Evaluation and analysis of socioeconomic data collected from censuses

United Nations Statistics Division
Socioeconomic characteristics

- Household and family composition
- Educational characteristics
  - Literacy
  - School attendance
  - Educational attainment
- Marital status
- Economic characteristics
  - Economic activity (labor force participation)
  - Status in employment

Core topics from the *Principles and Recommendations for Population and Housing Censuses, Rev. 2*
Household population

- The concept of household is based on the arrangements made by persons, individually or in groups, for providing themselves with food and other essentials for living
  - A household may be either (a) a one-person household, a person who makes provision for his or her own food and other essentials for living without combining with any other person to form a multi-person household or
  - a multi-person household, that is to say, a group of two or more persons living together who make common provision for food and other essentials for living
- The persons in the group may pool their resources and may have a common budget; they may be related or unrelated persons or constitute a combination of persons both related and unrelated
Institutional population

- The institutional population comprises persons who are not members of households and living in military installations, correctional and penal institutions, dormitories of schools and universities, religious institutions, hospitals and others.

- Personnel responsible for the running of an institution and not living in dormitories or similar accommodations should be excluded from the institutional population.
Household and family composition

- The **family** within the household is defined as those members of the household who are related, to a specified degree, through blood, adoption or marriage.

- The differences between the household and the family are that:
  - household may consist of only one person but a family must contain at least two members,
  - the members of a multi-person household need not be related to each other, while the members of a family must always be related.
How to analyze household characteristics

- Distribution of the households by size
- Average household size
- Distribution of households by composition
  - One-person household
  - *Nuclear household, consisting a single family nucleus,*
  - *Extended household, single family nucleus with other related persons, more than one nucleus family, etc.*
  - *Composite household, a single family nucleus with other non-related persons, two or more people related to each other but not family nucleus*

*Source: UN Principles and recommendations*
How to analyze household characteristics
**Household composition, Myanmar**

- **Relationship to the head of household**
  1. Head
  2. Spouse
  3. Son/daughter
  4. Son-daughter in law
  5. Grandchild/Great grandchild
  6. Parents/parents in law
  7. Siblings
  8. Grandparent
  9. Other relatives
  10. Adopted child
  11. Non relative
Figure 1: Household size in England and Wales, 2001 and 2011

Source: Census - Office for National Statistics
Average household size: Household population/Number of households
Household composition, New Zealand

<table>
<thead>
<tr>
<th></th>
<th>2001 Census</th>
<th>2006 Census</th>
<th>2013 Census</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-family household</td>
<td>70%</td>
<td>65%</td>
<td>60%</td>
</tr>
<tr>
<td>Two-family household</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Three or more family household</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>One-person household</td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
</tr>
</tbody>
</table>
Average HH Size, Myanmar

Average size
1983 census: 5.2
1997 FRHS: 5.0
2001 FRHS: 5.2
2007 FRHS: 4.9
Education

- Three core concepts;
  - **Literacy** – ability to read and write a short, simple statement
  - **School attendance** – current, regular attendance at an accredited educational institution or program
    - Distinguished from enrollment, which means that the student is officially registered at school, not necessarily that s/he actually goes to class
  - **Educational attainment** – highest grade completed within the most advanced level reached in the educational system
Education

- **How to evaluate the quality of data:**
  - Cohort analysis
  - Comparison of education indicators calculated from the census and other sources of data – household surveys, administrative registers
Cohort approach

- Use the demographic concept of birth cohort to generate time series data for people who were born in the same year/period by their completed level of education and literacy

- Analyze successive census data by cohorts - if they show the same or similar number/percentage for certain level of education while age increases

- Assumptions:
  - Population size changes with births and deaths only – no migration
  - People do not continue education after reaching certain age - based on educational system in a country
Cohort approach

- Data requirement: Consecutive population censuses by age groups, sex and literacy status and completed level of education

