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1.1 Introduction

The population is an important resource for development. It is a resource for labour supply for production as well as consumption of various products. Hence the size of a population is one of the important parameters for economic development. At the same time the growth of population increases demands for food, water, energy and other natural resources, and increases consumption of natural resources. It thus leads to a danger of destruction of environment. The growth and distribution of the population also determines the demand for essential social services, such as education, health, water, transport and housing. To maintain sustainable economic development, improve well being of people and reduce poverty in a society as well as to maintain environment, population growth should be kept at an appropriate level.

It is important to assess the size and distribution of population and trends in the population growth. This chapter will analyse the trends and distribution of population in Tanzania based on the 2002 population and housing census and the previous censuses.

1.2 Size and Growth of the Total Population

The total population of Tanzania enumerated in the 2002 Population and Housing Census was 34.4 million, of which 33.5 million or 97.1 percent were in Tanzania Mainland and 982,000 or 2.9 percent in Tanzania Zanzibar.

The total population almost tripled during 35 years between 1967 and 2002. During the most recent inter-censal period of 14 years from 1988 to 2002, the total population increased from 23.1 million in 1988 to 34.4 million in 2002, an increase of 11.3 million or 49.1 percent. The average annual rate of growth during this period was 2.9 percent.

By area, the trend was the same in Tanzania Mainland as All Tanzania, namely a decline from 3.2 percent for the period 1967-1978 to 2.8 percent for the period 1978-1988, then a slight increase to 2.9 percent for the period 1988-2002. But in Tanzania Zanzibar a different trend in the growth rate was observed. The growth rate continued to increase from 2.7 percent for the period 1967-1978 to 3.0 percent for the period 1978-1988 and further to 3.1 percent for the period 1988-2002.

A reason for a slight rise in the average annual increase rate of the total population is the influx of over 370 thousands refugees from the neighbouring countries during the period 1988-2002. Due to lack of reliable vital statistics in this country, it is difficult to assess the impact of changes in fertility and mortality on the population growth rate during the period.

Table 1.1 Total Populations at the Censuses of 1967, 1978, 1988 and 2002

	Tanzania Total	Tanzania Mainland	Tanzania Zanzibar
Total population			
1967	12,313,469	11,958,654	354,815
1978	17,512,610	17,036,499	476,111
1988	23,095,882	22,455,207	640,675
2002	34,443,603	33,461,849	981,754
Increase			
1967-1978	5,199,141	5,077,845	121,296
1978-1988	5,583,272	5,418,708	164,564
1988-2002	11,347,721	11,006,642	341,079
Average annual rate of increase (%)			
1967-1978	3.20	3.22	2.67
1978-1988	2.77	2.76	2.97
1988-2002	2.85	2.85	3.05

Source The United Republic of Tanzania Population and Housing Censuses, 1967, 1978, 1988 and 2002.

1.3 Geographical Distribution

1.3.1 Regional Population

Table 1.2 gives regional populations at the censuses of 1988 and 2002 and their changes during the inter-censal period 1988-2002.

Of 26 regions (21 in Mainland and 5 in Zanzibar), there are 5 regions with population of over 2 million in 2002. The region with the largest population is Mwanza (2.9 million), followed by Shinyanga (2.8 million), Dar es Salaam (2.5 million), Mbeya (2.1 million) and Kagera (2.0 million). Populations of these 5 regions in total accounted for 36 percent of the total population. The next group of regions with population of 1.5 to 2 million includes 5 regions: Morogoro (1.8 million), Tabora (1.7 million), Dodoma (1.7 million), Kigoma (1.7 million) and Tanga (1.6 million). There are 9 regions with population of 1 to 1.5 million. All of these 19 regions with population over one million are located in Tanzania Mainland.

During the 14-year period from 1988 to 2002, the population of Tanzania increased by 11.3 million from 23.1 million to 34.4million, an increase of 49 percent over the period. By region, the population increase over the period ranged from 24,000 persons in South Unguja Region, an increase of 34 percent, to 1.1 million persons in Dar es Salaam Region, an increase of 83 percent. Populations of Mwanza and Shinyanga also have increased by more than one million persons.

Regions whose population change was between a half million and one million persons include 6 regions: Kigoma, Kagera, Tabora, Mbeya, Arusha and Morogoro. Arusha and Mbeya.

Table 1.2 Population by Region: 1988 and 2002

Region	Population		Increase 1988 - 2002		
	1988	2002	Increase	Rate (%)	Average annual rate (%)
Tanzania	23,095,882	34,446,603	11,350,721	49.1	2.9
Tanzania Mainland	22,455,207	33,461,849	11,006,642	49.0	2.8
Dodoma	1,235,327	1,692,025	456,698	37.0	2.2
Arusha	(a) 744,135	1,288,088	(a)	(a) 73.1	(a) 3.9
Kilimanjaro	1,104,673	1,376,702	272,029	24.6	1.6
Tanga	1,280,212	1,636,280	356,068	27.8	1.8
Morogoro	1,220,564	1,753,362	532,798	43.7	2.6
Pwani	636,103	885,017	248,914	39.1	2.4
Dar es salaam	1,360,865	2,487,288	1,126,423	82.8	4.3
Lindi	646,494	787,624	141,130	21.8	1.4
Mtwara	889,100	1,124,481	235,381	26.5	1.7
Ruvuma	779,875	1,113,715	333,840	42.8	2.5
Iringa	1,193,074	1,490,892	297,818	25.0	1.6
Mbeya	1,476,278	2,063,328	587,050	39.8	2.4
Singida	792,387	1,086,748	294,361	37.1	2.3
Tabora	1,036,150	1,710,465	674,315	65.1	3.6
Rukwa	698,718	1,136,354	437,636	62.6	3.5
Kigoma	856,770	1,674,047	817,277	95.4	4.8
Shinyanga	1,763,800	2,796,630	1,032,830	58.6	3.3
Kagera	1,313,594	2,028,157	714,563	54.4	3.1
Mwanza	1,876,635	2,929,644	1,053,009	56.1	3.2
Mara	946,418	1,363,397	416,979	44.1	2.6
Manyara	(b) 604,035	1,037,605	(b)	(b) 71.8	(b) 3.9
Tanzania Zanzibar	640,675	981,754	344,079	53.7	3.1
North Unguja	96,989	136,639	39,650	40.9	2.5
South Unguja	70,313	94,244	23,931	34.0	2.1
Urban West	208,571	390,074	181,503	87.0	4.5
North Pemba	137,179	185,326	48,147	35.1	2.1
South Pemba	127,623	175,471	47,848	37.5	2.3

Source: The United Republic of Tanzania Population and Housing Censuses, 1988 and 2002.

Note: Manyara Region was a part of Arusha Region at the time of the 1988 census.

- (a) The 1988 population of Arusha is the 1988 population within the 2002 boundary of Arusha. The population increase in 1988-2002 is the increase in the period within the 2002 boundary of Arusha.
- (b) The 1988 population of Manyara Region is the 1988 population within the 2002 boundary of Manyara. The population increase in 1988-2002 is the increase in the period within the 2002 boundary of Manyara.

For the inter-censal period 1988-2002, there were substantial variations in the rates of population increase between regions. Kigoma had the highest inter-censal growth rate. Its population almost doubled during the 14 years, an increase of 95 percent or 4.8 percent per annum. The regions with the next highest growth rates are Urban West (an increase of 87 percent or 4.5 percent per annum) and Dar es Salaam (an increase of 83 percent or 4.3 percent per annum). Arusha and Manyara also had very high growth rates: 73 percent or 3.9 percent per annum and 72 percent or 3.9 percent per annum.

Table 1.3 shows a list of regions by level of average annual growth rates for the period 1988-2002. Map 1.1 presents a map showing average annual growth rates by region for the period 1988-2002.

Table 1.3 List of Regions by Level of Average Annual Growth Rates for the Period 1988-2002

Annual growth rate	Number of regions	Region
4.0% and above	3	Kigoma (4.8%), Urban West (4.5%), Dar es Salaam (4.3%)
3.5-3.9%	4	Arusha (3.9%), Manyara (3.9%), Tabora (3.6%), Rukwa (3.5%)
3.0-3.4%	3	Shinyanga (3.3%), Mwanza (3.2%), Kagera (3.1%)
2.5-2.9%	4	Mara (2.6%), Morogoro (2.6%), North Unguja (2.5%), Ruvuma (2.5%)
2.0-2.4%	7	Mbeya (2.4%), Pwani (2.4%), Singida (2.4%), South Pemba (2.3%), Dodoma (2.2%), North Pemba (2.1%), South Unguja (2.1%)
Below 2.0%	5	Tanga (1.8%), Mtwara (1.7%), Iringa (1.6%), Kilimanjaro (1.6%), Lindi (1.4%)

Source: The United Republic of Tanzania Population and Housing Censuses, 1988 and 2002.

As seen from Table 1.3 and Map 1.1, average annual rates of population increase by region for the period 1988-2002 reveal a perceivable growth pattern, which divides Tanzania into roughly three zones, namely western, central and eastern zones stretching north to south. Regions with annual growth rate above national growth rate of 2.9 percent, with the exception of Dar es Salaam, Urban West, Arusha and Manyara, are located in the western part of the country. These regions include Kigoma, Tabora, Rukwa, Shinyanga, Mwanza and Kagera all of which population grew at more than 3.0 percent per annum. The regional growth rates tend to get lower as one moves east. The regions with annual growth rates ranging from 2.2 percent to 2.6 include Mara, Ruvuma, Mbeya, Singida, Pwani and Dodoma. Apart from Mara and Pwani the other four regions are in central zone. With the exception of Dar es Salaam and Urban West regions which experienced growth rates above 3.0 percent, the remaining regions located in the eastern part of the country had annual growth rates below 2.0 percent. These regions are Tanga, Mtwara and Lindi. Other regions in this category are Iringa and Kilimanjaro regions.

High population growth rates in the regions in the western part of the country are due to inflow of refugees from neighbouring countries. A very high growth rate of Kigoma Region is mainly due to inflow of refugees from Burundi and the Republic of Congo. According to Kigoma Regional Planning Officer's records there were a total of about 371,000 refugees in the region. The United Nation High Commission for Refugees (UNHCR) also estimated the number of refugees in Kigoma region at the time of the census at about 376,000.

Other regions with significant contribution of refugee flows in their population are Kagera and Rukwa. The share of refugees in the growth rate of the population of Kagera region was estimated at 14 percent. The population growth rate of Rukwa Region is significantly influenced by refugee flows from Burundi, DRC, and Rwanda. However, for quite sometime refugees have dominated the population of Rukwa Region, especially the population of Mpanda district, where – according to the Rukwa regional administration – their proportion in the population at the time of the 1988 census was more than 50 percent. In 2002 this proportion declined to 24 percent. Since most of the refugees were counted in the 1988 census refugee flow had minimal influence on the growth of the region's population. Given their

share in the region's population the refugees' contribution to population growth, during the 1988-2002, was through fertility which, would not have been realised if there were no refugees in the region. At the same time the Rukwa Region administration recognizes the existence of undocumented refugees living outside official refugee residences at Katumba and Mishamo in Mpanda district, and the number of such refugees is yet to be known until special count of refugees planned by the region is undertaken in the near future. Most of the undocumented refugees live along Lake Tanganyika coast mingled among citizens and many of them have either given themselves up to authority or been apprehended.

Tabora and Shinyanga Regions being close to Kigoma region may be experiencing the same phenomenon whereby refugees run away from camps and live among citizens. This is due to the difficulty of explaining the high population growth rate of the region by natural increase and inter-regional migration alone.

