

# Development of Historical Dataset to Enhanced Age Estimation for 2024 Population and Housing Census in Nigeria: Method and Process

by

Prof. M. O. Osagbemi, Prof M. N. Danjuma, Binta Abba Ibrahim, U. W. Ibor & J. Silas  
Department of Geography, Federal University Lokoja, Nigeria  
Department of Geography, Nasarawa State University Keffi, Nigeria.  
Planning and Research Unit, National Population Commission, Nigeria  
Corresponding Author's Email: uguru.ibor@fulokoja.edu.ng

## ABSTRACT

Age estimation in population censuses has been a perennial challenge for many countries around the world. Inaccurate reporting of age can significantly affect a country's demographic outlook, affecting policies, allocation of resources, and developmental strategies. This study seeks to develop a historical dataset of significant local and national events to ensure a more accurate method of estimating age. Bauchi and Akwa Ibom states were purposively selected due to their peaceful nature with Bauchi representing the northern part of Nigeria and Akwa Ibom representing the southern part of the country. Thirty-three group discussions were held with each group consisting of at least 2 participants in the elderly, (70 years and above) retired Civil servants, Religious Leaders, Traditional rulers and Women leaders. The study utilized the free listing technique and Group Discussion to elicit systematic data about events in a cultural domain. The study found that the use of event history calendar has considerable potential in assisting respondents to reconstruct their personal past more completely and accurately. The calendar facilitates data collection by assisting respondents to answer questions about events such as marriage, pregnancies, births and other important demographic events. The study concludes that the technique promises to enhance accuracy and increase participation, leading to better outcomes for various age groups throughout Nigeria, adding to the credibility and acceptability of the census.

Keywords: Age, Event, Time, Census, Estimation, Nigeria

## **Introduction**

Age estimation in population censuses has been a perennial challenge for many countries around the world. Historically, the accurate documentation and recording of birth dates were not as common, especially in rural areas or during times of conflict, leading to a significant portion of the population being unsure of their exact age (Smith, 1985). This uncertainty poses significant challenges, as age is a pivotal demographic variable affecting various data analysis aspects, from understanding age-specific fertility and mortality rates to planning age-targeted health and educational interventions (O'Brien and Dyson, 1993).

In many cultures, significant events, rather than specific dates, often mark the passage of time. For instance, in some regions, individuals might know their age relative to a notable local event, such as a flood, drought, or festival, but not in exact years (Martin, 2002). Traditional age estimation methods, which often rely on physical examinations or verbal autopsies, have limitations. Such methods can be invasive or may not account for variances in development due to nutritional or health differences, leading to potential inaccuracies (Khan and Bhuiya, 1990).

Estimating the age of individuals in Africa is complicated by the continent's vast cultural and linguistic diversity. Adetunji (1995), observed that the lack of a unified system or method for recording births in many regions, coupled with cultural norms prioritising events over exact dates, exacerbates the challenge. In Nigeria, a country with over 250 ethnic groups and a history replete with significant events, from colonial periods to military coups and democratic transitions, the task becomes even more intricate. Many Nigerians, especially older generations and those from rural areas, may not have official birth records, relying instead on memories of events or eras to estimate their age (Afolayan and Adelekan, 1998).

Given that the last census in Nigeria was in 2006, the importance of precise age data becomes even more pronounced. As the most populous country in Africa, Nigeria's demographic profile holds significant weight in shaping the continent's overall trends. Accurate age data is crucial for Nigeria's developmental planning, especially in education, healthcare, and labour market policies. With its diverse ethnic and cultural fabric, understanding age-specific needs and challenges is paramount. For example, accurate age data can guide strategies for youth empowerment, addressing the needs of the elderly and ensuring that different age cohorts have access to relevant services and opportunities (Ogunjuyigbe, Ojofeitimi, and Liasu, 2009). Furthermore, as Nigeria aspires to achieve its Vision 2030 development goals, having a clear demographic picture underpinned by reliable age data is indispensable for informed decision-making and tracking progress.

Inaccurate reporting of age can significantly affect a country's demographic outlook, affecting policies, allocation of resources, and developmental strategies. According to Udjo (2000), in Nigeria, it is crucial to have precise age data to formulate informed policies that address the diverse needs of its large population rather than simply ensuring statistical accuracy.

