

Some Notes on the Preliminary Results of the 1998 Malawi Population and Housing Census¹

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Abstract. *The preliminary results of the 1998 Malawi Population and Housing Census (MPHC) indicate that the population of Malawi is 9.8 million. This figure is less than estimates prepared by most national and international institutions including renowned population specialists working on the population of Malawi. Nearly all-available population projections estimated that the population of Malawi in 1998 would be around 11 million. The aforementioned discrepancy has some serious consequences. First the Gross Domestic Product (GDP) per capita may be distorted in such a way as to suggest a general improvement in the quality of life contrary to the situation. Second, the results of the census may be interpreted to indicate the success of the national population program especially the national family planning program. As a result of these consequences there is need to evaluate the census results to verify whether the reported figure is indeed correct or to provide a plausible explanation for the anomaly. Though not prescriptive, the paper offers plausible explanation for the observed differences. In particular, the paper argues that the population figure obtained from the 1998 census, like most other censuses in developing countries, were underreported.*

Keywords: population growth; population projections; demographic estimates; quality of data; censuses; Malawi.

1. Introduction

Malawi is one of the poorest countries in the world with an estimated per capita income of US\$ 230 in 1994. As many as 60 and 65 percent of the rural and urban population respectively are living below the "poverty line" which is estimated at US\$40. According to the Human Development Report of 1999, Malawi is ranked as one of the lowest on

Human Development Index (HDI), at number 159 out of 174 countries in the world (UNDP 1999). The country has no significant mineral resources and is heavily dependent on agriculture for its survival. The agriculture sector provides 85 percent of employment, accounts for 77 percent of export earnings and contributes about 40 percent of Gross Domestic Product (GPD).

Table 1 below presents population figures and corresponding growth rates as reported at population censuses. As seen from this table, the population has increased from about 737,000 in 1901 to 9.8 million in 1998. The population of Malawi was estimated to reach around 11 million in 1998 (Malawi Government 1984, 1994a; United Nations 1995; World Bank 1992). In addition, it was believed that the population of Malawi was growing very rapidly at the rate of 3.3 percent per annum, implying that it will double in the next 20 years.

Table 1
TOTAL POPULATION AND INTER CENSAL GROWTH RATES, 1901-1998

| Census Year | Population | | Growth Rate (percent) | | |
|-------------|------------|-----------|-----------------------|----------|---------|
| | De facto | De jure | De jure | De facto | Period |
| 1901 | - | 737,724 | - | - | - |
| 1911 | - | 970,430 | 2.7 (25) | - | 1901-11 |
| 1921 | - | 1,201,983 | 2.1 (32) | - | 1911-21 |
| 1926 | 1,263,291 | 1,293,391 | 1.5 (46) | - | 1921-26 |
| 1931 | 1,573,454 | 1,603,454 | 4.3 (16) | 4.4 (16) | 1926-31 |
| 1945 | 2,049,914 | 2,183,220 | 2.2 (25) | 1.9 (36) | 1931-45 |
| 1966 | 4,039,583 | 4,305,583 | 3.2 (22) | 3.2 (22) | 1945-66 |
| 1977 | 5,547,460 | - | - | 2.9 (24) | 1966-77 |
| 1987 | 7,982,607 | - | - | 3.6 (19) | 1977-87 |
| 1998 | 9,838,486 | - | - | 1.9 (36) | 1987-98 |

Source: Figures are obtained from the various census reports.

Note: The figures in parenthesis indicate the doubling time (in years) corresponding to the growth rate.

The high population growth rate was attributed to a high and almost constant fertility and a decline, albeit slowly, in mortality. Although the Total Fertility Rate (TFR) declined from 7.6 children per woman in 1977 to 7.4 in 1987 and 6.7 in 1992, it is still very high by any standards (Malawi Government 1987a, 1987b, 1992, 1996). The observed trend in fertility is attributed to, among other things, the slight increase in contraceptive use, the slight increase in age at marriage, and improvement in the status of women including female education. The Contraceptive Prevalence Rate (CPR)

increased from 1 percent in 1984 to 7 percent in 1992 and to 14 percent in 1996 (Malawi Government 1987, 1994c, 1998a). The high fertility rate is partly explained by the fact that the child bearing occurs at early ages in Malawi. The Mean Age at First Marriage was 18 years for females and 23 years for males (Malawi Government 1994a). One third of all adolescent girls were mothers and nearly 38 percent of all women had their first child by age of 18 years. In spite of the fact that breast-feeding is lengthy, post partum amenorrhoea was short at 11.9 months that makes a woman susceptible to becoming pregnant very early (Malawi Government 1994c).

