	8.6	10.4	9.1	10.2	603,393	624,470
20-24	6.5	8.8	8.6	9.7	515,521	536,307
25-29	7.7	7.5	9.1	7.4	436,515	456,361
30-34	5.3	6.5	6.3	6.3	368,404	385,992
35-39	5.7	9.5	5.3	5.3	308,616	325,844
40-44	3.6	4.4	3.7	4.4	257,877	270,677
45-49	4.2	3.6	3.7	3.7	211,557	224,256
50-54	2.9	2.9	2.9	3.0	170,597	184,335
55-59	1.4	2.3	1.6	2.4	133,949	140,032
60-64	1.8	1.7	1.8	1.9	100,622	114,121
65-69	1.3	1.2	1.2	1.3	70,383	82,540
70-74	1.0	0.8	1.0	0.5	44,106	53,841
75-79	5.0	0.4	2.9	0.5	23,189	29,597
80+		0.2		0.3	11,303	15,760
Total	100.0	100.0	100.0	100.0	5,825,529	6,132,179

(9) A.J. Coale and P.A. Demery, Regional Model Life Tables and Stable Populations, Princeton University Press 1966. Further discussion on the selection of a life table is found in App. 11.2.

(10) The male age distribution was derived by using a suitable sex ratio model (sex ratio at birth = 103) given in 'Age Data in African Censuses and Surveys', *op.cit.* p. 16, Table 2. The difference between the recorded and the graduated total amounted to 179,473 persons or about 3%. This difference is probably on account of underenumeration or migration of males.

13.2.2 Summary of age mis-statements (females only)

From the comparison of the recorded age distribution and the stable population model the following age mis-statements are apparent:

- A tendency to overestimate the age of girls 10-14 who probably have passed puberty, especially if they were married, combined with a tendency to underestimate the ages of some girls in the same age group who have not reached puberty, causing a net transfer downwards across age ten and contributing to the bulge at ages 5-9.

- A tendency toward overestimation like that affecting some of 10-14 years old, for the females 15-19 and 20-24, causing net transfers upward across ages 15, 20 and 25 and causing deficits at 10-14 and 15-19 and 20-24 and excessive proportions at 25-29. This overestimation of the age of young women may be caused by an unconscious upward bias associated with marriage and child-bearing or from a mechanical assumption by the enumerator that women had some alleged conventional age at marriage and have then experienced an allegedly typical passage of time between marriage and first birth, and each subsequent interbirth interval.

- A general overstatement of ages of older women possibly resulting from the hard work which is the lot of women in Africa. Most of these errors are the result of the fact that the age entered on the schedule was an estimate made by the interviewer, rather than the transcription of a number supplied by the respondent. In other words the distorted age distribution is caused by the common biases in the estimation of women's age by another person (11).

13.3 Sex and age by region

13.3.1 Sex ratios

As can be seen from table 13.6 below, of the 17 Mainland regions, only two had a sex ratio over 100, namely Arusha and Tanga, in 1967. Further,

Table 13.6 Sex ratios by region: 1948, 1957/58 and 1967 censuses

Region	1948	1957/58	1967
Arusha	110	106	103
Coast (excluding Dar es Salaam)	88	90	98
Dodoma	97	89	94
Iringa	83	85	88
Kigoma	80	80	84
Kilimanjaro	97	99	95
Mara	87	91	91
Mbeya	86	85	91
Morogoro	102	99	98
Mtwara	94	93	95
Mwanza	93	97	99
Njombe	80	85	90
Shinyanga	88	89	94
Singida	83	84	87
Tabora	93	91	95
Tanga	118	114	105
West Lake	83	87	92
Zanzibar	110	111	102

(11) On this question, see for example Manual IV, Methods of Estimating Basic Demographic Measures from Incomplete Data, ST/SOA/Series A/42, United Nations, New York, 1967. pp. 17-22.

the sex ratio was equal to or near 100 in Coast, Mwanza, and Morogoro. In the remaining 12 regions, the sex ratios were less than 100. In fact it was less than 90 in Iringa, Ruvuma, Kigoma and Singida. However, there has been a general levelling out in the sex ratio since 1948. In 8 regions the sex ratio systematically rose from 1948 through to the 1957 and 1967 censuses. In 6 other regions, there was no clear trend either downwards or upwards. In the case of 4 regions, however, there was a definite drop in the sex ratio, as we move from 1948 to 1967.

Finally with regard to Zanzibar, the drop of the sex ratio to 102 in 1967, as compared with 111 in 1957 and 110 in 1948 may be due to out-migration of males in recent years.

13.3.2 Age distribution by region

The child/adult ratio has been used together with the appropriate mortality level from the North family, to graduate the age distribution for regions. The following table shows the child/adult ratios, the recorded and the graduated proportions of the population under 15 years for the regions in ascending order of the child/adult ratios.

Table 13.7 Recorded child/adult ratios, recorded and graduated proportions of the population under 15 years for regions (females)

Region	Child/adult ratio	Population under 15 years	
		recorded	graduated
Mtwara	0.325	36.8	36.7
Coast (incl. Dar es Salaam)	0.337	35.9	37.7
Tabora	0.369	38.6	40.3
Kigoma	0.379	39.1	41.0
Singida	0.384	38.5	41.0
Morogoro	0.385	41.5	41.5
Ruvuma	0.406	41.4	42.7
Dodoma	0.434	43.7	44.6
Mbeya	0.437	45.1	44.6
Mwanza	0.438	44.1	44.9
Tanga	0.439	44.3	45.2
Mara	0.442	44.3	45.0
Zanzibar	0.442	42.7	45.2
West Lake	0.448	41.6	45.4
Arusha	0.466	45.9	47.0
Shinyanga	0.472	44.6	47.1
Iringa	0.492	47.4	48.0
Kilimanjaro	0.510	48.5	49.4

If the graduated values are accepted as representing the true age distribution of the regions' population, then Kilimanjaro region has the youngest and Mtwara has the oldest population. 8 of the 18 regions (that is, including Zanzibar) have a proportion under 15 years of 45% and over another 8 have a proportion under 15 of between 40 and over but less than 45, while only 2 regions, namely Mtwara and Coast, have proportions less than 40%.

Finally, a glance at App. 13.2 shows that the direction of the errors in age mis-statements is nearly the same for the regions as for the country as a whole, namely a bulge in age group 5-9 and a shortage in age group 25-29, followed by a systematic overestimation of ages, which continues to old age.

13.4 Comparison with the 1957 population census age distribution

For the purpose of the 1957 census, the African population of Tanganyika was divided into five age groups: under 1 year, 1 to 5 years, 6 to 15 years, 16 to 45, and 46 years and over. A sample census was also carried out and an extra column was included where the exact ages of those who claimed to know them could be recorded (12).

In view of the changes in the administrative boundaries and to enable a comparison to be made between the 1957 and 1967 age distributions, the data for the 1957 districts were transformed to the 1967 census regions (that is, the 1967 administrative boundaries were used for both censuses) and the 1967 census data were regrouped from a one-year age group to the 1957 census age grouping. The results for the 1957 general and sample censuses and the 1967 census are shown below for males and females separately.

Table 13.8 Mainland Total, recorded age distribution 1957 and 1967, percent

Age group	MALES			FEMALES		
	1957		1967	1957		1967
	General	Sample		General	Sample	
Under 1	6.0	3.9	3.4	6.2	3.9	3.3
1-5	16.0	17.7	18.4	17.4	16.7	17.0
6-15	22.1	24.3	25.7	19.1	21.5	23.2
16-45	42.5	41.6	37.2	45.7	45.5	41.7
46+	11.4	12.5	15.4	11.6	11.4	14.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

It is obvious from the above table that the 1957 general census overestimated the proportion of infants under one year. On the other hand the 1957 sample census gives a more plausible proportion for this category than that from the 1967 census. The latter is certainly underestimated. Further the proportion 6-15 is underestimated by the 1957 general census as rightly pointed out by the African Census Report. A proportion of 22.8 as given by the sample census was probably nearer to the truth. The remaining proportions look plausible except that the male population aged 16-45 is probably on the low side. This in fact applies to both the 1957 and 1967 censuses. Generally however it can be said that the 1967 census age data are more plausible than those of 1957.

Before leaving this part it may be useful to compare the graduated female age distribution from the 1957 and 1967 censuses.

It needs to be pointed out that different methods were used for graduating the data on age distribution for the two censuses. However, assuming that the graduated data are nearer to the truth than the recorded age data, the following comments may be made:

- the proportion under 15 years is higher in 1967 as compared with 1957 (i.e. 43.7 as compared with 41.0), which implies that the population probably is

(12) It was however pointed out that the information obtained from this question was of value in the analysis of the fertility data, but was useless from the standpoint of the general age distribution of the population, since the proportion of persons stating individual ages varies from age group to age group. *African Census Report 1957, Dar es Salaam, 1963, p. 27.*

Table 13.9 Mainland Total, graduated female age distribution 1957 and 1967, percent

Age group	1957	1967	Difference
0-4	16.7	17.8	-1.1
5-9	15.0	14.0	+1.0
10-14	11.3	11.9	-0.6
15-19	10.4	10.2	+0.2
20-24	9.6	8.8	+0.8
25-29	8.5	7.4	+1.1
30-34	7.3	6.3	+1.0
35-39	6.1	5.3	+0.8
40-44	5.0	4.4	+0.6
45-49	3.7	3.6	+0.1
50-54	2.8	3.1	-0.3
55-59	2.1	2.4	-0.3
60-64	1.5	1.8	-0.3
65-69	2.0	3.0	-1.0
Total	100.0	100.0	-

younger in 1967 than it was in 1957;

- the proportions between 15 and 50 are systematically lower in 1967 as compared with 1957. In other words, while the proportion of women in the reproductive ages was higher in 1957 as compared with 1967, the proportion of their children (0-4 or 0-9) was lower;
- the proportions of women aged 50 and over were systematically higher in 1967 as compared with 1957.

13.4.1 Evidence from age data for 1957 and 1967 as to level and trend in fertility by region

The regions are arranged in the following table in ascending order of the proportion under 16 years according to the 1967 census, together with the same proportions from the 1957 census.

Table 13.10 Mainland Total, recorded percent females under 16 years, 1957 and 1967

Region	1967	1957
Coast	38.1	36.2
Mtwara	38.0	41.4
Ningida	40.1	36.8
Tabora	40.1	37.3
Kigoma	40.6	37.9
Morogoro	43.2	42.3
Iringa	43.2	41.4
West Lake	43.3	36.8
Dodoma	45.1	45.8
Mwanza	45.9	42.6
Mara	46.1	45.6
Shinyanga	46.3	44.9
Tanga	46.3	44.1
Mbeya	47.0	45.1
Arusha	47.6	44.5
Iringa	49.2	49.3
Kilimanjaro	50.6	47.3

The above table shows that the following 9 regions i.e. Kilimanjaro, Iringa, Arusha, Mbeya, Tanga, Shinyanga, Mara, Mwanza, and Dodoma are high fertility regions, judging from the relatively high child/adult

ratio and the high proportions under 16 according to the 1967 and 1957 censuses. On the other hand, Coast, Mtwara, Singida, Tabora and Kigoma seem to be the regions with low fertility and probably the remaining regions i.e. Morogoro, Ruvuma and West Lake, to some extent have medium fertility populations. The lower proportions under 16 in 1957 as compared with 1967 in the case of Kilimanjaro, Arusha, Tanga, Shinyanga, Mara and Mwanza may represent genuine differences and may signify an increasing trend in fertility. These comments must however be considered as tentative and speculative and can be ascertained only through more research.

13.5 Age distribution by ethnic group

The following table shows the distribution by age groups for the four ethnic groups:

Table 13.11 Mainland Total, recorded female age distribution by age and ethnic group

Age group	Africans	Arabs	Asians	Europeans
0-4	17.6	21.0	10.5	11.8
5-9	15.5	16.7	12.8	10.9
10-14	9.3	13.6	12.8	6.2
15-19	9.0	10.4	10.3	5.3
20-24	6.6	8.7	9.6	8.9
25-29	9.1	7.7	9.5	11.7
30-34	8.4	6.2	9.1	11.1
35-39	5.4	4.6	6.9	9.8
40-44	5.7	3.4	5.3	7.7
45-49	5.7	5.0	5.9	5.4
50-54	2.9	1.4	2.5	3.9
55-59	1.7	0.6	2.0	2.5
60-64	1.8	1.1	1.5	2.5
65-69	1.2	0.2	1.0	1.2
70-74	1.0	0.4	0.6	0.6
75+	5.0	1.0	0.9	0.5
Total	100.0	100.0	100.0	100.0

Judging from the shape of the age distribution the Arabs seem to have the youngest population with 51% under age 15, followed by the Africans with 43%, then the Asians with 36% and finally the Europeans with 29%. It must however be added that some of these differences may be the result of differential age mis-statements.

13.6 Summary

The data on age and sex from the 1967 census are far from being reliable judging from the several indices used to throw light on the degree of age mis-statement. There was not only evidence of age heaping but other serious age distortions which characterise similar data for many African countries. There is some evidence however that the 1967 census data are superior in quality to the data from the 1957 census. Efforts were made to graduate the data on age using stable population models. This device, however, was not without limitations, especially at the regional level. Finally there is some evidence that the proportion under 15 years has been rising since 1957. This may be an indication of a recent rise in fertility.

14 POPULATION GROWTH

by Bertil Egero and Roushdi A. Henin

14.0 Introduction

Earlier sections have dealt with the two components of population growth namely fertility and mortality (1). In this section, these two components together with migration as a third component will be brought together in an attempt to show the degree of consistency between these estimates and the recorded growth of regional populations. Thereafter, the regional population will be projected up to 1980. Projections of the Mainland population by age and sex will also be made up to the same year.

14.1 Recorded and estimated growth

The Mainland recorded growth from 1957 to 1967 is well over 3% per annum. This is an unrealistically high figure, which is not compatible with the recorded growth between 1948 and 1957 of 1.8% per annum. Although discarded as unlikely by the 1957 census analysis (2), it now appears very probable that the 1957 census was underestimating the population in relation to the 1948 results.

One reason for this is given by the rather drastic changes in mortality and fertility that would be required to satisfy the increase in the growth rate. Another is given by the independent estimates of natural increase, which for 1957 was 2.1% - 2.2% and for 1967, 2.4% - 2.5%. Still another reason is given by the sometimes extremely irregular pattern of growth 1948-57 and 1957-67, for regions and districts (3).

For the sake of illustration, the implied rates of underenumeration in earlier censuses are listed in table 14.1 for different assumed rates of growth. The

Table 14.1 Assumed growth rates and implied underenumeration in earlier censuses, Mainland Total (4)

Assumed annual growth		Implied underenumeration	
1948-57	1957-67	1948	1957
2.1	2.4	4.6	7.3
2.2	2.4	3.7	7.3
2.1	2.5	3.6	6.3
2.2	2.5	2.7	6.3

- (1) The third component is migration. This is discussed in Ch. 4.
- (2) *African Census Report 1957*, Dar es Salaam, 1963 p. 93.
- (3) *Recorded Population Changes 1948-1967, Tanzania*. Bureau of Statistics, Dar es Salaam 1968. See also App. Table 14.1.
- (4) The rates of underenumeration were achieved by regressing, geometrically, the 1967 recorded population to 1957 and 1948 respectively, using the assumed growth rates given in the table. The resulting population figures for the two earlier years were then compared with recorded census results and the difference expressed as a percentage of the latter.

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resulting figures - based on the crucial assumption of no underenumeration in 1967 - are not implausibly high and well within the limits of what could be expected with the resources and organization available in the earlier censuses.

Another factor contributing to the differences may be immigration. It seems likely that Tanzania has experienced a net gain in international migration, due to the halt in labour migration to Southern Africa and a simultaneous stream of migrants from neighbouring countries. The immigration is in the order of 400,000 persons. Assuming that the net gain in 1957-67 was of this order, the implied underenumeration is reduced to around 2% in 1957 and nil in 1948.

Internal migration may, on the other hand, have significant effects on the population growth in various parts of the country. In principle, for each region the 1957 recorded population, affected by natural increase and migration, should lead to the 1967 recorded population. Due to the various errors in the data, as well as lack of information on emigration, the discrepancies may be considerable. In order to give the reader an idea about the interrelations between estimates, table 14.2 gives the 1967 population reduced to 1957 by an estimated natural increase, then adjusted as a result of net migration to produce an estimate of the 1957 population. The latter is compared with the recorded 1957 population.

Table 14.2 1967 population compared with 1957 population as estimated and recorded

Region	Population in 1967 ('000)	Annual increase in population ('000)	Less annual increase in population ('000)	Less net gain or loss due to migration	1957 population estimated ('000)	1957 population recorded ('000)	Absolute difference	As per cent of 1957 recorded
Arusha	610	3.3	170	+71	369	408	-39	-9.6
Coast*	784	1.8	128	+149	507	537	-30	-5.5
Dodoma	709	2.4	161	-8	556	514	+42	+8.3
Iringa	690	3.0	177	-35	548	489	+59	+12.1
Kilimanjaro	473	2.0	85	+4	304	382	-78	-20.5
Mwanza	853	3.7	199	+11	443	474	-31	-6.6
Near	544	2.4	115	+55	374	380	-6	-1.4
Ndava	569	2.2	190	+5	784	608	+176	+29.3
Morogoro	685	2.0	123	+16	546	548	-2	-0.3
Ntarama	1,041	1.3	126	+44	871	747	+124	+16.5
Shirima	1,056	2.6	239	-35	852	804	+48	+5.9
Suswa	393	2.1	74	-8	327	287	+40	+13.9
Shinyanga	899	3.1	236	+19	644	661	-17	-2.6
Singida	458	1.8	75	-43	426	372	+54	+14.5
Tabora	563	2.1	106	+63	394	422	-28	-6.7
Tanga	771	2.5	192	+71	508	579	-71	-12.3
West Lake	659	2.7	154	+73	432	514	-82	-16.0
Zanzibar	355	2.7	83	+10	262	299	-37	-12.6

* including Dar es Salaam

The differences are large and inconsistent. They may be due partly to errors in 1957 estimates and partly to the fact that migration took place before that year (5). But they also point to the fact that the independent estimates of fertility and mortality may be liable to substantial errors, emanating from inaccurate data and age distribution affected by migration (see ch.11 and 13).

- (5) Migration estimates are based on data by place of birth and place of residence. Thus they give no indication about the time of the movement. Indeed this is one of the main limitations of this kind of data, a point which should be borne in mind when using table 14.2.

With these comments in mind, the vital rates estimates from Ch. 11 and 12 are summarized in table 14.3 below for the regions and major subdivisions. Corresponding estimates for districts are available in App. 14.2.

Table 14.3 Vital rates estimates by region 1967

Region	Birth rate per 1000	Death rate per 1000	Natural increase per 1000
Arusha	47	14	33
Coast	37	19	18
Dar es Salaam	35	16	17
Dodoma	48	23	25
Iringa	55	26	29
Kigoma	43	23	20
Kilimanjaro	51	14	37
Mara	52	28	24
Mbeya	52	31	21
Morogoro	44	25	19
Mtwara	38	25	13
Mwanza	49	23	26
Njombe	48	28	20
Shinyanga	51	21	30
Singida	45	27	18
Tabora	40	19	21
Tanga	46	17	29
West Lake	50	23	27
Mainland Total	47	23	24
Mainland Rural	47	23	24
Mainland Urban	35	15	18
Zanzibar	48	21	27

14.2 Projections of total population

The 1967 recorded population has been projected up to 1980 for Mainland Total and for each region. In addition, the Mainland Urban population has been brought up to 1980, with the sole purpose of demonstrating the effect of different rates of urban growth.

For regional projections, the best procedure would be to use independent estimates of natural increase and migration to project the population of each region. However, in view of the general unreliability of regional estimates of natural increase, as demonstrated above, and the lack of information on emigration patterns, it was felt that such an approach might lead to completely unrealistic country-wide growth rates and thus be a waste of effort.

The alternative procedure chosen was to project the Mainland Total population according to assumed rates of natural increase - the effects of international migration assumed to be negligible - and then distribute the projected annual increase over regions in accordance with their size and earlier growth. The approach rests on two assumptions: first that the estimates of overall growth rates are more accurate than those achieved by summing up results of regional estimates; and second that the future relative growth of regions is closely related to their past growth.

The latter assumption is of course open to criticism. Regional economic planning in Tanzania is striving towards raising the economy of the poorer regions to that of the more wealthy. To the extent that this succeeds, effects could be expected in migration patterns as well as levels of fertility and mortality. Therefore, the projections may be regarded as rather unrealistic, reflecting present regional differences, rather than what might be expected from the policy of regional development.

The procedure used for regional projections was as follows:

- (a) Two sets of assumptions were made concerning the Mainland annual growth up to 1980.
- (b) Independent of these, the Dar es Salaam population was projected up to 1980 with an average annual growth rate of 8.5%.
- (c) From the overall absolute increase according to (a) above, the Dar es Salaam increase was deducted, giving an absolute population increase by year for Mainland excluding Dar es Salaam.
- (d) The regional share of this increase was determined by a formula based on the recorded regional rate of growth 1948-67, and the regional population in 1967 (see App. 14.4).
- (e) Thus for each individual year, the Mainland increase according to (c) above was distributed and added to the population of each region according to (d). Thereafter, the resulting annual rates of increase were calculated for each region.

The procedure described above was also applied to the next lower level, namely districts. Formula (d) was applied to the districts within each region, giving the proportion of the regional increase which should be assigned to each district. No separate projections were made for the towns, which were included in surrounding districts.

The two assumptions concerning future Mainland growth rates both contain a regular decline in mortality as a result of economic development. A few words are necessary regarding fertility.

In the introduction to the section dealing with fertility, reference was made to the existing fertility differences, not only between African countries, but also between regions within countries. The importance of this aspect lies in the answer to the question: Where is fertility heading to in Africa in the foreseeable future?

So far demographers have produced alternative population projections using assumptions with regard to the future course of both fertility and mortality. The high population projection is usually based on the assumption that fertility will remain constant and at the present high level, accompanied by a rapid decline in mortality. No consideration is given to the possibility of a rise in fertility as a result of improvements in standards of living and health conditions, which follow in the wake of economic development. The low population projections imply a decline in the growth rate possibly following the European pattern as described by the theory of demographic transition.

A great deal has been written about the applicability of the Theory of Demographic Transition to the developing countries of today (6). We believe however that the prevailing conditions in Africa at present, which determine the course of events for fertility, mortality and consequently population

(6) See for example, A.J.Coale and E.H.Hoover, Population Growth and Economic Development in Low Income Countries, Princeton University Press, 1958 Chapter 2. Also The Demographic Transition in Tropical Africa, O.E.C.D. Paris 1971.

growth rates, are completely different from those which brought about the closure of the demographic gap in Europe.

The following table summarises the situation with regard to fertility in Africa, and shows how different it is from what Europeans ever experienced. The table covers the greater part of Africa (7).

Table 14.4 Estimated crude birth rates for the population of Africa

Number of persons (millions)	Per cent of total	Crude birth rate (per 1000)
306.6	94.6	54.4
324.0	46.1	46.1
34.9	15.0	42.4
3.4	1.3	37.3

It can be seen that only 1.3% of the population considered has a crude birth rate of 37 per thousand, which is approximately equal to the highest rate ever recorded for England and Wales, Sweden and Norway.

There is no evidence that fertility in Tanzania is positively correlated with the degree of economic development of the region. This aspect, however, needs further investigation. It has been shown elsewhere (8) that with the rise in income there is a tendency - other things remaining equal - for marriage instability to decline, for the proportions marrying to rise and for the age at marriage to decline. Further, improvements in health conditions lead to lower sterility and miscarriages rates. In other words growth rates, which are already high in Africa, could rise further.

Such reasons may partly explain the recent increase in the growth rate for the population of Kenya, from 3.0% in 1962 to 3.3% in 1969, and there are indications that the Kenyan experience may be valid even for Tanzania. Thus, of the two assumptions behind the projections the lower contains a constant fertility rate whereas the higher makes allowance for these recent experiences in the form of a steady rise in the fertility level.

Table 14.5 Fetal rate assumptions for Mainland projections

		Rate per thousand		
		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

The application of these population growth rates appears to imply no allowance for international migration. It is likely however, that this type of migration is too small to have a visible impact on the assumptions. For one thing, labour migration appears to have declined in recent years to less than 1% of the total population. Besides, no evidence is available to forecast any more radical changes in the number of refugees now present in Tanzania, either

(7) R.A.Henin, 'On the applicability of the Theory of Demographic Transition to African Countries', in *The Demographic Transition in Tropical Africa*, op.cit. p.18.

(8) R.A.Henin 'Fertility Differentials in the Sudan'. *Population Studies*, Volume XXII, No. 1, March 1968, pp. 147-154.

in terms of additional groups arriving or in terms of any large-scale repatriation of those present. Thus the assumption made with regard to migration is that its net effects would be too small to be taken into account in the projections.

For Zanzibar, the past and future levels of population growth are far more difficult to estimate. Firstly, the three censuses so far have produced conflicting estimates of the growth rates for 1948-58 and 1958-67; recorded growth is 1.2 and 1.9 per cent respectively, whereas estimates of vital rates give a natural increase of about 1.4 and 2.7 per cent for the same periods. Secondly, studies have shown rather peculiar differences in fertility between sub-populations, which due to lack of a good explanation render forecasts of fertility changes very unreliable (9). Thirdly, the 1964 revolution and the developments since then have led to a probably significant emigration of certain segments of the population, in a way which may have affected not only the recorded rates of growth but the estimates of vital rates as well. (See ch. 4, 10 and 11.)

A projection of the Zanzibar population becomes therefore an academic exercise illustrating possible developments of the population. In order to get a point of departure, it is assumed that the 1967 estimate of natural increase is rather on the high side. It is further assumed that the growth rate will remain lower than that of the Mainland, due mainly to a lower fertility. Under these assumptions, the two following sets of growth rates were selected as representing likely developments:

Table 14.6 Vital rates assumptions for Zanzibar projections

	Annual growth in per cent		
	1967-70	1970-75	1975-80
High assumption	2.4	2.6	2.9
Low assumption	2.3	2.4	2.6

A similar, mainly hypothetical, projection has been made for Mainland Urban. Given the recorded growth of slightly below 7% per year, two assumptions are made; the high being a continuous increase in the growth rate and the low keeping the growth rate constant.

In fact, by 1980 the overall rate of urbanisation under the two assumptions is still largely the same. Under the higher about 10 percent and the lower about 8 per cent of the population will be found in urban areas.

Table 14.7 Vital rates assumptions for Mainland Urban projections

	Annual growth in per cent		
	1967-70	1970-75	1975-80
High assumption	7.0	8.0	10.0
Low assumption	7.0	7.0	7.0

The results of the application of the above assumptions on the recorded 1967 population are given for each of the years 1968-1980 in table 14.8.

(9) J.G.C. Blacker, 'Population Growth and Differential Fertility in Zanzibar Protectorate'. *Population Studies* Vol. XV No. 3 March, 1962.

Table 14.8 Total population projections to 1980 ('000)

Mid-year	Mainland Total		Mainland Urban		Zanzibar	
	High	Low	High	Low	High	Low
1968	12,258	12,207	654	654	362	362
1969	12,535	12,512	699	699	371	370
1970	12,861	12,804	740	740	380	378
1971	13,234	13,171	800	797	389	387
1972	13,610	13,526	873	853	399	397
1973	14,013	13,898	945	913	410	406
1974	14,419	14,267	1,018	977	421	416
1975	14,830	14,652	1,099	1,045	432	426
1976	15,332	15,077	1,209	1,110	444	437
1977	15,862	15,584	1,330	1,197	457	448
1978	16,368	16,064	1,463	1,280	470	459
1979	16,830	16,427	1,610	1,370	484	470
1980	17,369	16,903	1,771	1,465	498	482

For sub-units of the country, projections have been prepared by five-year intervals according to the procedure described above. The results by region are given in table 14.9, and the corresponding district projections can be found in App. 14.3.

