



1974

World Population Year

**THE POPULATION
OF
LIBERIA**

C.I.C.R.E.D. Series

REPUBLIC OF LIBERIA

Ministry of Planning and Economic Affairs

THE POPULATION OF LIBERIA

A Monograph for the World Population Year 1974,
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TABLE OF CONTENTS

	Pages
CHAPTER I – Population Growth	7
1.1. Historical	7
1.2. Current	7
CHAPTER II – Components of Growth	9
2.1. Fertility	9
– Age Specific Birth Rate	10
– Birth by Tribal Affiliation of Mother	10
– Birth By Order	12
– Birth Probabilities by Age and Parity of Mother	13
– Place of Birth	13
– Month of Birth	14
– Number of Children Ever Born	14
2.2. Mortality	15
– Age Sex-Specific Death Rate	16
– Life Expectancy	17
– Mortality by Tribal Affiliation	17
– Place of Death	18
– Month of Death	18
– Infant Mortality	18
– Infant Mortality by Age of Mother	20
– Infant Mortality by Age of Child	20
2.3. International Migration	21
– Immigration and Emigration	22
– Immigration and Emigration Balance, 1971	22
– Immigrants by Estimated Length Of Stay	23
– Immigrants by Country of Origin	23
– Country of Origin and Immigrant's Age	24
– Emigrants by Age, Sex and Location	24
– Emigrants by Estimated Length of Stay	25
– Emigrants by Country of Destination	26
– Country of Origin and Emigrant's Age	28

CHAPTER III – Population Composition	29
– Relationship to Head	30
– Age and Sex Distribution	31
– Marital Status by Age and Sex	32
– Age at First Marriage	33
– Highest Grade Completed	33
– Tribal Affiliation	34
CHAPTER IV – Population Distribution and Internal Migration.....	36
– Regional.....	36
CHAPTER V – Population Projection of Liberia, 1965 – 1985	38
Introduction	30
Evaluation of Age-Sex Data	39
1. Evaluation of the 1962 Census	39
2. Evaluation of the 1970 Survey Data	43
Population Estimates	44
1. Mortality Estimate	44
2. Fertility Estimate	48
3. Migration	48
Assumptions	49
1. Mortality	49
2. Fertility	49
Methodology	50
1. Projection Method	50
2. The Estimation of Future Births and the Population 0-4	50
3. The Estimated and Projected Population of Liberia	51
Footnotes	56

DIAGRAMS

Figures

1. Crude Live Birth by Tribal Affiliation of Mother, 1971	12
2. Month of Birth, 1970 and 1971	14
3. Month of Death, 1971	19
4. Percentage Distribution of Immigration by Country of Origin, 1971	24
5. Emigration Rates by Age and Sex, 1971	25
6. Age Sex Pyramids, 1971	27

TEXT TABLES

Table

Number

1. Fertility Indices	9
2. Live Birth Rates By Sex and Age of Mother, 1971 (Rate per 1000)	11
3. Live Birth Rates by Tribal Affiliation of Mother, 1971 (Rates per 1000 Tribal Population)	11
4. Median Age of Mothers by Birth Order of Child, 1971	13
5. Selected Mortality Indices, 1971	15
6. Age – Sex Specific Death Rate, 1971	16
7. Mortality Up to Age 5 years, 1971 (Figure in Percent)	17
8. Age Adjusted Death Rates, 1971	17
9. Mortality Rates by Tribal Affiliation, 1971	18
10. Infant Mortality by Sex and Area, 1971	19
11. Infant Death by Age of Mother, 1971	20
12. Infant Death by Age of Child, 1971	21
13. Infant Mortality by Birth Order, 1971 (Rates per 1000 Live Births)	21
14. Crude Immigration and Emigration Rates, 1971	22
15. Median Age of Immigrants by Location, 1971	23
16. Crude Immigration Rates by Country of Origin 1971	23
17. Median Age of Immigration by Country of Origin, 1971	25
18. Median Age of Emigrants by Location 1971	25
19. Crude Emigration Rates by Country of Destination	26
20. Median Age of Emigrants by Country of Destination, 1971	26
21. Population Estimates by Sex, 1971	29
22. Selected Characteristics of Living Quarters, 1971	29
23. Household Types, 1971	30
24. Population by Relationship to Head, 1971	31
25. Age Ratios, by Sex, 1971	32
26. Median Age of the Population	32
27. Median Age of Bride and Groom	33
28. Comparison between 1970 Literacy Proportions and 1971 Highest Grade Completed Proportion	34
29. Comparison between the 1962 census and the Survey Population for Tribal Affiliation	35
30. First Five Year Group in Single Years	40
31. Digits Preference Index	41
32. Myers' Blended Index	41
33. Sex Ratio, Age Ratio, 1962 and 1970	44

Table
Number

34. Estimation of Mortality From Child Survival and Calculation of QX values	45
35. Life Expectancy at Birth for Some African Countries	46
36. Comparison of Unsmoothed and Smoothed Age Distributions of the Base Population by Sex	47
37. Projected Mortality Levels 1965 – 1985	49
38. Adjusted Age Specific Fertility Rates	50
39. Summary Estimates and Projected Population, Birth, Death and Growth Rates	51

APPENDIX TABLES

I. Estimated and Projected Percent Distribution of the Population in Broad Age Groups and the Dependency Ratios : 1965-85 ...	52
IA. Adjusted Life Table 1970 : Female	52
IB. Adjusted Life Table 1970 : Male	53
II. Estimated Population by Age and Sex : 1965	53
III. Projected Population by Age and Sex : 1970	54
IV. Projected Population by Age and Sex : 1975	54
V. Projected Population by Age and Sex : 1980	55
VI. Projected Population by Age and Sex : 1985	55

CHAPTER I

POPULATION GROWTH

1.1. HISTORICAL

Liberia is located on the West Coast of Africa with an area of 43 000 square miles (111 000 sq. km). The country was originally settled by freed American slaves of African origin in 1821. It was on July 26, 1847 that the country was declared an independent and Sovereign State from the supervision of the American Colonization Society.

Demographically, Liberia is within the fertility zone of West Africa, but not until in 1962 when the first population census was conducted. Prior to this time, a guessed figure of 2.5 million was determined as Liberia's population. Historical writings have carried this guessed figure up to 1962 when the population was observed to be far less than 2.5 million. The census figure showed 1.02 million.

In the past, besides head counts for tax purposes, vital registration and censuses which are used to determine the population, its growth and size were not in existence.

Because of the lack of such information, demographic parameters such as Crude Birth Rate (CBR), Crude Death Rate (CDR), Natural Rate of Increase (NRI), etc. which determine the size and growth of any population never existed in Liberia.

The result of the 1962 census would mean that the Liberian population has declined, but in reality this could not have been possible since there was no record of any major catastrophe such as war, earthquake, famine or epidemic.

Even though there would have been some amount of underenumeration in the census due to the inaccessibility of some remote areas at that time, we can safely say that the estimate of 2.5 million was at all cause too high.

1.2. CURRENT

In 1969 the Government of Liberia began a Population Growth Survey in an attempt to provide more accurate and current estimates of births and

deaths, migration, age and sex distributions, marital status, literacy and school attendance.

The survey included approximately 70 000 people or roughly 5 percent of the current estimated population of Liberia. The estimates which have been generated from this continuous survey, though subjected to both sampling and non-sampling errors, are used in the foregoing chapters of this monograph.

CHAPTER II

COMPONENTS OF GROWTH

2.1. FERTILITY

The fertility experience in Liberia during 1971 was, with minor fluctuations, due mainly to sampling variability, similar to that of 1970. The data suggested that 78,301 babies were born in Liberia in 1971. The fertility indices shown in Table 1 suggested that the *Crude Live Birth Rate* for the country was 50 per 1000 population, with the rural areas at 51 per 1000 and the urban at 47 per 1000. This was quite close to the 1970 experience where the rate for Liberia was 51 per 1000 with the rural and urban rates at 50 and 53 per 1000 respectively. The *sex ratio* at birth or the number of males per

TABLE 1 - FERTILITY INDICES, 1971

	Crude Live Birth Rate 1/	S.E. 2/	Natural Increase Rate 3/	Fertility Rate 4/	General Fertility Rate 5/	Total Fertility Rate 6/	Gross Reproduction Rate 7/	Net Reproduction Rate 8/	Median Age at Child-birth
Liberia	50	1.6 %	2.9	69	203	5 590	2 675	1 751	21
Rural	51	2.6 %	2.8	70	208	6 295	3 010	1 920	27
Urban	47	2.1 %	3.2	65	191	4 915	2 385	1 669	25

1/ Number of live births per 1 000 population

2/ S.E. (Standard Error) states that the chances are about 68 in 100 that the difference due to sampling variability between the estimate shown and the figure that would have been obtained by a complete count is less than 1 S.E. The chances are about 95 in 100 that the difference is less than twice the S.E. and 99 in 100 that is less than 2 1/2 times the S.E. Note that the S.E. does not include non-sampling errors which may be greater than the sampling error.

3/ Birth Rate minus death rate ; migrations not considered.

4/ Children under age 5 years per hundred women ages 15 to 44 years.

5/ Births per 1 000 women ages 15 to 44 years

6/ Sum of the age-specific birth rates per 1 000 women age 15 to 44 years.

7/ Sum of the female age-specific birth rates per 1 000 women age 15 to 44 years

8/ Sum of the female age-specific birth rates among women surviving at each age as determined by the life table.

100 females was 108, or about 3-5 per 100 over the expected ratio for tropical Africa. The Fertility Rate, or the number of children under age 5 years to every 100 women ages 15-44 years was 69 for the nation, with the rural at 70 and the urban at 65. The *General Fertility Rate*, or the number of live births per 1000 women ages 15-44 years, was 203 overall, with the rural at 208 and the urban at 191 per 1000. The *Total Fertility Rate*, or the sum of the age-specific birth rates for women ages 15-44 years, was 5.6 per 1000 women for Liberia, with the rural women at 6.3 and the urban at 4.9. The *Gross Reproduction Rate*, or the sum of the age-specific birth rates for female babies among women ages 15-44 years, was 2.7 per woman for the country, with the rural areas at 3.0 and the urban at 2.4. The *Net Reproduction Rate*, or the sum of the age-specific female birth rates among surviving women, ages 15-44 years, as determined from the Life Table of Liberia, was 1.8 per woman, with the rural at 1.9 and the urban at 1.7. The suggested *Natural Increase Rate* in 1971, or the difference between the live birth rate and the crude death rate, disregarding external and internal migration, was 2.9 percent with the rural at 2.8 percent and the urban at 3.2 percent.

Essentially, all of the above rates were lower than the 1970 survey results. The reasons for this were threefold. First of course, are the random fluctuations due to sampling and non-sampling errors. Second, in 1971, there was a severe outbreak cholera in the country which increased the mortality rate among children less than 1 year of age. Because births that terminate as infant deaths are particularly difficult to record, the birth rate dropped slightly, particularly in the urban areas of the country. A third reason may be the normal random changes in fertility among the nation's women from year to year.

Age Specific Birth Rate. The age-specific birth rate patterns for mothers ages 10 through 45 years and over, shown in Table 2, indicated that women ages 25-29 years had the highest probability of having a child. Twenty-seven out of every 100 women of these ages had a child in 1971. In the rural areas, 39 out of every 100 women ages 25-29 were mothers in 1971. In urban areas, it was the younger women ages 20-24 years who had the highest probability of child birth – 23 out of every 100.

Birth by Tribal Affiliation of Mother. Fertility differentials by tribe or ethnic group have long been studied by demographers. Moreover, it has been clearly demonstrated that in some countries, certain practices identified with a specific group, be it cultural, physical or social, are sometimes associated with higher or lower fertility. In order to investigate the possibility that fertility experience differed among the

TABLE 2 – LIVE BIRTH RATES BY SEX AND AGE OF MOTHER
1971 (RATES PER 1 000)

Age of Mother	Liberia All Areas			Rural Areas			Urban Areas		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Age 10-49 years	163	85	78	165	86	79	148	77	76
10-14 years	6	5	1	7	7	—	1	—	1
15-19 years	187	108	79	181	108	73	200	107	92
20-24 years	241	125	117	247	134	113	231	108	123
25-29 years	273	138	135	394	190	204	213	124	89
30-34 years	201	96	105	204	96	108	192	97	96
35-39 years	167	93	74	182	103	79	105	52	53
40-44 years	49	24	25	51	25	25	42	18	24
*45 years and over	25	8	17	24	7	17	28	12	16

*Base population : Women age 45-49 years.

various tribal groups in Liberia, tribal affiliation of the mother was asked during the 1971 enumeration. Because of the many tribes that exist in Liberia, only those that rank highest in population according to the 1962 census were tabulated individually. Nine tribes, which made up 83 percent of both the 1962 census and 1971 survey populations were selected. Included were the Kpelle, Bassa, Gio, Kru, Mano, Grebo, Lorma, Krahn and Gola. The remaining 17 percent of the population were recorded as “other or no tribe”.

