HOUSING CONDITIONS AND SOME OF THEIR RELATED SOCIO-ECONOMIC AND DEMOGRAPHIC ASPECTS: A CASE STUDY OF BUSHENYI DISTRICT - UGANDA

BY

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University.

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This thesis has been submitted for examination with my approval as University Supervisor.

Dr. A.B.C. Ocholla-Ayayo

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ABSTRACT

Bushenyi is one of the 33 districts of Uganda. It is located in the South Western part of the country and covers 5395.93 square kilometres which is 2.24 percent of the total national area. According to 1980 Uganda Population Census, the district had a total population of 524,669. This was 4.2 percent of the total National Population.

Demographically, Bushenyi is one of the areas with the highest fertility levels in Uganda. Its mortality is relatively low and showing signs of declining. The combination of high fertility and relatively low mortality has given the area a higher rate of natural increase than other districts in the country. Due to this fact, plus the fertile volcanic soils which attracted in-migration in the past, the district is densely populated. The high population density in the area is discouraging in-migration and most probably encouraging out-migration. This has been partly responsible for the lower rate of population growth than what was expected for 1980.

Socio-economically, the district is underdeveloped. The majority of its people are uneducated. At the same time, the main economic activity for the area is agriculture. In most cases this gives very low incomes to the people. A combination of low incomes and low

education has contributed to the existence of poor housing conditions in the area.

This study attempts to explore the possible relations that exist between housing conditions and some socio-economic and demographic variables for Bushenyi District. It is based on a one percent District representative sample, selected from the 1980 Uganda Population Census data for the study area. The sample is roughly 5,542 people, or 1000 households.

The study is organized into six chapters. The first chapter introduces the subject of study by mentioning the importance of housing conditions to peoples' well-being and the general socio-economic development of the area. It also gives the geographical, demographic and socio-economic aspects of the district.

Chapter two treats the general aspects of data sources, sampling procedures, data processing, and elaborates on some major problems encountered in the field. It evaluates the data particularly on age, and finds that it is defective. The implications of such data on the final results as well as the inferences made thereafter are pointed out.

In chapter three, we give the statement of the problem as well as the objectives, significance, and relevance of the study. We accordingly review some of the available literature on housing conditions, and find that very little research has been done to document the relationship between housing conditions and some socio-economic and demographic variables in the area.

Chapter four gives a general picture of the existing housing conditions in the District from the point of view of quality of shelter, source of water and toilet facilities. According to the findings in this chapter, most of the households sleep in temporary shelters. However, the average densities in the shelters suggest that probably, the units in the area are not over-crowded. With respect to source of water, most of the households are still found to be using inadequate sources like the unprotected spring and well. The general picture of available toilet facility is the pit-latrine whose quality might even be questionable. A relatively big proportion of the people in the District reported lack of any form of toilet facilities. The implications of such defective facilities to the general well-being of the people are accordingly spelt out. The chapter goes further to analyse the relationship that exists between housing conditions (shelter in particular) and socio-economic status - education level and economic activity of the head of household. A high

positive relationship is discovered in both cases. That is to say, the better the socio-economic status of the head, the better the housing conditions for the household.

Chapter five is specifically concerned with analysing the relationship between housing conditions and mortality, which in this study is measured by the use of infant and child mortality indices, crude death rate, and life expectation at birth. It is discovered that mortality is higher in the temporary class of housing than in the other classes. Likewise, life expectation at birth is found to be higher for the semi-permanent and permanent class dwellers than for the temporary class inhabitants. These findings suggest an inverse relationship between housing conditions and mortality rates - the better the housing conditions the lower the mortality and vise versa.

The last chapter is a summary of the study. In addition, it suggests some measures that can be taken to improve the quality of housing conditions from the point of view of source of water, toilet facilities, as well as shelter. It accordingly points out some areas which should be considered by future researchers on the subject.

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CHAPTER ONE
GENERAL INTRODUCTION

1.1 The general preamble

The term "housing conditions" encompasses a number of factors which are very fundamental to man's survival, general well-being, and effective social and economic performance. These factors include shelter, access to source of water, sanitation, power for cooking and lighting, communication systems, and, among the many others, availability of essential services like health, education, and marketing facilities just to mention but a few. Considering the relative importance of all these factors, shelter, source of water, and sanitary facilities are, no doubt, the most important of all.

Shelter forms a base from where man organizes and spends most of his life. It protects him from adverse climatic conditions, as well as the dangerous animals, insects, and other hazards of nature. In addition to protection, it provides man with a framework within which he develops his talents, and gains various types of culture economic and socio-psychological satisfactions. Furthermore, shelter offers man privacy and enables him to carry out a number of socio-economic activities, sleeping, as well as reproducing. It actually facilitates conditions for the creation and bringing up of man's basic socio-economic unit - the family. All these factors

make man spend most of his lifetime in shelter, and this is why he is always linked to where he lives - his home or base.

Apart from shelter, the central importance of good water and sanitary facilities to man's good health is too well known to demand emphasis in this introduction. For instance, people who have inadequate sources of water and sanitary facilities normally suffer and die from cholera, typhoid and other gastro-intestinal diseases.

All these factors, indeed, make "housing conditions package" so important that it is usually used, among others, as an appropriate indicator of a given society's level of socio-economic development - the better the housing conditions, the higher the level of socio-economic development and vise versa. In other words, there must be some interesting relationships between housing conditions, and the factors of the socio-economic development (see the theoretical explanation in section 3.5 of chapter three). The understanding of these relationships is basic in planning for effective improvements in housing conditions. In this regard, it is a major objective of this study to guage the nature of these relationships using Bushenyi District of Western Uganda as a case study.

The rest of this chapter is an introduction to the study area. It covers the geographical setting, as well as the socio-economic and demographic aspects of the study district.

1.2 The geography of the study area

Uganda, shown in figure 1:1, is an independent state lying astride the equator, near the centre of the African Continent. It shares boundaries with Sudan in the North, Zaire in the West, Tanzania in the South, and Kenya in the East. Its total area is 241,038 square kilometres, of which 43,942 square kilometres are open water and swamps, and the rest, 197,096 square kilometres are land. Most of the country forms a plateau about 4,000 feet above sea level, traversed in all directions by innumerable rivers and streams. The general altitude decreases from over 4,000 feet in the south-west to about 2,000 feet in the north (Uganda Atlas 1967). Due to the relatively high altitude, Uganda's climate is not typically equatorial, but fairly accurately likened to European summer

The indigenous population of Uganda is made up of three main ethnic groups - the Bantu, the Nilotic and the Nilo Hamitic. Comprising of the first group are the Banyankole, Bakiga, Banyoro, Batoro, Basoga and Baganda. These inhabit the Western, Central, and the Eastern regions of the country. The Acholi and Langi are the most important Nilotics, and they are dominant in the Northern Region. The Nilo Hamites include the Iteso in the East and the Karamajong in the North-east. Each of these groups has its own vernacular, though dialects within different ethnic groups are closely related.

Fig. 1.1 UGANDA : THE LOCATION OF BUSHENYI DISTRICT

Source : UGANDA POPULATION CENSUS 1980.

Administratively, Uganda is divided into 33 districts. The districts, together with their respective 1980 Uganda population census figures, are shown in Figure 1:1. Our study district, Bushenyi, is shaded in this figure. It is located in Southern Uganda, about 250 kilometres away from the capital city - Kampala. Bushenyi is bordered by Mbarara District to the East, Kabale to the North, Rukungiri to the West, and Kabarole District to the North. It is also worth noting that the district forms two international boundaries; it is bordered by Tanzania in its extreme South-east, and Zaire in its extreme North-west. The district's total area is 5,395.93 square kilometres - about 2.24 percent of the National area, and it has two small lakes, namely, Edward and George.

The District lies within a plateau ranging at an average altitude of about 3,000 feet to 8,000 feet above sea level (See Uganda Atlas ibid. p.20). This relatively high altitude gives it a pleasant climate with temperatures varying between 16°C (60°F), and 30°C (80°F). Its annual rainfall averages between 102 and 127 cm. but rises to as high as 203 centimetres in the wettest period of the year - April, September, and October. Generally, the district is blessed with high productive soils of different types including the volcanics of the South-western highlands. Most of its soils are suitable for producing food crops, and cash crops such as coffee, cotton and tobacco.

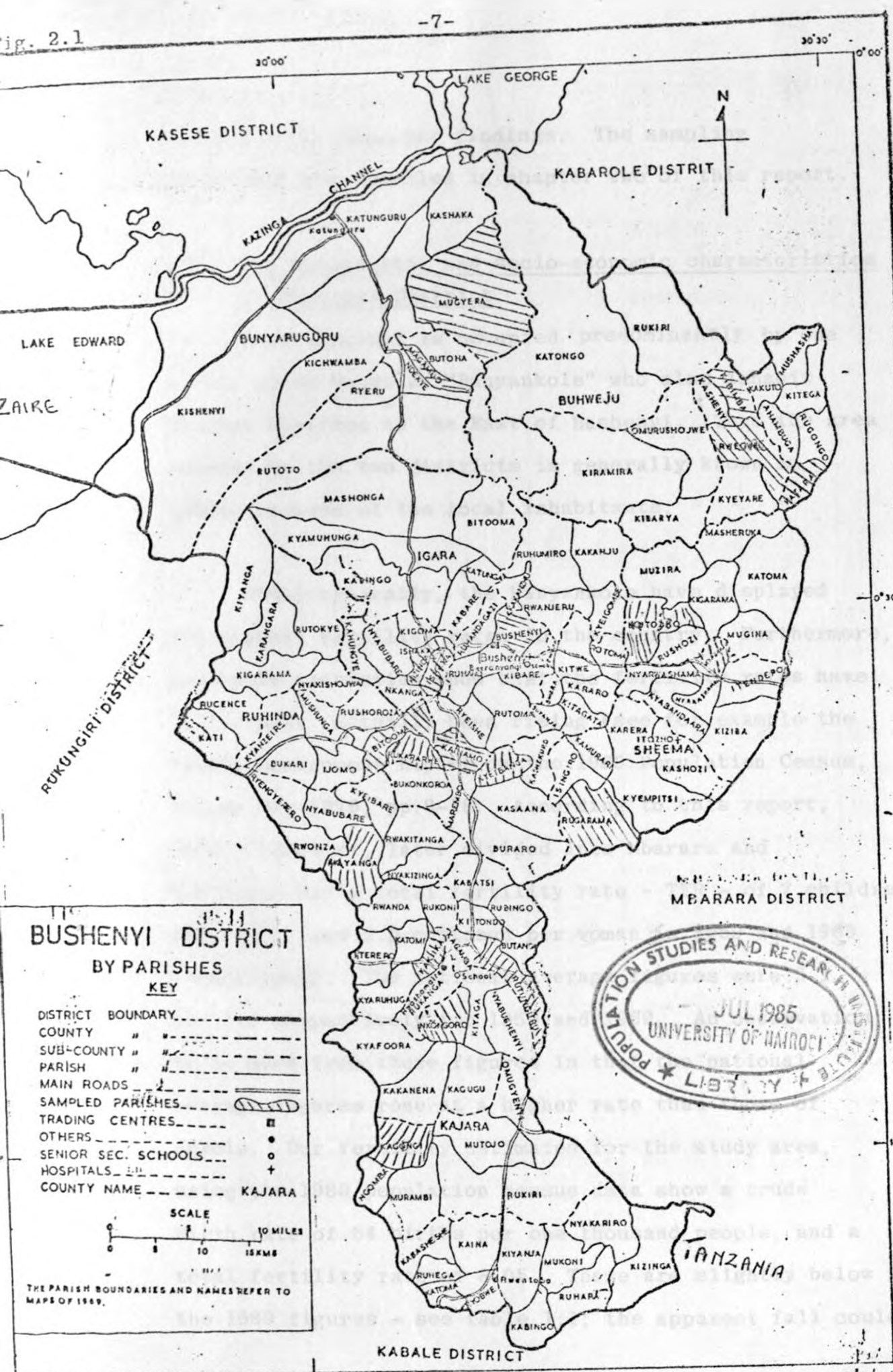
About three quarters of Bushenyi is covered with small trees and shrubs. A smaller portion is covered with unevenly distributed semi-deciduous forest; this is the only local vegetation which can provide strong poles for constructing reliable housing structures. This should be taken as a major problem in this area. Shortage of good timber can be partly responsible for the low housing standards in the area.

Like other districts in Uganda, Bushenyi is divided into counties, sub-counties, and parishes. It has 6 counties, 18 sub-counties, and 170 parishes.[1] The sub-divisions are shown in Figure 1:2 - the map of Bushenyi District. The map also shows the major trading centres like Bushenyi town, which is also the major administrative headquarters of the district. Apparently, the area is predominantly rural with few trading centres and almost no urban areas as such. Another outstanding feature to be observed from Figure 1:2, is the general lack of schools and health centres in the district. The district is also poorly covered with road networks. All these are obvious shortcomings in the area's general housing conditions.

The shaded areas on the map are the various parishes selected for the 1980 Uganda population census sample for Bushenyi District. The geographical spread of the sampled parishes is apparently poor. However, this may

1: A few parishes in the North of Bushenyi have been sub-divided, but not indicated in the map because the changes have not been surveyed.

ig. 2.1



BUSHENYI DISTRICT
BY PARISHES

KEY

- DISTRICT BOUNDARY
- COUNTY " "
- SUB-COUNTY " "
- PARISH " "
- MAIN ROADS
- SAMPLED PARISHES
- TRADING CENTRES
- OTHERS
- SENIOR SEC. SCHOOLS
- HOSPITALS
- COUNTY NAME — KAJARA

SCALE

0 5 10 MILES
0 5 10 15KMS

THE PARISH BOUNDARIES AND NAMES REFER TO MAPS OF 1969.

not seriously bias our findings. The sampling procedures are detailed in chapter two of this report.

1.3 The demographic and socio-economic characteristics of Bushenyi District.

This district is occupied predominantly by one ethnic group known as "Banyankole" who also inhabit Mbarara District to the East of Bushenyi. Thus the area covered by the two districts is generally known as Ankole because of the local inhabitants.

Demographically, the Banyankole have displayed the highest fertility rates in the country. Furthermore, available statistics show that the fertility rates have in the past actually been rising (see for example the Uganda Government Report on the 1969 Population Census, Volume IV, 1976, pp.8-18). According to this report, Ankole District, later divided into Mbarara and Bushenyi, had a total fertility rate - TFR - of 7 children per women, and 8.5 children per woman in 1959 and 1969 respectively. The national average figures were 5.1, and 7.1 respectively for 1959 and 1969. An observation to be made from these figures is that the national average figures rose at a higher rate than those of Ankole. Our fertility estimates for the study area, using the 1980 population census data show a crude birth rate of 54 births per one thousand people, and a total fertility rate of 8.05. These are slightly below the 1969 figures - see table 1:1; the apparent fall could

Table 1:1 Indices of Fertility, Mortality, and Population Change for Districts in Uganda - 1969 Census

Old name of District	Name of new District	Crude birth rate	Crude death rate	% Rate of natural increase	Total fertility rate	Infant Mortality rate
West Mengo	Mpigi	41	14	2.7	6.7	82
East Mengo	Muko+Luwero	38	18	2.0	5.6	114
Masaka	Masaka+Rakai	49	18	3.1	7.7	108
Mubende	Mubende	43	16	2.7	6.4	92
Kampala City	Kampala City	46	x	x	5.2	x
Teso	Soroti+Kumi	37	15	2.2	5.1	94
Bugishu	Mbale	50	19	3.1	7.5	148
Bukedi	Tororo	46	20	2.6	7.2	161
Busoga	Kamuli+Igandu + Jinja	51	22	2.8	6.9	154
Sebei	Kapchorwa	51	x	x	8.3	x
Karamoja	Moroto+Kotido	42	23	1.9	6.0	139
Kigezi	Kabale+ Rukungiri	54	19	3.5	8.1	105
Ankole	Mbarara + Bushenyi	55	19	3.6	8.5	121
Toro	Kabarole+ Kasese+ Bundibugyo+	52	21	3.1	7.7	143
Bunyoro	Masindi+ Hoima	47	19	2.8	7.2	113
West Nile	Arua+Nebbi	53	23	3.0	7.8	150
Madi	Moyo	54	22	3.2	8.0	151
Acholi	Gulu+Kitgum	54	22	3.2	8.5	161
Lango	Lira+Apac	49	18	3.1	7.3	124
Uganda	Uganda	50	19	2.9	7.1	120

Source: Compiled from Republic of Uganda: Report on the 1969 Population Census, Volume 1V, (1976 : p.13 and 29.

be most likely due to variations in the quality of reporting. The rates might also be be beginning to stabilize.

Considering mortality levels however, the rates for Bushenyi and Mbarara districts are not very significantly different from the national averages. But the statistics show that they are declining faster than the national averages are doing. For the two districts, for example, infant mortality rates dropped by 29 percent - from 170 to 121 deaths out of every one thousand births between 1959 and 1969. The national infant mortality rate - IMR - averages dropped by 25 percent within the same period - from 160 to 120 deaths out of every one thousand births (see Uganda Government, ibid. p.29).

Table 1:1 shows fertility and mortality indices for the various districts of Uganda for the period 1969. The rates of natural increase, derived by subtracting the crude death rate values from the crude birth rate values and expressing the products as percentages are also shown in this table. Still, Bushenyi and Mbarara's rates of natural increase come out to be the highest in the country. For the 1969 period, they were above the national average by about 19 percent. The high rates of natural increase are a product of the combination of moderate mortality rates with high fertility rates. Available statistics suggest that the rates of natural

increase are likely to rise. This is because fertility is high and does not show any strong signs of falling, while mortality seems to be constantly falling. For example,our estimated crude death rate for Bushenyi, from the latest census figures - 1980 -, is 18 deaths per thousand people which is below the 1969 figure. Mortality rates will no doubt continue to decline especially if health facilities and other housing factors improve; and fertility is likely to maintain its present levels for some time due to lack of pronounced fertility control measures.

Although Bushenyi is among the districts with the highest rates of natural increase (see table 1:1), latest 1980 census results show that its actual rate of population growth is low compared to the national average, and even to some neighbouring districts - Mbarara, Kabarole and Kasese. This fact is well demonstrated in Appendix 1:1, showing district population figures for 1969 and 1980, and their projected and actual growth rates.[2] According to this Appendix, Bushenyi

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2 Growth rate is the rate at which the population is changing per year, and is expressed in percentage. The growth rates shown in Appendix 1:1 were calculated using the exponential growth formula given as $Pt = Poe^{rt}$ where in this case:

Pt= the 1980 population, Po= the 1969 population, e= 2.71828 - the base of the natural logarithms, r= the rate of growth per year, and t= the period between 1969 and 1980.

was expected to grow at a rate of 4.3 percent per year between 1969 and 1979. However, actual growth rate turned out to be lower - 2.4 percent per annum, which is about 44.2 percent below the expected rate. The average national growth rate for the period was 2.8 percent per year. This was 26.3 percent below the projected rate of 3.8 percent. The growth rates for some neighbouring districts were 4.2 for Mbarara, 5.2 for Kasese, and 4.6 percent per annum for Kabarole. Kabarole and Kasese's actual growth rates were significantly above the projected rates, while Mbarara's actual and expected rates turned out to be more or less the same. Rukungiri district, bordering Bushenyi to the West, had a growth rate of 1.9 percent per annum. This was below Bushenyi's growth rate and even below its expected rate of 2.1 percent per annum.

These apparent differences in growth rates cannot be attributed to regional differentials in fertility and mortality rates. The most plausible explanation is in differences in net migration rates. As Appendix 1:2 shows, Bushenyi District is densily populated with 107 people per square kilometre as compared to Mbarara with 65, Kabarole with 64, Kasese with 102, and Uganda as a whole with 64 people per square kilometre. In other words, it might be suffering from population pressure reflected in a general lack of land for agriculture as well as for permanent residence. Because of this, people might be outmigrating from Bushenyi in

search of land in neighbouring districts which are less populated. Rukungiri's density being even higher than that of Bushenyi - 115 people per square kilometre, it came up with the lowest growth rate of 1.9 percent per annum in the areas surrounding Bushenyi. This is far below its rate of natural increase which was by 1969, in a region of 3.5 percent - see table 1:1. In other words, Rukungiri might also be experiencing an outmigration of people most probably due to population pressure on its land.

Bushenyi's population is very young with about 50 percent of it aged less than 15 years old. According to our study sample, this group - aged 0 to 14 - accounts for 51.1 percent of the total population. The economically active population aged 15 to 64 forms 45.6 percent only of the total population; and the old people aged 65 years and more cover 3.3 percent of the population. The age dependency ratio computed using the conventional model given as:-

$$\left(\frac{\text{Population 0-14+Population 65+}}{\text{Population 15-64}}\right) \times 100$$

is roughly 120%. In other words, for every 100 economically active persons, there are 120 dependents or (unproductive consumers). But in a traditional African societies this measure can be taken as a very rough guide since children begin to engage in productive activities from the age of about 7 years and adults - especially women - do not retire until they are well over 65 years of age.

This is why a more realistic formula has been adopted. $\frac{(\text{Population 0-9+ Population 65+})}{\text{Population 10-64}} \times 100$. It gives a lower dependant proportion of 63.4%. However, this proportion is in reality bound to rise as more children enroll at school.

The district's total population sex ratio is rather low - 92 percent. This means that for every 100 females, there are 92 males. The lowest ratios are in ages between 15 and 39 years old, and the highest are seen in age groups 0 to 4 - 107%, 40 to 44 - 149%, and 45 to 49 - 104%. The general excess of females over males cannot be attributed to sex differentials in mortality, but, most likely, to sex selective outmigration. Males, particularly in age groups between 15 to 39 years, might be outmigrating in search for employment or land for resettlement outside Bushenyi district, which is heavily populated. The high sex ratios in age groups 40 to 44, and 45 to 49 are rather hard to account for. One would think that probably, these ages have an excess of return migration of males or an outmigration of females. But such a reasoning would be rather hard to justify. A more likely reason might be a systematic misreporting of age within these particular age groups, and of course, in their adjacent age groups.

The implications of such an age/sex structure are many with respect to housing requirements. Although

unproductive, a young population would require a lot in terms of education services, health care, and other social services, leave alone appropriate shelter for human development. A general shortage of males particularly in the more economically active age groups can have obvious shortcomings on the general economic performance, as well as the improvement and extension of the existing housing services in the area.

Bushenyi's economy is predominantly agricultural. Our background data shows that about 81 percent of all the heads of households in the area earn their living from agriculture. The main crops produced are bananas, finger millet, groundnuts, beans, and peas mainly for subsistence; and coffee, tea, and tobacco for cash. It is also common for a family to keep a few heads of cattle for milk, and for purposes of meeting bride wealth when the need arises. Other livestock like goats and chickens are also kept. Non-agricultural activities like commerce, manufacturing and services take a very small portion of the district's labour force (see 4.9 of Chapter 4). With such an economic base, the average incomes are no doubt very low. It is therefore, hard for an average family to afford good housing.

One other observation to make of the district is its general lack of education. This fact is clearly evident in the table 1:2 below, which shows the

distribution of population aged 5[4] years and above by sex, age group, and education levels.

Table 1:2 Population aged 5 years and over by education status.of Bushenyi District 1980

Age Group	Total Pop.	No Education M	No Education F	Primary M	Primary F	Secondary M	Secondary F	Post Secondary M	Post Secondary F
5-9	940	372	410	93	65	-	-	-	-
10-19	1,496	248	412	450	379	5	2	-	-
20-29	740	92	248	198	173	19	9	1	-
30-39	522	95	231	123	57	13	1	1	1
40-49	368	96	141	107	19	3	1	1	-
50-59	192	47	99	41	3	1	-	1	-
60-69	131	38	66	24	3	-	-	-	-
70+	136	48	68	17	3	-	-	-	-
Total	4,525	1,036	1, 675	1, 053	702	41	13	4	1

Source: computed from the 1980 Uganda Population Census provisional results.

It can be learnt from the table that about 60 percent of the people aged 5 years and more has never been to school. The proportion is however, higher for females - 70.1 percent, and lower for the males - 48.5 percent. It can also be learnt from the table that even the few who go to school enroll at a late age. This is because 83.2 percent of children aged 5 to 9 years have never been to school, and the proportion falls to

4 The recommended primary school entry in Uganda is 5.

44.6 percent for age group 10 to 19. The proportions never been to school rise with age after age group 10 to 19. For age group 20 to 29, the proportion is 46%; for 30 to 39, it is 62%; 40 to 49, 64%; 50 to 59, 76%, 60 to 69, 79%, and 85% for age group 70 years and over. This trend suggests that probably, education has been gaining importance with the passing of years. Out of the 40 percent that have had some education, 39% have attained only primary levels, and only 1 percent has reached secondary education and over. However, these proportions are expected to rise with the passing of time, given the observations we have made above. Provision of education is no doubt a very important aspect of housing, and if effective improvements are to be attained in the general housing conditions, then provision of education must be taken as a very important pre-requisite. The relationships between housing conditions and education attainment are further detailed in chapter four of this work.

This chapter has been an introduction to the concept of "housing conditions" and its socio-economic importance. It has also introduced the study area from the geographical, demographic, and socio-economic point of view. The next chapter. two, covers the methodology of study and evaluates the study data.

CHAPTER TWO

METHODOLOGY OF STUDY AND DATA EVALUATION

This chapter outlines the sources of data, and describes the methods of data collection and processing procedures. It also evaluates the age/sex and other required data in order to expose some of the deficiencies that are likely to affect the accuracy of the findings and inferences made in this study.