Table 14.9 Projections of Mainland regional population to 1980, high assumption

Region	Projected population ('000)			Implied annual growth per cent	
	1970	1975	1980	1970-75	1975-80
Arusha	671	801	965	3.6	3.8
Coast	534	582	643	1.7	2.0
East of Salween	344	517	776	8.3	8.5
Dodoma	793	855	976	2.5	2.8
Iringa	752	886	1,055	3.3	3.6
Kigoma	493	534	587	1.7	1.9
Kilimanjaro	715	850	1,021	3.5	3.7
Mara	599	719	869	3.7	3.9
Mbeya	1,040	1,210	1,433	3.1	3.3
Morogoro	723	804	907	2.2	2.4
Mtwara	1,111	1,261	1,451	2.6	2.8
Mwanza	1,135	1,300	1,525	2.9	3.1
Pwani	424	491	575	3.0	3.2
Shinyanga	965	1,106	1,284	2.8	3.0
Singida	479	513	560	1.5	1.8
Tabora	595	666	755	2.3	2.5
Tanga	829	955	1,114	2.9	3.1
West Lake	695	774	873	2.2	2.4

14.3 Mainland projections by sex and age

Projections of the population up to 1980 by sex and age have been produced for the Mainland Total population. For Zanzibar, no projections have been attempted, due to the uncertainty in all estimates of present and future growth, and the possible impact of migration. The same reasons have also prevented a similar exercise for Mainland Urban or for the regions, as the present rural development policy may have significant effects on the future population distribution.

The Mainland Total population projections are in principle based on the overall vital rates of 1967-80 presented on page 216 above. This means that the general approach here - analogous to the case of the regional population projections above - is to rely more on forecasts of the average development of fertility and mortality than on assumptions regarding the detailed pattern of change in these parameters. However, even under this general approach some assumptions must be made at least regarding the age-specific survival rates, in order to bring the present population forward in accordance with the overall rates postulated.

The method used in the projections, in order of the different steps of the

procedure, was as follows:

- (a) The death rate estimated for 1967 was 23 per thousand, given by a stable population based on the North 10 life table in the Princeton set of life tables. It was assumed that the expected decline in mortality 1967-80 (see page 216) would be fairly well represented by the life tables North 10 for 1967-70, North 11 for 1970-75 and North 12 for 1975-80.
- (b) The graduated population of August 1967, was regressed to mid-year 1967 with relative age distribution held constant, and then projected to 1972 by means of the survival rates of the selected life table. Linear interpolation gave the population for 1970, subsequently projected to 1975 and 1980 through the selected sets of life table survival rates. This projection was done independently for each sex.
- (c) The assumption being that the overall population growth in principle was more reliably estimated than any of its components, the remaining gap in the age distribution, that is, the population under age 5, was filled by an adjustment to the expected total population. Thus, while the overall sex ratios recorded in 1967 were accepted as a departure, the population under age 5 required to bring the projected population up to expected size was distributed between the sexes in accordance with a sex ratio at birth of 103 males per 100 females (10), and the ${}_5L_0$ -values for each sex given by the selected life tables.
- (d) The resulting birth rates were calculated from the age distributions given, and were found to be slightly too high in the first period 1967-70 and too low in the subsequent periods up to 1980. This means that the life tables chosen have had slightly too high mortality in the first and too low in the later periods, with corresponding, slight, inconsistencies in the projected age distributions.

The method as described above gives age distributions with birth and death rates which do not coincide exactly with those postulated earlier. However, to achieve an exact agreement would have required rather elaborate iteration procedures, possibly also including a correction of the original recorded sex ratio. This extra effort seemed hard to justify in view of the rather minute corrections expected, and especially when considering the very low confidence that can be placed in the original vital rates estimated.

The relative age distribution of the population, under the above assumptions, can be expected to change over the years to come. Firstly, the sex ratio will come closer to unity, though still retaining a balance well in favour of the females; 96.4 in 1980 compared to 95 of the 1967 census. Secondly, the base of the age pyramid will be relatively broader, as reflected in a child/adult ratio increasing from 0.419 in 1967 to 0.489 in 1980. Thirdly, the proportion of dependent persons in general will increase; the dependency ratio of persons outside working ages (15-64) to persons in these ages will increase from around 87 to 95 during the same period (Table 14.10).

(10) As recommended in J.O.C.Blackler, Age Data in African Censuses and Surveys, E/CN.14/CPM/13, E.C.A. 1968.

Table 14.10 Estimated mid-year population distribution by sex and age, selected years 1967-1980, Mainland Total ('000)

Age	1967			1970			1975			1980			Total Pop. % increase 1967-1980
	Males	Females	Total	Males	Females	Total	Males	Females	Total	Males	Females	Total	
0-4	1040	1084	2124	1160	1151	2311	1419	1416	2835	1724	1715	3440	62.0
5-9	821	850	1671	885	827	1712	1047	1053	2100	1597	1503	2597	54.7
10-14	699	720	1427	752	705	1557	852	893	1745	1012	1019	2031	42.4
15-19	601	634	1225	647	673	1320	731	764	1495	831	871	1702	38.3
20-24	514	534	1048	552	576	1128	624	653	1277	708	743	1451	38.5
25-29	425	455	880	468	490	958	529	556	1085	605	633	1235	38.6
30-34	367	384	751	395	415	810	447	471	918	507	536	1043	38.9
35-39	308	323	631	332	346	680	375	396	771	427	451	878	39.2
40-44	257	270	527	276	291	567	313	330	643	356	377	733	39.2
45-49	211	223	434	227	241	468	257	274	531	293	313	606	39.6
50-54	170	184	354	185	198	381	208	225	433	237	257	494	38.8
55-59	132	147	280	142	155	297	163	181	344	187	208	395	40.4
60-64	100	114	214	108	123	231	123	140	263	141	161	302	41.3
65-69	70	82	152	76	89	165	86	102	188	100	118	218	42.8
70-74	44	54	98	47	58	105	54	66	120	63	78	141	44.5
75-79	23	29	52	25	32	57	29	37	66	34	44	78	48.1
80+	11	16	27	9	13	22	9	13	22	11	15	26	-3.4
Total	5804	6109	11913	6284	6577	12861	7227	7571	14838	8528	8840	17368	45.8

14.4 Summary

The three modern censuses held so far in Tanzania, 1948, 1957/58 and 1967, give rates of population growth which when compared both internally and with estimates of natural increase appear to be of doubtful accuracy. For Mainland, international migration cannot account for all the differences, while under-enumeration in 1957 seems to offer part of the explanation. For Zanzibar, however, migration may have played an important role, together with fairly uncertain estimates of birth and death rates.

Migration may for some time continue to have an impact on the population development in Zanzibar. With due regard to this factor, an admittedly hypothetical projection brings the population of Zanzibar in 1980 to around half a million people. By a similar attempt, the urban population of Mainland is seen to grow from slightly above 600,000 in 1967 to between 1.5 and 1.8 million in 1980. This impressive growth still represents a rate of urbanisation of not more than 10 per cent of the total population.

For the Mainland as a whole, the trends in fertility and mortality are expected to increase the population from 12 million in 1967 to around 17 million in 1980. This growth goes together with a corresponding change in the age distribution, due to a faster increase in younger age groups. Thus the population under 15 years will be proportionately larger, some 46.5 per cent in 1980, and the population outside working ages (15-64 years) will increase to about 48.5 per cent of the total population.

The regional population development is likely to depend to a certain degree on the implementation of the present rural development policies. The effects are however very hard to estimate in quantitative terms, and so the remaining alternative was seen to be to distribute the overall Mainland population growth in accordance with the past trends in regional growth. This also explains why no age-specific projections have been attempted for the regions; those presented in an earlier chapter remain the best that can be achieved from the 1967 census.

15 CONCLUSIONS

by Roushdi A. Henin and Adolfo C. Mascarenhas

In the introduction as well as throughout the body of this volume, a great deal was said about the limitations of the socio-economic data collected during the 1967 Population Census of Tanzania. It has, however, been possible to draw a picture showing the major characteristics of Tanzanian population.

15.1 Population composition

The size, the composition and the distribution of the population on the one hand affect the socio-economic characteristics of the population, but on the other hand they are themselves determined by these characteristics. The rate of population growth is determined in the absence of international migration by fertility and mortality. In Tanzania they are both high. Of the 18 Mainland regions, five show high fertility by African standards, that is an estimated crude birth rate of over 50 per thousand, namely Iringa, Mbeya, Mara, Shinyanga and Kilimanjaro; another seven have an estimated crude birth rate of between 45 and 50 which is the average for Africa. Three of the remaining six have a crude birth rate between 40 and less than 45 and another three a birth rate of less than 40 per thousand namely Mtwara, Coast and Dar es Salaam.

In other words, while fertility is generally high, there are some regions with relatively high fertility and others with relatively low fertility, and the question naturally arises as to what are the causes behind these differences. The answer to this question is very crucial for it throws light on the likely future trends of fertility in Tanzania. Unfortunately, data from the 1967 Population Census do not throw much light on the causes of these differences.

The fact that Dar es Salaam City comes at the bottom of the list with the lowest birth rate is understandable. This is probably partly on account of the fact that some of its population is non-African (Asians and Europeans). Further, a recent study of the impact of urbanization on fertility and child mortality in Tanzania has shed a great deal of light on the factors contributing to the lower level of fertility of the African population in urban as compared with rural areas (I.Sembajwe, M.A.thesis Dec 1973).

But why, then the large disparity between Coast (excluding Dar es Salaam) and Mtwara with birth rates of less than 40 on the one hand, and Iringa and Mbeya or Kilimanjaro with birth rates of over 50 per thousand on the other hand?

A recent study which was conducted to study fertility differentials in Coast and Singida (representing low fertility regions) and Arusha and Kilimanjaro (representing high fertility regions), shows that the differences in fertility between these two groups of regions is on account of disparities in per capita income, in health conditions and partly because of differences in marriage patterns. The two high fertility regions were characterized by better economic and social conditions than the two low fertility regions (S.Ngallaba, M.A.thesis Dec 1972).

With regard to mortality, of the 18 Mainland regions five have high crude

death rates which range from 26 per thousand for Iringa to 31.2 for Mbeya; another seven regions have crude death rates which range from 20 to 25 per thousand. The remaining regions have crude death rates, which are less than 20 per thousand. In other words, as with fertility, mortality ranges from very high death rates for some regions to relatively low death rates for some others, low, that is, by African standards.

Egero and Henin tried to correlate the level of mortality in the regions with available estimates of G.D.P. There was some evidence, though not conclusive, that the level of mortality is negatively correlated with the level of income. A study of mortality differentials in the same four regions referred to above, has shown that the differences are on account of economic, nutrition and health factors (C.L.A. Kamuzora, M.A.thesis Dar 1972).

In other words there is some evidence judging from the findings from the four regions referred to above that better economic and social conditions are conducive - at least in the short run - not only to lower mortality but also to higher fertility.

The remaining regions, however, offer other variations, at least according to the 1967 population census. Firstly there is Iringa, Mbeya and Mara where both fertility and mortality are high. Little needs be said about these regions for this is the general African pattern. On the other hand little explanation can be offered either in the case of Singida, Morogoro and Kigoma with medium fertility levels and high mortality levels or for Mtwara Region which combines one of the lowest birth rates (37.7) with a relatively high death rate (24.8). How much of these differences in fertility and mortality levels is due to errors in the data and how much is due to other factors, can not be immediately explained. There is little doubt therefore, that there is need for further demographic inquiries to establish the magnitude of the differences and to investigate the socio-economic factors behind these differences.

Two developments, however, emerge from the above discussion, with regard to fertility and mortality in relation to economic and social development. With regard to mortality, it needs to be pointed out that while substantial economic improvements may be a sufficient condition for a decline in mortality, it is not today a necessary condition. This is where Africa is unlikely to follow the European pattern. While it has taken a number of European countries over a hundred years to reach the low level of mortality, Africa can - given a certain set of circumstances - achieve the same result in no more than 15 or 20 years. This is primarily due to the combined effect of the development of antibiotics and insecticides, the establishment of effective public health organizations, and the invention of suitable low-cost methods of sanitation. The drop in mortality as projected by Egero and Henin (Chapter 14) from 22 for the period 1967-70 to 18 for the period 1975-80, is indeed modest judging from this country's achievements in this field and its emphasis on this sector in its past and current plans for economic and social development. Further, if as a result of better sanitary and health conditions the birth rate rises from 47 to 50 per thousand (possibly as a result of a drop in miscarriage and sterility rates), the rate of natural increase would reach 3.2 percent per annum. This would mean a doubling of the population in about two decades.

The age distribution of a population is affected jointly by fertility and

mortality. Of these two factors, it is fertility which is the principal determinant of the age distribution. persistent high levels of fertility give a broad based age distribution, while low fertility levels result in a narrow based age distribution.

A glance at table 14.6 shows how under the given assumptions the Tanzania age distribution may become progressively more broad based. The proportion under 15 years would rise from its already high level of about 41.9 percent in 1967 to 48.9 percent in 1980. Further, the dependency rate would rise from 87 in 1967 to 95 in 1980.

15.2 Economic data

Whether questions on economic characteristics of the population should be included in a population census schedule has been - as mentioned in the introduction - a controversial issue. All that needs be said here in this connection is that the data on the economic characteristics from the 1967 population census should be treated with great care, judging from the comparisons by Dey and Mogil between the 1967 census data and the 1965 Labour Force Survey. It is felt that a census taker should resist from being overly ambitious and should carefully determine the terms used in the schedule.

However, the data despite their limitation are still useful in giving a fairly reasonable picture with regard to the general economic characteristics of the population. A glaring characteristic of the Tanzanian Labour force is that the majority are engaged in primary production (Table 8.13). Less than 2 percent of the labour force is engaged in manufacture.

The occupational structure also reflects the same phenomenon. While 91 percent are "farmers, fishermen or hunters", no more than one percent are "professional and technical", less than half of one percent are "administrators, executive and managerial workers". Even "craftsmen and production process workers" comprise less than 3 percent of the total. This situation emphasizes the need for more diversification of production.

15.3 Education and literacy

Closely related to the productivity of a nation as reflected in its labour force structure is the level of literacy of the population. The problem of concepts and definitions which plagued the data on the economic characteristics are equally applicable to the data on literacy. The definition used by the census takers, as rightly pointed out by Dey and Mogil in chapter 7, is vague. This is not to mention errors in the data which are introduced by the respondents who are either illiterate or semi-literate; all such factors tend to produce biases in one direction only and tend to inflate the literacy rates arrived at from the census.

While on the one hand the country still suffers from a high illiteracy rate (69 percent for the Mainland and 62 percent for Zanzibar), there is strong evidence - judging from the higher literacy rates for the young as compared with the older age groups - that the level of literacy has been advancing in recent years. It should not, however, be forgotten that disparities in educational opportunities are demonstrated in many ways. Firstly, the more econo-

mically developed regions show higher literacy rates than the less developed (table 7.5). Secondly, urban areas enjoy higher literacy rates than rural areas (table 7.5). Thirdly, the sex differentials in literacy rates are in favour of males as compared with females (table 7.8). Fourthly with regard to the economically active population, it appears that those with the highest educational attainment are in non-agricultural occupations. These disparities point clearly to the need for more equal educational opportunities for the less favoured sectors of the population. Otherwise there is a real danger that these disparities will be accentuated.

For example, the close relationship between the level of economic development as reflected in the per capita income by region and the level of literacy should be expected. Lack of economic resources impedes the development of educational services, or, where these are provided by the central government, leads to a drain of educated people into areas offering better employment opportunities. Similarly, a generally low level of education impedes efforts at modernization of the local economy.

15.4 Population distribution

One of the great improvements of the 1967 population census over previous censuses was the information provided on population distribution and density. Previous censuses were notorious in this respect as is evidenced by the fact that the average size of the areal units of the 1948 and 1957 censuses was about 4,450 sq. kms. Each areal unit had approximately 15,000 people living in it. In contrast, the population in 1967 was counted in areal units which averaged 50 sq. kms. and has a population of about 670 persons. But even here there is need for improvement, for it is unlikely that during the next census many of the 1967 enumeration areas can be located and used. There is an obvious need for ward and even divisional boundaries to be properly surveyed and drawn on 1:50,000 maps, i.e. the maps which were available were the basis of the field work during the 1967 census.

However, as Moore states in his chapter, the importance of the population distribution and density is derived from two aspects of the nature of the population itself. First, population is a resource which is unevenly distributed and forms part of the nation's productive force. Secondly, population demands infrastructure such as educational, health and other facilities. To rationally plan and optimize on these services information is needed on density and distribution. Indeed, from the planning side information derived from the census has been used for planning of health facilities and similar work could be done for such facilities like education.

The process of calculating densities below the divisional level requires considerable manipulation. Comparison of densities between the 1967 and the previous censuses is mainly possible at the district level but the figures so derived are crude. Thus, using Lorenz curves for his analysis, Moore comes to the conclusion that overall there has been no significant intercensal change in the degree of unevenness in the distribution of population.

There is now fairly good quantitative data on the density of population. Tanzania is not as densely populated as the neighbouring countries. The most

important feature is that over three quarters of the population of Tanzania live in about one quarter of the land area. Even at the divisional level, population density varies enormously from an extreme of 220 per sq. kms. in Vunjo East Division (Kilimanjaro District), to less than 1 in Mlembwe Division (Nachingwea District). As John Moore points out, these differences in density reflect ecological influences. Since agriculture is the basis of life for the majority of Tanzanians, the question of changes in population density is important for it expresses the first level of generalization of the man land relationship.

Data on the resource base does not permit one to make any sophisticated analysis, but using simple parameters as an index the carrying capacities for the rural areas of Tanzania have been calculated. The significant feature is that there is no foundation for the common misconception that high population density is necessarily related to overpopulation. Low density districts like Dodoma, Kondoa and Mtwapa in fact carry a high density relative to their present agricultural system, but with remedial action in agriculture and pastoralism the land could support more people, i.e. take an increase in density. Here it may be pointed out that one of the Government's major efforts of resettlements and development since 1970 has been in Dodoma Region.

15.5 Migration

Information about the movement of people is not easily accessible for description and analysis. Claeson and Egero describe the various shortcomings of the data, which primarily inform about bordercrossing movements and add nothing about possible sequences of movements between place of birth and place of enumeration. As the timing of movements is unknown, even indirect inferences about the causes behind the various migratory flows are difficult to make.

Internal migration is perhaps in the long run more important than international migration because it consists more of mass adjustment to development than opportunistic movements and attendant enclave development. In terms of magnitude about a third of all residents in Tanzania live away from their birth place. Movement to towns has attracted considerable interest, but Claeson and Egero identify at least eight patterns of movements.

Also significant though not as much as in the past is migration across international boundaries. Briefly there were 444,000 persons who were born outside Tanzania. The majority are from eight neighbouring countries, but there is also a significant minority from India, Pakistan, the Middle East and European countries. The majority of these immigrants live in the peripheral districts of Tanzania or the urban areas. The non-Africans are especially concentrated in the latter.

A distinct category of migrants is refugees. In 1967 there were officially only 40,000 registered refugees, but a large proportion of the 100,000 persons from Mozambique living in Mtwara and Ruvuma should be categorised as refugees because they have moved out on account of the colonial tyranny in the south. The question of 'aliens' also merits attention. Of the nearly quarter of a million aliens by far the largest numbers are from the neighbouring countries, the largest being from Mozambique (60,000) and Kenya (39,000). Over 80% of the aliens are from African countries.

15.6 Urbanization

Movement to towns and the resulting change known as urbanization is a matter of concern, because of its rapidity and the strain it poses on the infrastructural services. While the growth of the urban population in Tanzania is more than twice as fast as the national population growth, the country is still among the least urbanized in the world. Only 6% of the population of Tanzania live in legal and defined urban areas. In the mainland there are 15 towns and 17 former townships. Unfortunately, the proclamation of towns has not caught up with development, thus creating anomalies especially in the total number of small towns. Redefinition of towns will give a better picture of the distribution of centres functioning as towns, and this in turn will become a better framework for planning purposes.

Within the limits mentioned above a considerable amount of data exists for the 15 towns in Mainland Tanzania. Of importance are the size and growth of the urban areas. Thus the national capital, Dar es Salaam, has all the characteristics of the primate city. Its population in 1967 was over 270,000 people or, in other words, two in every five persons living in the 15 major towns resided in Dar es Salaam. The fastest recorded annual growth rate, 12.4% per annum, occurred at Arusha which now ranks as the fourth largest town.

The other legally recognized urban areas known as former townships of Tanzania are small centers. A quarter of them had a population of 2,500-5,000 persons. Many district headquarters are found within this population range. Regional variation with regard to the extent of urbanization is considerable. In Zanzibar, 25% of the inhabitants are in urban areas. In Coast Region 35% of the population were concentrated in Dar es Salaam while the proportion of the population living in urban areas is less than 2% in West Lake, Ruvuma, Mbeya and Shinyanga.

The census did provide a considerable amount of information on those who moved into the 15 towns. The greater part of the out-migration from the majority of regions has been to Dar es Salaam. Mwanza and Arusha also exhibited the same trend. The value of this feature towards the creation of a national identity should not be underestimated. An additional feature is that the non-African population which once constituted a large proportion of urban dwellers is now rapidly declining in proportion. Therefore, Tanzanian towns, far from being enclaves for the development of alien enterprises, are now national growth points.

The quality of data collected on amenities in the urban areas varied considerably. Despite this limitation, some important features become apparent. The quality of life in urban areas is far from satisfactory or desirable. Over half of the people live in semi-permanent structures. The occupancy of housing along ethnic grounds is still apparent and will take some time to eradicate. By far the largest percentage of households live as tenants.

Single-roomed occupancy is most common and this is in keeping with the migration pattern, for at present individuals moving into urban areas is the largest category. However, there is need for concern, because as individuals settle and raise families in the urban areas conditions will become crowded. In addition to housing, the level of living in the urban environment can be gauged by the amenities available. More than 80% of the households were with-

out electricity and over a quarter did not have access to piped water. For the urban areas then there is much material which could be used for planning along new lines.

15.7 Data on ethnicity

Lucas and Philipson in the chapter on ethnic characteristics come to the conclusion that the question of *kabila* (tribe) should not be abolished until such time as when the people of Tanzania begin to identify themselves more strongly with a town, district and region. With urbanization, political education and ujamaa development, this day may come sooner than expected. However, on social and cultural grounds there may still be some academic interest in the question of tribes, and it is possible that some useful information for throwing light on the demographic and other characteristics of minor groups of people also can be obtained.

15.8 Agricultural information

The data collected on agriculture must be considered as only indicative. Thus while it may be true that own account workers form a substantial portion of agriculturalists, it is difficult to seriously accept that 98% of them are own account workers and family workers. Migration figures and their sources indicate that the figure should be much lower.

The single most important factor to emerge from Table 9.4 is the prominence of food crops in the agricultural practices of households and the significance of cotton in terms of the numbers who cultivated it. Surprisingly small numbers reported cattle raising as their main 'produce' perhaps reflecting that ownership of livestock can be concentrated in a few hands. The regional variations in crop combination is striking.

Estimation of the number of acres under each crop was attempted but the problems of acquiring accurate and meaningful figures was a major constraint and one will have to await the publication of data from the Agricultural Census for better results. In brief then, data collected on the agricultural sector helped to verify a few aspects which people long suspected as the pattern of agriculture, but overall the data clearly highlighted the need for a rigorous agricultural census.

15.9 The Rungwe Survey

Post-enumeration surveys are part and parcel of a good census enquiry. Their main purpose is to give an idea about the magnitude of errors in population estimates. They are, however, expensive operations and require a great deal of planning and skilled manpower which are not at the disposal of the average developing country.

A special study of the census was however conducted on a small scale, in Rungwe District, which is the subject of the last part of this volume. Two aspects were given attention in this part. One is the lessons that can be learned from the methods adopted during the 1967 Population Census, and the other the attention given to some aspects of marriage habits in Tanzania, an aspect that was not adequately covered during the 1967 Population Census.

The survey makes a number of important observations on sources of errors in the data. Some of these refer to the organisation of data collection, others to the concepts and definitions used in the census forms. The observations have been incorporated in the methodological sections of the present volume and need not be detailed here. A few examples are however worth stating.

The wording of questions on fertility and child survival left room for various types of misinterpretations. This can be significantly improved by a simple reorganisation and reformulation of the questions. In addition, a reference period of 12 months for current fertility and mortality can seldom be accurately established in a mainly illiterate population. The principal idea in all sorts of references should be to make use of available "raw material" rather than imported concepts alien to the local population. In the case of the reference period mentioned, a major national event (Saba Saba day) approximately 13.5 months before the census would have been an ideal point of reference.

The same applies to marriage patterns. Not only in the case of the 1967 population census of Tanzania but in almost all African censuses, "western" concepts are used which, strictly speaking, are inapplicable to African conditions. In most African censuses, four types of marital characteristics are used: single, married, divorced, and widowed. However, in a large country like Tanzania and within the context of African marriage customs, it is difficult to have a universal definition for either "married" or "divorced" as understood in the European sense. This is especially so in the case of the majority of the rural population. What needs to be emphasized here is that a new classification of marital characteristics need to be devised which relates more closely to the social conditions of the country concerned and which could be more easily utilized in examining other phenomena, for example fertility patterns. Such a classification may even have to be modified from one part of the country to another, although in the process it may introduce other difficulties for the country level tabulations. For example, one of the features that affect fertility in Africa is the extent of polygamy in a society. This is the case also for the incidence of marriage instability for the different modes of life and the different socio-economic groups of a population. Neither of these two phenomena have seriously been investigated using the population census as a tool for study. Their importance and the role they play in African marriage patterns are apparent in the last section of the Rungwe study.

15.10 A suggestion on age estimation

The writers of this chapter are of the view that the real problem of determining age, a very important characteristic in a population census and which is used in almost every table in the final report, has not been solved. It is certainly meaningless to report ages in single years for a rural population that is predominantly non-numerate. The list of the ten political events that were used in the 1967 Population Census of Tanzania were shown in chapter 13 to be of no practical value for determining age. The other alternative is to build up a detailed calendar of local events for each enumeration area. This is indeed an impossible task. The solution is probably the following compromise. It is suggested that for the selected sample enumeration areas a detailed calendar of local events could be built up during the preparatory stages for the census operation. For the non-selected enumeration areas, age

can be reported in broad age groups which can be understood directly by the population to be enumerated. For example, for males the following broad age group can be used: "under one year", "1 and over to under 5 years", "5 and over to under puberty" and "over puberty". For females the "over puberty" age group can be sub-divided into "over puberty not past child bearing age" and "over puberty past child bearing age". Subsequently a population model can be constructed at the analysis stage using the age characteristics available from the selected sample enumeration areas which can be used for comparison purposes with the relevant non-selected enumeration areas, where the broad age groups are used. Further, to cater for the tabulation programme, provided the age at puberty (for males and females) and the age at menopause (for females) are estimated, transforming the broad age groups into five year age groups should not pose serious problems.

15.11 A concluding remark

The first national census of Tanzania was a great improvement from the censuses taken during the colonial period. Although deficiencies have been noted, the census was important as a bench mark for a comprehensive range of demographic and socio-economic information. It is important in three other aspects: First, to the credit of the Central Statistical Bureau it was able to mobilize and coordinate the services of the administration and other institutions, in a very short time. Secondly, there was overwhelming and positive response to the census by the people of Tanzania. Thirdly, the effort in time and money has paid dividends in that the population census data continue to be fully utilized.

The first of these is the fact that the population of the country is increasing rapidly. This is due to a number of factors, including a high birth rate, a low death rate, and a large influx of immigrants. The second factor is the fact that the country is becoming more urbanized. This is due to the fact that many people are moving from the countryside to the cities in search of better living conditions and employment opportunities. The third factor is the fact that the country is becoming more industrialized. This is due to the fact that many new industries are being established in the country, which are creating a large number of jobs. The fourth factor is the fact that the country is becoming more educated. This is due to the fact that many more people are attending school and university, which is leading to a higher level of education and a more skilled workforce. The fifth factor is the fact that the country is becoming more developed. This is due to the fact that the country is investing in infrastructure, such as roads, bridges, and public services, which is leading to a higher standard of living and a more developed economy.

