Report on the Development of a Statistical Model to Determine the Integrality of Nigeria's Voter Register

1. Introduction

Nigeria's 93,469,008 voter register is Africa's largest database of registered voters deployed for four general elections (2011, 2015, 2019 and 2023). In the last twelve years, the Independent National Electoral Commission (INEC) has undertaken updates and clean-ups of the voter register in line with legal requirements to improve its quality. Despite these efforts, the credibility and accuracy of the voter register remain a key concern for most electoral stakeholders. These concerns are not misplaced as the electoral commission, civil society groups, and citizens continue to identify duplicates, deceased voters, multiple registrations, errors, and the inclusion of ineligible registrants on the voter register. The Integrality of the voters' register is that it captures the number of eligible voters (Nigerian population aged 18 years and above). Population projection estimates the number of people expected to be alive at a future date based on the assumptions of population structure, fertility, mortality, and migration.

The idea of voter register Integrality entails the state of completeness, having everything needed or containing the entire number of eligible voters in the country. In order to estimate the eligible voters' population, there is need to project the country population and estimate the population of the citizens below voting age (below 18years of age), then deduct the estimated population of the citizens below the voting age from the projected country population.

A variety of methods can be used to project a nation's population. Some methods directly project the total population given the initial size of the population and assumptions on future rates of population growth. One of the oldest methods of projecting population is the mathematical method. This method is frequently used to estimate the population. It is done for a short period, less than 10 years. The major assumptions of these methods are: the socio-economic setting affecting the population size is fairly unchanging, no allowance is made for the irregular fluctuations in the population growth and the same growth rate continues for the projection period. It is important to note that, these methods are used for intercensal, post-censual estimates and future population for shorter periods and projection for sub-national population (Bhattaraj, et al. 2019).

The mathematical method uses various statistical formulae where the population projection of these methods does not provide the population projection by age and sex as it does not assimilate the past and future trends of fertility rate, mortality rate, and migration rate. Some of the basic techniques of this method are:

a. Linear growth model (Arithmetic Growth Model)

$$P_t = P_0(1 + rt)$$

b. Geometric growth model

$$P_t = P_0(1 + r)^t$$

c. Exponential growth model

$$P_t = P_0 \exp(rt)$$

d. Gompertz curve

$$P_t = ab^{c^t}$$

e. Modified exponential function

$$P_t = a + bc^t$$

f. Makeham's Curve

$$P_t = \log(a + bc^t)$$

g. Polynomial of degree n

$$P_t = a_0t^0 + a_1t^1 + a_2t^2 + a_3t^3 + \cdots + a_nt^n$$

h. Logistic growth model

$$P_t = \frac{k}{1 + \exp(a + bt)}$$

where

a is rate parameter

b is location parameter (it shifts the function in time but does not affect the function's shape)

k is the asymptotic value that bounds the function, therefore specifies the level at which the growth process saturates

P_t is the current year population

P_0 is base year population

r is growth rate

t is the time interval (in years) and

e is the base of the natural logarithm.

These methods of projections are most appropriate when vital rates and age structure can be assumed to be constant (i.e. in the very short term or the very long term) or if the only thing that one knows about the population is its total size. It can be used for making quick estimates or for illustrative purposes, but not to be recommended for making official population projections. Hence, an improvement to the mathematical method that uses detailed information on fertility, mortality, and migration as input data; that provides projections by age and sex, and is applicable at national and sub-national levels, is the cohort component method.

1.1 Cohort component method

The cohort component method, however, can project population by age and sex employing the initial age and sex structure of the population together with assumptions on the future components of population change such as fertility and mortality. The major strength of this technique is its ability to project a population straightforwardly and unambiguously. The method does not embody restrictive or arbitrary assumptions and generates results that faithfully reflect the initial population structure and the fertility, mortality, and migration conditions specified by the user. It yields projection results indispensable to any planning exercise seeking to account for future population change. These features make this technique fundamental for integrating population factors into development planning.

A cohort is a group of people who experienced the same demographic event during a particular time. This will most commonly refer to births during a set period, but may also refer to marriages, onset of puberty, migration, first birth, etc. Hence, the Cohort-component population projections method considers the age-sex structure of populations and not just their size. It also models the components of demographic change: fertility, mortality, and migration not just population growth. The procedure for carrying out cohort component population projections was developed by Whelpton in the 1930s. It can be thought of as an elaboration of the ideas encapsulated in the demographic balancing equation.

The balancing equation is a fundamental axiom of demography. It states that a future population size will be the existing size minus any deaths that have occurred, plus births that have occurred, with further corrections for in and out-migration. The balancing equation serves as a reminder that populations can only change in size by a limited number of processes.

$$P_{(t+n)} = P_{(t)} + B_{(t)} - D_{(t)} + I_{(t)} - E_{(t)}$$

where:

- $P_{(t)}$ is the population at time t
- $B_{(t)}$ and $D_{(t)}$are number of births and deaths occurring between t and $t+n$.
- $I_{(t)}$ and $E_{(t)}$ are the number of immigrants and emigrants from the country during the period t to $t+n$.

This equation reminds that there are only two possible ways of joining a population: one can be born into it or can migrate into it. Similarly, the only ways to leave a population are to emigrate or to die. At the global level, nobody has joined the human population by immigrating and only a few unfortunate astronauts have emigrated and not returned.

Cohort-component projections extend this concept to individual age cohorts. They rely on the fact that every year that passes, every member of a population becomes a year older. Thus, after 5 years the survivors of the cohort aged 0-4 years at some baseline date will be aged 5-9 years, 5 years after that they will age 10-14 years, and so on.

The steps of a cohort-component projection are:

- project every age cohort for one projection interval at a time
- calculate the births during this interval and add in the newly-born children
- adjust for migration

before moving on to repeat the procedure to project the population to the end of the next interval.

To project a population in intervals of n years, one uses data on n-year age groups. Thus, populations are usually projected either one-year at a time, using data on single-year age groups, or by five-years at a time, using data on five-year age groups.

1.2 Data required for cohort-component projections

To carry out a cohort-component projection, detailed assumptions have to be made not just about the size and structure of the baseline population but also about each of the components of population growth throughout the period covered by the projection:

- base year *population* subdivided by age and sex

- sex-specific life tables for each projection interval in the projection period (*mortality*)
- age-specific *fertility* rates for each projection interval in the projection period
- age- and sex-specific net *migration* for each interval in the projection period (unless one is assuming that the population is closed to migration).

The steps required to project a population by means of the cohort-component method are:

1. Calculate how many members of each living age cohort will survive the current projection interval.
2. Either add the immigrants to each age cohort and subtract the emigrants or, more simply, add net migrants to each age cohort.
3. Calculate how many births will occur during current projection interval and divide them into boys and girls.
4. Calculate how many of these births of each sex will remain alive at the end of the projection interval and adjust for net migration into the youngest age group.
5. Repeat the calculations for the next projection interval.

Note that the assumptions made about fertility, mortality and migration can be different for each projection interval. The method does not require an assumption of constant vital rates. However, the component method could not be used to incorporate qualitative and quantitative prior information and even expert assumptions. Hence, to incorporate qualitative and quantitative prior information and experts' knowledge Bayesian method is used.

1.3 Bayesian population projection

Bayesian analysis**,** a method of statistical inference that allows one to combine prior information about a population parameter with evidence from information contained in a sample to guide the statistical inference process. A prior probability distribution for the parameter of interest is specified first. The evidence is then obtained and combined through an application of Bayes' theorem to provide a posterior probability distribution for the parameter. The posterior distribution provides the basis for statistical inferences concerning the parameter. Bayesian methods are data analysis tools derived from the principles of Bayesian inference. Bayesian methods provide: i. parameter estimates with good statistical properties; ii. parsimonious descriptions of observed data; iii. predictions for missing data and forecasts of future data; iv. a computational framework for model estimation, selection and validation. The components of the population (birth, death and net migration) will be estimated using the

Bayesian technique. To project the Nigerian population, each of these components was modelled. The major disadvantage of Bayesian model is the computational cost and time.

2. Statement of the Problem

Over the years, since the 4th Republic in 1999, Nigerians been having issues with the number of voters registered. There have been seven (7) rounds of election periods, but the awareness on the number of registered voters became pronounced following the introduction of electronic voting in 2011. Therefore, to address these issues, there is a need for structural review of the status of the voter register from 2011 to 2023. The structural review will include development of a scientific (statistical) model for estimating and forecasting the number of registered voters in the country and by state.

3. Objectives

The goal is to develop a statistical model to determine the Integrality of Nigeria's voter register. Specifically, the model will be utilized for estimating and forecasting the population of Nigeria's voter register. This will be achieved through the following objectives:

i. Develop a statistical model to forecast Nigeria population
ii. Determine the Integrality of the INEC Voter's Register

4. Limitation

Estimations in this work are based on Nigerian country-level data obtained from United Nations *World Population Prospects* (WPP) 2017. The study explores package wpp2017, using the following datasets as pertaining to Nigeria: total fertility rate (TFR), sex-specific life expectancy female life expectancy (e0F) and male life expectancy, (e0M), historical total population counts, sex-specific total population counts, age-and-sex specific mortality rates, net migration and sex ratio at birth as a ratio of female to male.

5. Assumptions

Following were the assumptions made not just about the size and structure of the baseline population but also about each of the components of population growth throughout the period covered by the projection:

- Base year *population* subdivided by age and sex

- Sex-specific life tables for each projection interval in the projection period (*Life Expectancy*)
- Age-specific *fertility* rates for each projection interval in the projection period
- Age- and sex-specific net *migration* for each interval in the projection period
- The method does not require an assumption of constant vital rates

6. Methodology

The model used is a hybridization of the Bayesian model and Lee-Carter extension model for Bayesian population forecasting for producing probabilistic population projections for Nigeria. The method is a Bayesian hierarchical model for the Total Fertility Rate (TFR) and Life Expectancy at birth, while the extending Lee-Carter method is used to forecast mortality rate and net migration rates. We illustrated how the method works. The method was implemented in the R packages bayesTFR, bayesLife, and bayesPop.

6.1 Bayesian Fertility Projection

The total fertility rate (TFR) is one of the key components in population projections.It is the average number of children a woman would bear if she survived through the end of the reproductive age span, experiencing at each age the age-specific fertility rates of that period. The evolution of fertility includes three broad phases: a high-fertility pre-transition phase, the fertility transition itself, and a low-fertility post-transition phase. We define Phase I as the stable pre-transition high-fertility phase; the fertility transition has not started yet, and fertility fluctuates around high TFR levels (e.g., around a TFR of about 6 or 7 children). In some countries, the TFR increased before it began to decline. Phase II is the fertility transition from high fertility to replacement-level fertility or below. Phase III consists of the post transition low fertility, which includes recovery from below-replacement fertility toward replacement fertility and oscillations around replacement-level fertility.

To construct TFR projections, we model the five-year changes in the TFR based on commonalities in past trends, as well as assumptions about the patterns underlying future TFR outcomes. Given the very different dynamics that underlie the changes in TFR in each of the three phases, a single model cannot represent these changes in the different phases. For example, the TFR might increase during Phase I at high levels, whereas the TFR is expected to decrease during Phase II. To overcome this difficulty, we capture the dynamics in each phase with a model for that phase. However, it is important to know that, Phase I will not model since

the TFR in the country has already started to decline, therefore Phase I is not relevant for projections.

Let $r(f_t,\ \delta^N)$ be the decrement in TFR in phase II. Therefore, to model fertility declines in Phase II, we used a double logistic function. This is defined as:

$$r(f_t,\quad \delta^N) = \frac{-d^c}{1+\exp\left(-\frac{2\log(9)}{{\nabla_1}^N}\left(f_t - \sum_{i=2}^{4}{\nabla_i}^N + 0.5{\nabla_1}^N\right)\right)} + \frac{d^c}{1+\exp\left(-\frac{2\log(9)}{{\nabla_3}^N}\left(f_{l,t} - {\nabla_4}^N - 0.5{\nabla_3}^N\right)\right)} \qquad (1)$$

where $\delta^N = ({\nabla_1}^N, {\nabla_2}^N, {\nabla_3}^N, {\nabla_4}^N, d^N)$ being a vector of specific parameters and ${\nabla_i}^N \geq 0$ for $i = 1, 2, 3, 4$. Hence, the complete fertility transition in phase II is modeled by:

$$f_{t+1} = f_t - r(f_t, \delta^N) + \ \varepsilon_{N,t} \qquad (2)$$

where $r(f_t,\ \delta^N)$ is the decrement in TFR defined in equation (1), and $\varepsilon_{N,t} \sim iid\ N(0, \delta(t, f_t)^2)$, where $\delta(t, f_t)$ is a function that describes how the error standard deviation changes with fertility level and time. To assume prior distributions to the specific parameters $\left({\nabla_1}^N, {\nabla_2}^N, {\nabla_3}^N, {\nabla_4}^N, d^N\right)$, let $U = f_t$ be the TFR at the start of the period. The five parameters that determine the pace of the fertility decline and the time that the transition takes place are ${\nabla_4}^N, \left\{\frac{{\nabla_i}^N}{U-{\nabla_4}^N}\ \ i = 1,\ 2,\ 3\right\}$ and d. Transformations of parameters are used to restrict their outcomes to realistic values and to use common probability distributions to represent their outcomes. Hence, let $q_i = \frac{{\nabla_i}^N}{U-{\nabla_4}^N}$ for $i = 1,\ 2,\ 3$ such that $\sum_{i=1}^{3} q_i = 1$. Hence, for computational purposes, new parameters ρ_i for $i = 1,\ 2,\ 3$ are introduced with q_i's defined as a function of ρ_i, that is, $q_i = \frac{\exp(\rho_i)}{\sum_j \exp(\rho_j)}$. The hierarchical model for the $\rho_i's$ is determined by:

$$\rho_i \sim N(a_i, b_i^2) \text{ for } i = 1, 2, 3$$

where a_i is the mean of ρ_i and b_i^2 are their variance. Furthermore, let the hierarchical model for the parameter d be modeled by: $d^* = \log\left(\frac{d-0.25}{2.5-d}\right)$. The decrement d is transformed so as

to restrict its outcomes to be between 0.25 and 2.5 child. It is assumed that d^* follows normal distribution with mean ϑ and standard deviation φ. In addition, the distribution of ${\nabla_4}^N$ is:

$$ {\nabla_4}^* \sim N\left({\nabla_4}^N, b_4^2\right) $$

where ${\nabla_4}^*$ is a logit transform of ${\nabla_4}^N$. That is, ${\nabla_4}^* = \frac{{\nabla_4}^N - 1}{2.5 - {\nabla_4}^N}$, also, this transformation is to restrict it to be between 1 and 2.5 children. To estimate the parameters for the model in phase II as mentioned earlier, we used the Bayesian method of estimation. In this method, the posterior distribution is proportional to the product of the likelihood and the prior distribution. Hence, we assumed a normal prior distribution for d^*, ${\nabla_4}^N$ and ρ_i for $i = 1, 2, 3$. To be specific, the following prior distributions for the hyper-parameters are assumed:

$$ \vartheta \sim N(-1.5, 0.6^2) $$

$$ \frac{1}{\varphi^2} \sim Gamma(1, 0.6^2) $$

$$ a_1 \sim N(-1.0, 1) $$

$$ a_2 \sim N(0.5, 1) $$

$$ a_3 \sim N(1.5, 1) $$

$$ \frac{1}{\frac{1}{b_i^2}} \sim Gamma(1, 1) \text{ for } i = 1, 2, 3 $$

$$ \frac{1}{b_4^2} \sim Gamma(1, 0.8) $$

To model phase III, fertility is assumed to converge towards and fluctuate around country-specific long-term total fertility rate levels. It is modeled as a first-order autoregressive time series model written as

$$ f_{N,t+1} - \mu = \rho\left(f_{N,t} - \mu\right) + b_{N,t}, \qquad (3) $$

where $b_{N,t}$~iid $\mathrm{N}(0, \delta_{\mathrm{b}}{}^2)$. We assumed $\mu \sim \mathrm{TN}_{0,\infty}(\bar{\mu}, \sigma_{\mu}^2)$, $\rho \sim \mathrm{TN}_{0,\infty}(\bar{\rho}, \sigma_{\rho}^2)$, where $\bar{\mu} \sim \mathrm{U}(0, 2.1)$, $\sigma_{\mu} \sim \mathrm{U}(0, 0.5)$, $\bar{\rho} \sim \mathrm{U}(0, 1)$, $\sigma_{\rho} \sim \mathrm{U}(0, 0.289)$ and $\sigma_{\varepsilon} \sim \mathrm{U}(0, 0.5)$.

6.2 Bayesian Life Expectancy projection

We modelled female life expectancy similarly to Phase II total fertility and used the UN's double logistic function to project expected gains, but we add a heteroscedastic error term, which allow the parameters of the country-specific double logistic functions to vary continuously across Nigeria. Further, we assumed that the double logistic parameters will come from a common "Nigerian" distribution.

The resulting Bayesian life expectancy projection model is as follows:

$$\ell_{\mathrm{N},t+1} = \ell_{\mathrm{N},t} + g(\ell_{\mathrm{N},t}|\boldsymbol{\theta}^{\mathrm{N}}) + e_{\mathrm{N},t+1}, \quad (4)$$

where, $\mathrm{g}\left(\ell_{\mathrm{N},t}\middle|\theta^{N}\right) = \frac{k^N}{1+\exp\left(\frac{-A_1}{\nabla_2{}^N}\left(\ell_{N,t}-\nabla_1{}^N-A_2\nabla_2{}^N\right)\right)} + \frac{z^N-k^N}{1+\exp\left(\frac{-A_1}{\nabla_4{}^N}\left(\ell_{N,t}-\sum_{i=1}^{3}\nabla_i{}^N-A_2 4^N\right)\right)}$

With $\theta^N = (\nabla_1{}^N, \nabla_2{}^N, \nabla_3{}^N, \nabla_4{}^N, z^N, k^N)$ are the parameters of the double logistic function, $e_{N,t} \sim iid\ N(0, \omega(\ell_{N,t})^2)$, and $\omega(.)$is a smooth function representing how the error standard deviation depends on the current level of life expectancy, and A_1 and A_2 are constants. $\{\nabla_i{}^N, i = 1, 2, 3, 4\}$ are on an interpretable scale, but they are arbitrary in that they could be changed without altering the results, provided that their product, A_1A_2, remains unchanged. Each of the parameters of the double logistic function is assumed to be drawn from truncated normal distributions given as follows:

$$\Delta i^N \overset{iid}{\sim} N_{[a_i,100]}\left(\Delta_i, \delta_{\Delta_i}^2\right), i = 1, \ldots, 4 \quad (5)$$

$$z^N \overset{iid}{\sim} N_{[0,1.15]}(z, \delta_z^2), \quad (6)$$

$$k^N \overset{iid}{\sim} N_{[0,10]}(k, \delta_k^2) \quad (7)$$

where $N_{[a,b]}(\mu, \delta^2)$ denotes a normal distribution with mean μ and standard deviation δ, truncated to lie between a and b. The parameter $z^N$is the asymptotic average rate of increase in life expectancy. When z^N is assumed to be nonnegative, then, it implies that life expectancy will continue to increase, on average.