Against this background, the historical calendar-based approach emerges as an innovative method designed to address the challenges of accurate age estimation, especially in contexts where birth records may be incomplete or non-existent. At its core, this approach employs a curated calendar of significant historical events, both local and national, as reference points to aid individuals in recalling their age or the year of their birth (Martin, 2002). Instead of relying

solely on memory or vague approximations, respondents can use these memorable events as markers, identifying their age in relation to them. For instance, an individual might not remember their exact year of birth but might recall being a certain age during a notable event, such as a major festival, natural disaster, or political upheaval.

The National Population Commission, through its Department of Research and Development in collaboration with Nigerian University-based consultants, were commissioned to develop a comprehensive Historical Calendar of Event for the 2023 Population and Housing Census. The historical calendar-based approach holds particular promise. Given Nigeria's rich historical events, from pre-colonial eras to modern-day milestones, such a calendar can effectively bridge the gap between traditional-age estimation methods and the realities of the Nigerian populace. By aligning age estimation with the nation's collective memory, this approach not only enhances accuracy but also deepens the cultural resonance of the demographic exercise, ensuring that the census is more reflective of the diverse narratives and histories of the Nigerian people (Afolayan and Adelekan, 1998).

### **Research Problem**

The upcoming 2023 Population and Housing Census in Nigeria is confronted with a major hurdle pertaining to the accuracy of age reporting. This is because relying on traditional birth records is difficult, particularly in rural areas and among the older generations, as these records are often unavailable. In addition, Nigeria's diverse cultural landscape places more importance on events, milestones, and rites of passage rather than exact birth dates. This cultural preference, combined with the absence of standardised birth documentation, results in discrepancies and errors in age data, which ultimately undermines the dependability of the census data. This paper describes the process and methods employed in developing the historical calendar for the trial census and the 2024 population and housing census.

### **Rationale for the Study**

Accurate demographic information is crucial for effective policy formulation, resource allocation, and strategic developmental planning. This project seeks to incorporate a historical dataset of significant local and national events to ensure a more accurate method of estimating age. Using culturally relevant events will make the census more relatable and trustworthy for the Nigerian populace. The technique promises to enhance accuracy and increase participation, leading to better outcomes for various age groups throughout Nigeria, adding to the credibility and acceptability of the census.

### **Literature Review**

#### **Age Estimation Techniques in Censuses**

Age estimation has always been a crucial component of demographic research, and various techniques have been employed in censuses globally to ascertain the age of populations. One of the most straightforward and widely used methods is the direct questioning of respondents about their birth date, relying primarily on official birth records as verification (Smith, 1985). While this method is prevalent in developed nations with well-established civil registration systems, it becomes challenging in regions with incomplete or non-existent birth record systems.

When no complete records of births are available, other methods must be used. Verbal autopsies are one such method, where trained interviewers ask questions about significant life

events or milestones to estimate age. This technique has been particularly useful in areas with high levels of illiteracy, where written records are scarce. The approach was first described by O'Brien and Dyson in 1993.

Physical examinations, especially dental and skeletal assessments, have also been adopted in some censuses. These examinations rely on developmental milestones, such as the eruption of specific teeth or the fusion of particular bones, to determine age brackets (Khan and Bhuiya, 1990). While this method can be accurate, it is often considered invasive and may not be culturally acceptable in all regions.

Local historical event calendars are an effective method for gathering information on age and historical events. Respondents are asked about their age during significant local or national events, utilising the human ability to remember events. This approach has succeeded particularly in areas with significant cultural or historical events.

It is important to mention that in today's digital era, some nations have started incorporating technology-based tools to estimate age. They use algorithms and machine learning to predict age based on different factors. However, it's worth noting that these methods are still in their early stages of development (Liu and Zhou, 2018).

### **Overview of Historical Datasets and Their Role in Aiding Demographic Surveys**

Historical datasets are incredibly useful in demographic surveys. They contain important information about significant events and milestones that help create a temporal framework that resonates with people's collective memory. These datasets cover a broad range of social, political, cultural, and natural events, and they can help address the challenge of inaccurate age reporting. In regions where birth records are incomplete or cultural norms prioritise event-based memories over precise dates, historical datasets can be particularly helpful in anchoring age estimation to memorable events.

The efficacy of historical datasets in demographic surveys lies in their ability to bridge the gap between objective data collection and subjective human experiences. For many individuals, especially in diverse and historically rich regions, life stages are often intertwined with broader societal events. According to Chandola (1996), major events such as political upheavals, cultural festivals, and natural disasters serve as temporary markers that help individuals remember their age or birth year in relation to the event.