It is apparent that, in Liberia, fertility differentials among the various tribes are significant. As indicated in Table 3 and graphically in Figure 1, live birth rates among the Gola people in 1971 were 96 per 1000. Although a birth rate this high is not credible, that the Gola rates were higher than other tribes in Liberia is clear; later it will be shown that infant mortality among the Golas is also the highest in Liberia. After the Golas, the next highest group in birth rates was for “other and no tribes”, with rates of 61 per 1000 ; again a figure that is overstated. The Gio people, with a birth rate of 34 per

TABLE 3 – LIVE BIRTH RATES BY TRIBAL AFFILIATION OF MOTHER, 1971
(RATES PER 1 000 TRIBAL POPULATION)

	Tribe of Mother										Other and no Tribe
	Total	Kpelle	Bassa	Gio	Kru	Mano	Grebo	Lorma	Krahn	Gola	
Liberia	50	43	53	34	51	40	43	42	41	96	61
Rural	51	43	62	37	53	38	42	41	38	94	65
Urban	47	43	39	25	48	59	45	46	49	104	53

1000, apparently had the lowest fertility rates in Liberia. Why the Golas had higher birth rates is not known at this time; however, it should be a challenging study for anyone interested in this type of research.

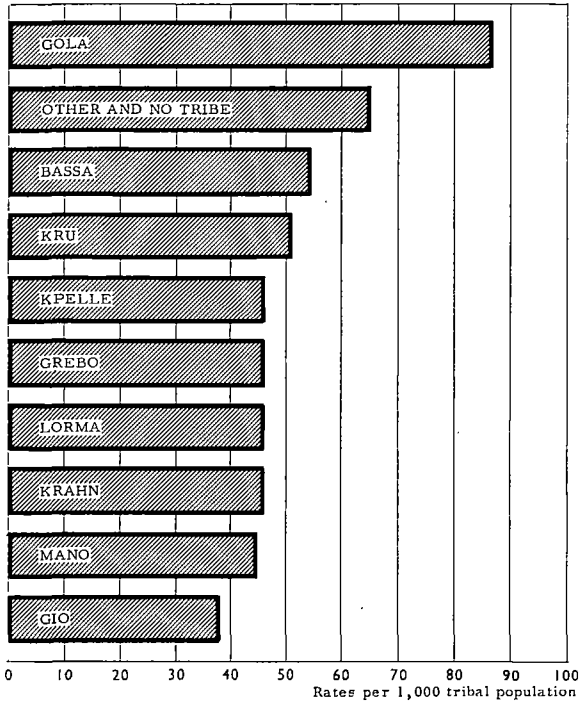


Figure 1. – Crude Live Birth by Tribal Affiliation of Mother, 1961

Birth by Order. Birth order is the sequence of the appearance of the child in the family. A first order birth for example, is the first child that a mother had. Birth order is directly associated with the age of the mother. The data indicated that for women ages 15 to 19 years, births of the 1st order were the most frequent; for mothers ages 25 to 29 years, 3rd order birth; for 35-39 years old women, 8th order births, and for women ages 40 to 44 years, 5th and 10th or higher order births.

Suggested in Table 4, median age of mothers who gave birth to their first child was 21 years; for 2nd births, 24 years; for 3rd order, 27 years; 4th order, 28 years; 5th order, 31 years; 6th order, 30 years; 7th order, 31 years; 8th order, 36 years; 9th order, 34 years and for births of the 10th or higher orders, the median age of the mothers was 36 years.

TABLE 4 – MEDIAN AGE OF MOTHERS BY BIRTH ORDER OF CHILD, 1971

Birth Order	Liberia All Areas	Rural Areas	Urban Areas
Total	26.7	27.3	24.7
1st	21.2	21.6	20.4
2nd	24.3	25.2	23.1
3rd	26.9	27.2	25.0
4th	28.0	28.2	25.3
5th	30.7	31.3	28.3
6th	29.6	29.5	26.0
7th	31.0	31.0	31.1
8th	35.5	35.9	33.1
9th	33.5	33.4	33.7
10th or more	35.8	35.4	33.0

Birth Probabilities by Age and Parity “Parity” identifies a woman as to how many children she has had ; thus, a 3 parity mother is one who has had 3 children previously, regardless of whether they are living or not. By relating the birth order of the child to the eligible population of women who could have had that particular order of child, an indication of the specific probability of a given birth order of child can be obtained. For example, births of the first order among women of a specific age group were divided by the number of women at that age group who were reported as having had no children ever born (zero parity women), during the mid-year population enumeration.

The data suggested that for women ages 15-19 years, the highest birth risk group was for the 5th birth order among women who previously had 4 children. For mothers ages 20-24 years, the highest birth probabilities occurred among zero parity mothers, for mothers ages 25-29 years, 6 parity mothers had the highest risk ; for 30-34 years old women, 4 parity mothers ; for women ages 35-59 years, 7 parity mothers and, for women ages 40-44 years, the highest birth risks occurred for 4 parity women.

Place of Birth. In 1971, about 7 out of 10 births in the country took place in the home ; the remaining births occurred in hospitals, clinics, doctor offices, and in a few instances, “other places”, such as homes of friends or relatives. In the rural areas of the country, 8 out of 10 babies were home deliveries, while in the urban areas, 4 out of 10 were reported as home deliveries ; the rest were delivered in hospitals, clinics, or presumably, in some places where qualified medical personnel were in attendance.

Month of Birth. The months, or "season" of most births in Liberia in 1971, occurred during the August, September period, with another peak in January. This would put the months of highest conception in November and December and possibly April. When plotting the monthly occurrence of births in 1971 with the monthly distribution in 1970, as in Figure 2, a slight, if not entirely consistent, pattern may be emerging. Generally, both years show the August-October high, a rapid drop off during November and December, the increase during January and a low period falling somewhere from February through May, although deviations from this generalized pattern are evident. Perhaps, as more data continues to build up, some definite pattern of birth seasonality in Liberia will be established.

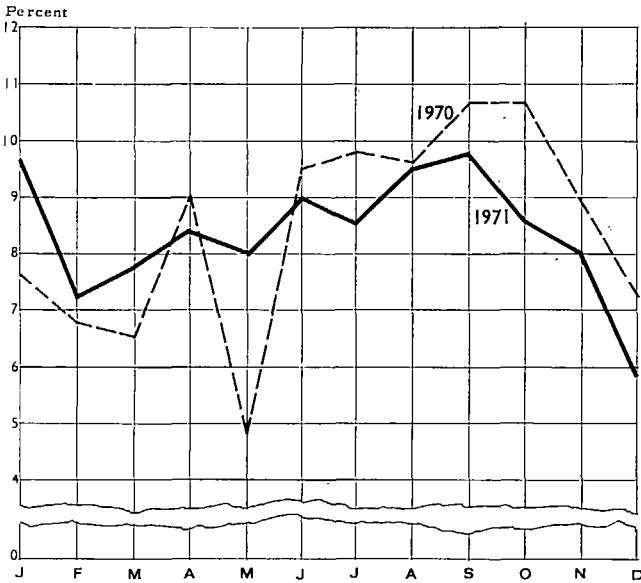


Figure 2. — Month of Birth, 1970 and 1971.

Number of Children Ever Born. Number of children ever born is considered a survey core question, therefore it is asked each year. Unfortunately, reports of children ever born are not complete because some women do not include children who died or children who are away from home, even though precautions are taken by survey enumerators to cover these omissions. In 1971, reports of children ever born were considered somewhat better than those for 1970. The average number of children ever born for women ages 15-19 years was 0.55 ; or 5 children for every 10 women of these ages. For women ages 20-24 years, the average was 1.7 ;

for ages 25-29 years, 2.9 ; ages 30-34 years, 3.7 ; ages 35-39 years, 4.3 ; ages 40-44 years, 4.4 ; for ages 45-49 years, 4.6 children.

2.2. MORTALITY

The major force affecting mortality in 1971 was the introduction and outbreak of cholera in the country during the latter part of 1970 and early 1971. As indicated in Table 5, the *Crude Death Rate* in 1971 was estimated at 21 per 1000 and the rate in the urban areas at 15 per 1000. The corresponding rates in 1970 were 16 per 1000 for the country, with the rural at 18 per 1000 and the urban at 12 per 1000. Although the large differential between the two years cannot be attributed only to the effect of cholera, much, if not most of it, can be. Approximately 32,928 Liberians died in 1971, 26,510 in rural areas and 6,418 in urban areas. Even as high as these figures may seem, there is evidence that the survey enumerators missed some deaths in 1971, particularly among children who died immediately after birth. This

TABLE 5 - SELECTED MORTALITY INDICES, 1971

Area	Crude Death Rate 1/	S.E. 2/ Percent	Age Adjusted Death Rate 3/	Infant Mortality Rate 4/	S.E. Percent	Life Expectancy at birth 5/	Median Age at Death	Median Age of Infant Death
Liberia All Areas	21	2.9	—	159	4.3	45.1	4.5	2.2
Rural Areas	23	3.9	20.0	171	6.3	45.8	4.6	2.4
Urban	15	4.1	13.9	126	5.9	44.0	4.0	1.7

1/ Number of deaths during year divided by mid-year population multiplied by 1 000.

2/ Standard Error (S.E.) ; To interpret the standard error, it may be stated that the chances are about 68 in 100 that the difference due to sampling variability between the estimates shown and the figures that would have been obtained by a complete count is less than (1) S.E.; the chances are about 95 in 100 that the difference is less than twice the S.E., and 99 in 100 that it is less than 2 1/2 times the S.E. Note that the S.E. does not include non sampling errors which may be greater than the sampling error.

3/ Direct method using the total population of Liberia at age for standard.

4/ Number of deaths among children under age 1 year during year divided by number of live births during year multiplied by 1 000.

5/ Life expectancy of both sexes.

6/ Age which represents half the distribution of deaths.

will be discussed later. Over one-third of those people who died were children under age one year. *The Infant Mortality Rate*, or the number of children under age 1 year who died, out of the children who were born in 1971, was 159 per 1000 live births for the country, with the rural rate at 171 per 1000 and the urban at 126 per 1000. As a result of this increase in mortality, the *life expectancy* at birth dropped from over 50 years in 1970 to about 45 years in 1971. Because of the high risk of death at an early age, the median age at death for Liberians was 4.5 years in 1971.

Age, Sex-Specific Death Rate. The age-sex specific death rates, shown in Table 6, indicated the usual picture, high mortality in the very early ages, low mortality from ages 5 years through age 39 years, and rapidly escalating rates thereafter. As shown in Table 7, once a child lives past the age of 5 years, his chances of survival are quite good. Sixteen percent of all persons who are born die before reaching age 5 years. Also apparent in the table is that death rates are much higher in the rural areas than in the urban areas. Moreover, it appears that death rates for women are somewhat higher than for men. When the death rates are age-adjusted, that

TABLE 6 - AGE-SEX SPECIFIC DEATH RATES, 1971 1/

Age at Death	Liberia All Areas			Rural Areas			Urban Areas		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
All Ages	21.0	20.0	21.1	23.3	24.3	22.4	14.8	12.7	17.3
Under 1 year 2/	159.2	137.2	183.1	171.0	158.6	184.3	126.1	76.3	179.5
1- 4 years	21.4	19.4	23.5	23.7	20.7	26.9	14.9	15.6	14.2
5- 9 years	6.9	7.6	6.1	7.1	7.8	6.4	6.1	7.2	5.2
10-14 years	3.6	1.3	6.3	3.7	1.2	6.5	3.3	1.4	5.9
15-19 years	5.4	7.1	3.8	6.0	8.4	4.0	4.3	5.1	3.4
20-24 years	7.6	12.5	4.4	9.8	17.6	5.6	4.1	6.5	2.2
25-29 years	7.0	5.8	7.8	8.2	7.1	8.7	4.8	4.1	5.4
30-34 years	3.2	2.3	4.0	3.0	2.6	3.3	3.6	1.8	5.8
35-39 years	10.8	10.5	11.1	12.6	12.6	12.6	6.0	6.5	5.4
40-44 years	11.9	18.5	4.7	11.8	20.2	3.8	12.3	14.2	8.9
45-49 years	19.8	14.3	26.9	18.9	10.2	29.2	23.9	29.7	14.0
50-54 years	24.9	25.0	24.9	25.0	24.4	25.6	24.7	27.5	19.9
55-59 years	26.8	31.3	20.4	24.7	30.3	17.2	39.3	36.7	44.1
60-64 years	40.1	35.7	45.2	37.5	34.6	40.8	56.0	41.7	79.1
65 years and over	78.8	81.0	76.1	77.6	82.6	71.7	90.2	66.8	122.2

1/ Rates per 1 000 population
2/ Rate per 1 000 live births.

is, when the effect of age is removed, it is shown in Table 8 that the rural-urban differential remained strong (6 per 1000 difference), but that the two sexes had nearly equal mortality experience, (about 1 per 1000 difference).