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15.10 A statement on the situation

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THE RUNGWE SURVEY ⁽¹⁾

by Klaas de Jonge and Jan J. Sterkenburg

Part 1 The evaluation study

1.0 Introduction

This survey will give the results of an evaluation study of the 1967 census carried out in the Rungwe district. This evaluation will show the type of errors made and their magnitude.

During the last years the demographic information about Tropical Africa has increased considerably as is apparent from some recent publications (2). These studies revealed that even the best planned and most organized census is not entirely free from mistakes. One usually tries to judge the quality of censuses and other demographic investigations by means of small-scale detailed evaluation studies. Sometimes such an evaluation study is carried out by the Census Bureau or Statistical Bureau itself as, for example, in Ghana after the census of 1960. Sometimes an evaluation may be performed by independent organizations abroad. In Tanzania possibilities for the Central Statistical Bureau to conduct an evaluation itself were limited. The presence of a research team in the Rungwe district, however, eventually opened up avenues for a limited evaluation.

The legitimacy of these evaluation studies has been proved ever since it appeared from a post-enumeration survey in the United States that during the 1950 census no less than 2 million people were not counted (= 1.4% of the total U.S. population). If such a margin of error occurs in a country with good statistics and carefully trained personnel, then one can imagine the possible mistakes in countries in which some essential conditions necessary for the collection of the right demographic material are less favourable.

On the basis of our experiences in the Rungwe district, we hope to throw more light on the problems which were encountered during the preparatory stages and during the actual census itself. The inconsistencies which were found during the analysis of the results, will subsequently be pointed out.

(1) This report partly draws upon the earlier publication by the same authors, Evaluation of the 1967 Population Census in Rungwe (Tanzania), Afrika - Studiecentrum, Leyden, 1971.

(2) W. Brass et al., The Demography of Tropical Africa, Princeton, 1968. Demographic comparés: Afrique Noire, Madagascar, Comores, 2 tomes, INSEE/INED, Paris, 1967, J.C. Caldwell and C. Okonjo: The Population of Tropical Africa, London, 1968.

1.1 The preparatory and field work

The organization of a population census requires a sophisticated organizational framework. The size of the population in Rungwe district (nearly 360,000) called for minor adaptations to the prescribed district census organization. Most important of these was the addition of a Divisional Census Assistant to co-ordinate all activities at the divisional level. The activities of the census organization at the district level consisted of:

- the delimitation and mapping of Enumeration Areas (EA's)
- the recruitment and training of supervisors and enumerators
- the execution of the actual count

1.1.1 The delimitation and mapping of EA's

Both the level of education and the additional training proved to be insufficient to enable the Census Assistants to carry out the mapping of EA's efficiently and accurately, at least under the conditions operative in Rungwe district.

These conditions were unfavourable since the quality of the topographical maps was rather poor; in a highly mountainous area only two out of twelve sheets had contour lines. Moreover, many population concentrations were not indicated on the map, while others were incorrectly located.

The high population density in most parts of the district made exact and detailed mapping extremely important in order to guide the enumerators to their correct EA's.

The difficulties in mapping the EA's were aggravated by the fact that the mapping had to be carried out in the wettest period of the year; in the period available for this work 53% of the total annual rainfall (or 1335 millimeters) is received.

Finally, there was a severe shortage of staff; only four Census Assistants were assigned to the district; an area of 4047 square kilometers (sq.kms.) divided into 660 EA's. The shortage of staff was caused by the fact that the regional census organization did not take account of the size of the area and the total population when assigning the staff to the various districts and towns.

In order to complete the preparatory work within the period set by the national census bureau, the district census organization decided to delimit the EA's on the basis of the Ten Cell Units. The Chairmen of the Village Development Committee (V.D.C.) territory or Ward supplied lists with the names of Ten Cell leaders.

Census Assistants visited these leaders and checked the number of households per leader and the approximate ratio between the number of households and the number of individual persons. In this way an EA was to be recognized by the name of the V.D.C. territory and the names of a number of Cell leaders. This system worked so fast that all preparations were completed in time and also so well - as the evaluation demonstrated later - that only minor omissions occurred while double counts were in fact impossible.

It was indeed quite remarkable that the national census organization did not fully realize the crucial role which could be played by Tanzania's unique administrative-political system until in the later stages of the preparatory work.

1.1.2 The recruitment and training of supervisors and enumerators

The district census organization only had to recruit enumerators; primary school teachers acted as supervisors and were made available by the Ministry of Education. The arrangement between this ministry and the census organization appeared to be insufficiently specified. Shortly before the enumeration phase, it became clear that certain groups of potential enumerators, i.e. the Standard VII and VIII pupils and their teachers, did not become available for census work because of the forthcoming examinations. Due to Rungwe's long tradition of education there was no problem of recruiting sufficient enumerators among the district's Standard VIII leavers group.

The training of supervisors and enumerators took place at the district on the basis of a programme devised by the national census organisation. This programme showed signs that it was rather hastily written. Moreover, it made no distinction in the quantity and type of knowledge transferred to supervisors, sample area enumerators and ordinary enumerators.

1.1.3 The execution of the actual count

The large number of EA's in the district and consequently of enumerators to be employed made for a decentralization of recruitment and training to the divisional level. This considerably facilitated the transport of enumerators to their respective areas. Assisted by the high population densities prevailing in some parts of the district, a number of enumerators were so close to their areas that they could reach these easily on foot. Sufficient means of transport at the disposal of the district census organization resulted in a timely beginning of the population count at the date originally set for it (3).

Enumerators were as far as possible posted in their own areas of residence. In view of this, applicants had been asked to give their name and place of residence or home area when they were recruited.

At first the enumeration went at a rather slow pace. This was caused to a considerable degree by the vague instructions, viz. "The enumeration shall continue until all inhabitants in each enumeration area are enumerated" while mid-October was stated as the deadline. The operation was accelerated by a circular letter and visits to the Divisional Census Assistant by the District Census Officer. As a result of this the whole enumeration was completed by the middle of September.

(3) This timely departure of enumerators from their training centres prevented the implementation of some last moment instructions which arrived late at the district census headquarters. These instructions concerned among other matters the changed date for census night, the advance payment of part of the salary and the swearing of an oath of secrecy.

1.2 Performance of the various elements of the district census organization

The district census organization consisted of four elements:

- the District Census Officer and his assistant; District Census Assistants, who also acted as Divisional Census Officers (4); Supervisors; Enumerators.

1.2.1 The District Census Officer

The Area Secretaries were appointed as District Census Officers. This decision proved in many ways to be wise. A population census is to a large degree an exercise in organization. The problems which occur are highly similar to those encountered by the Area Secretaries in their normal routine, e.g. when acting as returning officer during the central and local government elections. There is, however, also a disadvantage attached in using Area Secretaries since they are already burdened with a large share of the administrative activities at the district level.

The large amount of work they are normally occupied with probably explains the lack of enthusiasm of some Area Secretaries in the census activities. It appears from the minutes of Central Census Committee meetings that the national census organization was dissatisfied with the extent of participation of a number of Area Secretaries.

The appointment of Chief Area Census Assistants was a considerable improvement in the census organization since it enabled the Area Secretary to delegate many of the routine activities, while the management of and the responsibility for the census organization was still vested in him personally. The early appointment of a Chief Area Census Assistant in Rungwe district proved of particular importance since the Area Secretary was transferred twice in the preparation stage, while there also was a period of several weeks when there was no Area Secretary at all.

1.2.2 The District Census Assistants

The District Census Assistants, of which only four were available for the whole district, had as their main task to demarcate and map EA's of roughly 500 persons.

The Census Assistants had to work individually, cover a large area (an average of 1200 sq.kms.per person), and use insufficiently detailed topographical maps. They had no transport and had to divide a population of 360,000 people into EA's of about 500 persons in less than three months, all this in the middle of the rainy season.

The accuracy of the mapping played a less important role as use was made of the Ten Cell system. After completion of the population count it became apparent that there was only 3.9% difference between estimated and enumerated population for the whole district, but differences at the divisional level were considerable (they varied between - 15% and +19.5%).

(4) There were 4 Census Assistants in the district, which consists of 7 divisions. In 3 divisions the function of Divisional Census Officer was performed by teachers who gave the census training to the supervisors and sample area enumerators.

These differences may have been influenced by inaccuracies in the lists of Ten Cell leaders and/or the estimated ratio of number of households and persons per Cell leader. This, however, had no unfavourable influence on the complete coverage of all households and persons (see below).

In Rangwe district the Census Assistants made a considerable contribution to the success of the census; inadequate training and limited resources were counterbalanced by their dedication and long working hours in order to complete the large amount of work within the time available.

1.23 Supervisors

Primary school teachers acted as supervisors, who were in charge of the census operations within an area containing approximately 10 EA's. They had to assist in the training of the enumerators and had to supervise their activities during the actual count. In addition, they were responsible for the checking of the completed questionnaires and the handing of these to the district census office.

In many cases the performance of the supervisors left much to be desired. Already during the training period complaints were received from their trainers about their lack of interest in the work.

Also during the enumeration phase itself the co-operation of a number of supervisors was insufficient. A few had to be sent away because of negligence of duty while many appeared to be untraceable at their centres and when found had to be persuaded to stay there. No cases were reported of efficient measures taken on the part of the supervisors to rectify the mistakes of enumerators.

This negative impression of the supervisors' contribution may have been influenced by the non-availability of the best teachers who were engaged in Standard VII and VIII examination and by the fact that only one forwarded a report on the activities, although they were explicitly requested to do so by the district census organization.

1.24 Enumerators

The performance of the enumerators was in general commented positively upon on the part of the Divisional Census Assistants. Many interviewers failed to overcome the resistance of the people against certain crucial questions e.g. fertility and especially mortality. The same was experienced in the evaluation study. But it equally became clear that people were very co-operative where the interviewer took ample time to explain the reason behind certain questions.

The census interviewers were not only ill-equipped to give explanations for certain questions but their pattern of behaviour also left much to be desired at times. Repeatedly the villagers complained that the young men of the census left people no time for thinking.

It should be added that all interviewers dealing with this type of questions i.e. those posted in the sample EA's, were students of secondary schools. The quality of their work becomes further apparent in the evaluation of the results.

1.3 The census evaluation study

The census evaluation study was carried out in 5 villages in various parts of the Rungwe district; the survey covered a total of 496 households, consisting of 2483 persons. The survey was carried out by an experienced demographer with the help of two assistants, one of whom accompanied the demographer to all surveyed villages, while the other was an assistant-cum-informant living in the village under survey and familiar with local conditions.

The data collected were compared person by person with the individual census data; matching of individual persons proved, however, to be extremely difficult and possible in only 81% of the cases. Persons often appeared to be known under different names. The fact that only the names of heads of households were recorded and not those of the other members created an additional problem for matching.

Consequently, one was forced to match on the basis of characteristics (e.g. age) which one had hoped to test for reliability through this matching technique. Matching proved to be most difficult for the age groups between 15 and 29 years, i.e. the most mobile of the population.

In addition it became clear after the completion of the field work that the selected villages were not completely representative for the district as a whole as to percentage of children below 15 years, fertility and population growth.

These limitations, although to be taken into account in the analysis below, do not prevent an insight into the extent and the nature of the deviations. The reliability of the 1967 population census may consequently become apparent for the following aspects: coverage of households and persons, age, sex, fertility, mortality, population growth and economic activity.

1.3.1 Coverage of households and persons

The definition of a household was rather vague (5). Its application to the situation in Rungwe gave some difficulties in the case of polygamous households. Each woman in such a polygamous household has a house for herself and her young children; both aspects included in the definition are applicable here. The husband and his wives and their children live together - although not under the same roof, they occupy one compound - while all wives share their living expenses with the husband. However, the various wives do not contribute to each other's expenses.

(5) The definition was: a group of persons who live together and share their living expenses!

Usually, this will be the husband, wife and children. Other relatives, boarders, visitors and servants should be included as members of the household if they are present in the household on census night. Persons living alone should be considered as a separate household.

In the case of young unmarried men, especially among the Nyakyusa, it is rather difficult to determine whether they form a separate household. On reaching puberty, young men build their own house. Formerly this used to happen in their own age villages. Nowadays lack of space forces them to build their houses on the outer edge of the villages of their parents. Although these young men do not live together with their parents, they invariably share the living expenses. This is especially the case in the Lakeshore where lack of space and land scarcity is enormous. Often they assist their fathers in cultivating the land. Moreover, their mothers cook for them until they marry.

The vagueness of the definition or the lack of additional explanation especially influenced the reporting at the household size and to a minor extent the coverage. Although generally the place of residence should form the basis for a demographic survey, one may wonder whether the factor "sharing of living expenses" should not have the accent in Rungwe district. Probably, different interpretations of the household concept are responsible for the considerable differences between the findings on household size in 1957 and 1967. Assuming that no real changes have taken place in household size between 1957 and 1967, it seems that in 1957 too many people were registered as belonging to one household while in 1967 the reverse was the case. In the evaluation study a household size of 5.0 was found as opposed to 4.6 of the census; in the former, boys sharing their living expenses with their parents were included in the parents' household. Furthermore, polygamous households were regarded as constituting one unit.

The coverage of the households in the 1967 census was quite complete. This should to a large extent be contributed to the use of the Ten Cell System in demarcating the EA's, and the valuable assistance rendered by the Cell leaders (6). In all villages of the evaluation study only one household was found which in all probability was not enumerated although the persons were present in the village during the census.

The coverage of persons was equally satisfactory. An exception should, however, be made for young unmarried men. Sometimes these young men do not belong to a definite Ten Cell. Some census enumerators included these young men in their parents' household - as was done in the evaluation study - but others did not. The lack of a uniform approach resulted in both a great number of omissions and some double counts. Since census enumerators often found difficulty in tracing these young men, it would have been better in the case of Rungwe, to have counted them with the household of their parents because they shared their living expenses and ate with their mothers.

Especially in the event of parents and sons belonging to different EA's, the chances of making mistakes were fairly big. On the basis of our data it would not be too bold to state that 5-10 per cent of unmarried young men between the ages of 15 and 29 were not counted.

If for the entire Rungwe district, the percentage of omissions for young unmarried men between 15 and 29 was 7.5%, then in our opinion one would

(6) In Rungwe district all sales were generally fully-fledged members of their cell, irrespective of their party membership.

have an undercount of about 2600 in this age group. This would amount to 0.7% of the district's total population. Despite the concentration on one particular age category, this undercount should not be considered entirely impossible. Such an undercount finds further expression in the fact that among the group of 15-29 years, only 65% could be matched, (census versus own material) as against 80% in the other age categories.

Nevertheless, the chief aim of the census, i.e. complete coverage without omissions and double counting, was realised to a large extent. In this respect the 1967 census compares favourably with previous ones.

1.3.2 Sex and age

The sex ratios of the district's population reveal a preponderance of women.

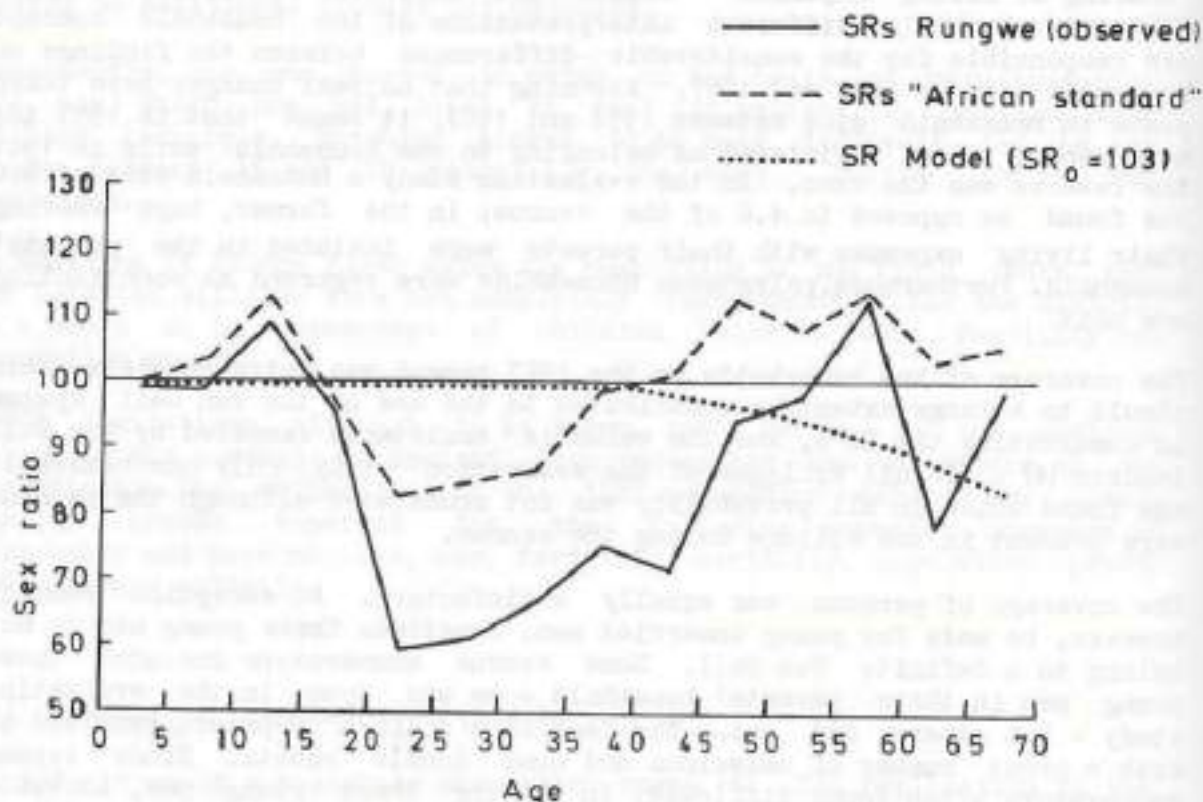


Figure 1. Sex ratio per age group

This sex ratio is clearly influenced by the heavy migration in the past (7). A differential death rate could have played a part during the period of absence (accidents at work, sickness). A comparison between the actual sex ratio per age category and the one of the "African Standard Model" makes clear that the form observed coincides with the standard model (see Fig. 1). The

(7) For details on migration, see P.H. Gulliver, A Report on the Migration of African Workers to the South from the Southern Highlands Province, with special reference to the Nyakyusa of Rungwe District, mimeo Dar es Salaam, 1955. His hypothesis about the men's 'weaker resistance to fatality' to explain the sex ratio however, would have to be taken with a pinch of salt.

only striking difference is a smaller number of men in the age category of 20-50 years in the Rungwe population. This should be explained by under-registration of young men, age misreporting and migration, the latter being the most important.

In conformity with trends elsewhere in tropical Africa, data on ages in Rungwe proved to be rather inaccurate. The general reasons for this phenomenon do not have to be repeated here. But some specific factors contributed to further inaccuracy. Firstly, the calendars devised to assist enumerators in order to determine the ages, contained only ten events. Although the district census organization was instructed to enlarge this calendar, this never occurred in Rungwe. Apart from the number of events being limited, certain data included appeared to have no relevance for the rural population. Especially in the case of women, political events had very little bearing on the estimation of ages. Even such an important date as Tanganyika's independence is for many women no point of reference in determining the ages of their children. In addition, enumerators and supervisors were given inadequate training in the field of collecting data and making estimations on ages. The inadequacies of the calendar of events led to some interesting phenomena: heaping of births in the years of generally known events (8), and at multiples of zero and five. If Whipple's Index is applied to the age data, they should - according to the U.N. scale - be classified as 'rough' (9).

Table 1 Sex ratios for children, adults and total population, Rungwe district.

	1948	1957	1967	'African Standard'	UN model (SR=103)
Children	103	99	102	104	100
Adults	62	66	80	95	97
Total	81	80	88	99	98

Age data were collected very carefully in the evaluation study; different techniques and cross-checks were applied to arrive at very reliable data. Comparison between census data and those of the evaluation study are given in the table below.

Table 2 A comparison between the ages of the men and women who could be matched, percent.

	Total	100% total	Same 5 yr. group	5-10 years diffe- rence	10+ yrs. diffe- rence	In case differences were more than 10 yrs percentage was stated Lower Higher	
Males	100	42	68	24	8	15	17
Females	100	39	64	26	10	15	21

Table 2 shows the extent and the direction of the deviations. It should be stressed that in spite of inadequacies in the preparations, 68% of the men and 65% of the women were placed in the correct 5 year age category. If the deviations in age are calculated per age category it becomes

(8) There was an exceptionally large number of people of 77 years old, i.e. born in 1890, the beginning of German rule. This was the first event in the calendar. But the same phenomenon occurred for other events included.

(9) For details on this method of age data evaluation, see: Manual II, Methods of Appraisal of Quality of Basic Data for Population Estimates, Population Studies No23, U.N. 1966. Notwithstanding the qualification 'rough', the Rungwe data fall in the same category as those of Swaziland in 1966 and appear to be better than those for the whole of Kenya in 1962 and Ghana in 1960, which fell in the category 'very rough'.

apparent that these deviations increase as age advances, while at the same time the inaccuracies grow faster for women vis-a-vis the men. Nevertheless, one should use the female population as the basis for further analysis and comparison, since this group could be considered "quasi-closed" due to absence of migration.

Table 3. Cumulated observed and selected stable age distribution for the female population of Rungwe, and the ratios $c(x)/c_s(x)$ of the observed and stable age distribution by five year age groups.

Age	Observed $c(x)$	Stable $c_s(x)$	$\frac{c(x)}{c_s(x)}$	Age group
5	17.0	17.8	99	0-4
10	32.7	31.1	113	5-9
15	43.0	43.0	87	10-14
20	51.4	53.3	81	15-19
25	59.5	62.2	92	20-24
30	68.0	69.7	113	25-29
35	74.6	76.0	103	30-34
40	80.5	83.4	109	35-39
45	84.8	86.0	96	40-44
50	89.3	89.7	118	45-49
55	92.1	92.8	90	50-54
60	94.0	95.2	79	55-59
65	95.7	97.1	94	60-64
70	96.2	98.4	92	65-69

From the ratio presented in column 4 of table 3 one gets a better insight into the nature and extent of the errors made with regard to age estimations. It shows a surplus in the 5-9 year age group, a deficit in the 10-14, 15-19 and even 20-24 year age groups. One again finds a surplus in the central age groups of 25-29, 30-34 and 35-39. Furthermore a surplus of 45-49 year olds; followed by a deficit of the people aged 50 years and over. These deviations are typical of the "African-South Asia" pattern (10).

The stable model for the female population may constitute the basis for a calculation of the male age distribution with the help of a constructed SR-model ($SR_0=103$). This calculation reveals a considerable difference between the constructed and the enumerated number of men: an undercount of 19,193 men, which equals 10.2% of the total male population. This difference could only be attributed to migration in the past, since it is chiefly found in the age category 15-44 years (11). We disagree with Gulliver that only a small percentage of all migrants should be regarded as a permanent loss. In his report he stated that in the 1950s no less than 25% of the estimated male population was absent. We assume that in the period 1940-1966 a maximum of 5% of the migrants did not return to the Rungwe district. Further research will have to elucidate where they settled permanently; this may either be in another African country or in another part of Tanzania. The same phenomenon may occur in other parts of the country with a strong migration tendency for selected age categories.

Unfortunately, the 1967 census material provides but little clarity as regards migration within Tanzania. People were only asked for the region of birth and not the place and district. In addition, only the heads of households were asked to state their tribe. Consequently one gets a

(10) See Manual IV, Methods of Estimating Basic Demographic Measures from Incomplete Data, Population Studies No. 42, United Nations 1967, chapter 5.

(11) The limited impact of the undercounting of men has been dealt with already, see above.

completely wrong picture of the sex ratios of, for example, the Nyakyusa in the whole of Tanzania, since all women would probably be tabulated as belonging to the husband's tribe.

1.3.2 Sex and age

In spite of insufficient census education, which is especially felt for this type of question, we got the impression that the co-operation on the part of the people was reasonable. Most of the faults should apparently be ascribed to insufficient training of the enumerators on the one hand, and the problems of demarcating the last 12 months period on the other. The latter appears to be the most important. The census instructions were insufficiently precise and left too much scope for the enumerator to define this period in the manner he deemed fit. It would have been better to use a fixed date; Saba-Saba day for example lends itself excellently as a point of reference since it is easy to recall the festivities. The exact duration of the period - in this case 13.5 months - is in fact immaterial; exact delimitation is of far greater importance. Corrections to a 12 month period can always be made afterwards. The major consequence of the wrong delimitation of the 12 month period is a much too high birth rate. The current fertility seems to be overstated since the figures are much higher than is possible on the basis of other demographic characteristics of this area. It is, therefore, not advisable to use these data to determine the absolute level of the crude birth rate.

From the report on the methodology of the census, it appeared that these questions were added by the census officials after 'initial reluctance'. They hesitated because of the expected unreliability of the results. And these results seem to bear out that their reluctance was well founded since the data are very unreliable indeed. It is generally assumed, and rightly so, that a deep distrust exists in most parts of Africa against these types of questions. However, it became apparent during the evaluation study that this distrust could be overcome if detailed information was supplied about the reasons underlying these questions. This detailed briefing was definitely lacking in the 1967 census.

Nevertheless, the data on births during the last 12 months preceding the census - after correction for mistakes made as to this aspect (see above) - enable us to determine the shape of the age-specific fertility distribution (12). Through this method, a total fertility (TF) of 6.72 was calculated for Rungwe: i.e. the women in this area have at the age of 50 years given birth to, on average 6.7 children who were born alive. This implies a Gross Reproduction Rate of 3.34; the crude birth rate in 1967 was 52 per thousand (13).

The data on current mortality proved to be too unreliable for analysis. A number of reasons caused this high unreliability:

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- (12) The best estimates of fertility were obtained by means of Brass' method. See W. Brass et al. The Demography of Tropical Africa, Princeton, 1968, Ch. III. To adjust the level of reported current fertility we used, however, the P/P ratio for the 30-35 year old women.
 - (13) A more detailed analysis of factors influencing fertility and the relations with marriage instability and polygamy is given in part 2 of this chapter.

- The non-response to questions on mortality in general, but especially for the last 12 months, was very high.
- The period of the last 12 months was not clearly defined and consequently was overstated.
- There was a considerable underregistration of deceased persons.
- Many mistakes were made in estimating the age of persons who had died.
- The absolute number of persons in each age group who had died during the last 12 months was rather small. Consequently, the data on retrospective mortality should be used for the analysis; i.e. the relationship between the reported number of children ever born and the children surviving (14).

As a result of the absence of information on adult mortality we used a one-parameter Brass model life table. The infant mortality rate found, appeared to be on the high side if compared with our own material. On the basis of the Brass-Carrier stable population model and our own material, an infant mortality rate of 160-170 per thousand for Rungwe was regarded as more acceptable ($q_0=164$ per thousand). The expectation of life at birth (e_0) for both sexes combined amounts to 37-39 years and the crude death rate to approximately 25 per 1000. Faulty age estimations during the census and other specific mistakes during the count, for example the inclusion of still births, could have led to the fact that the estimations on the basis of the census material were higher than those of the stable population and the material from the evaluation study.

A comparison of the census and our own material revealed that women, in answering questions on the number of children born alive, often first give the number of children still alive. Because some enumerators subtracted the number of children who had died from this number, the number of children still alive are underestimated.

Mistakes made during the course of this procedure reduces the parity and increases the proportion deceased.

All this seems to indicate that a new way of posing questions is wanted, namely, first the number of children still alive and the number born alive and then to check them against the number of children who had died.

1.3.4 Population growth

A comparison of the Rungwe population of 1948, 1957 and 1967 reveals the following picture of population growth.

Table 4 Observed annual growth in Rungwe 1948-67, per cent

	1948-57	1948-67	1957-67
Males	1.50	2.50	3.40
Females	1.55c	2.05	2.45

There are strong indications that in 1957 the population was underestimated. Consequently, the annual rate of growth observed over the period 1957-1967 must be regarded as too high.