Bayesian method of estimation was adopted in estimating the parameters of the model for female life expectancy. This requires the specification of prior distributions for the model

parameters. The parameters$\nabla_i i = 1, 2, 3, 4$, z and k were assumed to have normal prior distributions while the variance parameters $\delta^2_{\Delta_i}, i = 1, \ldots, 4$, δ^2_z and δ^2_k were assumed to have an inverse gamma prior distributions. A random variable T with shape parameter θ and rate parameter λ is said to have the inverse gamma distribution denoted by $IG(\theta, \lambda)$ if its probability density function (*pdf*) at x is proportional to $x^{-(\theta+1)}e^{-\lambda/x}$ for $x > 0$. To be specific, we assumed the following priors:

$$\nabla_1 \sim N_{[0,100]}(13.22, 3.85^2)$$

$$\nabla_2 \sim N_{[0,100]}(41.07, 4.03^2)$$

$$\nabla_3 \sim N_{[-20,100]}(9.24, 11.54^2)$$

$$\nabla_4 \sim N_{[0,100]}(17.60, 5.64^2)$$

$$z \sim N_{[0,1.15]}(0.38, 0.4^2)$$

$$k \sim N_{[0,10]}(2.84, 0.9^2)$$

$$\delta^2_{\Delta_1} \sim IG(2, 15.6^2)$$

$$\delta^2_{\Delta_2} \sim IG(2, 23.5^2)$$

$$\delta^2_{\Delta_3} \sim IG(2, 14.5^2)$$

$$\delta^2_{\Delta_4} \sim IG(2, 14.7^2)$$

$$\delta^2_{\Delta_z} \sim IG(2, 0.6^2)$$

$$\delta^2_{\Delta_k} \sim IG(2, 3.5^2)$$

To simulate future values of male life expectancy, we need to take into account the correlation between female and male life expectancies and also of the fact that the life expectancy of males is lower than the life expectancy of females. We therefore project female and male life expectancy jointly, by first projecting female life expectancy using the Bayesian hierarchical model described above and then projecting the gap in life expectancy between the female and male life expectancies. This is done by simulating a large number of future trajectories from a linear regression model with Bayesian hierarchical model of female life expectancy projections as a covariate.

For each simulated value of the gap, we subtract it from a simulated value of female life expectancy projection to obtain the corresponding simulated male life expectancy projection. The result is a large number of (female e0, male e0) pairs, which form a sample from the joint predictive distribution (female rather than male life expectancy is used as a basis for projecting

the gap because female life expectancy tends to be more stable and more accurately measured). This gap is represented using the regression model of Lalic (2011) with *t*-distributed errors as:

$$G_{t+1} = \min\{max(G^*_{t+1}, -2.67), 17\},$$

where

$$G^*_{t+1} = \begin{cases} \beta_0 + \beta_1 e^f_{0,2010} + \beta_2 G_t + \beta_3 e^f_{0,t} + \beta_4 \left(e^f_{0,t} - 75\right) + \varepsilon_t, & if\, e^f_{0,t} \le M \\ G_t + \varepsilon_t, & if\, e^f_{0,t} > M \end{cases} \quad (8)$$

$$\varepsilon_t \underset{\sim}{iid}\, t(\mu = 0, \delta^2 = 0.0665, v = 2)$$

Where G_{t+1} is the gap in life expectancy at birth between females and males in the current quinquennium$t+1$, which is a linear combination of four terms as seen in equation (8). These are: the gap in the previous quinquennium, G_t, female life expectancy at birth in the first quinquennium, $e^f_{0,t+1,2010}$; female life expectancy at birth in the current quinquennium, $e^f_{0,t+1}$ and the number of years by which $e^f_{0,t+1}$ exceeds τ, namely $\left(e^f_{0,t+1} - \tau\right)_+$ where $(x)_+ = x$ when $x > 0$ and zero otherwise. The quantity τ is the level of female life expectancy at which the gap is expected to stop widening and to start narrowing and *M* = 86.2 years, the highest life expectancy recorded in the WPP 2017. The gap is restricted to be no more than 17 years, which is slightly above the highest value observed to date.

6.3 Migration

Migration is another important input in population projection. Nevertheless, it is advantageous to model on the rate scale and convert the output to counts rather than modeling counts directly. The primary disadvantage to modeling net migration counts is that variability in count data grows roughly in proportion to population size. This suggests that dividing counts by population sizes is a way of stabilizing the variance, resulting in a model on migration rates. Let r_t be the migration rate, at the time t, then we modeled the migration rate using equation (a*)

$$r_t - \mu = \phi(r_{t-1} - \mu) + e_t$$

Where e_t is a normally distributed random deviation with a mean of zero and a constant variance ofσ^2, μ, is theoretical long-term average migration rate and ϕ is an autoregressive parameter. A normal prior is assumed for the parameter μ while a uniform prior is assumed for the parameter ϕ. The full specification of the model, including prior distributions, is given by:

1st level $$\begin{cases} r_t - \mu = \phi(r_{t-1} - \mu) + e_t \\ e_t \overset{iid}{\sim} N(0, \sigma^2) \end{cases}$$

2nd level $$\begin{cases} \varphi \overset{iid}{\sim} U(0,1) \\ \mu \overset{iid}{\sim} N(\eta,\ \kappa^2) \\ \sigma^2 \overset{iid}{\sim} IG(r,\ s) \end{cases}$$

3rd level $$\begin{cases} r \sim U(1,10) \\ \frac{s}{r} \sim U\big(0,\ 100(r-1)\big) \\ \eta\ \sim\ U(-100,\ 100) \\ \kappa \sim U(0,\ 100) \end{cases}$$

Draws from the posterior distributions of all parameters were obtained using Markov chain Monte Carlo methods. Let $\boldsymbol{\theta}$ be the complete parameter vector of the model, having obtained a sample of $\theta_1, \theta_2, \cdots, \theta_N$ of draws from the joint distribution of the parameters, we use these draws to obtain a sample from the joint posterior predictive distribution. For each sampled value θ_k from the joint posterior distribution of the parameters, we first simulate a set of joint trajectories $\tilde{r}_t^{(k)}$ for net migration rates at time point t, where k indexes the trajectory. Hence, net migration counts and rates are obtained as follows:

i. On the basis of the parameter vector θ_k, we project the net migration rates for a single time point into the future. Denoting the next time period in the future by t, this allows us to obtain a collection of (uncorrected) projected values of $\tilde{r}_t^{(k)}$.
ii. Convert the net migration rate projections $\tilde{r}_t^{(k)}$ to net migration count projections $\tilde{y}_t^{(k)}$. To convert from rates to counts, we multiply the rate $\tilde{r}_t^{(k)}$ by the projected average population.
iii. Furthermore, we break down the migration counts by age a and sex s to obtain estimates of net male and female migration counts and age groups, $\tilde{y}_{t,a,s}^{(k)}$.

iv. Continue projecting trajectories one step at a time into the future by repeating steps i–iii.

6.4 Population projection

The study explores package wpp2017, using the following datasets on Nigeria: total fertility rate (TFR), sex-specific life expectancy female life expectancy (e0F) and male life expectancy, (e0M)), historical total population counts, sex-specific total population counts, age-and-sex specific mortality rates, net migration and sex ratio at birth as a ratio of female to male.

In producing the probabilistic population projections, trajectories of the total fertility rate for each year from 2010 to 2027, and joint trajectories of female and male life expectancy were simulated from their posterior predictive distributions. These were converted to age-specific fertility and age- and sex-specific mortality rates using established UN methods and input to the cohort-component method. Current UN assumptions about future international migration were used. This yielded joint probabilistic projections of any future population quantity of interest.

The cohort components method makes it possible to develop the population from one year to the next using the posterior distributions of mortality, life expectancy, fertility (birth), and net migration. This translates into the following equations:

$$P_{t+1} = P_t + B_t - D_t + NM_t,$$

where

P_{t+1} = Population size at time $t + 1$

P_t = Population size at time t

B_t = Births at time t

D_t = Deaths at time t

NM_t = Net migration at time t

$$NM_t = I_t - E_t$$

$$I_t = Immigrant$$

$$E_t = Emigrant$$

In most applications, the cohort component method is used in solving this equation deterministically by decomposing it into age- and sex-specific components. The cohort component uses the following inputs:

sex- and age-specific population estimates at the initial time t = 0

projections of total fertility rate (TFR)

projections of fertility distribution over ages

projections of sex ratio at birth

projections of male and female life expectancy at birth (e0)

historical data on sex- and age-specific death rates for (t=0)

projections of sex- and age-specific net migration.

In each future time period t, the projected TFR is converted to age-specific fertility rates using the fertility distribution over ages at *t*. Using the historical data on death rates, the projected life expectancy is converted to age-specific mortality rates using a variant of the Lee-Carter method (Lee & Carter, 1992). Then the cohort component model is applied. However, this approach suffers from lack of a probabilistic basis and can lead to inconsistencies (Lee & Tuljapurkar, 1994; National Research Council, 2000). To solve this problem, probabilistic projections of two main input components were introduced. These are the TFR and life expectancy methodologies discussed above.

Hence, using the above methodology, we simulate a large number of trajectories of future values of the total fertility rate (TFR) and convert them to age-specific fertility rates using model fertility schedules. We simulate an equal number of trajectories of life expectancy at birth for females and males and convert them to age-specific mortality rates using a variant of the Lee–Carter method (Lee & Carter, 1992). We then convert each of these trajectories to a future trajectory of all age- and sex-specific population quantities using a cohort component model. For any future population quantity of interest, the resulting set of values is viewed as a sample from the sought predictive distribution.

7. Results

7.1 Probabilistic Total Fertility Rate

Table 1 presents the estimated parameters of phase II: transition from high to low fertility, where decrements are modeled by a random walk with drift given by a double logistic function. The projections for the total fertility rate in Nigeria from 2010-2027 are decreasing. In 2010, the total fertility rate was 5.84 at 95% predictive interval. It is projected to be 5.03 [4.52, 5.47] at 5% and 95% prediction interval, respectively in 2027. In addition, Figures 1 & 2 represent Bayesian probabilistic fertility projections for Nigeria. The plot in Figure 1 shows the estimated double-logistic curve. The data points for Phase I and Phase II are shown in black dots and squares, respectively. The median and the 80% predictive interval are shown in red - solid and dashed, respectively. The plot in Figure 2 illustrates the trajectory of Bayesian predictive

distributions of TFR shown in red: median-solid; 80% predictive interval-dashed; 95% predictive interval-dotted.

Table 1: Projections for Probabilistic TFR

Year	Mean	SD	2.50%	5%	10%	25%	50%	75%	90%	95%	97.50%
2010	5.84	0.0000	5.84	5.84	5.84	5.84	5.84	5.84	5.84	5.84	5.84
2011	5.81	0.0000	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81	5.81
2012	5.77	0.0000	5.77	5.77	5.77	5.77	5.77	5.77	5.77	5.77	5.77
2013	5.74	0.0000	5.74	5.74	5.74	5.74	5.74	5.74	5.74	5.74	5.74
2014	5.74	0.0000	5.74	5.74	5.74	5.74	5.74	5.74	5.74	5.74	5.74
2015	5.74	0.0000	5.74	5.74	5.74	5.74	5.74	5.74	5.74	5.74	5.74
2016	5.70	0.0425	5.62	5.63	5.65	5.67	5.69	5.73	5.75	5.76	5.78
2017	5.64	0.0636	5.52	5.53	5.57	5.60	5.64	5.69	5.72	5.75	5.76
2018	5.59	0.0849	5.42	5.43	5.49	5.55	5.60	5.65	5.71	5.72	5.74
2019	5.54	0.1018	5.34	5.39	5.41	5.46	5.54	5.60	5.68	5.71	5.74
2020	5.49	0.1157	5.20	5.33	5.36	5.43	5.48	5.56	5.63	5.67	5.70
2021	5.42	0.1455	5.03	5.23	5.26	5.35	5.42	5.52	5.60	5.63	5.66
2022	5.36	0.1612	4.94	5.09	5.16	5.28	5.38	5.48	5.55	5.57	5.62
2023	5.30	0.1890	4.81	5.02	5.09	5.21	5.31	5.44	5.52	5.55	5.59
2024	5.24	0.2189	4.69	4.89	4.97	5.11	5.25	5.38	5.48	5.54	5.58
2025	5.16	0.2390	4.54	4.80	4.90	5.05	5.18	5.30	5.44	5.50	5.57
2026	5.10	0.2639	4.45	4.66	4.82	4.96	5.11	5.28	5.41	5.47	5.54
2027	5.03	0.3011	4.23	4.52	4.73	4.88	5.07	5.25	5.37	5.47	5.47

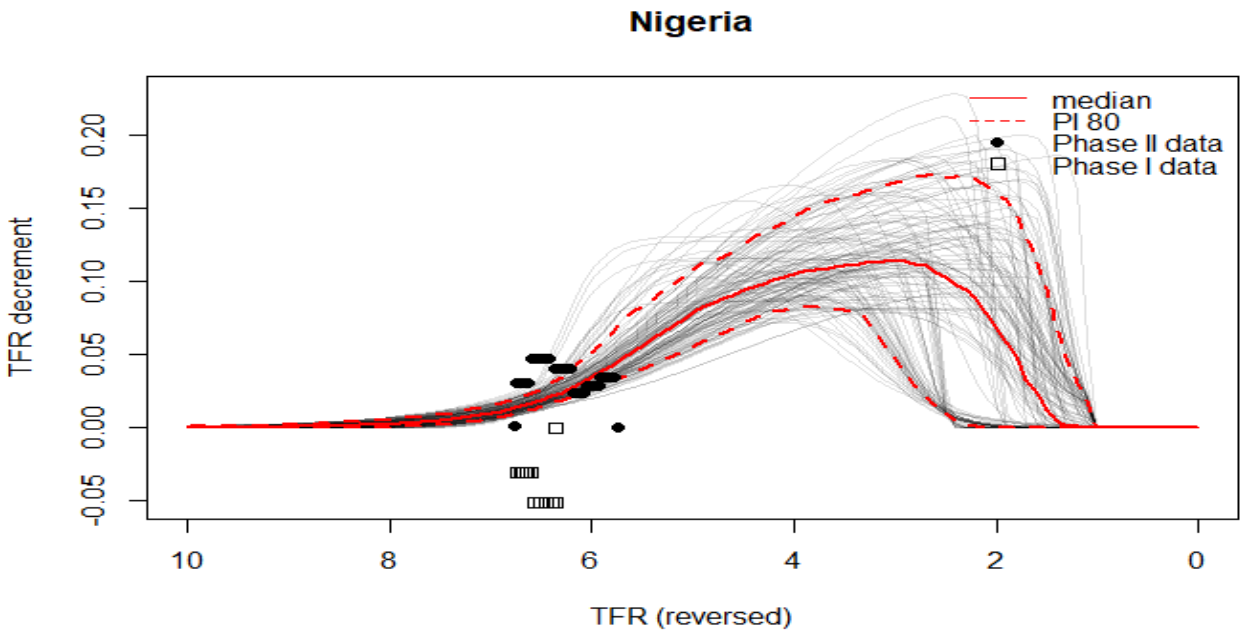


Figure 1: Probabilistic TFR Projections

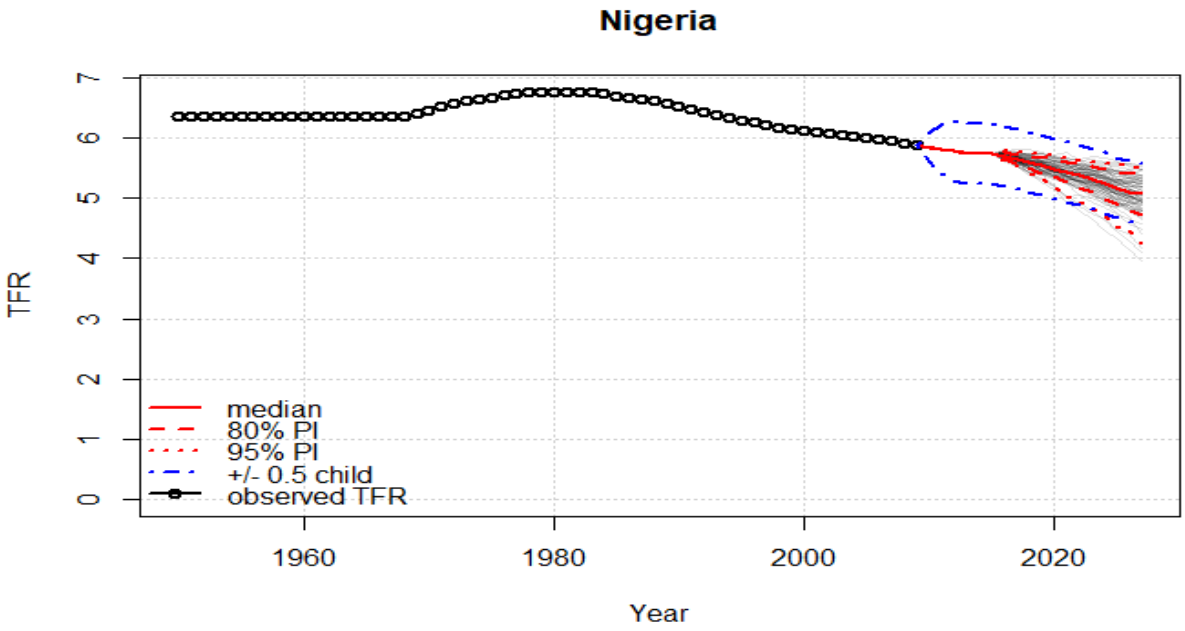


Figure 2: Projected Trajectories of Probabilistic TFR for Nigeria

7.2 Probabilistic Life Expectancy

The female life expectancy similar to Phase II total fertility is modelled using UN's double logistic to make projections for female and male life expectancy jointly from 2010 – 2027. The projected values are presented in Table 2. The life expectancy projection is gradually and consistently increasing. In 2010, 51.3 years lying within 5% and 95% predictive interval [51.3, 51.3]. It is projected that in 2027, the life expectancy will be 55.0 lying within predictive interval [53.5, 56.4] at 5% and 95%, respectively and are plotted in Figures 3 and 4. The plot in Figure 3 illustrate the double-logistic function of gains in life expectancy. The plot in Figure 4 is the trajectory of life expectancy with gains modelled according to double-logistic function. The female life expectancy projection is shown in pink: median- solid; 95% predictive interval- dotted while the male life expectancy is shown in green: median-solid; 95% predictive interval- dotted.