TABLE 7 – MORTALITY UP TO AGE 5 YEARS, 1971 (FIGURES IN PERCENT)

Area	Total	Male	Female
Liberia	16	14	18
Rural	17	16	18
Urban	13	8	18

TABLE 8 – AGE ADJUSTED DEATH RATES, 1971

Area	Total	Male	Female
Rural	20.0	20.5	19.4
Urban	13.9	13.3	14.5

Life Expectancy. As suggested previously, the increase in mortality had a direct adverse effect on life expectancy in Liberia in 1971. The abridged life tables indicated that the life expectancy for an average child born in 1971 was 45 years, with the males at 46 years and the females at 44 years. Because mortality is higher in the rural areas, the average child born in a village in 1971 may be expected to live about 44 years while one born in an urban area, about 48 years.

Mortality by Tribal Affiliation. Mortality differentials by tribal or ethnic group have been recognized for years by demographers, vital statisticians and anthropologists. Apparently there are certain physical, cultural, social or geographical attributes associated with various groups that influence the course of mortality either positively or negatively. It is apparent, as suggested in Table 9, that such is the case with certain tribal groups in Liberia. Of nine specific tribes in the country that accounted for 83 percent of the population, the Gola people had a suggested crude death rate that was about twice that for other tribes. The Golas had a death rate in 1971 of 53 per 1000. A rate this high is hardly credible ; however, that the Golas have higher mortality than the other groups specified is clear. Moreover, earlier, it was shown that this same tribal group apparently had a higher birth rate than any other group in Liberia.

TABLE 9 – MORTALITY RATES BY TRIBAL AFFILIATION, 1971

Tribal Affiliation	Liberia All Areas	Rural Areas	Urban Areas
Total	21.0	23.3	14.8
Kpelle	18.6	21.2	10.6
Bassa	17.7	22.2	10.4
Gio	14.5	34.0	8.7
Kru	20.4	21.4	19.5
Mano	19.8	19.1	25.0
Grebo	21.3	22.6	13.7
Lorma	12.1	12.0	13.7
Krahn	20.6	25.2	10.6
Gola	52.5	54.5	46.3
Other and no tribe	24.1	27.4	15.9

In regard to the other tribal groups, apparently the Lorma and Gio people, with death rates of 12 and 15 per 1000 respectively, had the most fortunate mortality experience while the Kpelle, Bassa, Kru, Mano, Grebo, Krahn and persons classified as "other or no tribe" all had about the same level of mortality.

Place of Death. In 1971, about 7 out of 10 people who died in the country, did so at their home. Approximately 2 of every 10 persons died in hospitals, clinics or doctor offices, that is to say, they were probably attended by qualified medical para-medical personnel. One in 10 died in "other places" such as on the road, in the bush, or in homes of relatives or friends.

Month of Death. As anticipated and shown graphically in Figure 3, the highest sustained mortality period occurred during the cholera outbreak during the latter half of 1970 and early 1971. The months extending from August, 1970 through February, 1971 had consistently high mortality while the months of April, May and July had the lowest rates. The most severe cholera period was from August through October, 1970. It was during this period that a mass immunization campaign was undertaken in the country.

Infant Mortality. The infant mortality rate, already high in the country, (1970 estimate, 137 per 100 live births), was given a further boost in 1971 by cholera. As suggested in Table 10, 12, 469 Liberian

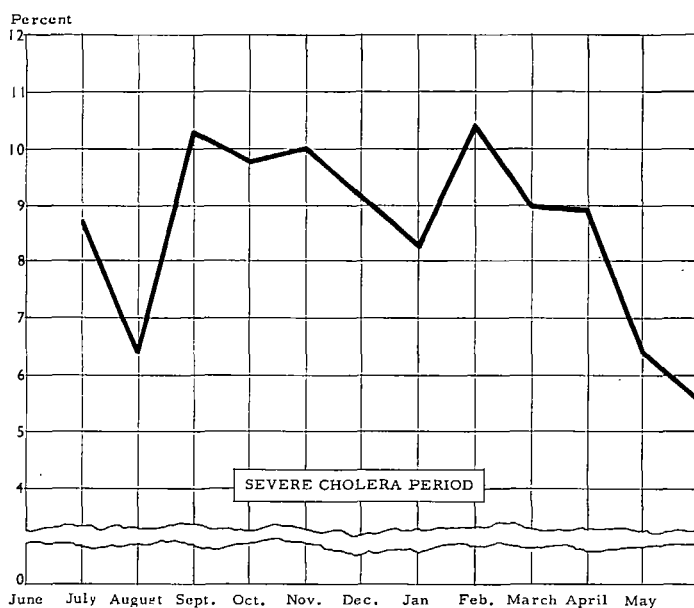


Figure 3. — Month of Death, 1971

babies, or 16 out of every 100 babies born in 1971, died before reaching their first birthday. Moreover, this is considered a conservative estimate because it is evident from the large number of female to male deaths (183 to 137 per 1000 births respectively) that many male infant deaths were not reported. Because of the more severe delivery and living conditions in the rural areas, the infant mortality rate was 171 per 1000 to the urban areas 126 per 1000 live births.

TABLE 10 — INFANT MORTALITY BY SEX AND AREA, 1971

Area	Number	Rate
<i>Liberia</i>		
Both Sexes	12,469	159.2
Male	5,583	137.2
Female	6,886	183.1
<i>Rural Areas</i>		
Both Sexes	9,894	171.0
Male	4,775	158.6
Female	5,119	184.3
<i>Urban Areas</i>		
Both Sexes	2,575	126.1
Male	808	76.3
Female	1,767	179.5

Infant Mortality by Age of Mother. Children born to mothers ages 35 to 39 years had the least chance of surviving through their first year of life. As shown in Table 11, nearly half the babies born to women of these ages died within the first year. This was apparently true in both the rural and urban areas. The second highest risk rates were for children born to women ages 30-34 years, where about one-quarter of all babies born did not survive through age 1 year. The median age of mothers who had infants who died was 32 years in 1971.

TABLE 11 - INFANT DEATHS BY AGE OF MOTHER, 1971

Age of Mother	Liberia All Areas		Rural Areas		Urban Areas	
	Number	Rate	Number	Rate	Number	Rate
All Ages	12,469	159.2	9,894	171.0	2,575	126.1
15-19 years	1,983	151.4	1,413	66.0	570	127.6
20-24 years	1,889	105.3	1,452	122.6	437	71.7
25-29 years	1,098	43.7	1,031	56.8	67	12.8
30-34 years	3,205	255.7	2,369	252.1	836	266.7
35-39 years	4,104	462.4	3,515	453.3	589	525.4
40-44 years	95	53.0	76	49.7	19	71.4
45 years and over	95	146.2	38	71.0	57	495.7

Infant Mortality by Age of Child. As suggested in Table 12, one-third of the infants who died in 1971, did not survive one week after birth. The median age of all children who died was 2.2 weeks with the rural areas at 2.4 and the urban at 1.7. Dividing infant deaths in two periods, the neonatal period and the post neonatal period, (more than 30 days), it is seen that during the first month approximately two-thirds of all infants died. For some reason, in both the rural and urban areas in the years 1970 and 1971, a rise in infant mortality was experienced during the 5th and 11th weeks.

When infant deaths were related to the child's birth order as in Table 13, there seemed to be a tendency, if not always consistent, for infant mortality to increase directly with the birth order of the child. The highest infant mortality rates occurred among the children of the 8th and 10th order (214 and 211 per 1000 respectively). All of these rates, of course, are based on small numbers and perhaps statements concerning the relationship between infant deaths and birth order should be reserved until more data is generated. As it stands now, however, it would seem that Public Health officials interested in improving maternal and child health should perhaps concentrate their efforts on the high parity mothers for maximum benefit of child saving.

TABLE 12 – INFANT DEATH BY AGE OF CHILD, 1971

Age at Death	Liberia All Areas		Rural Areas		Urban Areas	
	Number	Percent	Number	Percent	Number	Percent
All Ages	12,469	100.0	9,894	100.0	2,578	100.0
Under 1 week	4,493	36.0	3,400	34.3	1,093	42.4
1 -2 weeks	1,470	11.8	1,185	12.0	285	11.1
2 -3 weeks	1,154	9.3	840	8.5	314	12.2
3 -4 weeks	716	5.7	611	6.2	105	4.1
4 -5 weeks	477	3.8	420	4.2	57	2.2
5 -11 weeks	1,995	16.0	1,757	17.7	238	9.2
12-21 weeks	906	7.3	649	6.6	257	10.0
22-34 weeks	621	5.0	497	5.0	124	4.8
35-41 weeks	430	3.4	382	3.9	48	1.9
42-51 weeks	207	1.7	155	1.5	54	2.1

TABLE 13 – INFANT MORTALITY BY BIRTH ORDER, 1971
(RATE PER 1 000 LIVE BIRTHS)

Birth Order	Liberia All Areas		Rural Areas		Urban Areas	
	Number	Rate	Number	Rate	Number	Rate
Total	12,469	159.2	9,894	171.0	2,575	126.1
1st	2,698	117.8	1,987	120.7	711	110.5
2nd	2,042	176.9	1,719	222.8	323	84.4
3rd	1,708	159.5	1,413	172.0	295	118.0
4th	1,651	188.6	1,375	210.5	276	124.3
5th	1,431	186.9	1,108	188.4	323	182.0
6th	572	135.7	420	150.6	152	106.6
7th	935	170.3	764	163.9	171	206.3
8th	716	213.7	497	178.2	219	389.7
9th	220	166.0	143	160.2	67	181.1
10th	496	210.5	458	244.7	38	78.5

2.3. INTERNATIONAL MIGRATION

Migration, unlike births and deaths, often time involve many persons. Moreover, migrations are infinitely more complicated to interpret than either vital event because of the multiple possibilities open to the migrant regarding his origin or destination. A person can immigrate or emigrate into or out of the country ; he can migrate internally from rural to urban, rural to rural, urban to rural and urban to urban, or he can simply move into or out of one household to another within a single rural or urban locality. Furthermore, migrations of the above type may take place several times within a very short period of time, all with different combinations of origins or destinations.

Because of the above factors, any study of migration is dependent on the casefinding systems used, the definition of terms adopted and the detail in which the migrant's point of origin or destination is recorded in relationship to his present residence.

Immigration and Emigration. Immigrations and emigrations are defined as the movement of people across the national boundaries of Liberia. People moving into a sample household from another country from May 1970 through April 1971 for a period exceeding 30 days are classified as immigrants regardless of whether they are Liberian nationals returning home or are nationals of a country other than Liberia.

Emigrants are persons, either native Liberians or foreign nationals, who move out of a sample household either on a temporary or permanent basis to a country outside Liberia. In the case of both immigrations and emigrations, the country of origin or destination is recorded. Since it was not practical to list all possible individual countries of origin or destination, the distribution of foreign nationals as shown in the 1962 census was ranked as to frequency and only the top ranking countries were tabulated separately. The separate countries included Sierra Leone, Guinea, Ivory Coast and Ghana. The remaining possibilities were classified simply as "Other African Countries", "USA and Possessions" and Other Countries not elsewhere classified. In spite of these broad groupings, 89 per cent of the immigrants and 94 per cent of the emigrants either originated from or were destined for one of the four individual countries listed above.

