Estimating Population Of Idah Local Government Area Using Cadastral And CAMA Data

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Abstract: The aim of this research was to estimate the population of Idah Local Government Area using Cadastral and CAMA Data. The 1991 census count was used as a base for applying the CAMA postulation in order to estimate the expected population value for 2006. The estimated returned value from the process was compared with the actual head count. The procedure involved the determination of the control, the number of housing units, population per unit, the occupancy rate of the housing units and the group quarter. Other procedures involved the determination of uncontrolled household population, controlled household population and the weight. The study was able to provide an estimate with an acceptable percent difference with the actual head count.

Keywords: Estimates, Population, Cadastral, CAMA Data, Control, Controlled Population, Uncontrolled Population, Household Population.

I. INTRODUCTION AND BACKGROUND

The number of housing units is the basis for any housing unit method of estimating current population (Dale and McLaughlin 1990). Building permit have served as the primary data source for estimating additions to the housing stock from new construction, however building permits are usually limited to certain places owing largely to ignorance on the part of the developers about the permits and partly to intention to evade possible registration costs and so permit data at the address level are not readily available for most areas. The National Population Commission actually counted all housing units during the 2006 National Census thus giving the basis for this method of population estimation.

The Geographic Information System database associated with census housing unit data was used to update the population of the case study area.

In 1911, estimates of the population of the provinces making up Nigeria were obtained by sampling except in the main parts where house enumeration took place. From the estimates, the census returns gave the total population of Nigeria as 16.06 million made up of 8.12 million for the Northern Province and 7.4 million for the Southern Province.

In the 1921 exercise, the level of estimation was reduced by extending the scope of enumeration. At first a township census was taken. Later the exercise was conducted in the provinces. The result of the two stage head count put the population of Nigeria at 18.72 million made up of 10.58 million for the Northern Province and 8.16 million for the Southern Province.

In 1931 census, actual enumeration was conducted only in Lagos and in five townships and also in 201 villages in Northern Nigeria. For the majority of the population, estimates of the figures were obtained from existing records. The result showed a population of 19, 928,171 persons made up of 8,493,247 for the Southern Province including the Colony and 11,434,924 for the Northern Province (Nwilo and Badejo 2001).

The total population of Nigeria in 1991 was 88,992,220 made up of 44,529,608 males (50.4%) and 44,462,612 females (49.96%). The population figure was much less than the speculated pre-census estimate of 120 million based on the 1963 census. It was also less than the pre-census World Bank estimate of 110 million. Therefore some Nigerians initial reaction was to consider the 1991 population figure to be an under count. Many others were intrigued by the very small implied annual growth rate of 1.5% between the 1963 and 1991 (NPC, 1992).

In the United State of America informal cooperation between the Federal Government and the States in the area of local population estimates existed as early as 1953. In 1966, the National Governors’ Council of state governments initiated and sponsored the first National conference on comparative statistics held in Washington, D.C. This
conference gave National recognition to the increasing demand for substantial population estimates. Between 1967 and 1973, a group of Census Bureau and state employees charged with developing annual subnational population estimates formalized the Federal State co-operative for population estimates. (FSCPE 2013).

Sub-county estimates are produced by the US Census Bureau using a distributed housing unit method controlled to the official administrative county total. For example, there were censuses in 2000 and 2010. The 2000 number was used for starting the time series and the 2010 census gave comparison data for checking accuracy. The year a structure was built and the number of unit on a parcel formed part of the CAMA data. A GIS layer or list of blocks containing the sub-county area was required. Finally, a GIS layer of the sub county area where estimates are desired was necessary.

Four areas were chosen from the list of places in Florida and Montana; two from each state. Florida and Montana were chosen because all the necessary files were readily available with internet downloads. Montana does not require building permits outside of a few selected incorporated places. Florida requires building permit statewide.

Missoula and Lewis & Clark counties were chosen from Montana. Missoula County requires permits county - wide, but had only one incorporated place, Missoula city. About half of Missoula County’s population lives outside Missoula city in scattered urbanized areas. These urbanized areas are classified as Census Designated places (CDP) for census purposes.

The second Montana County is Lewis and Clark county. Helena is the county seat and state capital’s surrounded by five unincorporated suburbs classified as CDPs. One of two outlying areas has a large number of seasonal housing units. One the outlying area is suburb of Great Falls in neighboring cascade County.

The two Counties in Florida were selected randomly. Okaloosa County is a tourist area along the Gulf coast of the Florida panhandle. It is anchored by Destin and Fort Walton Beach. A large number of housing unity are seasonal.

Osceola County Florida is just outside Orlando. Kissimee city is the County seat. One CDP is celebration, a community next to Disney world. Occupancy rates and household size are similar across the county. The sub county estimates are evaluated by comparing the 2010 estimate based on 2000 census data with the 2010 census count for each area, some CAMA based estimates are closer and some building permit estimates were closer to the actual population as measured by the 2010 census. The percent difference between the CAMA based population estimates and census Bureau data were seen. A negative difference suggests that the 2010 census in lower than the estimate; a positive difference, the 2010 census number is larger than the estimate.

Osceola County Florida had two areas with large errors, St Cloud city and celebration CDP. The error associated with St Cloud city was about 20% for the Census Bureau estimate and 15% for alternative estimate.