2.1 Data sources and collection procedures:

The major source of data for this study is the 1980 Uganda population census in which the author participated as a "training officer". The census collected most of the information required for this project. Two types of questionnaires were used for this census; a short type of questionnaire "A" and a long type of questionnaire "B". A copy of questionnaire "B" is provided as appendix 2:1. It contained all the questions in the shorter questionnaire "A", that is the names of the people in each household, their relationships to the head of household, sex, age, marital status, nationality, birth place, education level attained, and literacy. All these are seen in that order from column 101 to 114. In addition to these, schedule "B" contained demographic questions like orphanhood, child birth history for females aged 12 years and above, and questions pertaining to economic activity of respondents aged 10 years and above as shown in columns 115 to 129.

The rest of the schedule was divided into two sections. A section labelled by columns 201 to 208, covering some aspects on housing conditions including materials used to construct a building, category of the building - whether permanent, semi-permanent or temporary, type of tenure, sanitary facilities, and number of rooms. And another section labelled by columns 301 to 308 intended to gather information on other housing aspects like source of water, power used both for cooking and lighting, and additional information on availability of services like education, transport, and health facilities, etcetera, as shown in appendix 2:1. Most of this information is required for a project like ours.

Since the census collected most of the information needed for this project, the author sought permission to use it as the major source of data for this study. Consequently, therefore, most of the findings of this work are based on the 1980 Uganda population census data for Bushenyi District. Data from other sources like the 1969 Uganda Population Census, reports and documents from the Ministry of Housing and Urban Development in Kampala, the Department of Urban Development and Housing of Nairobi University, Manuals and reports especially those produced by the United Nations Centre for Human Settlement (Habitat), are used as well to supplement our study data.

2.2 Data Collection procedure and Field problems:

We shall not detail the census data collection exercise because it is properly accounted for in the forthcoming - (Administrative report of the 1980 Uganda Population Census). However, it is important to say something about the application of the already mentioned questionnaire "B" in the census exercise.

Schedule "B" was applied to a "built in" sample[1] accounting for roughly 10 percent of the total national rural population and 100 percent of all urban areas and trading centres. The sampling design for the built-in sample was done by Ben Kiryegyera[2]. In this sample, parishes were taken as primary sampling units. This is explained more in section 2.2 of this chapter.

The actual data collection exercise involved some problems that are somehow responsible for the few shortcomings in the quality of our data. These problems included poor means of communication, small shortcomings in the administration of the census exercise, and problems emanating from respondents' unwillingness or inability to answer certain questions.

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1 A sample is a unit or units selected scientifically from a sampling frame to represent a whole universe. And a sampling frame is the totality of the sampling units. For example, the sampling frame for the 1980 Uganda Population Census, were the parishes of all the districts

2 Ben Kiryegyera is a senior lecturer in the Institute of Statistics and Applied Economics at Makerere Universit Kampala. He is the one who designed the 1980 Uganda Population Census built-in sample.

The poor communication system in terms of radio, telephone, language, road network, and means of transport, made it hard in some places for the census to run smoothly. The census supervisors could not be in consistent contact with their enumerators and in many cases, the poor road-network and lack of mechanical means of transport made it very tiring for the field workers to reach some people, especially in areas where settlements were very much scattered.

Tha language problem in particular, needs special elaboration. In some cases (especially in urban and trading centres) enumerators could not understand the language of the respondents, and they had to use interpreters. Furthermore, the questionnaires were written in English. This made it hard for the enumerators to translate properly to the respondents the clear meaning of the questions. Thus work was delayed in the process of translating and some information was inevitably distorted.

Administrative shortcomings resulted in occasional shortages of questionnaires in some areas. This delayed the exercise especially as communicating was not all that efficient to readily sort out these problems. The administrators also overlooked the issue of providing packed lunch for the enumerators. This made many enumerators work on empty stomachs thus reducing their

efficiency. Furthermore, the administrators made the questionnaire schedules so bulky and poorly bound. Some pages used to come out and enumerators used to spend some time fixing them back. Such process no doubt caused misplacement of some pages. Lastly, some respondents were unable to answer some questions due to illiteracy and ignorance. A few were unwilling to respond to some questions, thus the enumerators had to take trouble of convincing them to provide the required information.

2.3. Sampling for 1980 Census and the Study Sample

Sampling for 1980 Uganda population Census and for the study area was done scientifically to represent the whole population of Uganda in the first case, and Bushenyi District population in the second.

A sampling frame of all parishes in Uganda was constructed and then stratified by districts. A total sample of 340 parishes which is roughly 10 percent of the total number of parishes in the country, was allocated to the strata made up of districts in proportion to the relative 1979 projected population sizes. Appendix 2:2 shows the names of the districts by their absolute and percentage figures of the 1979 projected populations. The proportionate shares for each district in the total projected population, were multiplied respectively by the total sample of 340 parishes in order to get the number of parishes to be sampled in each

District. For example, the projected total population for Uganda for 1979 was 12,451,400 and that of Bushenyi District was 628,400 which is 5 percent of the total projected national population. In this case, Bushenyi was allocated 5 percent or 17 parishes of the total 340 sample parishes.

Population-wise, the 17 sampled parishes of Bushenyi District together with 100 percent urban and trading centres, amounted to 60,913 people. Due to limited financial resources, and as the data was not yet processed, it was necessary to reduce the sample to a manageable size. Accordingly, from the Bushenyi District Population Census sample of 10 percent, we selected another sample of 10 percent - thus reducing the original 10 percent sample to one (1) percent of the total district population. In actual fact, it can be said that the original sample design used to select the 10 percent in-built sample (the single stage stratified cluster sample design) was advanced, in our study, to a multi-stage stratified cluster sample design to select the one per cent sample.

For purposes of better Census administration and coverage for our study, parishes were sub-divided into enumeration areas (E.As) and in each enumeration area, enumeration was done on household basis. In order to reduce the 10 percent (roughly 60,913 people) to one (1) percent (roughly 5,542 people), the various enumeration

areas were arranged in order of their corresponding parishes and the households in each enumeration area were arranged accordingly . The households formed the primary sampling units of our study sample. A ten (10) percent sample of the total number of households in each enumeration area was then selected by the use of random numbers. The use of households as primary sampling units had the advantage of giving the sample a better geographical spread which would have been missed if either parishes or enumeration areas were sampled.

The absolute and percentage distribution of Bushenyi samples by parish are shown in table 2:1 below. The table shows the selected sample parishes by their sub-counties and counties. The absolute and percent distributions of the two samples (the Census 10 percent sample, and the study 1 percent sample) show that Mugyera and Kabingo parishes have more sampled population than other parishes. This is because in reality, these two areas have relatively bigger populations than the other parishes. Dense settlements in these parishes could be due to the tea estates in Kabingo parish which employ a lot of manpower , and the fertile volcanic soils in Mugyera parish which make it attractive for agricultural activities. These two factors make the parishes quite attractive to settlements.

Other parishes have relatively small populations of less than five thousand people. Some have populations of less than two thousand. Katara, for example, has a very small population most probably because it is a newly created parish, and may be its soils are not fertile enough for agricultural production.

But the variations in parish population figures are also, no doubt a function of actual parish areas. Various parishes have different sizes in terms of area, and obviously different population sizes.

Table 2:1 Absolute and Percent Distribution of the 1980 Census 10 percent, and 1 percent sample by County, Sub-county and Parish.

County	Sub-County	Selected Parish	The Census 10 percent sample		The Study 1 percent sample	
			Absolute distribution	Percent distribution	Absolute distribution	Percent distribution
Sheema	Kagango	Kyagaju	2,335	3.8	249	4.5
"	Shuuku	Rugarama	4,938	8.1	445	8.0
"	Kigarama	Kitojo	3,664	6.0	360	6.5
"	Kitagata	Keibanga	3,160	5.2	294	5.3
Igara	Bumbiare	Kainomo	3,626	6.0	376	6.8
"	"	Bushenyi	3,792	6.2	211	3.8
"	Nyabubare	Kazinda	3,420	5.6	305	5.5
Buhweju	Kyamuhunga	Kabinga	5,561	9.1	471	8.5
"	Burere	Rwejere	2,392	3.9	216	3.9
"	Karungu	Katara	1,650	2.7	161	2.9
Bunyaruguru	Kicwamba	Mugyera	5,177	8.5	493	8.9
"	Ryeru	Magambo	3,107	5.1	283	5.1
Kajara	Bwongeru	Kakiika	3,407	5.6	305	5.5
"	Ihunga	Rutunguru	3,477	5.7	249	6.3
"	Rubare	Kagenyi	2,184	3.6	211	3.8
"	Nyabihoko	Nkongoro	3,178	5.2	305	5.5
Ruhunda	Mitooma	Rukararwe	2,806	4.6	249	4.5
"	Bitereko	Kiyanga	3,039	5.0	261	4.7
TOTAL	-	-	60,913	100	5,542	100

Source: Compiled from 1980 Uganda Population Census, provisional results of Bushenyi District.

2.4 The Data Processing

By the time this project was conceived the 1980 Uganda Population Census schedules were lying in the stores unprocessed. One of our first assignments was to prepare for data processing. The preparation involved the writing of coding manuals and instructions, and the recruitment and training of coding supervisors and coders.

Before releasing the questionnaires for coding however, we carried out an intensive re-editing of all the questionnaires to ensure consistency in the recorded information. Although census supervisors together with other officers in charge of the districts did considerable editing and consistency-checks right in the field, there still remained minor corrections to be made before processing the data. For example, there were a number of "Not applicables" which were not filled in and which the coders could easily mistake for "Not stated". There were also some spaces with no information entered. Our aim was to eliminate such obvious loopholes in the data before coding it.

In order to ensure that the coding was properly done, each coding-supervisor had to pick a 10 percent random sample of what each coder had done, recode all the information and compare with what the coders had done. Any coder whose work was unsatisfactory was asked to correct all the mistakes before he could

receive his pay.

After the coding exercise, all the coded information sheets were packed and transferred to Nairobi for computer processing. Punching and verification were quite well done under the supervision of a programmer, who was well acquainted with the processing of such socio-economic and demographic data. The programming of the required tabulations was done through the use of the "SPSS" package (the statistical package for Social Scientists), and most of the tabulations came out correctly for the required analysis of this study.

In the next section, we have evaluated the quality of our age/sex and other data to have an idea about the few defects in the basic data that might in one way or the other affect the degree of reliability of our findings.

2.4.1 Evaluation of age/sex and other data.

Accurate age, sex and other demographic and socio-economic data are needed for a plausible analysis of the demographic and socio-economic characteristics of any given area. Such analysis is necessary for planning effectively for a developing country in particular.

Unfortunately however, most developing countries are characterized with defective age/sex and other

demographic and socio-economic data. This is due mainly to ignorance which is fundamentally a result of lack of education, and negligence among the people. In a number of cases, peoples' traditions and beliefs are equally likely to affect the general quality of reporting on age, sex, reproduction, mortality, etcetera. Where age is estimated by an enumerator, there is always a possibility of over estimating or under-estimating the actual age. Other information speculated by an investigator is also likely to be distorted.

There is also a problem of under-enumeration of people. This is likely to affect particular age groups and sex. In a pastoral society for example, there is a possibility of missing, especially, the young males who are usually grazing animals in the bush during the time of enumeration. All these factors inevitably distort the actual age/sex structure of a society under investigation as well as other information pertaining to that society.

A number of techniques have been devised to detect the order and magnitude of defects in the reported age/sex structures. Accordingly, smoothing or adjusting techniques have been developed for purposes of correcting faulty age/sex data to structures closer to reality. Smoothening is imperative when the objective

is for example to determine mortality or fertility levels for any given age. But since our interest is only to find how mortality responds to varying housing conditions, we shall save ourselves the trouble of smoothing our age/sex data for it is quite a time consuming exercise. On the other hand, however, for the interest of the planner and other researchers, we shall try to expose the few defects that are embedded in our age/sex data, and also try to point out possible errors in the other required data for this work.

To test the quality of the reported age structures, we shall employ the "Whipple's Index" technique which detects heaping at terminal digits zero (0) and five (5); and "Myers' Index" technique which, although cumbersome to calculate has an advantage of detecting heaping at each terminal digit - that is zero (0) to nine (9). The "Age Ratio" technique is also employed specifically to detect under-reporting, over-reporting and shifting within the reported age structures. All these techniques are well explained in U.N. Manual 11 (1958).

The absolute and percentage age/sex distributions and the respective age specific sex ratios of our study are presented in table 2:2 below.

Table 2:2 The Age/Sex Distribution of Bushenyi District Sample Population 1980

Age Group	Population Distribution						Sex Ratio
	Total		Male		Female		
	Abs.	%	Abs.	%	Abs.	%	
Total	5,542	100	2,658	100	2,884	100	92
0-4	1,017	18.4	525	19.8	492	17.1	107
5-9	940	17.0	465	17.5	475	16.5	98
10-14	872	15.7	427	16.1	445	15.4	96
15-19	624	11.3	276	10.4	348	12.1	79
20-24	436	7.9	181	6.8	255	8.8	71
25-29	304	5.5	128	4.8	176	6.1	73
30-34	297	5.4	141	5.3	156	5.4	90
35-39	225	4.0	91	3.4	134	4.7	68
40-44	217	3.9	130	4.9	87	3.0	149
45-49	151	2.7	77	2.9	74	2.6	104
50-54	122	2.2	56	2.1	66	2.3	85
55-59	70	1.3	34	1.3	36	1.3	94
60-64	76	1.4	35	1.3	41	1.4	85
65-69	55	0.9	27	1.0	28	0.9	96
70-74	53	0.9	25	0.9	28	0.9	89
75+	83	1.5	40	1.5	43	1.5	93

Source: Computed from Uganda Population Census 1980 (Bushenyi District)

Abs.= Absolute

A detailed analysis of the above age/sex distribution as well as its implications on production, consumption, and provision of social services including housing, is already covered in chapter one section three. Irregularities in the population's age specific percentage distributions and sex ratios immediately suggest that there are shortcomings in our age/sex data. A detailed picture of these shortcomings is presented in the following sections below.

2.5.2 Testing the accuracy of the reported age structure by use of Whipple's Index

Whipple's Index (which measures the quality of age reporting) is obtained by aggregating and finding what percentage is accounted for by the sum of the returns of years ending with 5 and 0 to one fifth of the total sum. Numerically, the index can be presented as below:-[3]

$$\frac{(P25 + P30 + P35 \ldots\ldots\ldots P55 + P60)}{\frac{1}{5}(P23 + P24 + P25 \ldots\ldots\ldots P60 + 61 + 62)} \times 100$$

The result would vary between 100 representing no concentration at all, and a maximum of 500 if no returns were with any other digit other than the two mentioned namely 0 and 5.

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3 The numerator is the sum of the total population with ages ending with 0 and 5 (beginning from 25 to 60 inclusive). The denominator is the sum of total population between age 23-62 inclusive. The denominator is multiplied by $\frac{1}{5}$ in order to equate it to the numerator.

The calculation of the quality of our data using Whipple's formula above, showed the following returns:-

Population	Calculated Whipple's Index	Quality of data
Male Population	181.3	Very rough
Female Population	200.7	Very rough
Total Population	192.8	Very rough

Given Whipple's quality data scale,[4] it can be concluded that Bushenyi District age data for both males and females is very rough. However, the males have less preferences for digits(0)and (5) than the females. Such reporting of age by women will no doubt affect age specific mortality and fertility rates.

4: Whipple's Index varies between 100 and 500, and the closer the index to 100 the better the reporting of age data. The United Nations scale of estimating the quality of data by Whipple's Index is given as follows:-

Whipple's Index	Quality of Data
Highly accurate	Less than 105
Fairly accurate	105-109.9
Appropriate	110-124.9
Rough	125-174.9
Very Rough	175 and over.

2.5.3 Testing the accuracy of the reported age data by use of Myers' Index

Theoretically, Myers' Index varies between 0 and 180. Where age is reported correctly, all "blended sums" are very nearly equal, and deviations from 10 percent are negligible resulting in an Index of almost zero (0). The higher the index from zero (0) the greater the value of digit preference or the bigger the magnitude of distortion. Table 2.2 demonstrates the application of Myrers' technique to the sampled population reported age structures by sex.

Table 2.3 The application of Myers' Blended Index method to the reported age structures by sex

	Percent distribution at terminal digit X			Deviation from 10		
Terminal	Total Population	Male Population	Female Population	Total Population	Male Population	Female Population
0	19.8	19.1	20.9	+9.8	+9.1	+10.9
1	5.6	6.6	4.8	-4.4	-3.4	-5.2
2	9.6	9.4	9.6	-0.4	-0.6	-0.4
3	7.7	8.4	7.9	-2.3	-1.6	-3.0
4	8.8	9.6	8.1	-1.2	-0.4	-1.9
5	13.7	13.2	14.2	+3.7	+3.2	*4.2
6	9.7	9.4	9.9	-0.3	-0.6	-0.1
7	7.6	7.8	7.2	-2.4	-2.2	-2.8
8	11.5	9.8	12.8	+1.5	-1.2	+2.8
9	6.0	6.7	5.5	-4.0	-3.3	-4.5
Myers' Index *	100	100	100	30*	24.5*	35.8*

It is clear from Table 2:2 that in addition to the preferences for terminal digits zero (0) and (5) five which were also detected with Whipple's Index, Myers' Index detects an additional preference for terminal digit 8.

Digit eight (8) seems to have preference in a number of other African Nations - Ntozi (1981:23-26). All the other digits are not preferred. The table shows that the proportion of people who reported in ages ending with digits 0 and 5 in the age range 10-69 is 32.3 percent for males and 35.1 percent for the female population instead of the expected 20 percent in each case. Thus only 67.7 percent of the male population and only 64.9 percent of the female population reported in ages with other terminal digits as against the expected 80 percent in each case. In all cases heaping seems to be strongest at terminal digits zero (0) followed by terminal digit five (5). Ages with terminal digits 6 and 2 seem to be not as repulsed as digits 1, 9, 3, 7 and 4. The effects of such distortions on our findings can be reduced when analysis is based on grouped age data instead of single years. However as is shown in the next section, the grouped data is also somehow defective.

2.5.4: The application of the age ratio technique to the reported age structures by sex

An age ratio is represented by the expression:-

$$r = \frac{{}_{n}P_{x}}{0.5({}_{n}P_{x-n}+{}_{n}P_{x+n})} \times 100$$

where n is 5 or 10 depending on the interval of age grouping.

${}_{n}P_{x}$ is the number of persons in a given age group; and

${}_{n}P_{x-n}$ and ${}_{n}P_{x+n}$ are the numbers in the two adjacent age groups.

In other words, age ratio is the number of persons reported in a given age group per 100 of the arithmetic

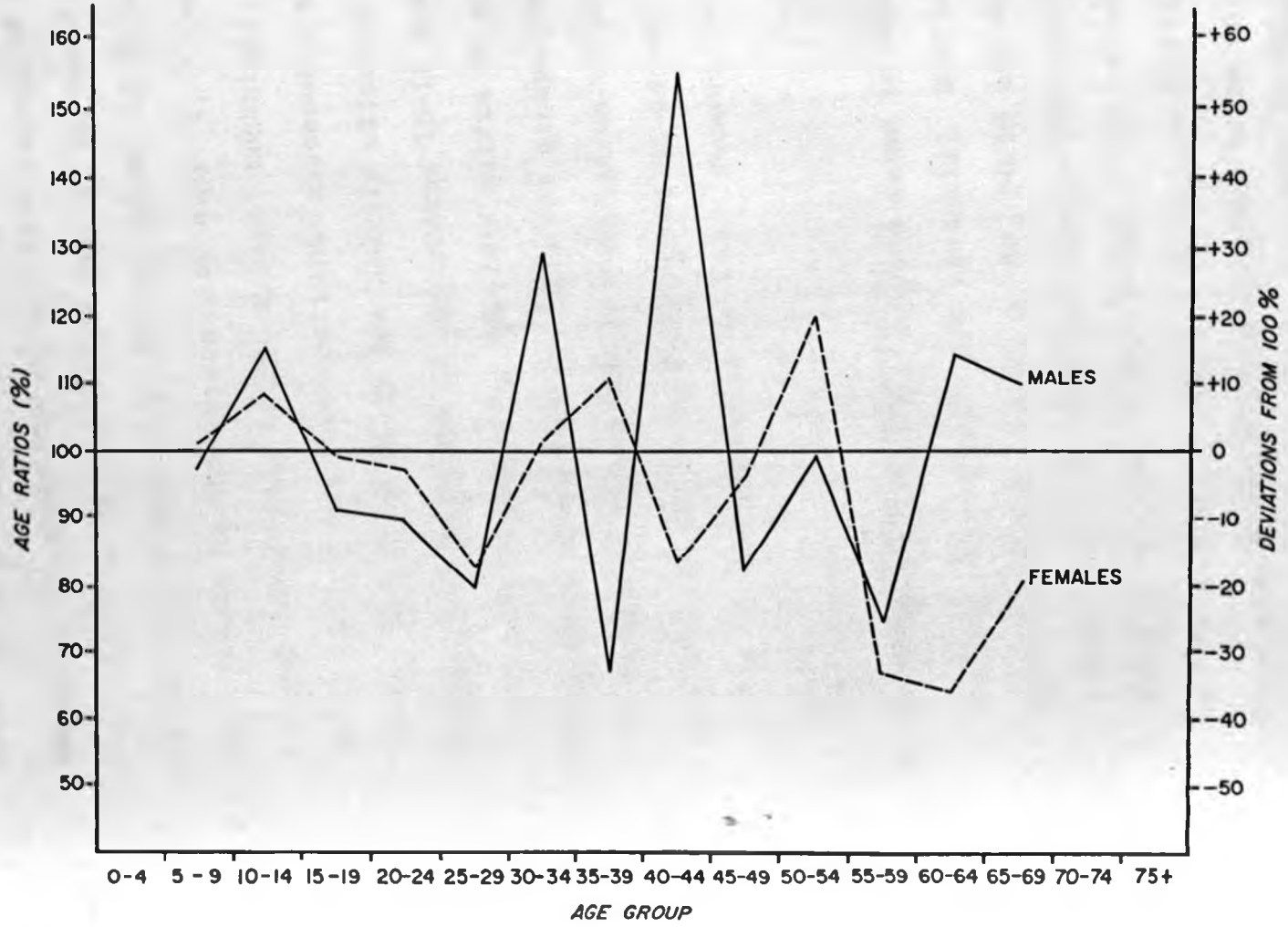
mean of the two adjacent groups of the same sex.

The primary idea behind this analysis is that under normal conditions - in the absence of a sudden rise or fall in births, deaths, or migration - the three concecutive age groups should form a near linear series. A considerable deviation of the ratios from 100 therefore indicates inaccuracy in the age data or fluctuations in fertility, mortality, and migration. The calculations of the age ratios for the study population are presented in table 3:3, and the accompanying graph in figure 3:1 gives a better picture of the age ratio distributions by age groups.

Table 2.4 Reported age/sex distribution and age ratios

	TOTAL		Males		Females	
Age Group	Total Males	Total Females	Age Ratios	Deviations from 100	Age Ratio	Deviations from 100
0-4	525	492	-	-	-	-
5-9	465	475	90.7	-2.3	101.4	+1.4
10-14	427	445	115.1	+15.1	108.1	+8.1
15-19	276	348	90.8	-9.2	99.4	-0.6
20-24	181	255	89.6	-10.4	97.3	-2.7
25-29	128	176	79.5	-20.5	85.6	-14.4
30-34	141	156	128.8	+28.8	100.6	+0.6
35-39	91	134	67.2	-32.8	110.3	+10.3
40-44	130	87	154.8	+54.8	83.6	-16.4
45-49	77	74	82.8	-17.2	96.7	-3.3
50-54	56	66	100.9	+0.9	120.0	+20.0
55-59	34	36	74.7	-25.3	67.3	-32.7
60-64	35	41	114.8	+14.8	128.1	+28.1
65-69	27	28	90.0	-10.0	81.2	-18.8
70-74	25	28	-	-	-	-
75+	40	43	-	-	-	-

Fig.3.1 DISTRIBUTION OF AGE RATIOS FOR THE TOTAL REPORTED POPULATION FROM ONE PERCENT SAMPLE OF BUSHENYI DISTRICT : 1980 POPULATION CENSUS.



It is descernible from table 2.3 that the male population at the ages 10-14, 30-34, 40-44, 50-54 and 60-64 is in a surplus. This could be due to an over-reporting in these age groups as a result of preference for particularly digit zero (0) or an under reporting in the age groups 5, 9, 25-29, 35-39, 45-49 and 55-59 as a result of the dislike for digit 9, 7 and 6 - as already identified by the Myrers' technique. It is worth noting too that the three successive age groups 15-19, 20-24 and 25-29 are heavily affected by deficits. Whereas the deficits in age groups 15-19 and 25-29 could be attributed to possible shifts in population from these age groups to adjacent groups namely 10-14 and 30-34 and to a possible out-migration of people in these groups, the deficit in age group 20-24 can only be attributed to out-migration or under enumeration of this group.

The female data somehow seems to have a similar pattern of surpluses and deficits. Surpluses appear in age groups 5-9, 10-14, 30-34, 50-54 and 60-64, most probably due to high preference for digit zero (0). The big deficts in age groups 25-29, 40-44, 55-59 and 65-69, can be attributed mainly to shifting to adjacent age groups but also to possible under enumeration in these age groups. However, a few of these age groups for example 25-29, could be affected by out-migration. Such distortions in the age distribution do cause

biases in the findings especially where accurate demographic and socio-economic indices are to be estimated from such a type of data.