Immigration and Emigration Balance, 1971. As indicated in Table 14, about as many persons immigrated to Liberia in 1971 as emigrated from the country. Both the immigration and emigration rates in 1971 were about 4 per 1000 persons. This is in contrast to the 1970 international migration experience when Liberia had a slight immigration gain. Moreover, unlike the 1970 results, international migration rates were only about half as high in 1971.

TABLE 14 - CRUDE IMMIGRATION AND EMIGRATION RATES 1/, 1971

Location	Net Difference	Immigration Rate	Emigration Rate
Liberia	-	4	4
Rural Areas	- 1	3	4
Urban Areas	+ 3	8	5

1/ Rates per 1000 population. Migration period May, 1970 through April 1, 1971.

In regard to urban/rural differences, the major portion of both the immigrants and emigrants were urban residents.

As shown in Table 15, about half the persons migrating to Liberia were less than age 25 years with the median age for males of nearly age 28 years and the median age for women about 5 years younger, at age 22 years. Generally speaking, male immigrants going to rural areas were about 3 to 4 years older than those going to urban areas (medians of 29 and 25 years respectively), whereas in the case of females, urban or rural location apparently made little difference in regard to age, (medians of 20 years each).

TABLE 15 – MEDIAN AGE OF IMMIGRANTS BY LOCATION, 1971

Location	Total	Male	Female
Liberia	25.0 years	27.6 years	21.7 years
Rural Areas	26.5 years	28.6 years	20.1 years
Urban Areas	24.6 years	25.3 years	20.3 years

Immigrants by Estimated Length of Stay. Most persons immigrating to Liberia in 1971 did so on a permanent basis. Ninety-five percent of all immigrants stated that they intended to remain in the country for at least 3 years. Only five percent of the migrants stated that they would remain under 6 months.

Immigrants by Country of Origin. Most of the immigrants who arrived in 1971 originated from the African countries adjacent to Liberia. As shown in Figure 4, over half the immigrants came from the Republic of Guinea, the Ivory Coast contributing nearly 20 per cent, Ghana, ten per cent and Sierra Leone and Other African Countries about 8 per cent each.

TABLE 16 – CRUDE IMMIGRATION RATES BY COUNTRY OF ORIGIN, 1971

Country of Origin	Rates/1 000
All Countries	4.28
Guinea	2.20
Ivory Coast	.83
Ghana	.41
Sierra Leone	.36
Other Africa	.33
USA & Possession	.14
Countries N.E.C.	—

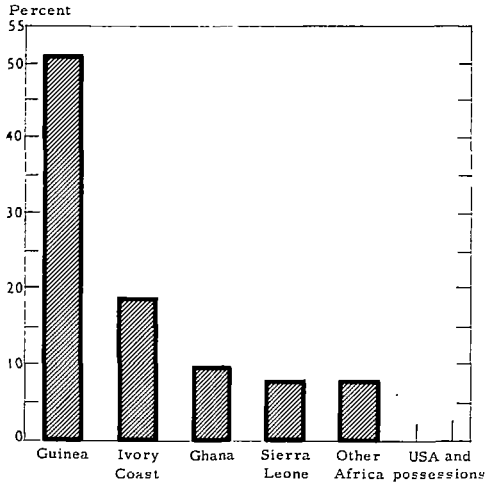


Figure 4. — Percentage Distribution of Immigration by Country of Origin, 1971

On a rate per 1000 basis, shown in Table 16, the rate for Guinea was 2 per 1000, in contrast to less than 1 per 1000 for other countries. Generally speaking, the major difference between the 1970 and 1971 experience, other than a sharp drop in immigrants, was that Ghana became the third ranking migrant supplier, displacing Sierra Leone.

Country of Origin and Immigrants Age. Immigrants age varied by country of origin in 1971. As suggested in Table 17, the median age of migrants from Guinea was 27 years, while those from the Ivory Coast, Ghana and Sierra Leone were approximately 5 years younger at ages 22 to 23 years. Migrants from Other African countries and the U.S.A. and Possessions ranged around 25 to 27 years old.

Emigrants by Age, Sex and Location. Emigrants departing Liberia, like immigrants, were generally young adults; unlike immigrants, however, women emigrated with about equal frequency as men. As shown graphically in Figure 5, males emigrated at a rate of 5 per 1000 while females left at a rate of 4 per 1000. As far as emigrants ages were concerned, the highest rates for males were ages 20 through 29 years, while for females, ages 10-14 years were the most frequent migrants. Emigrants left from urban areas slightly more often than from rural areas. The overall urban emigration rate was 5 per 1000 while for rural emigrants it was 4 per 1000.

TABLE 17 – MEDIAN AGE OF IMMIGRANTS BY
COUNTRY OF ORIGIN, 1971

Country of Origin	Median Age
Guinea	27.0 years
Ivory Coast	22.5 years
Ghana	23.4 years
Sierra Leone	22.3 years
Other Africa	27.1 years
USA & Possession	25.0 years

TABLE 18 – MEDIAN AGE OF EMIGRANTS BY LOCATION, 1971

Location	Total	Male	Female
Liberia	16.8 years	18.1 years	15.1 years
Rural Areas	14.7 years	17.1 years	13.7 years
Urban Areas	21.0 years	20.0 years	21.5 years

Rural male emigrants were about 3 years younger than their urban counterparts (median ages of 17 and 20 years respectively), while rural women emigrants were about 7 year younger than urban emigrants (medians of 14 and 22 years).

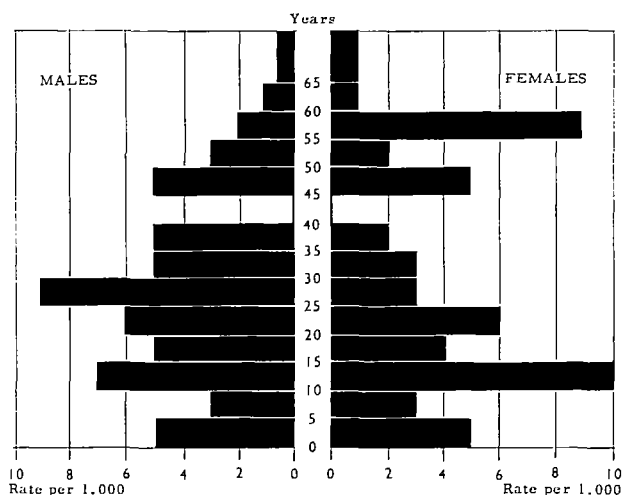


Figure 5. – Emigration Rates by Age and Sex, 1971.

Emigrants by Estimated Length of Stay. Persons leaving Liberia generally planned on staying over 3 years. Fifty-nine percent of all persons leaving Liberia reported that they were

staying over 3 years. Unlike the case of immigrants who nearly all stated that they were going to remain over 3 years, sixteen per cent of the emigrants said they would only remain outside Liberia for about one year, and another sixteen per cent stated they would leave for 31 to 35 months. Generally, persons emigrating from the rural areas of the country indicated that they would return sooner than persons migrating from the urban areas. Forty-nine percent of the village emigrants intended to return to Liberia within 36 months, whereas only twenty-four per cent of urban dwellers intended to return within a 3-year period.

Emigrants by Country of Destination. Ninety-four per cent of all emigrants were bound for the countries adjacent to Liberia, two-thirds of these migrants were going to Guinea. As shown graphically in Figure 6, Sierra Leone and the Ivory Coast accounted for about fifteen percent of the migrants, and USA, Ghana and Other African countries the rest.

Table 19 indicates that emigration rates for all countries were quite modest in 1971 and nearly duplicated in the 1970 rates on a country by country basis. Guinea, the emigration leader, had a rate of 2.7 per 1000, nearly identical to the 2.8 per 1000 in 1970. The other countries had generally lower overall rates than in 1970 and some displacement in ranking occurred with Ghana slipping from 4th place in 1970 to 5th place in 1971.

TABLE 19 - CRUDE EMIGRATION RATES BY COUNTRY OF DESTINATION

Country of Destination	Rates/1 000
All Countries	4.98
Guinea	2.74
Sierra Leone	.68
Ivory Coast	.63
U.S.A. & Possessions	.13
Ghana	.13
Other Africa	.07

TABLE 20 - MEDIAN AGE OF EMIGRANTS BY COUNTRY OF DESTINATION, 1971

Country of Destination	Median Age
Guinea	15.5 years
Sierra Leone	15.6 years
Ivory Coast	15.8 years
USA & Possessions	25.7 years
Ghana	21.0 years
Other Africa	23.5 years

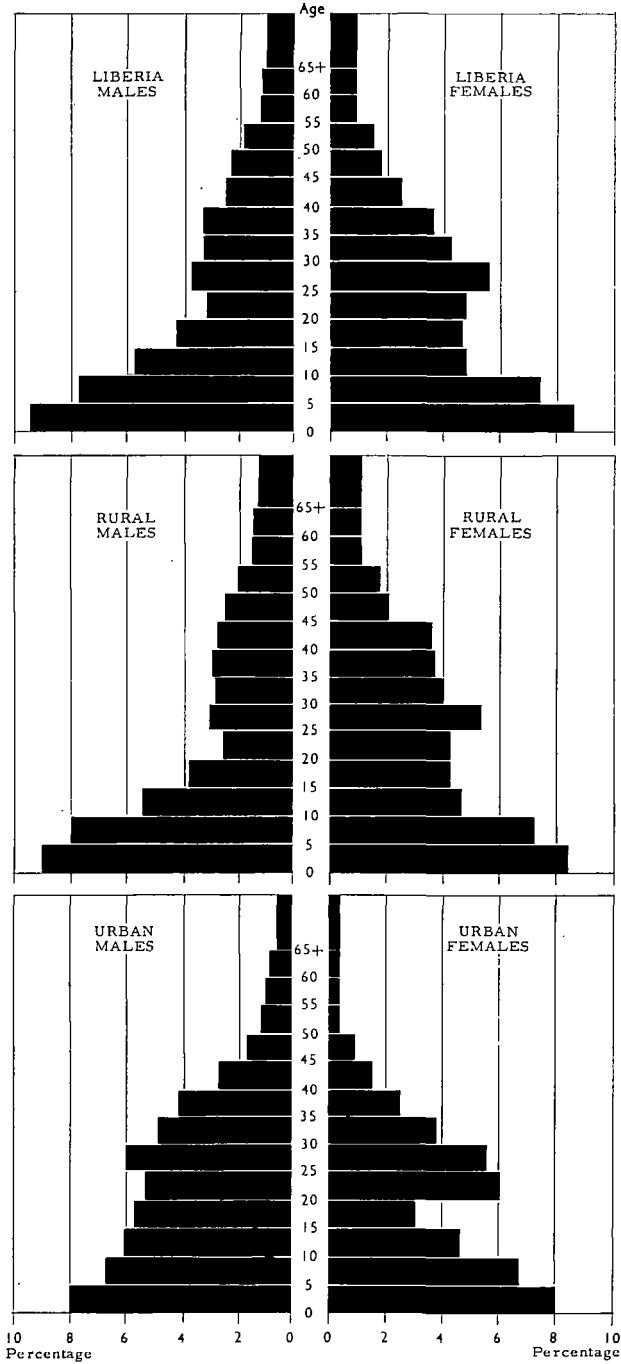


Figure 6. — Age Sex Pyramids, 1971

Country of Origin and Emigrants Age. Emigrants for the surrounding African countries, with the exception of Ghana, were generally young adults under age 20 years and those for USA, Ghana and Other African countries somewhat older — as indicated in Table 20, emigrants to Guinea, Sierra Leone and Ivory Coast were at median age of 15 – 16 years, USA at 26 years, Ghana at 21 years and Other African countries at 24 years.

CHAPTER III

POPULATION COMPOSITION

The estimated population of Liberia in 1971 was 1,571,477 with 1,137,556 or 72 per cent living in rural localities of 2000 or less persons and 433,921 or 28 per cent living in urban localities of over 2000 persons. Men made up 776,628 or 49 per cent of the population and women 794,849 or 51 per cent. (see Table 21).

TABLE 21 – POPULATION ESTIMATES BY SEX, 1971

Area	Total Numbers	Percent	Male	Percent	Female	Percent
Liberia	1,571,477	100.0	776,628	39.4	794,849	50.6
Rural	1,137,556	72.4	544,273	47.8	593,283	52.2
Urban	433,921	27.6	232,355	53.5	201,566	46.5

In 1971, there was an estimated 343,576 house holds or groups of people who lived and ate together. They resided in about 189,392 structures. As indicated in Table 22, there were, on average, 4.6 persons in each household, and about 1.8 households in each structure with an average of 8.3 persons per structure.