There are number of regions with very high population growth rates of over 3.0 percent that do not experience significant refugee flows. These regions include Urban West, Dar es Salaam, Arusha, Manyara, Tabora, Rukwa, Shinyanga, and Mwanza. The factors behind the phenomenal growth rates are related to inter-regional migration and natural increase in the population. With regard to inter-regional migration, factors which can be considered to have influenced positively population growth rates in these regions include new economic opportunities related to growth of non-agricultural activities, especially the expansion of mining activities with the opening of large and small scale gold mining in Shinyanga, Mwanza, and Tabora Regions, and expansion of gem-stone mining and the growth of tourist activities in Arusha and Manyara Regions; and the attraction of prime urban area including the City of Dar es Salaam and Urban West in Zanzibar.

Table 1.4 compares the average annual rate of population increase by region for the inter-censal periods of 1967-1978, 1978-1988 and 1988-2002.

Ten regions out of 26 regions experienced an increase in their growth rates. These regions recorded increase in their growth rates ranging from 0.1 percent point to 2.0 percent points. The population growth rate of Kigoma increased from 2.8% to 4.8%, an increase of 2.0 percent points, and the growth rate of Tabora from 2.4% to 3.6%, by an increase of 1.2 percent points.

The average annual population growth rates for the period 1988-2002 were lower than growth rates for the period 1978-1988 in 15 regions. These regions recorded reduction in their growth rates ranging from 0.1 percent point to 1.0 percent point. Iringa experienced a reduction in its population growth rate from 2.6% to 3.6% by 1.0 percent point, South Unguja from 3.1% to 2.1%, a reduction of 1.0 percent point, Rukwa from 4.4% to 3.5%, a reduction of 0.9 percent point.

**Table 1.4 Average Annual Rates of Population Increase for the Inter-censal Periods
1967-1978, 1978-1988 and 1988-2002, by Region**

Region	Average annual rate of increase (%)			Difference in annual rates	
	1967-1978	1978-1988	1988-2002	(1)	(2)
Tanzania	3.2	2.8	2.9	-0.4	0.1
Tanzania Mainland	3.2	2.8	2.8	-0.5	0.1
Dodoma	2.9	2.4	2.2	-0.5	-0.2
Arusha	3.8	3.8	3.9	0.0	0.2
Kilimanjaro	2.9	2.0	1.6	-0.9	-0.4
Tanga	2.7	2.1	1.8	-0.6	-0.3
Morogoro	2.9	2.6	2.6	-0.3	0.0
Pwani	1.7	2.1	2.4	0.4	0.3
Dar es Salaam	7.8	4.8	4.3	-3.0	-0.5
Lindi	2.1	2.0	1.4	0.0	-0.6
Mtwara	2.0	1.4	1.7	-0.6	0.3
Ruvuma	3.2	3.3	2.5	0.1	-0.7
Iringa	2.7	2.5	1.6	-0.1	-1.0
Mbeya	3.3	3.1	2.4	-0.1	-0.7
Singida	2.7	2.6	2.3	-0.1	-0.3
Tabora	4.4	2.4	3.6	-2.1	1.2
Rukwa	4.5	4.4	3.5	-0.1	-0.9
Kigoma	2.9	2.8	4.8	-0.1	2.0
Shinyanga	3.5	2.9	3.3	-0.6	0.4
Kagera	3.9	2.6	3.1	-1.3	0.5
Mwanza	2.8	2.6	3.2	-0.2	0.6
Mara	2.6	2.7	2.6	0.1	-0.1
Manyara	-	-	3.9		
Tanzania Zanzibar	2.7	3.0	3.1	0.3	0.1
North Unguja	2.8	2.3	2.5	-0.5	0.1
South Unguja	2.6	3.1	2.1	0.5	-1.0
Urban West	3.7	3.8	4.5	0.2	0.6
North Pemba	3.5	2.6	2.1	-1.0	-0.4
South Pemba	0.6	2.5	2.3	1.9	-0.3

Source: Computed from the census data in the United Republic of Tanzania Population and Housing Censuses, 1967, 1988 and 2002.

Note: Difference (1) is differences in growth rates for the period 1978-1988 and the growth rates for the period 1967-1978.

Difference (2) is differences in growth rates for the period 1988-2002 and the growth rates for the period 1978-1988.

1.3.2 District Population

Dealing with district population growth is complicated by the creation of new districts at various times since 1967 when the first post independence population and housing census was taken. The number of districts has increased from 85 in 1967 to 129 in 2002.

During the inter-censal period 1988/2002 alone 34 districts changed their boundaries through the creation of 16 new districts.

In order to avail all districts with information on district population growth, the inter-censal district annual growth rates for the period 1988-2002 were determined by using 2002 district boundaries to arrive at 1988 district population for districts which changed boundaries – with the assumption that wards change boundaries within the district.

Populations of 1988 and 2002 and average annual rates of population increase during the period 1988-2002 by district are shown in Annex Table 1.A at the end of Chapter 1.

There are considerable variations in the size of population of districts. In the 2002 census, the district with the largest population was Kinondoni District of Dar es Salaam Region with population of 1,083,913 and the smallest is South District of South Unguja Region with population of 31,853. Ten districts with largest population and 10 districts with smallest population are listed in Table 1.5.

Table 1.5 10: Largest Districts and 10 Smallest Districts in 2002

10 districts with largest population				10 districts with smallest population			
District	Region	Population		District	Region	Population	
1	Kinondoni	Dar es-Salaam	1,083,913	1	South	South Unguja	31,853
2	Temeke	Dar es-Salaam	768,451	2	Mafia	Pwani	40,557
3	Geita	Mwanza	709,078	3	Lindi Urban	Lindi	41,075
4	Ilala	Dar es-Salaam	634,924	4	Pangani	Tanga	43,920
5	Kasulu	Kigoma	626,742	5	North B	North Unguja	52,492
6	Bariadi	Shinyanga	603,604	6	Central	South Unguja	62,391
7	Kahama	Shinyanga	594,891	7	Liwale	Lindi	75,128
8	Arumeru	Arusha	514,651	8	Bukoba Urban	Kagera	80,868
9	Mbozi	Mbeya	513,600	9	Chakechake	South Pemba	82,998
10	Sengerema	Mwanza	498,993	10	Micheweni	North Pemba	83,266

Source: Annex Table 1.

Table 1.6 below gives distribution of districts by size class of population in 1988 and 2002. From this table it will be observed that there was a considerable increase in the number of districts with large populations.

Table 1.6. Number of Districts by Population Size Class: 1988 and 2002

Population	1988	2002
Less than 100,000	33	14
100,000-199,999	50	33
200,000-299,999	26	40
300,000-399,999	17	15
400,000-499,999	3	18
500,000 and more	0	9
Total	129	129

Source: Compiled from Annex Table 1.A.

Note: Based on districts with boundaries in 2002.

Average annual rates of population increase during the period 1988-2002 by district had a wide range from the growth rate of minus 0.1 percent for Lindi Urban District of Lindi Region to 9.2 percent for

West District of Urban/West Region. Table 1.7 below gives distribution of districts according to the magnitude of average annual rate of population increase.

Table 1.7 Number of Districts by Magnitude of Average Annual Rate of Population Growth in the Period 1988-2002

Annual growth rate (%)	Number of districts
Below 1.0%	6
1.0% to 1.9%	38
2.0% to 2.9%	37
3.0% to 3.9%	28
4.0% to 4.9%	11
5.0% and up	9
Total	129

Source: Compiled from Annex Table I.A.

Note: Based on districts with boundaries in 2002.

Districts whose average annual growth rates during the period 1988-2002 were higher than 5 percent are listed in Table 1.8.

Table 1.8 Districts with Annual Growth Rates Higher than 5 Percent

District	Region	Annual growth rate (%)
West	Urban West	9.2
Dakombe	Shinyanga	7.4
Simanjiro	Manyara	7.0
Hemela	Mwanza	6.2
Kibondo	Kigoma	6.1
Uyui	Tabora	5.7
Arusha	Arusha	5.4
Ngara	Kagera	5.3
Kiteo	Manyara	5.1

Source: Annex Table I.A.

District population growth rates within each of the regions that have high annual rates of population increase of 3.5 percent and above will be discussed below.

In the case of Kigoma Region that has the highest annual rate of population increase during the period 1988-2002, all 4 districts recorded high population growth rates ranging from 3.8 percent to 6.1 percent. These districts have been affected by the inflow of refugees during the inter-censal period, with the exception of Kigoma Rural District which could have experienced inter-regional migratory in-flows as well attracted by fishing activities in Lake Tanganyika in addition to the presence of undocumented refugees as shown by experience in Rukwa Region.

Urban West Region that recorded the second highest population growth rate in 1988-2002 has only two districts with big difference in district growth rates (West District 9.2 percent and Urban District 1.9 percent). West District attracted in-migration.

Dar es Salaam Region with its City of Dar es Salaam is prime urban region the seat of commercial and industrial activities which attract migratory inflows from all over Tanzania. This status of the region is enjoyed by its three districts: Ilala, Temeke and Kinondoni.

Arusha Region is known for its tourist attraction and agricultural activities and both of them to a large extent attract business and labour. These attributes are spread in all districts in varying degrees. Manyara Region that was separated from Arusha Region has five districts with population growth rates ranging from 7.0 percent for Simanjiro District to 2.7 percent for Babati District

Tabora Region has six districts with population growth rates ranging from 5.7 percent for Uyui District to 1.9 percent for Tabora Urban District. This situation indicates the presence of intra-regional migration, people moving from one district with less resource endowment to other district with better resource endowment in the same region, in addition to the possible inter-regional migration to the high growth rates districts.

Rukwa Region has a combination of factors which induce its high population growth rate. These include existence of resident refugees in Mpanda District with their documented high fertility; existence of undocumented refugees spread in other districts, especially along Lake Tanganyika coast; existence of high agricultural potential in Nkansi and Sumbawanga Districts and fishing activities in Lake Rukwa.

1.3.3 Rural-Urban Distribution

In order to get the distinction of rural and urban populations for the 2002 Population and Housing Census, the wards were grouped into three categories i.e. rural, urban, and mixed. Based on this grouping, the rural and urban populations were classified in data processing.

Table 1.9 gives a summary of the population distribution by type of residence for the 1967, 1978, 1988 and 2002 censuses.

Table 1.9 Rural-Urban Distribution of Population, by Area: 1966, 1978, 1988 and 2002
(%)

Year	Tanzania		Tanzania Mainland		Tanzania Zanzibar	
	Rural	Urban	Rural	Urban	Rural	Urban
1967	93.6	6.4	94.3	5.7	71.4	28.6
1978	86.2	13.8	86.7	13.3	67.4	32.6
1988	81.6	18.4	82.0	18.0	68.2	31.8
2002	76.9	23.1	77.4	22.6	60.4	39.6

Source: The United Republic of Tanzania Population and Housing Censuses, 1967, 1978, 1988 and 2002.

