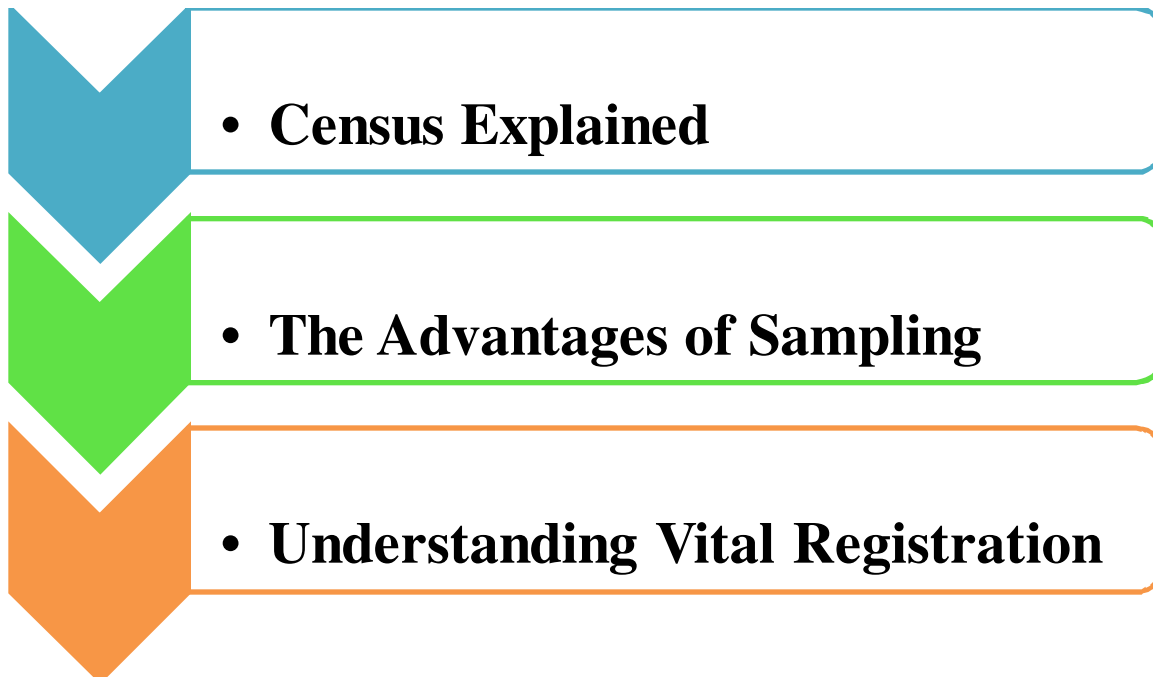


Lesson 2: Population Data Sources

Learning Objectives:



Introduction

There are three sources of population data:

- ❖ **Censuses**
- ❖ **Vital Registration Systems**
- ❖ **Sample Surveys**

I - Population Censuses

Censuses taking started nearly 6000 years ago [1]. Babylonians are said to be the pioneers in the field, followed later on by Persians and other civilizations, including the Greeks, Romans and the various Chinese dynasties. The practice also underlies a fundamental belief in Christianity regarding Jesus Christ's place of birth. "It was the five-yearly census ordered by Caesar Augustus which required every man in the Roman Empire to return to his place of origin, thus

ensuring that Joseph and Mary travelled to Bethlehem for the birth of Jesus” [2]. The 1841 census of England and Wales is widely regarded as the first truly modern census.

The following paragraphs are based on United Nations recommendations on census taking [3]:

Census: Definition

Population

“ A population census is the total process of collecting, compiling, evaluating, analysing and publishing or otherwise disseminating demographic, economic and social data pertaining, at a specified time, to all persons in a country or in a well delimited part of a country” [3]

Housing

“A housing census is the total process of collecting, compiling, evaluating, analysing and publishing or otherwise disseminating statistical data pertaining, at a specified time, to all living quarters and occupants thereof in a country or in a well-delimited part of a country” [3].

A census must have the following essential features:

Individual enumeration – each individual and living quarter has to be enumerated separately

Universality – A census must cover every individual or housing unit present within the defined census area.

