

Preface

The information on the future size, growth and structure of population is useful, among other things, in effective planning for socio economic development of people living in a country and its regions. This requires projection of population and derivation of its important and useful characteristics. This report presents population projections from 1999 to 2023 based on the results of the 1998 Malawi Population and Housing Census.

The initial work in projecting Malawi population started during a Demographic Analysis Workshop in Mangochi funded by UNFPA and USAID in September 2001. The International Programs Center (IPC) of the US Bureau of the Census provided the technical expertise. Local expertise was drawn from the National Statistical Office, the Demographic Unit at Chancellor College (University of Malawi), Department of Population Services (Ministry of Health and Population), Ministry of Labour and Vocational Training, Malawi AIDS Counseling Resource Organization (MACRO), UNFPA/Malawi and USAID/Malawi. During the workshop, after examining all the available demographic data since 1977, population projections for Malawi were produced. The projections were prepared using the Spectrum Beta Version that takes into account the impact of HIV/AIDS in a population.

These projections were prepared for Malawi only and could not satisfy the great demand for population projections at district level. The current projections have been developed taking this into account. In producing these projections the first step was to prepare projections for each of the 27 Districts in Malawi and then aggregate them to obtain the national total. The current report presents projected population growth, life expectancy at birth, infant mortality and total fertility rate and population by age and sex for Malawi and each of the 27 districts.

I am grateful to all those who participated in producing these projections. Special thanks to the Resident Representative of UNFPA/Malawi for her continued financial and technical support in population statistics, USAID/Malawi and the US Bureau of the Census for technical support through the International Programs Center in Washington. I should also thank the Demographic Unit at Chancellor College, Department of Population Services (Ministry of Health and Population), Ministry of Labour and Vocational Training and Malawi AIDS Counseling Resource Organization (MACRO) for participating and sharing their experiences in producing these projections.

Finally let me also acknowledge my fellow statisticians in the Demography and Social Statistics Division of the National Statistical Office for their untiring efforts to come up with this report. It is my hope that this report will provide much needed information on the future growth of the population of Malawi.

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INTRODUCTION

A. THE METHOD ADOPTED IN PROJECTING MALAWI POPULATION

The Rural Urban Projections (RUP) program of the U.S. Bureau of the Census is designed to project either the whole population of the country or its rural and urban populations. This brief describes how the program was used in preparing the projections for Malawi based on the 1998 Population and Housing Census results and provides instructions on how to use the program.

The most commonly used method for projecting populations is the cohort component method which projects each age and sex cohort over time based on the components of growth. Annual births produced new cohorts, while existing cohorts were decreased by mortality and either increased or decreased by migration.

The RURAL URBAN PROJECTIONS (RUP) program has features that allow a considerable amount of flexibility for specifying projected trends in fertility, mortality and migration. It also includes a wealth of output options that allow a detailed examination of the results. These features are discussed below.

- 1) The projection is performed by single years of age. This feature allows you to obtain data for special ages groups that do not fall into the conventional 5 – year age groups. It allows you to track population cohort that may be smaller or larger than surrounding cohorts due to past demographic events.
- 2) The projection is performed year by year. This feature allows you to input information on demographic events for a particular year (e.g. excess mortality due to an earthquake) without spreading the effect over a 5 – year period. It also provides planners with estimates for each year without having to interpolate between data for surrounding years.
- 3) Input data for the population and components can be provided in either single age or 5 – year age groups. The age groupings for each item are independent, so you can input 5 – year data for some items and single – year data for others. The program converts all data to single years of age before performing the projection.
- 4) The open – ended age group in your input data can vary between 50 years and over and 100 years and over. In spite of doubts regarding the accuracy of the data for the population at the oldest ages, projections should be made using the highest possible open – ended age group to more accurately represent the population dynamics. If you desire, you can still aggregate your results with a younger open – ended age group.
- 5) The program accepts mortality and fertility rates as input (as do most programs), and it also allows the input of numbers of births, deaths, and/or migrants. This feature allows you to update a base population with recent actual data on vital events. For instance, if your country has census data for 1982 and registered deaths and births as well as migrants from 1982 to 1988, you can include these actual data in the projection without having to estimate rates. In this case, the program would project the 1982 population by age and sex using life tables consistent with the numbers of deaths (by age and/or sex if available) and mortality patterns for surrounding years, ASFR's consistent with the numbers of births (by age of mothers if available), and the known number of migrants for the years 1982 to 1989. For subsequent years, the program would use the projected trend of these components as specified in the input.
- 6) You can provide input data for any year, including years prior to or following the projection period. The choices for each component (mortality, fertility, international migration, and internal migration) are completely independent. For example, a projection starting in 1970 can have fertility inputs for 1970, 1977, and 1995 and mortality inputs for 1965, 1975, and 2000. Data inputs for years outside the projection period are used to interpolate estimates for years during the projection and/or as patterns of the age structure of the particular component.