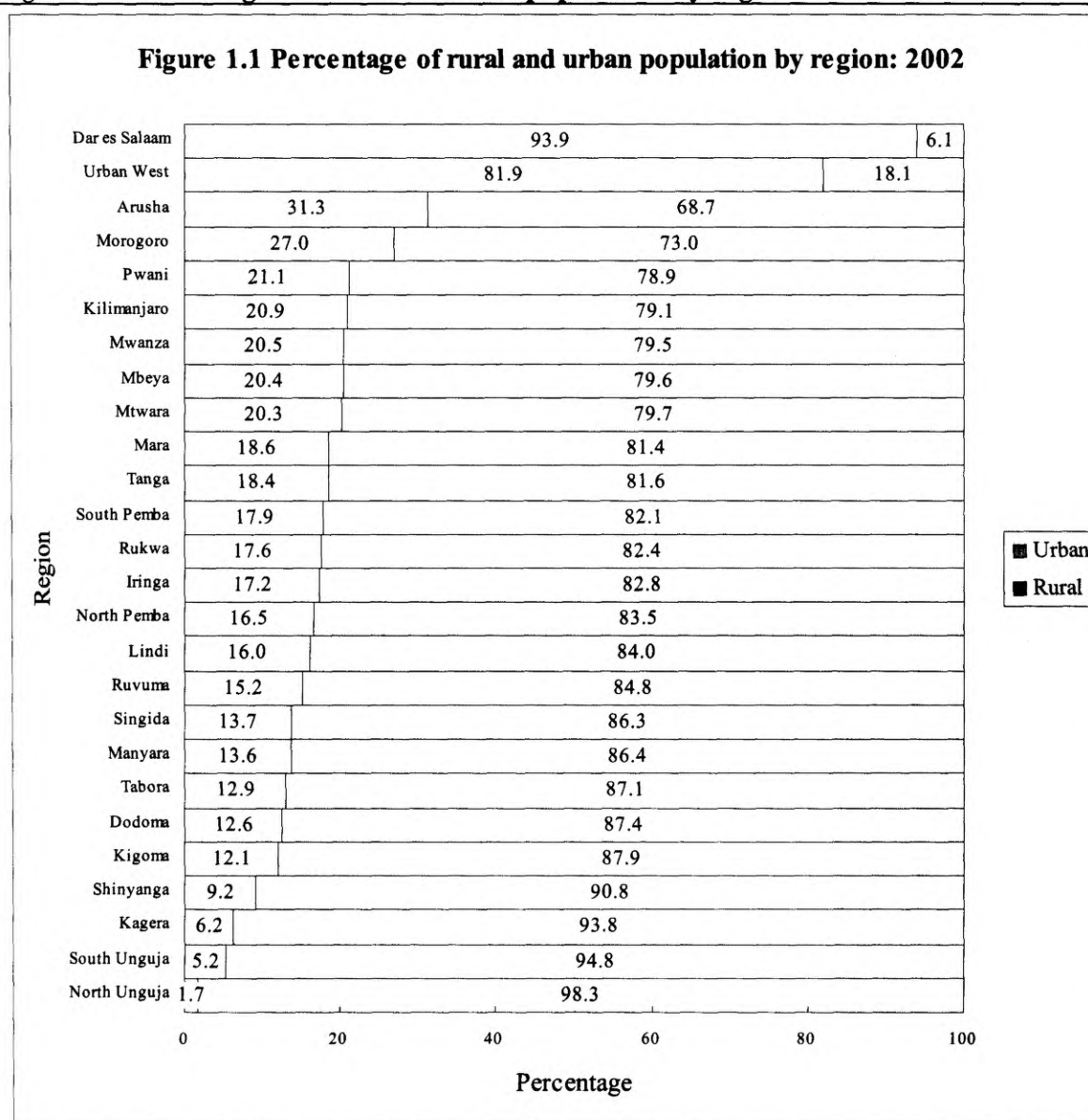
Table 1.10 Rural-Urban Distribution of Population, by Region: 2002

Region	Population			Percentage (%)	
	Total	Rural	Urban	Rural	Urban
Tanzania	34,443,603	26,500,042	7,943,561	76.9	23.1
Tanzania Mainland	33,461,849	25,907,011	7,554,838	77.4	22.6
Dodoma	1,692,025	1,478,782	213,243	87.4	12.6
Arusha	1,288,088	884,491	403,597	68.7	31.3
Kilimanjaro	1,376,702	1,088,611	288,091	79.1	20.9
Tanga	1,636,280	1,335,084	301,196	81.6	18.4
Morogoro	1,753,362	1,279,513	473,849	73.0	27.0
Pwani	885,017	698,156	186,861	78.9	21.1
Dar es salaam	2,487,288	151,233	2,336,055	6.1	93.9
Lindi	787,624	661,228	126,396	84.0	16.0
Mtwara	1,124,481	895,942	228,539	79.7	20.3
Ruvuma	1,113,715	944,045	169,670	84.8	15.2
Iringa	1,490,892	1,234,560	256,332	82.8	17.2
Mbeya	2,063,328	1,642,183	421,145	79.6	20.4
Singida	1,086,748	938,081	148,667	86.3	13.7
Tabora	1,710,465	1,490,581	219,884	87.1	12.9
Rukwa	1,136,354	936,232	200,122	82.4	17.6
Kigoma	1,674,047	1,471,240	202,807	87.9	12.1
Shinyanga	2,796,630	2,540,578	256,052	90.8	9.2
Kagera	2,028,157	1,901,407	126,750	93.8	6.2
Mwanza	2,929,644	2,328,387	601,257	79.5	20.5
Mara	1,363,397	1,109,791	253,606	81.4	18.6
Manyara	1,037,605	896,886	140,719	86.4	13.6
Tanzania Zanzibar	981,754	593,031	388,723	60.4	39.6
North Unguja	136,639	134,299	2,340	98.3	1.7
South Unguja	94,244	89,379	4,865	94.8	5.2
Urban West	390,074	70,593	319,481	18.1	81.9
North Pemba	185,326	154,747	30,579	83.5	16.5
South Pemba	175,471	144,013	31,458	82.1	17.9

Source: The United Republic of Tanzania Population and Housing Censuses, 1988 and 2002.

The data shows that about 77 percent of the total Tanzanian population were resident in rural areas in 2002 and 23 percent were living in urban areas. The proportions living in urban areas were 23 percent for Tanzania Mainland and 40 percent in Tanzania Zanzibar. It can be observed from the data that the proportion of population living in urban areas has been increasing between 1967 and 2002. For the Figure 1.1 compares the percent of rural and urban population for all the regions in Tanzania.

Figure 1.1 Percentage of rural and urban population by region: 2002



Source: The United Republic of Tanzania 2002 Population and Housing Census.

whole of Tanzania, the proportion of population in urban areas increased from 6 percent in 1967 to 23 percent in 2002. Rapid urbanization in Tanzania has largely been a result of rural to urban migration rather than natural increase. In recent years, there has been a notable wave of the younger generation migrating into urban areas to do petty business. This feature is common in all urban areas regardless of location and cultural background. The consequences of such rapid urbanization include rapid expansion of squatters, poor social services, inadequate infrastructure, lack of housing, and increasing urban unemployment.

In Tanzania Mainland, the percentage of urban population increased from 6 percent in 1967 to 23 percent in 2002. In Tanzania Zanzibar, the percentage urban increased from 29 percent to 40 percent between 1967 and 2002.

Table 1.10 gives rural-urban distribution of population in 2002 by region. In Tanzania Mainland regions, Dar es Salaam Region had the highest proportion of population living in urban areas (94%). Arusha Region has the second highest proportion of urban population (31%), followed by Morogoro Region (27%). Kagera Region has the lowest proportion of urban population (6%). In Tanzania

Zanzibar regions, the Urban West Region has the highest (82%) and the lowest level of urbanization is found in North Unguja (2%).

1.3.4 Population Density

Table 1.11 gives population density by region for 2002. The total land area of Tanzania is 881,749 km², of which 881,289 km² are Tanzania Mainland and 2,460 km² Tanzania Zanzibar. Population density in 2002 was 39 persons per km² for the whole Tanzania, 38 persons per km² for Tanzania Mainland and 399 persons per km² for Tanzania Zanzibar. Being in the limited land area, Tanzania Zanzibar's population density is 10 times that of Tanzania Mainland.

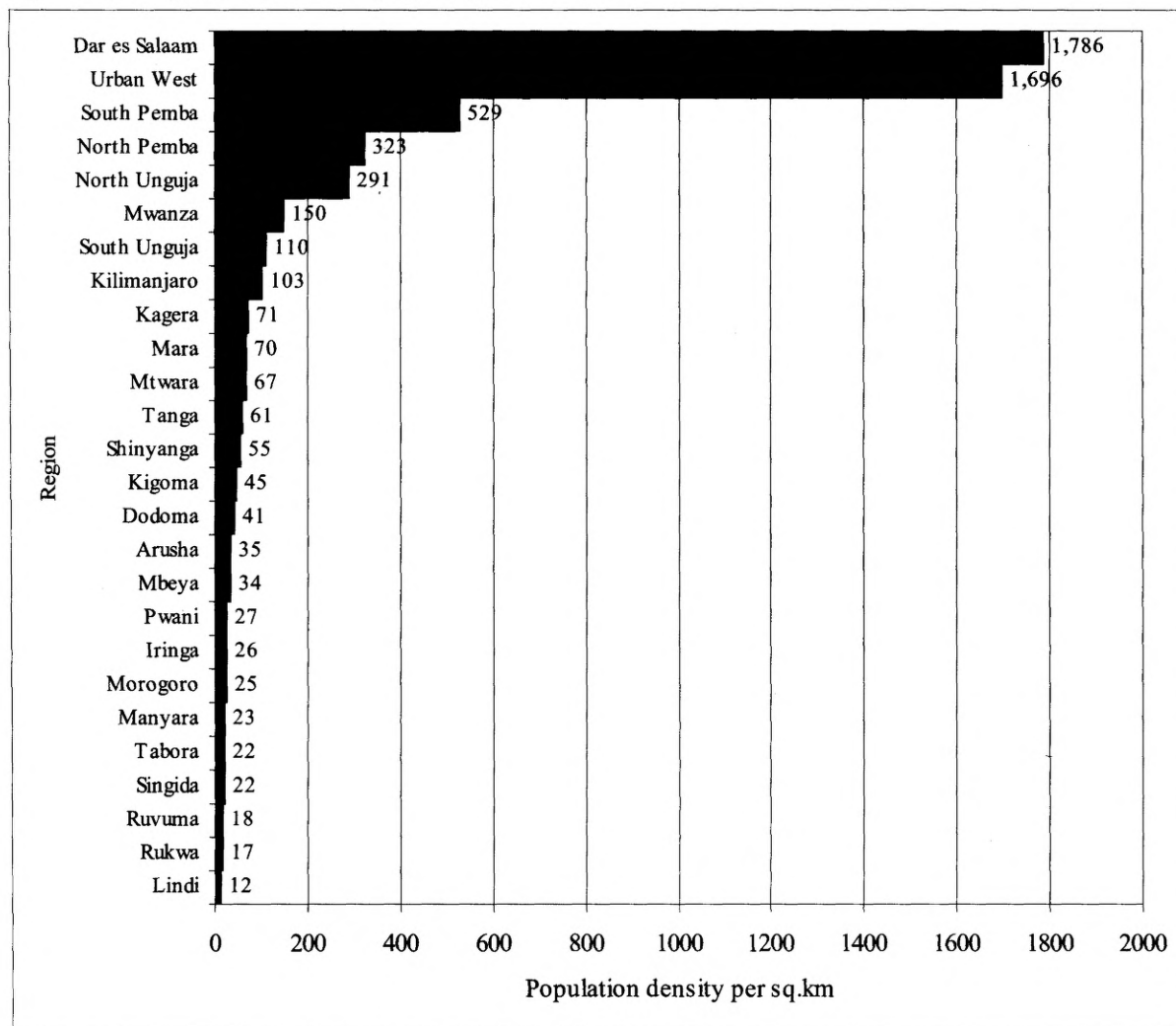
By region, there are great differences in population density. Population density ranges from 1,786 persons per km² to 12 persons per km². The most densely inhabited region is Dar es Salaam with density of 1,786 persons per km², followed by Urban West with 1,696 persons per km².