2.4.5 Evaluation of other types of data

Another very important type of data whose evaluation is necessary for our purposes is that on some aspects of housing conditions. For example, reported information on materials used in construction, number of rooms, source of water, toilet facilities etcetra, need evaluation.

With materials used in construction, some of our enumerators were not following very well the information given to them in 1980 Census Enumerators Manual (1980:20-25). This made them record some houses made completely of temporary materials as semi-permanent and vise versa. Secondly, the number of rooms reported in each type of dwelling unit cannot be taken on its face value as some respondents are likely to have reported more or less rooms, since the enumerators had no means of checking on the exact number of rooms available. This prevents us from seeing the exact degree of crowdedness in this area. Thirdly, sources of water could not be reported well as some respondents could not tell the difference between rivers, streams and springs. This is mainly because these water sources are in most cases covered with papyrus and other grass of Uganda.

We also have a feeling that toilet facilities were reported as wanted by the heads of household.

This is because there was no physical checking on these facilities - whether a pit-latrine really exists and at what distance from the residence; whether its depth meets the officially recommended one of not less than 15 feet, and provided with covers. All this leaves our study with gaps which perhaps might be filled with further housing research and investigations.

Our data on mortality might also be with some degree of errors introduced, among other factors by people's negative beliefs on talking about dead people. Mothers are usually reluctant for example, to talk about their children who are dead. At the same time, the reporting on children everborn is known to be affected by people's traditional and customary unwillingness to count their children.

Finally, data on economic activity also appeared to be very defective during the editing exercise. In many cases, one would find conflicting information recorded against one's occupation and industry. In such cases editing was a problem and might have either reduced or increased the error in the economc activity data.

This chapter has outlined the major sources of data used in this study. It has given an account of the sampling procedures, collection and processing of

data. The chapter has also evaluated the age/sex and other required data. A few possible defects have been identified with our data. These are likely, in one way or another to bring biases both in our results and their subsequent interpretations. It is our belief however, that such shortcomings are not so big as to significantly reduce the reliability of our findings.

With the background information presented in chapters one and two, we are now ready to start analysing the housing problem in Bushenyi District. The next chapter, three, gives an account of the nature and scope of the problem, and a review of available literature on the subject of housing in Bushenyi District in particular and Uganda as a whole.

CHAPTER THREE

NATURE AND SCOPE OF THE PROBLEM

Uganda is one of the countries with a rapidly growing population, although the 1980 Census showed a lower growth rate of 2.8 percent per annum as compared to that of 1969, 3.5 percent per annum.[1] Such a growing population needs adequate housing facilities to enable better living conditions and a high level of development. Unfortunately, this is not the case with Uganda. Housing conditions in this country are lagging behind the peoples' requirements. Human facilities including shelter, sources of water, and toilet are seriously inadequate. The inadequacy of these important services is due to lack of proper policies regarding shelter construction, water improvement, and sanitary facilities. In general, all these are due to the low socio-economic development in this area.

In rural areas, Bushenyi District inclusive, the housing problem is aggravated mainly by low levels of education and low income, as already seen in chapter one. These factors often result in apparent lack of awareness, appreciation and ability on the part of rural population to improve their housing conditions. As a result, almost all the rural housing structures are constructed with unimproved traditional materials, i.e. mud, wattle and thatch. In addition,

1 The lower figure indicated by the 1980 Census results might have been a result of the 1978-1979 Uganda liberation war, which forced some people out of the country thus lowering the rate much below the projected one of 3.8 percent per annum.

many of them are too small for the average family size of six people, they lack proper ventilation, and have poor accompanying important facilities like water and toilet (see chapter four of this thesis). These conditions affect the health and general well-being of the people. In actual fact, the general economic growth and socio-economic structure is negatively affected by the existence of poor housing conditions. In order to raise the standards of living for a society, its housing conditions should be carefully studied, and policies for positive changes designed. This is the general objective of this study as explained in the next section.

3.2 The objectives and Relevance of the Study

Apart from adding to the meagre stock of information available on housing conditions in Bushenyi District as well as Uganda as a whole, there are three specific objectives of this study. The first objective is to study the existing housing conditions in Bushenyi District with the aim of contributing to the wide gap existing in the knowledge about housing conditions in this area and Uganda as a whole. As it will be noticed in the coming section of literature review, very little research has been done on housing problem in Uganda. In actual fact no specific research appears to have been done on Bushenyi District; and yet this is one of the rural areas with some of the poorest housing conditions in the country. These observations underline the need and relevance of studying the existing housing conditions of the District so as to provide some basic information necessary to plan for their improvements.

The second objective is to relate housing conditions to some important socio-economic factors like education and economic activities of the heads of households. While education makes the heads of households aware of the need to improve their shelters, and to have adequate sources of water and toilet facilities for their families, their economic activities determine to what extent they can improve their living conditions. We shall examine the relationships between housing and these socio-economic factors by varying housing conditions with education levels and economic activities mostly of the heads of households in the study sample.

Thirdly, the study analyses the possible existing relationship between housing conditions and one demographi factor - the mortality. It is believed that housing conditions have got some effects on peoples' health. The study will detect this by estimating mortality rates in the classes of housing conditions. Such approach as well as that of the second objective, shows that this study takes a new approach altogether compared to what other studies on housing have done. Whereas other studies (see section 3.4) have mainly concentrated on assessing and projecting housing needs, and relating population growth or pressure to housing policy, this study goes a step further to assess the interrelationships between housing and some demographic and socio-economic factors. The fundamental idea is

that demographic and socio-economic variables and housing conditions are by and large interdependent. An understanding of these interrelationships is necessary if comprehensive housing policies are to be made. This study, although limited in a number of ways, trys to establish some of these relationships.

3.3 Scope and limitations of the study

Due to lack of resources in terms of finance and time, we could not cover the whole of Bushenyi District. Instead, the study is based on a one percent Bushenyi District representative sample drawn from the 1980 Uganda Population Census data (the sampling procedure is already detailed in section 2.3 of the second chapter). This means that our findings are subject to sampling errors, in addition to other errors introduced at the various stages of data collection, processing and analysis.

The available data also limits our study in a number of ways. For example, some aspects which one would expect to be covered in a study of this nature are missing. One would for example be interested in knowing all types of diseases promoted by poor housing conditions as well as the contribution of such diseases to the total incidence of mortality within a given period. This important information is not available, and the study concerns itself only with actual deaths

that occurred under the varying housing conditions irrespective of the actual causes.

One will also find that our consideration of housing conditions is limited in a number of ways. Our own definition of housing conditions as given in section 3.5 of this chapter, apparently falls short of a number of important components such as the age of the structure, size of rooms in terms of ground area and heights of walls, availability of utility services like roads, schools, hospitals, and marketing facilities etcetera. These are important components of housing conditions, which are unfortunately not covered in this study, but which we intend to propose to be included in future studies. In the next section, we review some of the avail literature on housing and its relationships to socio-economic and demographic factors.

3.4 The Literature Review

A general review of available literature on housing conditions has shown an apparent lack of research and relevant documentation relating housing conditions to demographic and socio-economic variables. We have found only a few studies alluding to the relationship between housing conditions and the health status together with the general economic development of a society. For example, Ramachandran, (1971:171), articulates the importance of considering water supply, sewage disposal lighting and ventilation when making choice of shelter,

because these factors are directly related to morbidity, mortality, and hence working capacity or productivity of a population. Marris,(1961:82-83), also considers the possible contribution of housing conditions to a society's general welfare and productive ability. Relating fertility to housing conditions, Bogue, (1969: 370-371), points out that fertility is among the factors responsible for determining the average size of households in any given population. For Bushenyi District, as well as the whole of Uganda, it would be added that the traditional phenomenon of "extended family" is another major contributing factor to the average family size.

Most other studies have concentrated on the housing needs of the growing urban areas like Kampala and other cities of the developing world. The literature on these is too enormous to be adequately summarised. Nearly two decades ago, a report of the United Nations, (1962:1), concluded as follows----------"World population is increasing at a faster rate, and the new demand for housing and urban services created by this growth, aggravates the problem of inadequate supply of housing." This is the result of high fertility, low and declining mortality, and rural to urban migration of mainly the developing world.

The same report (ibid, p.1), further adds that ------ "the supply of housing at a cost that the lowest income families can afford remains far too small." This view is echoed by other authors such as the World Bank (1975:1), and Hussey (1981:3-6). Most builders of urban houses are interested in high profits; therefore, they build high and middle class houses. This creates problems of shortages in housing especially in the primate cities like Kampala, because most of the urban migrants are in the low income group and cannot afford to pay rents for the available houses.

Hussey (ibid.p.4), observes a set of minimum housing standards which are very high, and a political bias against the least cost structures viewed as "slums" by politicians. As a result, the housing standards set by Governments are often too high to be afforded by the majority of the population. According to her, the gap between affordability and actual housing cost becomes subsidy. When the subsidy element is large, it constrains the Government from providing enough shelters to meet the needs of the population. This is quite true for Uganda, where the Government housing subsidy for senior government workers is 90 percent of the actual price. This has contributed to the Government's failure to provide sufficient housing in the urban areas and to improve rural housing conditions.

According to the World Bank (op.cit., p.3), by 1980, nearly a quarter of the people in developing countries, some 550 million, would be living in cities, and by the year 2000, the number would increase to 1,200 million. This unprecedented increase in the number of urban dwellers will pose a major challenge for urban development and housing policies. However, in a country like Uganda, the increase in the number of urban dwellers could be greately reduced when the rural conditions are improved. This would curb the rural to urban exodus.

Dakhil et. al, (1978:5) argues that the idea of increasing the stock of housing for a rapidly growing urban population may result into other difficulties such as lack of resources especially for rural development, shortage of building materials, lack of skilled labour and improper management. These possible problems could easily be avoided if a country has adequate rural and urban housing policies.

There appears to be very little research and documentation on the housing problem in Uganda in general. In actual fact, no single research has been carried out relating housing conditions to socio-economic factors and mortality. The little information available on the country lays emphasis on housing demand and supply needs of the urban areas, particularly Kampala. This

is the case with studies by Tribe (1968), Milton Obote Foundation (1969), Mulumba (1974), and a recent Conference on Housing Strategies and Policies in Uganda (1981).

Tribe, (ibid,.. p.128), discovered an element of dualism in the urban housing system, a phenomenon attributed to the tendency for planners to pay more attention to the demands of the high income groups and neglecting the low income class, who constitutes the majority of urban population. Other writers have attributed the development of dualism in African urban housing systems to colonial housing policies. This idea is expressed by Mulumba (1981:5), and Kulaba (1981:2-3). Mulumba, (ibid, p.8), points out that -----"the colonization of Africa brought with it, among other things, the urbanization process, not for improving the living standards of the 'native' African, but primarily for the smooth running of colonial administration." In Uganda for example, the colonial government ignored the urban African altogether. It had no housing policy for the low-income African as he was not considered to be part of the urban housing problem. He was a temporary rural visitor to town (migrant worker) and while in town, he had to look for his own dwelling in the suburbs of the town.

Having no alternative, the low income group in Kampala built poor houses in the nearby City Council land. The result of this is seen in the growth of the present slums like Kisenyi, Makerere Kivulu, and Wabigalo. In Kenya, Kibera, Majengo, and Mathare areas are pertinent examples. The situation is not likely to change soon because, as Kulaba, (op.cit, P.2) points out ----"many African countries continue using the planning, and legislation procedures and ideas of their former colonial powers". This means that the low-income class will continue living in suburbs where housing conditions are sometimes even worse than those of rural areas.

Although many slum houses are poor, the government should place a value on them and to about improving their environment instead of destroying them without even compensating the owners. Hussey (op.cit, P.4) argues that there is no need for Governments to destroy houses built by the low income group. This is because the replacement costs for these houses are beyond the reach of some governments like Uganda. The cheapest solution therefore, is to improve the conditions of these areas.

Concerned about the lowest income housing problem, the Uganda Second Five Year Development Plan (1966-1971) noted that ----"the totally inadequate volume of housing

for the lowest income earners in urban areas is a more pressing problem than the substandard quality of such housing problem". In this same Plan (ibid, pp.175-176), the Government took the initiative to make some plan for the rural housing problem. The plan was to tackle the rural housing problem through a Housing Advisory Service. Unfortunately, this scheme encountered tremendous difficulties. Its organization was poor, and it lacked a penetrating impact down to rural levels because of the shortage in requisite resources.

The Third Five Year Development Plan (1971/2-1975/6 PP.358-368) endeavoured to approach the rural housing problem from a different angle. It proposed to develop and disseminate housing designs appropriate to the needs and resources of the rural population and to render the necessary technical assistance. In order to achieve this, the Government was to rely heavily on the Community Development Programme of the Ministry of Culture and Community Development. This programme was to concentrate on the provocation and stimulation of the rural masses on the awareness of the necessity to improve housing conditions as an integral part of raising the standards of living. The programme was also to strive to inculcate into the minds of the rural population the vital importance of self-help effort as a means of achieving this goal through mobilization

of all available resources. Furthermore, the Government also realized the need and importance of Housing Co-operatives and promised to assist in the creation of such Co-operatives both in rural and urban areas. The main function of these Co-operatives was to secure and administer credit for the purpose of essential inputs such as windows, doors, cement, etcetera. These policies would actually have done a lot in improving especially the rural housing, but due to political instabilities, the programmes were not fully implemented. The action programme (A three Years Rehabilitation Plan 1977/78-1979/80), took efforts to create a Housing Ministry with the sole responsibility of designing and implementing housing programmes. Unfortunately, still nothing was implemented.

Presently, the Uganda Government is trying to alleviate the housing shortage in Kampala and other urban areas by rehabilitating the building materials industry, and encouraging the construction of more houses. It apparently does not put much emphasis on the rural housing problem. However, if the idea of rehabilitating the building materials industry is effectively implemented, the benefits are also likely to be received by the rural masses. This will be the case if more materials are produced and sold at reduced prices which some rural people can afford. In the urban areas, the programme of constructing more houses has to be carefully planned to avoid disappointment. For

instance, if care is not taken, the construction of more houses is likely to be done by outsiders and some rich people of Uganda. These people are likely to price their houses beyond the capacity of the low-income group who constitutes the majority of the urban people.

Our review of literature on housing brought us to one important observation about land tenure and the quality of housing conditions. The Milton Obote Foundation Conference (1968:66-68) pointed out that land tenure system is one factor that might hinder individuals from putting up private houses in a given area. It is also an important determining factor with respect to the class of a house to be built either in a rural or urban area. Individuals cannot be encouraged to build permanent houses on a land where they are not sure to stay for the whole of their life or to pass them over to their children at the time of their death. The existing land tenure system therefore should be examined when designing housing improvement programmes. In Uganda, there are four types of land tenures[2]; communal, individual freehold, leasehold, and the temporary occupation licence rights. Each of these could have its own implications with regard to the quality of housing conditions for the individuals concerned.

2 The four types of land tenure are (a) "communal," where the land is vested in the community, e.g. clan or a family; (b) "individual freehold", where land is vested in individual ownership, e.g. the mailo land; (c) the "leasehold" where the owner (landlord) grants interest in the land to another person or persons for a specific period of time ranging from 3 to 99 years; (d) "temporary occupation licence rights", where the Government or the Municipality grants a temporary permit to a person to stay on a plot of land until the land is ripe for high class development.

What we have reviewed on housing problem in Uganda shows that the past and present planners have been biased towards the urban housing problems. The rural housing problem was neglected by the colonial government and the subsequent governments have also paid little attention to its housing needs. This study however, and probably those to come in the future will show the planners the intensity of the housing problem in Bushenyi and other rural areas in Uganda.

From the literature reviewed, it was discovered that most of the writers have used the demand and supply factors in studying the housing problem. They have further studied the problem by projecting the future population figures as well as their respective characteristics, and accordingly assessing what such populations would require in terms of housing. Such methods have one short-coming which our study intends to cover; that is the need to detect the possible social and economic factors responsible for the prevailing housing conditions, and a further need to assess the likely implications of the existing housing conditions to the"general well-being"of a society as defined on page 58 of this chapter.

Furthermore, the review of available literature showed that most of the writers have concentrated on the urban housing problem. This is mainly because the planners have fears that urban populations are growing much faster through the rural to urban migration

process. This has resulted in a serious lack of concern about the rural housing problem, yet this is the problem faced by the majority of the people in Uganda. There is a need to cover this gap so as to effect a more balanced planning for the nation as a whole.

Finally, among the literature viewed, we agree with Ramachandran (op.cit. p.171), who articulates the importance of considering water supply, sewage disposal, lighting, and ventilation when making a choice of a shelter, because these factors are directly related to morbidity, mortality, and hence working capacity or productivity of the population. Marris (op.cit. p.82-83) is of a similar view that housing conditions contribute to the society's general well-fare and productive ability. Their ideas are used in formulating the theoretical structure of this study as explained in the next section.

3.5. The theoretical Postulation and research hypotheses

The theoretical backgrcund on which this study is built, is based on the general assumption that poor housir conditions will always have adverse effects on the general well-being of the people, and the economic growth and socio-economic development of any given society. We also believe that the reverse is true that po economic growth and socio-economic development have negative effects on the general housing conditions and consequently, the wellbeing of the people.

The key concepts in this theoretical formulation are, poor housing conditions, general well-being of the people, economic growth, and socio-economic development. These concepts are defined below for the reader to be in a better position of understanding this thesis.

The magnitude of the housing problem in especially Developing Nations has generated a great deal of interest on the part of various government planners, United Nations and other International Development Organizations. However, there appears to be no general consensus on the meaning of the term "housing". The World Health Organization, (1961:5), defined housing as a residential environment, neighbourhood, micro-district, or the physical structure that mankind uses for shelter. The environment of that structure includes all necessary services, equipment and devices needed for the physical health, and social well-being of the family and the individual. According to United Nations (1976:1), the concept of housing is more than merely a physical shell. It encompasses all the ancillary services and community facilities which are necessary to human well-being. The United Nations Centre for Human Settlement (Habitat, 1979:15-22) says that housing is used to connote water supply system, sewage and garbage disposal systems, electricity and other types of power, facilities such as markets, health centres, social and cultural areas and recreation centres.

According to our study, housing conditions revolve around various factors such as type of materials used in construction of shelter, the age of the structure or house, size of the structure, occupancy, equipments in the dwelling unit, location and type of facilities like water, toilet, cooking, bathing, etcetera. Since housing conditions consist of a number of components, this study is limiting itself to major components of the housing package; these include shelter, water and toilet facilities. Housing conditions will be considered to be poor if the shelter is made of unimproved traditional materials, with inadequate sources of water, as well as toilet facilities.

We have not come across any specific definition for the term "well-being of the people". To Okonjo, (1975:35), the general well-being of the people is reflected in the general health status of the population. According to Kalule (1976:17), a society's general well-being goes up with improved health care (particularly maternal and child care, as well as health preventive measures for the society as a whole), improved education and other important social services. In our study, "well-being of the people" is broadly defined to include the quality of shelter, water source, toilet facilities, and the general health status of the population, which is measured through the levels of infant mortality, crude death rate and life expectation at birth. In actual fact, the higher the well-being of the people the more the potential for economic growth and socio-

economic development.

Most economists consider economic growth to be an increase in production. It is normally measured through the Gross National Product or the Net National Product. Samuelson (1961:800) argues that certain factors have to change for economic growth to be realized. The quantity and quality of the productive population must, for example increase, and the stock of capital goods and available technology should also improve to enable increased production. This means that if Bushenyi is to achieve economic growth, the working group must be bigger than the consumers (the dependency ratio should fall), and available skills and levels of technology should also improve to afford a more effective exploitation of the available natural resources. Investment levels should accordingly go up.

Socio-economic development is an advanced stage of economic growth. According to Samuelson (ibid:pp.755-81 socio-economic development occurs when there is an improvement in the quantity and quality of goods and services produced; and when there is equal distribution of these products. In our case, such a development should be followed by improved technologies and skills of shelter construction, water and toilet facilities.

From the proposed theoretical framework, we have developed some hypotheses which, together with the theoretical framework can work as guidelines to our study. However, due to certain limitations as already pointed out in section 3.3, only a few hypotheses can be formulated and tested successfully in this work.

Looking at education level and economic activity of the head of the household as factors which might be responsible for the poor housing conditions in Bushenyi District, we hypothesize that:-

(i) There is a direct positive relationship between education status of the head of household and the quality of housing conditions. This means that the higher the education level for the head of the household, the higher the quality of housing conditions, and vise versa.

ii) There is also a direct positive relationship between the economic activity of the head of the household, and the quality of housing conditions. In other words, the better the head of household occupation in terms of payment, the better the quality of housing conditions.

Believing that housing conditions are directly related to morbidity and of course, mortality, we further hypothesize that:-

iii) Mortality varies inversely with housing conditions. In other words, the poorer the housing conditions, the higher the mortality (especially infant and child mortality), and vise versa.

The validity of the above suggested possible relationships are tested in the next two chapters, four and five. The last section of this chapter, gives definitions of other concepts used in this work.

3.6. Definition of other important concepts used in this work.

The first five definitions are taken from the 1980 Uganda Population Census Enumerators Manual and the rest are from the United Nations Multilingual Demographic Dictionary (1958).

(1) Temporary class of housing: This consists of structures with roofs made of bushpoles and thatch, walls made of either bushpole with mud or with thatch and floor made of earth or cowdung.

Permanent class: These are the structures with roofs made of galvanized corrugated iron sheets, tiles, asbestos and concrete; walls made of burnt bricks or cement blocks, stone or concrete; and floors made of either concrete, tiles or bricks.

Semi-permanent structure: These are the structures which are built with permanent and temporary materials. For example, the roof may be made of galvanized corrugated iron sheets while the walls are made of mud and bush pole and the floor made of earth.

In addition to these very important concepts, the others that will also appear very often in this work are defined below:

Household: This may be a one person household, that is a person who makes provision for his/her own food or other essentials for living without combining with any other person: or a nuclear family, as well as a multi-person household. A multi-person household is a group of two or more persons living together under one roof or different houses who make common or separate provision under one head for food or other essentials of living.

Dwelling Unit: is a statistical abstraction denoting housing accommodation appropriate for occupation by household. Dwelling unit may also be culturally defined as is the case with homestead, village and settlemen

Migrants: These are people enumerated in places other than their places of births. For example, people who were enumerated in Bushenyi District in 1980 Uganda Population Census but were born in other districts are migrants of Bushenyi District (the question of duration of stay is in this case disregarded).

Crude Death Rate: This is generally an annual rate and consists of the ratio of the annual number

of deaths occurring during a calendar year to the number exposed to the risk of dying during the same period. It can be expressed as,

$\frac{D}{P}.K$ where D is the total number of deaths in a year

P is the total population

K is a constant, normally 1000

Infant Mortality: This is the mortality of live born children who have not yet reached their first birth day.

Crude Birth Rate: This is the number of live-births that occur in the population in one year per 1000 population. It is normally computed as follows:

$\frac{B}{P}.K.$ where:-

B is the total live births in a year

P is the total population

K is a constant, normally 1000.

Total Fertility Rate: Is the mean number of births occurring to a woman who lives to the end of her reproduction life (15-49 years).

Rate of Natural Increase: These are births minus deaths of the same period usually one year per thousand people

In summary, chapter three has stated the problem and the objectives of the study. It has also discussed the scope and limitations of this study. Finally the chapter has covered theory formulation and literature review on housing conditions. The next chapter four examines the existing housing conditions in Bushenyi.

District, and their relationships to the education status and economic activity of heads of households.

CHAPTER FOUR

HOUSING CONDITIONS AND THEIR RELATIONSHIPS TO SOME SOCIO-ECONOMIC ASPECTS

The major objective of this chapter is to give a general overview of the existing housing conditions in Bushenyi District, and to see how variations in the quality of these conditions relate to some important socio-economic aspects, namely education level and economic activity of the head of household. It is our belief that the amount of formal education attained particularly by the head of the household and his economic activity are among the basic factors determining the quality of the housing conditions for a given household

Whereas education makes the head of household more aware of the need to raise living conditions for his people his type of occupation strongly determines his financial ability to meet the required improvements. There are of course other factors that can once in a while influence somebody's decision on the quality of shelter he should put up for his family. For example, we can think of the existing land tenure system. This determines how long somebody can stay on a piece of land and what he can confidently do on that land. We can also probably mention somebody's future plans. Does he, for example, intend to stay permanently or he intends to migrate?

All these are important factors in determining the quality of housing conditions - the shelter in particular - for a household. In this analysis however, we are holding all the other possible determining factors constant and varying only education and economic activity.of the head of household.

We first of all give a general picture of the existing housing conditions from the point of view of materials used in construction of shelters, classification of shelters into permanent, semi-permanent, and temporary categories, (see definitions in section 3.6 of chapter three) the nature of the important facilities like toilet, sources of water, power for cooking and lighting and ventilation.[1] Due to limitations in our data however, important housing conditions components like the age of structure, its height, geographical location, etcetera are among the many that are not analysed in this work. After the general overview, attempts are made to establish relationships between housing conditions - the quality of shelter in particular - and the education level, and of the head of household.