Table 2: Projected Probabilistic Life Expectancy

Year	mean	SD	2.50%	5%	10%	25%	50%	75%	90%	95%	97.50%
2010	51.3	0.000	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3
2011	51.8	0.000	51.8	51.8	51.8	51.8	51.8	51.8	51.8	51.8	51.8

2012	52.2	0.000	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2
2013	52.6	0.000	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6
2014	52.6	0.000	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6
2015	52.6	0.000	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6
2016	52.8	0.303	52.3	52.3	52.3	52.6	52.8	52.9	53.2	53.3	53.3
2017	53	0.392	52.3	52.3	52.5	52.7	53.0	53.2	53.3	53.7	53.9
2018	53.2	0.524	52.3	52.4	52.6	52.8	53.1	53.5	53.8	54.1	54.1
2019	53.3	0.601	52.2	52.3	52.7	52.9	53.4	53.6	54.2	54.3	54.4
2020	53.4	0.646	52.2	52.3	52.5	53.0	53.5	53.9	54.1	54.4	54.6
2021	53.6	0.667	52.4	52.5	52.6	53.2	53.6	54.0	54.5	54.7	54.8
2022	53.9	0.744	52.6	52.7	53.0	53.3	54.0	54.5	54.7	55.0	55.1
2023	54.1	0.750	52.8	52.9	53.2	53.6	54.3	54.7	55.0	55.2	55.3
2024	54.4	0.771	53.0	53.1	53.4	53.8	54.6	55.0	55.3	55.5	55.6
2025	54.5	0.871	52.9	53.1	53.3	54.1	54.7	55.2	55.4	55.7	55.9
2026	54.8	0.913	53.3	53.4	53.5	53.9	54.9	55.5	55.7	55.8	56.0
2027	55	0.997	53.4	53.5	53.5	54.3	55.0	55.8	56.0	56.4	56.7

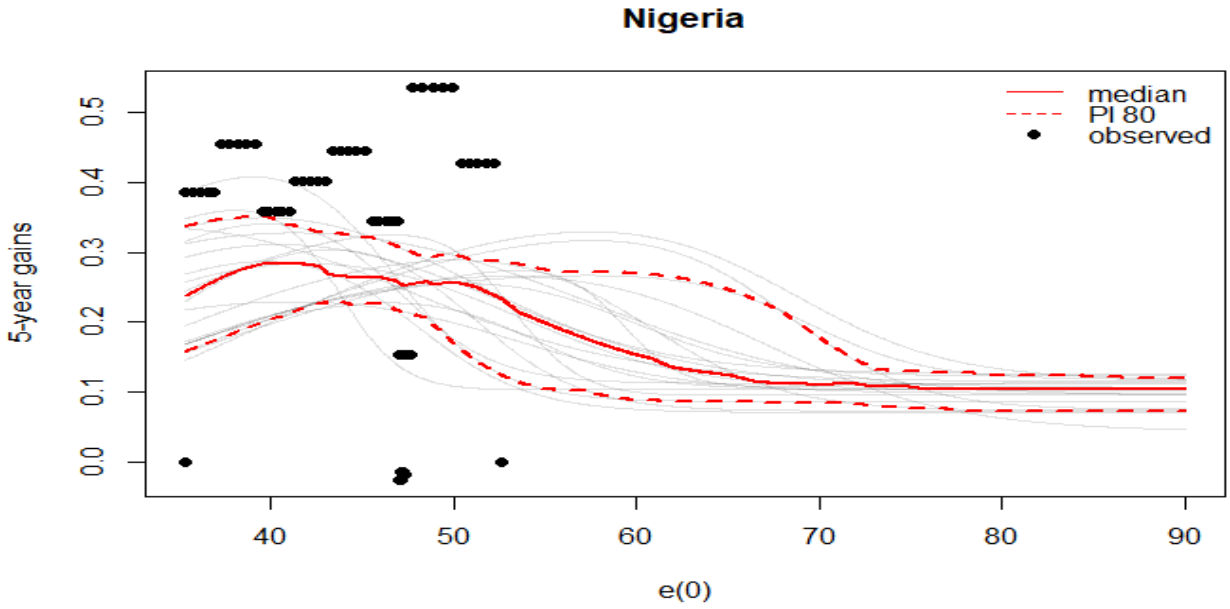


Figure 3: Probabilistic Life Expectancy Projections

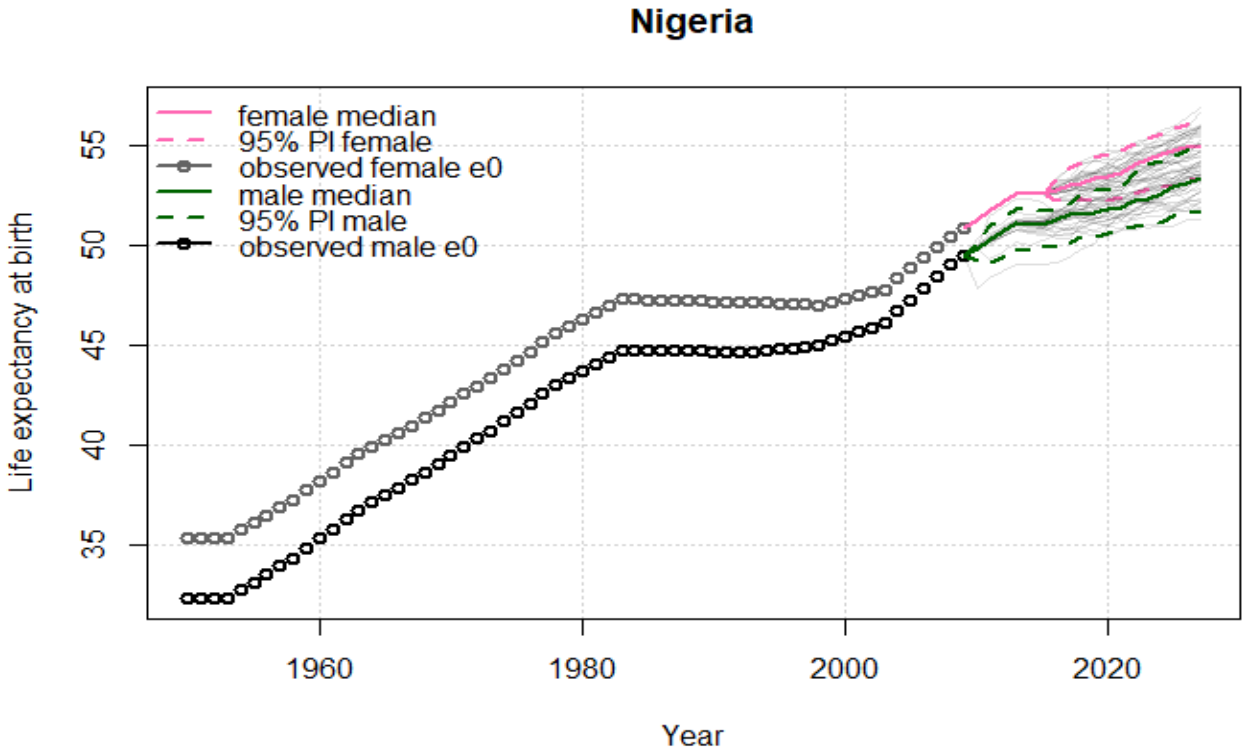


Figure 4: Projected Trajectories of Life Expectancy at birth for Nigeria

7.3 Net Migration Rates

Table 3 displays net migration over time. The in-migration was only experienced in 2010-2013 and 2017 with positive values, while the other years are characterized mostly by negative values indicating out-migration are more than in-migration. The trend as observed from the table shows the movement of people out of the Country are more than people moving into the country, which may indicate potential shift in economy, policy changes and demographic trends.

Table 3: Net Migration Rates

Year	Net Migration Rates
2010	0.224
2011	0.462
2012	0.49
2013	0.122
2014	-0.55
2015	-1.586
2016	-0.576
2017	0.156
2018	-0.82

2019	-1.022
2020	-0.046
2021	-0.716
2022	-0.548
2023	-0.536
2024	-0.524
2025	-0.512
2026	-0.5
2027	-0.488

7.4 Probabilistic Population Projections

The probabilistic population projection obtained is used for building Bayesian hierarchical models to project the total fertility rate and life expectancy. The trajectories from posterior predictive distributions of each of total fertility rate and life expectancy were input to provide a posterior predictive distribution of future population quantity of interest as presented in Table 6. It is noteworthy to point out the projected population is expressed in thousand.

Table 6: Probability Population Projections

Year	Mean	95% CI
2015	190471	(188292,191695)
2016	195474	(193056,196914)
2017	200542	(197805,202282)
2018	205682	(202551,207796)
2019	210904	(207322,213451)
2020	216218	(212136,219244)
2021	221622	(216998,225173)
2022	226741	(223745,230529)
2023	232202	(227669,237307)
2024	237750	(231533,244275)
2025	243375	(235316,251469)
2026	249062	(238938,258872)
2027	254814	(242507,266481)

7.5 Projected Population and Under 18 Population

To compare the probabilistic population projection with number of INEC voter, we adjusted for the under 18 population in Nigeria who are not eligible for INEC voter registration. Therefore, to adjust for the population of under 18 of age, we subtracted the under 18

population for 2015, 2019 and 2023 from the corresponding projected population as shown in Table 7.

Table 7: Population Adjustment for Under 18 of Age (UNICEF)

Year	Projected Population	Under18 Population	Projected Voting Population
2015	190,471,000	93,178,337	97,292,663
2019	210,904,000	102,264,886	108,639,114
2023	232,202,000	110,236,397	121,965,603

7.8 Comparison of Projected Population with Number of Voter Registration

Having adjusted for the population under 18, we compare the adjusted projected population with the number of voter registrations as presented in Table 8. The findings revealed a major difference across the three election years considered in this study. These differences can be measured by mean absolute deviation (MAD). The choice of MAD stems from the fact that MAD is a more robust variability measure and very useful for comparing the variability of different datasets. Hence, the variability existing between projected population and number of INEC voter registration for the different election years is measured by MAD to be 27,045,390.33. As it is evident in Table 8, the differences recorded are 28,004,546; 24,635,030 and 28,496,595 for 2015, 2019 and 2023, respectively.

Table 8: Comparison of Projected Population with Number of Voter Registration

Year	Projected Voting Population	Number of Voter Registration	Difference	MAD
2015	97,292,663	69,288,117	28004546	27045390.33
2019	108,639,114	84,004,084	24635030	
2023	121,965,603	93,469,008	28496595	

8. Conclusion

Evidence provided in this study shows that INEC voter registration does not capture a significant number of eligible voters in the election years under study. The study further indicates that while double and underage registrations may exist, they do not significantly affect the voter register. In addition, the study provides possible insight about the number of eligible voters yet to be registered.

National Population Projection Using Nigeria Population Census Data of 2006

1. Introduction

The demographic model in Spectrum, known as DemProj, is a computer program for making population projections for countries or regions. The program requires information on the number of people by age and sex in the base year, as well as current year data and future assumptions about the total fertility rate (TFR), the age distribution of fertility, life expectancy at birth by sex, the most appropriate model life table, and the magnitude and pattern of international migration This information is used to project the size of the future population by age and sex for as many as 150 years into the future. All population projections must start somewhere. The starting point is the number of people in the population by age and sex in the base year. For both males and females, the population is divided into five-year age groups from 0-4 to 75-79. There is also a final age group for those people aged 80 and older. The base year population is 2006.

DemProj uses model patterns for two processes, fertility and mortality:

Fertility

1. TFR
2. Life expectancy at birth

Mortality

1. Age distribution of fertility
2. Age-specific mortality

1.1 Fertility

A population projection requires information about the level of fertility (obtained through the TFR) and about its shape (obtained through the age distribution).

1.1.1 The Total Fertility Rate -*Base Year Estimates*

The TFR is the number of live births a woman would have if she survived to age 50 and had children according to the prevailing pattern of childbearing at each age group. It is not an average of the number of live births for currently living women. Rather, it is a synthetic measure that expresses the current level of fertility in terms of the average number of live births

that would occur per woman if the current age-specific fertility rates remained constant and all women survived to age 50.

1.1.2 The Age Distribution of Fertility

In addition to the TFR, the age distribution of fertility is also required to make a population projection. In DemProj, this information is entered as the percentage of lifetime fertility that occurs in the five-year age groups 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, and 45-49.

1.1.3 Use of Fertility Models in Population Projections

As noted earlier, in DemProj, model schedules are used to generate age patterns in conjunction with levels of fertility, mortality, and migration. Projected fertility is affected by certain age characteristics. For example, appropriate fertility rates need to be assigned by age group, as those groups vary in size, which contributes to the size of the population being projected to the next time period. In addition, some implications of population projections follow from the age of the mothers as they bear children.

1.2 Mortality

Mortality is described in DemProj through two assumptions: life expectancy at birth by sex, and a model life table of age-specific mortality rates.

1.2.1 Life Expectancy at Birth -*Base Year Estimates*

Life expectancy at birth is the average number of years that a cohort of people would live, subject to the prevailing age specific mortality rates. It is a useful measure that summarizes in one indicator the effect of age-specific mortality patterns. Life expectancy can be calculated from vital statistics on deaths if reporting is complete.

1.2.2 Age-Specific Mortality -*Model Mortality Tables*

The mortality input to DemProj, life expectancy at birth, indicates overall mortality in a population. But Demproj also needs the **pattern** of mortality in order to produce mortality rates by age group. Specifically, the rates required by DemProj are survival ratios, which will survive one age group into the next five-year group.

1.3 Migration

Migration refers to the number of migrants moving into or out of the area for which the population projection is being prepared. If the projection is for a country, then it is international migration. If the projection area is a region or city, then migration refers to people moving into or out of the region or city.

2. Methodology

DemProj calculations are based on the standard cohort component projection modified to produce a single-year projection.

2.1 Projecting the population by single ages

The inputs to the demographic projection are:

- Pop5(a,s): Population by 5 year age groups (a) and sex (s) in the base year
- TFR(t): Total fertility rate by year
- ASFD(a,t): Distribution of fertility by age by year
- SRB(t): Sex ratio at birth by year
- LEB(s,t): Life expectancy at birth with AIDS by sex and year
- Model life table
- Migration (a,s,t): Net in-migrants by age, sex and time

It is assumed that the base population is a mid-year estimate and that the rates (TFR, life expectancy and migration are calendar year averages).

The first step is to split the base year population, which in 5-year age groups, into single ages. This is accomplished by using the Beers procedure (Beers, 1945). This procedure uses a series of polynomial equations to divide the population in 5-year age groups into single year age groups while maintaining the population total and providing a smooth transition from one age to the next. This produces a base year population by single age: Pop (a,s,t_o). The age distribution of migration is also specified in 5-year age groups. Migration is also split into single age groups using the Beers procedure. Mortality is specified as life expectancy at birth by sex and age model life table. The life tables provide survival rates by single year of age for certain values of life expectancy, such as 20, 25, 30, 25, and so on.

DemProj interpolates between these index values to find the age-specific survival rates for the exact life expectancy specified for each year. Model life tables are provided in five-year age groups. These are split into single age survival rates, S(a, a+1), using the life table indicators for nLx (the number of person-years lived between ages x and x+n by an initial cohort of 100,000 people) and lx (the number of survivors at age x out of an original cohort of 100,000 people.

1. Spop(0) = 1L0
2. Spop(1) = (l1 + l2) / 2
3. Spop(2) = (l2 + l3) / 2
4. Spop(3) = (l3 + l4) / 2
5. Spop(4) = (l4 + l5) / 2
6. Spop(5..80+) calculated by applying Beers procedure to nLx values
7. Calculate S(a,a+1) = Spop(a+1) / Spop(a)

The number of deaths from mid-year to mid-year is calculated as:

$$Deaths(a,s,t-1,1) = (Pop(a-1,s,t-1) + [migration(a-1,s,t-1)+migration(a-1,s,t)/2] * (1 – [S(a-1,a,t-1)+ S(a-1,a,t)/2])$$

The number of deaths during the calendar year t is:

$$[Deaths(a,s,t-1) + Deaths(a,s,t)]/2$$

The population is projected by age and sex for ages 0 to 79 as

$$Pop(a,s,t) = Pop(a-1,s,t-1) + [migration(a-1,s,t-1) + migration(a-1,s,t)]/2 – deaths(a,s,t-1,t)$$

The number of births from mid-year to mid-year is

$$Births(t-1,1) = \Sigma a=15,49 [Pop(a,female,t-1) +Pop(a,female,t)]/ 2 * [TFR(t-1) + TFR(t)] / 2 *[ASFD(a,t-1) + ASFD(a,t)] / 2$$

The number of births during the calendar year is

$$[Births(s,t-1) + Births(s-t)]/2$$

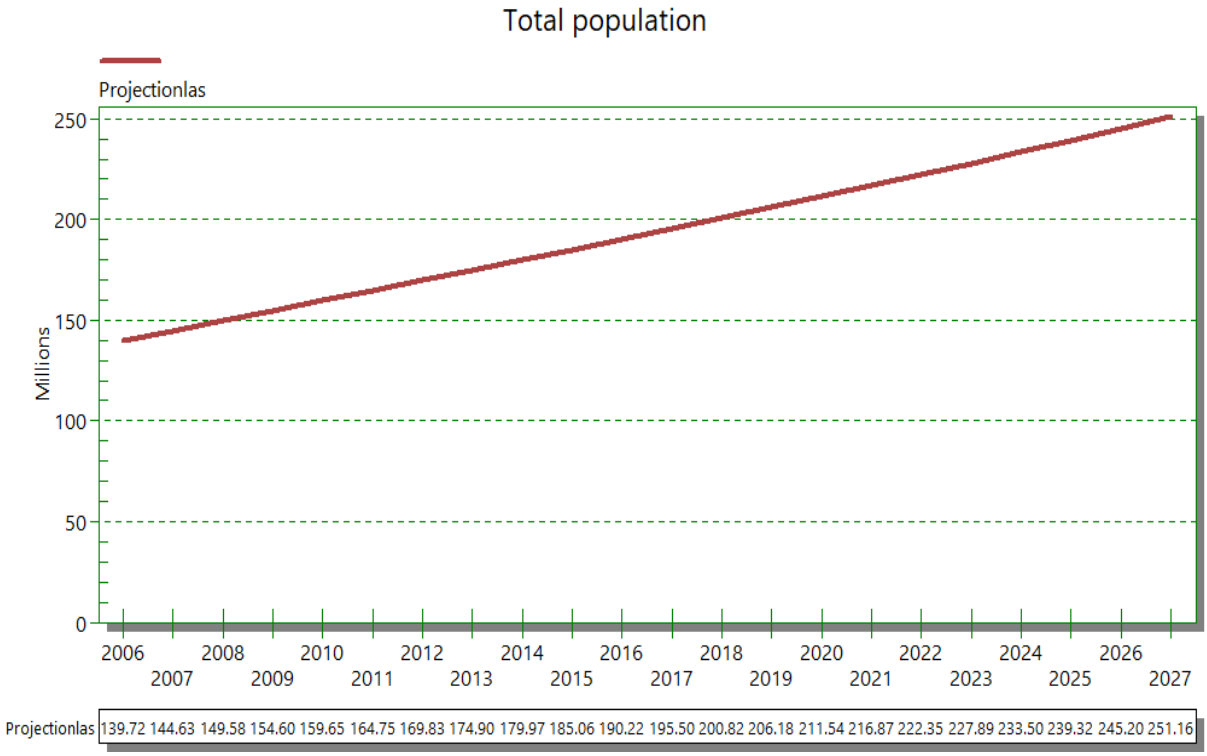
The population of age 0 is

$$Pop(0,s,t) = (Births(s,t-1) + Births(s,t))/2) * Spop(0)$$

3. Results

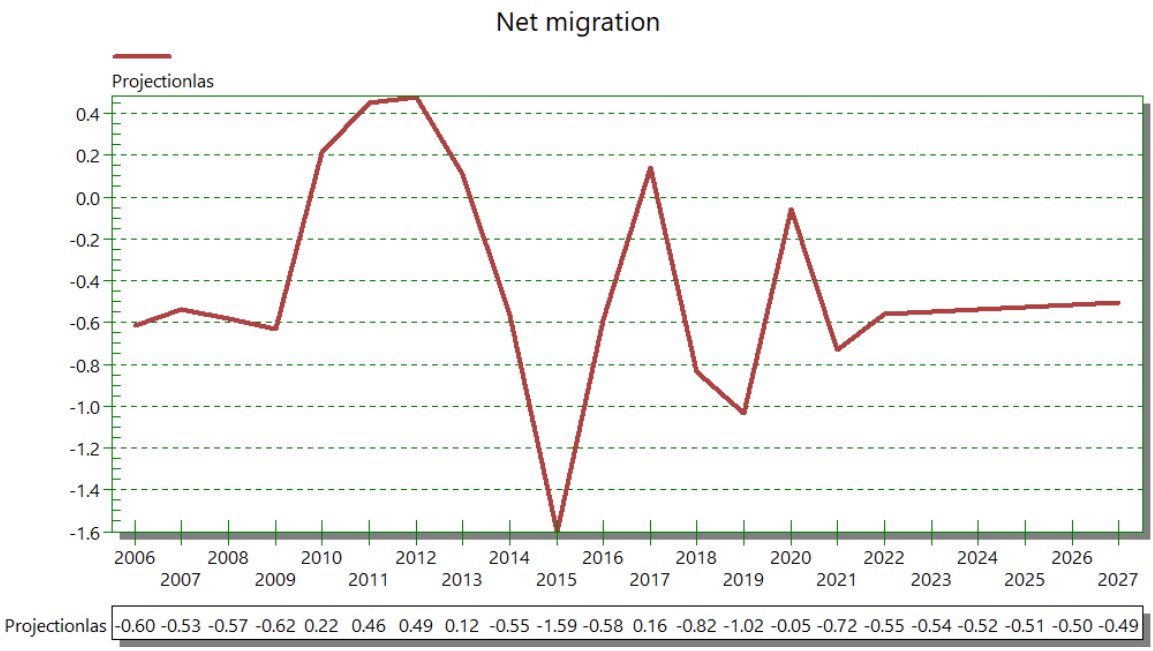
Due to the length of the data, the Results section has been placed to precede the data presentation section. The results obtained are grouped into seven categories as follows.