In addition, Malawi has a very high mortality rates, and although mortality has declined during the last decade, it is among the highest in the world. The Infant Mortality Rate (IMR) was currently estimated at 134 infant deaths per 1,000 live births. The Under-five mortality rate still remains high at 234 deaths per 1000 under-five population. Thus, almost one in every four Malawian children dies before reaching his/her fifth birthday (Malawi Government 1994a). The high under-five and infant mortality may be due to the continuing poor living conditions and the permanence of the high risk factors during pregnancy and the first five-years of life. The life expectancy at birth for both sexes was estimated at 51.7 years (Malawi Government 1994a). However, recent estimates suggest that this may be as low as 39 years as a result of AIDS epidemic (UNDP 1999). The situation is aggravated by conditions such as high illiteracy, high fertility and food insecurity.

The Maternal Mortality Rate is also very high in Malawi at 620 per 100,000 live births and this is mainly due to the low level of utilization of maternal health services during pregnancy and childbirth and poor conditions during pregnancy. The problem is exacerbated by high fertility rate and the tendency for short intervals between births, which do not allow women in Malawi to recover between births, thereby increasing the risk of complicated pregnancies.

Another component of population growth that is important when considering population dynamics of Malawi is migration. In Malawi, two forms of migration are important: internal and external (or international) migration. In the case of the latter, Malawi has provided refuge to people from Mozambique, Rwanda, Burundi, Somalia and Zaire. Refugee influx into the country has had far-reaching repercussions. At the same time, for economic reasons, Malawians have tended to emigrate to Zimbabwe, Zambia, South Africa and Tanzania in

search of good employment opportunities. Internal migration has also been substantial. According to 1987 Census, a total of 1.4 million people (representing 18.7 per cent) were enumerated outside their districts of birth. Corresponding percentages for the 1977 and 1966 Censuses was 17.2 percent and 11.2 percent respectively.

It is believed that rapid population hinders socio-economic development of the country (Mlia and Kalipeni 1987). There are indications that Malawi is experiencing enormous pressure on its meager resources as a result of rapid population growth. The Government of Malawi has acknowledged that the country has a population problem and that the problem needs to be addressed urgently. This concern prompted the Government to adopt an explicit population policy, which aim, among other things, at reducing the country's high fertility, mortality and population growth rates (Malawi Government 1994b).

The main objective of this paper is to critically analyze the preliminary results of the 1998 Malawi Population and Housing Census (MPHC). Specifically, the paper argues that the results of the 1998 MPHC should be treated with some caution, as there are indications that the census under-estimated the population. Furthermore, the paper explores the factors that might have caused the under-estimation of the population and population growth. This will be done by examining some of the methodological problems encountered during the enumeration exercise and examining the factors affecting population growth in Malawi (fertility, mortality and migration).

2. Justification for the Study

The reported total population in 1998 and the inter-censal population growth rate for the period 1987-98 have a number of serious implications. First, this could be attributed to a decline in fertility. This means that the figures may be interpreted to indicate that the various population and family planning programs being implemented in the country have produced the desired results. For instance, the national population policy calls for the reduction of the population growth rate from 3.2 percent in 1994 to 2.5 percent in 2002 (Malawi Government 1994b). The results of the preliminary census indicate that the population growth rate has been reduced to 1.9 percent per annum. As a result of this, there is a danger that

policy and decision-makers and donors may give the national population program including the family planning program a lower priority over other pressing reproductive health issues such as HIV/AIDS. There are already some indications that this is the case. This should not be the case. In fact the effect of the national family planning program appears to have been exaggerated. Several researchers have attributed the observed decline in fertility in Malawi to the success of the national family planning programme in the country as witnessed by the increase in contraceptive use. However if we accept the notion that the downward trend in fertility began in early eighties as suggested by National Statistical Office in 1994 (Malawi Government 1994a), then fertility decline in Malawi started without any form of organized family planning program. This view is beyond the domain of this paper and requires addition analysis.