Simultaneity – Each person and housing unit must be canvassed within a defined point in time.

Defined periodicity - There should be a defined time gap between censuses. The most commonly used interval is 10 years.

What are censuses useful for?

- ✓ *To provide facts to policy makers and planners*
- ✓ *Policy development and management/evaluation of programs*
- ✓ *Gerrymandering or redistricting – delimitation of election boundaries to insure adequate representation*
- ✓ *Scientific research*
- ✓ *Industry – to determine consumer demand and availability of labor*

Other Censuses

- ❖ **Agriculture**
- ❖ **Livestock**
- ❖ **Industry and commerce**

Two Types of enumeration:

- ❖ Canvasser (enumerator) method – information on each individual or housing unit is entered by a census official.
- ❖ Household method: responsibility for entering information given to an individual in the housing unit.

List of Census Topics

1. Geographical and internal migration characteristics

- (a) Place of usual residence
- (b) Place where present at time of census, **Locality**
- (c) Place of birth
- (d) Duration of residence
- (e) Place of previous residence
- (f) Place of residence at a specified date in the past

2. Household and family characteristics

- (a) Relationship to head or other reference member of
- (b) Household and family composition household
- (c) **Household and family status**

3. Demographic and social characteristics

- (a) Sex
 - (b) Age
 - (c) Marital status
 - (d) Citizenship
-

- (e) Religion
- (f) Language
- (g) National and/or ethnic group

4. Fertility and mortality

- (a) Children ever born
- (b) Children living
- (c) Date of birth of last child born alive
- (d) Deaths in the past 12 months
- (e) Maternal or paternal orphanhood

Principles and recommendations for population and housing censuses

Topics collected directly Derived topics

- (f) Age, date or duration of first marriage
- (g) Age of mother at birth of first child born alive

5. Educational characteristics

- (a) Literacy
- (b) School attendance
- (c) Educational attainment
- (d) Field of education and educational qualifications

6. Economic characteristics

- (a) Activity status
- (b) Time worked
- (c) Occupation
- (d) Industry
- (e) Status in employment
- (f) Income
- (g) Institutional sector of employment
- (h) Place of work

7. International migration characteristics

- (a) Country of birth
- (b) Citizenship
- (c) Year or period of arrival

8. Disability characteristics

- (a) Disability
 - (b) Impairment and handicap
 - (c) Causes of disability
-
-

Source: [3]

II. Vital Registration Systems

“Although local or parish registers were kept by some churches in Europe from the 14th century onwards, civil or state registration systems did not develop until the 19th and 20th centuries.....Unlike censuses that describe the state of the population at a fixed point in time, vital statistics are collected on a continuous basis” [4]

Life events registered under a complete registration system include [5]:

- *Live Births*
- *Deaths*
- *Foetal deaths*
- *Marriages*
- *Annulments/ Legal separations*
- *Adoptions*

Important principles of a Vital Registration system:

All of the paragraphs below come from a single source [3] which we have found to be one of the best guidelines available for understanding civil registration systems.

Universal coverage

A vital statistics system should include all vital events occurring in every geographic area and in every population group comprising the national area.

Continuity

“The principle of continuity in the collection and compilation of vital statistics should be observed in order that the data may reflect short-term fluctuations, including seasonal movements, as well as longer-term movements.”

Confidentiality

“Confidentiality of personal information in registration records and any associated statistical reports should be safeguarded insofar as consistent with the intended uses of these records for specific administrative and statistical purposes.”

Regular dissemination

“The compilation of vital statistics should have as its ultimate minimum goal (*a*) the provision of total monthly or quarterly summary counts of live births, deaths, foetal deaths, marriages and divorces on a time schedule prompt enough to provide information for health intervention and population estimation programs, administrative uses or other needs, and (*b*) the production of detailed annual tabulations of each type of vital event cross classified by its demographic and socioeconomic characteristics.”

Definition of Vital Events

“LIVE BIRTH is the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy, which after such separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached; each product of such a birth is considered liveborn (all live-born infants should be registered and counted as such, irrespective of gestational age or whether alive or dead at the time of registration, and if they die at any time following birth they should also be registered and counted as deaths).”