3.1 Population



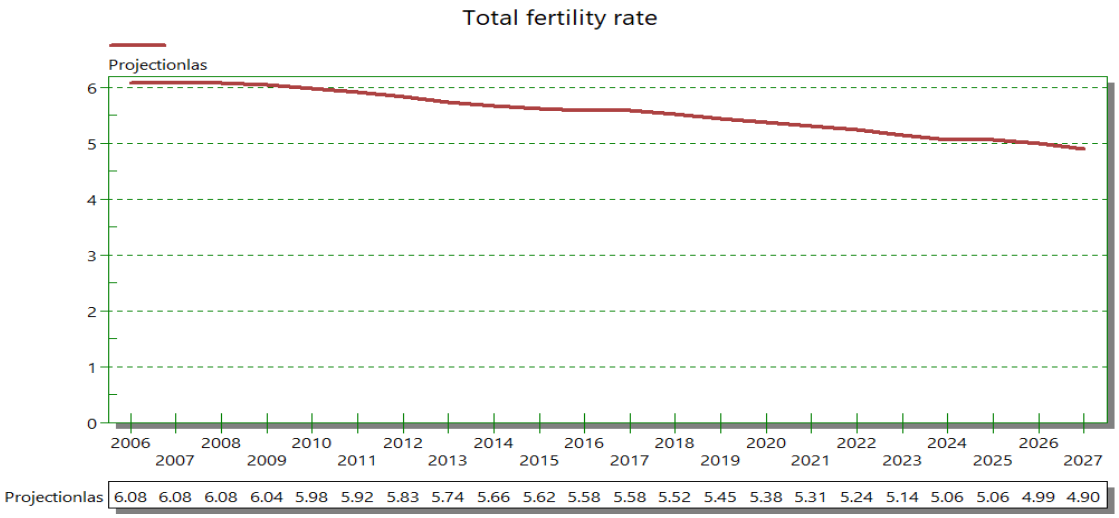
Year	Total Population
2006	139,716,550
2007	144,627,990
2008	149,577,470
2009	154,599,990
2010	159,651,960
2011	164,747,970
2012	169,832,230
2013	174,901,290
2014	179,966,750
2015	185,059,690
2016	190,219,130
2017	195,499,070
2018	200,821,030
2019	206,178,500
2020	211,537,060
2021	216,866,200
2022	222,346,280
2023	227,887,240
2024	233,504,460
2025	239,316,730
2026	245,203,370
2027	251,159,700

3.2 Migration



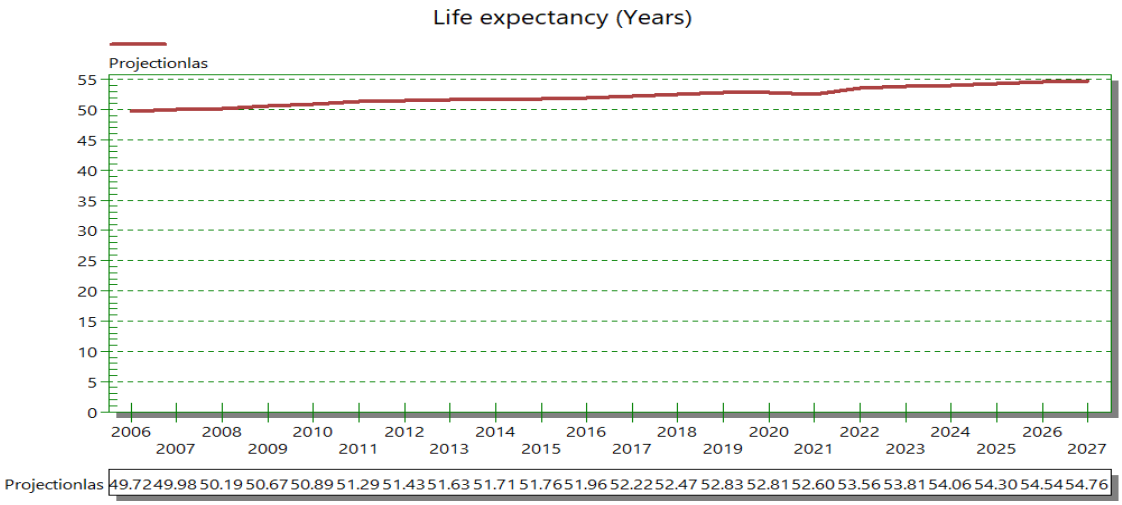
Year	Net Migration
2006	-0.6
2007	-0.526
2008	-0.57
2009	-0.618
2010	0.224
2011	0.462
2012	0.49
2013	0.122
2014	-0.55
2015	-1.586
2016	-0.576
2017	0.156
2018	-0.82
2019	-1.022
2020	-0.046
2021	-0.716
2022	-0.548
2023	-0.536
2024	-0.524
2025	-0.512
2026	-0.5
2027	-0.488

3.3 Total Fertility Rate



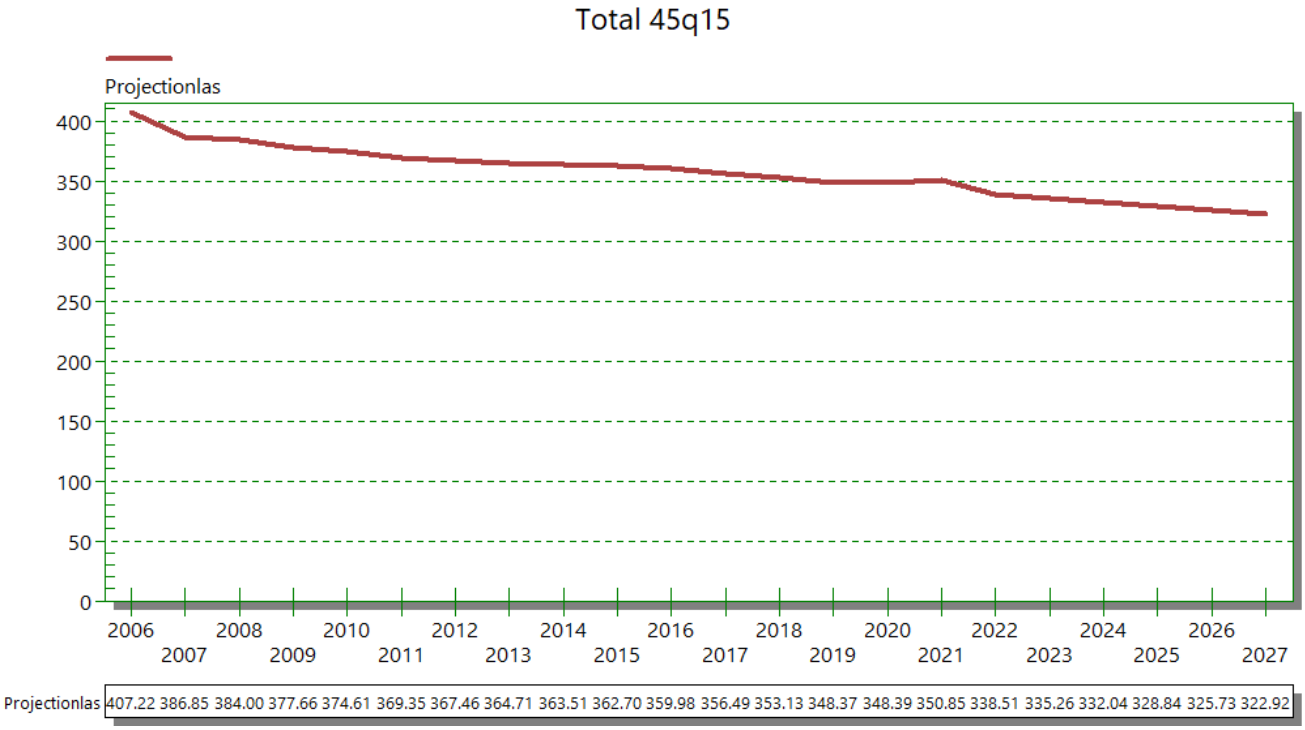
Year	Total Fertility
2006	6.081
2007	6.08
2008	6.078
2009	6.039
2010	5.9803
2011	5.9176
2012	5.8319
2013	5.7376
2014	5.6638
2015	5.6163
2016	5.5837
2017	5.5837
2018	5.5233
2019	5.4468
2020	5.3793
2021	5.3095
2022	5.2374
2023	5.1428
2024	5.0629
2025	5.0629
2026	4.993
2027	4.8989

3.4 Life Expectancy



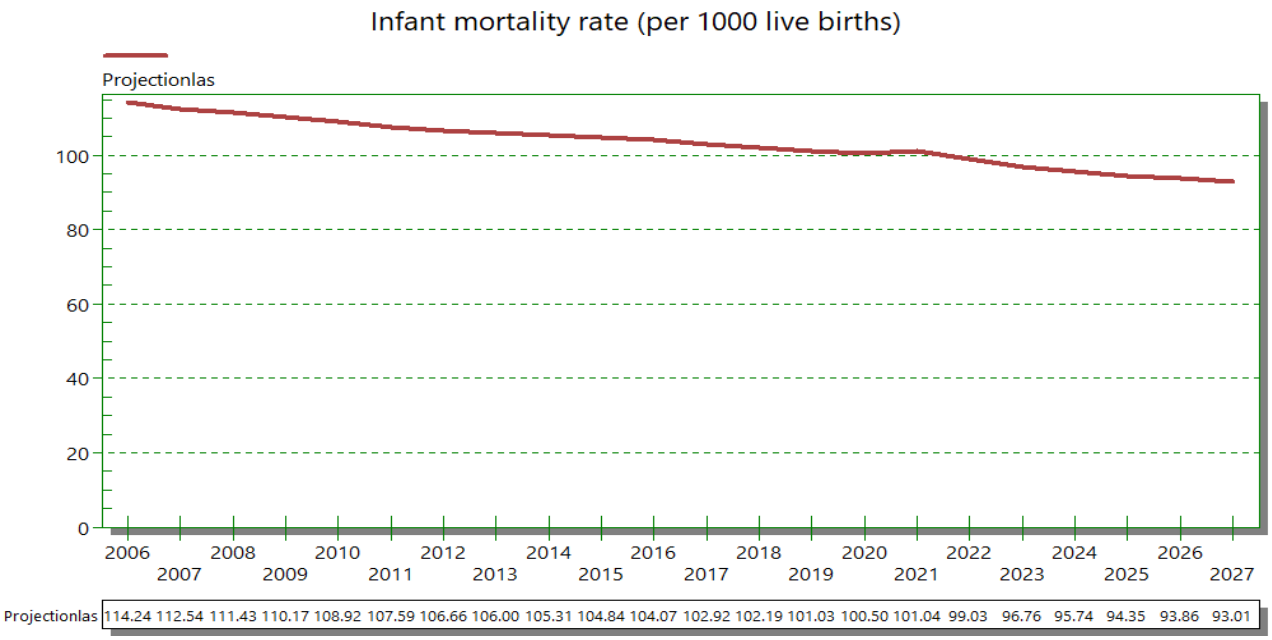
Year	Life Expectancy
2006	49.72482
2007	49.98455
2008	50.18697
2009	50.67023
2010	50.89211
2011	51.29025
2012	51.42609
2013	51.63096
2014	51.71381
2015	51.76303
2016	51.96057
2017	52.22143
2018	52.46916
2019	52.82811
2020	52.80796
2021	52.59502
2022	53.56496
2023	53.81112
2024	54.05649
2025	54.30152
2026	54.54127
2027	54.75859

3.5 Adult Mortality



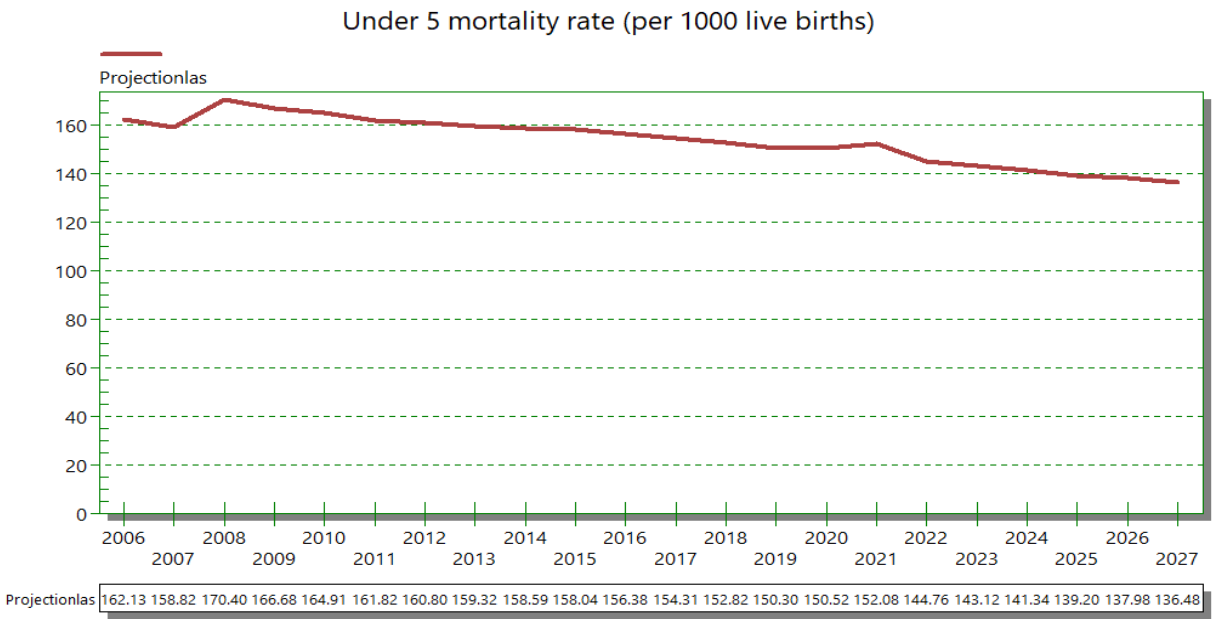
Year	Adult Mortality Rate
2006	407.22031
2007	386.85028
2008	384.00018
2009	377.66193
2010	374.60721
2011	369.35361
2012	367.46155
2013	364.7132
2014	363.50592
2015	362.70038
2016	359.98285
2017	356.48502
2018	353.1257
2019	348.37326
2020	348.38925
2021	350.84613
2022	338.50504
2023	335.25571
2024	332.03738
2025	328.84335
2026	325.73398
2027	322.91626

3.6 Infant Mortality



Year	Infant Mortality Rate
2006	114.2443
2007	112.53556
2008	111.42624
2009	110.1749
2010	108.92155
2011	107.58878
2012	106.65834
2013	106.65834
2014	105.3056
2015	104.83912
2016	104.0668
2017	102.91736
2018	102.19047
2019	101.033
2020	100.49722
2021	101.03754
2022	99.02504
2023	96.75889
2024	95.74266
2025	94.34645
2026	93.8596
2027	93.00788

3.7 Under 5 Mortality Rate



Year	Under 5 Mortality Rate
2006	162.13383
2007	158.82495
2008	170.40001
2009	166.68394
2010	164.90768
2011	161.82149
2012	160.80183
2013	159.31606
2014	158.58551
2015	158.03722
2016	156.37587
2017	154.31346
2018	152.82137
2019	150.29994
2020	150.52425
2021	152.07866
2022	144.76131
2023	143.11633
2024	141.33601
2025	139.19839
2026	137.98378
2027	136.48036

Sub-Title II: Sub-National Population Projection

1. The State Population Projection

Simple Exponential Extrapolation Projection Method

$$P(t) = P(0)e^{rt},$$

where

$P(t)$ is the projected population at time, t.

$P(0)$ is the population at the end of base period.

t is the length of years of the interval from the end of the base period to the date for which a projected population is required.

r is the average annual exponential rate of population change over the base period.

2. Assumption

The characteristics of the more recent periods of development for the States are expected to continue into the future

3. Data

The 2006 census was used as the base population and the growth rate for each State.

4. Subnational Population Projection

Table 1 presents the summary of the adjusted subnational population compared to the INEC voter registration for each of the States. The adjusted population is the difference between the projected and under-18-year populations. The under-18-year population was obtained by calculating 48.6% of the projected population. When the adjusted population is compared with the INEC voter registration for 2023, 2 States; Cross River and Taraba showed that their INEC voter registration numbers are more than the adjusted population (adult population). The detailed projections for each of the States and FCT are presented in Tables 2-38 and Figures 1-37, respectively.