Second, the total population is used to estimate, among other things, the Gross National Product (GNP) per capita, the amount of food required, the number of schools, classrooms, teachers and textbooks required and the number of health facilities and personnel required. Using a figure of 9.8 million when calculating the GNP per capita will give a higher value of GNP indicating that the standard of living is higher than is the case. In addition, the available food supply was based on the assumption that the population of Malawi is higher than 10 million. The estimate of 9.8 million will suggest that Malawi have more than enough food implying that the excess should be sold.

As a result of the aforementioned factors, the preliminary results of the 1998 MPCs should be accorded some serious consideration. Hence this modest attempt to critically examine the census results. Therefore the paper is based on the premise that the preliminary census results should be used with some caution, as there is a possibility that the population was underreported.

3. Quality of the 1998 Malawi Population and Housing Census

Any data obtained from a population census or demographic survey is usually affected by two types of errors: content and coverage errors. It is important to understand both of these before any reliance can be placed on the results of any enumeration exercise.

Coverage errors may take the form whereby some villages, households and individuals may not be counted at all leading to under-enumeration or are counted more than once leading to duplication or over-enumeration. There are a number of factors that may lead to coverage errors. These include inadequate planning leading to faulty demarcation of enumeration areas; failure by enumerators to understand or adhere to instructions; respondents misleading the enumerators and poor transportation and communication systems. Some of these factors appear relevant to the 1998 MPHIC and will be discussed in detail later in the paper.

Content errors may arise from a number of reasons including misunderstanding of the question, deliberate falsification or lack of knowledge. For example, respondents may give wrong information or the enumerator may wrongly record the data provided by the respondent. The former may be due to the fact that the respondent did not understand the question or the respondent did not want to give the correct information, as is often the case with information pertaining to one's income. The latter may be due to insufficient training on the part of the enumerator or the enumerator may unknowingly or deliberately make a wrong entry. For instance, age "12" may wrongly be recorded as "21". The effect of these errors may vary from one instance to another. In one case it is possible that these errors may lead to underestimation of the population whereas in another case the population may be overestimated. It looks tempting to one demographer to suggest that in the case of the 1998 population estimate was underestimated.

It is important to find out whether the 1998 Malawi Population and Housing Census depicts any of these errors. A detailed examination of this element is however beyond the scope of this paper. In any case, any detailed examination of this aspect will have to await the publication of the census results. It suffices to pinpoint that there is need to conduct a "post-enumeration survey" to check the validity of data in selected areas. There may also be need to select a random sample of enumerators and interview them to find out what exactly happened during the enumeration exercise.

Unlike the other three post-independent censuses that made use of primary school teachers as enumerators, the 1998 census recruited enumerators from the general public. Verbal reports indicate that most of these were young and recent school leavers without the necessary maturity to handle such a big assignment like the census. This behavior is further manifested in the frequent media reports of strike due to non-payment of

allowances. One newspaper reported "the on going ... census which started with disputes over allowances may not produce the desired results since the morale among the enumerators is low". Commentators further argued "the census might not reflect a true picture because some enumerators were at times just filling in the forms without actually visiting households" (Vikhumbo 1998).

It should be underlined that in Malawi, teachers and District Commissioners tend to command a certain respect from members of the general public. Their involvement in the census would entail trust and confidence on the part of the respondents. This is something that is lacking in the 1998 census.

In addition to the aforementioned problem, the previous censuses were conducted during the long summer vacation. However, following the change of the school calendar year, which now runs from January to October, instead of October to July as it was before, the 1998 census was conducted at a time when the school session was in progress. The 1966 census report noted "*August is the most suitable month in Malawi because it coincides with the school holiday ...*" (Malawi Government 1969, I). The 1998 MPHC is the only census in independent Malawi that was conducted whilst the school was in session. As such it is possible that the exercise encountered a number of peculiar problems notably the recruitment of enumerators. The preliminary census report noted:

"During the 1998 Population and Housing Census it was not possible to utilize the services of teachers as Enumerators or Supervisors because schools were still in session. Furthermore, it was not practicable to defer the census operation until schools closed because the impending rains in October or November would have hampered the progress of census enumeration. In view of these problems, it was imperative to recruit field staff on temporary basis. These were recruited from the areas they usually lived. This arrangement substantially reduced census operation costs as subsistence allowance were not paid to Enumerators and Supervisors who were deployed to work at their home areas".