“DEATH is the permanent disappearance of all evidence of life at any time after live birth has taken place (postnatal cessation of vital functions without capability of resuscitation) (This definition excludes foetal deaths, which are defined separately below).”

“FOETAL DEATH [DEADBORN FOETUS] is death prior to the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy; the death is indicated by the fact that after such separation the foetus does not breathe or show any other evidence of life, such as beating of the heart, pulsation of the umbilical cord or definite

movement of voluntary muscles²⁵ (note that this definition broadly includes all terminations of pregnancy other than live births, as defined above)”

“MARRIAGE is the act, ceremony or process by which the legal relationship of husband and wife is constituted. The legality of the union may be established by civil, religious or other means as recognized by the laws of each country.”

“DIVORCE is a final legal dissolution of a marriage, that is, that separation of husband and wife which confers on the parties the right to remarriage under civil, religious and/or other provisions, according to the laws of each country.”

“ANNULMENT is the invalidation or voiding of a marriage by a competent authority, according to the laws of each country, which confers on the parties the status of never having been married to each other.”

“SEPARATION, JUDICIAL is the disunion of married persons, according to the laws of each country, without conferring on the parties the right to remarry.”

“ADOPTION is the legal and voluntary taking and treating of the child of other parents as one's own, in so far as provided by the laws of each country.”

“LEGITIMATION is the formal investing of a person with the status and rights of a person born in wedlock, according to the laws of each country.”

“RECOGNITION is the legal acknowledgment, either voluntarily or compulsorily, of the paternity of a child born out of wedlock.”

Summary Definition of Civil Registration Systems

“Civil registration is defined as the continuous, permanent, compulsory and universal recording of the occurrence and characteristics of vital events pertaining to the population as provided through decree or regulation in accordance with the legal requirements of a country. Civil registration is carried out primarily for the purpose of establishing the legal documents provided by the law. These records are also a main source of vital statistics. Complete coverage, accuracy and timeliness of civil registration are essential for quality vital statistics.” [6]

Locality

According to this UN report a locality is defined as “a distinct population cluster (also designated as inhabited place, population centre, settlement etc.), in which the inhabitants live in neighboring sets of living quarters and which has a name or a locally recognized status” These entities should not be confused with the smallest administrative divisions of a country (a Kebele, in the case of Ethiopia). There might be an overlap between the two in some instances. But, “in others, however, even the smallest civil division may contain two or more localities”. [5]

The recommended classification of localities by size-class is as follows:

- All localities
- 500,000 or more inhabitants
- 100,000 - 499,000 inhabitants
- 50,000 - 99,999 inhabitants
- 20,000 - 49,999 inhabitants
- 10,000 - 19,999 inhabitants
- 5,000 - 9,999 inhabitants
- 2,000 - 4,999 inhabitants
- 1,000 - 1,999 inhabitants
- 500 - 999 inhabitants
- 200 - 499 inhabitants
- Less than 200 inhabitants
- Population not in localities

Vital registration in Ethiopia: a Brief History

Tentative and largely symbolic efforts to establish a registration system in Ethiopia include the following: [6]

- *The 1900 proclamation by Emperor Menelik to institute a registration system. This was well-intentioned but failed to materialize.*
- *The 1960 Civil Code: This too remained a unimplemented for lack of institutional support and enforcement.*
- *The city of Addis Ababa started birth registration in 1942. It started registering marriages and deaths in 1953 and 1970 respectively. However, this took place at the whim of individual residents with legal and other needs for a certificate.*
- *A 1980 proclamation stipulated that the Central Statistical Authority (CSA) will begin to undertake registration of vital events. All of the preliminary efforts and attempts to lay the groundwork for a national registration system proved costly and the plan was shelved in 1999.*
- *The proclamations of 1983/88 by the Derg to register births, deaths, marriages and population numbers did not come to fruition.*

- *The 1995 FDRE constitution considered the naming of a child and record of his/her birth a fundamental right, “but the law on civil registration has not come into effect.” [6].*

Ongoing activities:

- *Continuing efforts by CSA to develop the ground rules for a national program assisted by the UN and other donor agencies.*
- *CSAs continued efforts at model building, and testing.*
- *Continued canvassing by the tens of thousands of health care workers, who are supplying vital health information to a national database.*
- *The 2006 National Conference on registration of vital events entrusted the Ethiopian Human Rights Commission with the task of setting up a national- level task force.*

III Sample Surveys

The following are obtained from a UN “Studies in Methods” series on population sampling [26]. “Household surveys provide a cheaper alternative to censuses for timely data and a more relevant and convenient alternative to administrative record systems”.