The major analytical techniques used in this chapter are principally proportions and percentages. In a few cases, where possible and necessary the "differential

1 The 1980 Uganda Population Census did not collect information on ventilation. But the author has visisted the area as well as other places with similar housing conditions, and can therefore comment effectively on the conditions of ventilation in the area.

proportions technique", explained in United Nations (Manual VI, 1970:45; and in Bogue, 1967:117), is employed particularly to elicit the relationships between housing conditions and the selected socio-economic aspects. With this technique, coefficients of dissimilarity are calculated to show the degree of selectivity that exists between various housing conditions and education levels, and economic activity of the head of household.

4.1 Types of dwelling units and materials used in Construction

A dwelling unit (defined in chapter three section 3.6 is usually either in the form of a house, an apartment, flat or a hut. A breakdown of the total number of dwelling units in the study area into houses, flats, apartments and huts is as follows. Our sample is made up of 1037 dwelling units[2] altogether, out of which 80 percent are houses, 11.5 percent are huts, 4.8 percent are flats, and 3.7 percent are apartments. This distribution as well as that of materials used on walls, roofs and floors is detailed in table 4:1 at the end of this section. There is nothing much to say about this distribution apart from the suggestion that probably most of the shelters in the district are owner occupied since flats and apartments which are usually for hiring are relatively few. The proportion made of huts is undesirably too high especially as they tend to be constructed wholly with impermanent materials particularly thatch, and they are usually very small for the family.

2 The study is made of 1000 households living in 1037 dwelling units. This means that a few households have more than one dwelling unit on their compounds.

The type of materials used to construct shelter play a big role in determining the quality of that shelter. This is so because the more durable the materials are, the more permanent and the better the shelter. An analysis of materials used in the construction of dwelling units in the area reveals a very appalling situation. The full picture of materials used in the construction is presented in table 4:1. With respect to materials used in the construction of walls, the table shows that a very big proportion of the dwelling units (94.4 percent) is made of units with impermanent walls constructed either with bush pole and mud, thatch, or other temporary materials. Houses and apartments are particularly characterised with walls made of bush pole with mud. Walls made of thatch are extremely common with huts while permanent walls are mainly found in flats, 66 percent, and apartments, 23.7 percent. This means that most of the shelters in the district are made up of walls which can easily be destroyed by termites, fire, wind or even flowing water.

The situation is not any better with respect to roofing materials. As can still be learnt from table 4:1, 63.5 percent of all the dwelling units are roofed with thatch materials; only 36.5 percent are covered with permanent materials mainly iron sheets, 35.2 percent, leaving only 1.3 percent to other permanent materials like tiles, asbestos and concrete. It is worth

noting that all the huts are roofed with thatch. Permanent roofing is most common among flats -86 percent, apartments- 39.5 percent, and houses - 38.7 percent. The normal expectation would be one hundred percent permanent roofing for both the flats and apartments.

The units are equally poorly floored; 90 percent are floored with temporary materials mainly earth, while only 10 percent are floored with permanent materials like concrete, cement and bricks. As expected, the biggest proportion with permanent floors are found among flats - 50 percent, and apartments - 60.5 percent. Houses and huts are mainly floored with earth, 93.7 percent and 88.2 percent respectively. This means that a very big proportion of dwelling units in the district have floors which cannot be properly cleaned by washing with water.

The above findings about the types of materials used in the construction of dwelling units in the district reveal that most people in the area are badly sheltered, and therefore exposed to many risks. Most of the structures are temporary and can collapse at any time. They can easily catch fire, be blown down by wind or washed away by flowing water. Furthermore, the structures are susceptible to keeping house pests like rats, bats, snakes, and lots of harmful insects including ticks, bed-bugs, fleas, lice and even giggers. The dangers of these pests to human survival are very obvious and do not

demand over-emphasis. It is not uncommon, for example, to hear of people dying of snake bites. On the other hand, skin diseases resulting from bites by fleas, lice, bed-bugs and giggers are common under such conditions. Since such insects usually feed on blood, the problem of anaemia would not be a surprise in any society where such insects are found. Tick bites are responsible for "relapsing fever" and, in additio to destroying food and other property, rats are partly responsible for the development and spread of plague, and anybody bitten by a rat can easily suffer from "rat bite fever".

Table 4:1 The Distribution of Total Dwelling Units by Type of Dwelling Unit, and Materials Used on Walls, Roofs, and Floors.

Type of Dwelling Unit	Absolute Share by Type of Dwelling Unit	Wall Materials Percent Distribution					Roof Materials Percent Distribution				Floor Materials Percent Distribution			
		Permanent	Bush Pole with Mud	Thatch	Others	Total %	Permanent	Thatch	Other	Total %	Permanent	Earth	Others	Total %
Houses	830	1.8	95.7	1.8	0.7	100	38.7	61.3	0	100	6.3	93.7	0	100
Flats	50	66.0	20.0	8.0	6.0	100	86.0	14.0	0	100	50.0	20.0	30.0	100
Apartments	38	23.7	73.7	0.0	2.6	100	39.5	60.5	0	100	60.5	39.5	0	100
Huts	119	0.8	34.5	60.5	4.2	100	0.0	100.0	0	100	3.4	88.2	8.4	100
ABSOLUTE TOTAL	1037	58	873	91	15		379	658	0		104	908	25	
PERCENT DISTRIBUTION	100	5.6	84.2	8.8	1.4		36.5	63.5	0		10.0	87.6	2.4	

Source: Computed from 1980 Population Census - 'Uganda'

4.2 The classification of dwelling units:

In classifying a dwelling unit as permanent, semi-permanent or temporary, the main determining factor is the combination of materials used to construct that unit. A dwelling is classified as permanent if all its materials - materials for the walls, roof and floor - are permanent. On the other hand, if a house is made of mixture of both permanent and temporary materials, then it is classified as semi-permanent. Finally, a dwelling unit is temporary if it is fully constructed with temporary materials (see also section 3.6 of chapter three).

What is presented in section 4:1, shows that most of the structures in Bushenyi District are temporary To facilitate the analysis in the rest of the chapter, as well as chapter five, we make a detailed classification of the dwelling units in the district.

Out of the 1037 sample units, 658 or 63.5 percent are temporary; 351 or 33.8 percent are semi-permanent; and only 28 or 2.7 percent are permanent. Apparently, a very big proportion of the houses in this area fall under the temporary class. The main characteristics of these dwelling units are walls made of bush poles with mud, roofs made of thatch, and floors made of earth. A detailed examination of this class further reveals that out of the 658 temporary units, 91 or 13.8 percent (mainly huts) have both their walls and roofs made of

thatch. This proportion is 8.8 percent of the total dwelling units - 1037. The semi-permanent structures - mainly houses - are charaterised with walls made of bush pole with mud, roofs made of iron sheets and floors made of earth. The proportion permanent is, of course, negligible and it is mainly made of flats and apartments.

There are a number of shortcomings connected to the use of temporary materials in constructing a shelter. The biggest problem of course, is that such shelter is temporary. And, as mentioned earlier in section 4.1, it is liable to collapse any time there is a strong wind, rain, or even an incidence of fire or an attack by termites. Another problem is that such a dwelling unit is hard to keep free of dust; it cannot even be washed. Provision of adequate ventilation is a problem especially when construction is fully with temporary materials. For example, there is no way ventilators can be fixed on a hut wholly made of thatch. And with temporary materials, it is hard to make a dwelling unit large enough to avoid overcrowding. Furthermore, partitioning into rooms a hut fully made of thatch is not easy and yet, such partitioning is very important especially if appropriate living arrangements are to be achieved..

4.3. Number of rooms and average number of persons per room

The size of a dwelling unit and the number of rooms

in it are very important aspects of housing conditions. This is so because the more room[3] there is per person, the healthier the population and vise versa. On the other hand, the more number of rooms there are for a given household, the easier it is to achieve the appropriate living arrangements.

Considering the relationship between total number of rooms and dwelling units, the study reveals that the overall average number of rooms per dwelling in the district is 2.9. Seperate figures for the three classes, i.e. permanent, semi-permanent, and temporary are 2.9, 3.2, and 2.7 rooms respectively. A detailed picture of the number of rooms by class of structure is presented in table 4:2(a). The table shows that the biggest structures in terms of number of rooms are within the permanent class. In relative terms, the permanent class also dominates in the structures with one room. Further examination of the table shows that the temporary class of structures is characterised by sizes of two and three rooms, while the semi-permanent class structures are dominant in the sizes of four, five and six rooms. These observed facts are detailed in table 4:2(b). A careful study and understanding of the

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3 Unfortunately, the study did not collect information on the sizes of rooms and heights of walls, so we can not discuss density in the actual "technical" sense; neither can we comment effectively on the degree of crowdness in the dwelling units. We are only talking about average numbers per room irrespective of area.

Table 4:2(a) Distribution of housing structure by class, No. of rooms and density per room.

Class of structure	Total No. of units		One Room		Two Rooms		Three Rooms		Four Rooms		Five Rooms		Six Rooms		Seven Rooms		Total No. of rooms by class	Average No. of rooms by class	Population by class (Total)	Average No. of persons per room
	Abs.	%	Abs	%	Abs	%	Abs	%	Abs	%	Abs	%	Abs	%	Abs	%				
Permanent	28	2.7	13	9.5	1	0.3	4	1.3	4	2.2	2	3.3	0	0	4	16.0	81	2.9	93	1.2
Semi-permanent	351	33.8	48	35.0	58	19.2	104	34.2	84	45.9	33	55.0	18	72.0	6	24.0	1,127	3.2	2,092	1.9
Temporary	658	63.5	76	55.5	244	80.5	196	64.5	95	51.9	25	41.7	7	28.0	15	60.0	1,804	2.7	3,357	1.9
Total	1,037	100	137	100	303	100	304	100	183	100	60	100	25	100	25	100	3,012	2.9	5,542	1.8
% distribution	100		13.2		29.2		29.3		17.7		5.8		2.4		2.4		-	-	-	-

Abs. = for absolute

Source: Computed from the 1980 Population Census data - Bushenyi District

Table 4:2(b) Differential indices for the number of rooms by class of structure

Class of structure	% distribution by class of structure	One room		Two rooms		Three rooms		Four rooms		Five rooms		Six rooms		Seven rooms	
		% distribution	P.P.D	% distribution	P.P.D	% distribution	P.P.D	% distribution	P.P.D	% distribution	P.P.D	% distribution	P. P.D	% distribution	P.P.D
Permanent	2.7	9.5	+6.8	0.3	-2.4	1.3	-1.4	2.2	-0.5	3.3	+0.6	0	-2.7	16.0	+13.3
Semi-Permanent	33.8	35.0	+1.2	19.2	-14.6	34.2	+0.4	45.9	+12.1	55.0	+21.2	72.0	+38.2	24.0	-9.8
Temporary	63.5	55.0	-8.0	80.5	+17.0	64.5	+1.0	51.9	-11.1	41.7	-21.8	28.0	-35.5	60.0	-3.5
Abs. Total	1,037	137	-	303	-	304	-	183	-	60	-	25	-	25	-
Co-efficient of Dissi-milarity	-	-	8.0	-	17.0	-	1.4	-	12.1	-	21.8	-	38.2	-	13.3

Note: P.P.D = Percentage point difference. This is obtained by finding the difference between the percentage distribution of all dwelling units by class, and the percentage distribution by a given number of rooms.

The coefficient of dissimilarity is obtained by summing all the percentage point differences of similar signs (negatives, or positives). It indicates the magnitude of selectivity in terms of (attraction (+) or rejection (-) percent..

Source: Computed from the 1980 population census data (Bushenyi District).

percentage point differences and coefficients of dissimularity in the table 4:2(b) will clearly elicit the above observed relationships. It is apparent from table 4:2(a) that most of the structures (76.2 percent of the 1037 units) are in the sizes of two to four rooms. More important however, is examining the relationship between available room and total population.

Relating the total number of rooms to total population, the results show that on the average there are 1.8 persons per room in the district. With respect to the three classes, the ratios are 1.2, 1.9, and 1.9 respectively for permanent, semi-permanent and temporary. These ratios are presented in the table 4:2(a). The table also shows the distribution of the total number of rooms by classes of structures, as well as the break down of the total surveyed population by the three classes of dwelling units. The proportion living under permanent structures is apparently very small and negligible.

Notwithstanding the lack of information on the size of dwelling units in terms of area, we can afford to say that on the average, dwelling units in Bushenyi District are not overcrowded. According to United Nations (1976:43), structures with three or more persons per room are the ones that can be considered to be crowded. It has to be stressed however, that there are no internationally set standareds as to how many people

should actually live in a given type of house. According to Bogue, "One person or fewer per room is regarded as desirable, and 1.51 or more persons per room may be defined as "crowded" housing (Bogue 1969:372)

Table 4:3 give some standards set by selected coutries in the world. Obviously standards set by some countries are ambiguous and no doubt faulty. For example, Ghana's standard of 10 persons per dwelling unit is not clear, neither is Libya's standard of 1.20 households per dwelling. In other words, there is a need for internationally set standards to be followed by countries in various regions of the world. Such standards should of course, vary according to variations in climatic conditions, as well as traditions and cultures of various societies.

Although Uganda has not yet defined her acceptable standards, we are of the opinion that age and sex should be taken into consideration when setting acceptable standards. Of course, society's traditional and cultural beliefs with respect to living arrangements have to be strictly observed as they are the major determining factors in deciding as to who should sleep with who in a given household structure. Beliefs on living arrangements can easily result into overcrowding of some rooms in a dwelling unit. Such an overcrowding may not be detected when only averages are considered. In a country like Uganda where airborne diseases (like acute respiratory infection, pnuemonia, measles,

Table 4.3 Maximum acceptable levels of densities by selected countries

Country	Levels of density
Algeria	2 persons per room
Chile	2 persons per room and 13 ^{2}m a room. Overcrowding is determined by considering sex and age of occupants in relation to number of rooms
Ghana	10 persons per dwelling unit.
Hong Kong	35 sq.ft. per person.
Japan	15 ^{2}m per housing unit and 4.2 ^{2}m per person.
Libya	1.20 households per dwelling.
Peru	2 persons per bedroom with one traditional room per person.
United Arab Rep.	Less than 5.0 persons per dwelling, for a three room dwelling
Zambia	2 persons per room

Source: United Nations: Methods of estimating housing needs, in Method Series F No.12 New York, UN 1967.P.80.

tuberculosis, whooping cough and influenza are common, the acceptable standards should be at most two persons per room. The actual size of the room should of course be determined by the relevant professionals. Information on household average structures from the point of view of relationship to head of household, and household size is equally important in designing acceptable living standards.

4:4 Household size by class of building

As observed above, information on relation to head of household, as well as household size is important especially in designing realistic living standards for a given area. We are presently not in position to give the average picture of household structure from the point of view of relationship to head of household; we however treat household size by class of dwelling units.

A considerable proportion (39.2 percent) of the total number of the sampled 1000 households is made up of 7 people or more. This proportion is highest in the semi-permanent class - 47.3 percent, and smallest in the permanent - 29.2 percent. It is 35.1 percent for the temporary class (see table 4:4(a)P-82 If such households are to avoid over-crowding, then they must live in dwelling units with more than the observed average number of 2.9 rooms per dwelling unit. However,

as we discovered in the above section 4.3, on the average the semi-permanent structures have about 3.2 rooms which is slightly above the average. The temporary however, have 2.7. This is below the average; and in actual fact, given that 35.1 percent of the temporary structures have big household sizes of seven or more people, there is a strong likelihood that many of the temporary structures are overcrowded. The permanent structures have an average of 2.9 rooms per unit. But at the same time they were found to have some of the largest structures in terms of rooms (see section 4:3). Hoping that these big structures are the ones belonging to the big households of 7 people or more, it can be speculated that probably, the permanent structures in the district are not over-crowded.

We can still learn from table 4:4(a) that there are very few people who stay either alone or in groups of two to three. Obviously, this is partly due to the phenomenon of extended family, and partly due to the already observed high fertility in the area. Studies on family sizes have shown that families of 2 to 3 persons per household are common in developed communities, and large families of 5 to 6 or more persons per household in less developed communities (Kuznet, 1978:178).

Table 4:4(a) Distribution of sampled households by household size and class of structure

Class of Structure	Total No. of households	Household Size						
		One	Two	Three	Four	Five	Six	Seven
Permanent	24	7	3	4	2	1	0	7
Semi-Permanent	349	33	30	31	26	37	27	165
Temporary	627	29	60	73	89	86	70	220
Total	1000	69	93	108	117	124	97	392
Percent Distribution	100	6.9	9.3	10.8	11.7	12.4	9.7	39.2

Source: Computed from the 1980 Uganda Population Census data (Bushenyi District).

The application of the differential proportions technique (already referred to at the beginning of this chapter) to the distribution of household size by class of structure, suggests that single household sizes are selective of the permanent and semi-permanent classes of structures. Temporary structures are apparently characterized mainly by medium size households of three to six people. Very big households of seven and more seem to be selective of the semi-permanent structures. These observations are drawn from a careful study of the percentage point differences and the accompanying co-efficients of dissimularity presented in table 4:4(b).

Table 4:4(b) Differential Indices for the distribution of sampled households by household sizes and class of structure.

Class of Structure	Distribution of sample households	One		Two		Three		Four		Five		Six		Seven	
		% Distribution	PPD	% Distribution	PPD	% Distribution	PPD	% Distribution	PPD	% Distribution	PPD	%Distribution	PPD	% Distribution	PPD
Permanent	2.4	10.2	+7.8	3.2	+0.8	3.7	+1.3	1.7	-0.7	0.8	-1.6	0	-2.4	1.8	-0.6
Semi-Permanent	34.9	47.8	+12.9	32.3	-2.6	28.7	-6.2	22.2	-12.7	29.8	-5.1	27.8	-7.1	42.1	+7.2
Temporary	62.7	42.0	-20.7	64.5	+1.8	67.6	+4.9	76.1	+13.4	69.4	+6.7	72.2	+9.5	56.1	-6.6
Abs. total	1000	69.0	-	93	-	108	-	117	-	124	-	97	-		
Co-efficient of dissimilality	-	20.7	20.7	-	2.6	-	6.2	-	13.4	-	6.7	-	9.5	-	7.2

Note: PPD = Percentage Point Difference
Source: Computed from the 1980 Population Census Data (Bushenyi District).

The findings above as well as those made about materials used in the construction of dwelling units in the district, are important especially with respect to planning for improvements in the quality of shelter. We have already noted that housing conditions mean much more than the quality of shelter. Probably even more important than the quality of shelter, is the source of water, and the nature of available sanitary facilities. These two aspects need priority consideration in studying housing conditions for any given area, and designing policies for improving such conditions.

4.5. Available sources of water in Bushenyi District

Water is an extremely important component of housing conditions. Without it, man cannot survive; neither can other types of animals or even plants exist. Therefore, no water, no life of any form. However, for man to have a healthy life, available water must be of good quality. The use of poor water by man will no doubt affect his life. As is reported by the Earthscan Press Briefing, (1981), water borne diarrhoeal diseases kill six million children annually, and contribute to the deaths of 18 million more. Among the major diseases caused by bad drinking water are diarrhoea, infective hapatitis, typhoid, cholera and guinae worm. There are other diseases that can develop through a mere skin contact with polluted water. Diseases like hook worm, strongyloides infection, and bilharzia are commonly caused by skin contact with polluted water - (Village Housing in the Tropics; 1970). Therefore, for man to survive well, there must be water, and this water must be of good quality so as to avoid all the above mentioned water-borne diseases.

The safest source of water is of course, the refined or treated pipe water. Unfortunately, such type of water is rare in rural areas like Bushenyi because of the high costs involved in refining and piping it to the settlements which are in many cases very scattered. In the absense of piped water, the other possible source is the bore-hole, which though relatively safe, is equally

rare in the District. The commonest sources are the stream, well and spring. Water from such sources is rarely clean, and unless precautions such as boiling and filtering are taken, the users stand very big chances of falling sick.

A very big proportion of the households in Bushenyi District - 72.5 percent use the well or spring as their major sources of water. The safest sources, i .e. the pipe, and borehole, serve very small proportions of the households - 3.7 percent and 1.6 percent respectively Stream water which is worse than well or spring, serves 22.2 percent of the households. These proportions are well presented in table 4:5.

Table 4:5 Distribution of class of structure by water sourc

Class of Structure	Absolute Totals	Percent distribution (%)			
		Piped water	Bore hole	Stream	Well or Spring
Permanent	24	50	45.8	-	4.2
Semi Permanent	349	7.2	0.6	16.2	76.0
Temporary	627	0	0.5	26.3	73.2
Total	1000	3.7	1.6	22.2	72.5

Source: Computed from the 1980 Uganda Population Census. (Bushenyi District)

It can be learnt from table 4:5 above that the proportions vary by class of structure. For example, the percentages using piped water are 50 for the permanent class, 7.2 for the semi-permanent, and zero (0) for the temporary class. The proportions using bore-hole are 45.8 percent for the permanent, 0.6 percent for the semi-permanent, and 0.5 percent for the temporary. The worst source of water - the stream - is used as follows: zero (0) percent for the permanent, 16.2 percent for the semi-permanent, and 26.3 percent for the temporary.

In other words, the population living in the permanent and semi-permanent classes of housing is exposed to relatively better sources of water than that living in temporary structures. In actual fact, the proportions exposed to unrefined water are 99.5 percent for the temporary, 92.2 percent for the semi-permanent, and only 4.2 percent for the permanent. With respect to total population, the proportion is 94.7 percent. This is higher than that of Zambia - 73.1 percent in 1969 (see Compedium of Housing Statistics, 1971:30); but equal to that of Tanzania, 94.2 percent (Edvardsen et al, 1969:36).

We have already noted in this chapter that it would be extremely costly for the Government to embark on a programme of supplying treated pipe water to such a rural population. This should actually be a long time target.

The immediate short-run solution would be to find means and ways of improving the quality of the available sources, and encouraging people to boil and, if possible, filter any water before drinking it. For such programme to achieve its objectives however, it must go hand in hand with improvements in the sanitary facilities - the toilets in particular - for a given area.

4.6 Toilet facilities in the District

Toilet facilities constitute a very vital component of housing conditions. Lack of proper toilet facilities leads to improper disposal of faeces. This has usually contributed greatly to the development of very serious communicable diseases particularly cholera, dysentery, and other diarrheal diseases which, as mentioned in the above section 4:5, are currently responsible for a very considerable proportion of the total deaths especially in the less developed countries. This is reported by the Earthscan Press Briefing (op.cit.) intestinal round worms, hook worms and flat worms together infect some one third of the world's population. Their eggs are deposited on the soil in human faeces. In heavily infected people, the worms inside them can absorb the nutrients of most of the food they eat. This, no doubt, leads to malnutrition and lots of abdominal complications.

If all these sanitary problems are to be avoided, then proper toilet facilities must be ensured, and the toilets must be acceptably located in relation to the

source of water, of the kitchen, and the main house. In actual fact, proper location of toilets in relation to the source of water is one of the important considerations to be made in designing water improvement programmes.

The present picture of toilet facilities in Bushenyi District calls for a lot of improvements. According to our findings, of the sampled 1000 households, 92.3 percent use the pit latrine, and only 0.9 percent use water-borne systems. The remaining 6.8 percent have no toilet facilities whatsoever. Most probably many of these with no toilet facilities defecate either in the nearby bushes or their shambas.

The distribution of types of toilet facilities by class of structure is presented in the table 4:6 below.

Table 4:6 Percentage distribution of sampled households by toilet facilities and class of structure

Class of Structure	Absolute numbers of households	Percent distribution of households by type of facility		
		Water-borne	Pit-latrine	No toilet
Permanent	24	37.5.	62.5	-
Semi-Permanent	349	-	96.3	3.7
Temporary	627	-	91.4	8.6
Total	1000	0.9	92.3	6.8

Source: Computed from the 1980 Uganda Population Census (Bushenyi District)

Apparently, the proportions vary from one class to another. For example, 37.5 percent of the households in permanent housing use water-borne systems, while no single household either in the semi-permanent or temporary class of housing does use water-borne toilets. Pit latrines are relatively commonest among the semi-permanent class dwellers - 96.3 percent, and least used by the permanent housing dwellers - 62.5 percent. On the other hand, the 91.4 percent of the temporary housing dwellers use the pit latrine. This proportion is slightly lower than the average for the total households - 92.3 percent. Lack of toilet is commonest among the temporary class households - 8.6 percent, as seen against 3.7 percent for the semi-permanent. No household with permanent housing reported lack of any toilet facilities.

Like in the case of water sources as discussed earlier, the temporary class dwellers are the worst affected by poor toilet facilities. For example, most of the households that reported lack of toilet facilities were from the temporary housing dwellers. This means that the chances of being infected by intestinal round worms, hook worms and flat worms are highest among the temporary class residents. The same people are equally more likely to suffer attacks by diarrheal diseases, since their water is more likely to be affected by poor sanitary facilities.

It should be noted, however, that even in homes where there are pit-latrines, not everybody uses them. Some cultures put it that faeces of infants should not be thrown in toilets, but in either a bush or on a banana tree.[4] It is also common to find young children defecating somewhere in the open; they are actually prevented to go to the pit-latrines to avoid possible accidents of falling into the pits. Unless such faeces are carefully collected and deposited in the toilets, they form a very potential danger to life. Flies easily get in contact with them and carry the dirt to delicate places like drinking cups, to food etcetera. Furthermore, such faeces are sometimes collected by rain water to rivers, streams, and other open sources of drinking water. The result is of course, pollution of drinking water.

Another problem could be with the reported pit-latrines themselves. These latrines are usually too shallow to provent flies from touching the faeces. Worse still, these latrines are usually left uncovered (see Edvadsen and Hegdal; 1969:37). In Uganda, the standard depth for a proper pit-latrine is "not less than 15 feet". But also, this is safe only when it is well covered, properly located in relation to the source of water, the kitchen, and even the main house. These important observations are rarely respected by most pit latrine users.