(Malawi Government 1998b, 3)

One implication of conducting the census whilst the school was in session is that it is possible that most of the "school going population" were missed during the enumeration². This could have come about as a result of respondent either assuming that the pupils/students will be enumerated in their school premises or forgetting to include them when reporting about

members of the household. It can be argued that if they were present the respondent could have been reminded to include them. To make things worse no efforts were made to send special enumerators to educational institutions. As an attempt to check on the extent of coverage of the "school going population" the population reported as aged 5-14 in the census was compared with the population aged 5-14 as reported by the Ministry of Education, Sports and Culture. In countries with compulsory education up to a certain grade, a comparison can be made between the school-going populations recorded in a census with the school enrollments.

Another source of population data that can be compared with the census data is the voters' registration figures. According to the constitution of Malawi only those aged 18 years and over are eligible to vote. Assuming that there is no misreporting of age and double counting the number of registered voters is expected to be comparable to population reported as 18 years and over³. According to Table 2, the number of registered voters was higher than the population aged 18 years for the country as a whole with the exception of the following districts: Salima, Lilongwe, Machinga, Blantyre, Chikwawa and Nsanje. A discussion of the problems associated with the registered voters is well beyond the domains of this study. It suffices to note here that the number of registered voters is 4 percent higher than the population reported as aged 18 years and over in the 1998 census. This may be an indication that the 1998 population estimate was underreported by 2 percent.

Two additional factors may be suggested to be responsible for the underestimation of the population. These include burning or destruction of questionnaires and missing of households. First, it is worth mentioning that during the enumeration exercise or immediately there after some newspapers reported that enumerators deliberately destroyed some questionnaires. This was due to delays experienced in paying the enumerators. Second, some people claim that enumerators did not visit their households. Although this factor may be difficult to prove it is important to note that some responsible senior government officials have also reported the same. This may lead one to conclude that because of non-payment of allowances, most enumerators were deliberately not doing their job properly. It can be speculated that the non-payment of allowances was largely due to the "cash budget system" of financing activities.

Table 2
A COMPARISON OF CENSUS POPULATION AGED 18 YEARS AND OVER AND REGISTERED NUMBER OF VOTERS IN 1999 ELECTIONS, MALAWI

| REGION | CENCUS DATA (1) | VOTER (2) |
|------------------------|-----------------|-----------|
| | 4,880,799 | 5,071,822 |
| Northern Region | 548,320 | 678,906 |
| Chitipa | 56,867 | 70,801 |
| Karonga | 92,124 | 100,279 |
| Rumphi | 62,501 | 80,165 |
| Nkhata Bay | 84,600 | 95,399 |
| Mzimba | 252,228 | 332,262 |
| Central Region | 1,975,066 | 1,975,203 |
| Kasungu | 230,325 | 236,987 |
| Nkhosakota | 111,180 | 120,162 |
| Ntchisi | 80,191 | 82,528 |
| Dowa | 199,055 | 201,082 |
| Salima | 121,367 | 120,235 |
| Lilongwe | 666,359 | 634,120 |
| Mchinji | 152,176 | 159,895 |
| Dedza | 234,966 | 238,353 |
| Ntcheu | 179,447 | 181,841 |
| Southern Region | 2,312,874 | 2,417,713 |
| Mangochi | 298,782 | 323,713 |
| Machinga | 305,763 | 200,400 |
| Balaka | 123,938 | 136,913 |
| Zomba | 277,067 | 284,359 |
| Chiradzulu | 120,348 | 128,439 |
| Blantyre | 409,948 | 405,434 |
| Mwanza | 65,942 | 72,093 |
| Thyolo | 230,896 | 235,178 |
| Mulanje | 220,832 | 232,107 |
| Phalombe | 117,952 | 125,223 |
| Chikwawa | 169,721 | 174,316 |
| Nsanje | 95,623 | 99,538 |

Source: (1) Obtained from Malawi Government (1998b).
 (2) Obtained from Malawi Government (1999).

Before leaving this section, it should be underlined that any discussion of the completeness of coverage in the context of population censuses in Malawi has to be guided by two fundamental constraints. Firstly, the Malawian censuses with the exception of the 1966 census could not be informed of completeness of enumeration by post-enumeration surveys because such surveys were not undertaken. Secondly, collateral evidence

such as vital statistics, which could facilitate comparative study of the totals returned by various censuses, is also not available because registration of vital events is still not sufficiently developed to provide reliable data. As a consequence of these considerations, the evaluation of census totals for completeness has to rely on indirect procedures that cannot be expected to render conclusive results because they rely heavily on collateral evidence of variable quality. Some of these indirect procedures include the calculation of Census Survival Ratios, Sex Ratios and comparisons with "other" administrative records such as school registers or voter registration.

