

Accuracy of Data on the General Housing and Population Statistics in Algeria: Measurement and Correction

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ABSTRACT

BACKGROUND

Comparing the results of the five censuses, we find that the 2008 census is good and acceptable, and is the best of all the censuses of 1966, 1977, 1987, and 1998.

OBJECTIVE

We will review and correct these results, if necessary, so that we can conduct measurements on some indicators related to the population category in Algeria.

METHODOLOGY

We will use some electronic processing programs, such as PAS Papers, to measure the accuracy of the data for the five general statistics, as represented by the United Nations Secretariat Manual.

RESULTS

The weakness of the data in the first and second censuses is greater than 20. In the 1966 census, it exceeded 31.8, and in the 1977 census, it reached 24.4. This is due to Algeria's independence, the lack of experience among statisticians, and weak data collection, etc., which inevitably leads to poor data accuracy.

KEYWORDS: Correction, Measure, Data Sources, Population Statistics, Algeria.

1. Introduction

The primary data sources for Algerian national statistics include population censuses, sample surveys, vital registers, and population registers. The National Statistics Office (ONS) is the primary body responsible for collecting and disseminating this data.

Collecting and using a standard set of population data from a census helps in assessing the change that occurs over time in a country, as well as evaluating the performance of that country, measuring and analyzing the size and growth of population groups. The data should be classified by age and sex (Yekhlef 2018), and from it we can identify a type of source for studying these phenomena.

We will review and correct the data if necessary to enable us to measure some indicators related to the population category in Algeria. We will use electronic processing programs, such as PAS, to measure the accuracy of the data for the five general statistics, as represented by the United Nations Secretariat Manual.

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2. Methodology and techniques used

There are various analytical methods used to evaluate age and gender data. We will briefly review these methods below; Sex Ratio Analysis, Age Ratio Analysis, Population Pyramid (Moultrie et al. 2017).

Accuracy of classifications using specific indices: United Nations Age-Sex Accuracy Index, and Whipple's Index, and Myer's Index (Dodd 2010).

From these three indices, I selected a suitable index to measure the accuracy of data for the five general statistics, which is the United Nations Secretariat Manual (USAID 2025).

United Nations Age-Sex Accuracy Index: This is a combined index for both the sex ratio index and the age ratio. It was developed by the United Nations to measure the accuracy of age and sex data in censuses. It is calculated using the following formula: United Nations Secretariat Index = 3 times the sex ratio + the age ratio (for males) + the age ratio (for females).

Age and gender data accuracy index: A value below 20 indicates that the age and gender data are accurate. A value between 20 and 40 indicates that the age and gender data are moderately weak. However, a value above 40 indicates that the age and gender data are inaccurate and suffer from significant age-reporting problems.

To calculate this, follow these steps (Gumbo 2016):

- Calculate the sex ratios for the five age groups.
- Obtain the successive differences in the sex ratios for the age groups, and the successive differences, regardless of whether the sign is positive or negative. From this sum, calculate the average of the differences.
- The age distribution is calculated into five-year age groups for both males and females, divided by 100, and the mean deviations of the age ratios for both males and females are calculated. The United Nations index value is then found, according to the aforementioned equation: UN Secretariat Index = 3 times the sex ratio + the age ratio (for males) + the age ratio (for females).

3. National Census of Housing and Population 1966

When we put the results of the first post-independence national census of housing and population in the age sex calculation sheet of the United Nations Population Analysis Spreadsheet (PAS), we obtained the following results:

Table 1: National Census of Housing and Population 1966

| Age | Number of | | Percentages | | Standard deviation | | Sex ratio (males per 100 females) | Difference in sex ratio |
|------------|--------------|--------------|-------------|---------|--------------------|---------|--------------------------------------|-------------------------|
| | males | Females | males | Females | males | Females | | |
| | 6 062 915 | 6 012 340 | | | | | | |
| 0-4 | 1 188 403 | 1 155 798 | | | | | 100,8 | |
| 5-9 | 908 979 | 881 481 | 90,5 | 92,6 | -9,5 | -7,4 | 103,1 | 0,3 |

