DEMOGRAPHIC CHARACTERISTICS OF THE RURAL POPULATION OF ETHIOPIA

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ABSTRACT. In the field of population studies, Ethiopia has neither carried out even a single population census nor established a vital statistics registration system. But with the available scanty and defective data, attempts are made here to examine the demographic situation of rural Ethiopia. Since only about 13% of the total population of the country are estimated to reside in agglomerations of 2,000 and above, Ethiopia is predominantly rural. According to the estimates of the vital rates, Ethiopia has been experiencing high levels of fertility and mortality conditions.

The low average life expectancy at birth, together with the high birth and death rates can indicate the low level of living which has been prevalent in the country.

1. INTRODUCTION

Population is one of the basic factors affecting production and distribution of material wealth, and of the cultural and technological advancement of a nation. Population data can be used as basis for planning economic and social development, administrative arrangement and scientific research.

Conventionally, there are three methods of population data collection: Censuses, Sample Surveys, and Vital Statistics Registration System. Administrative records can also keep population information.

1.1 Population Census

A Census of Population is not simply counting individuals. It denotes the total process of collecting, compiling, evaulating, analysing and publishing demographic, economic and social characteristics pertaining to all inhabitants of a country or a well-defined part of a country [9, pp. 2-4]. Ethiopia has not yet carried out a single complete population census.

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1.2 Sample Survey

A complete coverage of the whole population of a developing nation, like Ethiopia, is usually constrained by shortage of available funds and trained manpower. When appropriate steps of sampling techniques were taken, a Sample Survey is a better alternative for obtaining population data.

The only comprehensive demographic data available in Ethiopia for socio-economic planning purposes have been those collected during the two rounds of multi-purpose national sample surveys, which were carried out by the Central Statistical Office (CSO), Addis Ababa in 1964-67 and 1969-71 respectively.

1.3 Vital Statistics Registration System

This is a system of registering events which have to do with an individual's entrance into or departure from life, including the changes in civil status which would occur to him during his life time.

A conventional vital statistics registration system has not yet been established in Ethiopia, apart from some births, deaths and marriages that are being registered voluntarily in certain municipal towns and religious institutions. However, the formation of the Peasant Association areas, Urban Dwellers' Associations and other associated mass organizations has created one of the ideal conditions for the future establishment of a national vital statistics registration system. The system, once established effectively, will provide vital statistics for socio-economic planning purposes and research, and for evaluation and implementation of certain programmes, such as educational health services and housing programmes, etc.

1.4 Administrative Records

In Ethiopia, the 1956 and 1962 head counts carried out by the Ministry of Interior for taxation and parliamentary representation are still used as a supplement to the results of the two national sample surveys conducted by the Central Statistical Office. The Immigration Department of the Ministry of Interior also collects arrival and departure statistics at the port of exit and entry. Other Ministries which record supplementary population data are the Ministry of Education (student population through school records); the Ministry of Agriculture (through agricultural sample surveys); and the Ministry of Public Health (through the various health centres).

However, the data which are being collected through administrative records are generally too incomplete in content, coverage and scope for comprehensive socio-economic planning programmes.

The population data that will be utilized largely in this paper, therefore, are those obtained from the results of the second National Sample Survey conducted by the Central Statistical Office during 1969-71.

1.5 Content of the Questionnaire

The questionnaire which was administered for the Second Round National Sample Survey contained items which led to obtaining statistics on total population, age, sex, relationship, martial status, births, deaths, etc.

The enumeration procedure was carried out by interview methods, i.e., enumerators canvassed the selected households by visiting every sample house.

1.6 Sampling Methodology

The sampling design for the Second Round National Sample Survey in the rural areas was a stratified two-stage sampling design. A complete list of all smallest administrative subdivisions (now equivalently replaced by the Peasant Association areas) of each district was produced for the first-stage sampling frame.

The second stage of sampling consisted of listing all the households residing in a selected sub-divison, and a proportion of households was sampled for further demographic and associated socio-economic inquiries by systematic sampling, after stratifying the households by class, such as owner, tenant, etc., and the overall sampling fraction was about 1 in 100.

1.7 Sampling Coverage and Error

About 82% of all districts of the country were surveyed. The results of the Survey, however, could have been subject to two types of error: response and non-response errors.

The number of households and population of the surveyed areas was estimated to be about 4 million and 17.7 million respectively. The standard errors have been estimated at district, Administrative Region and country levels, and the Coefficient of Variation for the number of households and population in the surveyed areas ranges between 2.9 and 10.1 for the Region and 1.7 at the country level. The coefficient of variation was noted to have been higher in lower administrative units.

Hence, our forthcoming analysis of the demographic characteristics of the rural population of Ethiopia, as resulted from the Second Round National Sample Survey, will at best be on regional and national levels. The population data for the areas which were not covered during the Second Round National Sample Survey have been obtained from two sources:

(1) Up-dating the population data of the First Round National Sample Survey results, if the areas in question were covered during the First Round.

(2) Up-dating the population size of the 1956 or 1962 Ministry of Interior head count, if the areas in question were not covered by the First Round.

2. SOME GENERAL DEMOGRAPHIC CHARACTERISTICS OF THE RURAL POPULATION OF ETHIOPIA

2.1 Population distribution and density

There have always been conceptual problems in rural-urban distinction in the countries of the world. It is common practice that rural-urban definition varies from country to country and even from census to census of the same country. Attempts at rural-urban distinction have been made in terms of legal and administrative or social and economic organization; and in terms of population characteristics such as population size, density and heterogeneity.

In the case of Ethiopia, there is no official definition of "rural" and "urban", except the definition adopted by the Central Statistical Office, in that localities with 2,000 inhabitants and over are considered urban areas. Nevertheless, this criterion has included some localities which have rural characteristics. Unless the criterion of minimum population size in defining "urban" is accompanied by the provision of social services such as electricity, pipewater supply, medical and toilet facilities, and the manifestation of non-agricultural activities, the rural-urban distinction will still remain ambiguous.

Accepting the definition of urban area adopted by the Central Statistical Office, the extent of urbanization in Ethiopia is exhibited in Tables 2.1 and 2.2. Localities with 5,000 and more inhabitants account for about 88% of all localities with 2,000 and more inhabitants. The urban and city populations[1] also account for about 62 and 41% respectively. From the same Table, it can be seen that the city population (Addis Ababa and Asmara only) accounts for about 65% of the urban population (20,000 and over inhabitants). The high proportion of city population implies that the country has been experiencing a sort of "urban-hypertrophy", namely in Addis Ababa and Asmara. If this condition continues, the Ethiopian towns will not act as agents of change and mobilization for the rural population to progress. Economic and social welfare in African states will be promoted more effectively if the urban population is kept distributed among small towns rather than concentrated in a few large cities [8, p. 77]. The implementation of the programmes of the National Democratic Revolution of Socialist Ethiopia, therefore, is expected to minimize and curtail the existing and future development of urban hypertrophy.