Table 1.11 Population Density by Region: 2002

Region	Land area (sq. km)	Population 2002	Population density (per sq. km)
Tanzania	883,749	34,443,603	39
Tanzania Mainland	881,289	33,461,849	38
Dodoma	41,311	1,692,025	41
Arusha	36,486	1,288,088	35
Kilimanjaro	13,309	1,376,702	103
Tanga	26,808	1,636,280	61
Morogoro	70,799	1,753,362	25
Pwani	32,407	885,017	27
Dar es Salaam	1,393	2,487,288	1,786
Lindi	66,046	787,624	12
Mtwara	16,707	1,124,481	67
Ruvuma	63,498	1,113,715	18
Iringa	56,864	1,490,892	26
Mbeya	60,350	2,063,328	34
Singida	49,341	1,086,748	22
Tabora	76,151	1,710,465	22
Rukwa	68,635	1,136,354	17
Kigoma	37,037	1,674,047	45
Shinyanga	50,781	2,796,630	55
Kagera	28,388	2,028,157	71
Mwanza	19,592	2,929,644	150
Mara	19,566	1,363,397	70
Manyara	45,820	1,037,605	23
Tanzania Zanzibar	2,460	981,754	399
North Unguja	470	136,639	291
South Unguja	854	94,244	110
Urban West	230	390,074	1,696
North Pemba	574	185,326	323
South Pemba	332	175,471	529

Source: The United Republic of Tanzania 2002 Population and Housing Census.

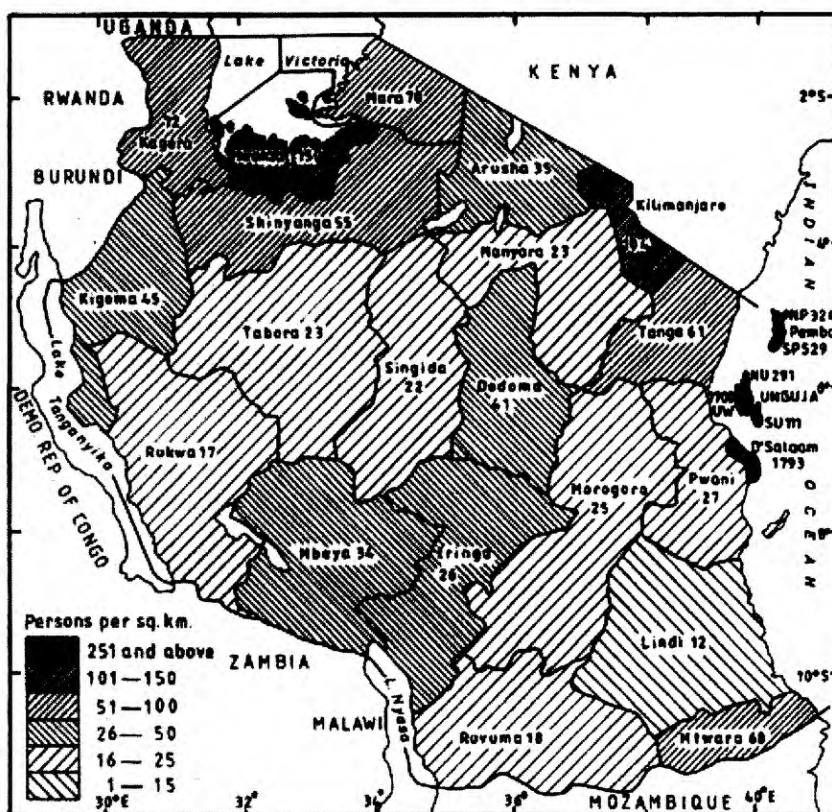
Figure 1.2 Population density by region: 2002



The high density in these regions can be explained by high rural-urban migration. Among other regions in Tanzania Mainland, there are 2 regions with density 100 or more persons per km². These are Mwanza (150 persons per km²) and Kilimanjaro (103 persons per km²). There are 5 regions with density between 50 and 100 persons per km²: Kagera (71 persons per km²), Mara (70 persons per km²), Mtwara (67 per km²), Tanga (61 per km²) and Shinyanga (55 per km²). Regions with lowest density are Lindi (12 persons per per km²), Rukwa (17 persons per km²) and Ruvuma (18 persons per km²).

Compared to Tanzania Mainland, all regions in Tanzania Zanzibar have higher population density. Apart from Urban West, population densities of 4 regions: South Pemba, North Pemba, North Unguja and South Unguja are 529, 323, 291 and 110 persons per km², respectively.

Fig. 3.3. Spatial Distribution of Population Density by Regions in Tanzania, 2002



4 Summary

The total population of Tanzania in 2002 was 34.4 millions. Of the total population 33.5 millions or 7.1 percent resided in Tanzania Mainland and 982 thousands or 2.9 percent resided in Tanzania Zanzibar.

During the 14 years from 1988 to 2002 the total population increased by 11.3 millions or 49.1 percent. The average annual population growth rate was 2.9 percent. By area the annual rate of population growth during the period in Tanzania Zanzibar (3.1 percent) was slightly higher than that in Tanzania Mainland (2.9 percent). The average annual growth rate of the total population declined from 3.2 percent during the period 1967-1978 to 2.8 percent during the period 1978-1988, but recorded a slight rise to 2.9 percent in 1988-2002. This change in the trend in population growth is considered to be due to the influx of a large number of refugees from the neighbouring countries.

All regions recorded population increases during the period 1988-2002, but the average annual population growth rate varies between regions ranging from 1.4 percent to 4.8 percent. Affected by the inflow of refugees Kigoma recorded the highest population growth rate (average annual rate of 4.8 percent). Two most urbanized regions followed this: Urban West (4.5 percent) and Dar es Salaam (4.3 percent).

By rural-urban areas 76.9 percent of the total population lived in the rural areas and 23.1 percent in the urban areas. A trend of urbanization continued. The percentage of urban population increased from 6.2 percent in 1967, 13.8 percent in 1978, 13.8 percent in 1988 to 23.1 percent in 2002.

Annex Table 1.A Population by district: 1988 and 2002

	Region	District	1988 population	2002 population	Average annual growth rate (%)
	Tanzania		23,095,882	34,443,603	2.9
	Tanzania Mainland		22,455,207	33,461,849	2.8
1	Dodoma		1,235,327	1,692,025	2.2
		Dodoma Urban	202,665	322,811	3.3
		Kongwa	163,446	248,656	3
		Mpwapwa	176,051	253,602	2.6
		Kondoa	340,267	428,090	1.6
		Dodoma Rural	352,898	438,866	1.6
2	Arusha		744,135	1,288,088	3.9
		Arusha	132,861	281,608	5.4
		Ngorongoro	69,101	129,362	4.5
		Monduli	108,964	184,516	3.8
		Arumeru	321,604	514,651	3.4
		Karatu	111,605	177,951	3.3
3	Kilimanjaro		1,104,673	1,376,702	1.6
		Moshi Urban	96,631	143,799	2.8
		Hai	197,518	258,935	1.9
		Same	169,718	211,738	1.6
		Rombo	200,912	245,716	1.4
		Mwanga	97,003	115,145	1.2
		Moshi Rural	342,891	401,369	1.1
4	Tanga		1,280,212	1,636,280	1.8
		Kilindi	88,666	143,792	3.5
		Handeni	161,578	248,633	3.1
		Tanga	186,818	242,640	1.9
		Mheza	229,139	278,405	1.4
		Kongwe	218,849	260,238	1.2
		Lushoto	357,492	418,652	1.1
		Pangani	37,670	43,920	1.1
5	Morogoro		1,220,564	1,753,362	2.6
		Morogoro Urban	117,601	227,921	4.7
		Kilombero	187,593	321,611	3.9
		Kilosa	346,526	488,191	2.4
		Ulanga	138,642	193,280	2.4
		Mvomero	204,345	259,347	1.7
		Morogoro Rural	225,857	263,012	1.1
6	Pwani		636,103	885,017	2.4
		Mkuranga	114,973	186,927	3.5
		Kibaha	81,952	131,242	3.4
		Bagamoyo	173,871	228,967	2
		Rufiji	153,938	202,001	1.9

Region	District	Average annual growth rate (%)		
		1988 population	2002 population	
	Mafia	33,079	40,557	1.5
Dar es salaam	Kisarawe	78,290	95,323	1.4
		1,360,865	2,487,288	4.3
	Hala	331,663	634,924	4.6
	Temeke	401,786	768,451	4.6
	Kinondoni	627,416	1,083,913	3.9
Lindi		646,494	787,624	1.4
	Liwale	52,240	75,128	2.6
	Ruangwa	86,449	124,009	2.6
	Nachingwea	117,473	161,473	2.3
	Kilwa	150,419	171,057	0.9
	Lind Rural	198,212	214,882	0.6
	Lindi Urban	41,701	41,075	-0.1
		889,100	1,124,481	1.7
		146,506	203,837	2.4
		335,448	440,987	2
Mtwara	Mtwara Rural	169,304	204,157	1.3
	Mtwara Urban	76,686	92,156	1.3
	Newala	161,156	183,344	0.9
		779,875	1,113,715	2.5
		86,491	130,860	3
		270,392	403,819	2.9
		170,320	247,055	2.7
		115,634	156,930	2.2
		137,038	175,051	1.7
		1,193,074	1,490,892	1.6
Iringa	Njombe	313,987	419,115	2.1
	Kilolo	156,989	204,372	1.9
	Ludewa	100,206	128,155	1.8
	Iringa Urban	84,501	106,371	1.6
	Mufindi	229,270	282,071	1.5
	Iringa Rural	205,504	245,033	1.3
	Makete	102,617	105,775	0.2
		1,476,278	2,063,328	2.4
		151,881	265,586	4
		331,653	513,600	3.1
Mbeya	Mbarali	153,182	234,101	3
	Mbeya Rural	179,900	254,069	2.5
	Kyela	135,091	173,830	1.8
	Chunya	164,493	205,915	1.6
	Ileje	88,562	109,847	1.5
	Rungwe	271,516	306,380	0.9

	Region	District	1988 population	2002 population	Average annual growth rate (%)
13	Singida	Manyoni	792,387	1,086,748	2.3
		Singida Urban	135,390	204,482	2.9
		Singida Rural	81,528	114,853	2.4
		Iramba	285,135	400,377	2.4
14	Tabora		290,334	367,036	1.7
			1,036,150	1,710,465	3.6
		Uyui	126,836	281,101	5.7
		Urambo	188,081	369,329	4.8
		Sikonge	78,633	132,733	3.7
		Igunga	203,367	324,094	3.3
		Nzega	296,085	415,203	2.4
	Tabora Urban	143,148	188,005	1.9	
15	Rukwa		698,718	1,136,354	3.5
		Nkasi	107,239	207,311	4.7
		Sumbwanga Urban	90,703	146,842	3.4
		Mpanda Sumbawanga Rural	261,823	410,452	3.2
		238,953	371,749	3.2	
16	Kigoma		856,770	1,674,047	4.8
		Kibondo	175,585	413,777	6.1
		Kasulu	319,711	626,742	4.8
		Kigoma Rural	276,770	489,271	4.1
		Kigoma Urban	84,704	144,257	3.8
17	Shinyanga		1,763,800	2,796,630	3.3
		Bukombe	140,362	395,298	7.4
		Kahama	359,076	594,891	3.6
		Bariadi	380,580	603,604	3.3
		Meatu	159,272	248,214	3.2
		Maswa	220,432	304,402	2.3
		Shinyanga Urban	98,682	134,523	2.2
		Shinyanga Rural	212,847	276,393	1.9
		Kishapu	192,549	239,305	1.6
18	Kagera		1,313,594	2,028,157	3.1
		Ngara	159,546	334,409	5.3
		Biharamulo	209,279	409,389	4.8
		Bukoba Urban	46,503	80,868	4
		Karagwe	284,137	424,287	2.9
		Muleba	273,329	385,184	2.5