Both the Census Bureau estimate and the CAMA estimate of housing units appeared to be low for these two areas when compared to the 2010 census count of housing units. The Census Bureau estimate for Valparaiso city Florida in Okaloosa county Florida was estimated to be about 18% larger than the 2010 census. The Census Bureau over estimated the number of housing units in Okaloosa County. The CAMA housing unit estimated was also higher than the 2010 census for Valparaiso city. The number of housing unit for Wright CDP was under estimated by the CAMA methodology. Both PPH and Occupancy rates remained relatively constant between 2000 and 2010 for both areas so that has little influence on the error.

Population estimates for sub county areas in Lewis & Clark Montana were very close to their 2010 population count with the exception of the balance of county with a large percentage discrepancy (64%) but the numeric difference was a small percentage of the overall population (5%). The CAMA based sub county estimates worked extremely well for Missoula County, Montana with one exception, Frenchtown, CDP. The housing count number was low for Frenchtown CDP by about half (Jim, 2011). The census Bureau’s population Estimates program (PEP) Produces estimates of the population for the United States, its states, counties, cities, and towns as well as for the Commonwealth of Puerto Rico and its municipalities. Demographic components of population change (births, deaths and migration) are produced at the national, state, and county level of geography. Additionally, housing unit estimates are produced for the nation, states and counties.

Based on the 2010 census. The estimates of total population for the counties, Puerto Rico municipalities and metropolitan and micro politan statistical areas for 1st July 2012 were released 14 March 201 (POPEST 2013).

II. OBJECTIVES

The broad objective of this paper is to show how estimates are evaluated by comparing a census estimate of a given census year based on a previous census year with the actual census count for that census year, the previous census year (basis) being the control.

The specific objectives included determining the number of housing units, the population per unit; the occupancy rate and the group quarter, others included the determination of the control, uncontrolled household population, controlled household population and weight.

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III. MATERIALS AND METHODS

Idah the seat of the Igala kingdom is an ancient town in Nigeria history. Before the advent of colonialism it was the administrative headquarters of the then famous Igala kingdom and the seat of the Ata ‘gala whose area of influence stretched throughout the present eastern part of Kogi State and beyond. It lies approximately within the geographic coordinates of latitudes 07° 00’N and 07° 30’N and longitudes 06° 30’E and 07° 30’E. The local government area has a population of 68,703 according to 1991 census and a land mass of 36km i.e.139 square meters (NPC, 1991 & City Population 2012).

Also according to NPC (2006) the population was 79,755 comprising of 40,489 males and 39, 614 females with a total housing unit of 15902.

IV. METHODS

The following equation summarizes the basic housing unit method used in this study. A population is equal to the number of housing units multiplied by the persons per household times the percentage of housing units that are occupied.

\[ \text{POP} = \text{HU} \times \text{PPH} \times \text{OCC. RATE} + \text{GQ} \]

Where: POP= Population  
HU= Housing Unit  
PPH= Persons per Household  
OCC. RATE= Occupancy Rate

GQ= Group Quarter

The limitation of this equation in that subcounty population figures are always not available for public consumption due to security reasons and result are published only for local government areas. The published local government value of housing unit for Idah local government area of Kogi State was used. The 1991 census value was used as the control. The value obtained was used for comparison with the 2006 census figure for the local government area. The PPH (number of persons per household) was assumed fixed for all households. Two values of 6 & 8 were used and the results were close to each other i.e. precise. Using priority sheet of National population commission, 100% occupancy rate was adopted.

The uncontrolled household population estimate was computed using the equation below:

Housing units x PPH X Occu. Rate = uncontrolled household population.

Then a weighting variable was computed using the following equation:

\[ \text{WEIGHT} = \frac{\text{CONTROL HOUSEHOLD POPULATION}}{\text{UNCONTROLLED HOUSEHOLD POPULATION}} \]

The weight was less than one since the control was smaller than uncontrolled household population.

Next, the controlled population estimate was computed as follows

\[ \text{Uncontrolled household population} \times \text{Weight} + \text{GQ} = \text{Controlled population} \]

V. REQUIRED DATA

Data needs for the estimation procedure discussed in this paper are minimal and readily available namely the population figure for Idah local government area of Kogi State from 1991 census and 2006.

The 1991 number was used for starting the time series (i.e. control) and the 2006 census area comparison data for checking accuracy and the number of housing units in the local government area.

VI. DISCUSSION FO RESULT

The local government area population estimate is evaluated by comparing the 2006 estimate based on 1991 census data with the 2006 census count. The percent difference between the CAMA based population estimates and National population commission census figure were analysed. A negative difference suggests that the 2006 census is lower than the estimates, a positive difference, the 2006 census number is larger than the estimate. In this work the percent difference was negative showing that 2006 census figure was lower than the estimate.
The results using various figures as persons per household showed a precision as the percent difference were all similar.

VII. CONCLUSION

The study has shown the most important material required for this estimation to be the number of Housing unit and a base population figure (in this case the 1991 census figure). The percentage occupancy rate was 1 since all counted housing units were used in the census.

The result also showed that irrespective of the number of persons per household the percent difference were precise. The study therefore adopted 8 PPH as the base number owing to the fact that a sizeable amount of housing units are polygamous.

VIII. RECOMMENDATION

Estimate of population is recommended regularly as such is useful in funding allocation as survey controls, as denominator for vital rates and per capital time series and as indicators of recent demographic changes. With each new release of annual estimates, the entire time series of estimates should be revised for all years back to the last census, and all previously published estimates should be superseded and archived (US census Bureau’ 2011).

The process has shown the estimate to be higher than the census figure by 7.6%. It is safe to recommend that for estimate made with this method, this amount (7.6%) be deducted to bring it to an approximate value of the head count.

REFERENCES

www.citypopulation.de/php/nigeriaaccessed 14th January 2012.