Since in 1957 in Rungwe, a great percentage of men worked outside the district (in 1967 this was much less so), the annual growth for men over

(14) See W.Brass et al. *Ibid.*, Chapter III.

the period 1957-1967 especially was strongly overestimated. Departing from the calculated fertility and mortality data we arrive at a net reproduction rate $NRR = 1.91$ and an annual natural increase of 2.3 - 2.4 per cent for the total population of the district. This, as is to be expected, is somewhat lower than the figure observed for the female population i.e. 2.45% for the period 1957-1967 (through undercounting in 1957). On the basis of a comparison of the population totals for Rungwe in 1957 and 1967, an annual growth rate of 2.9% is calculated. Keeping in mind the undercount in 1957, this figure must be reduced to 2.6 - 2.7 per cent annually. The difference between the last two growth rates must be attributed to the decrease in migration to areas outside Rungwe during the period 1957-1967.

1.3.5 The economically active population

Three factors influenced the quality of the data as to the economically active population: the vagueness of definition of the concepts and the limited explanation in the manual; the quality of the census training - closely connected with the first factor; and the Arusha Declaration.

Blacker has pointed at the vague definition of economic activity in both the United Nations and the African recommendations (15).

The main consequence in the 1967 census proved to be the exclusion of women from the group of the employed, although their labour input on the farms usually exceeds that of the men in Rungwe district - and indeed in most parts of Tanzania (16). Nevertheless, in the villages included in the evaluation study, 88% of the women were classified as 'homemakers' by the census enumerators. Such a mistake is, of course, easier rectifiable for rural vis-a-vis urban areas.

The definition of 'unemployed' also created some problems. Many young men with education of Standard IV-VIII were desperately trying to find work as wage labourers. Meanwhile they worked on the farms of their parents or other relatives. In the census many of these were classified as 'others not working', a category meant for children not attending school, aged and permanently sick or disabled persons. In fact they should have been regarded either as employed - family worker or employee - or as unemployed.

The unpaid family workers especially were a difficult group for some enumerators to handle. Of course, the question of how much time a person must spend to classify as a family worker is difficult to determine during a census.

The distinction between main and secondary occupation proved to be another stumbling block. It was not clearly stated whether time spent or income gained should form the main criterion in determining the main occupation. But it appeared that even some labourers at the estates who in any case should have been called employees, were recorded as own account workers.

(15) J.G.C. Blacker, 'Some Unsolved Problems of Census and Demographic Survey Work in Africa,' paper presented to the International Population Conference, London, September 1969.

(16) See the Arusha Declaration.

The same absence of a clear criterion applies to the question regarding the type of farming. Farmers often mentioned the major cash crop of the area, even if that crop only covered a small part of their total acreage and did not constitute their major source of money income. Consequently, in the cases which lend themselves to direct comparison only 55% of the households could be placed in the same category for 'main products'. This figure is further reduced to 34% for 'second product'. Especially the latter type of information could have been obtained more easily and with much more reliability from records of co-operative societies and agricultural extension officers.

The 1967 population census data in the field of economic activity were also influenced by the Declaration of Arusha. The emphasis on work - e.g. 'all people must be workers' - made people hesitant to state that they were unemployed and definitely resulted in an undercount of the unemployed. In addition, the definition of the concept of exploitation in the Arusha Declaration clearly reduced the number of people who stated that they employed other people. This especially applied to farmers, who usually paid the laid-down minimum wage or even less.

1.4 The lessons gained for a future population census in Tanzania

The preceding analysis of preparations, actual count and evaluation of results of the 1967 census in Rungwe district and their presumed applicability to other parts of Tanzania already contains implications for improvements in a future population census. Nevertheless, it has its advantages to repeat them briefly and a little more specifically here.

(a) As to the preparations of the census the following procedures seem the most suitable:

The Survey Department embarks upon a mapping programme of V.D.C. territories in the whole of Tanzania. Priority may be given to the economically most important areas. Experiences in Rungwe prior to the census preparations demonstrated the importance of aerial photographs for such a mapping programme. Because of the large amount of work involved, this programme will have to start well in advance (i.e. 2-3 years) of any other census preparations. Furthermore, the district administration and the district party machinery will have to keep records of all Ten Cell leaders elected in the various V.D.C.'s of the district. Census preparations by the Census Assistants may then be restricted to a thorough check of the lists of all leaders to see whether these are complete and contain the correct names. The assistants will subsequently have to check the ratio between a leader and the number of persons per household and per Cell in order to devise EA's of a fixed number of people for each V.D.C. In this way Census Assistants will not be burdened with mapping work for which they are not trained (17).

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- (17) It would be of considerable advantage if all heads of departments, local government organizations, co-operatives and voluntary organizations were advised to group all data/figures per V.D.C. area. Maps, demographic data and other information would provide regional Economic Secretaries with an excellent basis for their planning activities.

The absence of any changes in the system during the census preparation is a precondition for its efficient operation. Especially local government elections which may result in a change in Ten Cell leaders will exert an unfavourable influence. However, the same is applicable in the case of a transfer of those government officers who play a crucial role in the census preparations. This was clearly demonstrated by the subsequent transfer of two Area Secretaries in Rungwe district.

(b) The training programme should be devised and worked out in detail well in advance. This opens up possibilities of combining the training of supervisors and enumerators with census education at school. The training may be integrated in the geography lessons at secondary school and those standards of the primary schools from which pupils will be recruited as enumerators (18). The practical side of the training - i.e. role playing - should be geared to the specific activity of each element of the census organization. Ordinary enumerators who only collect data on sex and age should especially become experienced in the handling of local calendars. In addition, the lower echelon of the administration should be involved in the early stages of the preparations; to achieve their optimal co-operation a short course could be given in the early stages.

(c) There are also possibilities for the improvement of the results of the next census by introducing some changes in the questionnaire and the instructions relating to certain questions. It seems advisable to record the name for all members of the household. This facilitates the enumerator to check whether all members have been recorded. In addition, it opens better possibilities for post-enumeration evaluation studies.

For certain aspects of the census instructions, detailed preparation by specialists of the census organization is advisable. This applies to the preparation of detailed national and regional event chronologies to facilitate more accurate age estimations. This element of the preparation should not be left to the regional or district census organization. It opens, however, an excellent opportunity for co-operation between the national census bureau and the history department of the University.

In addition, the definition of the concept of "household" should be tested for the various regions and districts. The territorial age group organization of the Nyskyusa created problems for the enumerators in applying the household definition and demonstrated the necessity for a field check. For this aspect, co-operation with the sociology department of the University might be fruitful.

Data on mortality and fertility could be improved by a different phrasing of the questions. Preferably the total number of children still alive should be asked first, while a distinction should be made between those still at home and those who have left the household. Subsequently, the number of deceased children should be recorded. Finally, the enumerator can add both figures and check whether this tallies with the total number of children ever born.

Questions pertaining to current fertility and mortality require a clear

(18) Cf. H.M.Jones, Report on the 1966 Swaziland Population Census, Mbabane, Swaziland Government, 1968, pp. 57 and 68.

demarcation of the period under review. It is better to extend the period to more than 12 months if this facilitates the demarcation.

A final remark should be made about the sample fraction of the sample survey. After long discussions, the census organisation opted for a fraction of 20%. It would have been preferable to have reduced this figure and to have devoted more attention to a careful selection of the interviewers for this sample survey and a more thorough training and control of the sample area enumerators and supervisors.

It is difficult to indicate the optimal magnitude of the fraction. Moreover, the actual number of respondents included in the sample is more important than the percentage. The manual for African census surveys of the Economic Commission for Africa (19) advises a fraction of 5-10 per cent. sample of the EA's. In our opinion a 10% sample in 1967 would have provided the Census Bureau with more reliable results.

Part 2 Marital status and marriage instability

2.0 Introduction

Certain aspects of marital status, e.g. polygamy and marriage instability often receive a cinderella treatment in population censuses in African countries. The data which are usually collected mainly deal with the situation at the time of the count.

The classification of marital status used in the 1967 population census of Tanzania seems to be rather 'western' in orientation. Four types were distinguished: never married, married, divorced and widowed. No question was included on polygamy, although the previous census revealed a rather high incidence of this phenomenon.

A general view of the distribution according to marital status can be obtained from the following table, which is based on the census data.

Table 5 Rungwe, marital status by sex for two age groups, per cent

Age	Sex	Never Married	Married	Widowed	Divorced	Total
20-44	Male	23.6	75.8	0.0	1.8	100.0
	Female	1.5	99.7	3.6	1.2	100.0
45 and over	Male	2.5	99.4	3.1	3.0	100.0
	Female	0.2	99.6	38.6	1.6	100.0

However, this table certainly presents insufficient detail to get a thorough picture of the marital pattern. A detailed socio-demographic survey carried out in the Rungwe district enables us to throw more light

(19) See: Manual for Demographic Sample Surveys in Africa, E/CN. 14/CAS, 7/17, E.C.A. Addis Ababa, 1971.

on essential elements of this marital pattern. For Rungwe, the main characteristics of this marital pattern are:

- marriage is almost universal, i.e. almost everybody marries
- the first marriage of women takes place at an early age
- there is a high incidence of polygamy
- there is a high degree of marriage instability

Each of these characteristics will be dealt with below. Moreover, attention will be devoted to the interrelationship between marriage instability, the type of marital union and fertility.

2.1 The universal character of marriage

According to the 1967 census only 2.5% of the male and 0.2% of the female population of 45 years and over never marry - taking into account that the chances of marrying for the first time after 45 is practically non-existent (see table 5).

The Nyakyusa (20), who according to the 1967 census formed about 70% of the total population of Rungwe, regard only one type of marriage as valid, namely that when the father of the woman has accepted his future son-in-law and has received at least a portion of the bride-wealth and when the couples have had intercourse at least once. Without the first characteristic the relationship is unlawful and carries with it heavy sanctions, whilst without the second it is merely an engagement. Thus it is relatively easy to find out whether someone is married or not.

2.1.1 The age at first marriage

The census provides no information about the age at which a first marriage takes place. This is provided only indirectly by making use of the percentage "never married" of the total male and female population and the chosen stable population models (21). Thus, on the basis of the percentage "never married" in the census (for males 63.9% and females 46.5%) and the

Table 5. Rungwe, per cent never married by age and sex as from the 1968 survey

Age	Percentage never married	
	Males	Females
0-14	100	100
15-19	99	99
20-24	72	5
25-29	25	1
30-34	7	-
35-39	6	-
40+	1	-

(20) For sociological material related to this subject see: P.M. van Bekken and K. de Jonge, *Echtscheiding bij de Nyakyusa*, Afrika-Studiecentrum, Leyden, 1969; K. de Jonge, *Pecondite chez les Nyakyusa du Rungwe (Tanzania)*, Etude Socio-démographique, Mémoires pour l'Ecole Pratique des Hautes Etudes, Paris, 1971 (mimeo); G. Wilson, 'The Nyakyusa of Southwestern Tanganyika', in *Bantu Studies* V, 1936; M. Wilson, 'Nyakyusa Kinship', in Radcliffe-Brown and Forde (eds), *African Systems of Kinship and Marriage*, London 1965.

(21) E. van de Walle: 'Demographic Aspects of Marriage in Tropical Africa', paper presented to the Intern. Pop. Conference, London, Sept. 1969.

stable population models selected by us, we arrived at an average age of marriage of 25.8 years for men and 16.8 for women. In the case of women this figure tallies with that of the evaluation study. For men, however, the age of marriage is in reality higher as a result of undercounting and migration of unmarried young men which lead to an underestimation of the percentage 'never married'. For men and women who were married after 1960, we found an average age at first marriage of respectively 28.2 and 16.9 years (see table 7).

Table 7 The mean age at first marriage by marriage cohort and sex, Rungwe Survey, 1960

Marriage cohort	Males	Females	Difference in Years
1920-29	24.7	15.1	9.6
1930-39	27.6	15.2	12.4
1940-49	27.9	15.8	12.1
1950-59	28.0	16.1	11.9
1960-69	28.2	16.9	11.3
all	27.7	15.9	11.8

In general, a man marrying for the first time will take a young girl as his wife (in 93% of the observed cases) and not a divorced or widowed woman. Remarriage of women favours polygamy (in 82% of the cases).

2.1.2 Polygamy

Polygamy is the ideal of most non-Christian men in Rungwe. From our research it appeared that in 1967, 26.1% of the married males were polygynists (the incidence of polygamy). The average number of wives per polygamously married man is 2.35 (the intensity of polygamy) and the number of married women per married man is 1.37 (general index).

Table 8 Number of wives per husband

Region country	Year	General index	Intensity of polygamy	Percentage of married males with				
				1w.	2w.	3w.	4w.	5w.
Rungwe (Survey)	1960	1.37	2.35	73.9	19.3	4.7	1.8	0.3
Tanganyika*	1957	1.25	—	78.9	17.2	2.9	0.7	0.4
Ghana*	1960	1.4	—	73.8	20.0	4.5	1.2	0.5

* Demographic Handbook for Africa, E.C.A., 1968 (Table 19)

The major factor which influences polygamy is the difference in age at marriage between men and women. If we assume that the sex ratios for men and women are equal at each age, (22) it appears that as a result of the sex differences in the marriage pattern (a difference in the age at marriage of the men and women of more than 10 years!) the number of married women per married man would be 1.26. The difference between 1.26 and 1.37 must be attributed to the unequal sex ratios per age category, which results mainly from the migration of young unmarried men. Thus, there are more women available for those who remain behind.

As was to be expected, the percentage of men and women in polygynous unions increases as their age advances (see table 9).

(22) S. van de Walle in W. Brass, et al. The Demography of Tropical Africa, Princeton, 1968 Chapt. V.

Table 9 Rungwe spouses by type of union, age and sex as from the 1968 survey, per cent

Type of union	Age						
	15-19	20-24	25-29	30-34	35-44	45-54	55+
Husbands:							
monogamous	100	95	94	90	74	49	50
polygamous	-	5	4	10	26	31	42
total	100	100	100	100	100	100	100
Wives:							
monogamous	77	81	59	57	41	30	49
polygamous	23	19	41	43	59	60	51
total	100	100	100	100	100	100	100

Due to the rather vague definition of a household, some enumerators of the 1967 census regarded polygamous households as one unit, while others thought of them as a number of separate households. This prevents us from obtaining a reliable picture of the extent of polygamy on the basis of the census data. An additional problem is created by the absence of married men through migration which influences the 'general index'. Finally the question on the 'relationship to head of household', which is necessary for the calculation of the incidence and intensity of polygamy, was answered very unsatisfactorily. Thus, for example, married women who were visiting their parents or relatives, were sometimes registered as 'wives' of the head. In addition women who were absent were not registered as 'wives' in the household of their husbands.

An impression of the extent of polygamy is of importance for gaining a better idea about fertility and about the economic situation. We have noticed that women in a polygamous household have on average fewer children than women in a monogamous one (see below). Moreover, a polygamous man had better economic opportunities than a monogamous man in the Rungwe situation where the farming system was primarily dependent on family labour (23). Without much trouble the census category 'married' could have been divided into 'monogamous' and 'polygamous' i.e. 1, 2, 3+ wives.

2.1.3 Marriage instability

In Rungwe marriage instability is very high. This must firstly be attributed to the big difference in age at first marriage between men and women. We have calculated it to be on average 11 years. The differences in age of subsequent marriages are often much bigger. From the mortality level calculated by us, it appears that the chances, in the absence of divorce, of a woman marrying only once before her fiftieth year do not even amount to 55%. Women who are below 50 years when the husband dies, 're-marry' quickly (see table 5: less than 4% of the women between 20-44 are widowed).

People are familiar with an institution known as 'levirate' by which the widow is inherited by the heir of the deceased man. In our survey, we considered this inheritance as a new marriage. In Rungwe this is, however,

(23) See H.A. Luning, *A Farm Economic Survey in Rungwe District*, Afrika-Studiecentrum, Leyden 1969, p. 10.

(24) This example demonstrates that some basic knowledge of customary law is an essential pre-condition for certain types of demographic research such as that on marital status.

seen as just the continuation of the 'first' marriage. If the widow rejects the heir and returns to her family, it is regarded as a kind of divorce. There is a difference with the divorce when the husband is still alive. The widow is only obliged to return the brideprice if she re-marries a person other than the deceased husband's heir (24). Divorce is in Rungwe, apparently quite important. On the basis of the marital histories of women in the villages investigated by us, we calculated three types of divorce ratios.

The divorce ratios for men are higher than those for women. On the other hand, the chance that a marriage will be ended by death, is bigger for women vis-a-vis the men (see table 10, ratio B).

Table 10 Rungwe, divorce ratios as from the 1968 survey

Marriages ended in divorce, per cent of:	Total	Men Informants	Women Informants
A. all marriages	0.24	0.18	0.14
B. all marriages ended in death or divorce	0.57	0.68	0.47
C. all marriages except those ended in death	0.23	0.20	0.17

A comparison with other African peoples reveals a relatively high divorce ratio for Rungwe and the Nyakyusa.

Table 11 Divorce ratios for some African peoples (25) by mode of descent (per cent)

People	Ratio A	Ratio B	Ratio C	Mode of Descent
Shona	0.05	0.33	0.11	Patrilineal
Tonga (Sw.)	0.19	0.42	0.20	Matrilineal
Ganda	0.24	0.68	0.27	Patrilineal
Mumbwa	0.20	0.41	0.28	Patrilineal
Rungwe	0.24	0.57	0.29	Patrilineal
Nyakyusa	0.25	0.59	0.31	Matrilineal
Yao	0.31	0.70	0.35	Patrilineal
Akan	0.29	0.56	0.37	Matrilineal
Tonga (Pi.)	0.30	0.57	0.38	Matrilineal
Dororo	0.50	0.53	0.40	Double matrilineal
Lamba	0.33	0.61	0.42	Matrilineal
Tubala	0.39	0.70	0.43	Matrilineal
Nimba	0.53	0.80	0.61	Matrilineal

In a patrilineal society, in contrast to a matrilineal one, a woman who divorces her husband loses all rights to her children. This explains the relatively low divorce ratios in these societies.

In Rungwe women take the initiative in 70% of all the divorce cases. The women usually wait before they divorce until they have found a new marriage partner who then has to care for the return of the bridewealth. The figures on the percentage "divorced" as provided by the census (see table 5) tell us little about the incidence of divorce. In the five villages investigated by us we found that of 100 marriages contracted, 49.7 would end in divorce within 40 years (see table 12). If mortality was a negligible factor, more than 60% of the marriages in Rungwe would end in a divorce (26).

(25) For all data except for Rungwe and the Nyakyusa, see J.C. Mitchell, 'On Quantification in Social Anthropology', in: A.L. Epstein, ed., *The Craft of Social Anthropology*, London, 1967.

(26) For the methods used see: J.A. Barnes, 'The Frequency of Divorce', in A.L. Epstein, ed., *op.cit.*, London, 1967.

Table 12 Divorces per 100 marriages by marriage duration in years

duration of marriage	% divorce	duration of marriage	% divorce
1	11.3	19	42.6
3	21.5	24	45.0
5	24.2	29	47.0
7	29.1	34	48.6
9	32.3	39	49.7
14	38.7	40	49.7

The highest percentage of divorces occurs in the first three years of the marriage, when there are no or only a few children. One of the reasons is that divorce cases arising from conflicts over the bridewealth, which are quite common, usually take place in the first years of the marriage.

Two factors are responsible for the low percentage 'divorced' observed in the census. Firstly the short period between the divorce and the new marriage. Secondly the fact that divorce is frowned upon, despite its frequency, which leads to the fact that the actual status is hidden.

2.2 The interrelation between marriage instability, type of marital union and fertility

The high observed fertility in Rungwe, a total fertility of 6.7, is related to the following factors: the young age at first marriage; almost everybody marries; quick re-marriage after the death of a partner or a divorce; modern contraceptives are not used; men as well as women desire a great number of children (all women and 99% of the men wanted four or more children). We found however a variation in fertility according to the type of marital union (monogamous/polygamous) and the marriage instability.

Table 13 The average number of children born alive of women at 45 years and over by type of union and number of times married

married women by number of wives of husband:				
	1 wife	2 wives	2 or more wives	2 or more wives
Average number of children	7.3	7.7	6.1	5.2
women ever married by number of times married:				
	1 time	2 times	2 or more times	2 or more times
Average number of children	7.4	5.9	5.1	3.8

The table shows that women in polygamous households and women who have been married several times have a lower number of children ever born than women who have only been married once or who live in monogamous households. Marriage instability seems to exert a greater influence than the type of union.

A number of factors explain this situation.

Firstly, there are differences in the risk of conception. Women with unstable marriages and women in polygamous households have a lower chance of becoming pregnant. Although divorced women re-marry soon, there is usually a short period (6-12 months) that these women stay with their parents or other relatives. This phenomenon and the period of disturbed relations with the husband preceding the divorce have a negative influence on fertility. In a polygamous household the husband commonly shares

equally his (sexual) attentions to his wives (lives for example one week with one wife and the next with the second).

Secondly, the taboos on intercourse during certain periods (after child birth) seem to be better respected in polygamous households.

Thirdly, the influence of the age of husbands in polygamous households plays a role. For each age category of women, the average age of husbands in polygamous households is greater than that of husbands in monogamous ones.

Finally, the impact of sterility should not be underestimated both on the type of union and the degree of instability. In a monogamous household, sterility often induces the couple to divorce or the man to take a second wife. In both cases the wife will find herself in a polygamous household.

As we have seen, a woman who re-marries finds herself in 82% of the cases in a polygamous household. The fact that a woman is sterile or subfecund does not prevent her from re-marrying, since such a woman is still highly estimated as a member of the labour force of the household.

The results of a French study (27) coincide with those in Rungwe: there is an inverse correlation between the marriage instability and the fertility of women younger than 25 years of age. In Cohen's study, it was assumed that this phenomenon results from the fact that women who had been married twice or more, did so at a younger age than the others. This may well be so. In Rungwe, however, one also finds a relatively high percentage of divorces in the first three years of marriage. Especially in this period of the marriage reasons other than sterility play a dominant role in causing a divorce, as was explained earlier.

2.3 Conclusion

Apart from the mistakes made during the estimation of the ages, the census material relating to marital status is fairly reliable. In future it would be preferable to split the category 'married' into 'monogamous' and 'polygamous' marriages. Only the categories 'widowed' and 'divorced' provided difficulties of definition.

The degree of stability in the marriage is related to fertility. Women in polygamous households and women who have been married several times had a lower fertility than their age associates who have been married only once or who live in monogamous households.

M. Cohen, "Pecundite: facteurs", in Demographie Comparee: Afrique
et Madagascar, Comores, 2 tomes, INSEE/INED, Paris, 1967.

APPENDICES

Appendix 3.1 Population, area and density by districts, 1967.

District	Population	Accumulated % of total population	Area (sq.km.)	Accumulated % of total area	Density persons per sq.km.
Dar es Salaam	272,821	0.2	88	0.01	3100.2
Ukorewe	109,277	3.1	640	0.08	170.7
Penba I.	164,321	4.4	934	0.2	167.0
Sambar I	190,494	6.0	1,660	0.4	114.8
Kilimanjaro	503,067	10.1	5,310	1.0	94.7
Arusha	234,216	11.8	2,978	1.3	71.9
Mt. Meru	75,651	12.4	1,004	1.4	69.8
Mt. Meru	355,371	13.4	5,180	2.0	69.5
Mt. Meru	268,941	17.5	3,805	2.5	69.4
Mt. Meru	272,852	19.8	4,015	2.9	68.0
Irishoto	230,484	21.5	3,497	3.3	60.2
Tanga	258,609	23.6	4,921	3.9	52.6
Mt. Meru	305,516	26.0	6,087	4.6	50.2
Mt. Meru	188,536	27.6	3,085	5.0	48.5
Mt. Meru	383,129	30.7	8,073	5.9	47.7
Geita	371,407	33.7	9,065	6.9	41.0
Korogwe	140,304	34.8	3,756	7.3	37.4
Mt. Meru	174,741	35.9	3,756	7.8	35.9
Shinyanga	320,924	38.5	9,450	8.8	34.0
Mt. Meru	96,322	39.3	2,849	9.2	33.8
Mt. Meru	16,748	39.5	510	9.2	32.2
Mt. Meru	241,414	41.4	9,454	10.3	25.5
Mt. Meru	213,685	43.2	8,056	11.3	23.9
Mt. Meru	185,962	44.6	7,900	12.2	23.3
Mt. Meru	207,611	46.3	9,324	13.2	22.3
Mt. Meru	302,047	48.8	13,727	14.8	22.0
Mt. Meru	180,556	50.3	8,594	15.8	20.2
Mt. Meru	430,314	53.8	21,368	18.2	10.2
Mt. Meru	28,428	54.0	1,425	18.4	19.9
Mt. Meru	555,989	56.9	17,871	20.4	19.9
Mt. Meru	320,399	59.5	16,376	22.3	15.4
Mt. Meru	149,835	60.7	7,902	23.1	18.9
Mt. Meru	289,366	63.0	16,057	25.0	18.0
Mt. Meru	144,098	64.2	8,418	25.9	17.1
Mt. Meru	118,467	65.2	7,137	26.7	16.6
Mt. Meru	316,372	67.7	19,296	28.9	16.4
Mt. Meru	212,195	69.5	13,208	30.4	16.1
Mt. Meru	147,489	70.7	9,583	31.5	15.4
Mt. Meru	176,184	72.1	11,526	32.8	15.3
Mt. Meru	193,819	73.7	12,821	34.2	15.1
Mt. Meru	318,811	76.3	21,109	36.6	15.1
Mt. Meru	37,407	77.1	6,700	37.3	14.5
Mt. Meru	135,810	78.6	14,245	38.9	13.6
Mt. Meru	117,547	79.4	9,842	40.1	11.9
Mt. Meru	128,914	80.6	11,957	41.4	11.1
Mt. Meru	192,687	82.2	18,513	43.5	10.4
Mt. Meru	133,235	83.3	13,209	45.0	10.1
Mt. Meru	215,288	85.0	22,792	47.5	9.4
Mt. Meru	121,024	86.0	13,339	49.0	9.1
Mt. Meru	252,627	88.1	28,619	52.5	8.8
Mt. Meru	136,918	89.7	16,058	54.1	8.5
Mt. Meru	81,854	89.8	10,870	55.3	7.5
Mt. Meru	147,628	91.0	19,943	57.6	7.4
Mt. Meru	97,957	91.8	13,852	59.1	7.1
Mt. Meru	97,555	92.6	18,778	61.2	5.2
Mt. Meru	151,390	93.8	34,059	65.1	4.4
Mt. Meru	174,922	95.3	39,450	69.5	4.4
Mt. Meru	200,051	96.9	62,419	76.6	3.2
Mt. Meru	80,157	97.5	28,620	79.8	2.8
Mt. Meru	53,618	98.0	27,066	82.9	2.0
Mt. Meru	80,482	98.6	42,735	87.7	1.9
Mt. Meru	106,892	99.5	63,063	94.8	1.7
Mt. Meru	80,803	100.0	45,843	100.0	1.3
TANZANIA	12,313,469		886,265		13.9

Appendix 3.2 Derivation of population distribution index and index of distributional change.

3.2.1 Derivation of a population distribution index

This index is mapped in Fig. 3.6 to show the relative distribution of the Tanzanian population between the districts of the United Republic. Derivation is as follows:

(i) The population of each district (p) is expressed as a proportion of the total Tanzanian population (P), that is p/P .

(ii) The area of each district (a) is expressed as a proportion of the total Tanzanian area (A), that is a/A .

(iii) The distribution index is the ratio of the district's proportion of the total population to its corresponding proportion of the total area, that is $p/P \div a/A$ or pA/Pa .

(iv) 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. When values are greater than 1.0 the proportion of the total population exceeds 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.

For example, in 1967 the population of Kisarawe district was 180,536, which is 1.47% of the Tanzanian population. The area of the district is 8936 sq. kms. which is 1.01% of the total area. The distribution index is $1.47/1.01 = 1.45$.

(v) This index is identical to the value derived by dividing the population density of the district by the national average density.