The Overall Census Survival Ratio method involves comparing those that are already alive at an earlier census with the survivors at the subsequent enumeration. The Overall Census Survival Ratios are calculated and compared for evidence of omissions, duplication and/or age-sex reporting errors (see Table 3). The relatively low survival ratio suggests that either there was some under-enumeration in 1998 in these age ranges or there was some over-enumeration in 1987. The problem with this method, however, is that it is not always easy to determine whether the fault lies more with the first enumeration than with the second enumeration. Additional consistency checks will have to be undertaken to determine the magnitude of errors in each count.

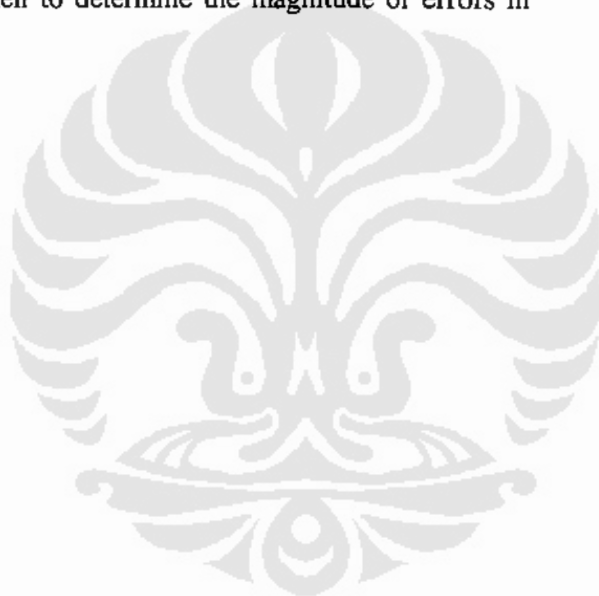


Table 3
OVERALL CENSUS SURVIVAL RATIOS, MALAWI

| REGION | OCSR (1) | OCSR (2) |
|------------------------|----------|----------|
| | 0.791 | 0.798 |
| Northern Region | 0.802 | 0.800 |
| Chitipa | 0.792 | 0.783 |
| Karonga | 0.832 | 0.822 |
| Rumphi | 0.869 | 0.869 |
| Nkhata Bay | 0.802 | 0.799 |
| Mzimba | 0.779 | 0.781 |
| Central Region | 0.812 | 0.821 |
| Kasungu | 0.946 | 0.950 |
| Nkhotakota | 0.925 | 0.938 |
| Ntchisi | 0.882 | 0.895 |
| Dowa | 0.817 | 0.830 |
| Salima | 0.832 | 0.847 |
| Lilongwe | 0.824 | 0.828 |
| Mchinji | 0.804 | 0.809 |
| Dedza | 0.747 | 0.775 |
| Ntcheu | 0.650 | 0.650 |
| Southern Region | 0.756 | 0.765 |
| Mangochi | 0.772 | 0.794 |
| Machinga | 0.772 | 0.789 |
| Zomba | 0.817 | 0.820 |
| Chiradzulu | 0.741 | 0.745 |
| Blantyre | 0.906 | 0.896 |
| Mwanza | 0.724 | 0.740 |
| Thyolo | 0.698 | 0.702 |
| Mulanje | 0.687 | 0.699 |
| Chikwawa | 0.695 | 0.708 |
| Nsanje | 0.585 | 0.598 |

Source: Calculated by the author using the 1987 census report and the 1998 census preliminary report.

Notes: (1) Overall Census Survival Ratios were calculated based on the assumption that the population aged 0 years and over in 1987 census was aged 15 years and over in the 1998.
(2) Overall Census Survival Ratios were calculated based on the assumption that the (3) population aged 1 year and over in 1987 census was aged 18 years and over in the 1998 (4) census.

4. Population Projections in Malawi

Apart from the abnormally low population growth rate of 1.9 percent per annum, various population projections carried out for Malawi, estimated that the population of Malawi would be 11.2 million in 1998

(Malawi Government 1994a). As such it is befitting to understand how these projections were carried out.