TABLE 2.1

Estimated urban population of Ethiopia in January 1977 by number of urban areas and population

Region	Localities with 2,000 and over		Localities with 5,000 and over		Localities with 10,000 and over		Localities with 100,000 and over	
	no.	population	no.	population	no.	population	no.	population
Arsi	14	82,653	6	56,676	1	23,783	0	0
Bale	7	38,854	2	21,629	0	0	0	0
Gondar	13	164,276	8	146,210	2	100,865	0	0
Eritrea	23	585,531	18	565,092	5	457,300	1	352,700
Gamo Gofa	6	35,480	4	27,886	0	0	0	0
Gojam	21	146,298	8	106,595	2	65,159	0	0
Harerghe	22	245,416	12	210,405	2	139,095	0	0
Illubabor	9	41,188	2	21,016	0	0	0	0
Keffa	12	118,368	4	92,814	1	63,390	0	0
Shewa	52	1,548,873	28	1,468,748	5	1,240,151	1	1,104,500*
Sidamo	22	178,417	13	149,216	1	23,038	0	0
Tigray	19	162,104	8	123,385	1	40,078	0	0
Wellega	20	97,754	5	55,427	1	21,694	0	0
Wello	15	145,705	8	120,860	1	57,493	0	0
Total	255	3,590,917	126	3,172,019	22	2,232,046	2	1,457,200
Percentage out of all 2000 & over	–	–	–	88.3	–	62.2	–	40.6

* excluding Addis Ababa

Source: Compiled from Central Statistical Office memeo.

The regional level of urbanization is also examined by comparing the total population with localities of 2,000 and more inhabitants of each region. The level of urbanization ranges from about 4% for Gamo Gofa to about 26% for Eritrea and Shewa, giving an average of about 13% for the country. Eritrea and Shewa are relatively more urbanized than the rest. But, excluding Addis Ababa, the proprotion for Shewa is about 9%. Table 2.2 therefore indicates that Ethiopia has a low level of urbanization, and the Ethiopian population is predominantly rural.

The extent of population concentration in Ethiopia as a whole in terms of persons per km^2 is shown in Table 2.3. The regional density ranges from about 7 in Bale to about 69 in Shewa (56, excluding Addis Ababa), whereas *Awraja* density ranges from about 2 to about 220, giving an average of about 23 for the country. About 28% of all *Awrajas* of Ethiopia have a density of less than 15, and these *Awrajas* are predominantly inhabited by a nomadic or semi-nomadic population. In the same Table, we can see that each region, except Arsi and Shewa, has at least one nomadic or semi-nomadic *Awraja*.

TABLE 2.2

Estimated degree of urbanization in localities of 2,000 and more in Ethiopia as of January 1977 by region

Region	Total rural-urban population (in '000)	Urban population (in '000)	Urbanized population of Region in %
Arsi	1,005.2	82.5	8.2
Bale	809.5	38.9	4.8
Gondar	1,893.9	164.3	8.7
Eritrea	2,238.5	585.5	26.2
Gamo Gofa	922.7	35.5	3.9
Gojam	1,879.7	146.3	7.8
Hararghe	2,882.2	245.4	8.5
Illubabor	717.7	41.2	5.7
Keffa	1,489.7	118.4	8.0
Shewa	5,864.0	1,548.9	26.4 (9.4)*
Sidamo	2,589.0	178.4	6.9
Tigray	1,993.8	162.1	8.1
Welega	1,862.5	97.8	5.3
Wello	2,408.0	145.7	6.1
Total	28,556.4	3,590.9	12.6

* excluding Addis Ababa

Source: Compiled from Central Statistics Office mimeo.

TABLE 2.3

Estimated population density by region and range of *Awraja* density as of Jan. 1977

Region	Population (in '000)	Area (in '000)	Density	Range of *Awraja* density	Total No. of *Awrajas*	*Awrajas* having less than 15 density
Arsi	1,005.2	23.3	42.8	31–43	3	0
Bale	809.5	124.6	6.5	7–18	5	3
Gondar	1,893.9	74.2	25.5	9–78	7	1
Eritrea	2,238.5	117.6	19.0	3–125	9	4
Gamo Gofa	922.5	39.5	23.4	12–38	4	1
Gojam	1,879.7	61.6	30.5	4–98	7	1
Harerghe	2,882.2	259.7	11.1	2–116	14	7
Illubabor	717.7	47.7	15.1	4–48	4**	2
Keffa	1,489.7	54.6	27.3	8–39	6	2
Shewa	5,864.0	85.4	68.7 (55.9)*	15–141	11	0
Sidamo	2,589.0	117.3	22.1	2–213	6	2
Tigray	1,993.8	65.9	30.3	13–129	8	3
Wellega	1,862.5	71.2	26.2	13–37	6	1
Wello	2,408.0	79.4	30.3	4–220	12	2
Total	28,555.4	1,221.9	23.4	2–220	102	29

* This index for Shewa excludes Addis Ababa

** Sor and Geba *Awrajas* in Illubabor was partly in Gore and partly in Buno Bedele *Awrajas*

Source: Compiled from Central Statistical Office Mimeo.

The population concentration is also examined when Table 2.3 is merged into zones, and this is shown in Table 2.4. The population concentration in the north, west, south and south-west seems relatively evenly distributed, with a density of around 25, whereas the eastern regions seem sparsely populated with a density of about 10, and the central regions are relatively thickly populated with a density of about 63 (53, excluding Addis Ababa). The mean density for Africa in 1965 was about 12, with a mean density of 16 for West African countries, 15 for East Africa, 10 for North Africa, 6 for Centeral Africa and 8 for other African countries, having a wide diversity of density, as low as 1 and as high as 136 [6, pp. 11-19]. In the same period, the mean density for Ethiopia was estimated to be about 18.