Table 1: Summary of States Projections

States	Projected Population of 18yrs & above (2023)	Number of Voter Registration (2023)	Difference
Abia	2305175.41	2120808	184367.41
Adamawa	2666056.31	2196566	469490.31
Akwa Ibom	3591653.57	2357418	1234235.57
Anambra	3459988.41	2656437	803551.41
Bauchi	4284528.32	2749268	1535260.32
Bayelsa	1433429.2	1056862	376567.2
Benue	3611502.72	2777727	833775.72
Borno	3803279.608	2513281	1289998.61
Cross River	2431155.452	2513281	-82125.548
Delta	3629382.211	3221697	407685.211
Ebonyi	1798237.859	1597646	200591.859
Edo	2617791.961	2501081	116,710.961
Ekiti	2075779.318	987647	1088132.32
Enugu	2788115.735	2112793	675322.735
Fct	3510113.382	1570307	1939806.38
Gombe	2084507.449	1575794	508713.449
Imo	3484599.794	2419922	1064677.79
Jigawa	3659524.455	2351298	1308226.46
Kaduna	5192732.432	4335208	857524.432
Kano	8452313.66	5921370	2530943.66
Katsina	4958213.177	3516719	1441494.18
Kebbi	2819664.115	2032041	787623.115
Kogi	2806252.664	1932654	873598.664
Kwara	2029556.568	1695927	333629.568
Lagos	7982049.529	7060195	921854.529
Nasarawa	1594888.262	1899244	304355.738
Niger	3619176.817	2698344	920788.816
Ogun	3358069.215	2688305	669764.215
Ondo	2945377.782	1991344	954033.782
Osun	3031754.908	1954800	1,076954.91
Oyo	5122955.358	3276675	1846280.36
Plateau	2585565.044	2789528	203962.956
Rivers	4750809.245	3537190	1213619.25
Sokoto	3164482.059	2172056	992426.059
Taraba	1919097.933	2022374	-103276.067
Yobe	2163485.791	1485146	678339.791
Zamfara	2886798.035	1926870	959928.035

Table 2: Population Projection for Abia State

Years	Projected Population	Under 18 Population	Projected Population of 18yrs & above (2023)	Number of Voter Registration	Difference
2006	2833999	1377323.514	1456675.49		
2007	2911559.326	1415017.832	1496541.49		
2008	2991242.307	1453743.761	1537498.55		
2009	3073106.036	1493529.533	1579576.5		
2010	3157210.196	1534404.155	1622806.04		
2011	3243616.102	1576397.426	1667218.68		
2012	3332386.748	1619539.96	1712846.79		
2013	3423586.851	1663863.21	1759723.64		
2014	3517282.901	1709399.49	1807883.41		
2015	3613543.206	1756181.998	1857361.21		
2016	3712437.943	1804244.84	1908193.1		
2017	3814039.213	1853623.058	1960416.16		
2018	3918421.086	1904352.648	2014068.44		
2019	4025659.661	1956470.595	2069189.07		
2020	4135833.121	2010014.897	2125818.22		
2021	4249021.786	2065024.588	2183997.2		
2022	4365308.176	2121539.774	2243768.4		
2023	**4484777.069**	**2179601.656**	**2305175.41**	**2120808**	**184367.41**
2024	4607515.563	2239252.564	2368263		
2025	4733613.141	2300535.987	2433077.15		
2026	4863161.731	2363496.601	2499665.13		
2027	4996255.782	2428180.31	2568075.47		

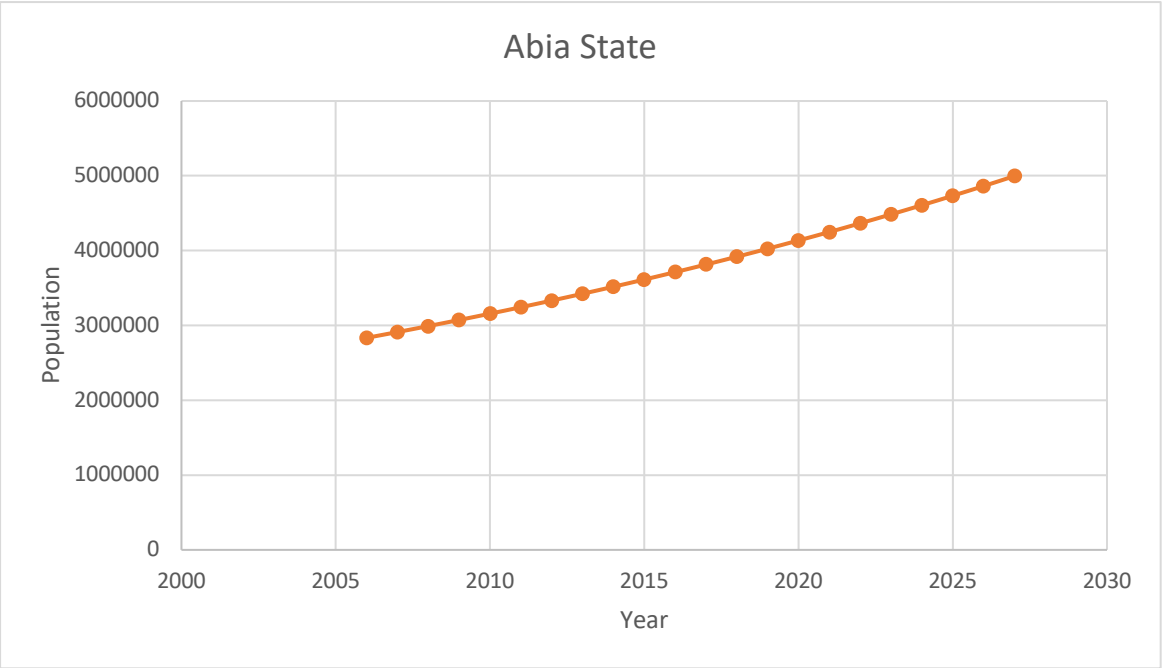


Figure 1: Plot of Population Projection for Abia State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	3168101	1539697.086	1628403.91		
2007	3261321.087	1585002.048	1676319.04		
2008	3357284.138	1631640.091	1725644.05		
2009	3456070.862	1679650.439	1776420.42		
2010	3557764.346	1729073.472	1828690.87		
2011	3662450.119	1779950.758	1882499.36		
2012	3770216.228	1832325.087	1937891.14		
2013	3881153.312	1886240.51	1994912.8		
2014	3995354.674	1941742.372	2053612.3		
2015	4112916.365	1998877.353	2114039.01		
2016	4233937.261	2057693.509	2176243.75		
2017	4358519.148	2118240.306	2240278.84		
2018	4486766.807	2180568.668	2306198.14		
2019	4618788.1	2244731.017	2374057.08		
2020	4754694.067	2310781.317	2443912.75		
2021	4894599.012	2378775.12	2515823.89		
2022	5038620.603	2448769.613	2589850.99		
2023	**5186879.971**	**2520823.666**	**2666056.31**	**2196566**	**469490.31**
2024	5339501.811	2594997.88	2744503.93		
2025	5496614.486	2671354.64	2825259.85		
2026	5658350.138	2749958.167	2908391.97		
2027	5824844.797	2830874.571	2993970.23		

Table 3: Population Projection for Adamawa State

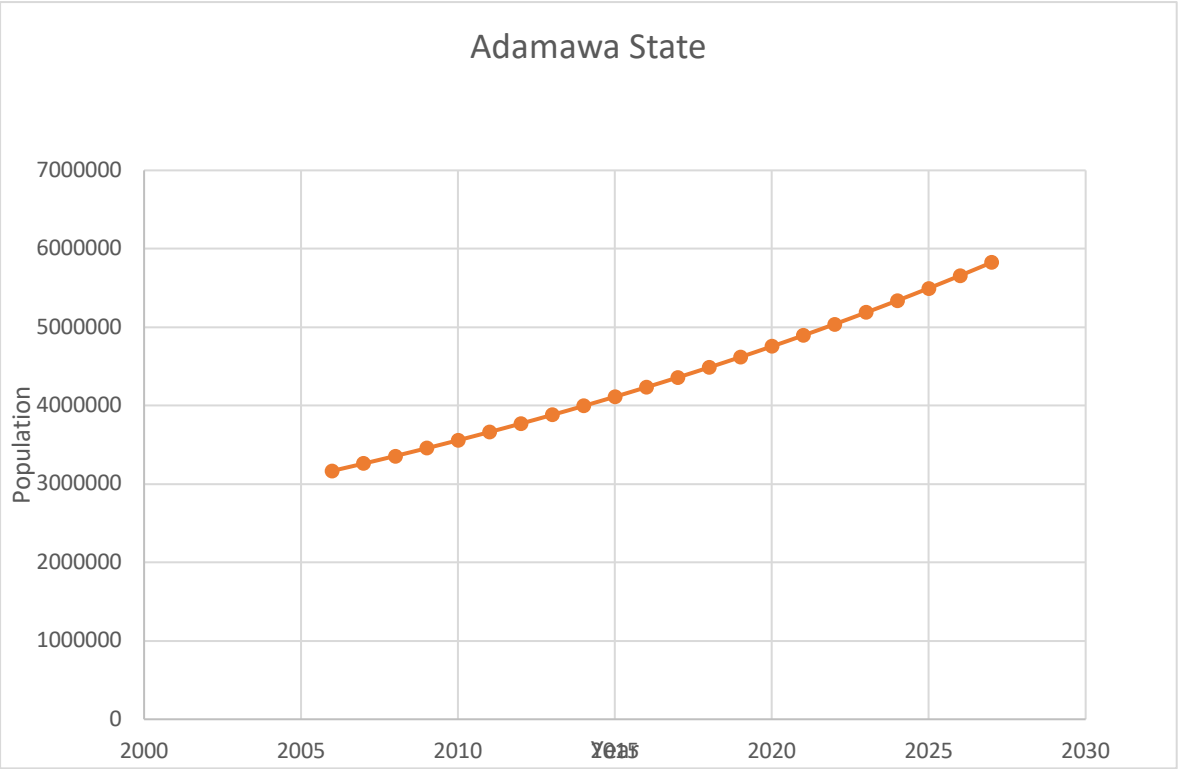


Figure 2: Plot of Population Projection for Adamawa State

Table 4: Population Projection for Akwa Ibom State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	3920208	1905221.088	2014986.91		
2007	4055786.852	1971112.41	2084674.44		
2008	4196054.645	2039282.557	2156772.09		
2009	4341173.545	2109810.343	2231363.2		
2010	4491311.325	2182777.304	2308534.02		
2011	4646641.561	2258267.799	2388373.76		
2012	4807343.832	2336369.102	2470974.73		
2013	4973603.927	2417171.509	2556432.42		
2014	5145614.063	2500768.435	2644845.63		
2015	5323573.102	2587256.528	2736316.57		
2016	5507686.784	2676735.777	2830951.01		
2017	5698167.966	2769309.631	2928858.33		
2018	5895236.864	2865085.116	3030151.75		
2019	6099121.312	2964172.958	3134948.35		
2020	6310057.024	3066687.714	3243369.31		
2021	6528287.865	3172747.902	3355539.96		
2022	6754066.133	3282476.141	3471589.99		
2023	**6987652.854**	**3395999.287**	**3591653.57**	**2357418**	**1234235.57**
2024	7229318.08	3513448.587	3715869.49		
2025	7479341.203	3634959.825	3844381.38		
2026	7738011.277	3760673.481	3977337.8		
2027	8005627.354	3890734.894	4114892.46		

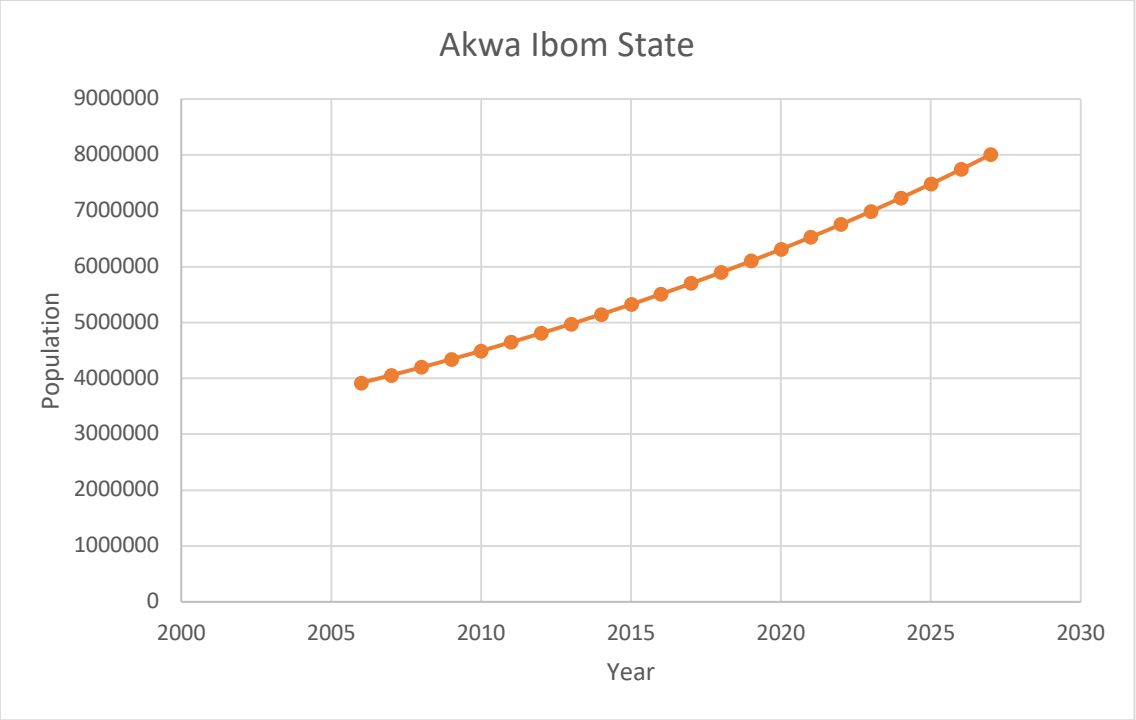


Figure 3: Plot of Population Projection for Akwa Ibom State

Table 5: Population Projection for Anambra State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	4182032	2032467.552	2149564.448		
2007	4300783.661	2090180.859	2210602.802		
2008	4422907.357	2149532.976	2273374.381		
2009	4548498.838	2210570.435	2337928.403		
2010	4677656.576	2273341.096	2404315.48		
2011	4810481.836	2337894.172	2472587.664		
2012	4947078.76	2404280.277	2542798.483		
2013	5087554.447	2472551.461	2615002.986		
2014	5232019.038	2542761.252	2689257.786		
2015	5380585.799	2614964.698	2765621.101		
2016	5533371.215	2689218.41	2844152.805		
2017	5690495.078	2765580.608	2924914.47		
2018	5852080.581	2844111.162	3007969.419		
2019	6018254.414	2924871.645	3093382.769		
2020	6189146.867	3007925.377	3181221.49		
2021	6364891.928	3093337.477	3271554.451		
2022	6545627.391	3181174.912	3364452.479		

2023	**6731494.961**	**3271506.551**	**3459988.41**	**2656437**	**803551.41**
2024	6922640.367	3364403.218	3558237.149		
2025	7119213.478	3459937.75	3659275.728		
2026	7321368.418	3558185.051	3763183.367		
2027	7529263.685	3659222.151	3870041.534		

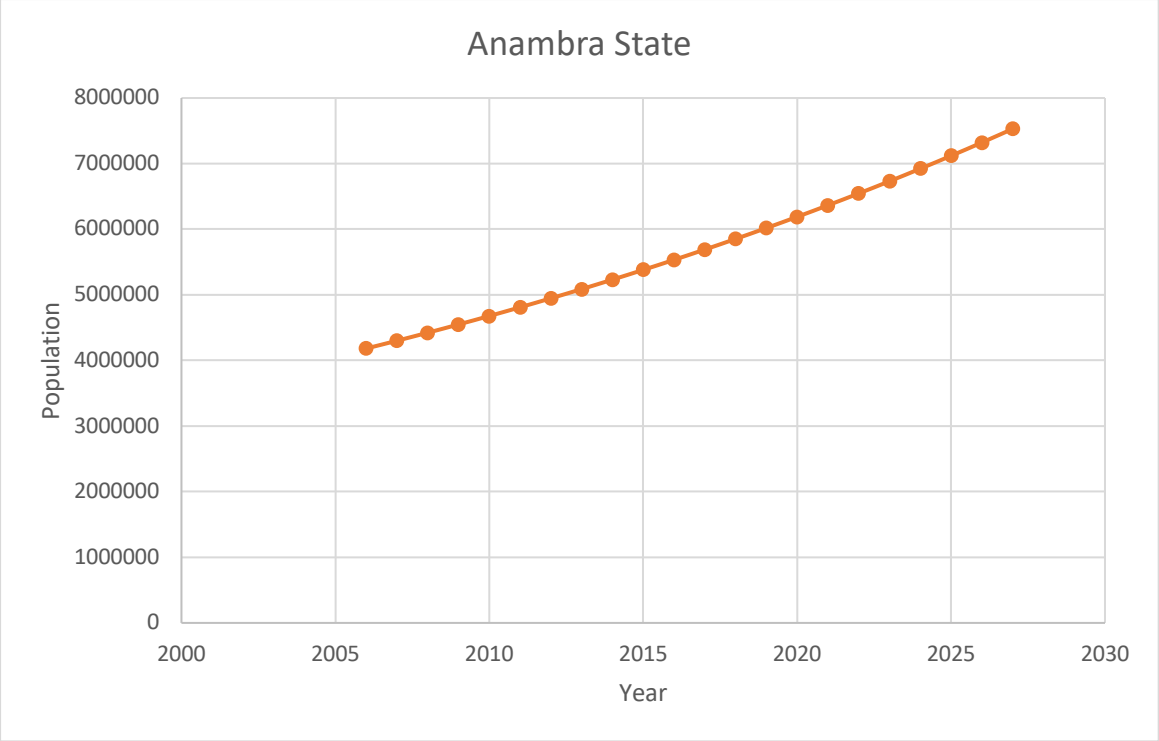


Figure 4: Plot of Population Projection for Anambra State

Table 6: Population Projection for Bauchi State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	4676465	2272761.99	2403703.01		
2007	4838198.703	2351364.57	2486834.133		
2008	5005525.902	2432685.588	2572840.314		
2009	5178640.047	2516819.063	2661820.984		
2010	5357741.277	2603862.261	2753879.016		
2011	5543036.652	2693915.813	2849120.839		
2012	5734740.394	2787083.831	2947656.563		
2013	5933074.135	2883474.03	3049600.105		
2014	6138267.171	2983197.845	3155069.326		
2015	6350556.727	3086370.569	3264186.158		
2016	6570188.234	3193111.482	3377076.752		
2017	6797415.61	3303543.986	3493871.624		
2018	7032501.556	3417795.756	3614705.8		
2019	7275717.857	3535998.879	3739718.978		
2020	7527345.697	3658290.009	3869055.688		
2021	7787675.988	3784810.53	4002865.458		
2022	8057009.699	3915706.714	4141302.985		
2023	**8335658.211**	**4051129.891**	**4284528.32**	**2749268**	**1535260.32**