- Example for two successive censuses conducted in 1994 and 2004

<table>
<thead>
<tr>
<th>Age group</th>
<th>1994 Census</th>
<th>2004 Census</th>
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<tbody>
<tr>
<td>15-19</td>
<td>1,001,617</td>
<td>1,319,162</td>
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<tr>
<td>20-24</td>
<td>862,136</td>
<td>1,097,725</td>
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<tr>
<td>25-29</td>
<td>606,808</td>
<td>884,574</td>
</tr>
<tr>
<td>30-34</td>
<td>498,536</td>
<td>772,154</td>
</tr>
<tr>
<td>35-39</td>
<td>436,522</td>
<td>595,152</td>
</tr>
<tr>
<td>40-44</td>
<td>354,813</td>
<td>527,018</td>
</tr>
<tr>
<td>45-49</td>
<td>192,203</td>
<td>448,700</td>
</tr>
<tr>
<td>50-54</td>
<td>134,027</td>
<td>362,123</td>
</tr>
<tr>
<td>55-59</td>
<td>99,384</td>
<td>184,222</td>
</tr>
<tr>
<td>60-64</td>
<td>74,235</td>
<td>125,762</td>
</tr>
<tr>
<td>65-69</td>
<td>40,602</td>
<td>81,536</td>
</tr>
<tr>
<td>70-74</td>
<td>27,775</td>
<td>56,054</td>
</tr>
</tbody>
</table>
# Cohort approach

## Literate Population, Morocco, Male

<table>
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<tr>
<th>Age group</th>
<th>1994 Census</th>
<th>2004 Census</th>
<th>Year of birth</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-19</td>
<td>1,001,617</td>
<td>1,319,162</td>
<td>1984-89</td>
</tr>
<tr>
<td>20-24</td>
<td>862,136</td>
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<td>1979-84</td>
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<td>25-29</td>
<td>606,808</td>
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<td>1974-79</td>
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<td>30-34</td>
<td>498,536</td>
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<td>1969-74</td>
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<tr>
<td>35-39</td>
<td>436,522</td>
<td>595,152</td>
<td>1964-69</td>
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<td>40-44</td>
<td>354,813</td>
<td>527,018</td>
<td>1959-64</td>
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<td>45-49</td>
<td>192,203</td>
<td>448,700</td>
<td>1954-59</td>
</tr>
<tr>
<td>50-54</td>
<td>134,027</td>
<td>362,123</td>
<td>1949-54</td>
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<tr>
<td>55-59</td>
<td>99,384</td>
<td>184,222</td>
<td>1944-49</td>
</tr>
<tr>
<td>60-64</td>
<td>74,235</td>
<td>125,762</td>
<td>1939-44</td>
</tr>
<tr>
<td>65-69</td>
<td>40,602</td>
<td>81,536</td>
<td>1934-39</td>
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<tr>
<td>70-74</td>
<td>27,775</td>
<td>56,054</td>
<td>1929-34</td>
</tr>
</tbody>
</table>

Re-organization of data by birth cohorts
Cohort approach

Impact of out-migration among literate population?

Literate population by birth cohort, Morocco, 1994 and 2004 censuses

- 1994 Census Male
- 2004 Census Male
- 1994 Census Female
- 2004 Census Female
Basic indicators

- **Adult literacy rate:** Percentage of population aged 15 years and over who can both read and write
  - Literate pop. (15+)/ Total population (15+)

- **Youth literacy rate:** Percentage of persons aged 15-24 years who can both read and write in the population of that age group

- **Age-specific literacy rate**
  - Literate pop at age (X)/ Population at age X

*Source: Education Indicators Technical Guidelines, UNESCO, 2009*
Adult literacy rate

Figure 1. Adult literacy rate by region and sex, 2011

Central Asia: 100
Central and Eastern Europe: 99
East Asia and the Pacific: 95
Latin America and the Caribbean: 92
Arab States: 77
South and West Asia: 63
Sub-Saharan Africa: 59
Countries in transition: 100
Developing countries: 80
World: 84