A more efficient measure of population pressure than the ratio of total population to total country area is non-arable land ratio. This ratio was about 135 for total population, and 114 persons per km^2 for rural population of Africa in 1965 [6, pp. 25-29]. A wide diversity of ratios was observed among the African countries. The ratios were much lower in Central African countries (46 and 42 respectively), and the highest ratios were recorded in Egypt (1,191 and 703). Angola (573 and 538) and Kenya (561 and 524). For Ethiopia, the ratio was about 288. Even if this ratio seems to be high, the land utilization of Ethiopia has to come into the picture, and hence estimates of the extent of land use in Ethiopia are shown in Table 2.5. It can be seen in the Table that about 69% of the total area of the country is agricultural land (11% cultivated land, 53% pasture land, 5% swamp area) and the percentages of forests, barren land, built-up areas, water or water-course areas account for about 7, 14 and 10 respectively. It can be estimated from the same Table that only about 16% of the agricultural land was cultivated in the 1970s. The proportion of built-up areas will naturally increase proportionately to the increase in population size. However, it is indisputable that there exists a considerable area that could be turned to human benefit in the country.

Table 2.4

Estimated population density of Ethiopia of zone, as of January 1977

Zone	Region	Population (in '000)	Area (in '000 km^2)	Density
North	Eritrea Tigray Gondar Wello	8534.2	337.1	25.3
West	Gojam Welega Illubabor	4459.9	180.2	24.8
South and South-west	Sidamo Gamo Gofa Keffa	5001.4	211.4	23.7
East	Harerghe Bale	3691.7	384.3	9.6
Central	Shewa Arsi	6869.2	108.9	63.1 (53.0)*

* excluding Addis Ababa Source: Compiled from Table 2.3

It could be concluded, therefore, that land utilization in Ethiopia has not yet exploited for a higher level of productivity in general, and the implementation of the programmes of the National Democratic Revolution of Socialist Ethiopia would meet the demands of the growing population.

TABLE 2.5

Estimated land utlization in Ethiopia as of 1972

Type of land	Area (in '000 km^2)		Percent	
Total area	1,221.9		100.0	
Agricultural land	840.3		68.8	
a) Cultivated land	137.2		11.2	
– Crop land		108.7		8.8
– Fallow land		21.2		1.7
– Fruits and Stimulants		7.3		0.6
– Meadows		0.1		0.1
b) Pastures	645.3		52.8	
c) Swamps	57.8		4.8	
Forests	88.6		7.3	
Barren land and built-up areas	172.1		14.0	
Water and water-courses	120.9		9.9	

Source: Central Statistical Office, *Statistical Abstract 1972.*

2.2 The Age Structure

Examination of Table 2.6 indicates that the age structure of the rural population of Ethiopia was not usually reported[2], and hence the age structure is subject to some adjustments.

A number of graduating techniques for removing age reporting irregularities have been recommended [7, pp. 223-224]. The mathematical techniques and stable population models are widely applied in smoothing distorted age-sex data of the developing societies [10, pp. 11-14].

However, the stable population models which have been developed for countries which have defective or incomplete data are more efficient than mathematical manipulations. The UN, therefore, has recommended that the adjusted age distribution for population projections that will provide a more valid basis by the stable population model can be used to provide a base population, for estimating the future evolution of the school-age and school-going population, or of the age of labour-force participation or the like, than would be obtained by basing a projection on the often highly distorted age distribution recorded in a census or survey [11, pp. 311-334, 73-75]. Hence the adjusted age-sex distribution of the rural population of Ethiopia by the stable population models (West Model, level 11) is shown in Table 2.7.

TABLE 2.6

Percentage recorded age distribution of rural population by sex, 1970

Age Group	Male	Female	Total
0 – 4	18.3	18.9	18.6
5 – 9	18.0	17.6	18.0
10 – 14	10.9	8.7	9.8
15 – 19	8.2	7.3	7.8
20 – 24	5.7	7.7	6.7
25 – 29	7.1	9.6	8.5
30 – 34	6.7	8.0	7.3
35 – 39	6.2	6.0	6.1
40 – 44	4.9	5.1	5.0
45 – 49	3.4	2.9	3.2
50 – 54	3.2	3.1	3.2
55 – 59	2.0	1.2	1.6
60 – 64	2.1	1.8	1.7
65 +	2.9	2.1	1.5
Total	100.0	100.0	100.0

Source: Central Stratistical Office, *The Demography of Ethiopia*, Vol. I, Addis Ababa, January 1974.

TABLE 2.7

Adjusted age distribution of rural population in percentage by sex and age group

Age Group	Male	Female	Total
0 – 4	17.3	17.1	17.2
5 – 9	14.2	14.0	14.1
10 – 14	12.3	12.0	12.2
15 – 19	10.6	10.4	10.5
20 – 24	9.0	8.9	9.0
25 – 29	7.0	7.5	7.5
30 – 34	6.4	6.3	6.4
35 – 39	5.4	5.3	5.4
40 – 44	4.5	4.5	4.5
45 – 49	3.6	3.7	3.6
50 – 54	2.9	3.0	2.9
55 – 59	2.2	2.4	2.3
60 – 64	1.6	1.9	1.7
65 +	2.4	3.0	2.7
Total	100.0	100.0	100.0

Source: Central Statistical Office, *The Demography of Ethiopia*, Vol. I, Addis Ababa, January 1974.

The age structure of a society is a useful indicator of the manpower potential of the population, and indicates the dependency burden, consumption needs and social requirements of the society. It is important to point out here that the general pattern of the age structure of a society is mainly a reflection of the past trends of fertility, mortality and migration. In rural Ethiopia, international migration was negligible in the 1970s, and the age structure can safely be assumed to be the results of past trends of fertility and mortality.

In order to draw the salient features of the age structure of rural Ethiopia, the five-year age group is expressed in broader age brackets: 0 — 14, 15 — 64 and 65 and over. This classification is functional, for these approximately represent the pre-school-age children, the school-age population, the working-age population and the aged population. The proportion are shown in Table 2.8. Examination of the Table shows the following features:

Reported young age population	(0 — 14)	= 46.4
Adjusted young age population	(0 — 14)	= 43.5
Reported old age population	(65 +)	= 2.5
Adjusted old age population	(65 +)	= 2.7
Reported working age population	(15 — 64)	= 51.1
Adjusted working age population	(15 — 64)	= 53.8

TABLE 2.8

Percentage distribution of the functional age group of rural population of Ethiopia

Functional Age Group	Reported			Adjusted		
	Male	Female	Total	Male	Female	Total
0 — 4	18.3	18.9	18.6	17.3	17.1	17.2
0 — 14	17.6	45.2	46.4	43.8	43.1	43.5
15 — 64	49.5	52.7	51.1	53.8	53.9	53.8
65 +	2.9	2.1	2.5	2.4	3.0	2.7

The age structure of rural Ethiopia, therefore, is in consonance with the age structure of other developing societies, showing a youthful population, and indicative of high fertility conditions with moderately declining mortality conditions. The ratio of the young age population plus the old age population to the working age population is about 96 to 100 when reported, and 86 to 100 when adjusted, indicating that there is a high dependency ratio in rural Ethiopia, assuming that children in the age group 0 — 14 and persons in the age group 65 + are economically inactive.