Sample surveys are used for the collection of detailed data on:

- *Socio-demographic characteristics*
- *Conditions under which people live*
- *Their well-being*
- *Activities in which they engage*
- *Demographic characteristics and cultural factors which influence behavior,*
- *Social and economic change*

The provide the structure within which other variables such as education, health status, labor force, disability, nutrition status, migration, fertility, mortality and even seemingly fringe topics such as criminal victimization are studied. Survey data often complements those obtained from registration records, or from censuses.

Planning and execution of surveys requires all of the following steps below and many more that have to precede the training of interviewers, such as the selection and specification of the subject matter, development of survey design, design and printing of questionnaires, pre-testing, and preparation of instructional and training materials for field use:

- *Training interviewers*
- *Data collection*
- *Field administration*
- *Data processing*
 - *Systems planning*
 - *Computer programming*
 - *Clerical coding*
 - *Key-to-disk operations*
- *Data review and publication*

The Sample design should insure the following [3]:

- *The sample must be conducted in stages to identify accurately the locations where interviews are to be conducted and to select the study households efficiently.*
- *It has to be stratified in such a it is spread over target geographic sub-areas and population sub-groups*
- *It has to make use of clusters of study households in order to keep costs down to a manageable level.*
- *The size of the study sample to try and optimally balance the competing needs of cost-cutting and accuracy of results.*

History of Sample Surveys in Ethiopia:

As you may have learned in the paragraphs above, census taking is a costly and time-consuming undertaking. The continuous and complete registration of vital events – births, deaths, marriages, etc. is even costlier and beyond the financial and technical reaches of a poor country like Ethiopia. The solution has been the use of sampling. Sampling is a statistical technique, and is defined as “the analysis of a group by determining the characteristics of a significant percentage of its members chosen at random.” [7]

The organization charged with the collection, analysis, and dissemination of sample and census data in Ethiopia is the Central Statistical Authority (CSA), formerly known as the Central Statistical Office (CSO) established in 1960. In the agency’s own words, its functions are anchored in “.... running a National Integrated Household and Enterprise Survey Program (NIHESP), undertaking ad-hoc surveys, conducting census, and compilation of secondary data from administrative records” [8]

“The Agency has carried out several socio-economic and demographic surveys that include agriculture, price, household income, consumption and expenditure, welfare monitoring, large and medium scale manufacturing and electricity industries, small scale manufacturing industries, cottage industries, construction, mining and quarrying, transport and communications, informal sector, distributive trade and services, manpower, demography, family and fertility, health and nutrition, child labour, etc.... These days sample surveys undergoing by CSA cover about 2,072 rural EAs and 790 urban EAs (enumeration areas).” [8]

The first national demographic surveys were conducted between 1964 and 67 (first round) and 1968 – 1969 (second round). Others ample surveys hitherto undertaken by the agency include the:

- Addis Ababa manpower and housing survey 1976
- Population and housing characteristics of 17 major towns 1978
- The rural labour force survey 1981/2
- The rural labour force survey 1987/8
- National Rural Nutrition Survey of 1992
- 1998 Health and Nutrition Survey
- National Labour force survey 1999
- Disability Survey of Selected Weredas
- Demographic and Health Survey 2000
- Child labor survey 2001
- Biannual employment 2003
- Biannual employment 2004
- Demographic and Health Survey 2005

Data Quality

Just how reliable are the data put out by the CSA? A quick answer would be, not very reliable. However, this has to be viewed within the context of the social, educational, and economic environments within which the agency operates. None are favorable for the production of high quality data. How is quality measured anyway? The answer lies in the following crucial ingredients forming the corner-stones of a high-quality survey data. [9].

Relevance: This refers to the degree to which the data produced meets all of the the real objectives of the survey.