Note: 2011 data refer to the period 2005-2011.
Youth literacy rate

Figure 7. Youth literacy rate by region and sex, 2011

Cohort approach

Educational attainment, Republic of Korea, 2000, 2005 and 2010 censuses

Upper secondary education, Male

Upper secondary education, Female

Thousands

2000 Census 2005 Census 2010 Census


2000 2005 2010

Ratio 2005-00 Ratio 2010-05
School attendance

- Percentage of children attending school by age
- Gross attendance ratio-by level of education
  - Total attendance in a specific level of education, regardless of age, expressed as a percentage of the eligible official school-age population corresponding to the same level of education in a given school year
- Net attendance rate-by level of education
  - Attendance of the official age group for a given level of education expressed as a percentage of the corresponding population
Percent of children attending school, by sex and age, Namibian 1991 and 2001 censuses
Percentage of students attending school by age and sex, Myanmar, 1983

Gross attendance ratio

\[ \text{GAR}_h^t = \frac{A_h^t}{P_{h,a}^t} \times 100 \]

- \( \text{GAR}_h^t \): Gross attendance ratio at level of education \( h \) in the year \( t \)
- \( A_h^t \): Students at the level of education \( h \) in the year \( t \)
- \( P_{h,a}^t \): Population in age group \( a \) which officially corresponds to the level of education \( h \) in year \( t \)
Net attendance rate

\[ NAR^t_h = \frac{A^t_{h,a}}{P^t_{h,a}} \times 100 \]

- \( NAR^t_h \): Net attendance rate at level of education \( h \) in the year \( t \)
- \( A^t_{h,a} \): Students of the population of age group \( a \) at level of education \( h \) in the year \( t \)
- \( P^t_{h,a} \): Population in age group \( a \) which officially corresponds to the level of education \( h \) in year \( t \)
Figure 5.1
Primary Net Attendance Ratio, by Region and Sex

Percentage in school

North Central 71 69
North East 50 39
North West 49 34
South East 82 78
South South 83 81
South West 81 85

Nigeria DHS 2003

Figure 5.2
Primary Gross Attendance Ratio, by Region and Sex

Nigeria DHS 2003
Marital status

- Marital status is the personal status of each individual in relation to the marriage laws or customs of the country. The categories of marital status should at least include the following:
  - Single (never married)
  - Married
  - Married but separated—comprise both legally and de facto separated
  - Widowed and not married
  - Divorced and not married
Marital status

1994 Population and Housing Census of Tunisia

Percentage of population by marital status and age, Male

Percentage of population by marital status and age, Female

Proportion of widowed men

Proportion of widowed women

Single, Married, Divorced, Widowed
Comparison with survey data

Very similar pattern between the census and DHS

Slight difference in the last age group
Singulate Mean Age at First Marriage (SMAFM)

- Technique for estimating the mean age at first marriage when actual dates of marriage are not available
  - a period measure (uses a synthetic cohort)
- Very simple data requirements:
  - Total number of women by 5-year age groups
  - Total number of ever-married women by 5-year age groups
SMAFM calculation (1)

<table>
<thead>
<tr>
<th>Age</th>
<th>Total women (1)</th>
<th>Ever-married women (2)</th>
<th>PEM x (1)/(2) (3)</th>
<th>Sx</th>
<th>n Sx</th>
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<td>0 - 4</td>
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<td>0</td>
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<tr>
<td>10 - 14</td>
<td>1,761,063</td>
<td>41,360</td>
<td>0.024</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 - 19</td>
<td>1,383,564</td>
<td>411,065</td>
<td>0.297</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 - 24</td>
<td>1,192,989</td>
<td>898,688</td>
<td>0.753</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 - 29</td>
<td>948,950</td>
<td>848,639</td>
<td>0.896</td>
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<td></td>
</tr>
<tr>
<td>30 - 34</td>
<td>711,856</td>
<td>668,129</td>
<td>0.939</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35 - 39</td>
<td>528,430</td>
<td>506,944</td>
<td>0.959</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40 - 44</td>
<td>427,753</td>
<td>413,149</td>
<td>0.965</td>
<td></td>
<td></td>
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<tr>
<td>45 - 49</td>
<td>285,083</td>
<td>276,787</td>
<td>0.971</td>
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</table>

SMAFM calculation (2)