Using historical datasets in demographic surveys is important for ensuring cultural sensitivity and inclusivity. By recognising and incorporating locally significant events, these datasets can build a stronger connection with respondents and encourage their participation. This ultimately leads to more accurate data and a demographic exercise that reflects the diverse narratives and histories of the population (Adetunji, 1995).

In recent years, with the advent of digital technologies, historical datasets have also been integrated into sophisticated data analytics tools. Machine learning algorithms, for instance, can utilise these datasets to predict age brackets based on respondents' memories of events, further refining the accuracy of demographic surveys (Liu and Zhou, 2018).

## **Methodology**

The study utilized the free listing and group discussion methods in the data collection. Free listing is one of several structured interviewing techniques designed to elicit systematic data about events in a cultural domain. This approach was developed by Weller and Romney (1988) to understand the domains of events from a cultural perspective. This approach was employed in the compilation of historical events in communities to aid the estimation of respondent's ages during census. The approach involves the following stages:

The first stage is to design a format that events and time of occurrence was recorded. The narrators in each community list events that have occurred in their communities by year of occurrence. For example, events that happened from 1930-40, 1940-50, 1950-60 and 1960-1970. The second step involved the collation of what the participants have listed and thereafter discussed them. Particular attention was given to how many people mention same event that occur in a year and noted the popular events mentioned.

The third stage focused on the year of occurrence and its corroboration with the one that is authenticated by one or two persons. The event generated by each person was noted and thereafter, categorized as national, state or peculiar to local communities. The outcome of this approach was a list of authenticated events and year of occurrence that happened at the state level and those peculiar to local government areas and communities. The target population consists of at least 2 participants in the following category:

- Retired civil servants
- Religious leaders
- Traditional rulers
- Women leaders
- Elderly(70 years and above)

Audio recorder digital camera was used to document evidence of field work.

## Results

**Table 1: Akwa Ibom State Event Historical Calender**

S/N	EVENTS	PLACE OF OCCURRENCE	YEAR	ESTIMATED AGE
1	Establishment of Methodist primary school	Ukot Ebak	1930	93
2	Construction of Afaha Okon Road to link Aba/Ikot Ekpene Road	Afaha Okok	1930	93
3	Establishment of first Catholic School	Ikot Essien	1930	93
4	Aeroplane flew past central annang for the first time	Essien Udim	1934	89
5	Late Chief I. U. Akpabio benefited From Ibibio Union Scholarship to Study overseas	Udim	1938	85
6	Boundary dispute between Ngwa and Odora	Essien Udim	1939	84
7	Obo Annang market ceased to hold on Sunday	Essien Udim	1939	84
8	Establishment of central Annang clan council	Essien Udim	1940	83
9	General scarcity of salt experienced	Essien Udim	1942	81
10	Locust invasion occurred	Essien Udim	1942	81
11	Graduation of Late Chief I. U. Akpabio from Columbia University	Essien Udim	1944	79