2.3 The Sex Structure

The sex structure of a society can be measured by a sex ratio expressed as the number of males per 100 females.

In many of the African countries, considering their respective total and indigenous population, males clearly outnumber females. Countries having a sex ratio between 102 and 108 are Libya (108), Tunisia (104), Egypt (104), Mauritania (106), Gambia (104), Ghana (102), Ivory coast (103), Nigeria (102), Angola (104), Uganda (102), etc., and countries having low sex ratios are those bordering South Africa, Rodesia and Central African countries, because of male out-migration [6, pp. 63-64]. For Ethiopia, it is 104, and regional sex ratios range from about 99 to 115 as shown below:

Arsi	= 102	Illubabor	= 104
Bale	= 99	Kefa	= 102
Gondar	= 109	Showa	= 103
Eritrea	= —	Sidamo	= 105
Gamo Gofa	= 102	Tigray	= 103
Gojam	= 103	Wellega	= 99
Harerghe	= 106	Wello	= 115

The high sex ratio recorded for Gondar and Wello might have been affected by higher female migration rates to urban areas, or a high female mortality rate might have been prevailed during the 1970s. Otherwise, sex ratio normally gravitates around 100. Furthermore, sex ratio differentials by age for rural Ethiopia have been examined, as shown in Table 2.9. Regular patterns of sex ratios have not been withheld in the reported age groups, as can be seen in the Table, for the sex ratio is normally higher in the younger age groups, since the frequency of male births is higher than the female births. At advanced ages, males generally suffer from higher mortality conditions, and fall short of the number of females advancing in age. Hence, the distortions in the ratios of the reported age groups could mainly be attributed to age mis-statements, and the fluctuations are considerably graduated by the stable age structure model, as can be seen in the same Table.

TABLE 2.9

Recorded and adjusted sex ratio differentials for rural Ethiopia by age group

Age Group	Reported sex ratio	Adjusted sex ratio
0 – 4	101	104
5 – 9	109	106
10 – 14	130	106
15 – 19	117	107
20 – 24	77	106
25 – 29	77	105
30 – 34	87	106
35 – 39	107	106
40 – 44	100	104
45 – 49	120	101
50 – 54	107	101
55 – 59	169	95
60 – 64	125	88
65 +	156	52
Total	104	104

Source: Central Statistical Office, *The Demography of Ethiopia*, Vol. I, Addis Ababa, January 1974.

2.4 The household size and composition

The size of a household is the total number of members of a household. Table 2.10 summarizes the household composition of the rural population of Ethiopia. Adult males play a significant role as heads of households in the country.

TABLE 2.10

Percentage distribution of household composition of the rural population by sex

Household Composition	Male	Female	Total
Head of Household	38.7	5.7	22.6
Husband/Wife	0.0	39.4	19.3
Son/Daughter	52.7	43.7	48.3
Father/Mother	0.3	3.2	1.7
Brother/Sister	2.0	1.5	1.7
Other relatives	4.3	5.6	4.9
Employees of the household and others	2.0	0.9	1.5
Total	100.0	100.0	100.0

Source: Central Statistical Office, *The Demography of Ethiopia,* Vol. I, Addis Ababa, January 1974.

The proportion of male heads of households is about 39%, with an almost equivalent proportion of wives. Female heads of households consist of about 6% of all females. In Ethiopia, empirical evidence shows that heads of households are usually males, and the females who are reported as heads of their respective households may be those who have lost their husbands, that is, widowed or divorced women. The proportion of relatives in the household composition consists of about 5% (4% males and 6% females), indicating the existence of extended family formation in Ethiopia. The high proportions of children as sons and daughters (53% sons, 44% daughters and about 48% both sexes) are consistent with the age-sex structure discussed previously, and this is an indication of a youthful population which has been experiencing high fertility conditions.

The following shows the average size of households in the Administrative Region:

Region	Size of Household	Region	Size of Household
Arsi	4.6	Illubabor	3.7
Bale	4.2	Kefa	4.0
Gondar	4.7	Shewa	4.5
Eritrea	—	Sidamo	4.5
Gamo Gofa	4.1	Tigray	4.4
Gojam	4.8	Wellega	4.5
Harerghe	4.7	Wello	4.2
		Country	4.4

The average size of households in African countries is fairly high, ranging from 3.9 in Gabon and in the Central African Republic to 7.8 in Guinea Bissaw. It is about 5 for North and West Africa, and about 4 for Central, East and Southern African countries [6, pp. 63-64]. The average size of households for rural Ethiopia is, therefore, in consonance with the average size of households of the developing societies, ranging from 3.7 to 4.8. This index can possibly be explained by the prevalence of high fertility trends, greater prevalence of extended family formation and smaller frequency of bachelorhood formation of households. Household size is one of the important indicators of the level of social and economic modernization of a society, and tends to vary inversely with the level of economic development and level of living; that is, the higher the standard of living of a society, the smaller the average size of households tends to be [1, pp. 371-372].

2.5 Marital Status Compositon

The question on marital status was asked of all persons aged 10 years and over during the Second Round National Sample Survey. Table 2.11 shows the results concerning the marital status of the rural population of Ethiopia. The proportion of single persons ranges from about 28% in Illubabor to about 41% in Arsi and Tigray for males, and from 12% in Kefa to about 21% in Shewa for females. For married males, the proportion ranges from about 56% in Tigray to about 67% in Illubabor, whereas for married females, it ranges from about 59% in Tigray and to about 76% in Kefa. The proportions of widowed and divorced females together are consistently higher than those for males. The highest proportions of widowed and divorced females are recorded in the northern regions, including Gojam, and the same regions have recorded the lowest proportion of polygamy of all the rest (see Table 2.11). For the country as a whole, the proportion of single persons is about 36 for males and 17 for females; about 61% against 68% for married persons; widowed and divorced persons, added together, account for about 4% for males and about 15% for females. The proportion of males having had two or more wives accounts for about 10% of all married males.