3.2.2 Derivation of the index of distributional change

The distribution index for 1967 is expressed as a ratio of the distribution index for 1948. For example the relevant values for Kisarawe district are:

$$\text{Index in 1967} = 1.45$$

$$\text{Index in 1948} = 1.92$$

The index of distributional change is $1.45/1.92 = 0.76$ which indicates that the proportion of the total population living in Kisarawe district in 1967 is less than the proportion of the total population living in the district in 1948. That is, the contribution of Kisarawe district to the total population has decreased between 1948 and 1967. Values greater than 1.0 indicate that the contribution of the district to the total population has increased.

Appendix 3.3 Derivation of population carrying capacities by district.

The appendix gives all the assumptions required for the calculation of carrying capacity rates. The evidence on which the assumptions are based, found in earlier research and other publications, has been brought together and presented in J.E. Moore, Rural carrying capacities of the districts of Tanzania. BRALUP Research Paper No. 18, University of Dar es Salaam, 1971.

3.3.1 Assumptions

- (i) Calculations are based on standardised households comprising five members.
- (ii) Land requirement per household is based on each household producing all its basic foodstuffs, and a gross monetary income of Shs. 2,500.00. p.a.
- (iii) Each district, or part of a district where major ecological differences cut across it, is assigned two staple food crops contributing equally to the diet.
- (iv) The calorie requirement is assumed to be an average of a 2000 calories per day per member of the household, totalling 3,650,000 per household per annum.
- (v) Type of calorie needed is disregarded.
- (vi) Calculation of food crop area assumes that each of the two food crops is grown in pure stand, but that intercropping will give a balance of land on which the specific calorie requirements from protein and minerals and vitamins are produced.
- (vii) Calorific values of the food crops is based on the Tanzania Food Tables published by the Tanzania Human Nutrition Unit of the Ministry of Health and Social Welfare. Values from these tables were reduced by approximately 10% to allow for losses in food preparation.
- (viii) Each district, or part of a district, is assigned a representative set of crops, usually between two and five in number, as the assumed source of income for (ii) above.
- (ix) Each cash crop is allocated a percentage contribution to the total income so as to calculate the area required for its cultivation.
- (x) Each cash crop is assigned an average yield for the whole district, or part of the District, based on farm management studies and experimental station results and extrapolated, according to mean annual rainfall, where no representative yields are known.
- (xi) Each cash crop is assigned an average producer's selling price per kilogram applied over the whole of the United Republic irrespective of regional differences.
- (xii) A percentage is applied to each district, or part of a district,

expressing the maximum area of land which may be expected to carry a crop in any one year.

(xiii) For districts not infested with tsetse fly it is assumed that all uncultivated land, after allowance has been made for waste land and forest reserves, is available for grazing at a stocking rate assigned to it according to mean annual rainfall and vegetation type.

(xiv) For districts which are infested with tsetse fly the F.A.O. livestock census figures (1) are taken, raised by an arbitrary 20% to allow for expansion, and used in calculating the population which can be supported by livestock rearing.

(xv) In areas of livestock production for meat a herd requirement of 84 livestock units per household is assumed, based on a 15% take-off per annum and a selling price of Shs. 200.00 per livestock unit.

(xvi) In areas of livestock production for milk a herd requirement of between 25 and 50 livestock units, varying according to the contribution of slaughter stock, is assumed, based on a slaughter take-off of 8% per annum, an average of 28% (2) of the herd producing 300 litres of milk per annum sold at 1/- per litre.

(xvii) In coastal and lake shore districts it is assumed that a part of the population will earn the assigned income level from fishing. This is allowed for in computing final carrying capacities.

(xviii) No allowance is made for those parts of the population deriving income from forestry or tourism.

(xix) No assumption is made regarding the ability of the household labour force to cultivate the area computed as necessary for it to fulfil the conditions in (ii) above, nor regarding the costs of cultivation.

(xx) In computing the carrying capacity the total area of each district, or part of a district, is reduced by an area representing urban and wasteland, (3) by the area of forest reserve, except where this exceeds 10% of the total area in which case the reduction is 10% and game reserve or National Park. The balance of land is assumed to be available for cultivation, but an assigned proportion of this balance only will carry a crop in any one year.

3.3.2 Method of calculation: the example of Mpwapwa district.

(i) Area required for monetary income per household:

(1) Figures from the Statistics Section, Agriculture Division of the Ministry of Agriculture, Food and Co-operatives; Dar es Salaam.

(2) Percentage based on figures given in: United Nations Development Program. East African Livestock Survey. Vol. II Development Plans. Food and Agriculture Organization. Rome, 1967.

(3) Figures from L. and E. Berry. Land Use in Tanzania by District. BRAUUP, Research Notes No.6. University of Dar es Salaam, April 1969.

<u>Crop</u>	<u>Percent of income</u>	<u>Yield (kg/hect.)</u>	<u>Price (per kg)</u>	<u>Area required (hectares)</u>
Groundnut	25	500	Sh. 1.00	1.25
Castor	25	400	Sh. 0.60	2.60
Maize	50	800	Sh. 0.25	6.25
Total Cash Crop Area				<u>10.10</u>

(11) Area required for household diet:

Crops assumed to be the source of calorie requirements are maize and millet in equal proportions. The assumed food value of both being 3200 calories per kg. after preparation. Land requirement per household is as follows:

<u>Crop</u>	<u>Food requirement (kg p.a.)</u>	<u>Yield (kg p.a.)</u>	<u>Area required (hectares)</u>
Maize	570.31	800	0.71
Millet	570.31	900	0.64
Total Food Crop Area			<u>1.35</u>

(iii) Total land requirement for cropping is 11.45 hectares per household.

(iv) Livestock:

Herd requirement per household is 84 livestock units at an assumed stocking rate of 4.0 hectares per livestock unit. Land required per household is thus 336 hectares.

(v) Mpwapwa district area is 1,152,600 hectares. Estimated urban and wasteland area is 5,120 hectares. Forest reserve covers 16,504 hectares. Cultivable balance is 1,130,976 hectares.

(vi) The proportion assumed to be capable of carrying a crop in any one year is 15%, that is 169,646 hectares.

(vii) The number of households which may be supported by 169,646 hectares at 11.45 hectares per household is 14,815.

(viii) Uncultivated area is 1,130,976 hectares less 169,646 hectares, which is 961,330 hectares. Grazing land requirements per household is estimated to be 336 hectares. Total number of households to be supported by livestock is 2961.

(ix) Total number of households to be supported by agriculture in Mpwapwa district is 17,676, which yields a total population of 88,380.

(x) The actual population recorded in the 1967 census was 176,186. The population-land ratio is, therefore, 0.50.

Appendix tables to chapter 4.

App. Table 4.1 Regional population by birthplace category

Region	State Locality	Same Region	Other Regions	Neighbouring Countries	Other African Countries	Countries Outside Africa	Total (estimated)
Arusha	317053	199716	80035	10176	738	2489	609203
Coast*	397254	192494	155688	30048	1461	13242	780125
Dodoma	473104	190432	38801	2015	806	969	708147
Iringa	574728	129350	22269	1543	159	1095	688887
Kigoma	269330	147841	10604	44021	86	545	472925
Kilimanjaro	457453	91886	41031	19264	320	1519	603079
Mara	274759	182180	39678	46026	161	547	543687
Mbeya	614050	293642	41095	16072	660	1456	967702
Morogoro	398454	204824	68960	9302	409	3042	685021
Mtwara	579718	390410	20142	80333	92	1759	1040464
Mwanza	604418	131580	102482	13460	243	2221	1054404
Ruvuma	196940	152710	15961	26509	263	334	392727
Shinyanga	349829	420311	121208	4710	142	926	897284
Singida	224245	202121	28752	1206	94	317	454755
Tabora	150050	224275	136389	8541	299	2138	561697
Tanga	437095	206880	88157	32543	613	3692	768980
West Lake	338217	211123	44703	61935	206	1214	697404
Zanzibar	180949	148464	16580	3090	1178	3636	353637
Total	7070980	3684938	1075553	401604	7940	42135	12091200

*Including Dar es Salaam

App. Table 4.2 Population born outside Tanzania by birthplace category

	Neighbouring Countries	Other African Countries	Europe	Asia	Other Countries	Total all Countries	Percent of 1967 Population
Mainland Total	398,514	6,770	13,310	22,601	3,648	443,841	3.7
Mainland Rural	368,143	4,316	8,703	7,421	1,678	390,261	3.4
Mainland Urban	29,765	2,454	4,607	15,180	970	28,916	2.0
Zanzibar	3,090	1,178	297	3,309	30	7,904	2.3
Arusha	10,176	738	1,066	1,212	187	13,389	2.2
Coast	9,425	808	1,326	690	287	11,536	2.3
Dar es Salaam	10,823	1,273	2,019	7,309	611	22,035	6.5
Dodoma	2,015	806	104	710	73	3,708	3.4
Iringa	1,343	169	520	459	56	2,547	3.7
Kigoma	44,021	66	260	313	70	44,730	9.5
Kilimanjaro	19,264	326	1,303	1,020	162	22,075	3.4
Mara	46,236	161	52	380	115	46,944	8.6
Mbeya	16,872	612	452	888	150	18,974	2.0
Morogoro	9,302	409	1,477	1,507	56	12,751	1.9
Mtwara	80,333	52	128	1,019	22	81,554	7.9
Mwanza	13,460	243	349	1,754	118	15,824	1.5
Ruvuma	26,509	263	196	138	-	27,106	6.9
Shinyanga	4,710	142	394	500	43	5,789	0.6
Singida	1,396	94	20	100	129	1,639	3.6
Tabora	8,541	299	587	1,309	142	10,778	2.0
Tanga	32,543	613	1,115	2,377	200	36,848	4.8
West Lake	61,935	206	426	568	220	63,355	9.6

App. Table 4.3 Mainland population born outside Tanzania by birthplace category, sex and age; per cent

Age	Neighbouring countries		Other countries		Mainland total	
	Male	Female	Male	Female	Male	Female
0-4	2.3	2.4	1.8	1.5	6.9	3.1
5-9	3.8	3.6	1.9	1.9	7.9	7.8
10-14	3.4	2.9	1.6	1.4	5.4	4.6
15-19	4.1	3.9	1.6	1.4	4.2	4.7
20-24	4.5	3.4	3.1	3.3	3.1	4.4
25-29	6.2	5.8	6.1	3.1	3.7	4.7
30-34	5.1	4.3	6.9	5.2	5.9	3.0
35-39	5.0	3.7	7.2	4.7	2.0	2.7
40-44	3.3	2.8	6.4	3.8	1.0	1.9
45-49	3.7	2.7	6.1	3.1	2.1	1.9
50-54	2.9	2.4	4.8	2.7	1.4	1.3
55-59	1.7	1.4	4.1	1.9	0.9	0.8
60-64	1.7	1.4	3.0	1.8	0.9	0.9
65-69	1.2	1.0	2.0	1.0	0.6	0.6
70-74	1.0	0.8	1.2	0.7	0.5	0.5
75+	3.4	2.2	1.6	1.1	1.2	1.1
All		100		100		100

App. Table 4.4 Number of immigrants from neighbouring countries

Region	Kenya	Uganda	Sierra Leone	Durumi	Congo	Zambia	Malawi	Mozambique
Mainland Total	97069	13806	35270	75520	17286	11379	17807	130324
Mainland Rural	81728	11638	34595	74004	15341	10311	14780	126162
Mainland Urban	15340	2168	675	1516	1945	1068	3027	4162
Zanzibar	794	168	39	124	150	49	111	1703
Arusha	7512	287	259	670	310	321	450	227
Coast	1118	188	96	288	300	171	742	6384
Dar es Salaam	4531	586	90	115	509	444	1668	2680
Dodoma	1071	86	16	47	375	89	300	21
Iringa	538	49	67	5	143	144	388	15
Kigoma	348	285	347	36444	6285	183	132	1
Kilimanjaro	12204	672	1422	1364	351	635	721	1099
Mara	44455	611	92	289	470	120	181	8
Mbeya	797	51	76	196	4383	4775	6325	293
Morogoro	1433	140	490	1428	222	484	2055	2670
Mtwara	343	38	64	15	104	218	684	78857
Mwanza	7259	1030	588	2907	846	274	441	15
Ruvuma	127	19	21	-	92	633	1258	24359
Shinyanga	3268	298	220	278	327	139	177	2
Singida	779	55	37	2	98	41	192	2
Tabora	2525	477	2303	1094	1224	636	267	15
Tanga	7332	425	184	5824	485	1959	1701	12855
West Lake	1450	8501	26985	24217	851	104	125	4

App. Table 4.5 Net population exchange between regions *

	Arusha	Coast	Dodoma	Iringa	Kigoma	Kilimanjaro	Mara	Mbeya	Morogoro	Mtwara	Mwanza	Ruvuma	Singida	Tabora	Tanga	West Lake	Zanzibar	Total gain
Arusha	-	15603	391	852	15771	89	2225	682	388	1345	805	-	15026	1200	4566	358	193	58695
Coast**	860	-	4082	3643	3778	7947	2074	4830	8305	33807	2087	8087	925	1195	7221	7577	4151	113826
Dodoma	-	-	-	508	413	-	-	1214	1772	269	-	600	-	624	-	1029	326	6755
Iringa	-	-	-	-	301	-	32	-	-	-	-	458	-	-	-	89	-	940
Kigoma	-	-	-	-	-	-	-	-	-	-	-	89	-	-	-	-	-	89
Kilimanjaro	-	-	634	175	735	-	983	2659	-	687	329	1200	-	4326	941	1330	495	14621
Mara	-	-	70	-	353	-	-	-	-	10924	78	-	190	842	-	354	14	12823
Mbeya	-	-	-	13412	889	-	73	-	41	-	1560	-	-	-	-	-	-	16843
Morogoro	-	-	-	7183	4371	932	85	5449	-	2419	-	8748	-	1533	-	314	-	31674
Mtwara	-	-	-	150	124	-	44	-	-	-	3984	-	-	-	-	-	-	4302
Mwanza	-	-	165	250	7827	-	-	814	210	218	-	582	-	898	-	-	-	10971
Ruvuma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Shinyanga	119	-	379	308	2412	919	1496	850	458	239	2795	484	-	11300	-	132	975	48137
Singida	-	-	-	536	71	-	1314	391	303	-	345	-	-	-	-	-	-	2980
Tabora	-	-	37	456	8610	-	-	8521	-	517	5217	297	33477	11530	-	866	-	69528
Tanga	-	-	-	11359	5547	-	37	12035	332	3740	477	7079	-	1778	4355	-	58	46765
West Lake	-	-	-	-	4928	-	111	-	103	12514	129	-	21	-	-	-	-	17855
Zanzibar	-	-	57	160	236	-	55	941	143	489	217	177	79	1241	-	98	-	3819
Total loss	979	-	19027	38665	41011	25029	4973	40000	28331	42135	63557	34737	34579	48019	17331	14634	8884	481893

* The table shows, horizontally, each region's net gains; vertically, each region's net losses

** Including Dar es Salaam

App. Table 4.6 Regional in- and net migration

Region	Immigration			Outmigration			Net Migration		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Arusha	52231	30804	83035	13443	11876	25319	39588	18928	57716
Coast*	92218	62550	154768	23752	18010	41762	69486	44340	113826
Dodoma	21645	17156	38801	29197	21876	51073	-7552	-4720	-12272
Iringa	18352	9917	28269	37204	22190	59394	-31025	-12373	-43398
Kigoma	5454	3150	8604	34676	14830	51506	-46122	-11720	-57842
Kilimanjaro	26868	14143	41011	35728	18113	53841	-12837	-4150	-16987
Mara	19561	20015	39576	18350	13468	31818	1511	8547	10058
Mbeya	22943	18152	41095	40886	24246	65132	-24143	-4094	-28237
Morogoro	44067	24713	68780	37859	27858	65697	22928	2945	25873
Mtwara	10560	9082	20142	39257	22716	57973	-47417	-13634	-61051
Mwanza	57285	45217	102502	38627	74441	113068	-16382	-29224	-45606
Ruvuma	3283	1680	4963	31850	18850	50700	-45817	-11370	-57187
Shinyanga	61341	59525	120866	54532	53176	107708	6809	6744	13553
Singida	15059	14673	29732	42635	31156	73791	-58006	-17467	-75473
Tabora	70516	45873	116389	45954	38238	84192	24562	27635	52197
Tanga	60574	27587	88161	31222	22754	53976	28939	4829	34131
West Lake	23375	21328	44703	19457	16075	35532	9248	5251	14799
Zanzibar	11465	5113	16578	8240	5803	14043	3225	-788	2437
All	617437	458116	1075553	617437	458116	1075553	0	0	0

*Including Dar es Salaam

App. Table 4.7. Total population by age, sex and birthplace category; per cent

Age	Same Locality		Same Region		Other Regions		Neighb. Countries		Other Countries	
	M	F	M	F	M	F	M	F	M	F
0-4	12.7	13.0	5.7	5.9	3.3	3.3	2.2	2.3	2.2	1.7
5-9	10.4	10.2	4.7	4.9	4.5	4.5	3.7	3.5	2.5	2.0
10-14	6.3	5.5	4.3	3.8	4.0	3.2	3.4	2.8	1.6	1.3
15-19	3.6	4.3	4.4	5.5	5.5	4.3	4.3	3.8	1.2	1.0
20-24	2.5	3.7	3.7	6.1	5.9	5.1	4.3	5.2	3.1	3.4
25-29	2.7	3.3	4.1	6.8	7.2	5.5	5.9	6.7	7.0	4.5
30-34	2.0	2.3	3.3	4.9	5.5	3.7	5.0	4.3	7.3	4.3
35-39	2.0	1.9	3.3	4.2	5.0	3.1	4.9	3.8	7.1	4.4
40-44	1.3	1.3	2.1	3.0	3.1	2.1	3.3	3.0	6.2	3.5
45-49	1.4	1.3	2.7	3.0	3.5	2.1	3.8	2.9	6.2	2.6
50-54	1.0	1.0	1.9	2.4	2.2	1.6	3.0	2.5	4.7	2.3
55-59	0.6	0.5	1.2	1.4	1.5	0.9	1.8	1.5	4.6	1.7
60-64	0.6	0.7	1.2	1.3	1.3	0.9	1.8	1.5	3.2	1.8
65-69	0.4	0.4	0.9	0.9	0.9	0.6	1.3	1.0	2.2	1.1
70-74	0.4	0.4	0.6	0.8	0.7	0.5	1.0	0.8	1.4	0.7
75+	1.4	1.0	2.7	7.5	2.7	1.6	3.6	2.5	2.1	1.1
All	100		100		100		100		100	

App. Table 4.8. Urban population by age, sex and birthplace category; per cent

Age	Same Locality		Same Region		Other Regions		Neighb. Countries		Other Countries	
	M	F	M	F	M	F	M	F	M	F
0-4	15.3	15.2	3.4	3.7	4.0	4.0	3.9	3.7	1.4	1.5
5-9	9.2	9.3	3.6	4.3	4.2	4.7	4.2	4.6	1.4	1.6
10-14	5.7	5.3	3.6	3.1	3.5	3.4	3.3	3.1	1.5	1.4
15-19	4.5	4.5	6.5	6.0	6.6	5.9	4.2	5.2	2.0	1.7
20-24	2.6	3.4	6.4	7.3	9.3	6.3	8.3	7.0	3.2	3.3
25-29	3.1	3.5	8.3	7.4	10.4	3.8	9.0	6.5	5.1	5.7
30-34	2.3	2.3	5.0	4.4	6.7	3.3	7.0	4.2	6.2	6.1
35-39	2.0	1.9	3.1	3.3	5.3	2.3	6.3	2.6	7.2	5.0
40-44	1.3	1.2	2.9	2.0	2.9	1.3	3.5	1.7	6.4	4.1
45-49	1.1	1.0	2.6	1.7	2.5	1.0	3.3	1.1	6.0	3.5
50-54	0.7	0.8	1.5	1.2	1.4	0.7	1.9	0.9	4.9	3.0
55-59	0.5	0.3	0.9	0.6	0.8	0.4	1.0	0.4	3.7	2.3
60-64	0.4	0.4	0.7	0.6	0.6	0.4	0.9	0.4	2.9	1.7
65-69	0.2	0.2	0.4	0.4	0.3	0.2	0.5	0.3	1.9	1.0
70-74	0.2	0.2	0.3	0.3	0.2	0.2	0.4	0.3	1.0	0.7
75+	0.4	0.5	0.6	0.9	0.7	0.3	1.1	0.9	1.2	1.1
All	100		100		100		100		100	

Appendix 5.1 Tanzania Mainland, estimated population of service centres 1967.

Centre	Population	Centre	Population	Centre	Population
ARUSHA REGION					
1. Arusha	32,482	KILIMANJARO REGION cont.			
2. Karatu	2,471	8. Kibosha	3,035	MTWRA REGION	
3. Katanzi	2,444	9. Sargu Jim	1,934	1. Songea	5,430
4. Usa River	2,400	10. Kaka	1,805	2. Mbingu	3,267
5. Mbulu	2,360	11. Ndaru	1,545	3. Tunduru	2,879
6. Bakenet	2,341	12. Gonja	1,321	4. Pembe	1,565
7. Mombasa	2,172	13. Iteheni	1,129	5. Iduli	1,485
8. Babati	1,544	14. Ugenya	1,041	6. Mwanu	1,405
9. Tengeru	1,446	15. Niro	967	7. Mamba Bay	1,178
10. Mgorongoro	1,225	16. Usangi	952	MUSOMBA REGION	
11. Mto wa Mbu	1,140	17. Kismungu	905	1. Shinyanga	5,155
12. Oldani	1,050	MARA REGION			
13. Solihole	724	1. Marwa	15,412	2. Mwanu	1,380
14. Longido	706	2. Taita	5,257	3. Kibaha	3,211
15. Oldonyi Samu	264	3. Ilmorog	1,905	4. Malindi	3,252
COAST REGION					
1. Dar es Salaam	272,821	4. Dunda	1,755	5. Nyakiranga/Mwanu	2,967
2. Kawa	6,884	5. Shirati	1,700	6. Songea	1,370
3. Bagamoyo	5,112	6. Kibakari	997	7. Isale	636
4. Maneromango	4,072	7. Kibaha	655	8. Kola-Mtoto	606
5. Kibaha	2,841	META REGION			
6. Mwanu	2,309	1. Meya	12,475	9. Doka	574
7. Soga	2,246	2. Dushanbe	4,991	SINDIGA REGION	
8. Utete	2,215	3. Tukuyu	4,009	1. Sindiga	9,478
9. Kilindini	2,191	4. Mwan/Vwani	3,272	2. Maryoni	4,362
10. Mwanu	2,054	5. Kysia	2,950	3. Itigi	1,790
11. Chalinze	1,992	6. Mwanu	1,398	4. Kiboni	1,450
12. Mwanu	1,658	7. Chisima	1,704	5. Kilimattide	1,045
13. Mwanu	1,624	8. Kwanu	1,541	6. Ilongoro	960
14. Suru	1,581	9. Dushanbe	1,127	7. Baraka	311
15. Mwanu	1,342	MOROGORO REGION			
16. Kwanu	1,293	1. Morogoro	25,282	8. Kintira	666
17. Kibiti	1,274	2. Kilombero	7,336	9. Itigi	617
18. Paga	848	3. Ifakara	7,245	10. Sekenke	500
19. Kibiti	839	4. Kilwa	4,458	TABORA REGION	
DODOMA REGION					
1. Dodoma	23,559	5. Gairo	2,740	1. Tabora	21,012
2. Kondon	4,514	6. Kibikwira	2,373	2. Songea	3,440
3. Kwanu	3,469	7. Kibikwira	2,366	3. Mwanu	2,915
4. Mwanu	2,429	8. Kibiti	2,309	4. Doka	2,800
5. Mwanu	1,335	9. Mwanu	2,304	5. Kibiti	2,244
6. Mwanu	1,177	10. Ngwengwe	2,242	6. Uruha	1,905
7. Mwanu	1,159	11. Mwanu	2,022	7. Kwanu	1,812
8. Gwelo	889	12. Mwanu	1,021	8. Igula	1,627
9. Mwanu	753	13. Mwanu	1,943	9. Kibiti	1,509
IRINGA REGION					
1. Iringa	21,746	14. Kwanu	1,863	10. Uruha	1,098
2. Tumbungu	3,479	15. Uruha	1,361	11. Itoto	698
3. Kwanu	2,577	16. Tumbungu	1,171	TANGA REGION	
4. Ilmorog	2,387	MTWRA REGION			
5. Ilmorog	2,310	1. Mwanu	13,369	1. Tanga	61,058
6. Kibiti/Mwinda	1,614	2. Ilmorog	13,351	2. Korogwe	4,675
7. Kibiti	1,275	3. Mwanu	1,045	3. Mwanu	3,255
8. John's Corner	1,031	4. Mwanu	3,751	4. Mwanu	3,009
9. Mwanu	899	5. Kibiti	4,116	5. Mwanu	3,971
KILIMANJARO REGION					
1. Kilimanjaro	8,419	6. Mwanu	3,124	6. Mwanu	3,969
2. Ujiji	82,950	7. Kipatini	3,022	7. Mwanu	3,941
3. Ujiji	2,482	8. Kilimanjaro	2,960	8. Mwanu	3,729
4. Mwanu	2,418	9. Mwanu	2,890	9. Mwanu	3,727
5. Kibiti	2,374	10. Kilimanjaro	2,400	10. Mwanu	3,688
6. Kibiti	2,311	11. Mwanu	2,229	11. Mwanu	3,688
7. Kibiti	1,950	12. Kilimanjaro	1,451	12. Mwanu	3,688
8. Kibiti	1,655	13. Kilimanjaro	1,297	13. Mwanu	3,688
9. Kibiti	1,435	14. Kilimanjaro	1,194	14. Mwanu	3,688
KILIMANJARO REGION					
1. Mwanu	25,064	MWANZA REGION			
2. Mwanu	8,194	1. Mwanu	34,061	WEST LAKES REGION	
3. Arusha Chini	6,018	2. Mwanu	3,007	1. Mwanu	8,441
4. Mwanu	5,192	3. Mwanu	3,066	2. Kwanu	3,758
5. Mwanu	3,718	4. Mwanu	2,137	3. Nyaka	2,869
6. Mwanu	3,330	5. Mwanu	2,080	4. Nyaka	2,246
7. Mwanu	3,256	6. Mwanu	1,800	5. Mwanu	1,642
KILIMANJARO REGION					
1. Mwanu	25,064	7. Mwanu	1,602	6. Mwanu	1,362
2. Mwanu	8,194	8. Mwanu	1,394	7. Mwanu	1,240
3. Arusha Chini	6,018	9. Mwanu	1,006	8. Mwanu	912
4. Mwanu	5,192	10. Mwanu	805	9. Mwanu	788
5. Mwanu	3,718	11. Mwanu	710	WEST LAKES REGION	
6. Mwanu	3,330	12. Mwanu	644	1. Mwanu	8,441
7. Mwanu	3,256	MWANZA REGION			
KILIMANJARO REGION					
1. Mwanu	25,064	1. Mwanu	34,061	2. Kwanu	3,758
2. Mwanu	8,194	2. Mwanu	3,007	3. Nyaka	2,869
3. Arusha Chini	6,018	3. Mwanu	3,066	4. Nyaka	2,246
4. Mwanu	5,192	4. Mwanu	2,137	5. Mwanu	1,642
5. Mwanu	3,718	5. Mwanu	2,080	6. Mwanu	1,362
6. Mwanu	3,330	6. Mwanu	1,800	7. Mwanu	1,240
7. Mwanu	3,256	7. Mwanu	1,602	8. Mwanu	912
KILIMANJARO REGION					
1. Mwanu	25,064	8. Mwanu	1,394	9. Mwanu	788
2. Mwanu	8,194	9. Mwanu	1,006	WEST LAKES REGION	
3. Arusha Chini	6,018	10. Mwanu	805	1. Mwanu	8,441
4. Mwanu	5,192	11. Mwanu	710	2. Kwanu	3,758
5. Mwanu	3,718	12. Mwanu	644	3. Nyaka	2,869
6. Mwanu	3,330	MWANZA REGION			
7. Mwanu	3,256	MWANZA REGION			

Appendix 8.1 Concepts and definitions used in the Labour Force Survey of Tanzania, 1965.