Population projections methodologies vary widely in terms of degree of sophistication, data requirements and detail of results. There is not any methodology that can be considered to yield absolute error-free results. It should be noted that the accuracy of the projections do not only depend on the calculations involved, but also on the assumptions underlying future levels of fertility, mortality and migration as well as on the accuracy of the base year population data. Population projections are based on a set of assumptions in terms of future trends of fertility, mortality and migration. A number of organizations and individuals have prepared population projections for Malawi. These include the National Statistical Office (NSO), Population and Human Resource Development Unit (PHRDU), United Nations, World Bank and other interested organizations. Some of these projections will be reviewed in the following paragraphs.

The first sets of population projections were prepared by NSO, a governmental department responsible for collecting, analyzing and disseminating population data through demographic surveys and censuses. The NSO has prepared two sets of population projections. The first set was prepared in 1984 based on the 1977 census and the second set was prepared in 1994 using the 1987 census (Malawi Government 1984; 1994a). Both projections require further discussion.

The first detailed sets of official national population projections were prepared by the NSO in 1984. These were based on three fertility assumptions and two mortality assumptions. In particular, fertility was assumed to remain constant; to decline at a slow pace and to decline at a fast pace. Mortality was assumed to remain constant and to continue to decline at a slow pace. In either case, international migration was assumed to be negligible. Surprisingly, even at a time when this assumption was being made, some Mozambican refugees were trekking into Malawi! The NSO recommended that constant fertility and slow decline in mortality scenario should be used for planning as it was deemed to be realistic. Based on this scenario the population of Malawi was estimated to be 10 million in 1998 (see Table 2).

The analysis of the 1987 MPHC produced three sets of projections covering the period of 1987 to 2012. The projections were based on one

mortality assumption (slow decline) and three fertility assumptions (constant, slow decline and fast decline). The variant based on slow decline in fertility and slow decline in mortality was recommended for planning purposes. The only problem with this set of projections is the fact they did not implicitly take AIDS assumption into account. Using this set of projections, the population of Malawi is estimated to be 11.2 million (Malawi Government 1994a).

The World Bank (1992) came up with three sets of projections consisting of one mortality assumption and three fertility assumptions representing constant fertility, moderate and fast fertility decline. The World Bank projections are based on the premise that with socio-economic development both fertility and mortality of the country will decline and fertility will reach a replacement level in year 2030. For Malawi, the most recent of the World Bank projections indicate that the population of Malawi will be 10.99 million in 1998.

It suffices to note that one implication of this is that all the projections were based on the 1987 MPHIC that could be said to have exaggerated the population of Malawi because of the presence of Mozambican refugees. This means that with a bigger base population, the projected population will be larger than the actual population. This may partly be responsible for the observed differences between the reported 1998 population and projected values for the corresponding period.

5. Components of Population Growth

The population of any given area can change as a result of people being born into that population (fertility); people dying (mortality), people moving out of a given area (emigration/out-migration) and people moving into a given area (immigration/in-migration). In this section, we will examine each of these factors in some detail.

6. Fertility

It is generally believed that fertility in Malawi is declining (Malawi Government 1994a; Palamuleni 2000). The nature, pattern, causes and consequences of this trend are yet to be determined. However, it is

important that these are known in advance if any meaningful assumptions regarding future trends in fertility can be made. Fertility decline is likely to lead to a reduction in population and population growth rate. However, given the pace of fertility decline in Malawi and the prevailing socio-economic conditions, it is doubtful that fertility has declined to such a level to bring population to 9.8 million and population growth rate of 1.9 percent per annum. In fact a study by Srivastava and Jager (1991) demonstrated the effect of fertility decline on future population growth and argued that even if fertility drops to replacement level the population of the country would still grow for sometime.

7. Mortality

Like fertility, mortality can either lead to an increase or decrease in the population of any given area. Other things being equal, if mortality conditions are worsening off the population of any given area will decline and vice versa. In this case, it is important to find out the levels and trends of mortality in Malawi. The few studies that have been conducted on this subject cover the period before AIDS started to take its toll. Hence there is need to conduct a detailed study on the subject.