TABLE 22 – SELECTED CHARACTERISTICS OF LIVING QUARTERS, 1971

Area	Households	Persons per Household	Structures 1/	Person per Structure	Household per Structure
Liberia	343,576	4.6	189,392	8.3	1.8
Rural	236,611	4.8	150,546	7.6	1.6
Urban	106,965	4.1	38,846	11.2	2.8

1/ Structures vary from huts to apartments. In rural areas the typical structure is a one room hut. Urban structures are typically one-to four-room houses and in some few areas, multi-storied houses and apartments.

Of the total number of households in Liberia, about a third could be classified as “family type” households, made up of one or both parents, and

their children and grandchildren if any. The rest were made up of either one person households, or households with various combinations of related and unrelated persons living together. Eight percent of the households in the country were made up of a husband and wife living alone. Table 23 indicates the various characteristics of the households enumerated in 1971.

TABLE 23 — HOUSEHOLD TYPES, 1971

Type of Household 1/	Liberia All Areas		Rural Areas		Urban Areas	
	Number	Percent	Number	Percent	Number	Percent
1. Total Households	343,576	100.0	236,611	100.0	106,965	100.0
2. Married couple with children.	27,629	8.0	18,794	7.9	8,835	8.3
3. Either one or both parents and unmarried children.	85,612	24.9	57,606	24.3	28,006	26.2
4. Either one or both parents and unmarried and married children without grandchildren.	859	0.2	688	0.3	171	0.2
5. Either one or both parents with unmarried and married children with grandchildren.	1,852	0.5	1,719	0.7	133	0.1
6. Household types not elsewhere classified.	227,624	66.4	157,804	66.8	69,820	65.2
1/ Household types 1 through 4 are classified as "family type."						

Relationship to Head. As shown in Table 24, of the total number of people in Liberia, about 22 per cent were classified as heads of households and 13 per cent were reported as head wives. The largest single category of persons was unmarried children of the head and his chief wife, 29 per cent. Other wives of the head accounted for 3.4 per cent, married children residing with head only, 1 per cent, while other related persons made up 11 per cent and other persons not related, 12 per cent.

The sex distribution varied from rural to urban. Females were more numerous in the rural areas — 52 percent to 48 percent, and males more numerous in the urban areas — 54 to 46 percent. The overall sex ratio for Liberia was 98 per 100 females, with the rural ratio at 92 and the urban at 115.

TABLE 24 – POPULATION BY RELATIONSHIP TO HEAD, 1971

Relationship	Liberia All Areas		Rural Areas		Urban Areas	
	Number	Percent	Number	Percent	Number	Percent
Total	1,571,477	100.0	1,137,558	100.0	433,919	100.0
Head	343,576	21.9	236,611	20.8	106,965	27.7
Head Wife	210,250	13.4	148,025	13.0	62,225	14.3
Unmarried Children of Head Wife	455,278	29.0	324,700	28.5	130,578	30.1
Other Wives of Head	52,894	3.4	44,961	4.0	7,933	1.8
Unmarried Children of Other Wives	67,132	4.3	59,095	5.2	8,037	1.9
Married Children	14,364	.9	12,644	1.1	1,720	.4
Grandchildren	57,636	3.7	48,896	4.3	8,740	2.0
Other Related	175,046	11.1	117,580	10.3	57,466	13.2
Other not Related	195,301	12.4	145,046	12.8	50,255	11.6

Age and Sex Distribution. The population distribution by age and sex in 1971, shown graphically in Figure 6, indicates that the population of Liberia is young and represents a configuration of high fertility, (50 per 1000 in 1971), and relatively high mortality (21 per 1000). The child-women ratio, or the number of children under age 5 years per 100 women ages 15-44 years in 1971 was 69 for the country as a whole, with the rural areas at 70 and the urban at 65. Fully 42 percent of the population is under the age of 15 years. The dependency ratio, or the number of persons below age 15 years and above age 65 years per 100 persons age 15 to 64 years was 70 in 1971.

The age reporting problems indicated in the 1970 survey year had not been solved in 1971. As suggested by the age ratios in Table 25, all the pitfalls of age estimation by survey enumerators have been retained. High ratios at ages 5-9 years, (123); under-estimation of men and women, particularly the latter, in the pre-puberty ages 10-14 years (ratio 88); excess of persons ages 25-29 years (ratio 122). It seems that perhaps, only the problem of rounding at convenient ages has been diminished slightly, and some of this may have been artificially induced due to the efforts of the enumerators who were made aware of rounding by their supervisors.

The age accuracy index, or simply, the average difference between the age ratios of the survey distribution from the accepted standard of 100, was between 9 and 17 with the accuracy among females and in rural areas being substantially lower than for males in urban areas. Considering that an age accuracy index of over 6 or 7 is not good, age reporting in Liberia for 1971 was not encouraging.

TABLE 25 – AGE RATIOS BY SEX, 1971

Age Group	Liberia			Rural Areas			Urban Areas		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
5-9	123.0	119.0	127.5	126.3	124.0	128.9	114.1	105.8	123.7
10-14	87.6	96.3	79.0	88.0	95.5	80.5	86.8	98.3	75.1
15-19	95.9	96.2	95.6	94.1	93.6	94.5	99.4	100.9	97.8
20-24	87.7	77.9	95.6	81.2	70.8	88.3	100.0	88.3	112.5
25-29	121.9	117.3	125.3	124.9	116.2	130.1	116.8	118.7	114.8
30-34	91.2	93.0	89.8	89.3	90.2	88.7	95.2	97.2	92.8
35-39	110.1	112.8	107.6	113.1	114.9	111.7	102.8	109.0	93.8
40-44	93.3	94.4	92.1	94.2	95.2	93.3	90.4	92.6	86.8
45-49	95.0	100.2	89.3	97.1	104.6	89.5	87.2	86.6	88.3
50-54	108.6	104.3	114.4	110.6	105.8	116.5	99.3	97.7	102.1
55-59	78.0	84.6	70.2	78.6	86.1	70.4	74.4	77.8	68.7
60-64	69.9	66.6	74.0	67.9	63.9	72.8	85.6	86.0	84.8
Age Accuracy Index		12.1	15.8	–	14.2	17.4	–	9.2	13.8

The median age of the population, as shown in Table 26, was 20 years, for both rural and urban areas. The median age of females was about 4 years higher than the males – 18 to 22 years in the rural areas ; but, in the urban areas, males were about a year older than females – median age 20 years males, 19 years females.

TABLE 26 – MEDIAN AGE OF THE POPULATION

Area	Both Sexes	Male	Female
Liberia	19.9	18.6	21.0
Rural	20.0	17.6	22.0
Urban	19.1	20.4	19.0

Marital Status by Age-Sex. In the 1971 marital status estimates, 55 per cent of all the people in Liberia were never married, 39 per cent were reported as married, 3 per cent as widowed, and 3 per cent as divorced/separated.

In the child-bearing age groups of 15-49 years, 68 per cent of both sexes were living in the married state, with the rural areas at 70 per cent and the urban areas at 63 per cent. Generally, the proportion of never married persons diminishes rapidly after age 15 years until by the age of about 24 years. Then it is surpassed by the married proportion. The percentage of married people increased rapidly after 15 years, reaching a zenith at about age 40 years ; it declined after age 50 years; due primarily to an increase in widowhood.

Age at First Marriage. As suggested in Table 27, over half the males in Liberia married before reaching age 25 years and over half the women married before reaching age 18 years. Rural grooms usually married about a year earlier than urban grooms. (median age 24 and 25 years for rural and urban respectively), while the rural and urban brides, on average, married about the same time (median age 18 for both); generally speaking, however, in the rural areas of Liberia, both the grooms and the brides have higher proportions of persons marrying in the youngest age groups. For example, 11 per cent of the rural men compared to 9 per cent of the urban men, became grooms before reaching age 20 years. While for the women, 85 per cent of the rural brides, in contrast to 80 per cent of the urban brides, married before reaching age 20 years.

TABLE 27 – MEDIAN AGE OF BRIDE AND GROOM, 1971

Area	Male	Female
Liberia	24.6	17.9
Rural	24.4	17.8
Urban	25.3	18.1

Highest Grade Completed. In 1971, the question of highest grade completed was included in the questionnaire. This question supplements the question on literacy asked in the 1970 enumeration. Of all persons in Liberia over age 5 years, 81 per cent reported that they completed no grade and 19 per cent reported that they completed some grade. Six per cent of the population over age 5 years completed one of the first 4 grades, 8 per cent completed some grade between 5th and 8th, 4 per cent completed a grade between 9th and 12th, and 1 per cent went above 12th grade (higher education).

Grade completion percentages varied between rural and urban areas and males and females. Specifically, in the rural areas, 94 per cent of the people over age 5 years did not complete any grade, while in the urban areas, 70 per cent did not complete any grade.

In regard to males and females, in Liberia, of the 1,065,511 persons over age 5 who did not complete any grade in school, 44 per cent were males and 56 per cent were females.

Generally, the 1971 results of the question on highest grade completed compared vary favorably with the 1970 results on literacy in the population, assuming that the proportion of persons who are literate should complement the proportion of persons who completed some grade in school.

This agreement is particularly encouraging since both questions, even though asked of the same population, were not asked the same year, thus an independent check of the information was maintained.

As indicated in Table 28, it was suggested that in 1970, 22 per cent of the population over 10 years was literate and in 1971, 21 per cent of the population of these ages reported that they completed some grade in school. When individual age groups are considered, it seems that the only serious discrepancy between the two figures was for ages 10-14 years. Here the data suggested that 45 per cent of the people of this group were literate but only 35 per cent completed some grade in school. This suggests that perhaps in 1970, an upward bias in reporting literacy occurred among this age group. Other than ages 10 to 14 years however, the remaining age groups compared quite closely with each other suggesting that overall, the 1970 literacy rate for the country may not have been seriously biased.

TABLE 28 - COMPARISON BETWEEN 1970 LITERACY PROPORTIONS
AND 1971 HIGHEST GRADE COMPLETED PROPORTIONS

	Proportion Literate 1970	Proportion Who Completed some Grade 1971
10 years and over	22	21
10-14 years	45	35
15-19 years	47	40
20-24 years	29	26
25-29 years	20	17
30-34 years	18	14
35-39 years	15	13
40-44 years	14	12
45-49 years	13	11
50-54 years	12	9
55-59 years	10	9
60-64 years	7	7
65 years and over	8	7

Tribal Affiliation. In 1971, tribal affiliation was asked of each person interviewed by the survey enumerators. Even though there are numerous tribes represented in Liberia, only those which were found dominant in the 1962 census of population were compiled individually; the remainder were grouped as "other or no tribe". Nine tribes were selected: Kpelle, Bassa, Gio, Kru, Mano, Gola, Grebo, Lorma and Krahn. These tribes accounted for 83 per cent of the 1962 census population and also 83 per cent of the 1971 survey population. As indicated in Table 29, with the exception

of the Grebo and Krahn tribes, the survey population by tribal affiliation matched the 1962 population by tribal affiliation very closely. The Kpelle tribe, the largest group in Liberia, accounted for 23 per cent of the survey population and 21 per cent of the census population. The other tribal distributions, except the two noted, varied by only 1 or 2 per cent. Concerning the two exceptions, basically the Grebo and Krahn tribes reside in the same general area — Grand Gedeh, and Maryland Counties, and their dialects, though slightly different, are mutually understood by each tribal member; moreover, depending upon the geographical situation of tribal residence, when the shift was made from Province status to County status in 1964, some Krahns may have called themselves Grebo at one place and time period and Krahns in another place and time. Essentially, if the Krahns and Grebos are viewed as one tribe, the apparent disparity disappears and the survey distribution (16 %) agrees quite closely with the 1962 census distribution (13 %).

TABLE 29 — COMPARAISON BETWEEN THE 1962 CENSUS AND THE SURVEY POPULATION FOR TRIBAL AFFILIATION

Tribal Affiliation	Percentage of Population	
	Survey	1962 Census
All persons	100	100
Kpelle	23	21
Bassa	15	16
Gio	6	8
Kru	7	8
Mano	5	7
Gola	5	5
Grebo	14	8
Lorma	7	5
Krahn	1	5
Other tribes and affiliation	17	17

CHAPTER IV

POPULATION DISTRIBUTION AND INTERNAL MIGRATION

Regional. The country was formerly divided into five counties, three provinces, and four territories. These were considered as the major political sub-divisions of the country up to the time of the 1962 population census. The census results were tabulated and published according to three divisions.