| | | | | | | | | |
|-------------------------------|------------|---------|-------|-------|-------|-------|-------|-------|
| 10-14 | 821 116 | 748 383 | 112,3 | 105,1 | 12,3 | 5,1 | 109,7 | 6,6 |
| 15-19 | 553 188 | 542 468 | 90,5 | 92,7 | -9,5 | -7,3 | 102,0 | -7,7 |
| 20-24 | 400 907 | 421 669 | 85,4 | 88,3 | -14,6 | -11,7 | 95,1 | -6,9 |
| 25-29 | 385 459 | 413 074 | 102,5 | 103,2 | 2,5 | 3,2 | 93,3 | -1,8 |
| 30-34 | 350 989 | 378 904 | 102,6 | 105,6 | 2,6 | 5,6 | 92,6 | -0,7 |
| 35-39 | 298 526 | 304 463 | 102,5 | 98,7 | 2,5 | -1,3 | 98,1 | 5,4 |
| 40-44 | 231 669 | 237 911 | 92,6 | 95,3 | -7,4 | -4,7 | 97,4 | -0,7 |
| 45-49 | 202 100 | 194 982 | 98,5 | 93,6 | -1,5 | -6,4 | 103,7 | 6,3 |
| 50-54 | 178 677 | 178 792 | 99,5 | 106,1 | -0,5 | 6,1 | 99,9 | -3,7 |
| 55-59 | 156 962 | 142 063 | 100,8 | 90,5 | 0,8 | -9,5 | 110,5 | 10,6 |
| 60-64 | 132 890 | 134 989 | 102,8 | 113,2 | 2,8 | 13,2 | 98,4 | -12,0 |
| 65-69 | 101 491 | 96 482 | 103,0 | 91,1 | 3,0 | -8,9 | 105,2 | 6,7 |
| 70-74 | 64 268 | 76 926 | #N/A | #N/A | 0,0 | 0,0 | 83,5 | -21,6 |
| 75+ | 87 291 | 103 955 | #N/A | #N/A | #N/A | #N/A | 84,0 | #N/A |
| Age ratio results for males | | | | 5,3 | | | | |
| Age ratio results for females | | | | 7,0 | | | | |
| Sex ratio results | | | | 6,5 | | | | |
| Age × gender index | | | | 31,8 | | | | |

From these results we conclude that the results of the 1966 Algerian census are somewhat weak (the accuracy index of age and gender data is 31.8, i.e. above 20), and this is due to the presence of errors in the data, from various sources that differ according to the role, activity or stage, and they may appear in the initial stages due to shortcomings in the design of the census form, and the method of formulating its entries.

Errors may arise from the data provided by the individuals surveyed about themselves and their families, due to a lack of knowledge of the answer or a deliberate incorrect or

inaccurate answer. The source of errors may also be the enumerator (when they record incorrect information, such as the age of the respondent, when estimating the respondent's age), or their inability to accurately ask the respondent questions. Errors may also arise during data processing or when preparing it for publication.

But it is not so weak as to be corrected, and its results can be used in future calculations.

4. Housing and Population Census 1977

When we insert the results of the second post-independence national housing and population census of 1977 into the agesex spreadsheet of the United Nations Population Analysis Spreadsheet (PAS), we obtain the following results (see table below):

Table 2: Housing and Population Census 1977

| Age | Number of | | Percentages | | Standard deviation | | Sex ratio (males per 100 females) Percentages | Difference in sex ratio Standard deviation |
|--------------|--------------|--------------|-------------|---------|--------------------|---------|---|--|
| | males | Females | males | Females | males | Females | | |
| | 7 989 204 | 8 070 820 | | | | | 99,0 | |
| 0-4 | 1 542 314 | 1 479 633 | | | | | 104,2 | |
| 5-9 | 1 298 291 | 1 245 060 | 98,5 | 98,8 | -1,5 | -1,2 | 104,3 | 0,0 |
| 10-14 | 1 094 935 | 1 039 761 | 102,8 | 100,7 | 2,8 | 0,7 | 105,3 | 1,0 |
| 15-19 | 832 400 | 820 538 | 94,6 | 93,8 | -5,4 | -6,2 | 101,4 | -3,9 |
| 20-24 | 663 971 | 708 909 | 98,9 | 105,3 | -1,1 | 5,3 | 93,7 | -7,8 |
| 25-29 | 510 205 | 526 249 | 103,4 | 97,3 | 3,4 | -2,7 | 97,0 | 3,3 |
| 30-34 | 323 294 | 372 499 | 77,9 | 82,1 | -22,1 | -17,9 | 86,8 | -10,2 |
| 35-39 | 320 076 | 380 946 | 102,0 | 106,3 | 2,0 | 6,3 | 84,0 | -2,8 |
| 40-44 | 304 089 | 344 123 | 105,8 | 103,2 | 5,8 | 3,2 | 88,4 | 4,3 |
| 45-49 | 254 793 | 286 182 | 100,8 | 102,8 | 0,8 | 2,8 | 89,0 | 0,7 |
| 50-54 | 201 430 | 212 855 | 93,5 | 89,5 | -6,5 | -10,5 | 94,6 | 5,6 |
| 55-59 | 176 022 | 189 397 | 101,9 | 104,7 | 1,9 | 4,7 | 92,9 | -1,7 |