<table>
<thead>
<tr>
<th>Age</th>
<th>Total women</th>
<th>Ever-married women</th>
<th>PEMx = (2)/(1)</th>
<th>Sx = 1 - PEMx/PEMult</th>
<th>n*Sx</th>
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<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
</tr>
<tr>
<td>0 - 4</td>
<td>2,272,297</td>
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<td>0</td>
<td>1.000</td>
<td>6.000</td>
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<tr>
<td>5.9</td>
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<td>1.000</td>
<td>5.000</td>
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<tr>
<td>25 - 29</td>
<td>946,960</td>
<td>848,639</td>
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<td>0.077</td>
<td>0.385</td>
</tr>
<tr>
<td>30 - 34</td>
<td>711,666</td>
<td>668,129</td>
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<td>0.061</td>
<td>0.320</td>
</tr>
<tr>
<td>35 - 39</td>
<td>528,430</td>
<td>506,944</td>
<td>0.959</td>
<td>0.012</td>
<td>0.060</td>
</tr>
<tr>
<td>40 - 44</td>
<td>427,753</td>
<td>413,149</td>
<td>0.966</td>
<td>0.005</td>
<td>0.026</td>
</tr>
<tr>
<td>45 - 49</td>
<td>286,083</td>
<td>276,787</td>
<td>0.971</td>
<td>0.000</td>
<td>0.001</td>
</tr>
</tbody>
</table>

SMAFM = \sum n\ast Sx = 20.107
Table 3.2  Singulate Mean Age at Marriage and Proportion Never Married from the 1973 and 1983 Censuses, 1991 PCFS, 1997, 2001 and 2007 FRHS

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
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<td><strong>Female</strong></td>
<td>Census</td>
<td>Census</td>
<td>PCFS</td>
<td>FRHS</td>
<td>FRHS</td>
<td>FRHS</td>
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<tr>
<td>Union</td>
<td>21.2</td>
<td>22.4</td>
<td>24.5</td>
<td>26.0</td>
<td>25.8</td>
<td>26.1</td>
</tr>
<tr>
<td>Urban</td>
<td>21.9</td>
<td>23.3</td>
<td>26.3</td>
<td>28.0</td>
<td>27.2</td>
<td>26.7</td>
</tr>
<tr>
<td>Rural</td>
<td>21.0</td>
<td>22.1</td>
<td>23.7</td>
<td>25.3</td>
<td>25.3</td>
<td>26.0</td>
</tr>
<tr>
<td><strong>Male</strong></td>
<td>Census</td>
<td>Census</td>
<td>PCFS</td>
<td>FRHS</td>
<td>FRHS</td>
<td>FRHS</td>
</tr>
<tr>
<td>Union</td>
<td>23.8</td>
<td>24.5</td>
<td>26.3</td>
<td>27.6</td>
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<td>Urban</td>
<td>24.9</td>
<td>25.7</td>
<td>28.1</td>
<td>29.7</td>
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<tr>
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<td>24.1</td>
<td>25.6</td>
<td>26.8</td>
<td>27.1</td>
<td>27.3</td>
</tr>
</tbody>
</table>
Economic activity

- Two concepts of the economically active population can be distinguished:
  
  (a) The *usually active population*, measured in relation to a long reference period such as a year
  
  (b) The *currently active population* (or, equivalently, the labour force), measured in relation to a short reference period such as one week or one day
Economic activity

- Current activity status – a person’s relationship to economic activity during a short reference period (typically a week)
  - Employed – a person who worked a defined, minimum amount of time over the reference period (may be as little as an hour)
  - Unemployed – a person who did not work the minimum amount of time during the reference period but was willing and able to work and looking for a job
  - Inactive (out of labor force) – a person who did not work the minimum amount of time during the reference period and did not want to work/was not looking for work
- Both the employed and the unemployed are economically active!
  - Employed + unemployed = labor force
**Economic activity**

- **Usual activity status** – The usually active population comprises all persons above a specified age whose main activity status, as determined in terms of the total number of weeks or days during a long specified period (such as the preceding 12 months or the preceding calendar year) was employed and/or unemployed
  - Usually employed population: number of weeks or days employed is more than unemployed
  - Usually unemployed population: number of weeks or days employed is less than unemployed
- Both the employed and the unemployed are economically active!
Figure 5