It was in 1964 that these political boundaries were relocated and the whole country was redivided into nine counties and five territories. The 1962 census figures were re-distributed as follows :

SUMMARY

Countries and Territories	Population
Liberia Total	1,016,443
1. Montserrado County	171,531
2. Nimba County	162,855
3. Bong County	157,641
4. Lofa County	131,554
5. Grand Bassa County	99,566
6. Maryland County	54,805
7. Grand Gedeh County	48,256
8. Sinoe County	44,639
9. Bomi Territory	39,388
10. Grand Cape Mount County	32,190
11. River Cess Territory	28,756
12. Kru Coast Territory	21,280
13. Marshall Territory	14,442
14. Sasstown Territory	9,540

The 1970-71 Demographic Survey was a household sampling instrument designed to give each household in Liberia a specific probability of being included in the sample. The estimates were generated for the country as a whole and for rural and urban areas.

Beside the high growth rate and relatively high mortality rate which are characteristic of many developing countries, what continues to be of great

economic and social significance is the rapid increase in urbanization in the country, the youth of the population and the high dependency ratio. Urban population has grown from 20 per cent in 1962 to 26 per cent in 1970 and now 29 per cent in 1972. The age which exactly half the population had reached in 1972 was 19 years. The dependency ratio, the number of persons in the "dependent" ages (0-14 years and 65 years and over) to the population in the working ages 15-64 years, was around 80 per 100 potential workers.

The high rate of growth of the population is indicative of the problem of slum housing, inadequate services and urban unemployment. It also demands the allocation of relatively large financial resources for human resources development. The youth of the population suggests a strong demand for additional educational facilities which imposes a heavy burden on the Government. The high dependency ratio places the burden of the care and maintenance of the dependents (population age 0-4 and 65 years and over) on a small number of potential workers and on the government.

CHAPTER V

POPULATION PROJECTION OF LIBERIA 1965-1985

INTRODUCTION

A development plan which does not give serious consideration to the population, its size and age structure, is susceptible to failure. This has been the situation in many developing countries of the world. Unlike the so-called developed countries, the under-developed countries have lacked the relevant demographic variables for social and economic planning.

Recently countries of this (under-developed) region are becoming aware of the importance of development planning based on demographic variables whether the plan is a short or long term one. These countries are now conducting or are in the process of conducting censuses and surveys through the help of the United Nations, other world organizations or individual donors. Since a vital registration system is yet far from being implemented in many of these developing countries, the census and the survey results are being used to forecast future population size, structure and other demographic characteristics, such as school age population, and number of persons entering the labour market each year for planning and policy making purposes.

In the absence of vital statistics and the lack of long population history, this paper was an attempt to critically examine and evaluate the 1962 census and the 1970 population sample survey data of Liberia and to make four five - year projections based upon the 1962 census of the country's population. Even though the necessary scientific methods which relate to population projection of defective data have been fully used, there remained the doubt that as long as a vital registration system has not been fully incorporated and accurate data made available, the chances are that projected figures will fall short of the hundred per cent mark.

However, the exercise has been useful in that it will serve as a benchmark for future population analysis and a guide to development planning.

EVALUATION OF AGE – SEX DATA

Liberia, like many other developing countries, lacks long-standing statistical records. Prior to the first national population census in 1962, two limited head counts were conducted at two different locations of the country. A census of Monrovia, the capital city, was carried out in 1956 which estimated the population at 41,391, and that of Greenville, the administrative headquarters of Sinoe County, was conducted in 1958 with an estimate of 3,628 persons (1). Beside knowing the population of these areas, the census did not amount to anything worth publishing. The prime objective was to acquaint the public with the idea of census taking and to train prospective census takers for the ensuing national census.

Both the 1962 census and the 1970 survey results undoubtedly have errors of age misreporting and incompleteness of enumeration. These natural phenomena of developing countries can be attributed to ignorance, or illiteracy, cultural behavior, fear of taxation and military service. In addition to these, physical factors, such as inaccessibility of remote areas, lack of communication (language and transport) contribute to a large extent the lack of proper coverage.

In order to make a reliable population projection into the distant future, the base data must be critically examined for irregularities of age distribution and incomplete coverage. Where these deficiencies are apparent, effort should be made for the necessary adjustment before a meaningful projection can be undertaken. It was therefore proper that adequate appraisals were made for both the census and survey data. The discrepancies and dissimilarities which existed between the two data served as a criteria in the selection of the base data.

Experiences in many countries have shown that children are usually underenumerated, especially those under one year of age. This has been proven in many African censuses and surveys.

Errors exhibited in age data whether in single or quinquennial years in developing countries stemmed from age misreporting and incompleteness of interviews due to causes already mentioned above. Liberia being one of the underdeveloped countries with an illiteracy rate as high as 75 per cent (2) and predominantly rural population of 72 per cent (3), can hardly be expected to produce a correct age statement for all ages.

1. Evaluation of the 1962 Census. Assuming population growth to be mainly caused by natural increase, one would expect a smooth declining pattern in the first five years age group by single years preceding the census. Besides the declining pattern of the percentage

distribution of ages, 0, 1, 2, 3 and 4 should not exhibit wide variations. The result of this exercise for the Liberian data is presented in Table 30 by sex.

TABLE 30—FIRST FIVE YEAR GROUP IN SINGLE YEARS

1962	Male	Percent	Female	Percent	Sex Ratio
0-4	81,625	100.0	83,757	100.0	97.5
0	18,694	22.9	19,048	22.7	91.1
1	9,203	11.3	9,514	11.4	96.7
2	16,787	20.6	17,420	20.88	96.4
3	18,732	22.9	20,071	24.0	93.3
4	18,209	22.3	17,704	21.1	102.9

The phenomenon that enumeration under age one is usually underestimated was surprisingly not exhibited according to the result above. Rather, age one was shown to have been grossly underestimated for both male and female. The reason one can assume in support of the usually held theory would be that the enumerators must have failed to investigate whether a child reported born in the census year was actually under one year of age. It is a common practice in many African countries for the mother to continue carrying her baby on her back for some time even after the child has learned to walk, in which case it is not easy to tell whether the child is a year old or not.

Besides age one, the other ages, 0, 2, 3 and 4 exhibited a declining pattern with a very slight variation for the males, and ages 0, 2 and 4 for females. Age 3 of the females is proportionally out of scope of the other ages. This heaping at age 3 could have been the result of remembering the famous Saniquelleh Conference in 1959. This was a meeting between presidents Seku Toure of Guinea, Kwame Nkrumah of Ghana and William Tubman of Liberia. The meeting was held in the interior of Liberia where about 31 % of the total population was located at that time. It is quite unusual that this did not reflect in the reporting of males.

However, as we see from the sex ratio of the single year age distributions, the females 0-4 were better enumerated than the males. With the exception of age 4 the sex ratios for ages 0, 1, 2 and 3 showed that the males have been underenumerated. There is also a declining pattern in the sex ratios from age 0-3, which shows that even though males were underenumerated, the proportions of ages 0 and 4 were much more covered than at the other ages 1, 2 and 3. It is a common concept in some African societies that great importance is attached to the male child in the family. Therefore they refrain from exposing the presence of a male baby to an outsider for fear that the baby might be witched, and consequently die.

It is also a common practice for persons in both developed and underdeveloped countries to report their ages ending in preferred digits. The most

common digits are 0 and 5. Even numbers are also preferred. The magnitude of age heaping due to this kind of practice may not be so obvious in developed countries. But it is truly one of the biggest problems in African censuses and surveys. A large part of the reported ages are sheer guess (44 percent of the ages reported in the Liberian Population Growth Survey were enumerator's estimate) (4).

To throw light on the magnitude of age heaping due to digital preference in the Liberian census, we have exhibited in Table 31 the percentage of those in age group 19-69 who have preference for special digits (0-9) as terminal digits in reporting their ages. The method is "Digital Preference Index" in age reporting (5).

TABLE 31 - DIGITS PREFERENCE INDEX

Digits	0	1	2	3	4	5	6	7	8	9	Index
Male	21.7	7.3	11.3	6.2	6.7	12.7	7.7	5.6	12.8	8.7	33.6
Female	23.5	7.0	9.6	5.6	6.1	13.3	7.4	5.2	13.1	9.2	39.8

From the above table it was concluded that a large number of people, both males and females, reported or were assigned ages ending in 0, 5 and 8. With the exception of digit 2 for males, all other digits 1, 3, 4, 6, 7 and 9 were fairly close. It should be noted here that digits 0, 5 and 8 were more preferred among the women than among the men. The indices of 33.6 for male and 39.8 for female showed that digital preference was much less among the males than females. This could mean that males were more knowledgeable about their ages and hence could give their actual age without the interviewers assigning the ages. Taking the deviations of the percentages from 10 showed a minimum of 17.8 males and 19.8 females for whom incorrect terminal digits were reported.

To further ascertain the accuracy in determining the inconsistencies in age distribution and the irregular age grouping due to digital preference, and to determine how defective the age data was, Myers' Blended Index method was also applied to the census data. The result of the exercise has been presented in Table 32 by sex.

TABLE 32 - MYERS' BLENDED INDEX

Digits	0	1	2	3	4	5	6	7	8	9	Index
Male	20.8	6.6	10.1	5.7	6.3	13.2	8.0	6.0	13.3	10.0	34.8
Female	23.1	6.2	8.8	5.2	5.8	13.7	7.5	5.4	14.1	10.2	42.2

This method is capable of reflecting preference or dislike for each of the ten digits (6). It is clearly indicated from the table above that digits 0, 5 and

8 were highly preferred by both sexes. The digit 2 has not been shown as preferred digit as it was in the case of the digital preference method. All other digits 1, 2, 3, 4, 5, 6, 7 and 9 are reasonably close or have very little deviations from 10. The indices of 34.8 for males and 42.2 for females further indicated that the male ages were more accurately reported than the females. Theoretically, the Myers' index fluctuates between 0 and 180. Consequently, the closer the index to zero, the better the age distribution and the further away from zero towards 180 the more the age distribution is distorted.

Another method of age and sex accuracy check is the United Nations Secretariat method, commonly called the age ratio, sex ratio and joint scope indices (7). The age and sex proportions are determined by population dynamics (fertility, mortality and migration). But where migration is assumed negligible as is the case of Liberia, and there are no major catastrophes such as wars, famine, and epidemic, the changes in sex and age structure will be expected to be gradual from one cohort to another. Any substantial fluctuation in the absence of the above mentioned conditions can only be due to age misreporting and underenumeration of one of the two sexes.

The 1962 census data showed a low sex ratio of 97.5 in age groups 0-4 and a high sex ratio of 123.8 at age group 10-14. Sex ratio fluctuated between 98 and 70 from age groups 15-19 to 35-39. It rose sharply from age groups 40-44 to 65 years and over with a high peak of 140.2 at age group 55-59.

The theoretical sex ratio distribution of a normal population is a ratio between 102-106 at birth which reduces until ages 12-13 years, due to the high proportion of male infant mortality. Then it increases from ages 14-19 because of maternal deaths during the childbearing period. Then finally at age 50 and over, male mortality is higher, therefore sex ratios become lower. But the sex ratio pattern of the 1962 census definitely indicated gross irregularities in the sex-age distribution of the population.

The high ratio of ages 10-14 may have been due to a downward bias of age reporting of males or an underreporting of ages of females. The low sex ratios of ages 15-39 was plausible due to upward shifting of females or underreporting of ages of males in the same age groups. The excessively high ratios at the older ages were mainly due to the over-statement of ages for males. From my personal experience, the males appear much older than they really are, especially the rural farmers. It is therefore a common practice for our interviewers to overstate the ages of the males in the older ages (8).