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4 For example, this is still the practice in actual Baganda traditional societies.

Any efforts to improve housing conditions for the area should first of all plan for positive changes in the quality of water for cooking, drinking, and washing. Such a plan will achieve its objectives only when concurrent efforts are made to improve sanitary facilities - the toilets in particular.

4.7 Physical energy used for cooking and lighting :

The other two important aspects of housing conditions besides water source and sanitary facilities are the types of power used for cooking and lighting. Without power for cooking, man can find it very hard to survive since he will not be able to eat some food unless it is cooked. And unless he has lighting power, he will be very miserable at night and may not be able to avoid many possible dangers.

For man to survive comfortably, both powers must be available to him. Of course, the better the quality of these powers, the higher the standard of life and vise versa. Although there is no recommended lighting or cooking power, we believe that electricity is the best as it leaves the dwelling unit free from any smoke, soot or even dust.

The distribution of the classes of building by power used for lighting and cooking is as presented in table 4:7.

Table 4:7 Distribution of Classes of building by power used for lighting and cooking

Type of Structure	Total Structure	Cooking Power				Lighting Power			
		Electricity	Paraffin	Charcoal	Fire Wood	Electricity	Paraffin	Hearth Fire	Others
Permanent	24	-	2	6	16	4	20	-	-
Semi-Permanent	349	-	3	26	320	3	332	10	4
Temporary	627	-	-	3	624	-	549	70	8
Total	1000	-	5	35	960	7	901	80	12
Percent Distribution	100	-	0.5	3.5	96.0	0.7	90.1	8.0	1.2

Source: Computed from 1980 Uganda Population Census (Bushenyi District)

The distribution indicates that almost everybody in Bushenyi District (96.0 per cent) use fire wood for cooking. Use of firewood has its own social and health problems. First, the actual exercise of collecting firewood is a very tidious one, since firewood is not readily available, and has to be head lifted from very far. The exercise is normally for women and children. As a result(as some people have pointed out) women have tended to desire many children to help them in this task, and others like fetching water etc. Thus the high incidence of child bearing. Use of firewood for cooking has another problem of smoke, soot, and dust (ashes) that result from wood burning. These by-products no doubt, have adverse effects on health.

On the side of lighting, 90.1 percent of Bushenyi District uses paraffin in either a latern, lamp or "tadooba".[5] Out of the 90.1 percent households which use paraffin only 5 percent use it in the latern, the other 85.1 use it in "tadoobas". Paraffin used in these "tadoobas" is very dangerous as it pollutes the fresh air, affects the eyes, as well as the general respiratory systems of the users. Besides the use of paraffin, a small proportion of Bushenyi Population (8.0 percent) uses hearth fire as a source of lighting. This is even more dangerous than the "tadoobas" as the hearth fires produce more smoke and ashes in the house. Hearth fire is commonest in the temporary dwelling units. It is not used at all in the permanent structures.

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5 This is illustrated by figure appearing in appendix 4:1

The proportion which uses electricity is very insignificant - only 0.7 percent, and that which uses other sources of lighting like perhaps candles, torches, etc. is 1.2 percent. No household uses electricity for cooking; and for lighting it is used only by 17 percent of the permanent housing dwellers, and 0.9 percent of the semi-permanent housing dwellers. It does not appear anywhere in the temporary structures.

We can comfortably complain that there is no reason why the proportion of households which use electricity both as a lighting and cooking power is too small in a country like Uganda. This country has two powerful falls, (Owen Falls and Kabalega Falls) which can even provide electricity for the whole of East Africa. It can therefore be concluded that the Government of Uganda should utilize these falls more by providing electricity to its population in Bushenyi District as well as other districts of the country. The provision of electricity will result into many incentives of especially rural developments.

Having discussed the major components of housing conditions (shelter, water sources, and toilet facilities) and their implications on the people in the District, we can now relate these housing conditions to education level and working industry of the head of household. It was pointed out at the beginning of this chapter

that these two factors play a major role in determining the type of housing conditions for individual households.

4.8.1 The Relation between housing conditions and some socio-economic characteristics of heads of households:

The three classes of housing conditions - permanent, semi-permanent and temporary are examined in relation to the education and economic activity of the heads of households in order to assess the relationships that exists between these variables. We believe that an understanding of these relationships is vital in the planners' efforts to improve housing conditions for a given society.

In studying the relationships that exist between housing conditions and education level of the heads of households, we also endeavour to test the validity of the first hypothesis (section 3.5 in chapter three)---- that there is a positive relationship between the education status of the head of household and the class of housing conditions. This relationship is studied through a careful analysis of the percentage point differences, and coefficients of dissimilarity as shown in table 4.8(a).

Table 4:8(a) Differential indices for the relationship between housing conditions and education status of the head of the household.

Class of Building Structure	Percent Distribution of total housing structure	No education		Primary 1-4		Primary 5-7		Secondary		University	
		Percent Distribution	PPD	Percent Distribution	PPD	Percent Distribution	PPD	Percent Distribution	PPD	Percent Distribution	PPD
Permanent	2.4	0.3	-2.1	1.0	-1.4	8.2	+5.8	22.7	+20.3	100	+97.6
Semi-Permanent	34.9	32.2	-2.7	37.1	+2.2	40.5	+5.6	50.0	+15.1	0	-34.9
Temporary	62.7	67.5	+4.8	61.9	-0.8	51.3	-11.4	27.3	+35.4	0	-62.7
Absolute Total	1000	608	-	210	-	158	-	22	-	2	-
Coefficient of dissimilarity	-	-	4.8	-	2.2	-	11.4	-	35.4	-	97.6

PPD = Percent Point Difference.

Source: Computed from 1980 Uganda Population Census Data (Bushenyi District).

A careful scrutiny of table 4:8(a) reveals an existence of a high positive relationship between education and housing conditions. The temporary class of housing is exceedingly predominant among the non-educated heads of households. But as education for the head of the households rises, the temporary class of housing starts losing value, giving room, first, to the semi-permanent class, and then eventually to the permanent class. Table 4:8(b) is extracted from table 4:8(a) to give a clearer view of the above observed relationship.

Table 4:8(b) Percentage point differences for the relative distribution of housing conditions by education status of head of household.

Level of Education for heads	Preference by education level of head of household			Coefficient of dissimilarity
	Temporary	Semi-permanent	Permanent	
University	-62.7	-34.9	+97.6	97.6
Secondary	-35.4	+15.1	+20.3	35.4
Primary 5-7	-11.4	+5.6	+5.8	11.4
Primary 1-4	-0.8	+2.2	-1.4	2.2
No Education	+4.8	-2.7	-2.1	4.8

Table 4:8(b) shows that as education rises, the temporary class of housing loses value while the semi-permanent and permanent classes come more on the scene (read vertical columns). Beyond a certain point in education attainment, even the semi-permanent class totally disappears leaving only the permanent class (read table horizontally). For example, the percentage point difference for the preference for semi-permanent class by University graduates is (-34.9) as seen against (-67.7) and (+97.6) for the temporary and permanent classes respectively. The column for the coefficients of dissimilarity shows that the degree of selectivity rises as education level goes up, and it is highest among the University graduates and lowest among the least educated.

The results from this analysis show that our suggested hypothesis is correct i.e., there is a direct positive relationship between the education status of the head of the household and the class of housing conditions. Such observations are quite justified because education makes people more aware of the need to reside in decent class of housing conditions and in addition, it puts them in a better financial status to afford buying permanent materials for housing construction. We proceed to examine a similar relationship between housing conditions and the working industry of the head of household.

4.8.2 The relationship between housing conditions and the economic activity of the head of household

Housing conditions are further examined in relation to the occupation of the head of household. The classification of heads of households by their occupation and class of housing conditions, reveals a strong relationship between these variables. Four major types of occupation are considered; agriculture which includes any type of agricultural activity (hunting, cultivation, and fishing) manufacturing which includes all manufacturing activities; the service and commerce industry.

The study shows that the temporary class of housing conditions is dominated by agricultural workers. And the other two classes of housing conditions (semi-permanent and permanent) are more preferred by manufacturing workers, service workers and those in the well paying commercial activities. The unemployed class of heads of households resides basically in the semi-permanent class of housing conditions. These relationships are well presented in Table 4:9.

Looking at the coefficients of dissimilarity, we can see that temporary houses are not favoured by the workers in manufacturing, services and commercial industries, and favoured by those who are unemployed and those working in agriculture. This then validates the second hypothesis of this study (see section 3.5 of this stud

Table 4:9 Differential indices for the distribution of total study households by class of housing conditions and industry Bushenyi District 1980

Class of Building Structure	Total No. Houses	Un-employed		Agriculture		Manufacturing		Services		Commerce	
		Percent Distribution	PPD	Percent Distribution	PPD	Percent Distribution	PPD	Percent Distribution	PPD	Percent Distribution	PPD
Permanent	24	0	-2.4	1.1	1.3	6.9	+4.5	10.7	+8.3	11.5	+9.1
Semi-Permanent	349	40	+5.1	31.5	-3.4	48.3	+13.4	49.5	+14.6	65.4	+30.5
Temporary	627	60	-2.7	67.4	+4.7	44.8	-17.9	39.5	-22.9	23.1	-39.6
Absolute Total	1000	45	-	807	-	29	-	93	-	26	-
Co-efficient of dissimilarity	-	-	5.1	-	4.7	-	19.9	-	22.9	-	39.6

PPD= Percentage Point Difference
Source: Computed from 1980 Uganda Population Census - Bushenyi District

that there is a direct positive relationship between economic activity of the head of household and housing conditions.

This analysis provides a base for the housing planners who could plan to educate the people and provide employment opportunities especially in the service, commercial and manufacturing industries; this is more likely to improve housing conditions in Bushenyi area as well as other regions of the country.

The analysis of the existing housing conditions and their relationships to some socio-economic aspects, has shown first, that the majority of the people in Bushenyi District reside in the temporary class of housing conditions. This is unfortunate because, as already pointed out, these houses are very difficult to keep clean and normally they lack the required fresh air due to poor ventilation. Furthermore, these houses keep pests and the other mentioned dangerous insects. The dangers of all these to the people are mentioned in this chapter. Secondly, this chapter has revealed that the majority of households in the area have inadequate sources of water as well as toilet facilities. This could be the reason for the possible high incidences of cholera, typhoid and other gastro-intestinal diseases in the area. Thirdly, the analysis of the relationships between classes of housing conditions and education

status of the heads of households has also revealed that housing conditions improve with rising education levels. Finally, it was also discovered that housing conditions are better where the head of the household works either in a service, commercial, or a manufacturing industry.

The next chapter, five, analyses the possible relationships between housing conditions and another dependent demographic variable, namely mortality. It is hoped that the findings in this chapter will help planners to understand more of the housing problem, and appreciate the need for improving the general housing conditions for the people.

CHAPTER FIVE
THE RELATIONSHIP BETWEEN HOUSING CONDITIONS AND MORTALITY.

In the preceding chapter, four, important relationships were discovered between the quality of shelter and the education level as well as the occupation industry of the head of the household. Obviously, such findings are very important to planners in their efforts to make effective housing development policies.

In this chapter, we shall move a step further and examine one of the demographic variables, namely mortality, with respect to varying "shelter conditions" in Bushenyi District. Before we proceed with this exercise, however, it is important to make it clear that our findings will be greatly influenced by important factors like the source of water, and the nature of toilet facilities. As it was noted in the first chapter of this study, the two factors named above are extremely important components of housing conditions, and their influence on peoples' health conditions are very significant. In this study, the influence of these two factors on mortality is unfortunately not controlled so as to detect the actual part played by the quality of shelter in determining a population's health conditions. The problem is that our sample is too small for carrying out such details. But having in mind our lack of control for the big influence of these two

factors, the explanations for whatever mortality differentials that will be detected with respect to varying shelter conditions will be done with much reference to what was presented in chapter four, with regard to the distribution of various sources of water and types of toilet facilities by class of housing- (see sections 4.5 and 4.6, of chapter four).

There is another problem still generated by the inadequate size of our sample. The sample is again too small to study separately mortality conditions in the permanent class of housing. Permanent class dwellers are only 93, or 1.7 percent of the total sample population. This is apparently too small and insignificant for any reliable study of mortality. In this regard, the 28 permanent housing units or 2.7 percent of the total housing units (see section 4:2) are in this analysis all considered to be part of the semi-permanent class. We believe this combination will not bring any significant biases in our findings. After all, it will give the trend of the relationship; and this is the major concern of this study.

In studying how mortality responds to varying housing conditions, we employ a number of techniques. These include the Brass, and Sullivan methods of estimating infant and child mortality (see Brass et. al, 1968:88-141; and Sullivan, 1972:79-97); and the Coale

and Demeny Model Life Table and Stable Population Techniques (Coale and Demeny, 1966). The Coale and Demeny techniques are used to determine indirectly, the various mortality levels, expectation of life at birth, and the crude death rates. Respective explanations for the working and reasoning behind all these techniques are given as the methods are employed.

We have already noted in chapter four that our study is made of one thousand households. These are residing in 1037 housing units. A few households, therefore, have more than one housing unit on their compounds. For this particular analysis however, we shall consider only the first recorded housing unit on each compound, since there is no way of relating the reported mortality information to each housing unit on a given compound. We still believe that this will not greatly biase our findings.

5.1 Estimation of Infant and Child Mortality by use of Brass Model and Sullivan Model.

In the absence of data on vital registration in Bushenyi District, infant and child mortality estimates based on our data can throw some light on the general mortality conditions in the two major classes of housing conditions. This is supported by the general view that infant and child mortality is related to mortality in other ages, and is therefore indicative of the general mortality levels. As Sullivan, (1972:79) indicates,..... "in the developing nations of the world, deaths to children

under five years of age constitute a large fraction, sometimes, a majority of all deaths". Thus information on infant and child mortality rates are of unlimited value for the knowledge of mortality conditions in the two classes of housing, and for the expansion of public health programmes.

One of the major objectives in this section is to test the validity of the hypothesis (Chapter three) that ..... mortality varies inversely with housing conditions; in other words, the better the housing conditions the lower the mortality and vise versa. The validity of this suggested hypothesis is first examined by studying the proportion of children who die at each age with respect to the two classes of housing conditions semi-permanent (representing the better quality of housing), and temporary (representing the poor quality of housing).

One method of estimating infant and child mortality has been developed by Brass (1968:88-141). Using information on children surviving and children dead to women aged 15-64, Brass developed a technique of translating proportions surviving or proportions dead among the children ever born to women in different age groups (between 15-64) into conventional measures of mortality.

The underlying assumptions for his techniques are:-

"(i) the age specific fertility schedule has been approximately constant in the recent past at least for the young women aged 20-29, and that the approximate form of the fertility schedule is known;

(ii) infant and child mortality have also been constant in recent years (at least for the past 5 years);

(iii) there is no powerful association between the age of mother and infant mortality or between death rates of mothers and their children.

(iv) omission rates of dead children and surviving children are about the same in the reported number ever-born and,

(v) the age pattern of mortality among infants and children conforms approximately to a certain model life table" (See United Nations Manual IV 1967:35).

With these assumptions, Brass developed a model with the following relationships:- that the proportion of

children dying among children ever-born to women in the age group 15-19, that is (D1), is approximately equal to the proportion of children dead by their first birth day, or at age 1, that is (q1) of the life table.[1] Furthermore, the proportion of children dying among children ever-born to women in age group 20-24, (D2), is approximately equal to the proportion of children dead by age 2, (q2), etcetera..... up to the proportion of children dying among children ever-born to women in the age group 60-64, (D10), which is approximately equal to the proportion of children dead by age 35, (q35) in the life table arrangement.

Brass's procedure of estimation therefore, depends on the approximate equality of (q1) to (D1),(q2) to (D2),..... (q35) to (D10), when fertility and mortality schedules are standard ones with age patterns roughly like those in the African Population (ibid. P.107). However, the equality of q(a) to D(a) is much affected by the age patterns of fertility. And in order to bring these indices to equality, Brass calculated a set of multiplying factors, (Ki), such that q(a) = KiDi. We shall not go in the details of how he arrived at this formula as it is explained elsewhere (ibid. P. 104-119). In order to get the best results with this technique, there should be stability especially in the demographic

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1 The life table refered to above is defined as a life history of a hypothetic group,or a Cohort of people as it is diminished gradually by death (see Barclay 1958: 93-122).

set up of the area of study, and the study sample should at least have 1000 women in each age group. Furthermore, the age reporting as well as the reporting of children surviving and children dead must also be accurate.

Obviously, the stability of the demographic set up cannot be guaranteed in our study area. First, with the 1978-1979 "Uganda Liberation War" there are very high chances that the socio-economic and demographic set ups for Bushenyi District were disturbed. Secondly, due to some major limitations (see section 3.3 of this volume), the sample is smaller than is normally required. Thirdly, as pointed out in section 2.5 of this study, the reporting of chidren ever-born and children dead is usually defective. However, since our aim is not to estimate actual mortality levels for the district, but simply to gauge how mortality responds to varying housing conditions, we believe the amount and quality of our data meet our requirements.

The reported distributions children everborn, children surviving, and children dead by age of mother in age group 15-49, are presented in appendix 5:1 for the two classes of housing. From this appendix, another appendix 5.2, has been derived. This shows the average number of children everborn per woman and the average number of children surviving per woman by age group - (see columns 1,3, and 4 in the table) - for the two classes

of housing. The proportions of children dead the,(Di) values, are shown in column 5. These proportions are derived by subtracting from one (1) the ratio of the surviving children over children everborn, that is $1-\frac{Si}{Pi}$. The results in column 5 are multiplied by the corresponding (Ki) values - the multipliers[2] in column 6. The result of these multiplications are the proportions of children dead by ages 1,2,3,5 ----- up to 20. These are shown in columns 7 and 8 of the appendix 5:2.

The proportions of children dead by age of mother - obtained by multiplying the (Di) values with the corresponding (Ki) values - are reproduced in table 5.1 below, to give a better picture of how mortality responds to variations in the quality of housing.

2: These multiplies were interporated from United Nations (1967:124). The first three (Ki) values - for age groups 15-19, 20-24 and 25-29 were interporated using the ratio of children everborn to women 15-19 over those everborn to women aged 20-24, the (P1/P2) ratio. The rest of the (Ki) values - from 30-34 to 45-49, were interporated using the estimated mean values of the fertility schedules the ($\bar{M}$) values. We decided to use the estimated mean ($\bar{M}$) instead of the actual mean calculated from the fertility schedules. This is because the calculated mean ($\bar{M}$) looked more realistic especially in an African Society with low age at marriage. Estimated values were, 27.8, 29.2 and 28.3 while actual values were 30.0, 31.8 and 30.3 respectively for the temporary, semi-permanent and the total.

Table 5:1 The proportions of children dead by age(x) for the study population by age group of mother, and class of housing conditions.

Age group of mother	Age x	Proportion dead by age (xqo)		
		Total Population	Temporary Class of housing conditions	Semi-permane and permanen class of hou ing conditio
15-19	1	0.111	0.071	0.137
20-24	2	0.143	0.161	0.118
25-29	3	0.178	0.204	0.128
30-34	5	0.188	0.197	0.173
35-39	10	0.232	0.271	0.165
40-44	15	0.211	0.306	0.150
45-49	20	0.225	0.244	0.200

Source: Computed from Appendix 5:2.

The table shows the age groups of women and the corresponding proportions of children dying at ages between 1 and 20, by class of housing conditions. Studying the table closely, it can be seen that there are inconsistencies in the proportions of dying children by age of mothers. The expectation is that proportions should gradually rise with increasing age. But, as the table shows this trend is lost at age 15 (40-44 for the women). This must be a result of some defects in the quality of data.

More important to note, is the fact that the proportions of children dying at ages 2,3,5, up to 20 are higher in the temporary class than in the semi-permanent and permanent class of housing conditions. At the first age. however, the proportion dying - (1qo) - is higher in the semi-permanent class than in the temporary class of housing. This could be due to either sampling errors, mis-reporting, and probably differences in breast feeding habits. In other words, temporary class dwellers might be breast feeding their children better than the dwellers in the permanent and semi-permanent classes. But the first two possibilities - that of sampling errors and another one of mis-reporting - are more likely to be the reasons.

Looking into the details of proportions dying by age and class of housing, we find that the proportions dying before their first birth day - (1qo), are higher by 48 percent in the semi-permanent and permanent classes than in the temporary class. At ages 2,3,5 and 10, the proportions are higher in the temporary class by 36,59.4, 13.9, and 64 percent respectively than in the permanent and semi-permanent classes. The (15qo) values - proportions dying by age 15 in the temporary class of housing are twice those dying in the other classes of housing. This difference is exceptionally too high compared to the differences at other ages. It could be due to errors in age reporting by mothers, or even due to

mis-reporting of children everborn, and those dead (see chapter two of this report). Finally, the proportion of children dying at age 20 is again higher by 22 percent in the temporary than in the permanent and semi-permanent classes of housing.

Notwithstanding some possible biases in our analysis the results allow us to conclude that the poorer the housing conditions the higher the mortality and vise-versa. In other words, the results show that our third hypothesis (see section 3.5) is valid.

5.1.1. Estimation of child mortality by use of l_2 technique

To ascertain the validity of the above findings, we proceed a step further to estimate child mortality by use of the measured l_2 value[3] or the total population surviving to age two (2). The index l_2 has been found to be a useful measure of mortality because the relationship between l_2 and death rates at later age is more stable.

The derivation of the life table survivors to age 2, that is l_2, is done through a smoothing operation as follows. The life table survivors to ages 2,3, and 5 are estimated from table 5.1 above as

3 l_2 is a life table function representing the proportion of the total population surviving to age 2 (for a given cohort of 1000 births).

(1-q2), (1-q_3), and (1-q5) respectively, and accordingly transformed into logits.[4] Then the differences between each logit and the corresponding logit in the African standard life table (Brass, 1968:133) are averaged, and the difference is added to the standard logit for age 2, to give a smoothed logit of the proportion surviving to age 2, that is l_2. The antilogit of this gives the actual l_2 value. The details of this smoothening technique are given elsewhere (ibid, pp.127-133).

Our calculations are presented in appendix 5:3, by class of housing conditions. Column 3 shows the proportions of children dying at ages 2, 3, and 5 - the (xqo) values by class of housing conditions. These proportions are copied from table 5:1 in this chapter. In column 4, we have the proportion of children surviving derived by subtracting the proportions dead from one (1) - that is (1-qx). Column five (5) is the ratio of the proportions surviving divided by the proportion dead at the same age. The natural logarithms of the values in column 5 are presented in column 6, and these values are accordingly multiplied by 0.5 to give the values in column 7. Column 8, is the African standard life table copied from Brass (ibid, P.133). The differences between column 7 and 8 are presented in column 9; and the averages of the three differences, by class of housing are presented in column 10. These averages are added to the l_2 value -

4 The logit of a proportion $P = \frac{1}{2} \log_e(P/1-P)$ and varies from infinity to minus infinity as P goes from 1 to zero (0), equalling zero (0) as P=0.5.

0.8052 - of the African standard life table to get column 11. The antilogits of the values in column 11, are presented in column 12; they are the smoothed 1_2 values, or the proportions surviving to age 2 out of 1000 births.

The results still confirm our initial findings. The survivors of the temporary class of housing are less than those of the permanent and semi-permanent classes of housing - 833 for the temporary, and 877 for the permanent and semi-permanent classes of housing. In other words, the poorer the housing conditions, the higher the mortality and vise versa.

5.1.2 Estimation of child mortality by use of Sullivan Model.

To further test the validity of the above findings, the relationship between mortality and the quality of housing is tested by use of Sullivan Model of estimating infant and child mortality - (see Sullivan; 1972:79-97). The data he uses, as well as the underlying assumptions are the same as Brass's - discussed in section 5:1 above. They only differ in their technical approach.

Sullivan evolved two models by use of regression analysis. The models are:- the age model, and the duration model. The former was generated from age specific fertility and mortality schedules, and the later from marital duration fertility schedules and age

specific mortality schedules. The two models can be used interchangeably depending on the availabiligy of data. We use the age model in our analysis.

The model is mathematically expressed as a linear regression equation of q(a)/Di on the fertility schedule parameter P_2/P_3.[5] Sullivan found this ratio to be more powerful in explaining a wide range of fertility schedules than that of P_1/P_2,[6], used by Brass to select multipliers. Sullivan's P_2/P_3 ratio is a fixed constant multipliers of Di values.

In working out his technique, Sullivan first obtained from the demographic experiences of some European countries, U.S.A, Canada, U.S.S.R, Scandinavia and Cocos-Keeling Islands, the fertility schedule that represented only fertility with $P_2/P_3 = 0.175$. He discovered that the fertility schedule for the rest of the countries ranged evenly, from 0.045 and 0.134. Sullivan then slid down the parameters along the axis between 0.134, and 0.175. These parameters were combined with the mortality schedule q(a) extracted from all the families of the Coale and Demeny Regional Model Life Tables and Stable Populations (Coale and Demeny, 1966), with life expectation at birth - (e_o), ranging

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5 P_2/P_3 this is the ratio of the number of children everborn to women aged 20-24 over the number of children everborn to women aged 25-29.

6 P_1/P_2 is already explained in footnote 2 in this chapter.

from 30 to 52.5 years. Then he came out with two constant regression coefficients (Ai) and (Bi) for each (i), as multipliers of P_2/P_3.