**Usually active population**

TOTAL POPULATION

- Population above specific age
- Population below specific age

**Over long reference period (for example, 1 year), number of weeks employed** and/or **unemployed** ≥ threshold (for example, 26 weeks)

**Over long reference period (for example, 1 year), number of weeks (days) employed** and/or **unemployed** < threshold (for example, 26 weeks)

- Usually active population
- Population not usually active

Usually employed population

Usually unemployed population

---


** As defined for current activity
Economic activity

- Difficulties:
  - What does “work” mean?
    - Goods and services produced for the market
    - Goods produced for own-use (replacing need to buy on market)
  - In practice, this is quite difficult to measure, especially in areas with large agricultural or informal economies
  - Women’s home-based production in particular is often undercounted in surveys
  - What does “looking for a job” mean?
    - E.g. some persons may have registered at a government labor office months ago, but done nothing else. Are they looking for a job?
Available data in the 2014 census

- Activity status-Q22
  - Employee (Government)
  - Employee (Private)
  - Employer
  - Own account worker
  - Contributing family worker
  - Sought work
  - Did not seek work
  - Full time student

- Household work
  - Pensioner, retired and elderly person
  - Disabled
  - Other
<table>
<thead>
<tr>
<th>Available data in the 2014 census</th>
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</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>1. Employee (Government)</td>
</tr>
<tr>
<td>2. Employee (Private)</td>
</tr>
<tr>
<td>3. Employer</td>
</tr>
<tr>
<td>4. Own account worker</td>
</tr>
<tr>
<td>5. Contributing family worker</td>
</tr>
<tr>
<td><strong>Unemployed</strong></td>
</tr>
<tr>
<td>1. Sought work</td>
</tr>
</tbody>
</table>
Basic indicators

- **Labor force participation rate**

\[
LFPR = \frac{\text{Number of persons employed} + \text{Number of persons unemployed}}{\text{Number of persons in the working age population}} \times 100
\]

- **Unemployment rate**

\[
UR = \frac{\text{Number of unemployed persons in the working age population}}{\text{Total number of persons in the labor force}} \times 100
\]

Source: Decent work indicators, Guidelines for producers and users of statistical and legal framework indicators, ILO Manual, Second version, 2013
Basic indicators

- Age-specific labor force participation rate

\[
LFPR(a) = \frac{\text{Number of persons employed}(a) + \text{Number of persons unemployed}(a)}{\text{Number of persons in the working age population}(a)} \times 100
\]

- Age specific unemployment rate

\[
UR(a) = \frac{\text{Number of unemployed persons in the working age population}(a)}{\text{Total number of persons in the labor force}(a)} \times 100
\]
**Labor force participation rate (\%), Myanmar, 1983**

LFPR for working age population (10-64)
- Male % 63.09
- Female % 34.98
Unemployment rate (%), Myanmar, 1983

Unemployment rate for working age population

Male % 2.00
Female % 1.17
Basic indicators

- Employment to population ratio

\[ EPR = \frac{\text{Number of employed persons in the working age population}}{\text{Total number of persons in working age population}} \times 100 \]

- EPR, Myanmar, 1983
  - Total: % 48.07
  - Male: % 61.83
  - Female: % 34.57
Employment status

- Status in employment refers to the type of explicit or implicit contract of employment with other persons or organizations.
- Care should be taken to ensure that an economically active person is classified by status in employment on the basis of the same job(s) as used for classifying the person by "occupation", "industry" and "sector".
- Recommended classification:
  (a) Employees
  (b) Employers
  (c) Own-account workers
  (d) Contributing family workers
  (e) Members of producers’ cooperatives
  (f) Persons not classifiable by status
Percentage distribution of employment status, 1983 Census

- Employer
- Own account worker
- Employee-Private
- Employee-Cooperative
- Employee-Government
- Unpaid family worker

Male
Female
Some remarks

- Census results are closely connected with other areas of statistical activities, therefore supplementary information about the census should be provided to the users for clarification of comparability of census data with previous censuses and other data sources
- Further analysis for interpreting the findings
References

• *Principles and Recommendations for Population and Housing Censuses Revision 2, 2008, United Nations*,

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