12	Establishment of Ukana parish	Ukana	1960	63
13	Establishment of independent high school Ukana	Ukana	1962	61
14	Visit of Inspector General of Police Mr. L. O. Edet to Ikot Umo Essien	Essien Udim	1965	58
15	Late Chief I. U. Akpabio was Awarded a doctorate degree in UNN	Nssukka	1965	58
16	Establishment of First Port-Harcourt Refinery	Old Rivers	1965	58
17	Declaration of Niger/Delta Republic	Niger/Delta	1966	57
18	Declaration of Biafra Country	Eastern Region	1967	56
19	Invasion of Asaba By Nigeria Troops Which Resulted In killings Of People	Asaba	1967	56
20	Outbreak of Cholera in Opokuma / Kolokuma, Bayelsa State	Kaiama	1970	53
21	End of Nigeria Civil War	Nigeria	1970	53
22	First Outbreak of Cholera in Ogbia, Bayelsa State/ Kasama, Rivers State	Ogbia	1971	52
23	Establishment of Ukana district court	Ukana	1972	51
24	Creation of Udim County Development Council	Udim	1972	51
25	Establishment of Trading Area	Udim	1975	48
26	Establishment of Sunshine Batteries	Ukana	1977	46
27	Establishment of International Biscuit	Ukana	1980	43
28	Renovation of Gov.pri.school	Ukana	1983	40
29	Estblishment of Ukana Town Union	Ukana	1986	37
30	Creation of Essien Udim LGA	Essien Udim	1989	34
31	Establishment Of Movement Of Ogoni People (MOSOP)	OgoniLand	1990	33
32	Establishment of Niger Delta Exploration and Production Plc	Omerelu, River State	1992	31
33	Invasion Of Ogoni Land By Nigeria Troops	OgoniLand	1993	30
34	Death Of Ken Saro-Wiwa	OgoniLand	1995	28
35	Commemoration of The Death of Isaac Boro	South South	1996	27
36	Creation of South/South Geo Political Zone	Nigeria	1996	27
37	Warri Crisis	Warri	1997	26
38	Odi Massacre in Odi	Odi, Bayelsa State	1999	2
39	Establishment of Niger Delta University	Bayelsa State	2000	23
40	Construction of East- West Road	South South	2006	17
41	Chief Dr. Godswill Obot Akpabio became third governor of Akwa Ibom State.	Uyo	2007	16
42	Establishment of Police Secondary School	Ukana	2009	14
43	Establishment of first MOPOL Base	Essien Udim	2014	9
44	Establishment of Cottage Hospital	Ukana	2019	4
45	Military and security agencies conduct joint operation	Ikot Akpan, Ukana	2021	2

Source: Authors fieldwork, 2024.

**Table 2: Akwa Ibom State Event Historical Calender**

S/N	Event	PLACE OF OCCURRENCE	YEAR	ESTIMATED AGE
1	Death of Adamu Tukka's father	Gar	1926	97
2	Construction of the first Chiefs Palace	Gaji	1940	83
3	Visit of Emir of Bauchi, Maje Wase Yakubu to Alkaleri	Alkaleri	1940	83
4	Establishment of the first baked sugar(Mazarkwaila) Cottage factory	Alkaleri	1953	70
5	Sir Abubakar Tafawa Balewa became Prime Minister	Nigeria	1957	66
6	Nigeria gained independence	Nigeria	1960	63
7	Establishment of Yankari Game Reserve	Mainamaji	1962	63
8	Death of District Head of Duguri, Adamu Yusuf	Duguri	1966	57
9	Pipebome water provided for the firsttime	Alkaleri	1967	56
10	Visit of Adamu Jumba(Emir of Bauchi) to Alkaleri	Alkaleri	1971	52
11	Establishment of the first rice threshing mill	Alkaleri	1974	49
12	Establishment of first ECWA Church in Alkaleri	Alkaleri	1976	47
13	Shehu Shagaribecame President	Lagos	1979	44
14	Visit of Alh. Abubakar Tatari Ali to Alkaleri	Alkaleri	1980	43
15	Construction of tarred roadinAlkaleri	Alkaleri	1980	43
16	Establishment of first Secondary School in Duguri	Duguri	1980	43
17	Visit of Alhaji Adamu Tafawa Balewa to Alkaleri	Alkaleri	<b>1981</b>	42
18	Death of District Head of Duguri, Ibrahim Bako	Duguri	1983	40
19	Visit of Emir of Bauchi, Suleiman Adamu to Alkaleri	Alkaleri	1984	39
20	Visit of Colonel Sani Sami to Alkaleri	Alkaleri	1984	39
21	FirstmosqueAppeal Fund	Alkaleri	1984	39
22	Gen. Ibrahim Babangida became Head of State	Nigeria	1985	39
23	Conduct of Population Census	Nigeria	1991	27
24	Establishment of Gigyara Nomadic Primary School	Gigyara	1991	32
25	Establishment of Gaji Primary School	Gaji	1992	31
26	Establishment of first market at Telwan Duguri	Telwan Duguri	1994	29
27	FloodingatDan	Dan	1994	29
28	Death of Councilor Gigyara, Alhaji Ibrahim Maiyaki Twara	Gigyara	1997	26
29	Death of Dan Lawan Mafara	Alkaleri	1997	26
30	Communal clash between Fulani and Dugurawa at Dan	Dan	1999	24
31	Communal clash between Fulani, Udawa and Dugurawa at Dimis	Dimis	1999	24
32	Establishment of Islamiya School at Duguri	Duguri	1999	24
33	Communal clash between Kanuris and Udawa	Alkaleri	2000	23
34	Death of village head ofYankari	Yankari	2000	23
35	DeathofSarkinGwana	Gwana	2000	23
36	Installation of Yeriman Marafa	Alkaleri	2000	23
37	FiredisasteratYalo	Yalo	2000	23