The result of the Secretariat method is given below.

$$(1) \text{ Sex ratio score (SRS)} = \frac{1}{x-1} \frac{E/si - si - 1}{}$$

$$= \frac{1}{13} (169.6) = \underline{13.04}$$

$$(2) \text{ Age ratio score : Male (ARS)} = \frac{1}{n-2} E/Ar - 100/$$

$$= \frac{1}{12} (108.8)$$

$$= \underline{9.07}$$

$$(3) \text{ Age ratio score Female (ARS)} = \frac{1}{n-2} E/AR - 100/$$

$$= \frac{1}{12} (129.0) = 10.75$$

$$(4) \text{ Joint score index} = 3(\text{SRS}) + \text{AR (F)} + \text{AR (M)} = 3(13.04) \\ + 9.07 + 10.75 = \underline{58.94}$$

The joint score of 58.94 indicated a high degree of inaccuracy in age reporting. It should be noted that the greater the accuracy in the age distribution of censuses and surveys, the less the joint score would be. Such joint scores have been calculated for the following countries :

Country	Date	Score
Ghana	1970	43.0 (urban 52.3 rural)
Lesotho	1966	45.9
Iran	1966	68.4
Ceylon	1953	33.0
U.S.A.	1910	19.2
Sweden	1910	10.1

It was therefore concluded that all the evaluation methods employed have shown the 1962 census data to be defective in age and sex reporting.

2. Evaluation of the 1970 Survey Data. Since the 1970 survey data was not presented in single years, it was not practical to perform similar tests. However, the United Nations Secretariat method was applied.

With the exception of the normally acceptable sex ratio of 102 at age group 0-4, the 1970 sex ratio distributions are relatively similar to that of 1962. This indicated that the population structure had not changed very much or that the similar errors committed in age reporting were repeated in

the survey. The joint score of 74.4 was no improvement over the 1962 census. We can therefore assume that the 1962 census showed a better accuracy in age reporting than the survey. Table 33 shows the comparisons of the sex ratios and age ratios for both periods.

TABLE 33 - SEX RATIO, AGE RATIO - 1962 AND 1970

	Sex Ratio		Age Ratio			
	1962	1970	Male		Female	
			1962	1970	1962	1970
0-4	97.5	102.0	-	-	-	-
5-9	105.9	103.4	110.0	98.4	109.3	103.8
10-14	123.8	122.8	80.5	99.6	64.4	80.6
15-19	89.1	92.9	100.3	96.3	104.0	98.4
20-24	70.1	65.8	87.5	75.0	100.1	91.4
25-29	73.0	69.4	112.6	124.0	116.1	130.9
30-34	81.2	82.6	98.4	87.8	100.8	84.0
35-39	98.5	94.4	101.2	121.3	96.5	118.1
40-44	115.1	109.0	106.0	81.1	99.9	78.9
45-49	126.4	125.7	96.7	121.2	93.5	106.4
50-54	135.7	112.4	103.9	89.6	100.2	102.2
55-59	140.2	133.3	80.9	91.4	75.0	75.8
60-64	122.1	108.0	118.8	-	128.1	-
65+	120.7	-	-	-	-	-

POPULATION ESTIMATES

1. Mortality Estimate. The irregularities in age distribution in both the census and survey data rendered unacceptable any attempt to compare the relative age groups, and to estimate survival ratios and mortality rates.

Also due to either incomplete enumeration of the 1962 census or an overestimation of the 1970 survey data, the growth rate between the two periods (5.2 percent per annum) was exceptionally high, especially so when migration was considered negligible. Therefore it was not practical to resort to its use in deriving other demographic indices.

The result of the post-enumeration survey, which was conducted after the 1962 census, was not processed, therefore no demographic indices were made available. However, the 1970 survey has provided some fertility and mortality indices, but it was not practical to use the mortality index directly for the following reasons :

1. Because of the gross underreporting of deaths, the life expectancy at birth as derived from the recorded annual deaths in 1970 was far beyond the expectation of a developing country like Liberia, 57.4, 50.8 and 53.7 for female, male and both sexes respectively. By comparison, Ghana's life expectancies at birth as constructed by Gaisie in 1968 were 48.25 and 45.56 for female and male respectively (9).
2. In his Monograph, John Rumford has discovered that a large proportion of deaths among infants who died during the first few days of life and persons of older ages were missed in the Liberian fertility survey (10). At this juncture it was necessary to use other available methods in order to derive a more realistic mortality level for the country.

Since data on children ever born and children surviving were available, the method of estimating mortality from child survival rates was applied and the q_x values for ages 1, 2, 3, 4, 5, 10, 15 and 20 calculated. In Table 34, $2q$ corresponded to a mortality north model level 7. This retrospective question in African censuses and surveys has often time proved less reliable than the current fertility inquiry. However, using the two informations together, they usually give a more reliable estimate. This was the case in the Brass P/F ratio method of estimating total fertility. The main reason for the poor response in the retrospective question is that of memory lapse (11) especially in a society of high illiteracy rate. The missed events are mainly children who died immediately after birth, which events the mothers do not wish to remember.

TABLE 34— ESTIMATION OF MORTALITY FROM CHILD SURVIVAL AND CALCULATION OF QX VALUES

Age of	1970 Women 15-49	Children Ever Born	Children Surviving	Ave. Children (Pi) Everborn	Ave. Surviving (Si)	Proportion dead $\frac{Si}{1 - \frac{Si}{Pi}}$	$\frac{P1}{P2}$	Age X	qx .
15-19	80 860	36 258	28 144	0.527	0.409	.2239	.928	1	.208
20-24	68 494	134 896	101 326	1.969	1.479	.2489	.983	2	.245
25-29	81 060	235 238	172 144	2.902	2.124	.2681	.978	3	.262
30-34	55 312	209 272	151 076	3.783	2.731	.2781	.988	5	.275
35-39	50 622	210 978	145 456	4.168	2.873	.3107	.996	10	.309
40-44	30 404	138 068	91 866	4.541	3.022	.3345	.971	15	.325
45-49	26 974	122 238	76 002	4.532	2.818	.3782	.969	20	.366

From the table above, the average number of children ever born to women aged 45 years and over was 4.5, while the current total fertility was the usual normal for developing countries of 6.3 from the recorded data and 6.7 by the application of the Brass P/F ratio method (12). The current birth

rate of 51 per thousand was considered plausible, but the death rate of 16 per thousand remained questionable.

For the purpose of projection, some adjustments and smoothing of defective age structure had to be made on the base data. By way of comparison it was observed that the 1971 survey, using the same sample areas, showed a better death coverage than that of 1970. This improvement may have been due to more training given to field staff including the re-emphasis placed on the use of the pregnancy and serious illness records (*). A recorded death rate of 21 per thousand was realized while the birth rate remained relatively the same, 51 and 50 per thousand in 1970 and 1971 respectively (13).

Taking the new rate as the actual rate which should have been recorded in 1970, the 1970 mortality schedule was proportionally adjusted, taking into account the underreporting of deaths in the younger and older age groups. The new life table constructed gave the corresponding life expectancy at birth as 49.1 and 42.9 for females and males respectively. These corresponded to the North Model levels, 12-13 for females and 11-12 for males (14). (See appendix Table 1).

Accepting these levels as the most plausible mortality levels for Liberia in 1970, the 1962 levels were estimated by backward projection using the UN generalized form of 5 years per year gain or decline in the expectation of life at birth. The 1962 levels were therefore set at 45.1 and 38.9 which

TABLE 35 - LIFE EXPECTANCY AT BIRTH FOR SOME AFRICAN COUNTRIES

Country	Period	Life Expectancy at Birth
Liberia	1962	41.9 (estimated by the author)
Dahomay	1961	37.3
Gambia	1963	43.0
Ghana	1960	39.0
Guinea	1960-65	35.9
Ivory Coast	1960-65	38.4
Mali	1960-61	35.0
Mauritania	1964-65	40.4
Niger	1960-65	38.4
Nigeria	1960-65	35.9
Senegal	1960-61	37.0
Sierra Leone	1960-65	38.4

Source : Demographic Hand Book for Africa.

(*) In the Liberian Demographic Survey special forms were designed to be used by the local registrar in recording pregnancies and seriously ill persons in each household. These records were reviewed upon the registrar's return a month later for possible birth or death.

corresponded to North model levels 11 and 10 for females and males respectively. These were relatively similar to those in Table 35 which were calculated for some African countries during the same period, early and middle 1960's.

Having established the mortality levels for both the 1970 and 1962 periods, the next problem was to locate a suitable stable model in order to adjust the age structure of the base population. This was accomplished by first

TABLE 36 - COMPARISON OF UNSMOOTHED AND SMOOTHED AGE DISTRIBUTIONS OF THE BASE POPULATION BY SEX

Age Group	Unsmoothed Base Pop. 1965			
	Male Number	Percent	Female Number	Percent
All ages	546 800	100	556 900	100
0-4	88 582	16.2	90 775	16.3
5-9	74 912	13.7	70 726	12.7
10-14	47 025	8.6	38 426	6.9
15-19	42 650	7.8	47 894	8.6
20-24	37 729	6.9	54 019	9.7
25-29	43 744	8.0	59 588	10.7
30-34	39 916	7.3	49 007	8.8
35-39	37 729	6.9	37 869	6.8
40-44	33 902	6.2	29 516	5.3
45-49	26 793	4.9	21 162	3.8
50-54	21 325	3.9	15 593	2.8
55-59	14 764	2.7	10 581	1.9
60-64	14 217	2.6	11 695	2.1
65+	23 512	4.3	20 049	3.6
Age Group	Smoothed Base Pop. 1965			
	Male Number	Percent	Female Number	Percent
0-4	105 532	19.3	105 254	18.9
5-9	82 567	15.1	82 978	14.9
10-14	68 897	12.6	69 056	12.4
15-19	57 414	10.5	57 918	10.4
20-24	48 118	8.8	48 450	8.7
25-29	39 916	7.3	40 097	7.2
30-34	32 808	6.0	33 414	6.0
35-39	26 793	4.9	27 845	5.0
40-44	21 872	4.0	22 833	4.1
45-49	17 498	3.2	18 378	3.3
50-54	14 217	2.6	15 036	2.7
55-59	10 936	2.0	11 695	2.1
60-64	8 202	1.5	8 910	1.6
65+	12 030	2.2	15 036	2.7

settling at a gross reproduction rate of 3.3 which corresponded to the total fertility rate of 6.7 and assuming a sex ratio at birth of 102 (*).

$$\text{GRR} = \frac{\text{TFR}}{1 + \text{SR}} = \frac{6.7}{1 + 102} = \frac{6.7}{202} = 3.316$$

With the gross reproduction rate, the mortality levels 11 and 10 for female and male and the sex age structure of the 1962 population, a stable age distribution which gave the least deviation was selected with its corresponding growth rate of 2.75 per cent per annum.

Since the 1970 estimates were used as a base in deriving the necessary mortality levels for 1962, and in order to compare the projected figure with the 1970 survey result, the year 1965 was chosen as the base period for the projection. The 1965 population was therefore estimated and prorated for male and female based on the 1962 census and the derived growth rate of 2.75 per cent per annum.

$$(\text{PoP } 1965 = \text{PoP } 1962 (1 + r)^n)$$

Also assuming that mortality conditions have already begun to improve after the 1962 census and projecting the mortality level to 1965 with an increase of .5 years per year, the life expectancies at birth in 1965 were 46.6 and 40.4 with corresponding north model levels of 11-12 and 10-11 for females and males respectively. Table 36 shows the unsmoothed and smoothed age distributions of the base population.

2. Fertility Estimate. The fertility indices derived from the survey records were not very much questionable like the mortality indices. A birth rate of 51/1000, gross reproduction rate of 3.3 and total fertility rate of 6.7 were quite plausible in the absence of previous knowledge of the fertility situation in Liberia.

3. Migration. Since the repatriation of the American freed slaves to Liberia in the early 19th century, (1821) Liberia has not been subjected to any considerable international migration ; at least there is no record available of a substantial international migration in the recent past. This kind of movement which may affect the size and age structure of the population has been considered negligible.

(*) Sex ratio at birth in 1970 was 92 and it rose up to 108 in 1971. Due to these fluctuations an assumed ratio of 102 was considered plausible.

ASSUMPTIONS

1. *Mortality.* With the limited information available on mortality pattern in Liberia, a prediction about the future trend must be made with caution. Indications show that medical facilities are continuing to improve in the country. Public health expenditure totalled 6.4 million dollars in 1971 compared with \$4.8 million in 1970 (15). It is therefore natural to expect a continuous decline in infant and maternal mortality and consequent increase in life expectancy at birth. The assumption of such an increase can well be based on the UN generalized form of half a year's gain per year in the expectation of life at birth (16). Our assumption was therefore .5 years per year.