Information on economic activity of the population was collected with reference to the seven days prior to the day on which data were collected from the household in the 1965 Labour Force Survey. All the labour force concepts used in the Survey closely followed the standards established by the International Labour Office in Geneva. The employed included all those who had reached their fourteenth birthday by the beginning of the reference week and were in at least one of the following categories:

- a) *at work* - persons who performed any work for pay or profit during the reference week.
- b) *with a job but not at work* - persons who, having already worked in their present job, were temporarily absent during the reference week because of illness or injury, industrial dispute, etc.
- c) *employers and workers on own-account* - were included among the employed. They were classified as at work or "not at work" on the same basis as other employed persons.
- d) *unpaid family workers* - assisting in the operation of a business or farm were considered to be employed if they worked at least two full days (or fifteen hours) during the reference week.

The unemployed included all those persons who had reached their fourteenth birthday by the beginning of the reference week and who were in at least one of the following categories:

- a) Workers available for employment whose contract of employment had been terminated or temporarily suspended and who were actively seeking work for pay or profit.
- b) Workers who were available for work (except for minor illness) during the reference week and were seeking work for pay or profit, who were never previously employed (new entrants) or whose most recent status was other than that of employee or who had been in retirement (reentrants).
- c) Workers without a job and available for work during the reference week who had made arrangements to start a new job at a date subsequent to the reference week.
- d) Workers on temporary or indefinite layoff without pay.

Appendix 8.2 Economic concepts and classifications in the 1967 Census.

In the 1967 Tanzania Population Census, information on 'economic activity' was collected from every individual in the urban areas and from a segment of the population in the rural populations. The concept of economic activity is usually associated with a fixed reference period but in the Census no such period was stipulated except in the case of 'employed'.

The whole population was classified into the following six categories - (i) employed, (ii) unemployed, (iii) home-makers, (iv) students, (v) income recipients, (vi) others not working. The Census instructions for categorising an individual are given below:

Employed: 'employed' was to be given for anyone who was gainfully employed. Therefore, the answer included all persons who (i) received salaries or wages in cash or in kind for their work, (ii) worked on their own farms, in their own shops, etc., (iii) grazed their cattle or gathered fruits and seeds, (iv) as family members helped the above mentioned persons in their work. It was stressed that women who in addition to their household duties worked on the family farms or in a family business were also to be counted as 'employed' if such work took one third or more of the time worked by other gainfully occupied household members. Persons temporarily absent from their jobs because of illness, injury, leave, bad weather, etc. were also to be given the economic activity 'employed'.

Unemployed: persons who did not work but were looking for work at the time of the census were to be recorded as 'unemployed'.

Home-makers: persons who were engaged in household duties in their own home (house-wives, persons preparing food for members of the household, persons taking care of children etc.) were to be recorded as 'home-makers'.

Students: persons who were attending any regular educational institution were to be recorded as 'pupils and students'.

Income recipients: persons living from pensions, home-rents, private means and not working were to be recorded as 'income recipients'.

Others not working: persons other than the above, e.g. children not attending school, aged and permanently sick persons supported by their relatives, etc., were to be recorded as 'others not working'.

Of the above six categories, the 'employed' and 'unemployed' constitute the economically active population, who supply the labour for the production of goods and services.

The individuals who declared themselves as employed were given additional questions relating to their economic status, occupation and industry. The economic status refers to the status of an economically active individual with respect to his employment, that is, whether he is an own-account worker with employees, (employer), own-account worker without employees, employee or family worker. Each of these status groups was defined as follows:

Own-account worker with employees is a person who operates his own economic enterprise or engages independently in a profession or trade and hires one or more employees. The employment of domestic servants in private households does not constitute an own-account worker with employees for census purposes.

Own-account worker without employees is a person who operates his own economic enterprise or engages in a profession or trade and has no

employees.

Employee is a person who works for a public or private employer and receives remuneration in wage, salary, commission, piece rates or pay in kind.

Family worker is a person who works without pay in an economic enterprise operated by another member of his household. It may be mentioned that the family workers include women who in addition to their household duties work on the family farms or in a family business for at least one third of the time worked by other gainfully occupied household members.

The occupation was defined as the kind of work performed by an individual during the period of twelve months before the census. In case of seasonal work or of work in two or more kinds of job, the occupation was determined on the basis of the greatest time spent. The description of the kind of work being done was recorded in detail and the classification and the codification were done in the Central Statistical Bureau.

The kind of establishment in which a person works irrespective of occupation or type of work performed by the person was recorded. The information was recorded in detail and classification into different industry groups was made later in the Central Statistical Bureau.

Appendix 11.1 Analysis of current mortality data.

The accuracy of the age-specific current mortality data from the census was studied by means of constructing a life table for each sex, to be compared with model life tables. The numerator for the m_x -values was the recorded number of deaths in the age/sex group, and the denominator the recorded population in the same group. The m_x to q_x transformation was done by the approximation,

$q_x = 2m_x/(2+m_x)$, recommended by for instance Barclay (1). App. table 11.1.1 below contains an extract from the life tables for Mainland Total, namely the m_x -values for each sex, compared with corresponding values from the Coale-Demeny North 10 life table selected to represent the mortality of Tanzania Mainland.

App. Table 11.1.1 m_x - and l_x -values from recorded current mortality data and from Coale-Demeny Model Life Tables, Mainland Total.

Age	Males						Females					
	m_x -values			l_x -values			m_x -values			l_x -values		
	Recorded	North 10	difference	Recorded	North 10	difference	Recorded	North 10	difference	Recorded	North 10	difference
0	199.4	187.9	11.7	1000	1000	0	187.6	157.0	30.6	1000	1000	0
1	106.7	35.9	71.7	819	833	-14	100.9	33.3	67.7	845	858	-13
5	12.5	11.1	1.4	696	728	-70	11.3	10.9	0.4	685	752	-67
10	10.3	5.7	4.6	616	686	-70	7.8	5.0	2.8	547	712	-165
15	7.6	6.5	1.1	505	667	-81	6.9	5.1	1.8	472	692	-70
20	5.5	5.2	0.3	363	646	-83	5.5	7.1	-1.6	401	871	-70
25	4.6	5.7	-1.1	237	617	-60	5.4	8.3	-2.9	382	643	-65
30	3.3	10.4	-7.1	525	588	-63	5.4	9.6	-4.2	366	621	-55
35	3.9	11.8	-7.9	511	558	-47	4.7	11.0	-6.3	351	592	-41
40	7.0	14.2	-7.2	501	526	-25	8.9	12.1	-3.2	339	560	-21
45	6.8	17.2	-10.4	484	490	-6	5.7	13.3	-7.6	315	527	-12
50	11.1	21.6	-10.6	466	450	16	8.9	15.5	-7.6	301	493	8
55	11.1	20.3	-17.2	443	403	40	3.8	22.3	-18.5	479	454	25
60	21.3	39.4	-18.1	415	350	65	17.4	32.7	-15.3	456	406	50
65	17.3	57.1	-39.8	377	288	89	14.2	49.9	-35.7	416	345	71
70	21.3	87.6	-66.3	345	216	129	27.1	77.2	-50.1	389	268	121
75*	30.8	131.1	-	295	138	-	32.6	115.7	-	359	182	-
80*	-	240.3	-	-	70	-	-	229.9	-	-	500	-

* Tabulated values from the census and with the open interval 75+, and from the models with the class 85+.

As seen from table 11.1.1, the recorded m_x -values are too high in the low ages and too low in the high ages, reflected in too high survival rates in the higher ages. This skewed distribution indicates that not only time-scale errors and general omissions may have distorted data, but that more profound misunderstandings of the rather delicate question on deceased persons must have taken place in the field.

A more elaborate analysis of the mortality data was carried out by John Blacker according to a method developed by himself. In short, the method consists of the calculation of a model life table from Brass's African Standard Life Table, using an estimated survival to age 2 and a fixed β -value. Applying the life table to different model age distributions gives expected number of deaths, which can then be compared with the recorded number.

The survival to age 2 was estimated by means of l_x -values derived from proportion surviving children, using Brass's method. l_2 was then adjusted to the values of l_3 and l_5 by adjustment of the corresponding logit value with the average difference from the African Standard. The adjustment for mortality differences between the sexes was done by means of the sex ratio models in an E.C.A. paper on Age Data in African Censuses and

(1) G.W. Barclay, *Techniques of Population Analysis*, London 1958, p. 115.

Surveys (2), and by applying an estimated sex ratio at birth of 103 and at age 2 of 100.5 to the estimated l_2 .

For each sex, the estimated l_2 and β -values fixed at varying levels gave corresponding α -values by insertion in the regression equation $Y_2 = \alpha + \beta \cdot Y_{(s)2}$. Applying the equation on the African Standard logit values gave l_x -values and, by ordinary means, m_x -values for all ages. The m_x -values for females were applied on two model age distributions, the Coale-Demeny West 10 with the recorded child/adult ratio of 0.419, and the Brass-Carrier model with a proportion under age 15 of 43% and over 45 of 14% (3). In addition, the recorded age distribution was utilized.

The expected deaths, for $\beta = 0.7$ and 0.8 respectively, and the recorded deaths are presented in App. table 11.1.2. below. Immediately clear from these comparisons are a considerable overreporting of deaths in low ages and an underreporting in high ages. The latter is even more pronounced when compared to expected deaths from the recorded age distribution, which as shown elsewhere, suffers from a systematic inflation of the age in the higher age groups.

App. Table 11.1.2 Expected deaths for varying age distribution and β -values, and recorded deaths, females, Mainland Total

Age	Expected deaths						Recorded Deaths
	C-D West 10 c/a ratio = .419		Brass-Carrier Pa15 Q=14		Recorded age distribution		
	β		β		β		
	0.7	0.8	0.7	0.8	0.7	0.8	
0-4	57787	58875	56634	57689	57468	58550	77020
5+	59530	48022	42718	32120	50555	51889	45195
Total	57117	106897	99352	109809	108023	120439	122215
0-9	64125	66182	62133	41222	64217	66330	87599
10+	32992	40715	36617	45987	43806	54109	34616
Total	97117	106897	98752	109209	108023	120439	122215
0-14	65930	68363	63875	46252	65607	68009	92123
15+	31187	38534	34877	42977	42416	52429	30092
Total	97117	106897	98752	109209	108023	120439	122215

No more definite conclusions can be drawn on the size of β for females on Tanzania Mainland, but the comparisons point at a low β -value, at least less than 1.0.

Appendix 11.2 The choice of a life table.

The two best sets of life tables available at present are the Coale-Demeny Regional Life Tables and Brass's African Standard Life Tables. The first set consists of four different 'families' of mortality patterns with age, and within each family a wide range of mortality levels. The second set, though retaining a basic relationship between the mortality of different ages, in principle allows for more variation in the chosen pattern of child/adult mortality.

Thus Brass's is a two-parameter model, where the two parameters should be estimated from the recorded data. In our case, as in most African censuses available, recorded data are the survival rates of children to

(2) See J.G.C. Blacker, Age Data in African Censuses and Surveys, E/CN.14/CPH/13, E.C.A., Addis Ababa 1968.

(3) Ibid.

mothers of different ages, from which l_x -values are derived with a technique developed by Brass. However, the common experience from the application of Brass's technique is that only a limited range of l_x -values can be trusted as accurate. By the same mechanisms distorting the retrospective data, the l_x -values for ages from say 10 and upwards, tend to be increasingly distorted. Similarly l_1 , based on the child survival for mothers 15-19 years old, would have to be used with care (see App. 11.3).

Under these conditions, a two-parameter model would not be suitable owing to the difficulties in estimating the parameters from l_2 , l_3 and l_5 only. Thus, unless the β -value of Brass's model can be independently estimated (see the attempt in App. 11.1), all arguments are in favour of choosing a Coale-Demeny life table which has the advantage of providing the relevant mortality measures, plus a set of stable population models with measures of vital rates. However, the results of applying Brass's model to recorded data may still be of value for an appraisal of the model.

Tabulated data for Mainland total permitted the calculation of l_x -values to age 30. Fitting a regression line of the logits recorded to the logits of the African Standard l_x -values gave the equation $Y_x = -0.1039 + 0.9454 Y(s)_x$. The correlation between the two sets of logits is high, 0.96, and the variation of Y_x around the regression line small, $\delta_{yx} = 0.0380$ (1). The derived and graduated l_x -values are presented in App. table 11.2.1 below, together with the corresponding values from the Coale-Demeny West 11 and North 10 life tables.

App. table 11.2.1. Survival rates and l_x -values from different sources (2)

Age	Recorded survival rates*	Mainland total		Regional Model Life Tables	
		Derived from survival rates	Brass graduation	West 11	North 10
1	809	825	842	841	845
2	799	805	798	801	801
3	778	783	762	783	774
5	747	741	739	762	739
10	717	700	697	742	699
15	684	681	682	727	679
20	645	642	658	707	656
25	622	617	631	681	632
30	601	591	595	652	604

* 'Recorded survival rates' are the proportion surviving children by age group of mothers 15-19, 20-24, ... 55-59.

(*) Kenya 1962, appeared to have a higher adult to child mortality relationship, shown in the β -value 1.0541. The infant mortality was lower ($\alpha = -0.1211$) but the correlation was almost perfect, 0.98, and the variation around the regression line slightly smaller, 0.0309. Recent results from the 1969 Kenya census, based on new data for estimation of adult mortality, give a far lower estimate of β , around 0.8. The confidence which can be given to the new estimate might lead to some doubts also on the β for Tanzania, whose value of 0.96 almost certainly is on the high side. See J.C.C. Blacker, The Estimation of Vital Rates from Census Data in Kenya and Uganda, paper presented to the African population conference, Accra, December, 1971.

(2) A third set of graduated l_x -values could be achieved by applying the so-called Sullivan's regression equations to the proportion children who have died. However, so far the value of this method has not been conclusively assessed, and at least in the case of Tanzania appears to give rather unsatisfactory results. See H.J. Page and A.J. Coale, Estimates of Fertility and child Mortality in Africa South of Sahara, paper presented to the Seminar on population growth and economic development, Nairobi, 1969, and J.C.C. Blacker, op. cit.

The graduation by means of Brass's model gives a set of l_x -values which are very close to the North 10 life table selected to represent Mainland mortality. The only notable differences are in crucial ages 2 and 3, where the graduated values are lower. This is a mere reflection of the fact that Brass's life table is constructed with a higher relative child mortality than any of the Coale-Demeny families.

In deciding to use Coale-Demeny life tables and stable populations, the second step consisted of the selection of a suitable pattern of mortality for the whole and parts of Tanzania. The publication of the West family only in a recent U.N. publication (3) may be regarded as a recommendation to use this family in all developing countries. However, after a careful consideration of the data, the North family was selected for use in Tanzania on primarily the following grounds:

- it seems likely that the mortality conditions for different parts of Tanzania are very similar as far as pattern is concerned, and that they would then be best represented by the selection of one family of life tables;
- there are indications (see App. 11.3) that in Tanzania as elsewhere in tropical Africa the mortality between age 1 and 5 is high compared to the infant mortality. A high child mortality is found in the North family of life tables;
- in the regional analysis, the North l_x -values tend to give a better fit to the l_x -values derived from child survival proportion, especially if use is made of l_2 and l_5 rather than l_2 and l_3 ;
- the overall mortality of a life table - CDR or e_0 - is to a large extent determined by mortality under age 5. Thus, despite the rather low adult mortality of the North family compared to African conditions, the overall mortality level tends to be higher with the choice of a best-fit North life table rather than a West;
- the mortality differences between North and West are in the corresponding stable population seen in different proportions in ages 5-19, but the age distribution for adults is almost identical. Thus no negative effects on selected parameters or in age distribution are found from the low adult mortality.

In App. Table 11.2.2 below are summarized the l_x -values to age 5; (a) derived from proportion children still alive; (b) from the best-fit North life table; (c) from the best-fit West life table; (d) from the life table based on current mortality data (see App. 11.1). In all but three cases the best-fit West life table has a lower mortality than the corresponding North, supporting the fourth point listed above. Further, looking at the regions, in no less than 6 cases does North give the overall best-fit, and in another 9 the value of l_5 points to North whereas l_3 would lead to West. The overall best-fit of West is apparent in only 2 cases.

The selection of model life tables was done on the basis of derived l_x -

(3) A.J. Coale and P. Demeny, Methods of Estimating Basic Demographic Measures from Incomplete Data, Population Studies No. 42, United Nations 1967.

App. table 11.2.2 l_x -values from proportion children still alive and from selected Coale-Demeny life tables and current mortality data

Source	1 ₁	1 ₂	1 ₃	1 ₄	1 ₁	1 ₂	1 ₃	1 ₄
<u>Mainland Total</u>				<u>Mainland Rural</u>				
a. Child survival	823	803	783	741	813	793	773	738
b. North*	(10) 845	801	774	739	(10) 845	801	774	739
c. West*	(11) 841	801	783	762	(11) 841	801	783	762
d. Current mort.	832	750	707	670	829	746	703	665
<u>Mainland Urban</u>				<u>Zanzibar</u>				
a. Child survival	884	860	859	844	868	842	797	744
b. North*	(15) 907	884	859	849	(11) 860	819	795	762
c. West*	(15) 898	874	864	852	(12) 856	820	804	785
d. Current mort.	893	840	818	796	888	849	835	823
<u>Arusha</u>				<u>Coast excl. Dar es Salaam</u>				
a. Child survival	859	830	813	827	859	834	824	778
b. North*	(15) 907	884	869	849	(12) 873	836	814	771
c. West*	(16) 910	891	882	872	(15) 871	839	825	809
d. Current mort.	903	834	827	799	863	775	689	657
<u>Dodoma</u>				<u>Etanga</u>				
a. Child survival	841	813	783	744	790	759	756	719
b. North*	(10) 845	801	774	739	(9) 830	782	753	714
c. West*	(11) 841	801	783	762	(10) 825	780	750	730
d. Current mort.	846	747	690	638	804	751	717	691
<u>Elgon</u>				<u>Elmwajane</u>				
a. Child survival	863	819	777	725	892	875	871	841
b. North*	(10) 845	801	774	739	(15) 907	884	869	849
c. West*	(11) 841	801	783	762	(15) 898	874	864	852
d. Current mort.	956	879	823	764	922	880	859	840
<u>Mapa</u>				<u>Mora</u>				
a. Child survival	757	730	747	691	781	737	709	674
b. North*	(8) 814	762	730	688	(7) 797	740	706	660
c. West*	(9) 807	758	737	712	(8) 789	736	712	685
d. Current mort.	852	761	726	690	800	711	659	608
<u>Morogoro</u>				<u>Mtwara</u>				
a. Child survival	837	789	765	722	812	780	764	733
b. North*	(9) 830	782	753	714	(9) 839	782	753	714
c. West*	(10) 823	780	760	738	(10) 825	780	760	738
d. Current mort.	787	704	657	619	668	537	473	430
<u>Mwanza</u>				<u>Namata</u>				
a. Child survival	819	804	773	738	760	750	745	697
b. North*	(10) 845	801	744	739	(8) 814	762	730	686
c. West*	(11) 841	801	783	762	(9) 807	758	737	712
d. Current mort.	866	785	734	700	858	756	732	696
<u>Shinyanga</u>				<u>Simbela</u>				
a. Child survival	841	822	813	762	764	755	741	695
b. North*	(11) 860	839	795	765	(8) 814	762	730	686
c. West*	(12) 856	820	804	785	(9) 807	758	737	712
d. Current mort.	881	835	759	723	838	756	725	702
<u>Tabora</u>				<u>Tanga</u>				
a. Child survival	857	827	815	762	868	856	816	795
b. North*	(12) 875	856	814	771	(13) 885	853	834	808
c. West*	(13) 871	859	825	809	(13) 871	839	825	809
d. Current mort.	825	727	689	650	730	715	670	631
<u>West Lake</u>				<u>Dar es Salaam</u>				
a. Child survival	810	794	786	723	879	867	862	844
b. North*	(10) 845	801	744	739	(14) 896	869	852	829
c. West*	(11) 841	801	783	762	(15) 890	874	864	852
d. Current mort.	839	833	812	787	905	852	834	814

* Figures within brackets give mortality level.

values from age 2 to age 5, and there possible by comparison with l_x -values from current mortality. As an aid in the selection, an adjusted l_2 was calculated as follows. Each of the three derived l_x -values was transformed to a logit function, the average differences of the logits from the corresponding logits of the African Standard Life Table was calculated and deducted from the standard logit for l_2 , and the resulting logit regressed into an l_2 -value. The advantage of this method of course depends on to what extent the three l_x -values can be assumed to be of the same degree of accuracy.

Appendix 11.3 Infant and child mortality.

In the absence of a useful set of current mortality data the mortality analysis rests heavily with the survival rates up to age five derived from the proportion children still alive. Of these, l_2 and l_5 have been the main guiding points for the selection of suitable life tables.

One reason for distrusting the derived l_1 as an indicator is given by Brass and Coale (1). 'In many populations having reliable records the mortality of the first born, and of children born to teenage women, is substantially higher than the mortality of other children. This difference, if also prevalent in Africa, would tend to make the infant mortality estimated from child survival to women in age group 15-19 unrepresentatively high'. This reason for avoiding the derived l_1 as a most likely biased estimate is no doubt valid in the case of Tanzania. A simple comparison of the proportion children still alive for the age groups 15-19 and 20-24 show that they are virtually the same for Mainland Total, and that the proportion for age group 15-19 is lower in 6 out of the 19 regions and virtually the same in another 7.

Consequently the bias is reflected in a systematic difference between the from survival rates derived l_1 -values and the corresponding life table l_1 -values, the former being clearly lower in 15 out of the 19 regional comparisons as well as for Mainland Total (see App. table 11.2.2). However, apart from these estimates, two recorded l_1 -values are available: one from the life table based on current mortality and recorded population, the other based on the infant deaths and births during the last 12 months (2). The degree of consistency in level and pattern of these four measures is demonstrated in App. table 11.3.1.

App. table 11.3.1 Correlations between regional estimates of l_1 , and estimated l_1 for Mainland Total.

Estimate:	Child surviving	Recorded birth/death	Model life table	Estimated l_1 Mainland Total
1. Current mortality	0.34	0.73	0.38	832
2. Child survival		0.44	0.66	823
3. Recorded births and deaths			0.53	879
4. Model life table				843

The low level of mortality for the estimate type 3 is most readily interpreted as an effect of the overstatement of births discussed in Ch. 12. The level provided by the estimate type 2 is on the other hand too high, for the reasons given above. The correlations are at least all positive, though not impressively high. The correlation between estimate type 1 and type 3 should be high for logical reasons, as both are computed from the number of deaths last year. The only other high correlation, 0.86, is the result of the selection of model life tables from their fit with estimate type 2.

(1) W.Brass and A.J.Coale 'Methods of Analysis and Estimation' in W.Brass et al., The Demography of Tropical Africa, Princeton, 1968. p. 118.

(2) Called the 'apparent' infant mortality. See R.Clairin, 'The Assessment of Infant and Child Mortality from the Data available in Africa', in J.C.Caldwell and G.Okonjo (eds), The Population of Tropical Africa, Longmans, 1968.

The correlation between estimates based on current mortality and child survival is only slightly improved for l_2 (0.48), and is down to almost the same level again for l_5 (0.41). Thus it is clear that not only the average level but its variation over regions differs considerably, which confirms the observations on crude death rates from current mortality made in an earlier section.

The unreliability and possible bias in recorded and derived infant mortality values make a critical assessment of the selected model life table values very difficult. It has been shown that, at least for some West African countries, the relation between infant and child mortality may be different from available model tables in the direction of a substantially higher child mortality (3). The proposed explanation, the pattern of change in diet connected to weaning, appears by all experience to be a valid statement of fact even for East African conditions (4). If this is so, and given the assumption that derived child mortality values are adequate for the selection of model life tables, the resulting estimate of infant mortality would tend to be slightly conservative.

Available evidence on the problem is scanty but nonetheless indicative. Survival rates derived from current mortality have been shown to be inaccurate at least as far as the level of mortality is concerned. Still, the relative pattern of mortality over a limited range of ages may have some informative value if it can be assumed that the errors in data are roughly the same within the age range. Comparisons of the observed and model l_x -values from age 1 to 5 were made for all regions with the mortality levels as given in table 11.3 above. With l_1 standardized to 1000, the observed range of l_x -values down to age 5 fell close to the West life table pattern in only two cases, and to the North pattern likewise in only two cases. For all remaining comparisons the observed child mortality was substantially higher in relation to the infant mortality than given by any of the two families.

The graduation of derived l_x -values by means of Brass's African Standard Life Table (see App. 11.2) resulted in a set of values very close to those of North 10, with the exception of ages 2 and 3 where the graduated l_x -values were lower. Accepting Brass's mortality assumptions as the 'extreme' infant/child mortality relation, the best estimates of survival rates for Mainland Total are $l_1 = 840 - 845$, $l_2 = 790-800$, $l_3 = 765-775$, and $l_5 = 740$.

Appendix 11.4 Sex differentials in mortality.

To establish the relative differences in mortality between the sexes is not necessarily easier than to estimate the overall pattern of mortality. With an accurate age distribution, the trend in sex ratios over all ages is a good indicator of mortality differentials where the population is not too affected by migration. In the case of Tanzania, the combined effect

(3) Clairin op. cit., P. Cantrelle, *Etude Démographique dans la Région de Sine-Saloum (Senegal)*, O.R.S.T.O.M., Paris, 1969.

(4) See for instance H.J.L. Burgess et al., 'The Nutritional Status of Young Children in Mombasa, Tanzania', *E.A. Medical Journal* Vol. 45, 1968, or H.J.L. Burgess et al., 'The Health of Children in Kisumu District, Tanzania', *Trop. Geogr. Med.*, Vol. 21, 1969.

of selective omission, age distortion and migration is enough to frustrate any effort in that direction (see Chapter 13).

With the child survival data available only of the sexes combined, the remaining source of information is the current mortality reports which have already been shown to be inaccurate in overall level and in the age pattern of mortality. However, under the present circumstances, the relative picture for the two sexes may still be of value to study.

Crude death rates have been compiled for each sex and region. This measure is affected by selective migration patterns, which generally differ for males and females. Despite this, in all but one case (Zanzibar, where also the overall CDR is far too low) the male CDR is higher than the female. The difference varies from nil to about a third of the female CDR, with an average for Mainland Total of 14.7%.

This observation thus supports the, in this chapter, accepted practice of using the average of the life table functions for males and females in the Coale-Demeny models. In order to estimate the effect on the CDR of differential mortality, the CDR of the Coale-Demeny stable population models were compiled for each sex, using the same level (North 10) and the same child/adult ratio in the selection of the models. The resulting CDR's differed by almost the same proportion as the recorded, the male CDR being 11.6% higher than the females.

Many arguments could be put forward for the assumption of a mortality pattern different from what has been found in developed countries. The economic and social role differentiation between the sexes in adult ages together with the high fertility levels points to a possibly higher adult mortality among the females. However, as the CDR is influenced rather much by infant and child mortality levels, such differences may be largely irrelevant to the overall mortality levels of the sexes.

Current mortality data have been used for the calculation of a life table for each sex (see App. 11.2). The age-specific mortality rates (q_x) from these life tables have been compared with those from the North 10. The comparison was made by means of the difference between the male and female q_x values for a certain age, expressed as proportion of the female q_x values. The results for the first five years are presented in App. table 11.4.1 below.

App. table 11.4.1 Difference between q_x -values for males and females, as per cent of female q_x -values

Age	Recorded Data	North 10
0	17.3	17.2
1	5.5	5.9
2	10.0	5.1
3	-1.0	3.5
4	0.6	3.9
5	10.3	2.0

The overall correlation over ages 0 to 75 between the two sets of proportions is not encouragingly high, $r = 0.35$. This largely depends on the irregular pattern displayed in higher ages, with for the recorded data

five cases of a higher female than male mortality. But for ages up to 5 the similarity is surprisingly high. A similar comparison done by region shows, however, a large variation even in these ages, with only a few regions displaying a reasonably coherent pattern.

The evidence for sex differentials in mortality is extremely weak and can in no way be regarded as proof of a higher mortality among males. But the evidence goes in one direction only, and therefore does not disprove the assumption behind the differentials expressed in the Regional Model Life Tables and which have been accepted for the analysis of Tanzania mortality.