2024	8623943.672	4191236.625	4432707.047		
2025	8922199.373	4336188.895	4586010.478		
2026	9230770.129	4486154.283	4744615.846		
2027	9550012.684	4641306.164	4908706.52		

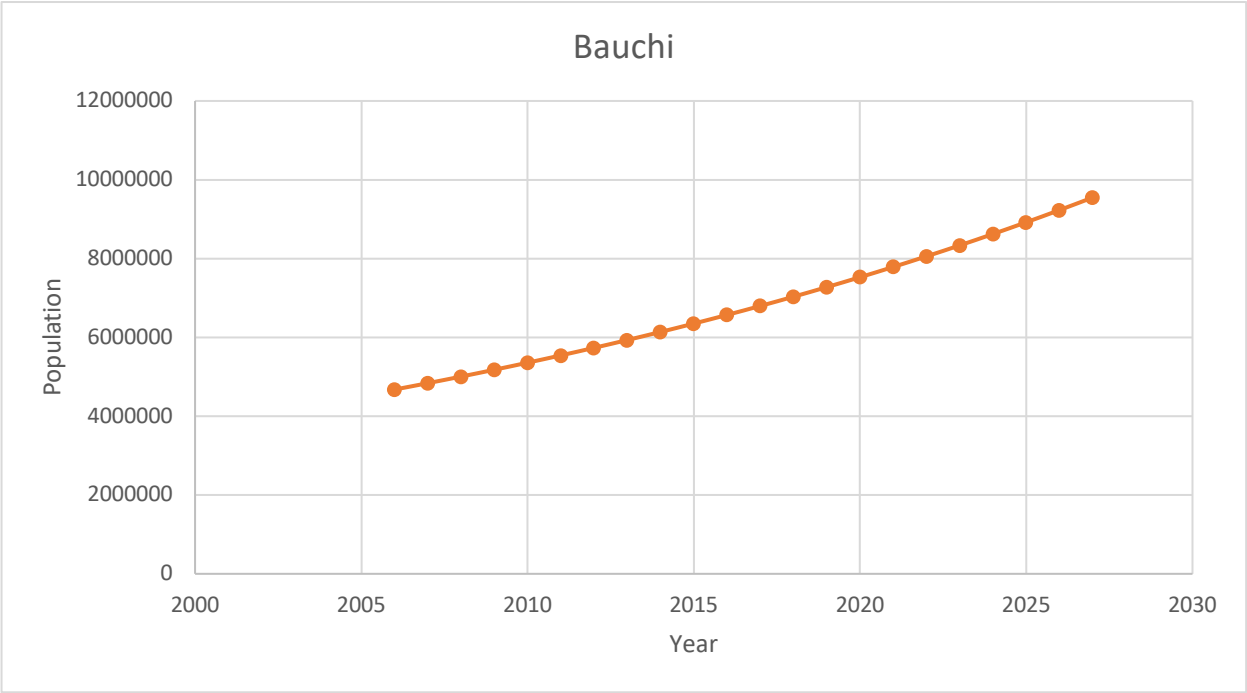


Figure 5: Population Projection for Bauchi State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	1703358	827831.99	875526.01		
2007	1753478.618	852190.61	901288.01		
2008	1805074.016	877265.97	927808.04		
2009	1858187.587	903079.17	955108.42		
2010	1912864.003	929651.91	983212.1		
2011	1969149.25	957006.54	1012142.7		
2012	2027090.668	985166.06	1041924.6		
2013	2086736.989	1014154.2	1072582.8		
2014	2148138.379	1043995.3	1104143.1		
2015	2211346.48	1074714.4	1136632.1		
2016	2276414.453	1106337.4	1170077		
2017	2343397.025	1138891	1204506.1		
2018	2412350.532	1172402.4	1239948.2		
2019	2483332.969	1206899.8	1276433.1		
2020	2556404.034	1242412.4	1313991.7		
2021	2631625.186	1278969.8	1352655.3		
2022	2709059.69	1316603	1392456.7		
2023	**2788772.673**	**1355343.5**	**1433429.2**	**1056862**	**376567.2**
2024	2870831.178	1395224	1475607.2		
2025	2955304.221	1436277.9	1519026.4		
2026	3042262.849	1478539.7	1563723.1		
2027	3131780.2	1522045.2	1609735		

Table 7: Population Projection for Bayelsa State

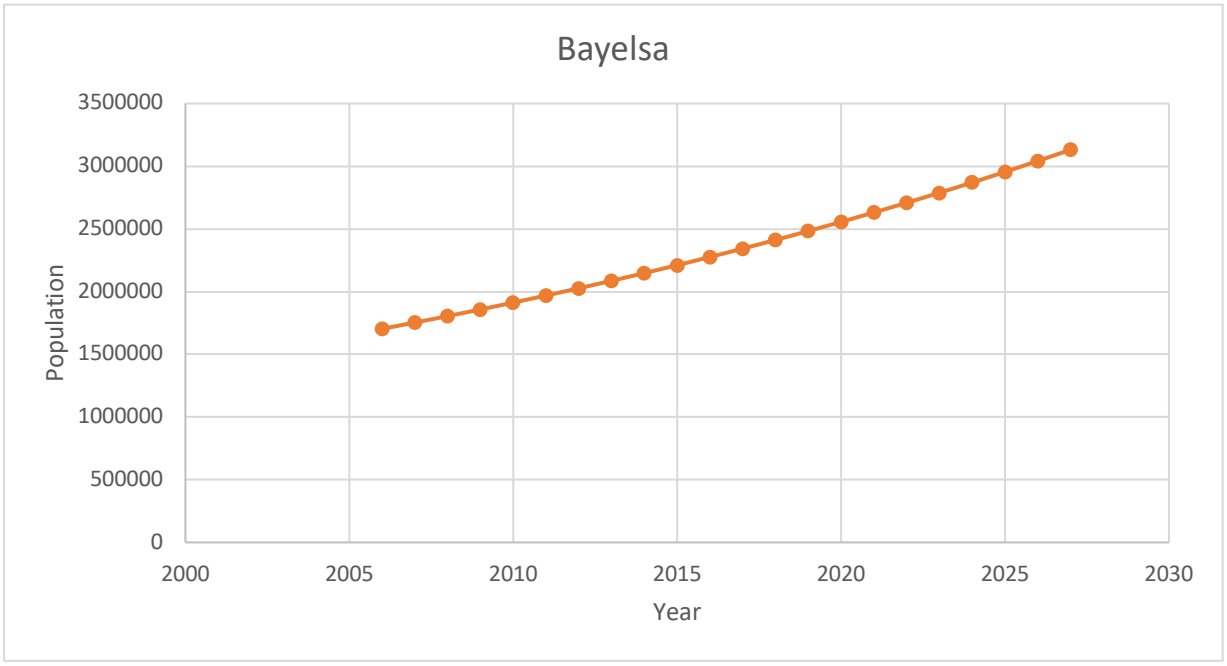


Figure 6: Plot of Population Projection for Bayelsa State

Table 8: Population Projection for Benue State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	4219244	2050552.584	2168691.416		
2007	4347739.11	2113001.207	2234737.903		
2008	4480147.478	2177351.674	2302795.804		
2009	4616588.281	2243661.905	2372926.376		
2010	4757184.326	2311991.582	2445192.744		
2011	4902062.158	2382402.209	2519659.949		
2012	5051352.176	2454957.158	2596395.018		
2013	5205188.752	2529721.733	2675467.019		
2014	5363710.35	2606763.23	2756947.12		
2015	5527059.649	2686150.989	2840908.66		
2016	5695383.675	2767956.466	2927427.209		
2017	5868833.93	2852253.29	3016580.64		
2018	6047566.532	2939117.335	3108449.197		
2019	6231742.353	3028626.784	3203115.569		
2020	6421527.162	3120862.201	3300664.961		
2021	6617091.779	3215906.605	3401185.174		
2022	6818612.225	3313845.541	3504766.684		
2023	**7026269.883**	**3414767.163**	**3611502.72**	**2777727**	**833775.72**
2024	7240251.657	3518762.305	3721489.352		

2025	7460750.147	3625924.571	3834825.576		
2026	7687963.816	3736350.415	3951613.401		
2027	7922097.171	3850139.225	4071957.946		

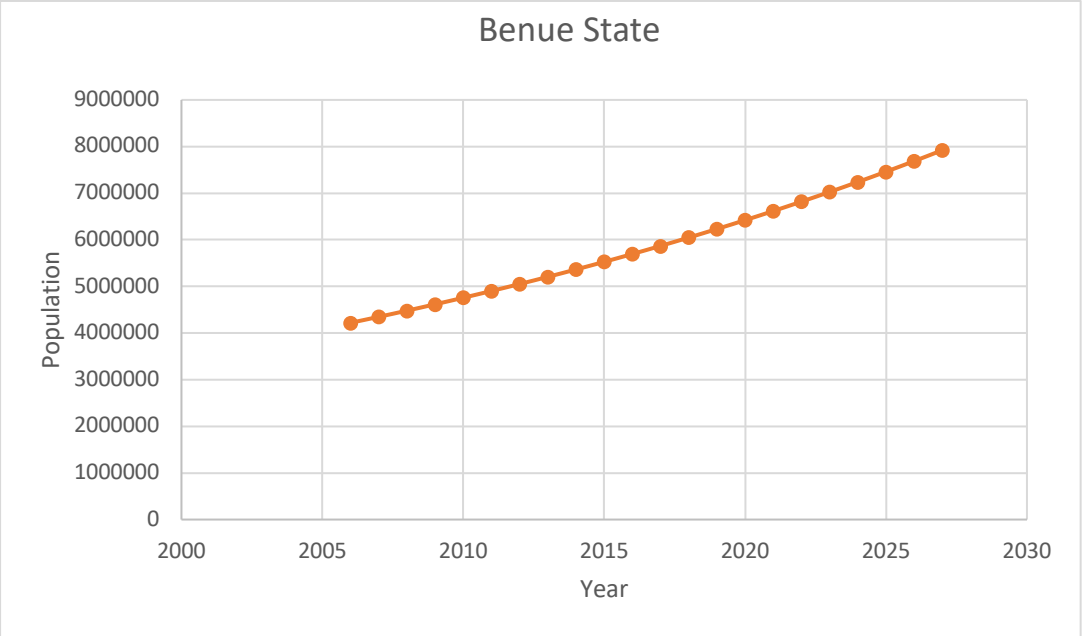


Figure 7: Plot of Population Projection for Benue State

Table 9: Population Projection for Borno State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	4151193	2017479.798	2133713.202		
2007	4294760.377	2087253.543	2207506.834		
2008	4443292.976	2159440.386	2283852.59		
2009	4596962.516	2234123.783	2362838.733		
2010	4755946.657	2311390.075	2444556.582		
2011	4920429.202	2391328.592	2529100.61		
2012	5090600.311	2474031.751	2616568.56		
2013	5266656.72	2559595.166	2707061.554		
2014	5448801.972	2648117.758	2800684.214		
2015	5637246.645	2739701.869	2897544.776		
2016	5832208.603	2834453.381	2997755.222		
2017	6033913.244	2932481.837	3101431.407		
2018	6242593.761	3033900.568	3208693.193		
2019	6458491.411	3138826.826	3319664.585		
2020	6681855.796	3247381.917	3434473.879		
2021	6912945.151	3359691.343	3553253.808		
2022	7152026.641	3475884.948	3676141.693		
2023	**7399376.669**	**3596097.061**	**3803279.608**	**2513281**	**1289998.61**
2024	7655281.202	3720466.664	3934814.538		

2025	7920036.091	3849137.54	4070898.551		
2026	8193947.425	3982258.449	4211688.976		
2027	8477331.874	4119983.291	4357348.583		

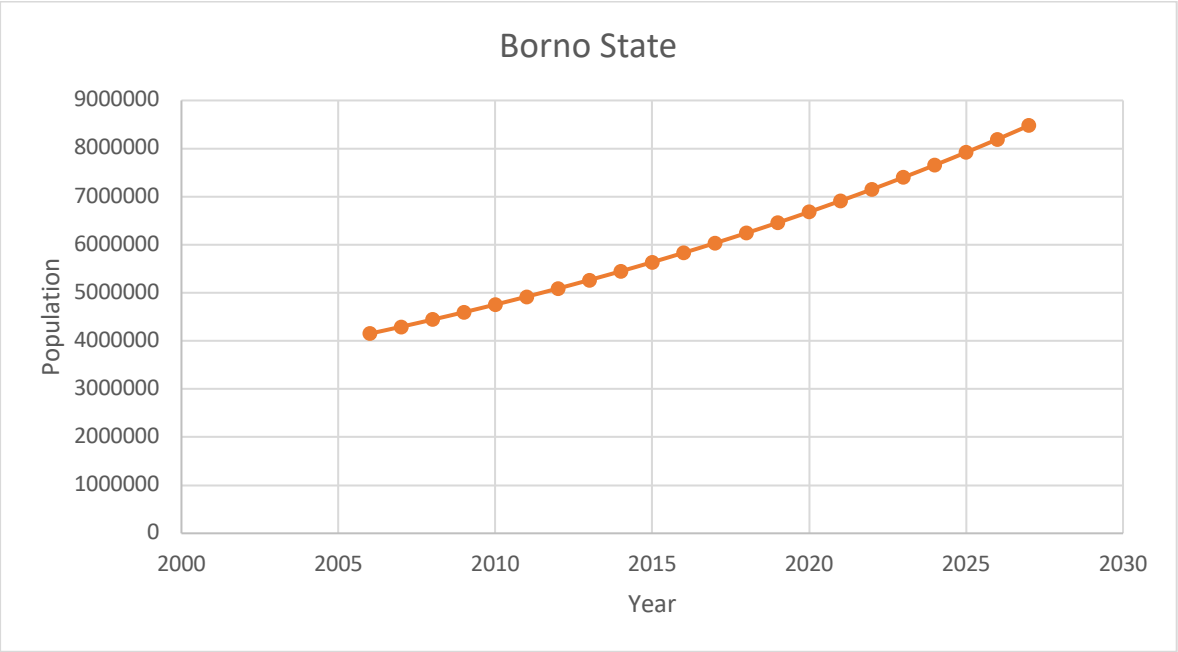


Figure 8: Plot of Population Projection for Borno State

Table 10: Population Projection for Cross River State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	2888966	1404037.476	1484928.524		
2007	2973972.653	1445350.709	1528621.944		
2008	3061480.592	1487879.568	1573601.024		
2009	3151563.417	1531659.821	1619903.596		
2010	3244296.893	1576728.29	1667568.603		
2011	3339759.013	1623122.88	1716636.133		
2012	3438030.068	1670882.613	1767147.455		
2013	3539192.708	1720047.656	1819145.052		
2014	3643332.019	1770659.361	1872672.658		
2015	3750535.586	1822760.295	1927775.291		
2016	3860893.574	1876394.277	1984499.297		
2017	3974498.802	1931606.418	2042892.384		
2018	4091446.818	1988443.154	2103003.664		
2019	4211835.981	2046952.287	2164883.694		
2020	4335767.547	2107183.028	2228584.519		
2021	4463345.749	2169186.034	2294159.715		
2022	4594677.887	2233013.453	2361664.434		
2023	**4729874.421**	**2298718.969**	**2431155.452**	**2513281**	**-82125.548**

2024	4869049.058	2366357.842	2502691.216		
2025	5012318.852	2435986.962	2576331.89		
2026	5159804.301	2507664.89	2652139.411		
2027	5311629.45	2581451.913	2730177.537		

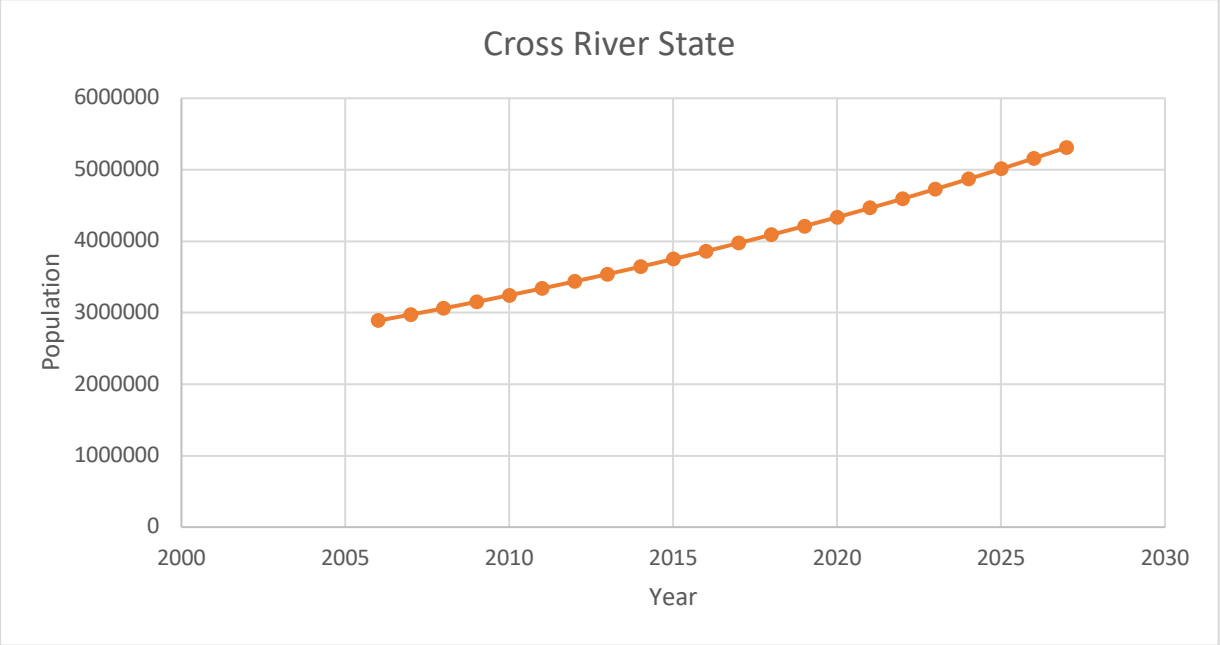


Figure 9: Plot of Population Projection for Cross River State

Table 11: Population Projection for Delta State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	4098391	1991818.026	2106572.974		
2007	4231660.451	2056586.979	2175073.472		
2008	4369263.492	2123462.057	2245801.435		
2009	4511341.041	2192511.746	2318829.295		
2010	4658038.597	2263806.758	2394231.839		
2011	4809506.392	2337420.107	2472086.285		
2012	4965899.542	2413427.177	2552472.365		
2013	5127378.206	2491905.808	2635472.398		
2014	5294107.754	2572936.368	2721171.386		
2015	5466258.931	2656601.84	2809657.091		
2016	5644008.035	2742987.905	2901020.13		
2017	5827537.096	2832183.029	2995354.067		
2018	6017034.065	2924278.556	3092755.509		
2019	6212693.002	3019368.799	3193324.203		
2020	6414714.28	3117551.14	3297163.14		
2021	6623304.785	3218926.126	3404378.659		
2022	6838678.134	3323597.573	3515080.561		
2023	**7061054.886**	**3431672.675**	**3629382.211**	**3221697**	**407685.211**
2024	7290662.776	3543262.109	3747400.667		