Accuracy: This measures the extent to which the data collected, as well as the knowledge gained “.....correctly describes the phenomena it was designed to measure” [9] They usual spoilers include errors in statistical estimation, bias (or systematic error) and variance (often described as random error), as well as other errors including interviewer error, and respondent error or non-response. We can add to this coverage error, and sampling error.

Timeliness: This pertains to the time-gap between the reference point (or the end of the survey) to which the information relates, and the date at which the data is made available.

Accessibility This relates to refers to the ease or difficulty with which data can be obtained as well as the form or medium of access to the data. To some users, the cost of acquiring the data becomes one aspect of accessibility.

Interpretability Listed underneath the interpretability heading are issues such as: the underlying concepts, types and number of variables and classifications used, and methodology adopted to collect the data.

Coherence: “ The *coherence* of statistical information reflects the degree to which it can be successfully brought together with other statistical information within a broad analytic framework and over time” [9]. Remember, however, that coherence does not necessarily entail total numerical consistency.

A cursory evaluation of the quality of some of the survey data for Ethiopia can be performed using a basic consistency test.

Example 1.

Table 2.1 Sex Ratio: Rural Populations by Region

Region	Sex Ratio Males/100 Females
Tigray	97.2
Afar	125.0
Amara	99.9
Oromia	99.6
Somali	116.0
Benishangul /Gumuz	101.0
SNNPR	98.9
Gambela	104.0

Source: Based on [8]

The rural population is selected for review of sex ratios to avoid confusion with the uneven balance of sexes in migratory streams and counter streams from rural origins. This first review (above) of the data put out by CSA earns it a failing grade as there are no realistic explanations on the ground to account for the differences in ratios and the marked variation from one region to another. This has to be an artifact of the data, and by no means a true reflection of differences in gender balance/imbalance from one region to another.

Example 2

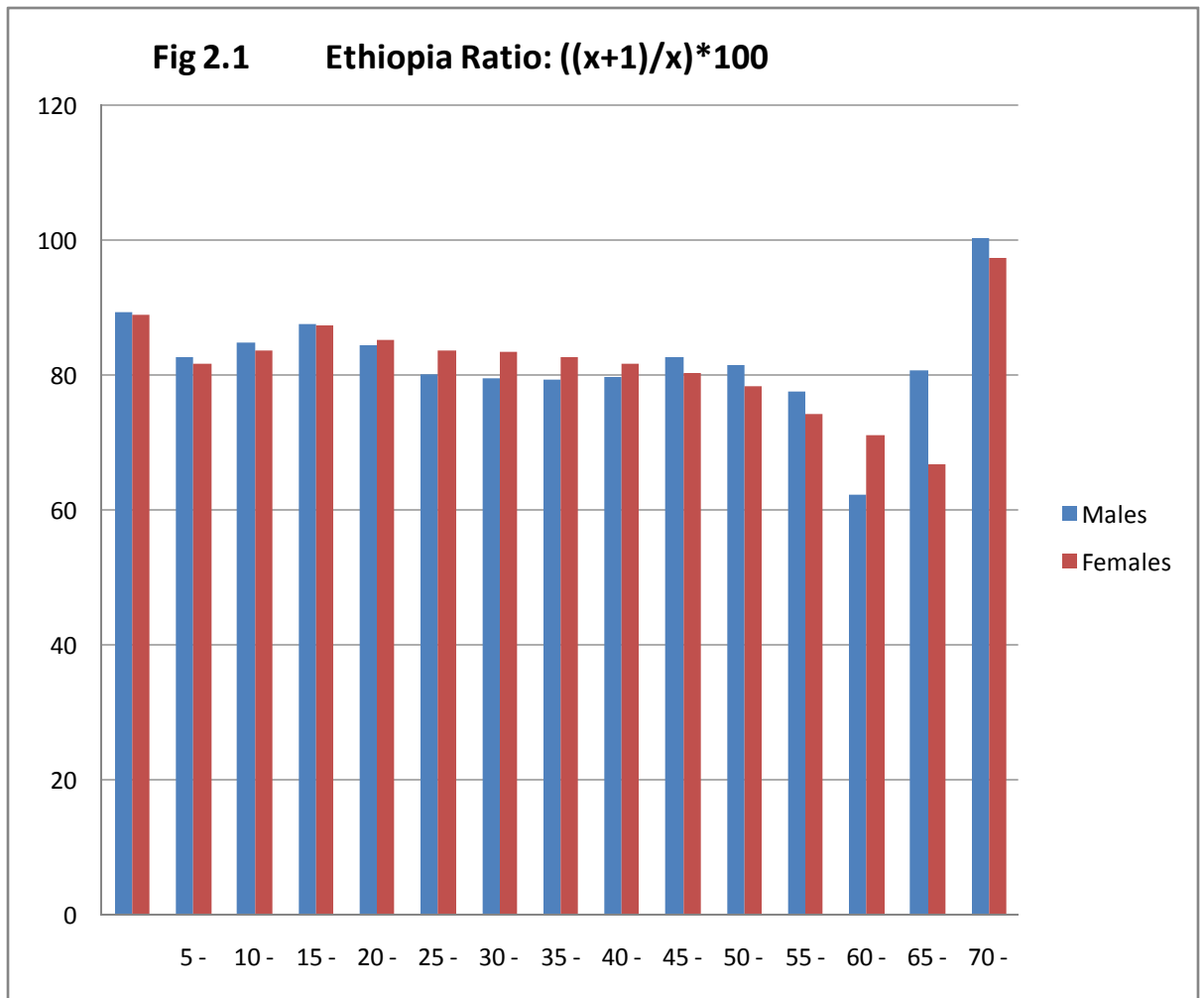
Ratio of populations in five-year age groups, to the preceding group