A number of studies conducted in the country agree that mortality rates have declined during the period after independence to late 1980s (Malawi Government 1984, 1994a; Ndawala 1989, 1994; Palamuleni 1987, 1992, 1994). Thereafter, differing opinions emerge. On the one hand, there are those that suggest a continuation of mortality decline but at a reduced pace. Those falling in this category include the National Statistical Office (Malawi Government 1994a). At a workshop to disseminate the results of the 1987 MPHIC a discussion on this issue surfaced. Participants to the workshop were worried that the projections that were prepared did not take AIDS into account. The response to this query was that AIDS was taken into account when making mortality assumption. In particular, instead of assuming a rapid improvement in mortality conditions, mortality was assumed to improve at a much slower pace. It was also difficult to explicitly incorporate AIDS in mortality projections since at that time models and computer packages that would handle this aspect were either under development or unavailable especially to demographers from developing countries.

On the other hand, some commentators have suggested an increase in mortality. This has largely been attributed to AIDS epidemic. Those holding this view include the UNDP, World Bank and USAID, just to mention a few.

The effect of AIDS on the projected population of Malawi remains to be a debatable subject. First, there are studies that indicate that the population of Malawi will not be greatly affected by AIDS (House and Zimalirana 1992). Second, there are those that argue that the population of Malawi will greatly be affected by AIDS epidemic to such an extent that life expectancy will decline to 39 years (World Bank 1998; United Nations 1999; UNDP 1999; USAID 1999). There is no doubt that AIDS will affect the population of Malawi. The results of the latter group are based on sophisticated models developed and applied in Washington and New York. The applicability of the models and the prevalence of the assumptions to the Malawian situation are yet to be verified. It appears that some of these may have good academic values with little applicability.

Quite recently, some studies have authoritatively presented mortality estimates that indicate a worsening off of mortality conditions in Malawi as a result of AIDS epidemic. Those having this view suggest a decline in expectation of life at birth, denoted at e_0 , from around 50 years to 44 years. Others even give e_0 estimates that may be as low as 37 years (United States Agency for International Development (USAID), 1999). These studies cannot go unchallenged. First, it should be mentioned here that no study based on demographic survey has established mortality increase. All the studies that report a rise in mortality are based on sophisticated modeling. In addition, few reports compare the projected mortality rates based on the 1977 census, which estimated an IMR of 151 per 1000, and the 1987 estimate of 159 per 1000. This is not comparing like terms. Second, without presenting the necessary statistical analyses, these studies have argued that the acclaimed increase in mortality is as a result of AIDS epidemic. Although this writer does not want to fall in the same trap it suffices to mention that there exist a large body of literature that suggest Structural Adjustment Programs prescribed by the World Bank have worsened the social and economic conditions in some developing countries (Basu 1995). Wakai (1997:485) lamented that "health indicators and economic indicators have not improved in countries like Zimbabwe but instead have worsened in some regions of the Bank's central policy - structural adjustment programs". Therefore the question that one may want to ask is to what extent is the rise in mortality attribute to AIDS or the worsening health conditions?

8. Migration

Another factor worth examining is migration, especially international migration. When examining this factor it is always important to remember that from early days of this century Malawians have tended to move to such lucrative places in South Africa, Zimbabwe, Zambia, and Botswana. At the same time, the country has played host to people from Mozambique (Palamuleni 1992).

Two factors merit our consideration. First, the influx of refugees from Mozambique in mid 1980s. Second, the repatriation of these refugees in early 1990s. From the outset, it should be underlined that both aspects require a detailed examination something beyond the scope of this paper. But it suffices to note that the refugees were included in population projections. As a result of this a somewhat large population estimate is expected.

Following the intensification of war in Mozambique, a number of people fled the country and settled in neighboring districts in Malawi (Palamuleni 1992). Although the exact figures are not known their presence was visible in such districts as Nsanje, Chikwawa, Mwanza, Mulanje, Mangochi, Machinga, Ntcheu, Dedza, Lilongwe and Mchinji.

As a result of this, it is possible that the 1987 MPHC overestimated the population. This came about as a result of "people from Mozambique" reporting themselves as Malawians during the 1987 census enumeration. The 1987 MPHC reported that there were 230,000 Mozambicans in Malawi at the time of the census.

The effect of this could be high in the districts that share borders with Mozambique. Already, the results of the 1998 MPHC indicate that the districts that register the highest decline in population or the smallest increase in population are those that border Mozambique (Palamuleni 1996). This point requires some serious consideration.