2025	7527736.941	3658480.153	3869256.788		
2026	7772520.167	3777444.801	3995075.366		
2027	8025263.133	3900277.883	4124985.25		

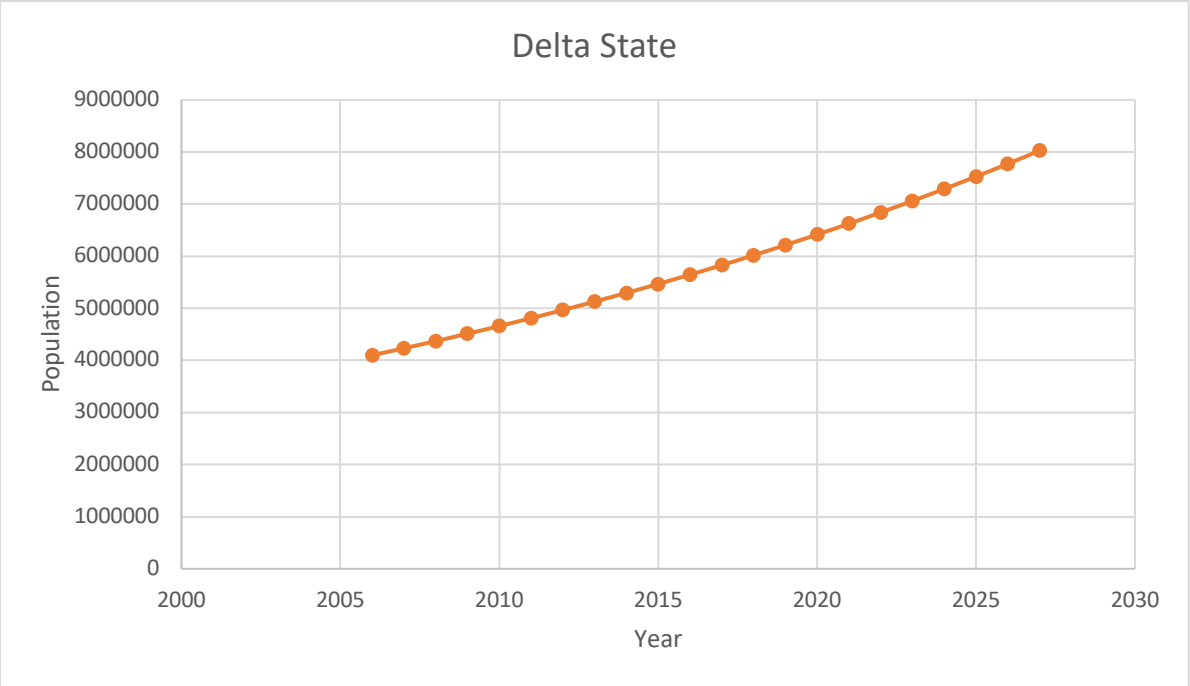


Figure 10: Plot of Population Projection for Delta State

Table 12: Population Projection for Ebonyi State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	2173501	1056321.486	1117179.514		
2007	2235219.048	1086316.457	1148902.591		
2008	2298689.623	1117163.157	1181526.466		
2009	2363962.488	1148885.769	1215076.719		
2010	2431088.821	1181509.167	1249579.654		
2011	2500121.252	1215058.928	1285062.324		
2012	2571113.906	1249561.358	1321552.548		
2013	2644122.445	1285043.508	1359078.937		
2014	2719204.112	1321533.198	1397670.914		
2015	2796417.774	1359059.038	1437358.736		
2016	2875823.97	1397650.449	1478173.521		
2017	2957484.96	1437337.691	1520147.269		
2018	3041464.77	1478151.878	1563312.892		
2019	3127829.244	1520125.013	1607704.231		
2020	3216646.096	1563290.003	1653356.093		
2021	3307984.963	1607680.692	1700304.271		
2022	3401917.46	1653331.886	1748585.574		
2023	**3498517.235**	**1700279.376**	**1798237.859**	**1597646**	**200591.859**

2024	3597860.026	1748559.973	1849300.053		
2025	3700023.724	1798211.53	1901812.194		
2026	3805088.43	1849272.977	1955815.453		
2027	3913136.52	1901784.349	2011352.171		

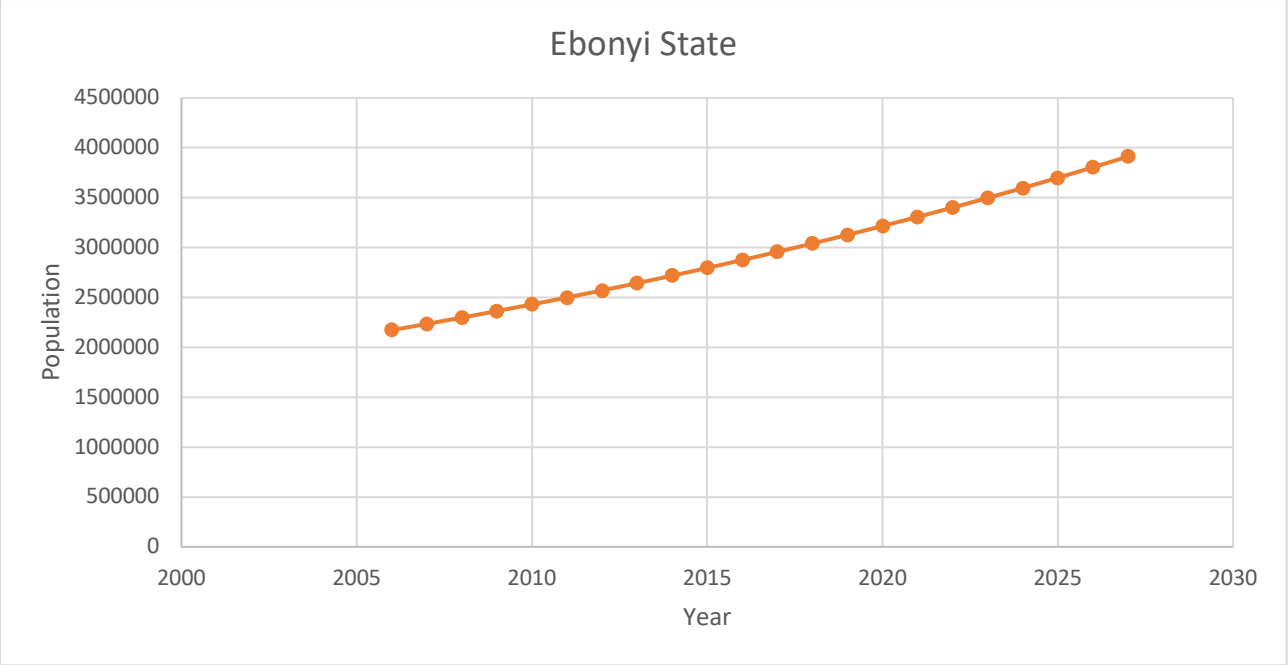


Figure 11: Plot of Population Projection for Ebonyi State

Table 13: Population Projection for Edo State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	3218332	1564109.352	1654222.648		
2007	3306410.675	1606915.588	1699495.087		
2008	3396899.871	1650893.337	1746006.534		
2009	3489865.556	1696074.66	1793790.896		
2010	3585375.509	1742492.497	1842883.012		
2011	3683499.358	1790180.688	1893318.67		
2012	3784308.642	1839174	1945134.642		
2013	3887876.855	1889508.152	1998368.703		
2014	3994279.502	1941219.838	2053059.664		
2015	4103594.155	1994346.759	2109247.396		
2016	4215900.511	2048927.648	2166972.863		
2017	4331280.444	2105002.296	2226278.148		
2018	4449818.073	2162611.583	2287206.49		
2019	4571599.817	2221797.511	2349802.306		
2020	4696714.459	2282603.227	2414111.232		
2021	4825253.214	2345073.062	2480180.152		
2022	4957309.792	2409252.559	2548057.233		
2023	**5092980.468**	**2475188.507**	**2617791.961**	**2501081**	**116,710.961**

2024	5232364.153	2542928.978	2689435.175		
2025	5375562.464	2612523.358	2763039.106		
2026	5522679.797	2684022.381	2838657.416		
2027	5673823.408	2757478.176	2916345.232		

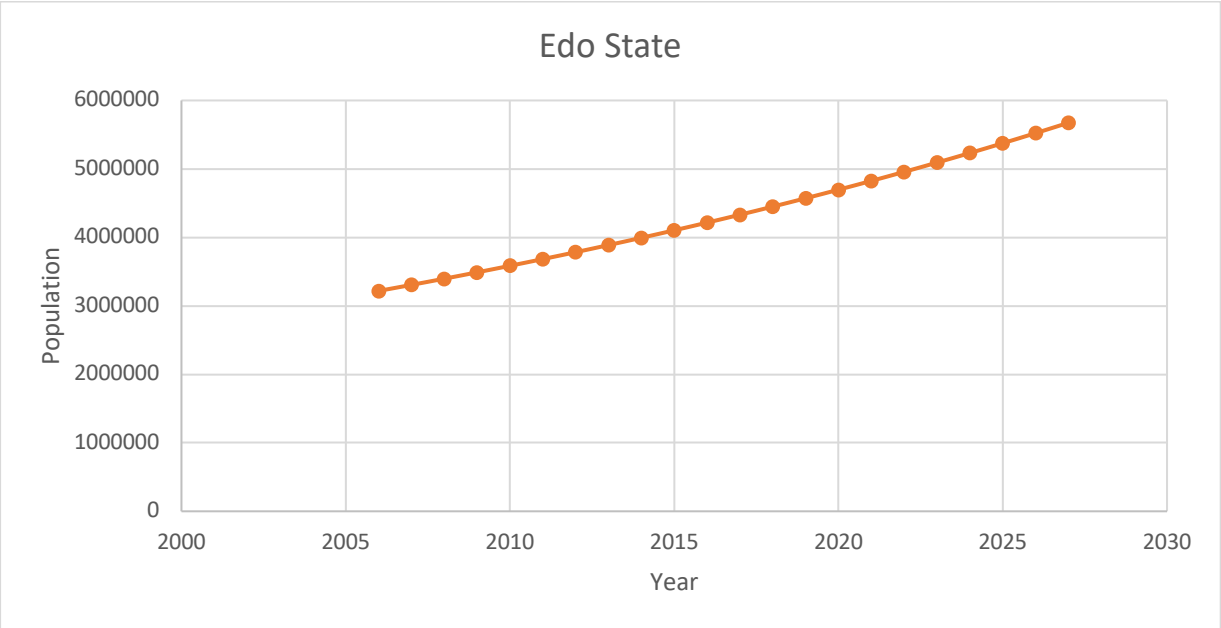


Figure 12: Plot of Population Projection for Edo State

Table 14: Population Projection for Ekiti State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	2384212	1158727.032	1225484.968		
2007	2459280.116	1195210.136	1264069.98		
2008	2536711.79	1232841.93	1303869.86		
2009	2616581.439	1271658.579	1344922.86		
2010	2698965.824	1311697.39	1387268.434		
2011	2783944.123	1352996.844	1430947.279		
2012	2871598.006	1395596.631	1476001.375		
2013	2962011.716	1439537.694	1522474.022		
2014	3055272.148	1484862.264	1570409.884		
2015	3151468.931	1531613.9	1619855.031		
2016	3250694.518	1579837.536	1670856.982		
2017	3353044.273	1629579.517	1723464.756		
2018	3458616.562	1680887.649	1777728.913		
2019	3567512.847	1733811.244	1833701.603		
2020	3679837.786	1788401.164	1891436.622		
2021	3795699.333	1844709.876	1950989.457		
2022	3915208.839	1902791.496	2012417.343		
2023	**4038481.163**	**1962701.845**	**2075779.318**	**987647**	**1088132.32**

2024	4165634.777	2024498.502	2141136.275		
2025	4296791.887	2088240.857	2208551.03		
2026	4432078.545	2153990.173	2278088.372		
2027	4571624.771	2221809.639	2349815.132		

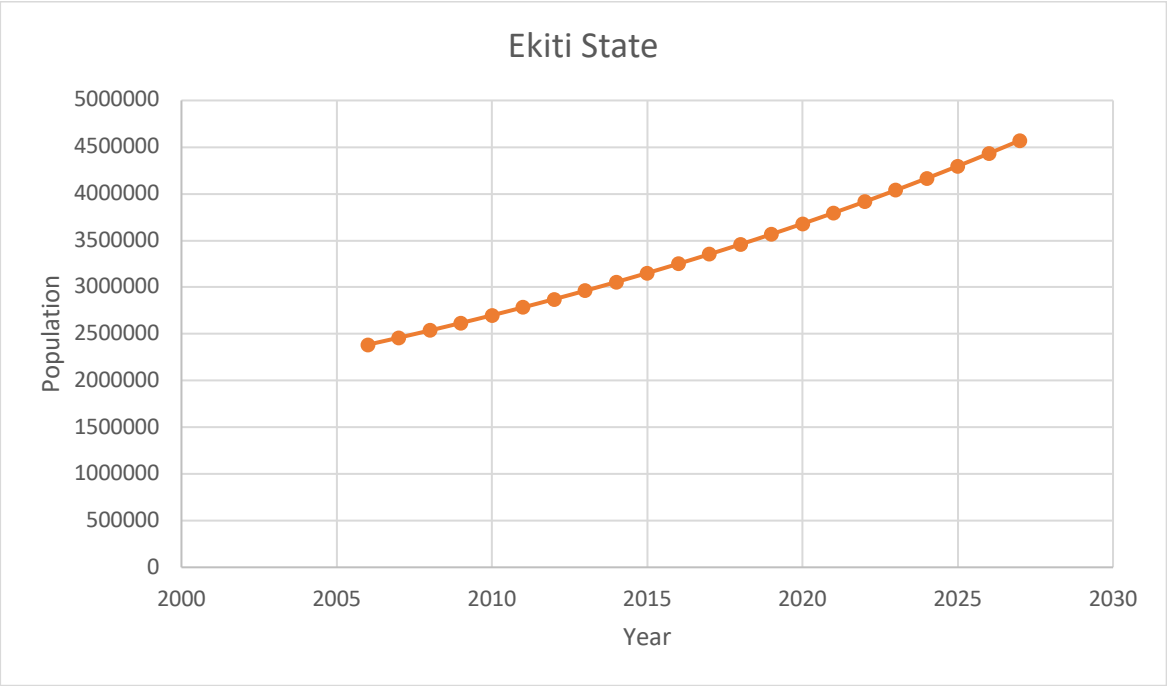


Figure 13: Plot of Population Projection for Ekiti State

Table 15: Population Projection for Enugu State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	3257298	1583046.828	1674251.172		
2007	3356497.493	1631257.782	1725239.711		
2008	3458718.059	1680936.977	1777781.082		
2009	3564051.706	1732129.129	1831922.577		
2010	3672593.24	1784880.315	1887712.925		
2011	3784440.355	1839238.013	1945202.342		
2012	3899693.722	1895251.149	2004442.573		
2013	4018457.077	1952970.139	2065486.938		
2014	4140837.315	2012446.935	2128390.38		
2015	4266944.585	2073735.068	2193209.517		
2016	4396892.394	2136889.703	2260002.691		
2017	4530797.703	2201967.684	2328830.019		
2018	4668781.035	2269027.583	2399753.452		
2019	4810966.586	2338129.761	2472836.825		
2020	4957482.331	2409336.413	2548145.918		
2021	5108460.145	2482711.63	2625748.515		
2022	5264035.918	2558321.456	2705714.462		
2023	**5424349.679**	**2636233.944**	**2788115.735**	**2112793**	**675322.735**

2024	5589545.72	2716519.22	2873026.5		
2025	5759772.73	2799249.547	2960523.183		
2026	5935183.924	2884499.387	3050684.537		
2027	6115937.185	2972345.472	3143591.713		

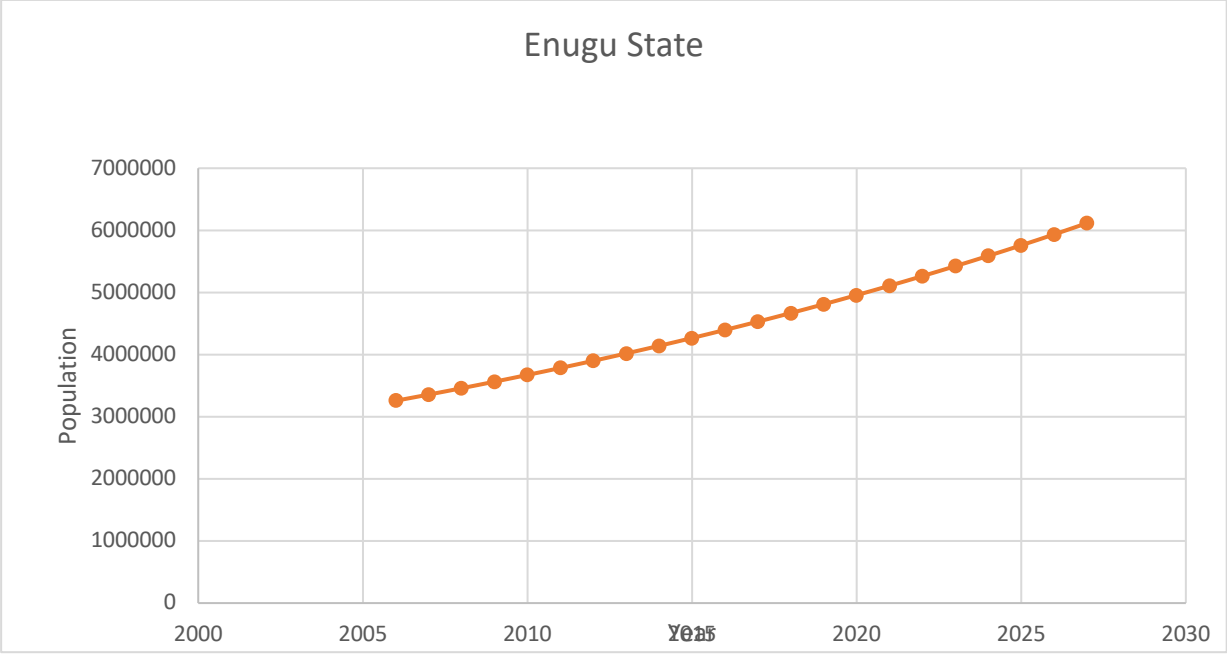


Figure 14: Plot of Population Projection for Enugu State

Table 16: Population Projection for the FCT

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	1405201	682927.686	722273.314		
2007	1542154.328	749487.0034	792667.3246		
2008	1692455.365	822533.3074	869922.0576		
2009	1857405.001	902698.8305	954706.1705		
2010	2038430.916	990677.4252	1047753.491		
2011	2237099.93	1087230.566	1149869.364		
2012	2455131.571	1193193.944	1261937.627		
2013	2694412.955	1309484.696	1384928.259		
2014	2957015.117	1437109.347	1519905.77		
2015	3245210.941	1577172.517	1668038.424		
2016	3561494.831	1730886.488	1830608.343		
2017	3908604.297	1899581.688	2009022.609		
2018	4289543.655	2084718.216	2204825.439		
2019	4707610.023	2287898.471	2419711.552		
2020	5166421.864	2510881.026	2655540.838		
2021	5669950.304	2755595.848	2914354.456		
2022	6222553.5	3024161.001	3198392.499		
2023	**6829014.362**	**3318900.98**	**3510113.382**	**1570307**	**1939806.38**