- 7) The program provides output of a wide variety of demographic measures for any specified year of the projection. These outputs include:
- Population by sex and age (single years, 5 - year age groups, special groups) and summary measures of age (e.g., percentages, sex ratios, median ages, dependency ratios).
 - Summary vital rates (e.g., crude rates, life expectancy, infant mortality rates, and total fertility rates).
 - Life tables.
 - Net number of migrants or migration rates by age and sex.
 - Number of deaths, by age and sex.
 - Number of births, by age of mother, and age – specific fertility rates.
 - You can make the projection for one or two areas. If two areas are projected, the program can calculate a third area as the sum of the two areas (e.g., total = rural + urban or the difference (e.g., urban = total – rural).
 - The flexibility described above has the clear advantage for allowing a demographer to create a projection model that accurately reflects what is known about the demographic situation in a country and making maximum use of available data in as close as possible to its original form. However, this flexibility comes at a price as it places a burden on you as the user (1) to decide on the best way to model the situation (since the program does not limit the options) and (2) to provide accurate data for all the inputs required to run the program.

B. INPUTS FOR POPULATION PROJECTIONS FOR MALAWI

The Malawi population projections were produced using RUPMENU and RUPAGG programs developed by the US Bureau of the Census. To obtain the various indicators PASEX programs developed by the same were used. The results present the population projections at national and district level.

Projection refers to as good estimate of the past or future situation of population trends in a country, region or district. The projection concentrated much on the future trends based on the 1998 Malawi Population and Housing Census, and 2023 was taken as end year of the projections.

To obtain projected population the information on births, deaths and migration are required.

1. Initial Census Date and Mid Year Date

The 1998 Malawi Population and Housing Census was conducted from 1st September to 21st September 1998. This gave a census date of 11 September 1998. In preparing the projections normally the figures have to relate to mid year date and a spreadsheet called MOVEPOP in PASEX was used to get the adjusted mid year population. This adjustment ensures that all the projected figures refer to mid year population i.e. 30th June of any particular year.

2. Fertility

Fertility means the actual occurrence of live births in a population. The fertility measure that was calculated is the total fertility rate (TFR) defined as the number of children a woman would have by the time she completes her child bearing period assuming she experiences the current fertility rates.

It is normally assumed that the reported TFR's from a census or survey may suffer from underreporting due to recall errors by mothers in reporting the number of children born. This leads to estimation of TFR using indirect

estimation techniques that have been developed and are recognized in demographic analysis. In this case the Brass P/F RATIO method based on the Trussell Variant was used to estimate TFR for all the districts in Malawi.

In projecting fertility, the RUPMENU program assumes that ultimate fertility in the population will be reached in 2100 and will be estimated at 2.925. The TFRs calculated for each district for 1998 and used in the projections are given in the table below.

3. Mortality

Mortality rate refers to the rate at which people die in a given period in a population. Various mortality indicators can be calculated for purposes of preparing population projections. In the present case as an input to the projections life tables for each district in 1998 were calculated to obtain the expectation of life at birth and the age specific death rate (nMx) for each sex.

These outcomes for males and females separately were used as input in the RUPMENU for projecting each district. As the Malawi population is greatly impacted with the HIV/AIDS, there is no doubt that the mortality measures calculated for 1998 are affected by this impact. Malawi has experienced declining life expectancy at birth from around 49 years observed in 1987 to around 42 in 1998. The present projection assumes that this trend will be reversed due to reduced incidence of new cases as the various awareness campaigns leads to changes in behavior and those affected die off.