| | | | | | | | | |
|-------------------------------|------------|---------|-------------|-------|------|------|-------|------|
| 60-64 | 144 146 | 148 929 | 93,1 | 93,7 | -6,9 | -6,3 | 96,8 | 3,9 |
| 65-69 | 133 474 | 128 482 | 114,1 | 111,6 | 14,1 | 11,6 | 103,9 | 7,1 |
| 70-74 | 89 836 | 81 310 | #N/A | #N/A | 0,0 | 0,0 | 110,5 | 6,6 |
| 75+ | 99 928 | 105 947 | #N/A | #N/A | #N/A | #N/A | 94,3 | #N/A |
| Age ratio results for males | | | 5,7 | | | | | |
| Age ratio results for females | | | 6,1 | | | | | |
| Sex ratio results | | | 4,2 | | | | | |
| Age × gender index | | | 24,4 | | | | | |

From the results obtained in the table, we note that the accuracy index of age and gender data improved during this census of 1977 compared to the census that preceded it in 1966, as it became around 24.4, which is approaching the number 20, but the data remains somewhat weak.

The average deviation from 100 for the age accuracy scale for males is weak at 5.3, and less than the deviations for females by a difference of 0.4 (6.1-5.7=0.4), and the gender accuracy scale is somewhat weak at 4.2, but the census data for the year 1977 can be used.

5. National Census of Housing and Population 1987

When we put the results of the third national census after independence for the year 1987 for housing and population in the calculation sheet agesex of the United Nations Population Analysis Spreadsheet (PAS) we get the following results:

Table 3: National Census of Housing and Population 1987

| Age | Number of | | Percentages | | Standard deviation | | Sex ratio (males per 100 females) Percentages | Differen- ce in sex ratio Standard devia- tion |
|--------------|---------------|---------------|-------------|--------------|--------------------|--------------|---|---|
| | males | Females | males | Fema- les | males | Fem- ales | | |
| | 11 561 952 | 11 306 674 | | | | | 102,3 | |
| 0-4 | 1 941 069 | 1 859 991 | | | | | 104,4 | |
| 5-9 | 1 735 044 | 1 665 121 | 101,3 | 102,2 | 1,3 | 2,2 | 104,2 | -0,2 |
| 10-14 | 1 485 426 | 1 399 450 | 99,1 | 96,4 | -0,9 | -3,6 | 106,1 | 1,9 |
| 15-19 | 1 263 639 | 1 238 577 | 96,9 | 99,0 | -3,1 | -1,0 | 102,0 | -4,1 |

| | | | | | | | | |
|-------------------------------|-----------|-----------|-------------|-------|-------|-------|-------|------|
| 20-24 | 1 122 123 | 1 103 455 | 106,4 | 107,3 | 6,4 | 7,3 | 101,7 | -0,3 |
| 25-29 | 846 235 | 818 300 | 91,8 | 92,1 | -8,2 | -7,9 | 103,4 | 1,7 |
| 30-34 | 721 979 | 672 633 | 105,0 | 100,9 | 5,0 | 0,9 | 107,3 | 3,9 |
| 35-39 | 529 048 | 515 207 | 97,9 | 98,2 | -2,1 | -1,8 | 102,7 | -4,6 |
| 40-44 | 358 783 | 376 812 | 82,4 | 85,3 | -17,6 | -14,7 | 95,2 | -7,5 |
| 45-49 | 341 768 | 367 949 | 101,0 | 101,8 | 1,0 | 1,8 | 92,9 | -2,3 |
| 50-54 | 317 822 | 346 336 | 107,0 | 107,6 | 7,0 | 7,6 | 91,8 | -1,1 |
| 55-59 | 252 173 | 275 747 | 97,7 | 98,8 | -2,3 | -1,2 | 91,5 | -0,3 |
| 60-64 | 198 403 | 211 707 | 97,1 | 95,7 | -2,9 | -4,3 | 93,7 | 2,3 |
| 65-69 | 156 670 | 166 578 | 100,2 | 102,5 | 0,2 | 2,5 | 94,1 | 0,3 |
| 70-74 | 114 450 | 113 450 | #N/A | #N/A | 0,0 | 0,0 | 100,9 | 6,8 |
| 75+ | 177 320 | 175 361 | #N/A | #N/A | #N/A | #N/A | 101,1 | #N/A |
| Age ratio results for males | | | 4,5 | | | | | |
| Age ratio results for females | | | 4,4 | | | | | |
| Sex ratio results | | | 2,7 | | | | | |
| Age × gender index | | | 16,9 | | | | | |

Through the results obtained in the table, we note that the accuracy index of age and gender data improved during this census of 1987 compared to the census that preceded it in 1977, as it became around 16.9, and for the first time in the history of the Algerian census it fell below the number 20, and thus it became good.