In mid 1990s, following the signing of peace agreement, there was voluntary repatriation of Mozambican refugees. The United States Committee for Refugees (USCR) noted that from 1993 to 1995, 1.7 million Mozambican refugees were repatriated from six countries including Malawi. The reports

further notes that "at the start of the 1996, nearly 600,000 Mozambicans remained uprooted: 90,000 in South Africa, 5,000 in Tanzania, some 2,000 in Malawi, and approximately 500,000 within the country as internally displaced persons (USCR 1997). There is also a possibility that some of these left with Malawian spouses hence reducing the population of Malawi.

Therefore it is possible that the population of Malawi was overestimated in 1987 as a result of the presence of refugees and underestimated in 1998. The precise magnitude of the underestimation remains to be determined. That the population of Malawi was underestimated in 1987 is further confirmed by the fact that the census report suggests that there were about 300,000 refugees in the country whereas the reports from the Office of the President and Cabinet indicate that there were no more than half a million refugees in 1987.

9. Conclusion

The result of the 1998 MPHC indicate that the population of Malawi is 9.8 million. Like most other African censuses, the 1998 MPHC is believed to have under-enumerated the population. This resulted in the reduction of the population growth rate from 3.6 to 1.9 percent per annum. The factors responsible for this under enumeration are not fully understood but may include poor organization and planning of the census operation as witnessed by problems experienced during training of enumerators and fieldwork. There is however need to critically examine this aspect once the census results are published. In this regard, a survey of enumerators and census officials could be conducted in order to verify the validity of some of the rumors that are associated with conduct of the 1998 census. Also, it is prudent to urge the NSO to release and publish the results of the census as soon as it is feasible so that other researchers can evaluate the census results.

Regardless, Malawi still remains one of the most densely populated countries in the world. Without sustained intervention, rapid population growth will not only erase economic gains and cripple national development but also hinder the implementation of the poverty alleviation program which the government place high priority. As such the national population program needs to be strengthened and the population policy revisited in light of new of increasing mortality due to HIV/AIDS and continued high fertility.

The population of Malawi in 1998 was expected to be 11 million in absence of HIV/AIDS and 10.5 million if HIV/AIDS is taken into account. This means that the census under enumerated about 700,000 persons representing about 7 percent of the enumerated population. More details about under enumeration need to be investigated.

There are reasons to believe that the reported total population is close enough to projected population as presented by the NSO, World Bank, United Nations organizations and others. The difference could be attributed to: Mozambican Refugees who must have inflated the 1987 population; a possible fertility decline; and an increase in mortality largely due to HIV/AIDS epidemic; under-enumeration caused by enumerators. A detailed examination of each of the factors mentioned above is recommended. In this regard social scientists, especially demographers and statisticians, and all concerned with the population of Malawi are urged to critically evaluate the available demographic data. One way would be to conduct a survey of enumerators and census officials in order to verify whether some of the rumors are indeed true and to find out what exactly happened during the fieldwork. In addition one may wish to compare the census results with other independent data collection exercises including sample surveys and administrative records.

Another aspect of the population of Malawi that needs careful examination is the demographic impact of HIV/AIDS. It should be noted that the population growth rate declined partly as a result of the rise in mortality due to HIV/AIDS. Tentative figures indicate that reported Crude Death Rate has increased from 14 to 22 per thousand. One implication of this is that as more people become aware of the dangers of HIV/AIDS, thereby adopt good behavioral practices (safe sex, abstinence) and as cheaper drugs become available, we should expect an improvement in mortality and a consequent increase in population growth.

Notes

1. The first draft of this paper was presented at the Faculty of Science Seminar series. I would like to thank Dr. G. Zimba who introduced me to the seminar series and encouraged me to write the paper; Dr Ambali for ensuring that I was included in the programme and Professor Ononogbu for continually reminding me that my presentation is on 20th January 2000 and for chairing the session. I would also like to thank all those who participated in the seminar. The comments of the participants were taken seriously and where possible

incorporated in this version. I am also grateful to Mr. Jameson Ndawala and Dr. C. Chilimampungwa for comments on an early draft. Interpretation of results, opinions and errors therein are solely my responsibility.

2. It should be noted that an instruction in the Enumerator Manual indicated that all persons in boarding institutions (schools) should be recorded in their respective household. This should have been reinforced by having as a reminder a question asking head of household to report all members of household residing in boarding institutions.

3. For those interested in the reliability of the voters statistics references can be made OTT, M, PHIRI, K.M. and PATEL, N. (2000), *Malawi's Second Democratic Elections: Process, Problem and Prospects*, Kachere Series, Zomba.

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