The table below shows the number of persons in an $x+1$ age group for every 100 persons in the x age group. For example there are 89 males in the 5 – 9 age group for every 100 males in the 0 – 4 age group (see the graph below). A similar table and graph are added at the bottom (United States 2000) for comparison. The table can also be regarded as a survivorship probability table.

For example, the ratio of children in rural Ethiopia in the 0 – 4 age group surviving to age 5 -9 is 0.89, and so on. The table shows, that the female “mortality advantage” commonly observed among virtually all human populations is absent in rural Ethiopia save the 25 – 45 age groups. Note, also, that the very prominent “mortality advantage” displayed in the US graph below at the higher ages is replaced in rural Ethiopia by a sizeable male advantage. This also has to be due to data error. If it is not, studies need to be conducted to discover the factors behind the implied underlying excess mortality for rural women in Ethiopia. Please note, however, that the focus on rural populations doesn’t imply the absence of similar observations in data for urban residents.

Table 2.2 Ethiopia Ratio of Age category (x+1) to x, 2007

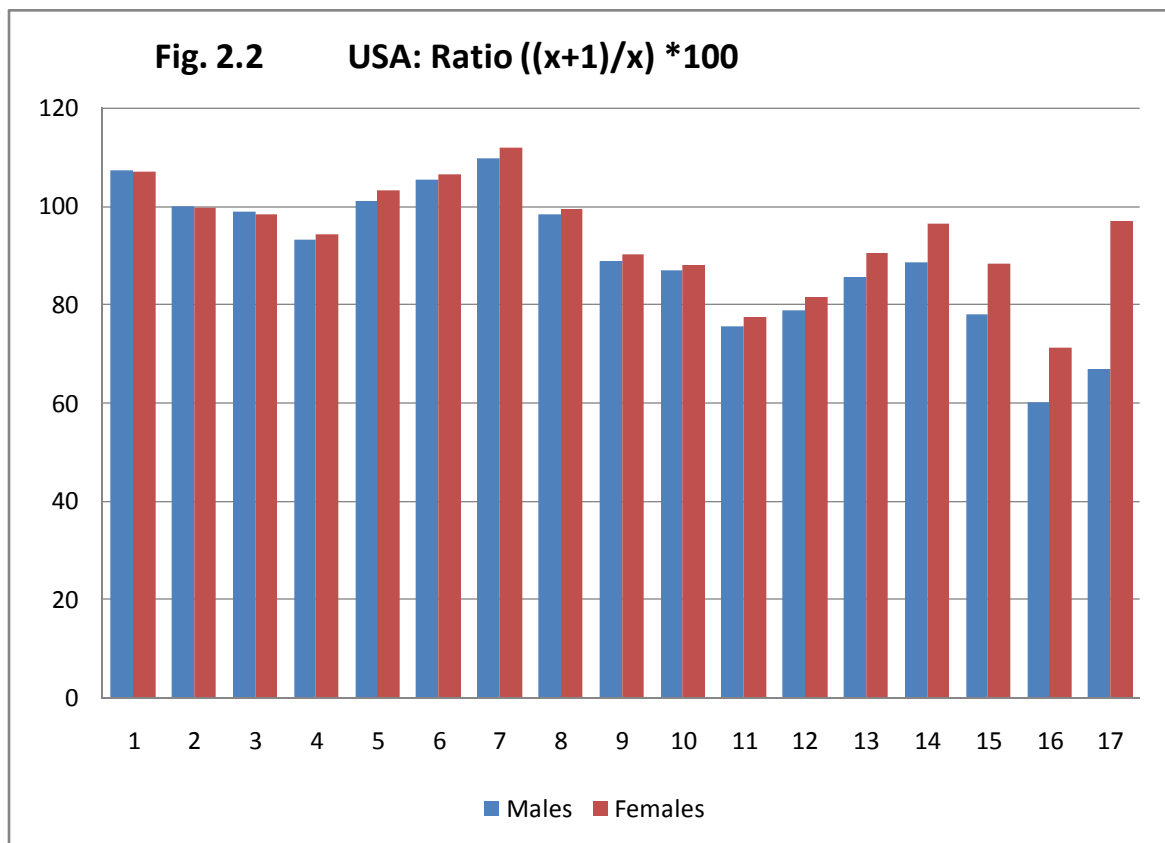
Rural Ethiopia, 2007					
Age Group	Category (x)	Males	Females	Ratio ((x+1)/x)*100	
				Males	Females
5 -	1	5477074	5415921	89.33403	88.75098
10 -	2	4892891	4806683	82.74292	81.60611