The average deviation from 100 for the age accuracy scale for males is 4.5, and is less than the deviations for males by only 0.1 (4.5-4.4=0.1), unlike what was in the previous census, and the gender accuracy scale is weak, 2.7, and from it the census data for the year 1987 can be used in the other calculations that we will conduct.

6. National Population and Housing Census 1998

When we put the results of the fourth national census after independence for the year 1998 for housing and population in the calculation sheet agesex from the United Nations POPULATION ANALYSIS SPREADSHEETS (PAS) spreadsheet, we obtained the following results:

Table 4: National Population and Housing Census 1998

| Age | Number of | Percentages | Standard deviation | Sex ratio (males per | |
|-----|-----------|-------------|--------------------|----------------------|--|
| | | | | | |

| | males | Females | males | Females | males | Females | 100 females) Percentages | Difference in sex ratio Standard deviation |
|--------------|---------------|---------------|-------|---------|-------|---------|-----------------------------|--|
| | 14 680 452 | 14 386 102 | | | | | 102,0 | |
| 0-4 | 1 626 710 | 1 552 095 | | | | | 104,8 | |
| 5-9 | 1 819 736 | 1 753 397 | 102,7 | 103,1 | 2,7 | 3,1 | 103,8 | -1,0 |
| 10-14 | 1 917 719 | 1 849 840 | 106,5 | 106,6 | 6,5 | 6,6 | 103,7 | -0,1 |
| 15-19 | 1 781 581 | 1 716 653 | 105,1 | 104,3 | 5,1 | 4,3 | 103,8 | 0,1 |
| 20-24 | 1 471 408 | 1 442 582 | 96,8 | 97,5 | -3,2 | -2,5 | 102,0 | -1,8 |
| 25-29 | 1 259 226 | 1 242 699 | 99,7 | 99,9 | -0,3 | -0,1 | 101,3 | -0,7 |
| 30-34 | 1 055 474 | 1 044 610 | 100,5 | 101,0 | 0,5 | 1,0 | 101,0 | -0,3 |
| 35-39 | 841 255 | 825 591 | 96,3 | 95,4 | -3,7 | -4,6 | 101,9 | 0,9 |
| 40-44 | 690 811 | 686 929 | 98,3 | 100,3 | -1,7 | 0,3 | 100,6 | -1,3 |
| 45-49 | 564 892 | 543 548 | 106,3 | 100,9 | 6,3 | 0,9 | 103,9 | 3,4 |
| 50-54 | 371 537 | 390 708 | 81,7 | 87,1 | -18,3 | -12,9 | 95,1 | -8,8 |
| 55-59 | 345 039 | 353 098 | 102,6 | 99,2 | 2,6 | -0,8 | 97,7 | 2,6 |
| 60-64 | 300 982 | 320 837 | 100,9 | 104,9 | 0,9 | 4,9 | 93,8 | -3,9 |
| 65-69 | 251 796 | 258 507 | 108,5 | 105,6 | 8,5 | 5,6 | 97,4 | 3,6 |
| 70-74 | 163 106 | 168 793 | 90,8 | 91,6 | -9,2 | -8,4 | 96,6 | -0,8 |
| 75-79 | 107 595 | 110 169 | #N/A | #N/A | #N/A | #N/A | 97,7 | #N/A |
| 80+ | 111 585 | 126 046 | #N/A | #N/A | #N/A | #N/A | | #N/A |

| | |
|-------------------------------|------|
| Age ratio results for males | 5,0 |
| Age ratio results for females | 4,0 |
| Sex ratio results | 2,1 |
| Age × gender index | 15,2 |

From the results obtained in the table, we note that the accuracy index of age and gender data improved during this census for the year 1998 compared to the census that preceded it for the year 1987, as it became around 15.2, and with this improvement in the level of accuracy of age data.

Gender is significant over the four consecutive censuses, with the average deviation from 100 for the age accuracy scale for males being 5.0, and significantly less than the deviation for females at 1.0 ($5.0-4.0 = 1.0$), and the gender accuracy scale being weak at 2.1, so we can use the 1998 census data.