TABLE 2.12

Percentage distribution of population 10 years and over by marital status, age and sex for the rural population

Marital Status	Sex	Age Group 10 Years and over													Total
		10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+	N.S.	
Single	M	100.0	93.1	48.5	12.5	3.1	1.0	0.7	0.4	0.3	0.3	0.4	3.0	24.2	35.5
	F	89.8	32.7	3.6	1.0	0.7	0.4	0.4	0.4	0.5	1.2	0.6	2.0	13.6	17.0
Married	M	—	5.9	46.7	82.6	92.7	95.4	95.4	95.6	95.2	94.6	93.7	87.7	64.8	60.9
	F	8.2	60.8	89.9	93.4	91.0	89.4	79.7	72.2	59.6	49.8	34.0	19.6	65.15	68.3
Widowed	M	0.0	0.1	0.6	1.0	0.9	1.4	1.9	1.9	2.4	3.1	3.7	8.5	3.4	1.4
	F	0.2	0.5	1.0	1.6	3.7	5.8	13.9	21.4	32.6	40.6	56.3	70.0	14.6	9.7
Divorced	M	0.0	0.9	3.9	3.7	3.3	2.2	2.0	2.1	2.0	1.8	2.1	3.0	4.8	2.1
	F	1.8	6.0	5.3	4.0	4.5	4.1	5.8	5.7	6.8	6.7	8.5	7.7	5.0	4.8
N.S.	M	0.0	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.2	2.8	0.1
	F	—	—	0.2	—	0.1	0.3	0.2	0.3	0.5	1.7	0.6	0.8	1.2	0.2

Source: Central Statistical Office, *The Demography of Ethiopia*, Vol. I, Addis Ababa, January 1974.

Age-specific percentage distribution of the marital status is also shown, in Table 2.12. The proportion of single males and females consistently decreases with increasing age, especially for females, and marriage seems to be universal, starting at age group 25 for males and at age 20 for females. The proportion of widowerhood increases with increasing age, especially for females, and the same is generally true of divorced persons starting at an early age for females.

3. THE POPULATION DYNAMICS OF THE RURAL POPULATION OF ETHIOPIA

3.1 Reported Fertility and Mortality Levels of Rural Ethiopia

The reported fertility and mortality levels of the rural population of Ethiopia have been derived from the questions asked on the following points:

(1) Children ever born and those surviving, to women in the childbearing ages;

(2) Children born to women in the childbearing ages during the last 12 months preceding the survey;

(3) Persons deceased in a selected household during the last 12 months preceding the survey.

Based on the responses to these questions, the reported fertility and mortality parameters[3] were obtained. The average number of children ever borne by a woman in her childbearing age, children surviving, and age-specific fertility rate of a woman are shown in Table 3.1. There is a general tendency of decline in the proportion of children ever born per woman, starting from the age group 50-54. This decline could possibly be attributed to memory lapse on the part of older women to recall the number of total children ever born alive up to the survey period. This estimate can at best be plausible up to the age group 45-49. Results show that about 68% of all children ever born alive to all women who completed their reporductive years survived and about 32% died. When the age-specific fertility rates in Table 3.1 are summed up, the recorded total fertility rate of rural Ethiopia was found to be, on average, about 5 per woman, after which she reaches her menopause; and, assuming a sex ratio at birth for rural Ethiopia to be 103 [11, pp. 73-75], the gross reproduction rate (number of daughters borne by women in the age group 15-49) per woman would be 2.5. The pattern of the age-specific fertility of the rural population is in conformity with the conventional age-specific fertility rates of other similar societies. The peak of the rate is in the age group 20 — 24, constituting about 25% of the total fertility range of the women. Beyond the age group 20-24, the age-specific fertility

rate declines. Here, the mean age of fertility schedule[4] is estimated to be 27.9. Empirically, we observe that early age at marriage is a common practice in rural Ethiopia. In view of this, the estimated mean age of the fertility schedule seems biased upward, possibly because of respondents' switching the age statement upward.

TABLE 3.1
Reported average number of childern ever born, surviving and age-specific fertility rate of a woman by age group

Age group of women	Ever born alive per woman	Surviving per woman	Percentage surviving	Age-specific fertility rate per woman	Age-specific fertility in percentage
15 – 19	.4416	.3759	85	.7265	14.2
20 – 24	1.6526	1.3544	82	1.2825	25.0
25 – 29	2.9190	2.2771	78	1.1770	22.0
30 – 34	3.9793	3.0076	76	.8390	16.4
35 – 39	4.7192	3.4879	74	.6675	13.0
40 – 44	4.9750	3.5487	71	.2845	5.5
45 – 49	5.2852	3.6094	68	.1535	3.0
50 – 54	4.9359	3.2152	65	–	–
55 – 59	4.9986	3.1326	64	–	–
60 – 64	4.8075	2.9095	61	–	–
65 – 69	4.4194	2.6953	61	–	–
70 – 74	4.7339	2.8214	60	–	–
75 +	4.4403	2.5152	57	–	–
Total	2.8935	2.0937	72	5.1295	100.0

Source: Compiled from Central Statistical Office, *The Demography of Ethiopia*, Vol. I, Addis Ababa, January 1974.

Age-sex specific death rates can also be examined in Table 3.2. Under normal conditions (that is, in the absence of war, drought, etc.), the age-specific death rates typically show a bimodel pattern, similar to a parabolic curve. The rate is usually high at infant ages, declines to the lowest at the age bracket 10—14 and rises at the advanced ages. This phenomenon is generally true for rural Ethiopia, except that there are some inconsistencies in the pattern. This fluctuating behaviour may possibly be due to misreporting of the age of the deceased, or in the denominator, or because of the numerous cells in the age groupings. Female mortality rates also seem to be higher than those of males, especially from the age group 45 and over. This may be due to reporting errors on the part of the female population.

TABLE 3.2

Reported age-sex specific death rates of the rural population of Ethiopia per 1,000 persons

Age group	Male age-specific death rate	Female age-specific death rate	Age-specific death rate for both sexes
0	88.0	91.0	90.0
0 – 4	34.0	31.0	32.0
1 – 4	22.0	17.0	19.0
5 – 9	6.0	5.0	6.0
10 – 14	4.0	4.0	4.0
15 – 19	3.0	5.0	4.0
20 – 24	4.0	6.0	5.0
25 – 29	2.0	6.0	4.0
30 – 34	5.0	7.0	6.0
35 – 39	3.0	5.0	4.0
40 – 44	7.0	7.0	7.0
45 – 49	8.0	11.0	7.0
50 – 54	7.0	10.0	8.0
55 – 59	9.0	13.0	11.0
60 – 64	80.0	23.0	22.0
65 – 69	21.0	20.0	20.0
70 – 74	36.0	48.0	41.0
75 – 79	24.0	31.0	26.0
80 +	58.8	70.3	63.8
N.S.	215.0	193.0	204.0
Total	12.0	12.5	12.3

Source: Central Statistical Office, *The Demograph of Ethiopia*, Vol. I, Addis Ababa, January 1974.