Age	Male	Female
0-5	1.00	1.00
5-10	1.00	1.00
10-15	1.00	1.00
15-20	1.00	1.00
20-25	1.00	1.00
25-30	1.00	1.00
30-35	1.00	1.00
35-40	1.00	1.00
40-45	1.00	1.00
45-50	1.00	1.00
50-55	1.00	1.00
55-60	1.00	1.00
60-65	1.00	1.00
65-70	1.00	1.00
70-75	1.00	1.00
75-80	1.00	1.00
80-85	1.00	1.00
85-90	1.00	1.00
90-95	1.00	1.00
95-100	1.00	1.00

Appendix 12.1 Application of Brass's techniques to Tanzania fertility data.

The relationship between the cumulative current fertility and the observed retrospective values is crucial for the purpose of studying the behaviour of these two sets of rates and thus may throw light on the reliability of fertility data from these two sources. This relationship has been used by Brass and is shown in the following table using the data for Tanzania Mainland.

App. table 12.1.1. Application of Brass's technique to Tanzania Mainland current and retrospective data on fertility

Age Group	Cumulative Fertility ($d + 12f$) P	Average Fertility F	P/F (1)
15-19	0.4057	0.5217	1.286
20-24	1.8116	1.9714	1.068
25-29	3.4736	3.1754	0.914
30-34	4.9015	4.1572	0.840
35-39	6.0424	4.7094	0.781
40-44	6.7275	5.0587	0.741
45-49	7.2230	5.2195	0.723
$\bar{x} = 29.5$		$t_1/t_2 = 0.506$	
Total fertility rates:			
Current recorded		7.3	
Retrospective		5.2	
Adjusted (Brass)		7.9	

Brass's method is based on the following assumptions:

- The most important source of errors in the recalled number of births in the year preceding the census is imprecision of the reference period. The respondents may report events which occurred, on average, in the past 8 months or (with a different culture or framing of questions) in the past 15 months. The same average reference period, however, can be expected to hold for each age of mother.
- The number of children ever born is reported with good accuracy by younger women. The events which they are asked to recall have happened recently; the total births to each are typically not more than 2 or 3, so that the difficulties of counting large numbers in a non-numerate society do not arise.
- The age pattern of specific rates obtained from the reports of current births is accepted but the level of fertility is estimated from the mean children ever born reported to the younger women.

In the application of the procedure the mean children ever born implied by the current rates is compared at each age with the observed retrospective value. The P/F ratio of the retrospective to the cumulative measures for the younger women gives a factor which is applied to the current specific rates at all ages to adjust the fertility to the required level.

It must be pointed out that factors behind the behaviour of the P/F values are obscure. While for age group 15-19 P is about 30% higher than F and for age group 20-24 it is higher by about 9% the picture is reversed for the older age groups, where the value of P is smaller than that of F by between 9% for age group 25-29 to about 26% for age group 45-49. The divergence between the

(1) P/F for age group 20-24 (i.e. 1.068) was used for correction purposes.

P and F values from age 25 onwards could be explained by the increasing effect of recall lapse on the one hand (as reflected in the lower values for P with the advance in age) or by a recent rising trend in fertility on the other hand. While both factors should not be completely dismissed, one wonders why the values for P_1/F_1 and P_2/F_2 are higher than 1.0. A possible explanation for the latter phenomenon is that there might have been an element of selectivity in age mis-statement in that young women who had had a birth during the 12 months preceding the census were pushed upward from age 15-19 to 20-24 and from 20-24 to 25-29 etc. On the other hand women who did not have a birth during the 12 months preceding the census had their ages unchanged.

Appendix 12.2 Analysis of fertility by parity

The analysis of accuracy of fertility data could be brought one step further by an examination of current fertility by parity of the woman. This approach is discussed by W.Brass in The Demography of Tropical Africa, and also tested on data from Guinea presented in the same volume (1). The cross tabulations required for the analysis were produced from the 1967 census (see Census Volume 3) and subjected to a first round of analysis and interpretation by J.G.C.Blacker.

The main purpose of the analysis was to get an estimate of the errors in current fertility introduced by inflation in the reference period. This should be achieved by comparisons of cumulated first-birth rates with the proportion of women who are mothers. According to Brass, 'the ratio of ever-fertile women to cumulated first-birth rates at ages 30-34 years should be a useful index of the time-scale error' (2).

There may, however, be some useful results from the study of this ratio over the whole age range, and for second and higher birth orders as well. The problem of whether the time-scale error is related to age and/or parity of the woman may be touched upon in this analysis.

The method employed is as follows. From a cross tabulation of current and retrospective fertility, by age group of women, the birth order of current births could readily be determined. For each of first, second, etc. up to sixth birth, the age-specific birth rate was calculated by dividing the total number of such births by the number of women in the age group. These rates, in cumulated form, were then compared with the corresponding proportion of women who have ever had at least one, two etc. up to at least six children. This is in principle the same procedure as advocated by W.Brass for studying P/F ratios.

However, available tables of multipliers to adjust cumulated current birth rates to the mid-point of each group could not be applied to the present situation. The multipliers were therefore determined by graphic interpolation between the curves representing the two rates. The P/F ratios for each birth order and age group are shown below in App. Table 12.2.1 and Fig. 12.2.1 for each of Mainland Total and Mainland Urban.

(1) W. Brass et al., The Demography of Tropical Africa, Princeton University Press 1968, pp. 103 and 396.

(2) Ibid., p. 103.

App. table 12.2.1 P/F ratios by birth order and age group for Mainland Total and Mainland Urban

Area	Age group	All births	Birth order					
			1st	2nd	3rd	4th	5th	6th
Mainland Total	15-19	1.29	1.21	1.50	-	-	-	-
	20-24	1.09	0.99	1.17	1.20	1.33	1.50	-
	25-29	0.91	0.87	0.92	0.94	1.00	1.00	1.10
	30-34	0.85	0.83	0.85	0.84	0.86	0.89	0.96
	35-39	0.79	0.82	0.83	0.80	0.80	0.79	0.82
	40-44	0.74	0.79	0.79	0.75	0.74	0.72	0.74
	45-49	0.72	0.79	0.79	0.73	0.72	0.70	0.72
Mainland Urban	15-19	1.20	1.19	1.50	-	-	-	-
	20-24	0.98	0.90	0.94	1.08	1.31	1.21	-
	25-29	0.84	0.85	0.80	0.86	0.87	0.90	0.95
	30-34	0.76	0.79	0.75	0.74	0.76	0.80	0.87
	35-39	0.71	0.76	0.70	0.69	0.71	0.71	0.72
	40-44	0.66	0.73	0.65	0.65	0.65	0.64	0.64
	45-49	0.64	0.71	0.64	0.63	0.64	0.64	0.66

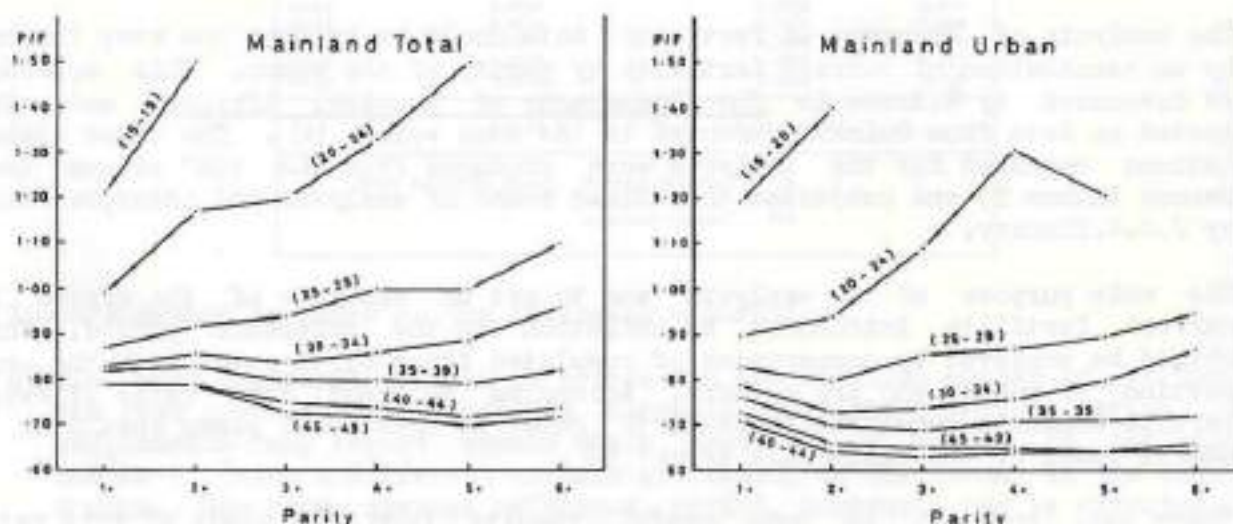


Figure 12.2.1 P/F-ratios for urban and rural populations

The following observations can be made:

- For the younger age groups the P/F ratios tend to rise with parity. With increasing ages, the trend becomes less pronounced or even reversed.
- More important, for age groups 25-29 and higher age groups, the P/F ratios are remarkably constant over parity levels and therefore also close to the overall P/F ratios.
- With the data for Mainland Total and Mainland Rural almost identical, the results for urban and rural areas are very similar, the only difference being a generally lower level of the P/F ratios in urban areas.

The suspicion that the current fertility data are inflated is confirmed in the cumulated current fertility rates by birth order, which reach far too high levels (App. table 12.2.2). For Mainland Total, the cumulated rates exceed 1.00 even for the second birth order, when already for first births the rates should remain at approximately 0.9 from age 35 onwards.

One contributing factor might be an increase in current fertility among

App. table 12.2.2. Cumulated birth order current fertility rates, up to third child

Cumulated to age	Mainland Total			Mainland Urban		
	Birth order			Birth order		
	1st	2nd	3rd	1st	2nd	3rd
20	0.536	0.205	0.065	0.514	0.211	0.060
25	0.915	0.668	0.435	0.861	0.634	0.350
30	1.035	0.818	0.735	0.981	0.831	0.590
35	1.080	0.965	0.865	1.056	0.911	0.700
40	1.105	1.003	0.930	1.066	0.951	0.750
45	1.120	1.025	0.975	1.086	0.976	0.775
50	1.125	1.035	0.990	1.101	0.991	0.795

younger women, although this is contradicted by the high overall P/F ratios in ages 15-19 and 20-24. A more valid explanation would be the general inflation of the reference period, which to take care of the whole error would have to be in the order of 20-25%. However, the contribution of the older women to the 'first-births' show that other factors are at work as well.

The figures in App. table 12.2.2 may be regarded as proof of an inflation in current fertility rates, which means that the estimated total fertility of 7.27 for Mainland Total is too high. The lower limit would then be represented by the retrospective fertility rate, which for age group 45-49 is 5.22.

The fall with age in the P/F ratios for all births indicate a more serious underreporting of the retrospective births for older women, possibly connected with the number of births and the time elapsed since the first birth. In the present analysis, this could be seen in a fall of the P/F ratios with parity. As noted above, however, the ratios are more or less constant over the different parity levels, which would seem to indicate that the error must be referred to the current fertility data. This falls in line with earlier comments on the behaviour of P/F ratios in data from English-speaking African countries, that one of the assumptions underlying Brass's method of fertility estimation is not in fact valid, but that the inflation of the reference period is increasing with age (3).

Apart from this, however, there is still evidence of underreporting of the retrospective fertility. As explained in Ch. 12, a total fertility of only 5.2 does not agree very well with the recorded age distribution, and is not supported by experience from other censuses and countries. Further, the proportion childless women is suspiciously high, 11 - 12%, in comparison with for instance 5 - 6% in Kenya in 1962 (4). Thus it seems likely, that the total fertility is higher than 5.2.

The analysis of current fertility by birth order was carried out for the regions of Tanzania down to the third birth. The results are summarized in App. table 12.2.4 below. Three regions were selected for further analysis; Arusha, with a high apparent inflation in current fertility rates up to the third birth order and a high frequency of first births in older ages; Morogoro with the least apparent inflation in current fertility rates and few first births in older ages; and Tabora with a high apparent inflation only for current first births but with a high proportion of childless women, and with many first births in older ages.

Graphic interpolations of P/F ratios by birth order were carried out for these

(3) Personal communication from J.G.C. Hlaacker

(4) Kenya Population Census 1962, Volume III: African Population, Nairobi 1966.

App. table 12.2.3 P/F ratios by birth order and age group for three selected regions

Region	Age group	All births	Birth order			
			1st	2nd	3rd	4th
Arusha	15-19	1.32	1.42	1.38	-	-
	20-24	1.08	0.89	1.14	1.41	1.56
	25-29	0.89	0.81	0.92	0.90	0.91
	30-34	0.84	0.77	0.80	0.79	0.91
	35-39	0.79	0.75	0.76	0.74	0.83
	40-44	0.70	0.72	0.71	0.66	0.73
Morogoro	45-49	0.72	0.72	0.71	0.66	0.74
	15-19	1.32	1.59	1.48	-	-
	20-24	1.19	1.04	1.25	1.39	1.54
	25-29	1.02	0.96	1.02	0.99	1.09
	30-34	0.97	0.93	0.94	0.90	0.99
	35-39	0.91	0.90	0.92	0.86	0.91
Tabora	40-44	0.86	0.88	0.88	0.81	0.84
	45-49	0.81	0.85	0.85	0.77	0.79
	15-19	1.28	1.38	1.35	-	-
	20-24	1.04	0.93	1.13	1.19	1.13
	25-29	0.84	0.78	0.88	0.82	0.84
	30-34	0.76	0.71	0.83	0.73	0.75
Tabora	35-39	0.70	0.70	0.82	0.68	0.69
	40-44	0.63	0.66	0.75	0.62	0.60
	45-49	0.58	0.64	0.74	0.58	0.58

regions up to the fourth birth. With the small numbers in each cell of the tables, random fluctuations might be expected; nevertheless the trends are consistent with the patterns presented above.

The three regions, displaying quite different patterns of fertility and reporting errors, still have a very similar pattern of P/F ratios by birth order, which also closely resembles the pattern for Mainland Total. Thus it seems as if the relation between retrospective and current fertility data within an age group is rather constant and unaffected by level of fertility or errors in reporting.

The variation in the time scale error over regions can be studied in the following table.

App. table 12.2.4 Cumulative fertility to age 49 by birth order; childlessness; and total fertility estimates, by region

Region	Cumulated current rates by birth order			Proportion mothers in age group 45-49	Total fertility	
	1st	2nd	3rd		Current data	Retrospective data
Arusha	1.25	1.15	1.13	0.90	7.49	5.31
Geusi	1.20	0.98	0.82	0.84	5.77	3.71
Dodoma	1.24	1.05	1.00	0.90	7.61	5.34
Iringa	1.07	0.98	0.90	0.95	7.01	6.77
Kigoma	1.26	1.09	1.05	0.81	6.56	4.88
Kilimo-njoro	1.05	1.05	1.05	0.95	8.91	6.57
Mara	1.14	1.03	0.89	0.89	7.96	6.03
Mweya	1.07	1.01	1.00	0.94	8.10	6.56
Morogoro	1.05	0.94	0.92	0.88	6.20	5.01
Mtwara	1.10	1.00	0.88	0.89	5.70	4.51
Mwanza	1.12	1.02	1.05	0.90	8.14	5.51
Ruvuma	1.12	0.89	0.81	0.95	7.10	6.18
Shinyanga	1.24	1.20	1.15	0.90	8.66	5.19
Singida	0.86	1.08	0.95	0.89	6.26	4.73
Tabora	1.27	0.94	1.00	0.82	6.74	3.99
Tanga	1.16	1.12	1.08	0.87	7.74	5.08
West Lake	1.09	0.98	0.90	0.86	7.48	5.08
Zairu	1.17	0.97	0.76	0.80	4.99	3.10
Zanzibar	1.26	1.05	0.92	0.84	7.21	4.51

The first columns of the table show the cumulated current births by birth order up to the end of the fertile period, i.e. age 49. They can be compared with the proportion of women who have had at least one birth in their life

time, in column four. Only Singida, with a most irregular pattern of cumulated current births, happens to have some consistency between cumulated first births and proportion mothers.

The last two columns give the recorded total fertility from current and retrospective fertility data respectively. It might be expected that the ratio between these two should bear some relation to the difference in the estimates of proportion mothers from first births and retrospective data. And in fact, there is some association between the variation of the two ratios, though not extremely strong. Other comparisons, for instance with ratio between recorded and model fertility levels, or with the fertility adjustment arrived at using Brass's P/F technique, do not show any clear relation to the time scale errors expressed by the cumulated birth order rates.

Appendix 12.3 GRR derived from stable population models and recorded female age distributions.

Regions	Mainland			Islands																		
	Total	Rural	Totals	Aruba	Curaçao	Dominica	Trinidad	Eligible	Eligible (all)	Guam	Marshall	Micronesia	Nauru	Palau	Papua	Samoa	Sierra Leone	Tonga	Vanuatu	West Bank	East Jerusalem	Yemen
Model	N ₁₀	N ₁₀	N ₁₅	N ₁₅	N ₁₂	N ₁₀	N ₉	N ₁₀	N ₁₅	N ₈	N ₇	N ₉	N ₉	N ₁₀	N ₈	N ₁₁	N ₈	N ₁₂	N ₁₃	N ₁₀	N ₁₄	N ₁₁
Observed	29	29	24	29	27	29	29	29	29	21	29	29	29	29	29	29	29	29	29	27	27	27
Recorded	(29.5)	(29.5)	(27.8)	(30.1)	(30.2)	(29.7)	(30.6)	(29.6)	(30.4)	(28.8)	(30.3)	(29.1)	(30.8)	(29.2)	(29.7)	(29.7)	(28.7)	(29.2)	(29.4)	(24.3)	(27.5)	(27.7)
Age : 5	3.19	3.22	2.61	3.49	2.48	3.57	3.71	2.82	3.34	3.45	3.48	3.07	2.62	2.56	3.23	3.58	3.02	2.77	3.31	2.84	2.64	3.12
10	3.39	3.43	2.54	3.64	2.58	3.63	4.12	2.90	3.57	3.64	3.64	3.27	2.86	2.63	3.50	3.61	3.11	2.89	3.38	2.91	2.62	3.03
15	3.05	3.08	2.26	3.20	2.17	3.21	3.80	2.68	3.36	3.43	3.44	2.97	2.49	2.44	3.06	3.04	2.73	2.62	3.10	2.80	2.20	2.87
20	2.95	2.96	2.38	2.99	2.09	3.03	3.60	2.54	3.40	3.34	3.50	2.92	2.50	2.16	3.02	3.18	2.66	2.46	2.95	2.78	2.32	2.54
25	2.94	2.95	2.68	3.06	2.15	3.11	3.54	2.46	3.21	3.32	3.45	2.93	2.50	2.12	3.00	3.22	2.68	2.47	2.90	2.52	2.67	2.52
30	3.12	3.10	3.15	3.41	2.25	3.37	3.74	2.63	3.23	3.41	3.69	3.16	2.81	2.30	3.19	3.38	2.81	2.85	3.15	2.57	3.00	2.61
35	3.13	3.09	3.29	3.44	2.28	3.34	3.63	2.61	3.15	3.37	3.69	3.19	2.86	2.36	3.18	3.35	2.78	2.66	3.21	2.61	3.51	2.73
40	3.12	3.07	3.57	3.46	2.25	3.29	3.65	2.64	3.10	3.35	3.70	3.24	2.88	2.39	3.17	3.26	2.87	2.68	3.28	2.74	3.74	2.66

Accepting the recorded f_{20-24} as correct, three alternative adjustments were made to the age-specific fertility rates from age 25 onwards to reach a total fertility rate of 6.6 (which was considered a reasonable estimate of fertility level for Tanzania). The three alternatives are described below.

Alternative 'A' was based on the assumption that the gap between current and retrospective rates was the result of both over-stated current fertility rates (as a result of a too long reference period) and understated retrospective fertility. The correction for f_i from age 25 onwards was based on the proportion: $\frac{a - b}{c - b}$

where a = total fertility rate of 6.6
 b = recorded retrospective total fertility rate
 c = recorded current total fertility rate.

Alternative 'B' was similar to alternative 'A' except that the recorded 'too low' f_i was left unaltered.

Alternative 'C' was based on a linear adjustment of the f_i -values from age 25 upwards to reach a total fertility rate of 6.6.

App. table 12.4.1 Adjusted age-specific fertility rates

Age group	Alternative			United Nations		
	A	B	C	Early peak	Broad peak	Francophone
15-19	.200	.169	.200	.214	.117	.226
20-24	.334	.334	.334	.320	.313	.317
25-29	.266	.284	.296	.269	.322	.266
30-34	.226	.228	.226	.230	.263	.226
35-39	.158	.155	.152	.156	.194	.162
40-44	.086	.090	.078	.077	.066	.073
45-49	.050	.050	.024	.030	.025	.032
T (years)	26.01	26.36	27.55	27.53	28.75	27.48
Relative Distributions						
15-19	.151	.128	.151	.162	.069	.171
20-24	.253	.253	.253	.247	.237	.240
25-29	.201	.213	.224	.219	.244	.216
30-34	.171	.173	.171	.174	.199	.171
35-39	.120	.124	.123	.118	.147	.123
40-44	.065	.069	.059	.058	.065	.055
45-49	.038	.044	.018	.023	.019	.024
Total	1.000	1.000	1.000	1.000	1.000	1.000
R/P Values						
15-19	.994	1.282	.994	.893	2.156	.815
20-24	.997	1.090	.997	.972	1.332	.955
25-29	.912	.943	.908	.886	1.015	.885
30-34	.863	.897	.855	.854	.909	.857
35-39	.847	.855	.823	.824	.840	.825
40-44	.809	.815	.791	.793	.735	.794
45-49	.794	.795	.792	.803	.793	.791

The three alternative fertility distributions are given below together with three other model distributions namely the United Nations' 'Early Peak' and 'Broad Peak' (1) and the so called 'Francophone model' (2).

- (1) Population Bulletin of the United Nations No. 7 1953, with special reference to conditions and trends of fertility in the world, United Nations, New York, 1965. Chapter VII.
- (2) Kenya Population Census, 1962 Volume III, African Population, Statistics Division, Ministry of Economic Planning and Development, October 1966. Table X.5, p. 63.

Also included in the table are the relative distributions and the P/F values as derived from these six alternatives and recorded retrospective values.

Both alternative 'B' and the UN Broad peak give implausible distributions judging from:

- the low relative contribution of age group 15-19 to total fertility,
- the relatively high value of the mean of the fertility distribution,
- the rather high value of P/F for age group 15-19 in the case of alternative B and for age groups 15-19, 20-24 for the UN Broad peak.

Although alternatives 'A' and 'C' are almost identical, judging from the relative share of each age group to the total fertility and the behaviour of the P/F values, yet any small differences that may exist between them makes alternative 'C' more plausible than alternative 'A' in view of the broader peak between ages 20-29 and because fertility tapers off at the tail of the fertility distribution, thus giving a low contribution of 18% for age group 45-49 rather than the 38% in the case of alternative 'A'. Further it gives a low value of $\bar{m}$ (27.55 as compared with 28.01). Finally alternative 'C' is generally nearer to the UN Early peak and the 'Francophone' distribution than alternative 'A'.

Appendix 13.1 Graduation of the age data.

The application of the stable population procedure to the Tanzanian data rests on the assumption that fertility and mortality have been constant in the past. As discussed in Ch. 12, there is some evidence that fertility might have been rising in recent years. This, however, cannot be substantiated. With regard to mortality, the general argument is that it had been declining in Africa in recent years. That this is true also of Tanzania has already been established, but it is not yet possible to arrive at estimates of the duration and average pace of mortality decline. However, such mild changes would give rise to quasi-stable conditions, and thus the shape of the age distribution would not be materially different from that of a stable population.

The demographic approach has therefore been used for the purpose of selecting a suitable population model. The age distribution of a stable population is jointly determined by the mortality schedule and the annual rate of increase. Characteristics of an actual population can be estimated by locating the stable population model that best fits certain recorded or calculated features of the population in question and then assigning the characteristics of the stable model to the actual population.

Seven stable population models are used in this appendix. Six have been selected from the Coale and Demeny Regional Model Life Tables (1); three from the West family and three from the North family. Although the study of mortality has indicated that the North family fits best the Tanzanian pattern, the selected West family stable populations have also been shown for comparison purposes. Within each family, three parameters were used, namely a growth rate r of 2.5%, a gross reproduction rate of 3.0 and a child/adult ratio calculated from the recorded age distribution and used for interpolation purposes within columns of the 'r' set of tables. The seventh stable age distribution is selected from a range of stable populations, constructed by N.H. Carrier at the London School of Economics and based on Brass's African Life Tables system (2). The selection of the model is made with reference to the recorded female age distribution as it tended to be less affected by migration than that of males.

The seven stable population models are given below together with the deviation of the recorded values for Tanzania Mainland from each of these population models.

From the table below, the following comments can be made:

- There is very little difference between the North 10 and the West 11 models, except that where $r = 2.5$, the proportion age 0-4 in the case of North 10 is nearer to the recorded than West 11.

(1) A.J. Coale and P.A. Demeny, Regional Model Life Tables and Stable Populations. Princeton University Press, 1966.

(2) The proportion under 15 (P) and 45 and over (Q) for the recorded data, were used together with the relevant l_x -values, arrived at from the investigation of mortality. See J.G.C. Blacker, Age Data in African Censuses and Surveys, E/CN.14/CPR/13, E.C.A., Addis Ababa 1968.

App. table 15.1.1 Tanzania Mainland, deviation of female recorded from selected model age distributions

Age group	Recorded female	Coale-Demeny model age distributions							Brass-Carrier	Recorded minus model age distribution							Model P minus model G
		A	B	C	D	E	F	G		A-B	A-C	A-D	A-E	A-F	A-G	A-H	
0-4	17.7	17.1	17.9	17.0	16.9	17.8	17.8	17.7	+0.6	-0.2	+0.7	+0.8	-0.1	-0.1	0.0	0.0	
5-9	15.3	14.0	14.1	13.9	13.6	14.4	14.0	14.2	+1.3	+1.2	+1.4	+1.7	+0.9	+1.3	+1.1	+0.4	
10-14	9.5	12.1	12.0	12.0	11.6	12.3	11.9	12.1	-2.6	-2.5	-2.5	-2.1	-2.8	-2.4	-2.6	+0.4	
15-19	9.1	10.4	10.2	10.4	10.1	10.5	10.2	10.3	-1.3	-1.1	-1.3	-1.0	-1.4	-1.1	-1.2	+0.3	
20-24	8.6	9.9	8.8	8.9	8.7	8.9	8.7	8.7	-0.3	-0.2	-0.3	-0.1	-0.3	-0.1	-0.1	+0.2	
25-29	7.1	7.5	7.4	7.5	7.5	7.5	7.4	7.3	+1.6	+1.7	+1.5	+1.6	+1.6	+1.7	+1.8	+0.1	
30-34	6.3	6.4	6.3	6.4	6.4	6.2	6.3	6.2	+0.1	0.0	+0.1	+0.1	+0.1	0.0	+0.1	+0.1	
35-39	5.2	5.3	5.3	5.4	5.5	5.2	5.3	5.2	0.0	0.0	-0.1	+0.2	+0.1	0.0	+0.1	-0.1	
40-44	3.7	4.5	4.4	4.5	4.6	4.3	4.4	4.3	-0.8	-0.7	-0.8	-0.9	-0.6	-0.7	-0.6	-0.1	
45-49	3.7	3.7	3.6	3.7	3.9	3.5	3.7	3.6	0.0	0.0	0.0	+0.2	+0.2	0.0	+0.1	-0.2	
50-54	2.9	3.0	3.0	3.1	3.2	2.9	3.0	2.9	-0.1	-0.1	-0.2	-0.3	0.0	-0.1	0.0	-0.1	
55-59	1.4	2.4	2.4	2.4	2.4	2.1	2.4	2.3	-0.6	-0.8	-0.8	-1.0	-0.5	-0.8	-0.7	-0.3	
60-64	1.8	1.9	1.8	1.9	2.0	1.7	1.9	1.8	-0.1	0.0	-0.1	-0.2	+0.1	-0.1	0.0	+0.2	
65-69	1.2	1.3	1.3	1.3	1.5	1.2	1.3	1.4	-0.1	-0.1	-0.1	-0.3	0.0	-0.1	-0.2	-0.1	
70-74	1.9	0.9	0.9	0.9	1.0	0.8	0.9	0.9	+0.1	+0.1	+0.1	0.0	+0.2	+0.1	+0.1	-0.1	
75+	2.9	0.7	0.7	0.8	0.9	0.7	0.8	1.0	+2.2	+2.2	+2.1	+2.0	+2.2	+2.1	+1.9	0.0	

Characteristics of the selected stable population models:

- A Coale-Demeny; West 11, $r = 2.5\%$
 - B " " North 10, " "
 - C " " West 11, GRR = 3.0
 - D " " North 10, " "
 - E " " West 11, c/a -ratio = 0.419
 - F " " North 10, " "
 - G " " North 10, " "
 - H Brass-Carrier; $P = 44\%$, $Q = 14\%$
- (for models B - G, $\bar{N} = 29.0$)

- The two stable population models based on a gross reproduction rate of 3.0 seem to underestimate the proportion of children aged 0-4 and therefore the figure of 3.0 may in fact underestimate the true GRR.
- The North 10 stable population model based on $r = 2.5$ and on a recorded child/adult ratio = 0.419 are almost identical. This is not surprising for they originate from the same set of parameters as given in the 'r' set of tables. The only difference between them is on account of the fact that a child/adult ratio of 0.419 gives a growth rate r of 2.416.
- The deviation between the Brass-Carrier and North 10 (with a child/adult ratio of 0.419) models, from the recorded female age distribution, are almost identical, for nearly all age groups, as can be seen from columns 14 and 15 of the above table, despite the fact that each of these models is based on different parts of the recorded age distribution. This may strengthen the case for using the child/adult ratio as a suitable parameter for the purpose of selecting a model stable age distribution in the case of Tanzanian data.