15 -	3	4048521	3922547	84.66386	83.55071
20 -	4	3427634	3277316	87.85991	87.40829
25 -	5	3011516	2864646	84.35027	85.25207
30 -	6	2540222	2442170	80.04466	83.51532
35 -	7	2033312	2039586	79.36805	83.43453
40 -	8	1613800	1701719	79.34205	82.72635
45 -	9	1280422	1407770	79.69951	81.68948
50 -	10	1020490	1150000	82.72095	80.22913
55 -	11	844159	922635	81.38597	78.25955
60 -	12	687027	722050	77.51675	74.16509
65 -	13	532561	535509	62.30817	71.0974
70 -	14	331829	380733	80.58247	66.74415
75 -	15	267396	254117	100.2805	97.19853
75+	16	268146	246998	0	0



Source: Based on [28]

Table 2.3 USA: Ratio of Age category (x+1) to x, 2007

United States , 2000			$((x+1)/x)*100$	
Age group	Males	Females	Males	Females
5-	9,810,733	9,365,065	0-	107.2629
10 -	10,523,277	10,026,228	5 -	99.97073
15-	10,520,197	10,007,875	10-	98.77195
20-	10,391,004	9,828,886	15-	93.2327
25-	9,687,814	9,276,187	20-	101.1452
30-	9,798,760	9,582,576	25-	105.3375
35-	10,321,769	10,188,619	30-	109.6585
40-	11,318,696	11,387,968	35-	98.32495
45-	11,129,102	11,312,761	40-	88.86167
50-	9,889,506	10,202,898	45-	87.03897
55-	8,607,724	8,977,824	50-	75.61498
60-	6,508,729	6,960,508	55-	78.91905
65-	5,136,627	5,668,820	60-	85.66637
70-	4,400,362	5,133,183	65-	88.69525
75-	3,902,912	4,954,529	70-	78.00473
80-	3,044,456	4,371,357	75-	60.27011
85-	1,834,897	3,110,470	80-	66.87013
85+	1,226,998	3,012,589		



Source: Based on [10]

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