	Region	District	1988 population	2002 population	Average annual growth rate (%)
		Bukoba Rural	340,800	394,020	1
19	Mwanza		1,876,635	2,929,644	3.2
		Ilemela	111,224	264,873	6.2
		Nyamagana	109,985	209,806	4.6
		Sengerema	303,897	498,993	3.5
		Geita	439,022	709,078	3.4
		Ukerewe	172,946	260,831	2.9
		Misungwi	191,283	256,133	2.1
		Kwimba	236,443	314,925	1
		Magu	311,835	415,005	1
20	Mara		946,418	1,363,397	2.6
		Serengeti	111,689	176,057	3.3
		Musoma Urban	68,437	107,855	3.2
		Tarime	331,790	490,731	2.8
		Musoma Rural	233,338	329,824	2.5
		Bunda	201,164	258,930	1.8
21	Manyara		604,035	1,037,605	3.9
		Simanjiro	52,895	141,136	7
		Kiteto	74,460	152,296	5.1
		Hanang	113,270	204,640	4.2
		Mbulu	156,058	237,280	3
		Babati	207,352	302,253	2.7
	Tanzania Zanzibar		640,675	981,754	3
22	North Unguja		96,989	139,639	2.6
		North B	36,999	52,492	2.5
		North A	59,990	84,147	2.4
23	South Unguja		70,313	94,244	2.1
		Central	45,252	62,391	2.3
		South	25,061	31,853	1.7
24	Urban West		208,571	390,074	4.5
		West	50,945	184,204	9.2
		Urban	157,626	205,870	1.9
25	North Pemba		137,179	185,326	2.1
		Micheweni	61,064	83,266	2.2
		Wete	76,115	102,060	2.1
26	South Pemba		127,623	175,471	2.3
		Chakechake	60,051	82,998	2.3
		Mkoani	67,572	92,473	2.2

2.1 Introduction

Age and sex are the most fundamental characteristics of a population. Age and sex structure of a population is a reflection of population dynamics in the past. It reflects the accumulation of fertility, mortality and migration experienced by the population. At the same time age and sex structure of a population will be one of the most important determinants for fertility, mortality and migration of the population. It will affect the future growth of the population and its structural changes in the future.

Data on age and sex of population are essential for policy-making and planning as well as for administration in various fields. They are indispensable for making future projection of the population. In the countries where good vital statistics is not available, the age and sex data may be used to estimate indirectly fertility and mortality levels.

Actual numbers of persons in various age spans are important. The number of children will be needed for education plans and administration, for determining need for schools and teachers and for determining need for childcare. The number of people in working-ages is an important factor for the labour force. The number of older people is essential for social security.

Hence analysis of age and sex structure of a population is essential, but unfortunately in many developing countries census age data suffers from errors of age reporting, and this should be borne in mind when analyzing and interpreting age data.

2.2 Quality of Age Data

Reported age data in the censuses of Tanzania were affected by errors due to misreporting of ages, as in the case in the censuses of many developing countries. Errors of age data may have occurred from various causes. One of the causes is age misreporting by respondents. Some people particularly older people do not know their actual ages. They might have reported approximate ages, or the enumerators might have recorded approximate ages by estimation or a guess. Such approximation and guessing of ages tend to give ages ending in specific digits, often 0 and 5. Another source of errors is the enumerators' mistakes that might have occurred when they recorded the marks of answers in the optical mark sensing census questionnaires. Errors might have occurred also in scanning of questionnaires by the optical mark sensing machines.

From a glance at an age pyramid of the total population by single years of age shown in Figure 2.1, it will be noted that there were serious age heaping or digit preferences in the 2002 census data. In younger ages there was heaping at ages 10 and 12 years, and dents at ages around 10 and 12 years. In ages higher than 15 years, there were very strong preferences for terminal digits 0 and 5, and moderate but strong preferences for terminal digits 2 and 8.

A number of indices have been developed to detect digit preference in age reporting. In this section, the following three indices were computed and compared with those for 1988: Whipple's index, Myers' index and Bachi' index¹. The results of the computation for 2002 as compared with those for 1988 are shown in Table 2.1a and Table 2.1b.

¹ See for details H.S. Shryock, J.S. Siegel and Associates, *The Methods and Materials of Demography*, Academic Press, 1976, pp.115-119.

Table 2.1a Whipple's Index of Digit Preference: 1988 and 2002

Area	Male		Female	
	1988	2002	1988	2002
Tanzania	175	153	202	164
Tanzania Mainland	173	153	200	164
Tanzania Zanzibar	231	170	265	179

Source: Computed from data on population by single years of age in the 1988 and 2002 censuses.

Table 2.1b Myer's Index and Bachi's Index of Digit Preference: 1988 and 2002

Areas and terminal digits	Myers' index				Bachi's index			
	Male		Female		Male		Female	
	1988	2002	1988	2002	1988	2002	1988	2002
Tanzania								
0	7.2	5.8	10.8	7.8	10.0	7.8	14.8	10.2
1	-4.1	-3.7	-4.7	-3.9	-4.6	-4.1	-5.9	-4.6
2	-0.6	2.0	-0.9	1.5	-1.0	2.3	-1.9	1.0
3	-2.9	-2.2	-3.5	-2.5	-3.6	-2.7	-4.3	-3.0
4	-1.6	-1.3	-2.2	-1.8	-2.9	-1.9	-3.5	-2.4
5	4.7	2.9	5.1	2.8	6.1	3.4	7.2	3.5
6	-0.1	-1.0	-1.2	-1.3	-0.5	-1.4	-1.8	-1.6
7	-2.0	-1.3	-3.1	-2.0	-2.9	-1.9	-3.9	-2.3
8	2.6	1.5	2.7	1.8	2.3	1.4	2.4	1.9
9	-2.9	-2.7	-3.0	-2.5	-2.8	-2.8	-3.5	-2.8
Summary index	14.4	12.2	18.6	14.0	9.2	7.4	12.3	8.4
Tanzania Mainland								
0	7.0	5.7	10.6	7.8	9.8	7.7	14.5	10.1
1	-4.1	-3.7	-4.7	-3.9	-4.6	-4.1	-5.9	-4.6
2	-0.6	2.0	-0.8	1.5	-1.0	2.3	-1.8	1.0
3	-2.9	-2.2	-3.4	-2.5	-3.6	-2.7	-4.2	-3.0
4	-1.6	-1.3	-2.1	-1.8	-2.9	-1.8	-3.5	-2.3
5	4.6	2.8	5.0	2.8	5.9	3.3	7.1	3.0
6	-0.1	-1.0	-1.2	-1.3	-0.5	-1.4	-1.7	-1.6
7	-2.0	-1.3	-3.1	-2.1	-2.9	-1.9	-3.9	-2.3
8	2.6	1.6	2.8	1.8	2.3	1.4	2.5	1.9
9	-2.9	-2.7	-3.0	-2.5	-2.8	-2.8	-3.4	-2.8
Summary index	14.2	12.2	12.2	14.0	9.1	7.4	12.4	8.4
Tanzania Zanzibar								
0	12.4	7.1	17.1	8.7	17.0	9.4	24.3	12.0
1	-5.1	-3.8	-5.9	-3.9	-5.7	-4.3	-6.9	-4.6
2	-1.4	1.7	-1.9	1.0	-2.5	1.7	-3.9	0.7
3	-3.8	-2.0	-4.5	-2.2	-4.9	-2.8	-5.6	-2.9
4	-2.9	-2.1	-3.7	-2.4	-4.5	-3.1	-5.1	-3.4
5	8.5	4.0	8.1	3.5	10.8	5.3	11.4	5.0
6	-1.4	-1.4	-2.1	-1.5	-2.1	-1.7	-3.1	-1.9
7	-2.7	-1.4	-3.6	-1.5	-3.1	-1.6	-4.6	-1.9
8	0.6	1.0	0.3	0.8	-0.7	0.7	-1.3	0.4
9	-4.2	-3.1	-4.0	-2.5	-4.7	-3.6	-5.2	-3.4
Summary index	21.5	13.8	25.9	14.1	14.0	8.5	17.9	9.1

Source: Computed from data on population by single years of age in the 1988 and 2002 censuses.

Whipple's index assumes rectangularity of the population in a 10-year age range and measures heaping on terminal digit "0" by comparing the sum of the population at ages ending in "0" in the age range excluding very young and very old ages with one-tenth of the total population. It varies between 100 and 500. The Whipple's index of 100 indicates no preference for "0", and the index of 500 indicates that all ages reported end in "0".

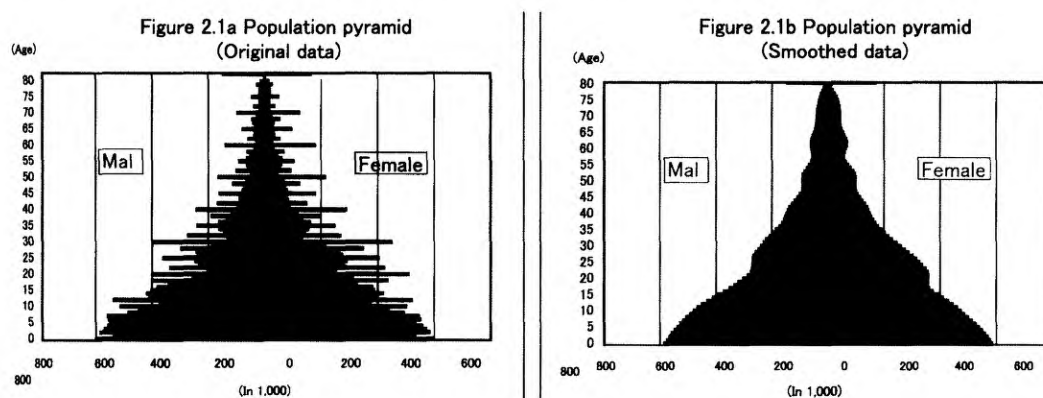
Myers' blended method was developed to avoid the bias in Whipple's index that is due to the fact that numbers of persons at ages ending in "0" would normally be larger than the following numbers ending in "1" to "9" because of the effect of mortality. The method yields an index of preference for each ending digit, representing the deviation of the proportion of the total population reporting on the given ending digit from 10.0 percent. A summary index of preference for all terminal digits is derived as one-half of the sum of the absolute values of the deviations. Theoretically Myers' index varies between 0 and 90. The index of 0 indicates no heaping and the index of 90 indicates that all ages reported end in at a certain single digit.

Bachi's index is obtained basically by applying the Whipple method repeatedly. It measures the preference for each ending digit. A summary index is calculated as one-half of the sum of the absolute values of deviations from 10 percent. Theoretically the index ranges between 0 and 90.

It will be seen from Table 2.1a and Table 2.1b that any of the three indices indicated that age reporting was slightly better in the 2002 census than in the 1988 census. It will also be seen from Table 2.1b that in the 2002 census there was very strong preference for digit 0 particularly for females and also digit 5. However, digits 1, 3, 4, 6, 7 and 9 seem to have been quite unpopular as shown by the negative values. This compares well with the situation in the 1988 census as shown in the table.