Given these regression coefficients, the values of q(a) for our study can be estimated using the following formular:- $q(a) = Ai+Bi\ (P_2/P_3) \times Di$. The selection of the Ai and Bi values depends on the mortality schedule; where the mortality is unknown, Sullivan (Ibid P. 85) recommended the West Model equations to be used in order to get the q(a) values.

In our study both the regression coefficients of North and West model families are utilized. This is because the North Model's infant mortality is relatively low and childhood mortality is relatively high, and is fit for African mortality schedule (Brass, op.cit, P.113). At the same time, the West Model has some superiority over the North Model, because it incorporates experiences of more countries, and can be the best guess of the prevailing pattern of mortality for any population (Brass, Ibid, P.123).

The regression coefficients A(i) and B(i) values selected by Sullivan from the West and North families are shown in appendix 5.4. In the same appendix, the ratio P_2/P_3 for our study sample is shown. These three parameters have been used in the calculations of values

shown in columns 1,2, and 3 of appendix 5: 4. Column three gives the proportion of children dying at aged 2, 3, and 5. These are also reproduced in Table 5.3 by class of housing.

Table 5.3 Estimated child mortality using Sullivan Model

	All Classes		Temporary Class		Semi-permanent and Permanent Class	
Age X	Sullivan North	Sullivan West	Sullivan North	Sullivan West	Sullivan North	Sullivan West
2	0.139	0.146	0.150	0.159	0.121	0.120
3	0.162	0.171	0.179	0.191	0.122	0.123
5	0.175	0.180	0.178	0.185	0.168	0.166

Source: Compiled from appendix 5:4

Table 5:3 presents the proportions of children dying at ages 2,3, and 5 by class of housing. These proportions are calculated from appendix 5:4, using Sullivan regression coefficients from the West and North families of Model Life Tables and Stable Populations, and the ratio P_2/P_3 derived from our study sample data (see columns 1,2 and 3 of the appendix 5:4). The D(x) values indicated in column 3 of the appendix 5:4, are actually the already calculated proportions dying at aged 2,3 and 5, as presented in appendix 5;2, or table 5:1.

Looking first of all, at the proportions dying in the semi-permanent class of housing conditions, there seems to be little difference between the estimates based on North and West family Models. With the temporary class of housing, however, proportions based on the West Model are higher than those based on the North Model. This has accordingly influenced the picture for the total population, where West Model based estimates are also higher than the North Model based estimates.

Comparing the results by class of housing, it is still apparent that mortality is higher in the temporary class than the permanent and semi-permanent classes of housing conditions. For example, if one was to compare proportions dying by the North Model estimates, one would find that the temporary class is higher by 24 percent, 47, and 6 percent respectively for ages 2, 3 and 5. With the West Model estimates, the temporary is higher by 33 percent, 55, and 11 percent respectively for ages 2, 3 and 5. Again, these findings confirm the validity of the hypothesis that mortality varies inversely with housing conditions; in other words, the better the housing conditions the lower the mortality and vise versa.

5.2 Estimation of mortality levels, life expectation, and Crude death rates by classes of Housing Conditions.

Another alternative method[7] to estimate mortality is by the use of the Regional Model Life tables and Stable Populations (Coale and Demeny, 1966). The selection of appropriate mortality levels[8] from these tables however, requires the presence of data on life expectation at birth as well as inter-censal growth rates for the study population. In our own case, this requisite information is missing. However, given the pre-determined l_2 - or the proportions surviving to age 2 (see section 5.1. for the two groups of the population, appropriate mortality levels for both males and females can be selected (see United Nations Manual 1V, 1967:38). In this study, the levels are of course selected from the North[9] family Model life tables (Coale and Demeny, op.cit,p.42). The selected levels are then used to identify appropriate expectations of life at birth (e_o) for the people in the two classes of housing conditions - see(ibid, pp230-233).

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7 The alternative Method is the interporation method using either inter-censal growth rates or gross reproduction rates together with life expectation at birth to select appropriate mortality levels from model life tables.

8 Mortality levels present the age specific death rates or number of survivors to each age to be expected under given mortality conditions.

9 The North family Model was chosen because it fits better the African Population Situation (see section 5:1:2) of relatively higher child mortality than infant mortality.

Using the above explained procedure, the following mortality levels are identified. For the temporary class of housing, the appropriate level is eleven (11) with life expectation at birth (e_o) of 41, and 45 years respectively for the males and females. For the semi-permanent and permanent class, the appropriate level is fourteen (14) with expectation of life at birth of 49, and 52 years respectively for the males and females. These findings are presented in table 5.4 below.

Table 5.4 Estimated Mortality indices for the two classes of housing conditions using the North Family Model Life Tables

Class of housing	Estimated l_2 values	Corresponding Mortality levels	Expectation of life at birth (e_o)	
			Males	Females
Temporary	833	11	41	45
Semi-Permanent	877	14	49	52
All Classes	848	12	44	47

It is apparent from the above table that the lower the l_2 value, the lower the mortality level and the expectation of life at birth. In all cases expectation of life is higher for females than mates. This is principally a biological establishment.

Comparison of the above results by class of housing shows that mortality levels and expectation of life at

birth are higher in the semi-permanent and permanent class of housing than in the temporary class. These findings are still in line with what has already been established in this study - that mortality is higher in the temporary than in the semi-permanent class of housing.

5.2.1 Crude death rate as observed from varying housing conditions

The general relationship between housing conditions and mortality is finally examined through the general mortality index - the crude death rate (CDR). However, as the census did not collect information on the total deaths that had occurred in the preceding one year (January 1979 to January 1980), the crude death rate index cannot be estimated by use of the conventional forumula:-

$$\left(\frac{\text{Number of deaths that occurred within last 12 months}}{\text{Total mid-year population}}\right) \times 1000$$

Instead, the Coale and Demeny Life Tables, and Stable Population Models are used to indirectly derive the CDR index. Still, it is the North family of Model Life Tables and Stable Populations, that is used for this exercise.

By use of the estimated l_2 values (see section 5:1:1), life expectations were derived as accounted for in the above section - 5:2. Using the estimated life expectation values, together with the calculated gross reproduction rates[10] for the study populations, crude death ra

10 Gross reproduction rate -GRR - is the average number of daughters a woman would have during her reproductive life time.

values are interporated from the appropriate model life tables, and stable population models. The estimated crude death rates by class of housing, are presented in table 5:5.

Table 5:5 Estimated Crude death rates by use of Stable Population technique, by class of housing conditions Bushenyi District 1980.

Class of housing	GRR		e_o		CDR			
					Male		Female	
	Observed	Adjusted	Male	Female	Using observed GRR	Using adjusted GRR	Using observed GRR	Using adjusted GRR
Temporary	3.9	4.2	41	45	22	23	20	21
Semi-permanent	4.2	4.8	49	52	17	17	14	14
All classes	3.9	4.3	44	47	20	20	18	18

Source: Calculated from the Coale and Demeny Model Life Tables and Stable Populations (1961:408-412 for the Male values, and 312-318 - for the female values).

Table 5:5 shows the observed and adjusted gross reproduction rates - the GRR values, life expectation at birth for both the males and females, and the interporated crude death rates by sex and class of housing conditions. Overall, the CDR values are higher in the temporary class as compared to the permanent and semi-permanent class. However, in both classes of housing as well as for the total population as a whole, the crude death rates are higher for the males than the females. The same trend was observed

and accounted for with respect to the expectation of life at birth (section 5:2).

These findings still emphasize the fact that mortality is higher in the temporary class of housing than in the permanent and semi-permanent class of housing. In other words the poorer the housing conditions, the higher the mortality and vise versa. The immediate question is, why is mortality higher in the poorer class of housing conditions than in the relatively better-housing conditions? The answer to the above question is a necessary complement to the above findings if the planners are to really appreciate the importance of adequate housing conditions to the population. But before we attempt to provide plausible reasons for the above observations, we briefly present some interesting observations about fertility and housing conditions.

5.3. Observed relationships between fertility and housing conditions.

Although the study does not specifically concern itself with fertility, it is worth noting, and perhaps keeping in mind, that fertility seems to be relatively higher in the semi-permanent than in the temporary class of housing conditions.

Some fertility indices are presented in the table 5:6 by class of housing.

Table 5:6 Gross reproduction rates, and total fertility rates by class of housing conditions

Class of housing	Total fertility (TFR)		Female proportion at birth	Gross reproduction rate (GRR)	
	observed	adjusted		observed	adjusted
Temporary	8.095	8.7	0.487	3.9	4.2
Semi-permanent	8.625	9.8	0.485	4.2	4.8
Total	8.045	8.9	0.481	3.9	4.5

Source: Calculated from the current fertility data for Bushenyi District - 1980 Uganda Population Census

The total fertility rates observed, and adjusted are calculated from current and retrospective fertility data presented in appendix 5:5. Adjustment is by the use of Brass method of comparing current and retrospective fertility data - the P/F ratio method - (see Brass et. al, 1968:92-104). The details are given in appendix 5:5. Female proportions at birth are actually the ratios of the female births over total births within the last 12 months. A multiplication of the Total fertility rate values with the corresponding female proportions at birth, gives the respective gross reproduction rates - the GRR values, as presented in the last two columns.

It can be seen from the above table, 5:6, that fertility as indicated both by the Total fertility and the Grosss reproduction indices is higher in the permanent and semi-permanent class of housing than in

the temporary class. Probably this is contrary to what many would expect. It is therefore important to find possible explanations for the above finding. The possible reasons are alluded to in the following section, where reasons for the already observed relationships between mortality and housing conditions are given.

5.4 Reasons for the observed mortality differentials with respect to classes of housing conditions.

The results we have got from our modest analysis give us a certain degree of confidence to say that mortality is higher among the residents of the temporary class than among the dwellers of the permanent and semi-permanent class of housing conditions. In other words, our hypothesis that the poorer the housing conditions the higher the mortality holds true. We are then faced with an immediate and important question - why is mortality higher in the temporary class than in the semi-permanent and permanent class of housing? Obviously, the answers to this question are quite many and not easily exhaustible. Some of them are directly connected to the quality of shelter itself, and others are connected to the quality of other important components of housing conditions - for example the source of water, and the nature of toilet facilities - connected to the class of a given shelter(see chapter 4). have pointed out in the beginning of this chapter that the relationships between the quality of water as well as that of the toilet facilities and mortality, is quite

high. Unfortunately, the influence of these two factors - water and toilet - was not controlled in this study. In spite of this shortcoming however, it is still our belief that this influence is one of the main reasons for the nature of our findings.

It was discovered in chapter four, section 4:5 that people living in the permanent and semi-permanent classes of housing relatively consume better water than those living in the temporary class of housing. Reference is again made to table 4:5 in chapter 4. This table shows that whereas 99.5 percent of the temporary class households is exposed to unfiltered water, the proportions are lower for the permanent, 4.2 percent, and the semi-permanent, 92.2 percent. In other words, unless the temporary class dwellers are mindful of the important need to boil and filter their water before use (drinking in particular) their chances of infection by the already mentioned deadly water-borne diseases are much higher than for the permanent and semi-permanent class dwellers. On the other hand, it is very unlikely that the temporary class dwellers do really appreciate the need of boiling their water before use. It was suggested in chapter four, section 4:8, that the temporary class is mainly dominated by the un-educated who are usually very careless about such details like drinking clean water, washing hands before eating, etcetera

The supply of good toilet facilities was again found to be most defective among the temporary class dwellers. As already mentioned in chapter four section 4:6, lack of any form of toilet facilities is commonest among the temporary class households - 8.6 percent as seen against 3.7 percent for the semi-permanent, and zero (0) percent for the permanent. Furthermore, it is also likely that the pit-latrines for the temporary class are not as proper as those for the other two classes. They might be poorly located in relation to the streams and wells where people get their water. In other words, pollution of source of water by toilets might be very high among the temporary class dwellers than among the other classes.

In cases where the source of water is common both for the temporary and other classes, of course the effect of poor toilet facilities in the temporary class will be suffered by the other classes. The only chance is that the other classes are more likely to be cautious about boiling their water before use. In a nutshell therefore, people living in temporary shelters are more exposed to the dangers emanating from poor sources of water as well as poor toilet facilities. No doubt, this is in addition to other dangers related to the poor shelter itself.

The biggest shortcoming with most temporary shelter is that of poor ventilation[11], which could be one of the

11 We feel proper ventilation should be at least two windows at the sitting room, and at least one window at each bedroom. Ventilators, should accompany each window, and door.

many other reasons for the observed mortality differentials. Although we lack data on the availability of ventilation, the physical observations and experiences of the author indicate that generally, the ventilation system of the temporary class is poorer than that of semi-permanent and of course, permanent structurers. While the walls' foundations of the permanent and semi-permanent classes are relatively strong to have a number of windows between them, those of the temporary class are weak, and the risk of falling is increased when many windows and doors are placed. Due probably to this, most temporary units have at most one or two windows (sometimes not for opening). Those wholly constructed with thatch will obviously be without a single window. In such circumstances, oxygen which is needed in abundance especially by the babies, the sick, and the elderly people may not be enough. This might result in a quick spread of air borne diseases like whooping cough, measles, tuberculosis, etcetera.

There are of course other problems related to temporary shelter. First of all, such type of shelter is very hard to clean and keep free of dust. It is usually necessary to clean the floors with water and soap. With a temporary structure, washing is no doubt out of place. This means that there is a lot of dust to hide such harmful insects like lice, fleas, giggers, etcetera. Other domestic pests like rats also reside

easily in temporary dwellings. Obviously all these factors make the temporary structures very unhealthy. It is not even strange to find people in temporary structur sharing dwellings with their domesticated animals like goats, cattle, dogs, etcetera. Sleeping with animals can generate a number of diseases, one of which is tuberculosis which can easily be contracted from cattle and dogs.

A number of the above mentioned problems connected to temporary housing could probably be avoided if only the inhabitants were aware of these problems. Obviously, such awareness would be there if people had some education. Heads of households would appreciate the need for better toilet facilities, proper ventilation. Accordingly, mothers would be aware of the necessity of hygiene for a proper and healthy family, as well as the general upbringing of the infants. Unfortunately, however, an examination of education levels of mothers by class of housing reveals that education is extremely low among mothers living in temporary dwellings. It is relatively much higher in the other classes of housing. The details of this observation are presented in table 5:6.

Table 5:6 Females within reproductive age groups by education and class of housing conditions - Bushenyi District - 1980

Age group of woman	Total No. of women		Percentage with No Education		Percentage with Primary 1-4		Percentage with Primary 5-7		Percentage with Secondary	
	Temp.	Semi-perm.	Temp.	Semi-perm.	Temp.	Semi-perm.	Temp.	Semi-perm.	Temp.	Semi-perm.
15-19	177	149	61.0	37.6	28.2	20.8	10.2	40.2	0.6	1.3
20-24	153	98	62.7	42.9	21.6	17.3	15.7	36.7	-	3.1
25-29	124	57	66.9	61.4	14.5	8.8	18.5	22.8	-	7.0
30-34	93	64	82.8	71.9	12.9	10.9	-	3.1	4.3	14.0
35-39	82	53	90.2	67.9	8.5	24.4	-	5.7	1.2	1.9
40-44	61	44	82.0	93.2	16.4	2.3	1.6	4.5	-	-
45-49	44	31	100.0	80.6	-	12.9	-	6.5	-	-
Total	734	496	72.5	56.7	17.7	15.2	9.0	23.8	0.8	3.8

Source: 1980 Uganda Population Census - Bushenyi District.

The Table 5:6 shows that generaly the education levels of mothers in Bushenyi District are low. It further shows however, that mothers living in the semi-permanent class of housing have attained more education than those living in the temporary class. While 72.5 percent of the mothers in the temporary class have never been to school the proportion is lower for the semi-permanent 56.7 percent. The table further indicates that while 26.7 percent of the mothers in the temporary class have had some primary school education the proportion is much higher for the semi-permanent 39.5 percent. Generally, very few mothers have attended some secondary education, but still, of the few that have attended, the proportions are higher for the semi-permanent 3.8 percent as compared to only 0.8 percent of the temporary class.

In addition to the education of the mothers, is the education of the heads of households. It is shown in section 4:8 of chapter four that again education levels for the heads of households are higher in the semi-permanent than the temporary class of housing. What these findings mean is that generally the people living in the semi-permanent class of housing, are better informed about the need for hygienical living conditions.

It might also be of interest to note that the difference in education levels attained by mothers

might partly explain the observed fertility differences for the two classes. As some studies have shown, fertility is higher among women with primary education than those with no education at all - (Henin, 1973:110-179, Kaija 1975:2-8).

In summary this chapter has analysed the relationships between the existing housing conditions and mortality rates. The results showed a high relationship between type of housing conditions and mortality. For example the better the housing conditions the lower the general mortality rates and vise versa. Some of the factors responsible for this relationship have also been enumerated in this same chapter. All these have brought our study to its conclusion. The last chapter gives a summary of the whole work and suggest some positive policies for improving housing conditions in Bushenyi and other districts of Uganda.

CHAPTER SIX

SUMMARY, POLICY IMPLICATIONS, AND REQUIREMENTS FOR FUTURE RESEARCH

What has been covered in this study as well as the observations made, have added considerably to the meagre stock of information available on housing conditions in Bushenyi District in particular, and in Uganda as a whole. Unlike other studies which have given preference to the urban housing problem, this study has looked at the problem from a rural point of view. This approach has underlined the relevance of this study especially to a country like Uganda, where the biggest proportion of the population lives in the rural areas. The significance of our study especially to housing planne is also seen in the fact that it has revealed some important relationships between housing conditions and some socio-economic and demographic variables.

The success of this study has been mainly facilitated by the pertinent information provided by the 1980 Uganda Population Census. Unlike the preceding National Censuses of 1948, 1959, and 1969, the recent 1980 census contained a special questionnaire, "schedule B", which was applied to a built-in sample of 10 percent of all the rural areas, and 100 percent of all the urban areas and trading centres. This questionnaire collected information on economic activity, housing conditions, and other socio-economic character-

istics of households in addition to other information collected on the basis of a shorter questionnaire, "schedule A", which was applied to the remaining 90 percent of the rural areas in the country. Information collected with "schedule B" in Bushenyi District has been the basis for the analysis and findings of this work.

One major reason of limiting the questionnaire to 10 percent of the rural areas was the problem of scarcity particularly with respect to money and man power. These same handicaps forced the author to further reduce the sample to one percent only of the District's population (see section on sampling, in chapter two of this volume). Inevitably, therefore, our findings are biased in one way or another by sampling errors, in addition to the unavoidable non-sampling errors introduced at the various stages of data collection, processing and analysis. For example our failure to raise enough people for studying mortality in the permanent class of housing (see chapter five) was a result mainly of sampling. It should be appreciated however, that all possible efforts were taken at the various stages of sampling, data collection, processing and analysis, to minimize the magnitude of error in our findings and conclusions.

The reader might have realized that some important aspects which should be covered by a study of this nature have been omitted. For example, the author appreciates that the study would have had more weight if it provided information on diseases connected to various shortcomings in housing conditions. Additional knowledge on the contribution of such diseases to the total incidence of mortality within that period would have been highly valuable. Furthermore, it is apparent that the coverage of housing conditions fell short of important considerations like size of rooms in terms of ground area and height of walls, ventilation systems, availability of important infrastructural facilities like schools, hospitals, roads, etcetera. All these were inevitable gaps necessitated by circumstances; but they are highly regretted. Notwithstanding all this however, we feel that our study has achieved its objective of contributing to the wide gap existing in the knowledge about housing conditions, particularly in the rural areas and how they are related to some socio-economic and demographic variables.

6.2. Some important observations.

The general findings about the status of housing conditions in Bushenyi District have been rather appalling. The study has revealed that an undesirably big proportion of housing units in the area are wholly constructed with temporary materials and no doubt,

they are inadequate almost in everything. Considering the health implications of such structures, the study mentioned their susceptibility to keeping all sorts of house pests and insects, and accordingly alluded to the sorts of possible diseases that can be a product of such conditions. The proportionate break up of all dwelling units into quality classes was as follows:- 63.5 percent are temporary, 33.8 percent semi-permanent, and only 2.7 percent are permanent.

Relating population to available rooms, it was found that on the average, dwelling units in the District are probably not over-crowded. Average population figures per room were found to be 1.2, 1.9, and 1.9 percent respectively for the permanent, semi-permanent and temporary class of buildings. However, our efforts to analyse actual room densities were impaired by the absence of data on sizes of dwelling units. In this connection, Uganda was found to be among the countries with no officially fixed acceptable levels of densities in dwelling units. This was found to be a serious policy shortcoming.

Our findings regarding the nature of toilet facilities in the area were not really encouraging. A very big proportion of households, 92.3 percent, reported to be using pit latrines. The biggest fears are with respect to the quality of the toilets in terms

of depths, shelters around them, protection from flies, and their locations with respect to kitchens, actual living structures, and most importantly to source of water. While only 0.9 percent of the households were found to be using water borne toilet , an unfortunate proportion of 6.8 percent did not have any form of toilet facility. The study pointed out the possible dangers of improper disposal of feaces, mentioned the connected deadly communicable diseases like cholera, typhoid, dysentery, and other gastro-intestinal diseases.

With respect to source of water, it was found that quite a big proportion of the population in Bushenyi District, 94.7 percent of the households, do not use refined water. The health problems connected to this factor were found to be very similar to those related to the lack of proper toilet facilities. In actual fact, a combination of poor source of water with poor toilet facilities aggravates the health problem in a population.

Another housing aspect that was examined is the power used both for cooking and lighting. Ninety six percent of the households were found to be using firewood for cooking, and 91 percent reported use of paraffin for lighting. Only 0.7 percent of the households use electricity for lighting; no one uses electricity for cooking. Eight out of every one

hundred households were found to be using hearth fire for lighting. The social and health problems connected to the use of firewood for cooking were pointed out, and the use of paraffin especially in "tadoobas" was found to have adverse effects to the general respiratory and visual systems of the users. It was mentioned that there is a very big potential to electrify to a very big proportion of rural Uganda. What is required is proper planning reflected in a more rational allocation of the nation's scarce resources.

The study endeavoured to examine the relationships between housing conditions and some socio-economi variables, namely education and the economic activity industry of the head of household. Housing conditions were found to be positively related to education status of the head of the household, i.e. conditions were found to improve with rising education standards. It was argued that probably, this is so because education makes people more aware of the need to reside in decent conditions, and furthermore, it puts them in a better financial position to afford decent housing. Housing conditions were also found to be related to the activity industry of the head of the household. Heads of households in non-agricultural activities were found to live under better conditions than those in agriculture. These findings are of great importance to the policy makers.

Efforts were also made to relate housing conditions to mortality. In this respect, we were forced to treat both the permanent and semi-permanent as one class because the permanent cases were too few for a justified study of mortality. However, the results gave a proper picture of the trend of the relationship. A relative study of mortality using various techniques - including Brass (1968), Sullivan (1972), Coale and Demeny Stable Population techniques (1966), invariably showed strong relationships between housing conditions and mortality. Mortality was found to be highest among the temporary class dwellers, and accordingly, the expectation of life at birth (e_o) was found to be much higher in the permanent together with the semi-permanent class of housing conditions.

A little extension was made to examine the possible relationship between housing conditions and fertility. Probably to the contrary of what many would expect, fertility was found to be higher among the semi-permanent together with the permanent class dwellers. Finally, an attempt was made to explain the observed differentials particularly with respect to mortality.

In the following sections, we attempt to suggest some possible measures that can help in reducing the problems related to poor housing conditions. We also consider requirements for further research.

6.3. Policy measures for improving housing conditions

A work of this nature would be incomplete if it ended without considering some of the possible measures that can be taken to deal with the various problems identified with housing conditions and their implications on the general well-being of the people as well as the socio-economic development of the area. Generally, in Uganda, policy makers have not paid serious attention to the problem of improving housing conditions particularly in the rural areas. For example, they have never defined their priorities regarding appropriate housing standards; neither have they done much towards improving water sources and sanitary facilities in the rural areas let alone improving socio-economic services like education, health and communication, etcetera. There is therefore an urgent need on the side of the planners to draw a comprehensive housing conditions development plan which will take into consideration both the urban and rural housing needs. In this respect, the rural areas should command priority consideration since the biggest part of the population lives there, and they form the backbone of the national economy in terms of production and consumption.

The best housing conditions development plan for Bushenyi as well as other rural areas of Uganda is that which tackles both the water and sanitary problems first. Although due to shortcomings in our

data, these two housing components were not given specific treatment especially in the analysis of how mortality is related to housing conditions (chapter five of this study), it is our belief that they play the biggest role in determining the health conditions of any given society. Diarrhoeal diseases are known to be responsible for the biggest proportion of deaths especially in the developing world; and these diseases can be effectively reduced when proper measures are taken to improve the quality of both drinking and washing water, and improve the sanitary facilities - the toilet in particular - for the majority of the population. Improved water and sanitary conditions should of course go hand in hand with positive changes in the quality of shelter from the point of view of ventilation, size of rooms and materials used in construction. Improved ventilation conditions in particular can help reduce the incidence of such diseases like tuberculosis, measles, whooping cough and other airborne diseases in any given society. No doubt, all the above mentioned goals can be achieved more easily if efforts are accordingly taken to provide pertinent education to the majority of the target population. It is with education that the masses can appreciate the good intentions behind any development programme. Another vital aspect to be considered by any housing conditions plan is that of communication from the point of view of road networks, and radio and

other media for spreading important information. With improved road networks, the people can easily be reached when necessary, and they can also be in easy reach of the locations of important services like education, health and trading centres. An improved radio service will be the cheapest and fastest means of forwarding important information, education, etcetera, to the masses. In the following sections we suggest some measures that can be taken to improve important housing conditions components, like water, sanitation and shelter.