Further a close scrutiny of the recorded and the graduated data show close agreement, not only with regard to the numerator of the child/adult ratio, i.e. age group 0-4, but also with regard to the denominator, that is, age group 15-44. For the Mainland total the recorded and the graduated values are given below for these two age groups together with the proportion under 15 years.

As can be seen from the table below, the values for 0-4 and 15-44

App. Table 13.1.2 Recorded and graduated values for age groups 0-4, 15-44 and proportion under 15, Mainland Total (females)

Age group	Recorded	Graduated	Difference
0-4	17.7	17.8	-0.1
15-44	42.3	42.6	-0.3
Proportion under 15	42.5	44.5	-2.0

age groups are almost identical for the recorded and graduated values. Apart from the bulge in age group 5-9 (which partly accounts for the trough in age group 10-14 and which does not affect the child/adult ratio) the upward shifting in age which starts in age group 10-14 (producing the deficit under 15 years of about 2%) continues beyond age 45 years and thus, on balance, the magnitude of the proportion aged 15-44 remains unchanged.

With regard to age group 0-4, it is doubtful that the recorded data are inflated. On the contrary, African experience shows that the bulge in age group 5-9 is usually on account of the inclusion both of children really aged 0-4 and of those aged 10-14 (3). It is equally difficult to assume that this age group is deflated, for this would render the fertility level for Tanzania implausibly high.

The picture for most of the regions follows the same pattern as that for Tanzania Mainland with regard to the near equality between the recorded and the graduated values for the two age groups in question as shown in the following table.

App. Table 13.1.3 Deviations of graduated from recorded values for age groups 0-4 and 15-44, regions

Region	0-4			15-44		
	Recorded	Graduated	Difference	Recorded	Graduated	Difference
Arusha	19.7	19.1	0.6	41.9	41.0	0.9
Coast (incl. ZSM)	15.9	14.6	1.3	47.1	43.9	3.2
Dodoma	18.3	18.2	0.1	42.6	42.1	0.5
Iringa	15.5	16.1	-0.6	39.7	41.0	-1.3
Kigoma	16.1	16.4	-0.3	42.4	43.1	-0.7
Kilimanjaro	19.1	20.4	-1.3	37.5	40.1	-2.6
Mara	18.3	18.7	-0.4	41.4	42.8	-0.8
Morogoro	18.2	18.5	-0.3	41.7	42.3	-0.6
Mwanza	17.0	16.6	0.4	44.1	43.1	1.0
Njombe	14.9	14.3	0.6	45.5	44.0	1.5
Njombe	16.5	16.5	0.0	42.2	42.0	0.2
Ruvuma	17.4	17.4	0.0	43.0	42.9	0.1
Shinyanga	19.4	19.4	0.0	41.3	41.1	0.2
Singida	16.6	16.6	0.0	43.4	43.3	0.1
Tabora	16.2	15.9	0.3	43.8	43.0	0.8
Tanga	18.7	18.3	0.4	42.5	41.7	0.8
West Lake	16.8	16.7	-1.9	37.4	41.7	-3.5
Zanzibar	18.5	18.5	0.0	42.0	41.8	0.2

With regard to age group 0-4, there is no difference between the recorded and the graduated values in the case of 5 regions. Further, the differences are either less or about half of 1% in the case of 10 regions. Only in the case of Coast, Kilimanjaro and West Lake does the difference exceed 1%. For age group 15-44, the deviations are less than 1% in the case of 12 regions, between 1% and 2% in the case of three regions and between 2% and 3% for the remaining three regions.

(3) J.G.C. Blacker, *op.cit.*

It must be pointed out, however, that the use of population models for graduating data by age assumes the absence of migration in or out. For this reason the use of such models at the regional level becomes of little value. Further, a glance at table 4.7 (Regional in and out migration) shows that in most cases, males are more affected by migration than females. This would render a selected stable population model based on the female age distribution, inapplicable to the males. Finally data on inter-regional migration by age indicates that migrants (in or out) are mainly concentrated between ages 15 and 50. For this reason the use of population models and indeed the resort to the child/adult ratio as a parameter for selection purposes at the regional level becomes of dubious value. The following table shows the magnitude of net migration by regions.

App. Table 13.1.4 Magnitude of net migration by region

Region	Population ('000)	Net migration	
		Absolute ('000)	Percent of population
Coast (incl. Dar)	780	114	14.5
Arusha	609	58	9.5
Tabora	562	52	9.3
Tanga	769	34	4.4
Shinyanga	897	13	1.4
Mara	543	8	1.5
West Lake	657	3	1.4
Zanzibar	354	3	0.8
Morogoro	685	3	0.4
Dodoma	708	-12	-0.7
Kilimanjaro	652	-11	-1.7
Mbeya	968	-24	-2.5
Mtwara	1,040	-38	-3.7
Kwana	1,054	-51	-4.8
Iringa	689	-38	-5.5
Kigoma	473	-40	-8.5
Ruvuma	393	-35	-8.9
Singida	437	-45	-9.8

The above table shows that the effect of internal migration is probably an important factor in limiting the use of population models for graduation purposes in the case of Coast, Arusha, Tabora, Iringa, Kigoma, Ruvuma and Singida, where net migrants (in or out), are over 5% of the population of the region.

Appendix 13.2 Difference between female recorded and model cumulative age distributions, per cent

Regions	Proportion under ages														
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
Arusha	+0.6	+1.8	-1.1	-2.9	-2.3	+0.6	+0.7	+0.8	+0.2	+0.0	+0.3	-1.2	-1.3	-1.6	-1.6
Coast (excl. Dar)	+0.9	+2.3	-1.6	-3.2	-2.8	-1.0	-0.6	-0.8	-1.2	-1.6	-2.0	-3.3	-2.9	-3.4	-3.2
Dodoma	+0.2	+1.7	-0.3	-2.5	-1.5	+0.3	0.0	-0.2	-1.1	-1.2	-1.4	-2.2	-2.1	-2.5	-2.4
Iringa	+0.6	+1.1	-0.6	-2.0	-2.4	-1.0	-1.5	-1.2	-2.0	-1.5	-1.7	-2.1	-2.1	-2.1	-1.9
Kigoma	+0.3	+0.7	-1.5	-3.4	-4.3	-2.5	-2.5	-2.0	-3.6	-3.2	-2.1	-2.9	-2.8	-3.0	-2.9
Kilimanjaro	-1.3	-0.6	-0.9	-2.0	-3.6	-3.1	-3.4	-3.2	-3.5	-3.4	-3.3	-3.7	-3.4	-3.2	-2.7
Mara	+0.3	+0.6	-0.2	-1.5	-1.7	-0.9	-1.1	-1.1	-1.4	-1.6	-1.4	-1.9	-1.9	-2.0	-1.8
Mbeya	+0.3	+1.6	+0.3	-0.4	-0.8	+0.8	+0.9	+0.7	-0.1	+0.1	-0.3	-1.2	-1.5	-1.7	-1.7
Morogoro	+0.4	+1.3	0.0	-0.3	-0.3	+1.6	+1.7	+1.8	+1.0	+0.7	+0.1	-1.0	-1.4	-1.8	-1.7
Mtwara	+0.7	+2.3	+0.1	+0.3	+1.1	+3.0	+3.8	+3.5	+2.2	+1.7	+0.6	-1.3	-2.0	-2.6	-2.9
Mwanza	+0.1	+1.7	-0.6	-1.9	-2.0	+0.5	0.0	+0.2	-0.7	-0.6	-0.3	-1.0	-1.1	-1.2	-1.1
Ruvuma	+0.1	+1.8	+1.3	+1.7	+2.1	+0.3	+0.3	-0.4	-1.1	-0.7	-1.0	-1.5	-1.3	-1.3	-1.2
Shinyanga	0.0	+1.2	-2.3	-3.3	+2.9	-1.5	+1.6	-2.0	-2.4	-2.0	-1.6	-2.2	-2.2	-2.5	-2.4
Singida	0.0	+0.3	-2.6	-3.6	-3.6	-2.2	-2.4	-1.2	-2.6	+1.7	+1.7	-2.7	-3.3	-3.8	-3.8
Tabora	+0.3	+1.2	-1.7	-2.5	-2.5	+0.3	+0.6	-0.2	-0.9	-1.2	-1.3	-2.1	-2.3	-2.7	-2.6
Tanga	+0.4	+2.0	-0.9	-2.4	-2.8	-0.6	-0.1	+0.4	0.0	-0.4	-0.4	-1.2	-1.1	-1.2	-1.1
West Lake	-1.9	-2.3	-4.0	-5.8	-8.4	-8.7	-8.6	-8.1	-8.2	-7.7	-6.7	-6.5	-5.2	-4.4	-3.4
Dar es Salaam	+3.2	+4.2	+1.5	+3.4	+7.7	+12.7	+13.8	+13.4	+11.8	+9.6	+7.5	+5.1	+3.3	+1.6	+0.4
Zanzibar	0.0	+3.0	-2.3	-6.1	-4.4	-5.1	-3.2	-3.7	-2.4	-3.3	-1.9	-2.9	-1.4	-2.0	-1.2

Appendix tables to chapter 14.

Appendix 14.1 Recorded population 1940, 1957/58 and 1967

	Population			Annual growth rate			Males per 100 females		
	1940	1957	1967	1940-57	1957-67	1940-67	1940	1957	1967
Mainland total	7,400,429	8,700,466	11,950,654	1.8	3.1	2.5	93	95	95
Arusha region	324,606	407,485	610,474	2.6	4.1	3.4	110	106	104
Arusha town	5,320	10,058	38,452	7.3	12.4	10.0	207	160	132
Arusha district	105,895	138,695	181,754	3.0	2.7	2.9	126	112	105
Masai district	62,340	70,685	106,890	1.4	4.2	2.9	104	102	98
Mbali district	151,055	188,087	289,366	2.5	4.4	3.5	102	102	103
Coast region	385,908	408,271	511,306	0.6	2.3	1.5	86	90	97
Hagunyo district	79,667	88,824	117,547	1.2	3.8	2.1	93	95	99
Kisarawe district	150,262	149,980	180,536	0.0	1.9	1.0	90	91	94
Mafia district	12,210	12,199	16,748	0.0	3.8	1.7	104	100	103
Mtindisi district	38,810	38,402	75,651	0.0	7.0	3.6	107	113	118
Rufiji district	105,250	118,865	181,004	1.4	0.9	0.7	89	87	88
Dodoma region	466,197	514,425	709,380	1.1	3.2	2.2	97	89	94
Dodoma town	9,414	13,425	23,559	4.0	3.8	4.9	105	126	115
Dodoma district	203,431	226,206	297,440	0.9	2.8	1.9	87	88	90
Kondea district	145,797	158,834	212,195	1.0	2.9	2.0	89	89	95
Kwana district	101,957	115,950	170,386	1.5	4.5	2.9	126	95	97
Iringa region	389,248	409,291	689,905	2.6	3.5	3.1	83	85	88
Iringa town	5,708	9,987	21,745	5.9	8.5	7.3	121	156	102
Iringa district	126,121	170,652	230,881	3.4	3.1	3.2	96	94	97
Mufindi district	50,472	60,295	118,467	3.4	5.7	4.6	93	93	89
Mjomba district	206,953	240,652	319,811	1.7	2.9	2.3	78	75	81
Kigoma region	340,611	382,505	473,445	0.7	2.1	1.4	80	80	85
Kasulu district	169,519	175,007	207,611	0.3	1.7	1.1	76	75	77
Kibondo district	107,568	120,292	136,913	1.3	1.3	1.3	75	75	81
Kigoma/Miji town	-	14,255	21,369	-	2.8	-	197	101	120
Kigoma district	82,418	70,954	107,545	-1.5	4.2	1.4	98	99	100
Kilimanjaro region	353,485	473,859	652,722	3.3	3.2	3.3	97	99	95
Kilimanjaro district	250,645	351,255	476,225	3.4	3.1	3.2	97	98	95
Moshi town	8,048	12,735	26,864	6.1	6.9	6.5	188	167	129
Seme/Pare	85,789	106,908	149,635	2.7	3.2	3.0	97	96	95
Mara region	283,405	379,891	544,125	3.3	3.7	3.5	87	91	96
Morogoro town	2,960	7,207	15,418	10.4	7.9	9.1	-	122	107
Morogoro district	155,204	221,243	340,177	3.6	4.1	3.9	-	88	83
North Mara	115,239	145,441	188,336	2.6	2.6	2.6	90	88	90
Mbeya region	568,564	686,261	963,953	2.1	3.5	2.8	86	85	91
Morogoro district	38,384	38,209	53,618	-0.1	3.4	1.8	109	95	97
Mbeya town	3,179	6,932	12,479	9.1	6.1	7.5	133	121	101
Mbeya district	106,951	129,482	180,208	1.0	3.7	2.8	91	86	91
Mbuni district	75,335	99,121	147,489	3.0	4.1	3.6	85	84	90
Pungwe district	236,564	271,887	359,971	1.6	2.8	2.2	81	80	88
Susungu district	106,332	145,283	215,886	3.3	4.0	3.7	88	91	95
Morogoro region	477,903	547,358	685,104	1.5	2.3	1.9	102	99	98
Kilosa district	124,437	153,298	193,810	2.3	2.4	2.4	126	118	107
Morogoro town	8,173	14,507	25,262	5.6	5.7	6.4	128	127	110
Morogoro district	223,776	258,328	291,710	1.4	1.4	1.4	96	95	94
Ulundi district	121,599	127,225	174,922	0.5	3.2	1.9	89	85	93
Mtwara region	680,427	747,232	1,041,146	1.0	3.4	2.3	94	93	94
Kilwa district	96,054	98,628	97,957	-0.9	1.0	1.0	89	89	88
Kilwa town	8,577	10,315	13,552	2.1	2.6	2.4	142	124	109
Kilwa district	170,130	187,859	228,062	-0.1	3.1	1.6	104	96	95
Masasi district	22,624	150,054	215,683	2.3	3.5	3.0	90	92	96
Mtwara/Mt. town	-	15,066	20,413	-	2.9	-	128	124	121
Mtwara district	84,583	80,715	114,345	-0.5	2.5	1.6	100	96	100
Mchinge district	39,215	56,217	80,488	4.1	2.7	3.9	90	95	96
Mtwara district	154,289	177,265	272,652	1.6	4.4	3.0	85	88	90
Mwanza region	654,970	804,031	1,055,885	2.3	2.8	2.6	93	97	99
Geita district	139,499	270,191	371,407	1.6	3.2	2.4	96	101	101
Malya district	236,383	242,134	303,514	0.2	2.4	1.3	90	92	94
Mwanza town	11,296	19,877	34,851	8.5	5.8	6.1	139	140	120
Mwanza district	179,348	171,464	234,022	-0.1	2.8	1.4	94	97	101
Ukerewe district	86,424	94,360	109,277	1.0	1.5	1.2	92	90	94
Songha region	257,221	267,055	385,043	1.3	4.0	2.7	88	85	90
Songha district	76,059	92,824	144,098	2.1	4.3	3.4	82	86	90
Songha district	94,529	104,096	151,390	1.1	3.8	2.5	60	84	89
Tunduru district	65,803	70,113	97,555	0.7	3.4	2.1	77	84	91
Shinyanga region	559,948	660,441	895,688	1.8	3.1	2.5	86	89	95
Kahama district	100,485	112,575	147,628	1.3	2.7	2.0	83	83	91
Kahama district	245,382	292,279	430,916	3.0	4.6	3.8	87	89	94
Shinyanga district	214,181	255,587	320,924	2.0	2.3	2.2	92	92	94

Appendix 14.1 cont.

	Population			Annual growth rate			Males per 100 females		
	1948	1957	1967	1948-57	1957-67	1948-67	1948	1957	1967
Singida region	354,948	372,537	457,938	0.5	2.1	1.3	83	84	86
Irumbi district	135,410	150,377	185,968	1.4	2.0	1.7	79	73	82
Korogwe district	52,647	53,294	80,191	1.3	3.1	2.8	89	90	94
Singida district	166,891	168,706	192,819	-0.4	1.8	0.7	84	86	87
Tabora region	383,055	422,235	562,871	1.2	2.9	2.0	93	91	96
Mganda district	37,879	50,415	60,503	3.2	1.9	2.5	99	97	97
Mgea district	187,862	205,299	300,017	1.0	3.9	2.5	88	87	95
Tabora town	12,768	15,351	21,012	2.1	3.2	2.7	111	113	101
Tabora district	144,546	151,160	179,039	0.5	1.7	1.1	93	90	96
Tanga region	471,456	579,382	771,060	2.5	2.9	2.6	118	114	105
Ruvuma district	75,582	90,797	133,295	2.3	3.7	3.0	89	92	95
Korogwe district	90,063	113,053	140,306	2.6	2.2	2.4	143	141	113
Tashoto district	127,663	153,108	210,484	2.1	3.2	2.7	88	87	87
Pongwe district	19,063	20,349	29,426	0.7	3.4	2.1	158	141	122
Tanga town	20,519	38,053	61,058	7.0	4.8	5.9	145	137	119
Tanga district	138,466	161,620	199,551	1.7	2.0	1.4	151	136	122
West Lake region	456,396	514,431	658,712	1.4	2.5	1.9	83	87	90
Mbarara district	49,938	40,924	81,854	-1.9	7.2	3.6	88	86	99
Bukoba town	3,247	5,297	8,141	5.6	4.4	5.0	150	137	119
Bukoba district	250,502	300,036	374,998	2.1	2.3	2.1	85	90	90
Kamwaga district	47,830	62,865	97,407	3.1	4.3	3.6	89	95	96
Mgara district	104,795	100,405	96,322	-0.2	-0.6	-0.4	76	76	63
Barotsi Salween	69,227	128,742	272,821	7.1	7.8	7.5	147	159	125
Sansibar	264,162	299,111	354,815	1.2	1.3	1.3	110	111	108
Sansibar town	45,284	57,325	68,490	2.5	1.9	2.2	-	116	101
Magharib	19,020	19,802	21,557	0.2	3.6	1.8	-	128	124
South region	37,361	37,133	39,087	-0.1	0.3	0.2	-	109	105
North region	47,910	50,792	56,360	0.6	1.1	0.8	-	103	98
Zomba	114,367	133,856	164,321	1.6	2.3	1.9	104	111	101

Explanatory note to Appendix 14.1

The figures on recorded population are compiled from *Recorded Population Changes 1948-67, Tanzania*, Bureau of Statistics, 1968, and *Census Volume I, Statistics for Enumeration Areas*, Bureau of Statistics, 1968. The former also gives the necessary background information to the figures presented. The main problem was the adjustment required for boundary changes between 1948 and 1967. Of about fifteen such changes between 1948 and 1957, all but one could be reliably traced back to 1948 divisions, thus making it possible to arrive at exact adjustments of the population totals. In a similar way, the seven boundary changes between 1957 and 1967 were successfully traced back to 1957 units. To bring them one step further to 1948 proved more difficult, and various methods had to be employed to estimate the 1948 population of the relevant districts. A few cases in App. table 14.1 represent cases where no estimates could be made due to lack of necessary information.

Appendix 14.2 Estimates of fertility, mortality and natural increase by district*

District	Birth rate	Death rate	Natural increase	District	Birth rate	Death rate	Natural increase
Karacha*	46	11	3.5	Musoni	44	30	1.4
Kwana	51	20	2.5	Mwera*	50	25	0.9
Kwana	49	15	3.4	Nashinywa	45	17	1.6
Ngunyoni	45	19	2.4	Nesulu	36	21	1.5
Kisarwe	39	21	1.8	Deits	47	23	2.4
Mafia	51	22	0.9	Malya	52	23	2.9
Mafikou	40	19	2.1	Mwema*	47	21	0.6
Mafisi	35	25	1.0	Ukerewe	49	23	2.6
Dodoma*	46	25	2.1	Mbirizi	49	21	2.8
Korosi	47	19	2.8	Songea	45	27	1.8
Mwenge	54	26	2.8	Tandara	46	33	1.3
Iringa*	45	23	2.2	Kilima	44	17	2.7
Mufindi	56	24	3.4	Mwaa	55	21	3.4
Mjomba	56	28	2.8	Shinyanga	49	21	2.8
Kasulu	43	25	1.8	Iruha	44	23	2.1
Kibondo	43	30	1.3	Mwanga	48	27	1.5
Kigoma*	41	23	1.8	Singida	46	30	1.6
Kilimanjaro*	50	13	3.7	Mpanda	39	19	2.0
Seme	52	15	3.7	Mwaga	43	19	2.4
Musono*	49	25	2.4	Tabora*	37	19	1.8
M. Mwaa	54	31	2.3	Harard	52	21	3.1
Chunya	53	31	2.2	Korogwe	47	19	2.8
Mbeya*	50	29	2.1	Isiboto	49	15	3.4
Mbizi	58	31	2.7	Pungu	44	17	2.7
Mwaga	49	29	2.0	Tanga*	40	17	2.3
Sumbawaga	56	30	2.6	Biharawa	50	28	2.2
Kilima	47	25	2.2	Mwanga*	47	19	2.8
Morogoto*	43	23	2.0	Korogwe	50	26	2.4
Uluha	44	25	1.9	Mwaa	54	31	2.3
				D'Salaam	53	16	1.7
Kilwa	40	20	1.3	Zanzibar Town	52	17	1.5
Ididi*	35	25	1.0	Mgbarib	42	19	2.3
				S. Region	59	21	1.8
				N. Region	50	23	2.7
				Tanga	55	19	3.6

*including town population.

Appendix 14.3 Projection of Mainland district* population up to 1960, high assumption

District	Population ('000)			District	Population ('000)		
	1950	1955	1960		1950	1955	1960
Arusha*	236	283	345	Elwa	96	99	100
Moshi	116	125	160	Ilindi*	258	276	306
Mtindu	319	362	463	Masasi	230	271	320
Bagamoyo	104	139	157	Mtwara*	145	161	184
Eleonoro	105	136	210	Nachingwea	89	100	123
Mafia	18	19	21	Nemba	296	345	406
Mtindao	83	99	120	Gedda	424	538	681
Mtiji	123	130	135	Mtitya	316	339	368
Isioma*	378	379	430	Mtunda*	285	311	346
Kondon	224	251	284	Ukorewe	115	120	130
Mwanja	191	203	263	Whanga	358	389	427
Iranga*	270	333	402	Songea	162	186	213
Mafikoti	154	168	211	Tanduru	105	116	132
Mjomba	340	385	443	Kibara	156	174	197
Karatu	214	227	244	Morwa	468	547	647
Kibondo	143	152	166	Shinyanga	341	384	459
Kigoma*	137	155	172	Irumbi	193	211	235
Moiti*	552	660	795	Murundi	85	96	109
Seme	183	191	226	Siigida	198	206	216
Musoma*	397	485	590	Spanda	65	74	86
N. Mara	205	233	272	Isaga	323	362	426
Chunya	56	62	69	Tabora*	207	223	243
Mbeya*	209	244	289	Serdani	145	162	200
Mbari	162	195	236	Korogwe	150	171	197
Pungwe	382	431	491	Kashoto	277	262	306
Gushungu	258	286	347	Pongwe	30	34	38
Elloa	207	236	273	Tanga*	278	319	372
Morogoro*	331	363	407	Dharamala	87	99	115
Olongwa	185	205	232	Darake*	406	453	513
				Korogwe	107	128	154
				Ngara	95	95	90
				Bay de Salama	344	517	716

* Including town population.

Appendix 14.4 Method for population projections for regions and districts.

The method chosen for population projections by sub-units of the Mainland is an extrapolation of earlier trends as given by recorded population figures. On the assumption that such trends change slowly over time, the method is a convenient means of distributing the overall population increase over parts of the country in a way that takes account of differences in both natural increase and migration.

Of the two earlier censuses, the 1948 census appears to be more reliable in terms of both overall coverage and regional variation in degree of underenumeration. Further, the longer period from 1948 to 1967 may provide a better basis for extrapolation, making the effect of temporary migration streams less significant.

The formula allocates to each region a part of the overall population increase which is determined by its average growth 1948-1967 and population in 1967 in relation to the growth and population of other regions. Thus, the absolute level of growth 1948-67 is disregarded, but the relative order between the regions remains unchanged. The formula is as follows:

$$I_i = \frac{P_i \times G_i}{\sum_i (P_i \times G_i)} \cdot \sum_i I_i ;$$

where I_i is the future absolute increase of the population of area i ;
 P_i is the 1967 population of area i ;
 G_i is the average growth 1948-67 of the population of area i ;
 $\sum_i I_i$ is the absolute increase of the total population.

The projection of district population uses the same formula as above, except that it is applied within each region instead of directly from the Mainland population increase. The reason for such a step-wise distribution of population increase is that variations in accuracy are believed to be smaller for the larger units, i.e. the regions, leading to a more meaningful distribution of the increase.

In applying the formula to Mainland regions and districts, the overall population increase was calculated from the estimated growth rates between 1967 and 1980. From this increase was deducted the increase of the Dar es Salaam population, which - in accordance with prevailing opinion in the planning ministry (1) - was accorded a higher growth rate than the recorded 7.5% per year 1948-67. The growth rate chosen was 8.5% per year (2). The remaining increase was distributed first to regions, then to districts, according to the above formula. No separate projections were made for the other towns, whose population has generally been included in that of the surrounding district.

The method is very simple but also very crude. Events such as the establishment of cotton schemes south of Lake Victoria or the decline in the sisal industry in Tanga may lead to substantial errors in the projections. One very concrete example of this is the Ngara district, whose population has decreased in absolute numbers over the whole period 1948-67. Many reasons could be given for a reversal of this trend, yet the projection results in a continuous decline of the population.

Thus, while the projections presented give the development under conditions of sustained inequalities between regions or between districts, later enumeration may show to what extent the regional development policies have succeeded in removing these inequalities.

(1) Tanzania Second Five-Year Plan for Economic and Social Development, 1969-1974. Vol. 1, General Analysis, Dar es Salaam, 1969.

(2) The exact level of growth chosen for the Dar es Salaam population has, in the short run, no significant effects on the projections achieved for regions and districts, as the Dar es Salaam population is only about 2% of the total Mainland population.