38	Death of district head of Pali	Pali	2000	23
39	Fire disaster at Fanti	Fanti	2001	22
40	Flooding at Garin na Allah	Garin na Allah	2001	22
41	Flooding at Jauro Gani	Jauro Gani	2001	22
42	Installation of Sarkin Yamman Marafa	Alkaleri	2001	22
43	Installation of Madakin Marafa	Alkaleri	2001	22
44	Installation of Matawallen Alkaleri	Alkaleri	2001	22
45	Death of Ciroman Gwaram	Gwaram	2001	22
46	Death of councilor Birim (Alh. Danlami Gwalbaji)	Birim	2003	20
47	Flooding at Futuk	Futuk	2004	19
48	Flooding at Mai Ari	Mai Ari	2004	19
49	Flooding at Kwaimawa	Kwaimawa	2004	19
50	Flooding at Mansur	Mansur	2004	19
51	Flooding at Gwana	Gwana	2004	19
52	Flooding at Yalo	Yalo	2004	19
53	Flooding at Duguri	Duguri	2004	19
54	Flooding at Dan	Dan	2004	19
55	Flooding at Pali	Pali	2004	19
56	Installation of Sardaunan Yerima	Alkaleri	2004	19
57	Adamu Usman became village head of Birim	Birim	2005	18
58	Death of village head of Birim, Alh. Usuman Dantara	Birim	2005	18
59	Bala Muhammad became Senator	Bauchi	2007	16
60	Installation of village head of Maimadi (Dikko)	Maimadi	2010	13
61	Goodluck Jonathan became President	Nigeria	2011	23
62	Bala Muhammad became Minister	FCT	2010	23
63	Establishment of first Police Station at Mainamaji	Mainamaji	2012	11
64	Muhammadu Buhari became President	Nigeria	2015	11
65	Two persons killed by an elephant at Gwartanbali	Gwartanbali	2018	5
66	Bala Muhammad became Governor	Bauchi	2019	6
67	Covid 19 Lockdown	Global	2020	3

Source: Authors fieldwork, 2024.

### Challenges of Age Estimation in Developing Countries

Age estimation in developing countries is fraught with many challenges, many deeply rooted in historical, cultural, and infrastructural contexts. One of the foremost challenges is the absence or inconsistency of formal birth registration systems. In many developing nations, particularly in rural or remote regions, birth registration has historically been overlooked or deprioritised, leading to a significant portion of the population lacking official birth records (Smith, 1985). Without these foundational documents, age estimation relies heavily on individuals' memory or familial oral histories, which can be imprecise or influenced by cultural narratives.

Cultural factors further complicate age estimation. In many communities within developing countries, the passage of time is often marked by significant events, rites of passage, or seasonal changes rather than specific dates (Adetunji, 1995). While rich in cultural significance, this



event-centric perception of time poses challenges for standard demographic data collection, which often requires precise age or birth year data.

In certain regions, accurate age reporting can be hindered by a lack of education and widespread illiteracy. This is because individuals may not be familiar with the Gregorian calendar system or be uncertain of their age in relation to standard calendar years (Martin, 2002). Linguistic diversity worsens the problem, which could result in inaccuracies in age data collection due to translation or interpretation challenges. Additionally, socio-political factors play a role. Chandola (1996) states that in regions affected by conflict, displacement, or socio-political upheavals, records may have been lost or destroyed, and people may hesitate to provide personal information due to fears of potential repercussions.

## **Conclusion**

It is noteworthy that various age estimation techniques have been employed throughout global censuses, but regional specificities, cultural differences, and resource availability often influence their effectiveness. As demographic data becomes paramount for policymaking and development, the role of historical datasets, enriched with events and landmarks, has become pivotal. These datasets enhance the accuracy and cultural tone of demographic surveys and ensure that as our world grows more interconnected, surveys remain scientifically robust and culturally attuned. Furthermore, the challenges of age estimation in developing countries, shaped by a blend of historical, cultural, educational, and socio-political factors, underscore the need for a distinct, culturally sensitive approach. It is essential to recognise the diverse realities of these populations while persistently aiming for demographic precision.

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