6.3.1 Alternative measures to improve the source of water

Although the safest water is that which is treated and piped to residential areas, in the initial stages of water development this would be very expensive. It is therefore advisable to start with improving all the available natural sources of water including springs, wells and streams, which are the commonest sources in Bushenyi and other rural areas. Water development is a very complicated exercise on which expert advise should always be sought. Because of the technical skills required to construct dams, water development is an area where the central administration should be directly involved. Efforts should be taken to learn what programmes are being undertaken by other countries, and whether such programmes can be adopted with the prevailing conditions. In Bushenyi

and other rural areas in Uganda, some measures designed for water development in Nigeria could be adopted, for they are cheap and quite ideal for rural areas.

Under this programme, it is advised that wells should be sorrounded with concrete walls sufficiently high to prevent dirt from being blown in. They should have a cover which shelters the water from airborne rubbish. The ground around the base of the well should be designed that any water spilt will drain to a soak away.

The Geological Department of Nigeria has already designed a very useful form of well (see footnote [1] below). This well is designed for bucket delivery by several persons at the same time. The buckets are lowered and raised on four sets of rollers by means of a cord, the water emptied into four shaped concrete troughs with a pipe outlet enabling the water to be safely received by narrow-necked vessels. A seperate trough is provided for watering cattle and other domestic animals.

Another very important source of water for Bushenyi District is the spring. Springs may rise from clefts in rocks or from the ground. The water as a rule

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1 See Village Housing in the Tropics with special reference to West Africa. Published for use of the Agency for International Development, Department of Housing and Urban Development, Office of International Affairs, Washington DC. 20410 -1970.

is clear having passed through porous layers underground, but the water does not always come from the spring in a convenient form for collection, and springs are notoriously difficult to keep free from contamination by puddles. Due to difficulty of drawing water from the runni spring, the users usually dig a well where water from the spring collects for easy collection by the users. Well digging results into more contamination of the water and policy should discourage the practice, and find better means of securing spring water in a more hygienic form. Some measures still designed for Nigeria can be adopted.

With springs from rocks, if there is a sufficient fall in the ground, the best thing is to build a small covered concrete tank with delivery pipes, and an overflow is built slightly down hill from the spring. The spring is boxed in with a small concrete chamber and the water is carried down from this box by means of a short concrete covered channel into the delivery tank at a lower level. The water from these rocky springs, as a rule requires no filteration, and if the above desribed technique is applied, people will get relatively safe water. The diagram 6(1) illustrates the above technique.

Springs arising from the ground are rather more difficult to control for sometimes it is

Diagram 6 (1) SPRING OF A ROCKY ORIGIN CONNECTED TO A DELIVERY TANK

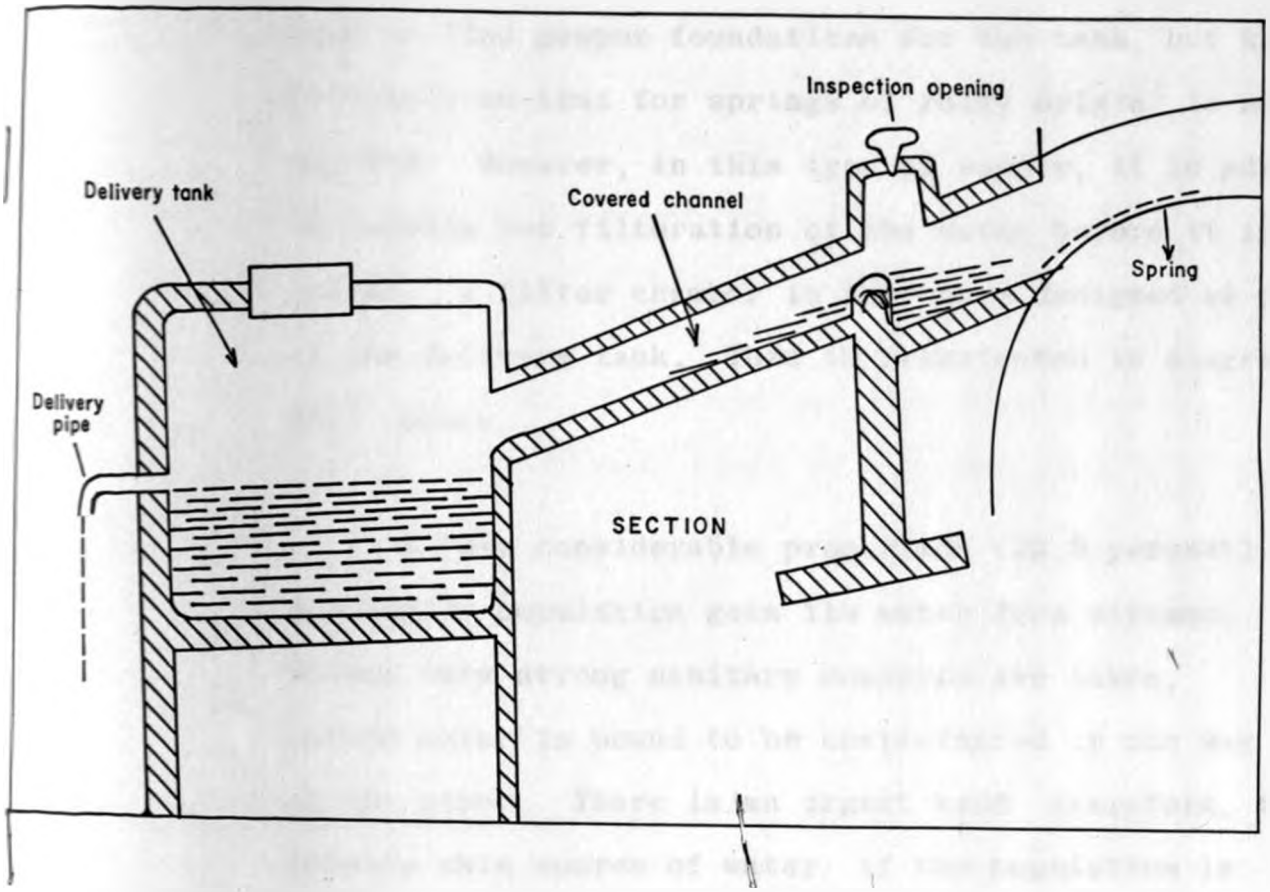
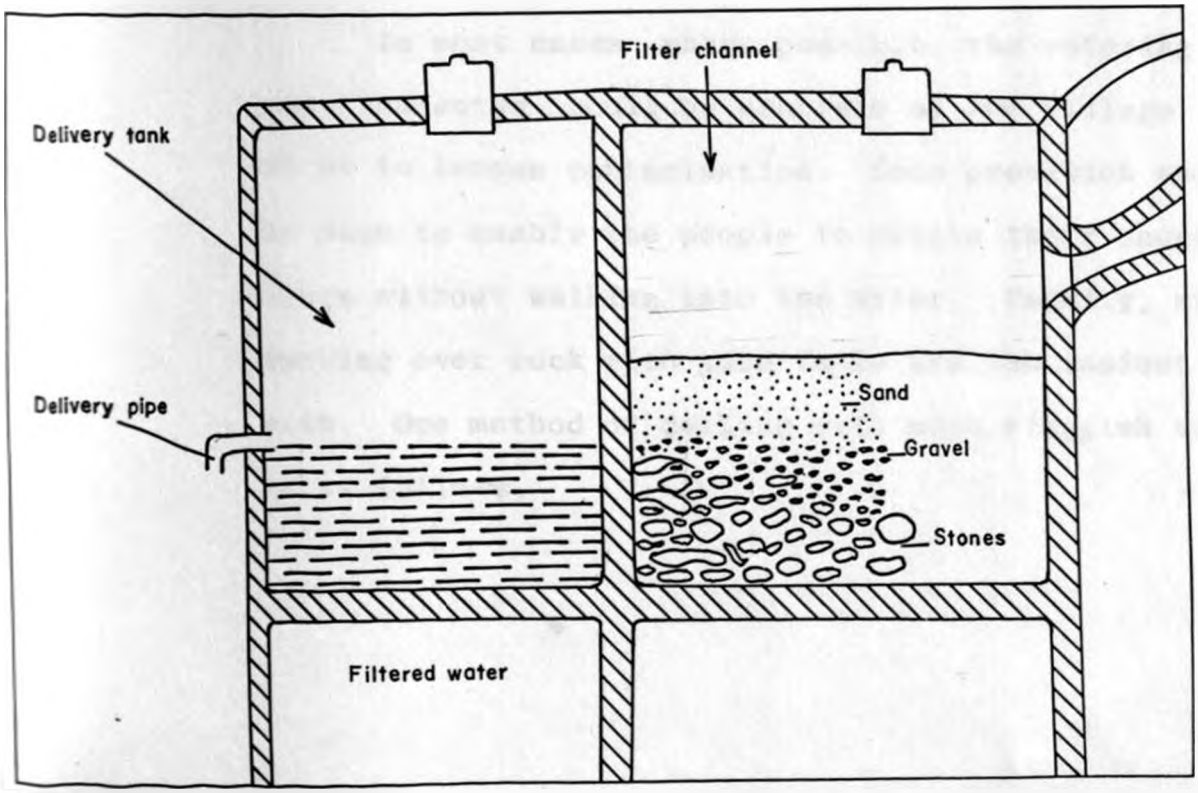


Diagram 6(2) FILTER CHAMBER AND DELIVERY TANK CONNECTED TO A GROUND SPRING



hard to find proper foundations for the tank, but the same principle as that for springs of rocky origin is normally applied. However, in this type of supply, it is advisable to provide for filteration of the water before it is collected. A filter chamber is therefore designed as part of the delivery tank. This is illustrated in diagram 6(2). above.

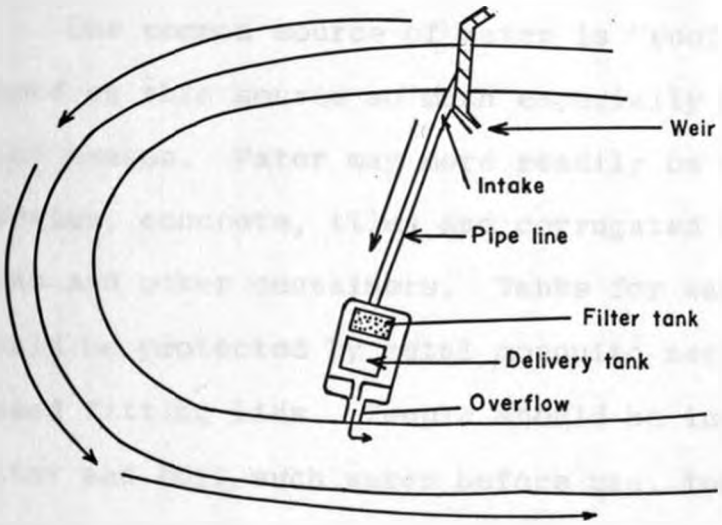
A very considerable proportion (22.2 percent) of Bushenyi's population gets its water from streams. Unless very strong sanitary measures are taken, stream water is bound to be contaminated in one way or the other. There is an urgent need therefore, to improve this source of water if the population is to be saved from a number of diseases that can result from drinking contaminated water.

In most cases where possible, the watering point selected should be upstream of the village so as to lessen contamination. Some provision should be made to enable the people to obtain their requirements without walking into the water. Usually, streams running over rock with good falls are the easiest to deal with. One method of dealing with more sluggish streams is as follows.

Points are taken on the course of the stream, usually on a bend. A weir is constructed across the stream at the upper of these two points. A screened intake is constructed at the weir and the water from this intake is run by means of a covered channel or pipe line to a pipe where it is filtered before being stored in a tank. The water overflow is carried by gutter into the stream. This is illustrated in diagram 6(3).

Diagram 6(3): Water supply from a flowing stream

Diagram 6(3) WATER SUPPLY FROM A FLOWING STREAM



Although not provided for in the 1980 census schedule "B", the lake source of water must be applicable to a few people in Bushenyi. After all, there are two lakes in the area namely George and Edward. Here, unless other methods can be designed, the only viable measure is to treat the water and pump it to the settlements. However, treating such water and pumping it to the people, would highly depend on the size of potential users in terms of population figures for it is quite an expensive undertaking. If treating and pumping is not economically viable due to the small size of potential consumers, then alternative measures should be taken to ensure that people use clean water from the lake.

One common source of water is "roof water". People depend on this source so much especially during the rainy season. Water may more readily be collected from asbestos, concrete, tiles and corrugated iron roofs into tanks and other containers. Tanks for water collection should be protected by metal mosquito netting or really closed fitting lids. People should be instructed to filter and boil such water before use, for it is usually unclean. Accordingly, gutters connected with such water collection should be avoided. The yellow fever mosquito-aedes aegypti - in particular breeds in gutters if care is not taken.

There might be some areas of Bushenyi District, where local supply of water is liable to disappear especially in the dry seasons. Such possible areas must be identified, and all efforts must be taken to ensure that there is water throughout the year. The rainy season could be used to collect reserves for the dry season. Reserving water however, is an exercise far beyond the abilities of a common man. This is where government concern should be greatly motivated. Probably, in such areas with seasonal shortages, the "borehole" systems might be a very positive answer.

In order to implement the water development programmes, the Department of water and sewage should extend their offices to the lowest levels possible (if possible to parish level). Voluntary workers should be encouraged at the village level to assist the villagers to understand and implement the water programmes. People should be urged to boil any form of water before drinking it.

6.3.2. Improvement of sanitary facilities

Another extremely important consideration to be included in any housing conditions development plan relates to sanitation especially with respect to toilet facilities. Unless sanitary facilities are improved, any efforts, for example, to provide good drinking water to the population will inevitably be frustrated.

This is so because a lot of water-borne diseases can still develop even if water is clean, provided the sanitary facilities are poor. In this respect, a water development programme must go hand in hand with sanitary improvements if positive results are to be achieved.

It was discovered in this study that a very big proportion of the population - 92.3 percent of the households - use the pit latrine for their toilet facilities. An unfortunate 6.8 percent use either the bush or nearby gardens to dispose of their feaces. A combination of this with the fact that most of the people use the well, spring or stream as their main source of water seriously aggravates the health problem of diarrhoeal diseases. There is therefore a great need on the side of planners to improve the sanitary facilities so as to prevent such dangers.

First and foremost policy should ensure that at least every household owns a pit latrine. If necessary this should be an order and anybody who fails to meet it should be punished. Certain regulations should be followed in constructing the pit latrine. For example, a pit latrine should be constructed not less than 40 or more yards away from the house, kitchen, and compound. They should be 15 or more feet deep and 6 or more feet wide. Although not a must, efforts should be taken to cement the cover (floor) so that it can be washed as

often as possible during a week. Cementing may not be possible to many poor families. In this case, the Government should take the responsibility of making wide cement blocks with a squatting slag. These blocks are very convenient in flooring pit latrines, and where care is taken, they can easily be washed. The squatting slag should be provided with a cover attached with a handle. This cover could be made of wood or kerosine tins. Since the cement blocks are expensive to make but quite permanent, they should be made in such a way that they can be transferred from a full pit latrine to a newly constructed one. Since the construction of a pit latrine is not easy, households should be advised to prepare new ones before the old ones get completely full. Finally, the latrines should not be left in the open. A small house should be built around them in order to provide for more privacy, decency, and permanency.

Another important consideration to make is the location in relation to the source of water - a well, spring or stream in particular. Pit latrines easily pollute the sub-soil water which is usually the source for a well, or a spring. Because of this, they should be located quite far from the source of water, and, where possible, they should be below the water sources where the land is sloping. When the pit is full, it shoul be fully covered with rubbish and earth, left to rot and ferment; and when this has taken place, the contents are like fine earth and they should be used as manure.

It might be advisable to observe for culture and tradition when providing toilet facilities for a household. For example, the Baganda believe that a man should not use the same toilet with his mother-in-law, neither should a women use a common toilet with her father-in-law. A similar tradition might be pertaining in Bushenyi. In this case, precautions should be taken to provide two sets of pit latrines - one for the family members, and the other for such special occasional visitors.

Apart from the toilet facilities, provision should be made for the disposal of all forms of garbage in a home. A wide, shallow pit (hole) - about four feet deep and six feet wide should be dug some yards away from the main compound for the central collection of all sorts of rubbish in a home. The rubbish should occasionally be burnt, and the ashes used as manure. A home environment kept free of rubbish will have less flies, and will not be very attractive to rats.

6.3.3. Improvement of shelter

A comprehensive rural housing improvement programme should also give special consideration to the improvement of the general conditions of shelters - the permanent, semi-permanent, and the temporary. A clear understanding of the uses of shelters from the point of view of living arrangements based on family needs for sleeping, eating, child rearing, leisure

and earning a living would help the planners in setting appropriate building standards for all kinds of shelters. The standards should be consistent with the available resources and the level of economic development; and should take into consideration the social cultural aspects of the population of the area. Planners should make sure that all shelters in the district create a safe and pleasant environment, for example by ensuring adequate circulation of air, preventing structural failure or limiting the likelihood of fire, insects, pests, flood and other possible hazards.

Although shelters constructed with permanent materials would normally provide the best shelter, the majority of houses in the district are made of temporary materials. Obviously, the best plan would be to ensure that all structures are permanent. However, given the present economic situation in the district and the Nation as a whole, such a policy would be very impossible to implement. Therefore the immediate and most plausible policy would be that which encourages the use of improved traditional materials. There is a need to set up institutions to study local conditions including culture, and to conduct research on technical improvement of traditional building materials found in the area. The Uganda Association of Technical Professions (UATP) should be put in charge of these institutions and should be helped by the Ministry of Housing and Urban Development, Ministry of Culture and

Community Development and the Ministry of Health. The syllabi for these institutions should be based on local conditions and should not imitate housing models studied abroad.

Students for these institutions should be recruited from all over the districts. Those who failed senior four, five or six should qualify for the housing training. After the training, the students should go back to their respective areas to work with extension workers of housing or shelter improvements.

The shelter improvement extension workers from the Ministries of Culture and Community Development, and Health, together with the trained students, should draw a shelter improvement programme based on the village level. They should first educate the village people, especially the heads of households, about the implications of poor shelter. This could be done through printing pertinent manuals, evening classes, and propaganda by the chiefs. The team should organize to hold demonstrations of shelter construction once or twice a month. Each village should have its own construction demonstration. Stress should be put on use of improved traditional materials. For example, blocks made out of a mixture of mud, cowdung, and grass could be used in wall construction of the demonstration shelters in particular. The floor should be cemented and the roof

preferably covered with iron sheets. Special care must be given to the ventilation systems through the windows, ventilators, and doors. Ventilation should be from all possible sides; from the walls, ceiling, and, if possible, from the floor. The walls of the shelters must be plastered with lime or smeared with a mixture of cow dung and fine mud to prevent cracks which hide harmful insects and pests.

In such a programme, it would be necessary for the government to provide at subsidized prices the required iron sheets and bags of cement for plastering the floors. Due to poverty, some families may not afford to buy the cement or iron sheets even at the subsidized prices. Such poor families should find ways of keeping the floors of their houses smooth and free from dust. For example, they can smear their floors with cowdung at intervals of six months; they can also change the thatch on their roofs now and again to avoid the rotting of roofs.

The improvement of rural housing conditions through improved traditional materials should be looked at as a short term programme. The long term programme should aim at assisting the people to build semi-permanent permanent structures. Since the construction of semi-permanent or permanent structures requires the buying of some materials, policy to assist people to acquire

materials should be designed. For example, the government can assist people to construct adequate shelters through support and encouragement of Housing Co-operative Societies and self help schemes. However, the government may not have sufficient funds to raise the initial capital for these societies. In this case, it would be necessary for the government to seek housing loans from International lending Institutions. The lenders should permit a longer period of grace and charge low interest rates, because housing is not a directly productive investment and involves no cash flow.

The government should take proper measures in administering outside loans and they should reach the people they are intended to help. In order to avoid misuse of loans, the borrowers should get the loan in form of materials like windows, doors, wood, cement and iron sheets. In this case there is no pressing need for security, since some of these materials can be confiscated if the person fails to pay back. In order to meet the demand for materials from the housing co-operatives, there is a need to form Building Co-operatives responsible for making some of these materials like windows, doors, ventilators, blocks, etcetera. In addition to satisfying the demand for materials, the Building Co-operatives will also create employment for the unemployed.

The building of rural houses and their improvement would no doubt have to depend on the rehabilitation of building materials industries. Presently, the two cement industries, nails and steel co-operation industries are producing below their capacities (see Uganda Government 1982:20-21). The Government has to rehabilitate these industries and allocate them the necessary foreign exchange to import some of their raw materials. Increased production of building materials would result into a fall in their prices. This, in turn, would raise the demand for the materials and better shelters would be built.

Finally, since income is a major determining factor for the quality of shelter, government should design policy towards the earning of reasonable incomes by all the working groups. In the district, the majority of the people are farmers, and their incomes could be raised through increased and improved agricultural production. This is possible if all farmers - whether small or big scale - are provided with various agricultural inputs such as seeds of high quality, fertilizers, etcetera. Animal driven ploughs can be encouraged in the area since cattle are common there. Furthermore all categories of farmers should be entitled to financial credit and technical assistance from extension workers. Storage, transportation as well as favourable marketing facilities should be a

responsibility of the Government. In addition, rural industrialization programmes through promotion of cottage industries, and small scale industries based on local raw materials will help to increase the incomes of the people as well as reduce unemployment. With the increased incomes, the people will be able to pay for their necessities, meet their debts and social obligations, and be in position to build or improve their shelters - (U.N.-Habitat 1980:19).

The other important steps in rural housing improvements should be with respect to physical energy improvement, provision of schools and hospitals, trading centres as well as communication roads.

Power used for cooking and lighting in Bushenyi District has a lot of implications. Firewood collection is a very time consuming exercise and it requires a lot of energy especially from the females who already have a lot of other domestic responsibilities. The exercise speeds up deforestation, soil erosion, and desertification. The use of kerosene particularly in the "tadooba" produces a lot of harmful smoke to the eyes and respiratory systems of the users. There is a need to minimize all these effects by introducing rural electrification.[2] Although this is a very expensive programme, it is one quick way of solving many of the rural problems. The long run results are worth meeting the initial costs.

2 Besides electricity power - there is also a new development of biogas which is cheap and can easily be used in in temporary structures.

For example if electricity is provided along the main roads in a village a lot of people will be attracted and are likely to move near the main road. This could help to change the present rural pattern of dispersed settlement. People would be motivated and encouraged to live closer to each other making it easier for the government to provide other important social services.

In conjunction with the improvements in housing conditions, another important aspect which needs consideration is the peoples' diet. According to Katende (1977:25-28), a number of children in rural Uganda - Bushenyi District inclusive - suffer or die from malnutrition. But the proportions are lower in western Uganda (Bushenyi included) mainly because of the type of diet made of milk, meat and millet. These are high protein content foods, and the only thing required is to educate the people on the best way to utilize them in feeding infants and children, and to emphasize hygiene methods. All this will no doubt, raise the general living conditions, and contribute to the socio-economic development of the area.

6.4. Requirements for further research

The findings from this study as well as the problems encountered in producing this work clearly suggest that researchers still have a lot to do on the

field of housing before concrete requisite information for effective planning, policy formulation and implementation can be obtained. Unless there is comprehensive knowledge regarding the actual determinants and consquences of variations in the quality of housing conditions, meaningful planning will never be easily achieved. For purposes of effective policy formulation and implementation therefore, there is a need for researchers to effectively document the causes and consequences of the observed variations in the quality of housing. We might think, for example, that, probably, the major factors responsible for variations in the quality of shelter are education and income. Of course, these are the most obvious factors. But on the other hand, there might be other factors which might even be stronger than these two. Such possible factors need to be disclosed with more organized research.

With respect to the inter-relations between mortality and the quality of shelter, future research should be based on bigger samples to allow for actual estimation of mortality levels by class of housing namely, permanent, semi-permanent, and temporary. Efforts should be made to control other crucial factors like source of water and toilet facilities so as to detect the actual influence of shelter on health. Diseases related to various defects in housing conditions should be identified, and the contributions

of such diseases to the total incidence of mortality estimated.

There is a need to determine actual densities in the various qualities (classes) of shelter. This will, of course, call for documentation on the actual sizes of houses, as well as number of rooms and people living there. This will help in the estimation of average densities and help in formulating policy on housing standards. Average densities can, in actual fact, be distorted by certain traditional and cultural factors which determine the living arrangements in a given household. These traditions, cultural beliefs and practices, can bring very big variations in room densities within a given house. For example, the room for the parents can be below the average density, while that for the children can be far above the average and terribly overcrowded. Information on traditional arrangements, and household composition from the living point of view of relationship to the head of household is vital in formulating effective housing policies.

Ventilation being a very important component of shelter, future research should pay special consideration to it. Information should be collected on how effectively shelters are ventilated and what changes and improvements need to be made.

Lastly, a study on prefernce, opinion or attitudes of people towards housing conditions will make a useful contribution in a planners' effort to improve housing. In order to minimize the cost of collecting all this required information, all future censuses should include built-in samples with specific questions on housing conditions. The questions should vary from census to census so that new data can be acquired and accumulated with time. In this way, more documentation will be made on the housing problem not only in Bushenyi, but also in other districts of the Country.