Furthermore, the results of the questions asked on live births and deaths during 12 months preceding the survey period can indicate the extent of the levels and differentials of fertility and mortality conditions of the country. Table 3.3 shows the main measures of fertility and mortality conditions that could be compiled from the results of live births and deaths collected through the survey. The Table shows differentials in fertility and mortality conditions among the regions of the country. The fertility parameters for Bale, Gamo Gofa, Hararghe and Sidamo seem to be plausible, whereas the parameters for other regions, especially for Illubabor, Wellega and Wello are deemed unrealistic in view of the fertility experience of other developing societies. With regard to mortality conditions, the parameters are significantly low and generally reflect the mortality conditions of a developed society, except in Kefa and, to some extent, in Bale, where the crude death rates are about 22 and 18 per 1,000 persons respectively. However, the rate of natural increase, a resultant of the crude birth and death rates, is generally plausible, in all the regions, except in Arsi (1.7%), Illubabor (1.4%) and Kefa (1.7%).

TABLE 3.3

Measures of fertility and mortality conditions of Ethiopia, by region

Region	General fertility rate	Total fertility rate	Gross reproduction rate	Crude brith rate	Crude death rate	Infant mortality rate	Child mortality rate	Rate of natural increase
Arsi	176.0	5.2	2.6	37.7	10.6	56.0	27.4	17.1
Bale	196.0	5.8	2.8	43.5	18.0	128.0	62.7	25.5
Gondar	168.0	5.2	2.5	37.7	10.4	51.0	28.0	27.3
Eritrea	—	—	—	—	—	—	—	—
Gamo Gofa	199.0	6.2	3.0	49.3	16.1	83.0	35.4	33.2
Gojam	173.0	5.3	2.6	37.6	13.7	85.0	35.6	33.9
Harerghe	213.0	6.2	3.0	46.5	9.7	57.0	19.6	37.8
Illubabor	106.0	3.3	1.6	28.7	14.5	69.0	31.0	14.2
Kefa	154.0	4.7	2.3	39.3	22.0	137.0	73.0	17.0
Shewa	131.0	4.9	2.4	35.0	10.0	43.0	28.0	25.0
Sidamo	174.0	5.7	2.8	42.4	15.3	70.0	38.0	27.1
Tigray	172.0	5.3	2.6	38.3	7.9	46.0	23.0	30.4
Wellega	125.0	4.6	2.2	34.8	13.1	50.4	34.7	21.7
Wello	133.0	3.9	2.0	33.0	9.0	55.0	28.8	23.0
Country	167.7	5.1	2.5	38.2	12.3	90.0	32.0	25.9

Source: Compiled from Central Statistical Office, *The Demography of Ethiopia*, Vol. I, Addis Ababa, January 1974.

According to the available data, the crude birthrate of African countries ranges from 33 in Gabon to 52 in Niger, and most of the countries have rates that range from 42 to 51, with a modal of 45-49, while estimates of crude death rate for rural and urban Africa combined together also show a range of 14-27, with a modal value of 20-25; average infant mortality rate is about 150 per 1,000 live births [6, pp. 11-19, 25-29, 63-64] But the reported crude birth rate (38.2), crude death rate (12.3) and infant mortality rate (90) for Ethiopia fall short of the averages for African countries.

Some measures of fertility and mortality conditions of some selected countries of the world are shown in Table 3.4 for comparison. The crude birthrate and general fertility rate of the developing countries are at least three times higher than those in developed countries. The crude death rates and infant mortality rates are also higher by at least twice, and are generally eight to ten times higher than those prevailing in the developed countries. In the same Table it can be seen that very successful measures of reducing infant mortality conditions have been taken in the developed societies of the world. The reported low level of fertility and mortality conditions, especially the crude birth rate, crude death rate and infant mortality rate of rural Ethiopia can mainly be explained by the inaccuracies of the quality of data on fertility and mortality.

TABLE 3.4

General fertility, crude birthrate, crude death rate, infant mortality rate and rate of natural increase of some selected countries (around 1970-1975)

Country	Crude birth rate	General fertility rate	Crude death rate	Infant mortality rate	Rate of natural increase
Ethiopia*	38.2	167.7	12.3	90.0	25.9
Egypt	35.5	189.3	12.4	100.4	23.1
Gabon	32.2	115.6	22.2	229	10.0
Ghana	48.8	203-224	21.9	156	26.9
Guinea	46.6	227.8	22.9	216	23.7
Nigeria	49.3	217.8	22.7	–	26.6
Uganda	45.2	187	15.9	160	29.3
Tanzania	47	217	22	160-165	25
India	34.5	136.4	14.4	122	20.1
Mexico	42.0	198.8	8.6	49.7	33.4
Ghina	26.9	112.5	10.3	–	16.6
Cuba	20.7	89.8	5.4	27.3	15.3
USSR	18.1	55.5	4.3	27.7	8.8
Bulgaria	16.5	67.9	10.0	23.2	6.4
Poland	19.5	71.3	8.9	23.8	10.6
USA	14.7	58.5	8.9	15.1	5.8
France	13.6	72.0	10.5	10.3	3.1
UK	12.1	55.7	12.2	14.3	−0.1
Sweden	11.9	56.4	11.0	8.7	0.9
GDR	10.8	45.3	14.3	15.8	− 3.5
GFR	9.8	41.3	11.9	19.8	− 2.1