There are a number of methods developed for smoothing the age data with age heaping. Here the Sprague formula² was used for smoothing the data on the total population by single years of

age. The Sprague formula is a six-term fifth difference osculatory formula. The age pyramid of the resulting smoothed population by single years of age is shown in Figure 2.1b together with the age pyramid based on the original data in Figure 2.1a. Even after smoothing one can see some irregularities in age data. These might have reflected actual situations such as migration and under-enumeration of persons in particular age spans. Or there might be some other reasons to explain.



2.3 Age and Sex Composition of the Total Population

Table 2.2 presents data on age and sex structure and sex-ratios of the population by 5-year age groups in 2002 for Tanzania Mainland and Tanzania Zanzibar as well as for the whole Tanzania. Table 2.3

² See for details H.S. Shryock, J.S. Siegel and Associates, *The Methods and Materials of Demography*, Academic Press, 1976, pp.531-559.

gives a comparison of age distribution and sex-ratio of the total population in 2002 with those in 1978 and 1988.

Of the total population of 34,444 thousands in Tanzania in 2002, there were 16,830 thousands males and 17,614 thousands females, or 95.5 males per 100 females. By area the sex-ratio of the population in Tanzania Mainland was slightly lower than that in Tanzania Zanzibar (95.5 males per 100 females and 96.0 males 100 females respectively). It will be noted from Table 2.2 that the sex-ratio was considerably low in young age groups. There were 80.3 males per 100 females in age group 20-24 years and 87.8 males per 100 females in age group 25-29 females. Similar trends of low sex-ratios in these age groups were observed in the previous censuses of 1978 and 1988. Such trends may be due to migration and partly due to possible under-enumeration of young males.

It will be seen from Table 2.3 that there was a slightly decreasing trend in the proportions of children and youth below 20 years of age from 1988 to 2002. In particular, the proportion of children below 10 years of age decreased continuously from 1978 to 1988, then to 2002. On the contrary the proportions of persons in working ages slightly increased from 1988 to 2002. There was a decrease in the proportion of older people during the period 1988 to 2002.

Table 2.4 compares the age structure of population of Tanzania in 2002 by broad age groups with that of selected countries. As Table 2.4 suggests Tanzania has a young age structure: broad at the base with 44.2% of its total population below 15 years of age, and 51.8% of the population between 15 and 64 years, traditionally referred to as working-age population. The old age population (aged 65 years and over) constitutes only 3.9% of the total population. This structure is very much similar to the age structure of populations of Malawi in 1998, Swaziland in 1997, Nigeria in 2000, and to some extent to that of South Africa in 1996. Young age structures of population in Tanzania and other African countries are the consequence of high fertility in long past periods. In contrast, as the results of fertility decline for long past years and extension of life expectancy, the developed countries have typical old age structures. In the case of Japan the population aged 65 and over already surpassed the population below 15 years of age. While only 14.6 percent of the total population is below 15 years of age, 17.3 percent is the population 65 years of age and over. In Sweden the proportions of population in age groups 0-14 years, 15-64 years and 65 years and over are 18.3 percent, 64.5 percent and 17.2 percent respectively. The population of the United States has an old age structure too but to a lesser extent compared with Japan and Sweden. These features are better illustrated in the population pyramids given in Figures 2.2a to 2.2d.

Age structure of a population has an implication of burdens of dependency of working-age population. Table 2.4 also shows dependency ratios, which indicate the number of people supported by 100 persons in the working-age group 15-64 years. These are rough measures of degrees of dependency burdens. Total dependency ratio is the ratio of populations aged 0-14 years and 65 years and above to the population aged 15-64 years. Youth dependency ratio is the ratio of the number of persons below 15 years of age to the number of persons aged 15-64 years, multiplied by 100. It implies a degree of burden of children on a working-age population. Old-age dependency ratio is the ratio of the number of older persons aged 65 years and over to the number of persons aged 15-64 years, multiplied by 100. It implies a degree of burdens of older people on a working-age population in the whole population.

Table 2.2 Population by Age and Sex: 2002

Area and age	Number			Percentage			Sex-ratio
	Both sexes	Male	Female	Both sexes	Male	Female	
Tanzania							
All ages	34,443,603	16,829,861	17,613,742	100.0	100.0	100.0	95.5
0 - 4	5,664,907	2,830,545	2,834,362	16.4	16.8	16.1	99.9
5 - 9	5,130,448	2,573,993	2,556,455	14.9	15.3	14.5	100.7
10 - 14	4,443,257	2,233,401	2,209,856	12.9	13.3	12.5	101.1
15 - 19	3,595,735	1,761,329	1,834,406	10.4	10.5	10.4	96.0
20 - 24	3,148,513	1,402,077	1,746,436	9.1	8.3	9.9	80.3
25 - 29	2,801,965	1,309,661	1,492,304	8.1	7.8	8.5	87.8
30 - 34	2,229,046	1,087,599	1,141,447	6.5	6.5	6.5	95.3
35 - 39	1,669,873	824,338	845,535	4.8	4.9	4.8	97.5
40 - 44	1,348,508	669,549	678,959	3.9	4.0	3.9	98.6
45 - 49	984,823	478,522	506,301	2.9	2.8	2.9	94.5
50 - 54	883,820	428,501	455,319	2.6	2.5	2.6	94.1
55 - 59	590,667	290,117	300,550	1.7	1.7	1.7	96.5
60 - 64	604,956	287,502	317,454	1.8	1.7	1.8	90.6
65 and over	1,347,085	652,727	694,358	3.9	3.9	3.9	94.0
0 - 14	15,238,612	7,637,939	7,600,673	44.2	45.4	43.2	100.5
15 - 64	17,857,906	8,539,195	9,318,711	51.8	50.7	52.9	91.6
65 and over	1,347,085	652,727	694,358	3.9	3.9	3.9	94.0
Tanzania Mainland							
All ages	33,461,849	16,349,015	17,112,834	100.0	100.0	100.0	95.5
0 - 4	5,511,065	2,753,048	2,758,017	16.5	16.8	16.1	99.8
5 - 9	4,983,212	2,500,282	2,482,930	14.9	15.3	14.5	100.7
10 - 14	4,309,446	2,165,812	2,143,634	12.9	13.2	12.5	101.0
15 - 19	3,489,233	1,710,012	1,779,221	10.4	10.5	10.4	96.1
20 - 24	3,058,372	1,360,255	1,698,117	9.1	8.3	9.9	80.1
25 - 29	2,721,861	1,272,126	1,449,735	8.1	7.8	8.5	87.7
30 - 34	2,165,480	1,057,887	1,107,593	6.5	6.5	6.5	95.5
35 - 39	1,617,594	799,302	818,292	4.8	4.9	4.8	97.7
40 - 44	1,308,013	649,640	658,373	3.9	4.0	3.8	98.7
45 - 49	956,673	464,097	492,576	2.9	2.8	2.9	94.2
50 - 54	858,625	416,216	442,409	2.6	2.5	2.6	94.1
55 - 59	575,671	282,251	293,420	1.7	1.7	1.7	96.2
60 - 64	588,667	279,477	309,190	1.8	1.7	1.8	90.4
65 and over	1,317,937	638,610	679,327	3.9	3.9	4.0	94.0
0 - 14	14,803,723	7,419,142	7,384,581	44.2	45.4	43.2	100.5
15 - 64	17,340,189	8,291,263	9,048,926	51.8	50.7	52.9	91.6
65 and over	1,317,937	638,610	679,327	3.9	3.9	4.0	94.0
Tanzania Zanzibar							
Total	981,754	480,846	500,908	100.0	100.0	100.0	96.0
0 - 4	153,842	77,497	76,345	15.7	16.1	15.2	101.5
5 - 9	147,236	73,711	73,525	15.0	15.3	14.7	100.3
10 - 14	133,811	67,589	66,222	13.6	14.1	13.2	102.1
15 - 19	106,502	51,317	55,185	10.8	10.7	11.0	93.0
20 - 24	90,141	41,822	48,319	9.2	8.7	9.6	86.6

Area and age	Number			Percentage			Sex-ratio
	Both sexes	Male	Female	Both sexes	Male	Female	
25 - 29	80,104	37,535	42,569	8.2	7.8	8.5	88.2
30 - 34	63,566	29,712	33,854	6.5	6.2	6.8	87.8
35 - 39	52,279	25,036	27,243	5.3	5.2	5.4	91.9
40 - 44	40,495	19,909	20,586	4.1	4.1	4.1	96.7
45 - 49	28,150	14,425	13,725	2.9	3.0	2.7	105.1
50 - 54	25,195	12,285	12,910	2.6	2.6	2.6	95.2
55 - 59	14,996	7,866	7,130	1.5	1.6	1.4	110.3
60 - 64	16,289	8,025	8,264	1.7	1.7	1.6	97.1
65 and over	29,148	14,117	15,031	3.0	2.9	3.0	93.9
0 - 14	434,889	218,797	216,092	44.3	45.5	43.1	101.3
15 - 64	517,717	247,932	269,785	52.7	51.6	53.9	91.9
65 and over	29,148	14,117	15,031	3.0	2.9	3.0	93.9

Source: The United Republic of Tanzania 2002 Population and Housing Census.

Note: *Sex-ratio* is males per 100 females, i.e. a ratio of the number of males to the number of females multiplied by 100.

Table 2.3 Percentage Distribution and Sex-ratio of Population by 5-year Age Groups:
1978, 1988 and 2002

Age	Percentage distribution			Sex-ratios (Males per 100 females)		
	1978	1988	2002	1978	1988	2002
All ages	100.0	100.0	100.0	96.2	94.2	95.5
0 - 4	18.1	16.8	16.4	96.1	98.5	99.9
5 - 9	16.0	15.6	14.9	98.5	100.2	100.7
10 - 14	12.0	13.3	12.9	103.1	100.5	101.1
15 - 19	9.8	10.9	10.4	95.8	94.4	96.0
20 - 24	7.6	8.1	9.1	79.0	78.6	80.3
25 - 29	7.5	7.6	8.1	86.7	84.1	87.8
30 - 34	6.6	5.3	6.5	130.3	88.9	95.3
35 - 39	5.1	4.7	4.8	98.4	92.2	97.5
40 - 44	3.8	3.4	3.9	92.2	87.3	98.6
45 - 49	3.6	3.1	2.9	102.7	97.0	94.5
50 - 54	2.7	2.7	2.6	98.5	87.2	94.1
55 - 59	2.2	2.0	1.7	117.2	106.3	96.5
60 - 64	2.0	1.9	1.8	98.3	88.0	90.6
65 and over	4.1	4.3	3.9	114.5	106.3	94.0
0-14	46.2	45.7	44.2	98.7	99.7	100.5
15-64	50.9	49.8	51.8	97.0	88.8	91.6
65 and over	4.1	4.3	3.9	114.5	106.3	94.0

Source: The United Republic of Tanzania Population and Housing Censuses of 1978, 1988 and 2002.