APPENDIX 1.1. District Growth Rates

Districts	Population of 1969	Population of 1980	Observed Growth Rates % Between 1969-1980	Projected Growth Rate % Between 1969-1979
1. Apac	225,413	313,333	3.1	2.7
2. Arua	369,620	472,283	2.3	1.7
3. Bundibugyo	74,420	112,216	3.4	4.7
4. Bushenyi	410,683	524,669	2.4	4.3
5. Gulu	223,708	270,085	1.8	3.5
6. Hoima	184,057	294,301	4.7	5.5
7. Iganga	470,189	643,881	3.0	3.2
8. Jinja (a)	196,262	228,520	1.5	3.2
9. Kabale	403,400	455,421	1.2	2.1
10. Kabarole	327,962	519,821	4.6	4.2
11. Kampala (b)	351,796	479,792	3.0	8.0
12. Kamuli	278,296	349,549	2.3	3.2
13. Kapshorwa	64,464	73,967	1.4	2.6
14. Kasese	164,132	277,708	5.2	4.7
15. Kitgum	240,136	308,711	2.4	3.5
16. Kotido	105,576	161,445	4.2	2.3
17. Kumi	190,715	239,539	2.1	1.8
18. Lira	278,902	370,252	2.8	2.7
19. Luwero	315,204	412,474	2.6	3.2
20. Masaka	458,024	631,156	3.0	3.6
21. Masindi	167,846	223,230	2.8	5.5
22. Mbale	421,433	556,941	2.8	2.7
23. Mbarara	450,462	688,153	4.2	4.3
24. Moroto	164,695	188,641	1.4	2.3
25. Moyo	89,978	106,492	1.6	3.8
26. Mpigi	492,402	639,919	2.6	3.2
27. Mubende	330,955	510,260	4.2	4.1
28. Mukono	541,016	634,275	1.5	3.2
29. Nebbi	204,142	233,000	1.3	1.7
30. Rakai	182,572	274,558	4.0	3.6
31. Rukungiri	244,588	296,559	1.9	2.1
32. Soroti	379,913	476,629	2.2	1.8
33. Tororo	527,090	668,410	2.3	2.3
UGANDA	9,535,051[c]	12,636,179	2.8	3.8

a) Jinja district excludes Njeru Town (Population 4,637 in 1969 and Population 3,880 in 1980), while Njeru is included in Mukono District.

b) Kampala District includes Kampala City and Entebbe Town

c) Population excludes that of Karasuk (Population 13,796 in 1969) transferred to Kenya after 1969.

Source: Uganda, 1980 Population Census provisional results Table 11

APPENDIX 1:2 Population Densities For Districts

Name District	Area		Population		Population Density			
					1969		1980	
	Total Area In Sq. km.	Total Land Area Sq.km.	1969	1980	By Total	By Land	By Total	By Land
Apac	6,488	5,885	225,413	313,333	35	38	48	53
Arua	7,830	7,595	369,620	472,283	47	49	60	62
Bundibugyo	2,338	2,097	74,420	112,216	32	36	48	54
Bushenyi	5,396	4,905	410,683	524,669	76	84	97	107
Gulu	11,735	11,501	223,708	270,085	19	19	23	23
Hoima	9,897	7,463	184,057	294,301	19	25	30	39
Iganga	13,114	4,923	470,189	643,881	36	98	49	134
Jinja	734	678	196,262	228,520	274	296	312	337
Kabale	2,489	2,315	403,400	455,421	162	174	183	197
Kabarole	8,361	8,108	327,962	519,821	40	41	62	64
Kampala	238	198	351,796	479,792	1390	1,674	1,926	2, 320
Kamuli	4,348	3,332	278,296	349,549	64	84	80	105
Kapchorwa	1,738	1,738	64,464	73,967	37	37	43	43
Kasese	3,205	2,724	164,132	277,708	51	60	87	102
Kitgum	16,136	16,136	240,136	308,711	15	15	19	19
Kotido	13,208	13,208	105,576	161,445	8	8	12	12
Kumi	2,861	2,457	190,715	239,539	67	78	84	97
Lira	7,252	6,151	278,902	370,252	39	45	51	60
Luwero	9,198	8,539	315,204	412,474	34	37	45	48
Masaka	16,327	5,963	458,024	631,156	28	77	39	106
Masindi	9,640	8,766	167,846	223,230	17	19	23	26
Mbale	2,546	2,504	421,433	556,941	166	168	219	223
Mbarara	10,839	10,587	450,462	688,153	43	43	64	65
Moroto*	14,113	14,113	164,695	188,641	12	12	13	13
Moyo	5,006	4,666	89,978	106,492	18	18	21	23
Mpigi	6,222	4,486	492,402	639,919	83	115	106	147
Mubende	10,310	9,820	330,955	510,260	32	34	50	52
Mukono	14,245	4,494	541,016	634,275	38	117	44	138
Nebbi	2,891	2,731	204,142	233,000	71	75	81	85
Rakai	4,973	3,889	182,572	274,358	37	47	55	71
Rukungiri	2,753	2.584	244,588	296,559	89	95	108	115
Soroti	10,060	8,526	379,913	476,629	38	45	47	56
Tororo	4,553	3,900	527,090	668,410	116	135	147	171
UGANDA	241,038	197,096	9,535,051	12,636,179	40	48	52	64

Source: District areas are compiled from Department of Land and Survey Entebbe. Population figures are compiled from 1969 and 1980 Uganda Population Censuses.

*Population excludes that of Karasuk which was handed over to Kenya in later 1969 (1969 Population of Karasuk was 1376).

STRICTLY CONFIDENTIAL

ENUMERATION AREA NUMBER

THE REPUBLIC OF UGANDA

1980 POPULATION

NAME	RELATIONSHIP	SEX	AGE		MARITAL STATUS	NATIONALITY	BIRTHPLACE	GENERAL EDUCATION		TRAINING AFTER GENERAL EDUCATION		
Give, starting with the Head of the Household, names of all persons including babies and elderly persons who usually live here, whether present or absent. • Include visitors and guests who lived here on census night.	1 Head 2 Spouse 3 Son/Daughter 4 Son/Daughter in Law 5 Grandchild or Grand Grandchild 6 Father or Mother 7 Other Relatives 8 Servants 9 Others	1 Male 2 Female	If aged 1 year and above state number of completed years on age on last birthday	If under 1 year state number of completed months	1 Never Married 2 Now Married 3 Widowed 4 Divorced or Separated	State Country of Citizenship	District of Birth for persons Born in Uganda or Country of Birth for persons Born outside Uganda.	1 Studying in Govt. School 2 Studying in Private School 3 Stopped Studying 4 Never Studied	Highest grade attained P1 - 11 S1 - 31 P2 - 12 S2 - 32 P3 - 13 S3 - 33 P4 - 14 S4 - 34 P5 - 15 S5 - 35 P6 - 16 S6 - 36 P7 - 17 U1 - 41 J1 - 21 U2 - 42 J2 - 22 U3 - 43 J3 - 23 U4 - 44 U5 - 45	Have you done any post General Education training? 1 Doing Now 2 Completed 3 Never Done	Field of Training Pursued 1 Teaching/ Education 2 Health 3 Commercial 4 Technical 5 Agricultural 6 Other	Highest Qualification Attained 1 Certificate 2 Diploma 3 Post Gradu Course
(101)	(102)	(103)	(104)	(105)	(106)	(107)	CODE	(108)	CODE	(109)	(110)	(111)	(112)	(113)

I have listed these names (read all listed names)
Is there any Person who lived here on the census night whom I have not listed? Give names

Number of Persons Enumerated

Males _____

Females _____

Total _____

_____

Enumerator's Signature

Date _____

_____

Supervisor's Signature

Date _____

REPUBLIC OF UGANDA

SCHEDULE B

INSTITUTION [ ] PRIVATE HOUSE HOLD [ ]

167(b)

G 141032

OPULATION CENSUS

5 AFTER GENERAL DUCATION		LITERACY			TO BE ASKED OF FEMALES AGED 12 AND OVER ONLY					TO BE ASKED OF ONLY THOSE AGED 10 YEARS AND ABOVE. (Unless otherwise stated, the answers should refer to the 18 days before census night)				
of Training ad aching/ ducation ealth ommercial echnical gricultural Other	Highest Qualification Attained 1 Certificate 2 Diploma 3 Post Graduate Course	Can you read with understanding and write meaningfully ? (In any language) 1 Literate 2 Illiterate 3 Aged less than 10 years	Is Father alive ? 1 alive 2 dead	Is Mother alive ? 1 alive 2 dead	Of the children you have ever born alive: How many are now living at home ?	How many are now living elsewhere ?	How many have died ?	Date of your most recent live birth: Year	Month	ECONOMIC ACTIVITY Did you do any work for pay or profit since Christmas ? If YES write: - EMPLOYED If NO write: - Had a job but did not work - Unemployed - Homemaker maker - Student - Other (specify)	OCCUPATION (Only for Those Employed and Unemployed) What kind of work did you do during the reference period or were you doing before becoming unemployed ?	INDUSTRY Name of Establishment Write the name of the Establishment or the name of the owner if the Establishment has no name	INDUSTRY Maid product or Service of Establishment Write what the establishment produced and NOT what the respondent produced	EMPLOYMENT STATUS Write whether a) Employee b) Self employed without employees. c) Self employed and employs others. d) Unpaid family worker. e) Others (specify)
(112)	(113)	(114)	(115)	(116)	(117)	(118)	(119)	120)	(121)	(122)	(123)	(124)	(125)	(129)

HOUSING CONDITIONS—TO BE ASKED OF THE HEAD OF THE HOUSEHOLD OR ANY OTHER RESPONSIBLE PERSON

TYPE OF DWELLING UNIT	PREDOMINANT CONSTRUCTION MATERIAL OF EACH BUILDING IN THE DWELLING UNIT			CATEGORY			
Write down whether flat, house, apartment, hut or other (specify what other is)	ROOF State whether the roof is made of iron sheets, tiles, asbestos, concrete, thatch, old paraffin tins, or other (specify)	WALL State whether the walls are made of burnt bricks, cement blocks, stone, concrete, bush pole, with mud, thatch, wood, or other (specify).	FLOOR State whether the floor is made of concrete, tiles, bricks, earth or other (specify).	State whether the building is permanent, semi-permanent or temporary	TYPE OF TENURE State whether owner-occupied, rented, employer-subsidized, or free housing.	SANITARY FACILITIES State whether water-borne, bucket, pit-latrine or none	NUMBER OF ROOMS Write down number of Habitable rooms in each Dwelling Unit excluding toilet, kitchen, bathroom, store, corridor, verandah or balcony
(201)	(202)	(203)	(204)	(205)	(206)	(207)	(208)
1.							
2.							
3.							
4.							
TOTAL							

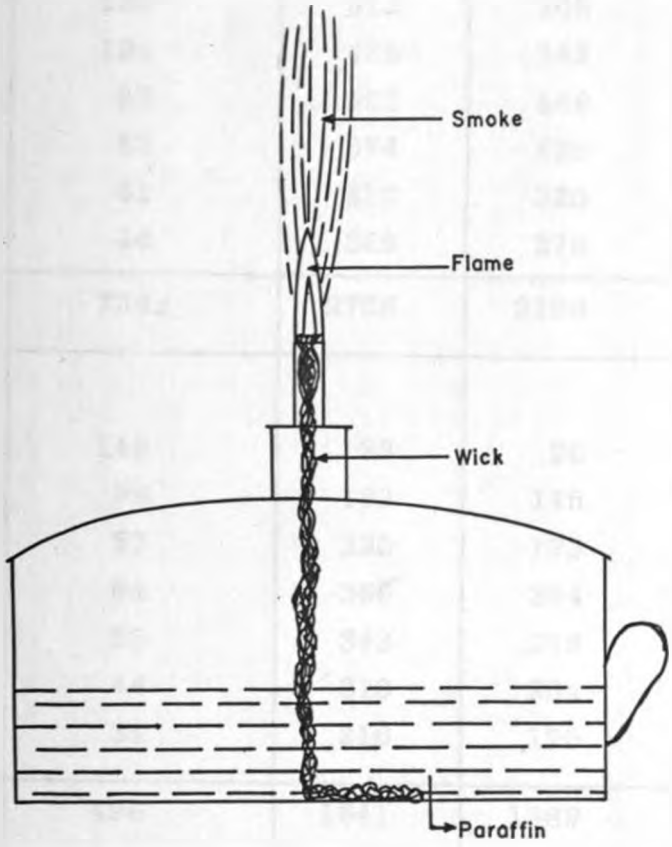
OTHER SOCIO-ECONOMIC CHARACTERISTICS—TO BE ASKED OF THE HEAD OF THE HOUSEHOLD OR ANY OTHER RESPONSIBLE PERSON

MAIN FUEL POWER USED FOR COOKING	MAIN FUEL / POWER USED FOR LIGHTING	MAIN PERMANENT SOURCE OF WATER	SOURCE OF ENTERTAINMENT AND INFORMATION	DOMESTIC APPLIANCES		MEANS OF TRANSPORT	PRIMARY EDUCATION	HEALTH FACILITIES
(301)	(302)	(303)	(304)	(305)		(306)	(307)	(308)
Firewood ☐	Paraffin ☐	Well ☐	Radio ☐	Tadooba ☐	Electric Iron ☐	Motor Vehicle ☐	State the distance between residence and the nearest Primary School in km	State the distance between residence and the nearest Medical Unit in km.
Charcoal ☐	Hearthfire ☐	Spring ☐	Gramophone ☐	Lantern ☐	Cooker ☐	Motorcycle ☐		
Paraffin ☐	Electricity ☐	Stream or Swamp ☐	Radio Cassette ☐	Sigiri ☐	Fridge ☐	Bicycle ☐		
Electricity ☐	Gas ☐	Borehole ☐	T.V. ☐	Charcoal Iron ☐	Sewing Machine ☐	Animal Transport ☐		
Gas ☐	None of These ☐	Piped Water ☐	None of These ☐	Stove ☐	None of These ☐	Water ☐		
None of These ☐		Dam or Valley Tank ☐				None ☐		
		None of These ☐						
		State the distance between main water source and residence in km						

Appendix 2.2 : The 1980 Population Census Sampling For Rural Areas

District	1979 Projected Population (N 100)	Proportion of Population (Wh)	No. of Parishes Sampled (3x340)
Apac	290.8	0.023	8
Arua	439.8	0.035	12
Bundibugyo	135.9	0.011	4
Bushenyi	628.4	0.050	17
Gulu	354.8	0.028	10
Hoima	313.0	0.025	9
Iganga	648.9	0.052	18
Jinja	121.1	0.010	3
Kabale	486.0	0.039	13
Kabarole			12
Kamuli	384.1	0.031	11
Kapchorwa	83.2	0.007	2
Kasese	312.4	0.025	9
Kitgum	299.3	0.024	8
Kotido	134.1	0.011	4
Kumi	228.8	0.018	6
Lira	359.8	0.029	10
Luwero	-	0.035	2
Masaka	650.1	0.052	18
Masindi	285.4	0.023	8
Mbale	543.6	0.044	15
Mbarara	689.3	0.055	19
Moroto	209.2	0.017	6
Moyo	130.5	0.010	3
Mpigi	708.6	0.057	19
Mubende	503.1	0.040	14
Mukono	740.2	0.059	20
Nebbi	241.7	0.019	6
Rakai	259.3	0.021	7
Rukungiri	291.6	0.023	8
Soroti	455.9	0.037	12
Tororo	632.5	0.051	17
Uganda	12,451.4	0.998	340

Appendix 4.1 TADOOBA



APPENDIX 5:1 THE DISTRIBUTION OF CHILDREN EVERBORN, SURVIVING AND DEAD FOR THE TEMPORARY, SEMI-PERMANENT AND THE TOTAL SAMPLE POPULATION OF BUSHENYI DISTRICT 1980

	Age Group	Total Number of Women	Children Everborn	Children Surviving	Children Dead
Temporary	15-19	177	31	29	2
	20-24	153	312	268	44
	25-29	124	435	348	87
	30-34	93	555	446	109
	35-39	82	574	420	154
	40-44	61	430	320	110
	45-49	44	369	278	91
	Total	734	2706	2109	597
Semi-permanent	15-19	149	23	20	3
	20-24	98	163	145	18
	25-29	57	220	193	27
	30-34	64	366	304	62
	35-39	53	343	288	55
	40-44	44	310	264	46
	45-49	31	216	175	41
	Total	496	1641	1389	252
Total sample population	15-19	326	54	49	5
	20-24	251	475	413	62
	25-29	181	655	541	114
	30-34	157	921	750	171
	35-39	135	917	708	209
	40-44	105	740	584	156
	45-49	75	585	453	156
		1230	4347	3498	849

Source: 1980 Uganda Population Census data.

APPENDIX 5:2 ESTIMATION OF VALUES OF xqo (Proportions Dead by Age x) FROM CENSUS REPORTS ON CHILDREN EVER BORN AND CHILDREN SURVIVING FOR BUSHENYI DISTRICT-1980.

1	2	3	4	5	6	7	8	
Age Group of mother	i	Average No. of children ever-born per woman (pi)	Average No. of children surviving/ woman (si)	Proportion of children dead $(1-\frac{si}{pi}=Di$	Multipliers (Ki)	Age x x	Proportion Dead by age x (xqo)	
15-19	1	0.175	0.164	0.063	1.133	1	0.071	
20-24	2	2.039	1.752	0.148	1.089	2	0.161	
25-29	3	3.509	2.806	0.200	1.022	3	0.204	
30-34	4	5.968	4.796	0.196	1.003	5	0.197	$R/P_2=0.086$
35-39	5	7.000	5.123	0.268	1.013	10	0.271	M=27.8
40-44	6	7.587	5.246	0.309	0.990	15	0.306	
45-49	7	8.386	6.318	0.247	0.988	20	0.244	
15-19	1	0.154	0.134	0.130	1.057	1	0.137	
20-24	2	1.663	1.480	0.110	1.075	2	0.118	
25-29	3	3.860	3.386	0.123	1.032	3	0.127	$P_1/P_2=0.093$
30-34	4	5.718	4.750	0.169	1.031	5	0.174	$\frac{1}{M}$ 29.2
35-39	5	6.472	5.434	0.160	1.033	10	0.165	
40-44	6	7.032	6.000	0.148	1.014	15	0.150	
45-49	7	7.032	5.645	0.197	1.013	20	0.200	
15-19	1	0.166	0.150	0.096	1.156	1	0.111	
20-24	2	1.892	1.645	0.131	1.089	2	0.143	
25-29	3	3.619	2.989	0.174	1.022	3	0.178	$P_1/P_2=0.088$
30-34	5	5.866	4.777	0.186	1.010	5	0.188	$\frac{1}{M}$ 28.3
35-39	10	6.793	5.244	0.228	1.020	10	0.232	
40-44	15	7.048	5.562	0.211	0.998	15	0.211	
45-49	20	7.800	6.040	0.226	0.996	20	0.225	

e: Computed from 1980 Uganda Population Census (Bushenyi District)

APPENDIX 5:3 PROCEDURE OF SMOOTHING l_2 THROUGH THE LOGIT (logit $P=\frac{1}{2}\log_e\frac{p}{1-p}$)

1	2	3	4	5	6	7	8	9	10	11	12
Class of housing	Age x	q_x	p	$p/_q$	Log. $p/_{qx}$	$\log\frac{1}{2}(p/_q)$	African Standard Life Table	Logit Difference	Average	Logit P	Smoothed l_2
Total classes of housing conditions	2	0.143	0.857	5.9930	1.7906	.8955	.8052	+.0901	-	-	-
	3	0.178	0.822	4.6180	1.5300	.7650	.7252	+.0398	+.0596	8648	848
	5	0.188	0.812	4.3191	1.4613	.7307	.6819	+.0488	-	-	-
Temporary class of housing conditions	2	0.161	0.839	5.2111	1.6508	.8254	.8052	+.0202	-	-	-
	3	0.204	0.796	3.9020	1.3615	.6808	.7252	-.0444	-.0012	8040	833
	5	0.197	0.803	4.0761	1.4051	.7026	.6819	+.0202	-	-	-
Semi permanent class of housing conditions	2	0.118	0.882	7.4745	2.0116	1.0058	.8052	+.2006			
	3	0.129	0.873	6.8740	1.9278	.9639	.7252	+.2387	+.1787	9839	877
	5	0.194	0.826	4.7471	1.5572	.7788	.6819	+.0969			

Source: Computed from Uganda Population Census 1980 (Bushenyi District)

APPENDIX 5:4 MORTALITY ESTIMATES BY SULLIVAN FORMULA $(A+BC(P_2/P_3) = q_2/D_2)$

Class of Housing	Age x	North Model Life Table Regression Coefficients Ai	Bi	P_2/P_3 C	1 BXC	2 A+BXC	3 (A-BXC)xDx=q_x
Total classes of housing	2	1.30	-0.63	.523	-0.330	0.970	0.139
	3	1.17	-0.50	.523	-0.262	0.908	0.162
	5	1.15	-0.42	.523	-0.220	0.930	0.175
Temporary class of housing	2	1.30	-0.63	.581	-0.366	0.934	0.150
	3	1.17	-0.50	.581	-0.291	0.879	0.179
	5	1.15	-0.42	.581	-0.244	0.906	0.178
Semi-permanent class of housing	2	1.30	-0.63	.430	-0.271	1.029	0.121
	3	1.17	-0.50	.430	-0.215	0.955	0.122
	5	1.15	-0.42	.430	-0.181	0.969	0.168
		West Model Life Table Regression Coefficients					
Total classes of housing	2	1.30	-0.54	.523	-0.282	1.018	0.146
	3	1.17	-0.40	.523	-0.209	0.961	0.171
	5	1.13	-0.33	.523	-0.173	0.957	0.180
Temporary class of housing	2	1.30	-0.54	.581	-0.314	0.986	0.159
	3	1.17	-0.40	.581	-0.232	0.938	0.191
	5	1.13	-0.33	.581	-0.192	0.938	0.185
Semi-permanent class of housing	2	1.30	-0.54	.430	-0.282	1.018	0.120
	3	1.17	-0.40	.430	-0.209	0.961	0.123
	5	1.13	-0.33	.430	-0.173	0.957	0.166

Source: Column A and B are the regression coefficients of Sullivan, J.M. 1972.
Column C is calculated from the study sample of women aged 20-24 and 25-29 - 1980 Uganda Population Census Data (Bushenyi District).

APPENDIX 5:5 BRASS P/F RATIO OF ESTIMATING FERTILITY LEVELS FOR THE TEMPORARY AND SEMI-PERMANENT CLASSES OF HOUSING CONDITIONS IN BUSHENYI DISTRICT 1980

	1	2	3	4	5	6	7	8	9	10	11
	Age Group	i interval	Current Fertility	Current Fertility	Cumulative Fertility	Multi-plying Factors	Estimated Average Cum. fert. Qi+K1f1	Ave.No. of children/ per woman everborn	P1/F1	P2/F2	PU/FU
			fi	fix5	Qi	Ki	F1	P1	P1/F1	P2/F2	P4/F4
Temporary	15-19	1	0.082	0.410	0	1.591	0.130	0.174	1.308	0.110	0.088
	20-24	2	0.400	2.000	0.410	2.773	1.519	2.039	1.342	0.537	0.431
	25-29	3	0.430	2.150	2.410	2.983	3.693	3.508	0.950	0.577	0.463
	30-34	4	0.313	1.565	4.560	3.138	5.542	5.968	1.077	0.420	0.337
	35-39	5	0.200	1.000	6.130	3.181	6.760	7.000	1.036	0.268	0.215
	40-44	6	0.127	0.635	7.130	3.600	7.587	7.587	1.000	0.170	0.137
	45-49	7	0.067	0.335	7.765	4.607	8.074	8.386	1.039	0.090	0.072
	Total		8.095							10.86	8.715
Semi-permanent	15-19	1	0.067	0.335	0	1.726	0.116	0.154	1.328	0.103	0.076
	20-24	2	0.265	1.325	0.335	2.800	1.077	1.663	1.544	0.409	0.302
	25-29	3	0.386	1.930	1.660	3.000	2.818	3.860	1.370	0.596	0.440
	30-34	4	0.453	2.265	3.590	3.107	4.997	5.718	1.140	0.699	0.516
	35-39	5	0.321	1.605	5.855	3.231	6.892	6.472	0.936	0.496	0.366
	40-44	6	0.136	0.680	7.460	3.473	7.932	7.045	0.885	0.210	0.155
	45-49	7	0.097	0.485	8.140	4.273	7.554	7.032	0.818	0.150	0.111
	Total		8.625							13.315	9.830
Total	15-19	1	0.074	0.37	0	1.624	0.120	0.166	1.383	0.106	0.082
	20-24	2	0.342	1.71	0.37	2.781	1.321	1.892	1.432	0.480	0.380
	25-29	3	0.412	2.06	2.08	2.985	3.310	3.619	1.093	0.590	0.458
	30-34	4	0.364	1.84	4.14	3.128	5.279	5.866	1.111	0.521	0.404
	35-39	5	0.248	1.24	5.96	3.261	6.769	6.793	1.004	0.355	0.276
	40-44	6	0.130	0.65	7.20	3.550	7.662	7.048	0.920	0.186	0.144
	45-49	7	0.039	0.195	7.85	4.484	8.025	7.800	0.972	0.056	0.043
	Total		8.045							11.47	8.935

Computed from 1980 Uganda Population Census . . (Bushenyi District)

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