Source: UN *Demographic Year Book 1976*, * Table 18

3.2 Adjusted Estimates of Fertility and Mortality Levels

The ratio of the average parity (p) to the cumulated age specific rate (F) of females in the age group 20-24 is applied as a correction factor to adjust the total fertility rate and other current fertility rates, like the crude birth-rate and the age-specific fertility rates. Brass made the choice of the age group 20-24 on the assumptions that in this age group only a small proportion of the women who entered the reproductive period have died, the possible effect of a differential fertility of the dead is slight, and a great majority of the births to women aged 20-24 years will have taken place within a few years of the census or survey [2, pp. 99, 123,349]. The Coale Demeny Stable Population Model is also applied for selecting model life tables for estimating mortality and fertility levels. It provides four family life tables (East, South, West and North). There is a problem in selecting a model life table which fits the population in question for countries which, like Ethiopia, do not possess the intercensal population growth rates and reliable gross reproduction rates. However, Brass suggested that there is some rationale for accepting the West model as a best guess of the prevalent

patterns of mortality for any population in the absence of contrary evidence, and, alternatively, at moderately high levels of mortality (such as is found in African populations), estimates of birth and death rates based on North model tables are little different from the West family ... [2, p. 123]. Furthermore, Brass contended that the mortality level implied in the first two years of life can reliably represent other mortality measures, because it is derived from the retrospective reports on children dead from the age groups of mothers (20-24 years) whose experience is most recent and reliable (numbers for mothers aged 15-19 are too small); the relationship to death rates at later ages is more consistent from population to population for mortality under 2 years than under 1; and the proportion surviving to age 2 is a guide for the selection of an age distribution in stable population models [2, p. 349]. Thus the adjusted estimates of fertility and mortality levels, as depicted by the West model life table (level 11) and derived by Brass techniques for rural Ethiopia, are shown in Table 3.5.

TABLE 3.5

Estimates of fertility and mortality measures for rural Ethiopia, for both sexes

Parameters	Reported	Adjusted	
		Brass Method	Stable Population Model
Crude birth rate	38.2	42.8	44.7
General fertility rate	167.7	188.0	–
Total fertility rate	5.1	5.8	6.2
Gross reporduction rate	2.5	2.8	3.0
Crude death rate	12.3	–	19.8
Infant mortality	90	135.0	–
Child mortality rate	32.0	247.0	–
Live expectancy at birth	–	–	43.5
Rate of Natural Increase	25.9	–	24.9

Source: Compiled from Central Statistical Office, *The Demography of Ethiopia*, Vol. I, Addis Ababa, January 1974.

Recent data on fertility and mortality conditions were also collected by the Ministry of Agriculture through its Agricultural Sample Survey carried out during 1977/78. The Survey covered about 5,000 peasant households, consisting of about 20,000 population. The reported and adjusted estimates of fertility and mortality levels, applying Brass technique and West Stable Population Model (level 11.7), are given in Table 3.6. The reported general fertility, total fertility, crude death and infant mortality rates are relatively more plausible than those obtained from the Second Round National Sample Survey. However, reported crude birth and childhood mortality rates seemed under-reported during the Agricultural Sample Survey, too.

TABLE 3.6

Reported and adjusted estimates of fertility and mortality measures for rural Ethiopia, 1977-78

Parameters	Reported	Adjusted	
		Brass Method	Stable Population Model
Crude birth rate	37.9	48.6	50.4
General fertility rate	174.4	223.4	231.9
Total fertility rate	5.5	7.1	
Gross reproduction rate	2.7	3.5	
Mean age of fertility schedule (m)	29.6	–	29.6
Crude death rate	17.7	–	19.1
Infant Mortality rate	156.0	174.4	–
Child mortality rate	62.3	236.1	–
Life expectancy at birth ($e\delta$)	–	–	45.1
Rate of natural increase	20.2	–	31.4

In the light of the base data information and the available techniques of adjustments for defective and incomplete data, the fertility and mortality conditions of rural Ethiopia could be summarized as follows:

Crude birth rate:	43 – 50
General fertility rates:	188 – 232
Crude death rate:	19 – 20
Total fertility rate:	6 – 7
Gross reproduction rate:	3 – 4
Infant mortality rate:	155 – 175
Child mortality:	236 – 247
Expectation of life	44 – 45
Rate of Natural Increase	24 – 30

3.3 Population Movements in Rural Ethiopia

In the Second Round National Sample Survey, only temporary absence from the usual place of residence and reasons for absence during the 12 months preceding the survey, were asked. The information collected cannot show migration trends, levels and patterns. It can at best throw some light on the temporary sesonal mobility of the population. Table 3.7 can give some idea of the movements of the rural population. About 13% of the surveyed rural population was subject to mobility. In the 1970s, the regions which indicated a high percentage of out migration from the usual place of residence were Shewa (19%), Tigray (27%), Wellega (9%), Wello (9%) and Kefa (9%); whereas those regions which gained population were Addis Ababa (22%), Gondar (14%), Harerghe (12%) and Eritrea (10%). The inter-regional movements and mobility to Addis Ababa may have been largely motivated

TABLE 3.7

Number and percentage of population absent during the per survey period by region of origin and destination

Region	Origin of the absent population		Destination of the absent population	
	number	percent	number	percent
Arsi	2,800	2.3	1,300	1.1
Bale	1,800	1.4	4,200	3.5
Gondar	2,700	2.3	17,001	14.3
Eritrea	—	—	12,100	10.1
Gamo Gofa	400	0.3	3,910	3.3
Gojam	3,500	2.9	4,130	5.5
Harerghe	916	0.8	14,550	12.2
Illubabor	3,220	2.7	9,370	7.9
Kefa	10,275	8.6	5,400	4.5
Shewa	34,680	29.1	1,810	1.5
Sidamo	5,400	4.5	1,320	1.1
Tigray	31,900	26.8	800	0.7
Wellega	11,130	9.3	1,840	1.5
Wello	10,560	8.9	3,000	3.0
Addis Ababa	—	—	26,585	22.3
N.S.	—	—	10,195	8.5
Abroad	—	—	1,250	1.0
Total	119,281	100.0	119,281	100.0

Source: Central Statistical Office, *The Demography of Ethiopia*, Vol. I, Addis Ababa, January 1974.

by the differentials of commercial activities, commercialized agricultural sectors, etc., existing in the country, as could partly be learnt from the reasons for being absent shown in Table 3.8. A significant proportion of the mobility was motivated by trading in commodities other than the cash crop (31% for males and 16% for females); and labour (type of work not known) contributed about 37% (36% for males and 58% for females) of all reasons for being absent from the usual places of residence. These persons might have intended to settle in some of the urban areas of the country, for there is evidence from the results of the First and Second Rounds National Sample Surveys that rural Ethiopia has been losing about 100,000 persons annually to the urban areas of the country, and the urban growth rate due to migration (rural-urban) has been estimated to be about 0.4% per annum during the 1970s [3, p. 1].