The expectations of life at birth calculated for each district for 1998 and used in the projections are given in the table below. It should be pointed out that the results from some of the districts gave very low expectations of life at birth most likely due to reporting errors as such the expectation of

Inputs for the RUPMENU Projection Program for Malawi by Districts

DISTRICT	LIFE EXPECTANCY				TFR
	1998 FEMALE	MALE	2023 MALE FEMALE		
<u>Northern Region</u>					
Chitipa	47.38	54.19	59.85	66.31	6.802
Karonga	40.47	46.28	53.95	59.18	6.428
Nkhata-Bay	40.12	43.23	53.64	56.52	6.469
Rumphi	42.69	48.31	55.78	60.99	6.734
Mzimba	40.12	43.23	53.64	56.52	4.902
Likoma	40.12	43.23	53.64	56.52	8.021
Mzuzu City	58.82	62.50	69.97	73.82	4.905
<u>Central Region</u>					
Kasungu	47.63	51.88	60.07	64.22	7.748
Nkhotakota	43.53	46.22	56.50	59.13	7.915
Ntchisi	50.52	58.46	63.21	70.72	7.893
Dowa	40.12	43.23	53.64	56.52	6.155
Salima	43.45	52.83	57.12	65.68	7.682
Lilongwe Rural	40.12	43.23	53.64	56.52	7.605
Lilongwe City	58.82	62.50	70.42	74.29	7.311
Mchinji	40.12	43.23	53.64	56.52	7.784
Dedza	40.12	43.23	53.64	56.52	7.614
Ntcheu	40.12	43.23	53.64	63.45	7.409
<u>Southern Region</u>					
Mangochi	40.12	43.23	53.64	63.45	6.701
Machinga	40.12	43.23	53.64	56.52	6.567
Zomba Rural	40.12	43.23	53.64	56.52	6.240
Zomba Municipality	58.84	62.50	70.42	74.49	5.103
Chiradzulu	40.12	43.23	53.64	56.52	6.249
Blantyre Rural	40.12	43.23	53.64	56.52	5.604
Blantyre City	58.82	62.50	69.97	73.82	5.604
Mwanza	40.12	43.23	53.64	56.52	6.716
Thyolo	40.12	43.23	53.64	56.52	6.284
Mulanje	40.12	43.23	53.64	56.52	6.499
Phalombe	40.12	43.23	53.64	56.52	7.552
Chikwawa	42.53	49.20	55.64	61.79	6.839
Nsanje	40.20	44.20	53.71	57.36	7.157
Balaka	40.12	43.23	53.64	56.52	6.697

life at birth for Malawi was adopted for these districts. The districts were Nkhata Bay, Mzimba, Likoma, Dowa, Lilongwe rural, Mchinji, Dedza, Mangochi, Machinga, Chiradzulu, Blantyre rural, Mwanza, Thyolo, Mulanje, Phalombe, and Balaka.

4. Migration

Migration, the movement of people between define geographical locality with a purpose of changing residence, is difficult to ascertain its future trends than the other determinants of population change. Migration can be influenced by a number of factors commonly described as push and pull factors. Data on migration from censuses or surveys is collected for a specific period or to what is referred to as lifetime migration. Some examples of migration are rural to urban migration, rural to rural or urban to urban, refugee movements and displacements due to natural calamities.

Migration data was not collected in the 1998 Census and in the current projection net migration was assumed to be zero.

C. PRESENTATION OF RESULTS

Finally all district-projected figures were aggregated to produce the national tables using RUPAGG program. Tables produced are shown in the publications as follows:

- Table 1, Summary of projected population growth.
- Table 2, Life expectancy, infant mortality rate and total fertility rate.
- Table 3, Population by age and sex.

Table 1: Summary of Projected Population Growth

This table provides projected information about mid year population, growth rate, births, crude birth rates, deaths and lastly crude death rates.

Table 2: Life expectancy, infant mortality rate and Total Fertility rate

This table provides projected information about expectation of life at birth by sex, infant mortality rate per 1,000 live births by sex and total fertility rate.

Table 3: Population by age and sex

This table contains projected information about mid year population by 5 – year age groups and sex. It also provided information on special age groups such as the under five, child bearing age group 15–49 and school going age groups 6 – 13 years and 14 –17 years, the voting age population (18 years and over) just to mention a few.