7. National Census of Population and Housing in Algeria 2008

When we put the results of the fifth national census after independence for the year 2008 for housing and population in the agesex calculation sheet from the United Nations Population Analysis Spreadsheet (PAS), we obtained the following results:

Table 5: National Census of Population and Housing in Algeria 2008

| Age | Number of | | Percentages | | Standard deviation | | Sex ratio (males per 100 females) Percentages | Difference in sex ratio Standard deviation |
|--------------|-----------|---------|-------------|---------|--------------------|---------|---|--|
| | males | Females | males | Females | males | Females | | |
| 17 | 16 847 | | | | | | 102,3 | |
| 232 | 284 | | | | | | | |
| 746 | | | | | | | | |
| 0-4 | 1 750 | 1 654 | | | | | 105,8 | |
| | 097 | 821 | | | | | | |
| 5-9 | 1 475 | 1 412 | 86,5 | 86,9 | -13,5 | -13,1 | 104,5 | -1,3 |
| | 674 | 702 | | | | | | |
| 10-14 | 1 662 | 1 596 | 100,0 | 99,8 | 0,0 | -0,2 | 104,1 | -0,3 |
| | 260 | 513 | | | | | | |
| 15-19 | 1 847 | 1 787 | 103,8 | 103,2 | 3,8 | 3,2 | 103,3 | -0,8 |
| | 311 | 859 | | | | | | |
| 20-24 | 1 895 | 1 867 | 106,0 | 107,4 | 6,0 | 7,4 | 101,5 | -1,8 |
| | 704 | 802 | | | | | | |
| 25-29 | 1 730 | 1 691 | 105,7 | 104,8 | 5,7 | 4,8 | 102,3 | 0,8 |
| | 409 | 968 | | | | | | |
| 30-34 | 1 379 | 1 361 | 95,2 | 95,0 | -4,8 | -5,0 | 101,3 | -1,0 |
| | 085 | 910 | | | | | | |

| | | | | | | | | |
|-------------------------------|--------------|--------------|-------|-------|-------|-------|-------|------|
| 35- 39 | 1 167 249 | 1 175 529 | 97,8 | 99,1 | -2,2 | -0,9 | 99,3 | -2,0 |
| 40- 44 | 1 007 683 | 1 010 644 | 101,6 | 101,7 | 1,6 | 1,7 | 99,7 | 0,4 |
| 45- 49 | 817 004 | 812 432 | 96,7 | 97,0 | -3,3 | -3,0 | 100,6 | 0,9 |
| 50- 54 | 682 357 | 664 337 | 100,0 | 100,1 | 0,0 | 0,1 | 102,7 | 2,1 |
| 55- 59 | 547 181 | 515 398 | 105,5 | 100,9 | 5,5 | 0,9 | 106,2 | 3,5 |
| 60- 64 | 354 694 | 356 788 | 82,3 | 85,8 | -17,7 | -14,2 | 99,4 | -6,8 |
| 65- 69 | 314 958 | 316 345 | 104,4 | 103,2 | 4,4 | 3,2 | 99,6 | 0,1 |
| 70- 74 | 248 672 | 256 254 | #N/A | #N/A | 0,0 | 0,0 | 97,0 | -2,5 |
| 75+ | 352 408 | 365 982 | #N/A | #N/A | #N/A | #N/A | 96,3 | #N/A |
| Age ratio results for males | | | | | | | | |
| 5,3 | | | | | | | | |
| Age ratio results for females | | | | | | | | |
| 4,4 | | | | | | | | |
| Sex ratio results | | | | | | | | |
| 1,7 | | | | | | | | |
| Age × gender index | | | | | | | | |
| 14,9 | | | | | | | | |

From the results obtained in the table, we note that the accuracy index of age and gender data declined during this census for the year 2008, which is good and accurate, because the average deviations from 100 for the male age accuracy scale were weak, but more than the deviations for females by a difference of 0.9 (5.3-4.4 = 0.9). As for the gender accuracy scale, it is also considered good, as the age and gender accuracy index is equal to 14.9.

Comparing these results with the United Nations value index, we note that this value is less than 20. This indicates that the age and gender data for the fifth general housing and population census in Algeria for the year 2008 are accurate and free of errors. From this, its results can be used in the calculations used.

8. Results and Conclusion

Comparing the results of the fifth census of 2008 with the results of the previous four censuses, they are considered good, acceptable, and the best among all the censuses of 1966, 1977, 1987, and 1998. When placing the results of each census in the AGESEX calculation sheet in the population analysis spreadsheet (PAS), we obtain the previous results, which can be summarized.

The weakness of the data in the first and second censuses (greater than 20, in the 1966 census it exceeded 31.8, and in the 1977 census it reached 24.4) is due to the independence of Algeria, the lack of experience among those working in the field of statistics, and the weakness of the statements...etc. which inevitably leads to weak accuracy of the data.

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