Clearly the dependency ratio for Tanzania is rather high since 100 persons in working-ages are supporting about 93 people. Dependency ratios for Malawi, Swaziland and Nigeria are somewhat similar to that of Tanzania where 100 persons in working-ages are supporting about 90 people. Whereas a youth dependency ratio was very high, an old-age dependency ratio was still very low in these countries. In contrast old-age dependency ratios are high in Japan, the United States and Sweden, though total dependency ratios are in a range of 45 to 55 and youth dependency ratios in these developed countries. However, it should be borne in mind that the burden of old age population per head is normally much greater than the burden of children per head and that in developing countries like

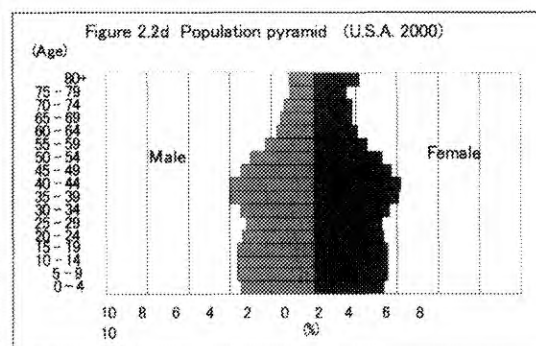
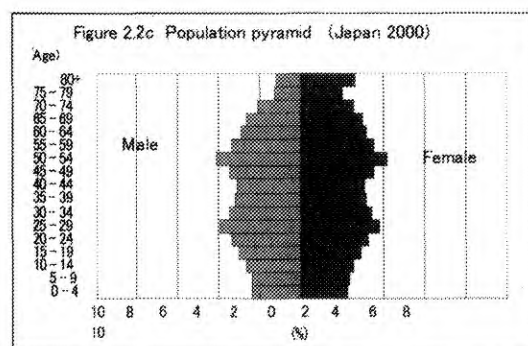
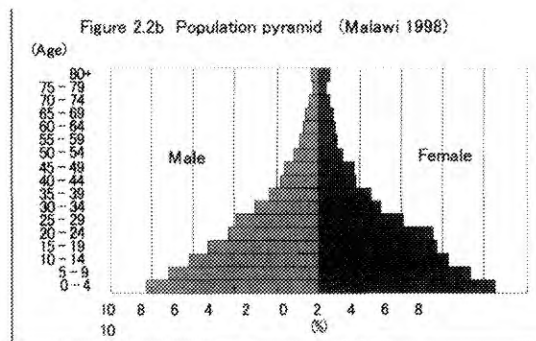
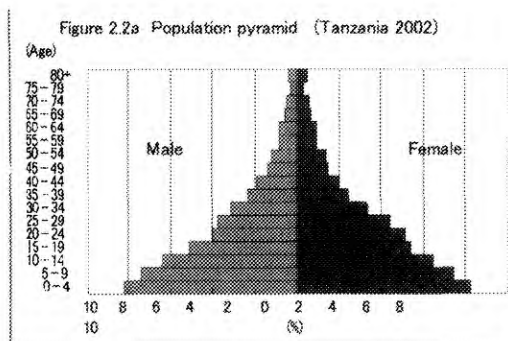
Tanzania children cannot entirely be regarded as dependants since their contribution to economic and domestic activities cannot be ignored.

Table 2.4 Percentage of Population by Broad Age Groups in Selected Countries

	Tanzania 2002	Malawi 1998	Swaziland 1997	South Africa 1996	Nigeria 2000	Japan 2000	U.S.A. 2000	Sweden 2001
All ages	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
0-4 years	44.2	43.6	44.6	33.9	44.2	14.6	21.3	18.3
5-64 years	51.8	52.4	52.3	60.1	53.0	67.9	66.1	64.5
65 years +	3.9	4.0	3.2	4.7	2.8	17.3	12.7	17.2
Total depend. ratio	92.9	90.8	91.3	64.3	88.9	46.9	51.3	55.0
Youth depend. ratio	85.3	83.2	85.3	56.4	83.5	21.4	32.2	28.3
Old-age depend. ratio	7.5	7.6	6.0	7.8	5.3	25.5	19.2	26.7

Source: United Nations, *Demographic Yearbook 2001*.

Note: *Total dependency ratio* is the number of persons under 15 years of age plus 65 years of age and over per 100 persons aged 15-64 years. *Youth dependency ratio* is the number of persons under 15 years of age per 100 persons aged 15-64. *Old-age dependency ratio* is the number of persons aged 65 years and over per 100 persons aged 15-64 years.



2.4 Differentials in Age Structure

Percentage distribution of population and sex-ratios by 5-year age groups are given in Table 2.5.

Table 2.5 Percentage Distribution of Population by 5-year Age Groups and Sex-ratios, by Rural-Urban Areas: 2002

Age	Rural areas				Urban areas			
	Percentage distribution			Sex-ratio	Percentage distribution			Sex-ratio
	Both sexes	Male	Female		Both sexes	Male	Female	
All Ages	100.0	100.0	100.0	95.3	100.0	100.0	100.0	96.3
0-4	17.4	17.8	17.0	99.7	13.4	13.7	13.1	100.5
5-9	15.7	16.2	15.2	101.5	12.3	12.4	12.2	97.5
10-14	13.3	13.8	12.8	103.4	11.6	11.4	11.8	92.7
15-19	10.1	10.3	9.8	100.3	11.7	10.9	12.4	84.6
20-24	8.3	7.5	9.0	79.1	12.1	11.2	13.0	83.1
25-29	7.4	7.0	7.8	84.8	10.5	10.5	10.6	95.0
30-34	6.0	5.9	6.2	91.5	7.9	8.3	7.6	105.6
35-39	4.6	4.6	4.7	93.7	5.6	5.9	5.2	108.7
40-44	3.8	3.8	3.8	93.8	4.2	4.6	3.9	114.5
45-49	2.8	2.7	2.9	88.5	2.9	3.2	2.7	116.6
50-54	2.6	2.5	2.7	88.2	2.4	2.6	2.1	119.5
55-59	1.8	1.8	1.8	91.8	1.4	1.6	1.3	119.6
60-64	1.9	1.8	2.0	88.5	1.3	1.4	1.3	100.9
65+	4.3	1.4	1.4	94.3	2.6	0.9	0.9	95.6

Source: The United Republic of Tanzania 2002 Population and Housing Census.

Table 2.6 Population by Broad Age Groups, by Region: 2002

Region	Number				Percentage		
	All ages	0-14 yrs.	15-64 yrs	65 yrs. +	0-14	15-64	65+
Tanzania	34,443,603	15,238,612	17,857,906	1,347,085	44.2	51.8	3.9
Tanzania Mainland	33,461,849	14,803,723	17,340,189	1,317,937	44.2	51.8	3.9
Dodoma	1,692,025	750,626	863,731	77,668	44.4	51.0	4.6
Arusha	1,288,088	565,026	682,501	40,561	43.9	53.0	3.1
Kilimanjaro	1,376,702	592,759	702,601	81,342	43.1	51.0	5.9
Tanga	1,636,280	720,475	839,394	76,411	44.0	51.3	4.7
Morogoro	1,753,362	729,786	951,405	72,171	41.6	54.3	4.1
Pwani	885,017	353,973	472,772	58,272	40.0	53.4	6.6
Dar es Salaam	2,487,288	816,739	1,618,544	52,005	32.8	65.1	2.1
Lindi	787,624	306,998	436,131	44,495	39.0	55.4	5.6
Mtwara	1,124,481	418,798	642,251	63,432	37.2	57.1	5.6
Ruvuma	1,113,715	472,904	598,840	41,971	42.5	53.8	3.8
Iringa	1,490,892	663,868	767,669	59,355	44.5	51.5	4.0
Mbeya	2,063,328	900,028	1,081,637	81,663	43.6	52.4	4.0
Singida	1,086,748	503,594	529,335	53,819	46.3	48.7	5.0
Tabora	1,710,465	802,835	835,620	72,010	46.9	48.9	4.2
Rukwa	1,136,354	549,944	553,973	32,437	48.4	48.8	2.9
Kigoma	1,674,047	828,122	791,875	54,050	49.5	47.3	3.2
Shinyanga	2,796,630	1,365,339	1,339,813	91,478	48.8	47.9	3.3
Kagera	2,028,157	959,411	990,106	78,640	47.3	48.8	3.9
Mwanza	2,929,644	1,365,915	1,468,890	94,839	46.6	50.1	3.2
Mara	1,363,397	656,218	655,468	51,711	48.1	48.1	3.8
Manyara	1,037,605	480,365	517,633	39,607	46.3	49.9	3.8
Tanzania Zanzibar	981,754	434,889	517,717	29,148	44.3	52.7	3.0
North Unguja	136,639	61,875	69,470	5,294	45.3	50.8	3.9
South Unguja	94,244	40,213	50,296	3,735	42.7	53.4	4.0
Urban West	390,074	156,992	223,656	9,426	40.2	57.3	2.4
North Pemba	185,326	90,818	89,030	5,478	49.0	48.0	3.0
South Pemba	175,471	84,991	85,265	5,215	48.4	48.6	3.0

Source: The United Republic of Tanzania 2002 Population and Housing Census.

It will be seen in the table that the rural areas have relatively high proportions of population in younger ages and relatively low proportions in working ages as compared with the urban areas. This is due to movements of young people in working ages from the rural areas to the urban areas. It is also observed that sex-ratios are relatively high in younger ages 5-19 years and relatively low in ages 20 years and above in the rural areas as compared with the urban areas.

Table 2.6 gives distributions of population by broad age groups. Although the distribution of population by broad age groups was similar in Tanzania Mainland and Tanzania Zanzibar, there were differences in age structure of the population between regions. In Dar es Salaam the proportion of population in younger ages is low and the proportion in working ages is high. A similar age structure is observed in Urban West. To a less extent Mtwara recorded a similar pattern. On the other hand, populations of other regions have relatively young age structure. Kigoma, Shinyanga, Rukwa and Mara in Tanzania Mainland and North Pemba and South Pemba in Tanzania Zanzibar have relatively large proportions of persons below 15 years of age.

2.5 Ageing of Population

Ageing of a population is a process in which the proportion of the older people in the population increases. This is a structural change of the population, and it is distinguished from a biological process of ageing of individuals. Conventionally ageing of a population is considered to have started when the proportion of population 65 years of age and over exceeds 7 percent, and the population in a region is considered aged when the proportion of population 65 years of age and over has reached 14 percent. Ageing of population is primarily caused by falling fertility. A rapid decline in fertility and following sustaining low fertility levels will increase relatively the proportion of older people. Ageing of a population occurs also due to increasing life expectancy. When older people live longer the number of older people will increase, and this will result in an increase of the proportion of the older people. Hence ageing of population should be viewed from two aspects: one from structural ageing, namely an increase in the proportion of older people in the population, and the other from an absolute increase in the number of the aged.

Ageing of a population is in progress in many countries in the world, not only in the developed countries but also in some developing countries. It has a number of important consequences a serious concern of social and economic policies in many countries in the world, in particular in developing countries. These countries face many problems of social security systems caused by ageing of population. Increase in the number of elderly people causes a rapid increase in the government expenditures on medical care and nursing care of the elderly who need help. In many developing countries the population is still relatively young and the ageing of the population has not started. Social security systems are as yet well developed. But in the years to come, not far from now, when fertility decline continues, ageing population will progress, then these countries may face similar problems, the developed countries have faced. Even at present an absolute number of older people is increasing with a gradual increase in life expectancy and an increase in the number of people in a cohort entering older age groups.

In this section the cut off points for old age of both 60 years and 65 years are used. In Tanzania age 60 years is the official Government retirement age at which old age benefits begin to be provided. Table 2.7 gives a trend in the population aged 60 years and over as well as that aged 65 years and over. The proportions of population aged 60 years and over and that aged 65 years and over in 2002 were 3.9 percent and 3.9 percent respectively, a decline from 6.2 percent and 4.3 percent respectively in 1978. These proportions were lower than those in 1978. The average annual rates of increase in population aged 60 years and over and 65 years and over during 1988 to 2002 were both 2.3 percent, which were lower than the annual growth rate of the total population.

However there was a considerable increase in actual numbers of older persons. The number of persons 60 years of age and over increased by about 532 thousands during 14 years from 1988 to 2002. The corresponding increase in the number of persons 65 years of age and over was about 365 thousands.