TABLE 3.8

Number of population absent during the 12 months preceding the survey by sex and reason for absence

Reason for absence	Male		Female		Total	
	no.	%	no.	%	no.	%
To cultivate or pick own coffee	7,895	6.9	200	4.4	8,995	6.8
To cultivate or pick own cotton	400	0.3	–	–	400	0.3
To cultivate or harvest own crop	4,785	4.2	300	6.6	5,085	4.2
To graze own livestock	3,400	3.0	–	–	3,400	2.9
To trade in coffee	4,940	4.3	–	–	4,940	4.1
To trade in commodities other than coffee	35,786	31.2	710	15.8	36,496	30.6
Employment as coffee picker	5,650	4.9	200	4.4	5,850	4.9
Employment as cotton picker	1,310	1.1	–	–	1,310	1.1
Employment as sugarcane harvester	500	0.5	100	2.2	660	0.6
As a labourer (type of work not known)	41,605	36.3	2,620	57.8	44,225	37.1
Not stated	8,420	7.3	400	8.8	8,820	7.4
Total	114,751	100.0	4,530	100.0	119,281	100.0

4. CONCLUSION

Ethiopia is one of the few countries of the world which are statistically undeveloped. In the field of population studies, it has neither carried out even a single population census nor established a vital statistics registration system. Basic population information can contribute to the effective implementation of the programmes of the National Democratic Revolution of Socialist Ethiopia. At present, the availability of population data in the country is not only scanty but also defective. Nevertheless, in the light of the existing data with some adjustments, attempts have been made in this paper to examine the demographic situation of rural Ethiopia.

The Ethiopian population is predominantly rural. Agglomerations of 2,000 and over inhabitants are estimated to constitute about 13% of the total population of the country. In view of the high proportion of localities with 20,000 and over inhabitants (62%), and city population with 100,000 and over inhabitants (41% for Addis Ababa and Asmara only) out of all localities with 2,000 and over inhabitants, the population in the non-agricultural sector resides in a few towns, and Ethiopia can be said one of the least urbanized countries.

As regards the dynamics of population, the estimates of the vital rates can sufficiently indicate that rural Ethiopia has been experiencing high levels of fertility and mortality conditions in the recent years: the crude birth rate ranges 43-50; the general fertility rate, 188-232; the total fertility

rate, 6-7; and the gross reproduction rate, 3-4. These rates are typical of an agrarian society. On the other hand, the annual mortality levels, as revealed by the crude death rate, ranges 19-20; the infant mortality rate, 155-175; the child mortality rate, 236-247; and the average life expectancy at birth of 44-45 years can sufficiently reflect the low level of living which has been prevailing in the country.

In the statistics of vital rates of developed societies, it can be observed that fertility and mortality conditions have inverse relationships with the level of socio-economic advancement, that is, the higher the socio-economic development, the lower the fertility and mortality trends tend to be. In the case of Ethiopia, there have not been any favourable conditions that could have had depresent effects on the fertility and mortality levels. In the Ethiopian society, marriage is an almost universal practice, and early age at marriage for females is a common practice in all the Ethiopian regions, ranging from about 14 years in Gondar and Wello, to about 18 years in Wellega [4, p. 21]. These factors usually favour high fertility conditions. Furthermore, in an agrarian society like Ethiopia, the birth of a child is valued as an asset, a guarantee of protection in old age, and since there exists a high infant mortality rate, parents tend to produce more children to get some survivors. Little provision of social, economic and political opportunities for women is also one of the important factors favouring high fertility trends. On the other hand, in an agrarian society where there has been less modern technology, and inadequate health facilities, mortality tends to be on the higher side. Epidemic diseases such as malaria, yellow fever, smallpox, leprosy, tuberculosis, cholera and other serious debilitating diseases, insufficient maternal care, serious nutritional problems, insanitary housing and inadequate water supply system have been rampant in the developing societies. The manifestations of these factors are, then, high mortality rates as implied in crude death rate, infant and childhood mortality rates and the low expectation of life.

Programmes of short- and long-term nature, attempting to improve the level of living conditions of the society by better nutritional levels, health facilities, education, better housing, water supply, etc., can have an immediate impact in reducing mortality conditions of a society. Nevertheless, due to well established customs, beliefs and institutions in a developing society, like Ethiopia, a decline in fertility rates would take place gradually, for there is a growth potential inherent in the age structure of the population, and the prevailing high fertility level would remain constant for some decades.

Prospects of population growth of rural Ethiopia, therefore, would be immense. At the rate of natural increase of between 2.4% and 3.0% per annum, the population would double in a matter of 24-29 years, whereas the doubling periods for Africa at the rate of 2.5%, and for Europe, U.S.A., USSR and other developed countries whose population have recently been growing at the rate of about 1% per annum, would be about 28 and 70 years respectively.

Hence, with regards to the population problems the N.D.R. programmes will face three main challenging questions:

1. How to reduce the high mortality conditions prevailing in the country;

2. How to meet the demands of the rapidly growing population;

3. How to mobilize Ethiopian women to participate in the social, economic and political life of the nation, in order to create favourable conditions for future fertility reduction.

NOTES

1. In the Sixth Conference of African Statisticians, "Size and Growth of urban population in Africa", the following definitions have been adopted:

   (a) Urban population: population in towns with 20,000 and more inhabitants.

   (b) City population: population in cities with 100,000 and more inhabitants.

   (c) Big city population: population in cities with 500,000 and more inhabitants.

2. Under normal demographic conditions (that is, in the absence of war, drought, abnormal international migration, etc.,), the age structure of the population of a society exhibits a gradual decline from the young age bracket to the advanced ages, manifesting a graph similar to a finite asymptotic curve.

3. (a) Crude birth : number of births that occur during one year per 1000 persons.

   (b) General fertility rate: number of births that occur during one year per 1000 women in the reproductive ages 15-49.

   (c) Age specific fertility rate: number of births that occur during one year per women by age group (usually 5-year age interval) of women in the age group 15-49.

   (d) Total fertility rate: average number of births that a woman has when passing through her reproductive years 15-49, that is, the sum of age-specific fertility rates.

   (e) Gross reproduction rate: sum of age-sepcific birth rate of women aged 15-49, restricted to female births only, usually expressed as rate per woman.

   (f) Crude death rate: number of deaths that occur during one year per 1000 persons.

(g) Infant mortality rate: number of deaths of infants aged under one year that occur during one year per 1000 live births.

(h) Child mortality rate: number of deaths of children aged 0-4 that occur during one year per 1000 children in the age group 0-4.

4. The mean age of fertility schedule of the women can be estimated by relating the age-specific fertility rate with the mid-point of each age group of the women, as follows:

$$\bar{m} = \frac{\Sigma wi\ fi}{\Sigma\ fi}$$

where $\bar{m}$ = mean age fertility schedule

wi = the mid-point of the age of women at the ith age group

fi = the frequency of births at the ith age group of women

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