Below are the indicated levels at each five year period.

TABLE 37 – PROJECTED MORTALITY LEVELS 1965-1985

Year (period)	Female North Level	E_x^o	Male North Level	E_x^o
1965-70	11.6	46.4	10.4	40.4
1970-75	12.6	49.1	11.2	42.9
1975-80	13.6	51.6	12.1	45.4
1980-85	14.6	54.1	13.5	47.9

2. *Fertility.* Fertility information is only available from one survey and there is no past experience from any other source. It is therefore difficult to predict what the future trend would look like. However, with the limited information available, one can employ the usual demographic custom of relying on the experience of a similar country to make a reasonable prediction about one's own country. At this point we chose to base our assumption on the fertility experience of Ghana for the following reasons :

- (1) Both Ghana and Liberia lie in the high fertility zone of West Africa.
- (2) Ghana's crude birth rates were 51/1000 in 1950-55, 50/1000 in 1960 (17) and between 49-50/1000 in 1970, while Liberia had a recorded birth rate of 51/1000 in 1970 and 50/1000 in 1971.
- (3) Ghana had a gross reproduction rate of 3.0 in 1955 and 3.3 in 1960, while Liberia's gross reproduction rate was 3.3 in 1970.

Basing his argument on many factors including those mentioned above, Gaisie has assumed constant fertility for Ghana over the decades (18). It was therefore assumed that Liberia's fertility condition has remained constant over the years with no indication of immediate decline.

In the absence of population policy aimed at family limitation and with the presidential decree issued at the latter part of 1972 proposing to offer free medical treatment of children from birth up to two years of age, we can expect a continuous rise in the growth rate and constant or accelerated fertility for some years to come. Fertility decline will only come about with the improvement in education, increased urbanization and higher economic benefits for the mass.

It was therefore assumed that fertility has remained constant since 1965 and will continue in the same trend for the next 12 or more years, while mortality continues to decline. Any assumption for a decline of fertility must be based on conditions such as improvement in education, increased urbanization and industrialization, higher economic benefit for the mass and a Government programme geared toward family limitation, which are not forthcoming in the recent future.

The projection was therefore based on the lone assumption of high fertility and declining mortality with the total fertility rate of 6.7 remaining constant during the projected period. Table 38 gives the adjusted age specific fertility rate which has been used to calculate the future births.

TABLE 38 – ADJUSTED AGE SPECIFIC FERTILITY RATES

Age Group	15	20	25	30	35	40	45	TFR	GRR
Adjusted ASFR	.231	.273	.252	.261	.172	.113	.033	6.677	3.3

METHODOLOGY

1. Projection Method. The projection under the assumption of constant fertility and declining mortality has been computed on the basis of component method : the survival ratios for each projection period were selected from the North Model life table based on the assumed mortality levels for each period. These were interpolated between the levels in order to correspond to the expectation of life at that particular period, (table 37).

2. The Estimations of Future Births and the Population 0-4. The adjusted age specific fertility rates which were derived from the 1970 fertility schedule were used as a standard to estimate the future births between the projection periods. (Table 38).

Since the number of children to be born in the future depended on the number of women surviving between the child bearing ages, the average number of women in age groups 15-19 to 45-49 between two projected periods was calculated. This was mainly to adjust for the variation in age structure as the women approached the end of the projection period. These averages of women were multiplied by the adjusted age specific fertility rates in order to derive the annual births. The annual births were then multiplied by five and the total five years births, males and females, were obtained.

The calculation of the births by sex was done by applying the sex proportions at birth, which were .495 and .505 for females and males respectively. These proportions were obtained from the assumptions that the sex ratio at birth was 102 males per 100 females. This was discussed earlier in this paper. Then finally, each five years, births by sex was multiplied by the corresponding survival ratios at birth and the population 0-4 was estimated.

3. The Estimated and Projected Population of Liberia. The estimated and projected population of Liberia as given in Table 39, indicated that the 1965 estimated population will double itself a few years after 1985. The projected figure for 1970 fell short of the survey estimate by 19 per cent. But since the validity of the survey estimate can be questionable due to sampling and non-sampling errors, only the 1974 ensuing census will show how far each figure deviated from the true value. The age and sex data are given in appendix tables 2-6.

TABLE 39 – SUMMARY ESTIMATE AND PROJECTED POPULATION, BIRTH, DEATH, AND GROWTH RATES

Year	Population	Birth Rate	Death Rate	Growth Rate
1965	1,103,700	.049	.020	.029
1970	1,247,906			
1975	1,486,271	.049	.018	.031
1980	1,744,179	.049	.017	.032
1985	2,062,170	.048	.015	.033

Even though the total population does not seem to pose any population problem for Liberia at the moment, what is important to note is the continuous rise in the rate of growth. This is a result of the fall in the crude death rate.

It is also interesting to note the rapid growth of the younger population. This is illustrated in Table I. The population under 15 years of age rose from 37.2 per cent in 1962 to 46.6 per cent in 1965, and will be 3 per cent less

than half the total population by 1985. This does not only create problems for the construction of more schools and the training of more teachers, but it also accelerates the dependency ratio to an un-manageable level. By 1985 the dependency ratio will be as high as one dependent to one potential worker.

APPENDIX TABLES

TABLE I – ESTIMATED AND PROJECTED PERCENT DISTRIBUTION OF THE POPULATION IN BROAD AGE GROUPS AND THE DEPENDENCY RATIOS : 1965-85

Broad Age Group	Census 1962	Estimate 1965	Proj. 1970	Proj. 1975	Proj. 1980	Proj. 1985
Total	100.0	100.0	100.0	100.0	100.0	100.0
Under 15 years	37.2	46.6	46.1	46.1	46.4	47.0
15-64 years	58.8	51.0	51.1	51.0	50.6	49.9
65 years & over	4.0	2.4	2.8	2.9	3.0	3.1
Dependency Ratio	70.1	96.0	95.7	96.0	97.6	100.4

TABLE IA – ADJUSTED LIFE TABLE 1970: FEMALE

Age	NK _x	l _x	n ^p _x	n ^q _x	nL _x	Ex ⁰
0	.1 764	100 000	.83 790	.16 210	88 264	49.1
1-4	.0 239	83 790	.90 876	.09 124	319 870	57.6
5-9	.0 047	76 145	.97 677	.02 323	376 302	59.2
10-14	.0 035	74 376	.98 265	.01 735	368 655	55.5
15-19	.0 061	73 086	.96 996	.03 004	359 940	51.4
20-24	.0 057	70 890	.97 190	.02 810	349 470	47.9
25-29	.0 059	68 898	.97 093	.02 907	339 483	44.3
30-34	.0 076	66 895	.96 271	.03 729	328 237	40.5
35-39	.0 047	64 400	.97 677	.02 323	318 260	37.0
40-44	.0 123	62 904	.94 033	.05 967	305 138	32.8
45-49	.0 066	59 151	.96 754	.03 246	290 955	29.7
50-54	.0 155	57 231	.92 539	.07 461	275 480	25.7
55-59	.0 199	52 961	.90 522	.09 478	252 255	22.5
60-64	.0 270	47 941	.87 354	.12 646	224 548	19.6
65+	.0 585	41 878	.00 000	1.00 000	715 863	17.1

TABLE IB - ADJUSTED LIFE TABLE 1970 : MALE

Age	nM_x	l_x	n^p_x	n^q_x	nL_x	e^o_x
0	.1 950	100 000	.82 232	.17 768	87 136	43.0
1-4	.0 237	82 232	.90 949	.09 051	314 042	51.2
5-9	.0 062	74 789	.96 947	.03 053	368 238	52.1
10-14	.0 043	72 506	.97 873	.02 127	358 675	48.6
15-19	.0 036	70 964	.98 216	.01 784	351 655	44.6
20-24	.0 083	69 698	.95 934	.04 066	341 405	40.4
25-29	.0 082	66 864	.95 982	.04 018	327 603	37.0
30-34	.0 093	64 177	.95 456	.04 544	313 595	33.4
35-39	.0 160	61 261	.92 308	.07 692	294 525	29.9
40-44	.0 091	56 549	.95 551	.04 449	276 455	27.2
45-49	.0 294	54 033	.86 301	.13 693	251 660	23.4
50-54	.0 281	46 631	.86 872	.13 128	217 850	21.7
55-59	.0 230	40 509	.89 125	.10 875	191 532	19.6
60-64	.0 322	36 104	.85 099	.14 901	167 070	16.7
65 +	.0 707	30 724	.00 000	1.00 000	434 569	14.1

TABLE II - ESTIMATED POPULATION BY AGE AND SEX, 1965

Age group	Both sexes	Male	Female
All ages	1 103 700	546 800	556 900
0-4 years	210 786	105 532	105 254
5-9 years	165 545	82 567	82 978
10-14 years	137 935	68 897	69 056
15-19 years	115 332	57 414	57 918
20-24 years	96 568	48 118	48 450
25-29 years	80 013	39 916	40 097
30-34 years	66 222	32 808	33 414
35-39 years	54 638	26 793	27 845
40-44 years	44 705	21 872	22 833
45-49 years	35 876	17 498	18 378
50-54 years	29 253	14 217	15 036
55-59 years	22 631	10 936	11 695
60-64 years	17 112	8 202	8 910
65 years and over	27 066	12 030	15 036

TABLE III - PROJECTED POPULATION BY AGE AND SEX, 1970

Age group	Both sexes	Male	Female
All ages	1 274 906	628 305	64 660
0-4 years	237 102	116 352	120 750
5-9 years	190 858	94 625	96 233
10-14 years	159 419	79 286	80 133
15-19 years	134 256	66 912	67 344
20-24 years	111 603	55 294	56 309
25-29 years	92 863	45 977	46 886
30-34 years	76 635	38 036	38 599
35-39 years	63 087	31 107	31 980
40-44 years	51 670	25 171	26 499
45-49 years	41 842	20 277	21 615
50-54 years	33 168	15 941	17 227
55-59 years	26 427	12 612	13 815
60-64 years	19 674	9 301	10 373
65 years and over	36 302	17 464	18 838

TABLE IV - PROJECTED POPULATION BY AGE AND SEX, 1975

Age group	Both sexes	Male	Female
All ages	1 486 271	727 298	758 973
0-4 years	282 580	138 521	144 059
5-9 years	217 788	105 638	112 150
10-14 years	184 722	91 256	93 466
15-19 years	155 630	77 212	78 418
20-24 years	130 347	64 648	65 699
25-29 years	107 742	53 039	54 703
30-34 years	89 338	43 993	45 345
35-39 years	73 381	36 235	37 146
40-44 years	59 998	29 385	30 613
45-49 years	48 733	23 497	25 236
50-54 years	38 960	18 567	20 393
55-59 years	30 232	14 273	15 959
60-64 years	23 248	10 855	12 393
65 years and over	41 575	20 182	23 393

TABLE V – PROJECTED POPULATION BY AGE AND SEX, 1980

Age group	Both sexes	Male	Female
All ages	1 744 179	850 192	893 987
0-4 years	335 535	165 393	170 142
5-9 years	262 027	127 279	134 748
10-14 years	211 498	102 290	109 208
15-19 years	180 703	89 088	91 615
20-24 years	151 440	74 809	76 631
25-29 years	126 168	62 223	63 945
30-34 years	103 955	50 935	53 020
35-39 years	85 824	42 077	43 747
40-44 years	69 881	34 229	35 652
45-49 years	56 626	27 397	29 229
50-54 years	45 361	21 489	23 872
55-59 years	35 715	16 762	18 953
60-64 years	26 793	12 415	14 378
65 years and over	52 653	23 806	28 847

TABLE VI – PROJECTED POPULATION BY AGE AND SEX, 1985

Age group	Both sexes	Male	Female
All ages	2 062 170	1 003 138	1 059 032
0-4 years	399 945	197 615	202 330
5-9 years	314 579	153 776	160 803
10-14 years	255 447	123 734	131 715
15-19 years	207 401	100 092	107 309
20-24 years	176 295	86 542	89 753
25-29 years	147 031	72 232	74 799
30-34 years	122 140	59 957	62 183
35-39 years	100 245	48 899	51 346
40-44 years	82 272	40 117	42 155
45-49 years	66 486	32 310	34 176
50-54 years	53 235	25 471	27 764
55-59 years	41 835	19 536	22 298
60-64 years	31 899	14 707	17 192
65 years and over	63 359	28 150	35 209

FOOTNOTES

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