Table 2.7 Older Population: 1978, 1988 and 2002

Age	Number			Percentage			Annual increase rate (%)	
	1978	1988	2002	1978	1988	2002	1978-1988	1988-2002
All ages	17,512,611	23,057,922	34,403,603	100.0	100.0	100.0	2.8	2.1
60+	1,064,869	1,420,012	1,952,041	6.1	6.2	5.7	2.9	2.1
65+	717,098	981,839	1,347,085	4.1	4.3	3.9	3.2	2.1

Source: The United Republic of Tanzania Population and Housing Censuses, 1978, 1988 and 2002.

Proportions of older people in Tanzania in 2002 are compared with those in selected countries in Table 2.8. Proportions of persons aged 60 years and over and those aged 65 years and over in Tanzania were more or less at the same levels as in Malawi, South Africa and Nigeria. The proportions of the elderly in Tanzania were much lower compared with developed countries that already face ageing of the population. The proportion of persons aged 65 years and over exceeded 17 percent in both Japan and Sweden.

Table 2.8 Proportions of Older Population in Selected Countries
(%)

Age	Tanzania 2002	Malawi 1998	South Africa 1996	Nigeria 2000	Japan 2000	U.S.A. 2000	U. K. 1999	Sweden 2001
60 years +	5.7	5.5	6.9	4.3	23.4	16.5	20.4	22.3
65 years +	3.9	4.0	4.7	2.8	17.3	12.7	15.6	17.2

Source: United Nations, *Demographic Yearbook 2001*.

Table 2.9 shows the sex-ratio of older population as observed in the 1978, 1988 and 2002 censuses. Normally women survive longer than men, hence it is expected that there were more women than men in the older age groups. Data in the table does not suggest clear patterns and trends in sex-ratios of older population. This is probably due to miss reporting of ages among older persons.

Table 2.9 Sex-ratio of older population: 1978, 1988 and 2002

Age	1978	1988	2002
60 years and over	108.9	100.3	92.9
65 years and over	114.5	106.3	94.0
70-64 years	98.3	88.0	90.6
75-69 years	107.5	113.4	94.5
80-74 years	113.1	98.4	91.2
85 years and over	121.8	106.8	95.6

Source: The United Republic of Tanzania Population and Housing Censuses, 1978, 1988 and 2002.

Note: Sex-ratio is the number of males per 100 females.

With regard to disability there were about 105 thousands persons aged 65 years and over who were disabled. This accounted for 7.8 percent of the population 65 years of age and over. Of 105 thousands disabled persons aged 65 years and over about half (47.7 percent) were physically impaired and about one quarter (23.6 percent) were visually impaired (See Chapter 4).

Older people had fewer opportunities to receive formal education. According to the 2002 census, 59.3 percent of males aged 65 years and over and 86.3 percent of females aged 65 years and over have never attended school. If those either completed or dropped out in the first 4 years of the primary education are included, the percentage becomes 96 percent for both males and females. This means that 96 percent of males and females aged 65 years and over either never attended school or attended only lower level of primary education. This is reflected in relatively high illiteracy rates particularly among older women in the rural areas. In fact, about 90 percent of women aged 65 years and over in the rural areas were reported to be illiterate (See Chapter 5).

2.6 Summary

As in the censuses of many other developing countries, age data from the Tanzania census suffer from errors in age reporting. Strong preferences for terminal digits 0 and 5 are detected in the data population by single years of age except for younger ages. However, indices calculated suggest some improvement in errors caused by digit preference compared with the 1988 census.

Age structure of population of Tanzania is still young and ageing population does not seem to have started. The proportion of people aged below 15 years of age in the total population declined from 50 percent in 1988 to 44 percent, the proportion of those aged 15-64 years increased from 50 percent to 54 percent in the period 1988 to 2002. The proportion of older population aged 65 years and over declined slightly to a little less than 4 percent in 2002. Although the rate of increase in the older population aged 65 years and over was lower than the total population growth rate during the period 1988-2002, actual number of older people increased by about 365 thousands persons during the period.

Annex 1 : SAMPLING USED IN THE 2002 CENSUS

A1.1 Introduction

The 2002 Census of Tanzania was the fourth to be conducted since the Independence of Tanzania Mainland and Zanzibar Revolution in 1961 and 1964 respectively. The other three censuses were carried out in 1967, 1978 and 1988.

Two types of questionnaires were used in the 2002 Population and Housing Census. These were:

- Short questionnaire with 8 questions for all households; and
- Long questionnaire with additional 29 questions for a sample of households.

The following 8 questions appeared in both short and long questionnaires:

Name, relationship to head of household, sex, age, disability, citizenship, marital status, and total number of household members by sex.

In addition, the long questionnaire includes 29 extra questions on the following topics:

- Survival of parents
- Place of Birth
- Place of residence
- Education
- Economic status
- Fertility
- Mortality
- Housing conditions and ownership of selected assets.

A1.2 Sample Design

As in the 1988 census, results from the 2002 Population and Housing Census are presented at district level, broken into rural and urban parts.

As in earlier censuses, the Institutional Enumeration Areas such as hospitals, guest houses, schools etc. were not included in the sample design for 2002 Population and Housing Census.

A sample of households for the long questionnaire was selected by cluster sampling using the Census Enumeration Area (EA) as cluster. That is, a sample of EAs was first selected, and then all households within each selected EA were enumerated with the long questionnaire. The size of the EA was about 800 people in rural areas and about 400 people in urban areas on average.

Each of the 123 districts was divided into urban and rural parts. A sample of EAs was selected in each district for rural and urban parts separately. The number of EAs to be selected was allocated according to the following criteria:

Table 1A.1 Allocation of Sample EAs

Number of EAs in a district	Number of sample
Rural part of the district:	
Less than 30	All EAs
30-199	30
200-399	40
400 and more	50
Urban part of the district:	
Less than 50	All EAs
50 or more	50
Municipalities of Mwanza, Zanzibar and Dar es Salaam	70 each

Within rural/urban part of each district, a sample of EAs was selected at random with equal probability by systematic sampling. Thus the sampling ratio varied according to rural and urban parts of districts. By the use of systematic sampling, good geographical spread of the sample within each district was achieved.

The number of EAs selected in the sample and the number of selected EAs that were used in the actual census are shown in Table 1A.2 below.

Table 1A.2 Number of Selected EAs and Used EAs

Area	Total EAs ^{a)}	Selected EAs	Used EAs
Tanzania			
Total	55,822	9,992	9,907
Rural	33,749	4,744	4,692
Urban	19,073	5,248	5,215
Tanzania Mainland			
Total	50,760	9,462	9,377
Rural	32,505	4,988	4,955
Urban	18,255	4,474	4,422
Tanzania Zanzibar			
Total	2,062	530	530
Rural	1,244	270	270
Urban	818	260	260

a) Excludes institutional EDs such as those covering hospitals, guest houses, schools, fishing and mining camps, etc.

A1.3 Estimation

Most of the tables from the detailed questionnaire will be of a form where the cells contain the number of persons in the different categories (educational attainment, number of children, occupation, etc) Usually there is also a basic sex-age breakdown.

Let X_c^b be the number of persons in category c of a variable in sex-age group b in the rural/urban part of a district. An estimate \hat{X}_c^b of X_c^b was computed by the following formula:

$$\hat{X}_c^b = \frac{M}{m} \sum_{i=1}^m x_{ci}^b$$

where,

x_{ci}^b : Number of persons in category c of a variable in sex-age group b in the i th sample EA in the rural/urban part of a district

M : Number of EAs in the rural/urban part of the district

m : Number of sample EAs in the rural/urban part of the district

Estimates at a regional level were derived by summing up district estimates over all districts within the region. National level estimates were the sum of regional estimates.

The linear estimates thus obtained were adjusted by using ratio estimation in order to result in the same age and sex composition as the results on a complete basis. Let denote the population in sex-age group b derived on a complete basis by X^b , and the estimate of number of persons in sex-age group b obtained on the basis of data from long questionnaires by \hat{X}^b . The estimate \hat{X}^b may not coincide with X^b . The final estimate for X_c^b was derived by multiplying the ratio of X^b to \hat{X}^b into the linear estimate \hat{X}_c^b .

A1.4 Sampling Errors

Census data based on the long questionnaire is subject to sampling errors. Sampling errors of estimates for selected variables were estimated. For the sake of simplicity, sampling errors were calculated by using a formula for linear estimates without taking into account the ratio estimation.

Variance of the estimate \hat{X} of a given variable X was calculated first at a district level for rural and urban parts separately, using the following formula.

$$V(\hat{X}) = M^2 (1-f) \frac{1}{m(m-1)} \sum_{i=1}^m (x_i - \bar{x})^2$$

where,

$V(\hat{X})$: Variance of the estimate \hat{X}

x_i : Value of the variable X in the i th sample EA, e.g., the number of literate persons in the i th sample EA

\bar{x} : Mean of x_i within the district, i.e. an average of x_i for m sample EAs in that district

f : Sampling fraction, i.e. m/M

M : Number of EAs in the rural/urban part of the district

m : Number of sample EAs in the rural/urban part of the district

Variance of the estimate at a regional level was calculated for rural and urban parts separately as the sum of district level variances within the region, and variance of the national estimate was the sum of regional level variances. Variance for the total of rural and urban areas was the sum of variances for rural and urban parts.

The standard error is the standard deviation of the estimates, namely the square root of variance and the relative standard error is the coefficient of variation (C.V.) of the estimate, i.e. the ratio of standard error to the estimate as expressed in percentage. Standard errors and the coefficients of variation for selected items at a national level are shown in Annex Table 1A.

The sampling error of the estimate is considered approximately twice the standard error.

Annex Table IA Sampling Errors of Data for Selected Items

Item	Estimate	Standard error	C.V. (%)
Literacy			
Illiterate	10,258,371	65,550	0.6
Literate	17,573,982	207,402	1.2
Education			
Now attending	6,830,856	46,018	0.7
Partly attended	2,486,045	17,267	0.7
Completed	9,399,373	93,088	1.0
Never attended	9,116,080	63,234	0.7
Economic activity			
Economically active	15,951,395	138,610	0.9
Employed	15,507,463	154,322	1.0
Worked paid, non seasonal	1,035,385	18,536	1.8
Worked paid, seasonal	242,332	10,199	4.2
Worked unpaid, non seasonal	525,374	24,443	4.7
Worked unpaid, seasonal	353,989	20,913	5.9
Worked for own benefit fulltime	11,649,011	147,014	1.3
Worked for own benefit seasonal	1,701,372	60,585	3.6
Unemployed	443,932	11,859	2.7
Seeking for work	238,804	6,682	2.8
Not worked, but not actively seeking for work	205,128	6,612	3.2
Not active	11,694,333	106,822	0.9
Employment status			
Employer	13,277	981	7.4
Employee	1,418,464	24,360	1.7
Own-account	12,480,015	118,316	0.9
Family worker	735,459	26,205	3.6
Apprentice	30,662	1,145	3.7
Occupation			
Professional	110,231	5,061	4.6
Technician and associate professional	373,681	9,216	2.5
Clerk	138,420	8,960	6.5
Service and shop sales worker	529,377	16,694	3.2
Street vendor	658,813	20,599	3.1
Crafts and related worker	486,699	16,662	3.4
Farmer	10,567,659	124,359	1.2
Livestock keeper	314,691	14,554	4.6
Elementary worker	878,237	35,330	4.0
Industry			
Agriculture	10,515,752	137,084	1.3
Forestry, fishing, hunting, livestock and related worker	1,397,555	40,451	2.9
Manufacturing	275,973	6,612	2.4
Raw food sales	177,740	6,076	3.4
Trade and commerce	935,622	36,725	3.9
Public administration and education	627,523	11,053	1.8