2024	7494581.952	3642366.829	3852215.123		
2025	8225016.914	3997358.22	4227658.694		
2026	9026641.335	4386947.689	4639693.646		
2027	9906393.463	4814507.223	5091886.24		

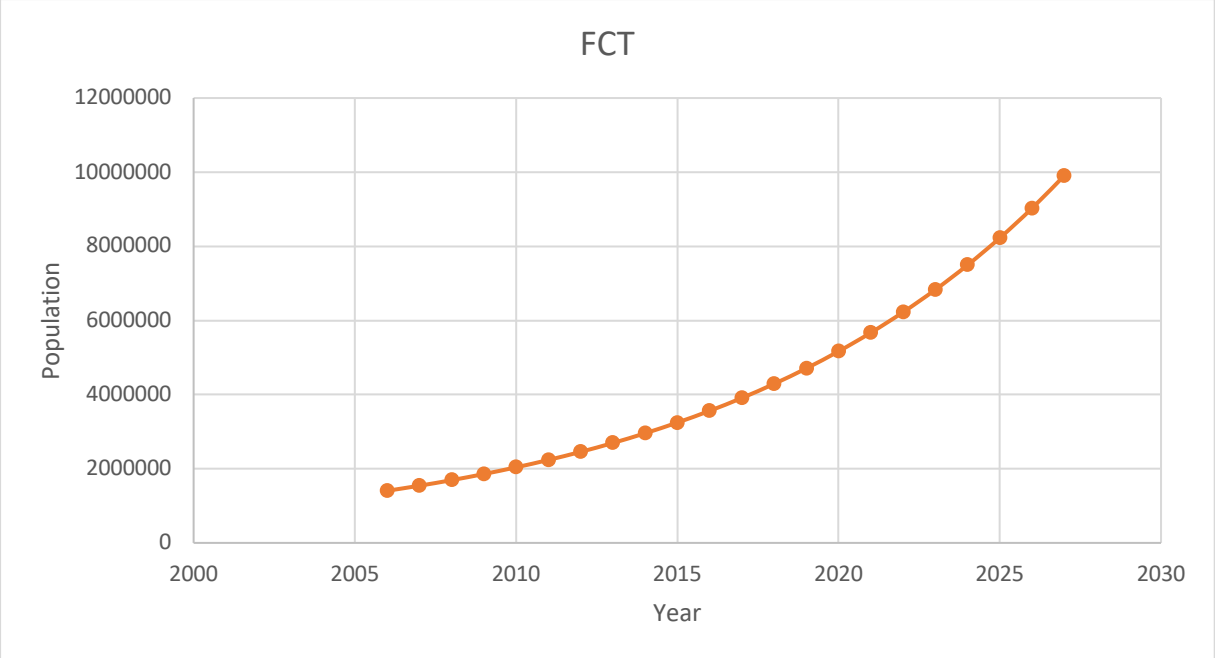


Figure 15: Plot of Population Projection for the FCT

Table 17: Population Projection for Gombe State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	2353879	1143985.194	1209893.806		
2007	2430421.273	1181184.739	1249236.534		
2008	2509452.51	1219593.92	1289858.59		
2009	2591053.645	1259252.071	1331801.574		
2010	2675308.245	1300199.807	1375108.438		
2011	2762302.595	1342479.061	1419823.534		
2012	2852125.785	1386133.132	1465992.653		
2013	2944869.8	1431206.723	1513663.077		
2014	3040629.619	1477745.995	1562883.624		
2015	3139503.309	1525798.608	1613704.701		
2016	3241592.125	1575413.773	1666178.352		
2017	3347000.614	1626642.298	1720358.316		
2018	3455836.724	1679536.648	1776300.076		
2019	3568211.913	1734150.99	1834060.923		
2020	3684241.263	1790541.254	1893700.009		
2021	3804043.598	1848765.189	1955278.409		
2022	3927741.606	1908882.421	2018859.185		
2023	**4055461.964**	**1970954.515**	**2084507.449**	**1575794**	**508713.449**
2024	4187335.47	2035045.038	2152290.432		

2025	4323497.173	2101219.626	2222277.547		
2026	4464086.516	2169546.047	2294540.469		
2027	4609247.473	2240094.272	2369153.201		

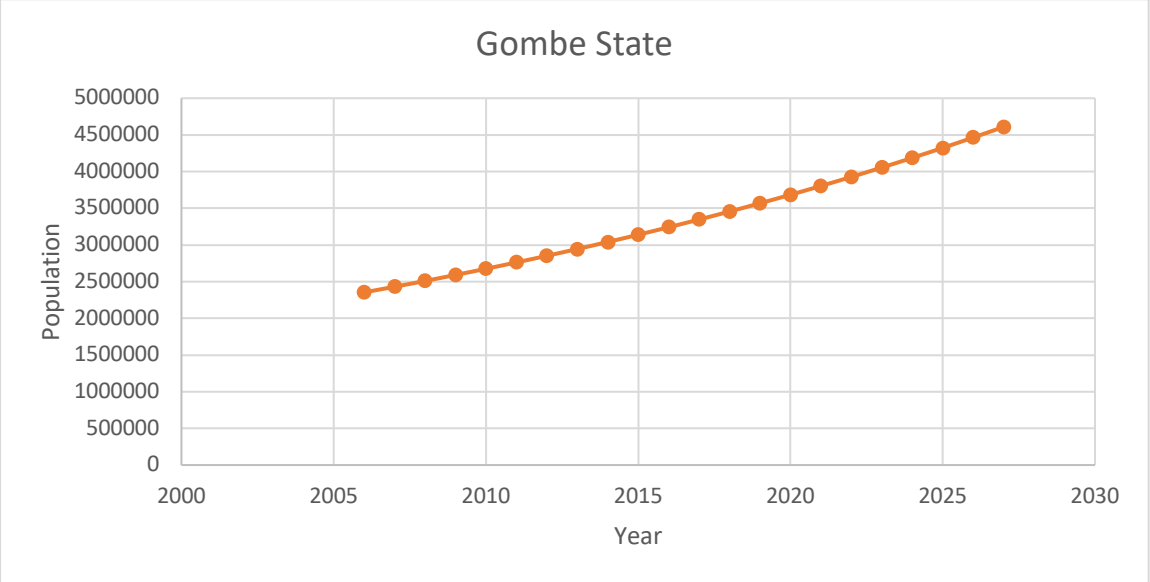


Figure16: Plot of Population Projection for Gombe State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	3934899	1912360.914	2022538.086		
2007	4062852.099	1974546.12	2088305.979		
2008	4194965.914	2038753.434	2156212.48		
2009	4331375.74	2105048.61	2226327.13		
2010	4472221.274	2173499.539	2298721.735		
2011	4617646.753	2244176.322	2373470.431		
2012	4767801.106	2317151.338	2450649.768		
2013	4922838.103	2392499.318	2530338.785		
2014	5082916.517	2470297.427	2612619.09		
2015	5248200.282	2550625.337	2697574.945		
2016	5418858.663	2633565.31	2785293.353		
2017	5595066.428	2719202.284	2875864.144		
2018	5777004.03	2807623.959	2969380.071		
2019	5964857.79	2898920.886	3065936.904		
2020	6158820.084	2993186.561	3165633.523		
2021	6359089.549	3090517.521	3268572.028		
2022	6565871.277	3191013.441	3374857.836		
2023	**6779377.031**	**3294777.237**	**3484599.794**	**2419922**	**1064677.79**

2024	6999825.46	3401915.174	3597910.286		
2025	7227442.321	3512536.968	3714905.353		
2026	7462460.715	3626755.907	3835704.808		
2027	7705121.321	3744688.962	3960432.359		

Table 18: Population Projection for Imo State

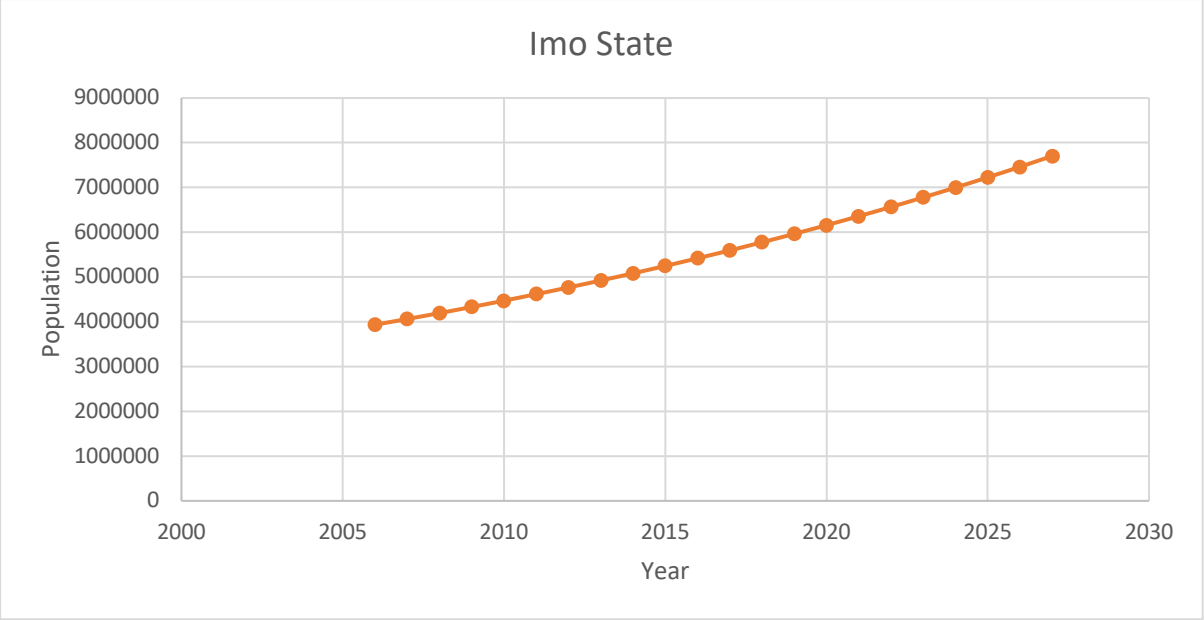


Figure 17: Plot of Population Projection for Imo State

Table 19: Population Projection for Jigawa State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	4348649	2113443.414	2235205.586		
2007	4476606.233	2175630.629	2300975.604		
2008	4608328.556	2239647.678	2368680.878		
2009	4743926.755	2305548.403	2438378.352		
2010	4883514.876	2373388.23	2510126.646		
2011	5027210.321	2443224.216	2583986.105		
2012	5175133.946	2515115.098	2660018.848		
2013	5327410.164	2589121.34	2738288.824		
2014	5484167.048	2665305.185	2818861.863		
2015	5645536.439	2743730.709	2901805.73		
2016	5811654.059	2824463.873	2987190.186		
2017	5982659.623	2907572.577	3075087.046		
2018	6158696.957	2993126.721	3165570.236		
2019	6339914.117	3081198.261	3258715.856		
2020	6526463.519	3171861.27	3354602.249		
2021	6718502.061	3265192.002	3453310.059		
2022	6916191.26	3361268.952	3554922.308		
2023	**7119697.383**	**3460172.928**	**3659524.455**	**2351298**	**1308226.46**

2024	7329191.591	3561987.113	3767204.478		
2025	7544850.082	3666797.14	3878052.942		
2026	7766854.236	3774691.159	3992163.077		
2027	7995390.772	3885759.915	4109630.857		

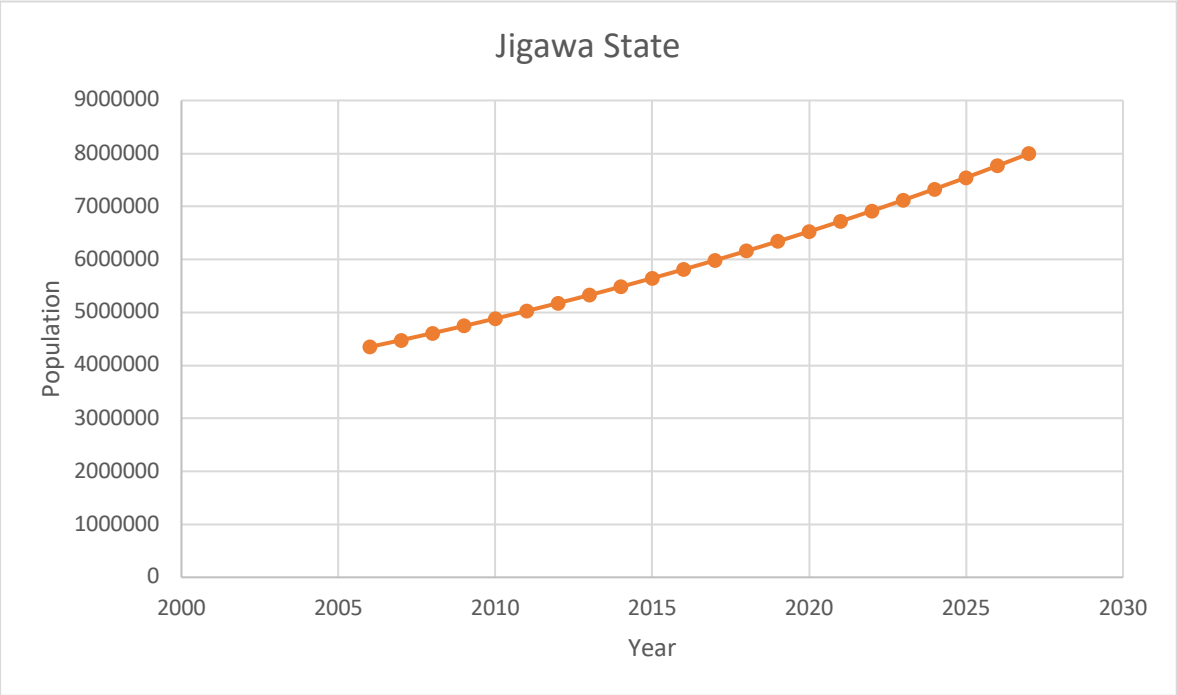


Figure 18: Plot of Population Projection for Jigawa State

Table 20: Population Projection for Kaduna State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	6066562	2948349.132	3118212.868		
2007	6251316.318	3038139.731	3213176.587		
2008	6441697.243	3130664.86	3311032.383		
2009	6637876.131	3226007.8	3411868.331		
2010	6840029.555	3324254.364	3515775.191		
2011	7048339.467	3425492.981	3622846.486		
2012	7262993.361	3529814.773	3733178.588		
2013	7484184.439	3637313.637	3846870.802		
2014	7712111.788	3748086.329	3964025.459		
2015	7946980.558	3862232.551	4084748.007		
2016	8189002.147	3979855.043	4209147.104		
2017	8438394.391	4101059.674	4337334.717		
2018	8695381.76	4225955.535	4469426.225		
2019	8960195.559	4354655.042	4605540.517		
2020	9233074.139	4487274.032	4745800.107		
2021	9514263.109	4623931.871	4890331.238		
2022	9804015.558	4764751.561	5039263.997		
2023	**10102592.28**	**4909859.848**	**5192732.432**	**4335208**	**857524.432**

2024	10410262.02	5059387.342	5350874.678		
2025	10727301.7	5213468.626	5513833.074		
2026	11053996.67	5372242.382	5681754.288		
2027	11390640.99	5535851.521	5854789.469		

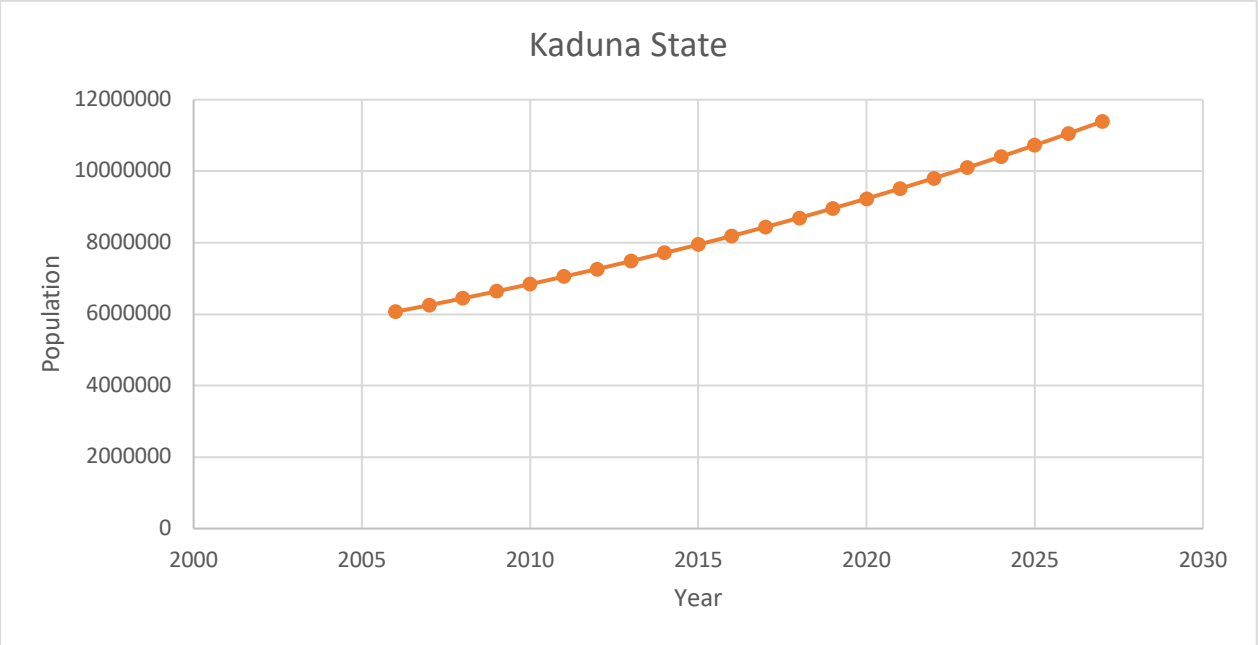


Figure 19: Plot of Population Projection for Kaduna State

Table 21: Population Projection for Kano State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	9383682	4560469.452	4823212.548		
2007	9698509.591	4713475.661	4985033.93		
2008	10023899.82	4871615.313	5152284.507		
2009	10360207.06	5035060.631	5325146.429		
2010	10707797.6	5203989.634	5503807.966		
2011	11067049.98	5378586.29	5688463.69		
2012	11438355.47	5559040.758	5879314.712		
2013	11822118.47	5745549.576	6076568.894		
2014	12218756.92	5938315.863	6280441.057		
2015	12628702.8	6137549.561	6491153.239		
2016	13052402.59	6343467.659	6708934.931		
2017	13490317.73	6556294.417	6934023.313		
2018	13942925.17	6776261.633	7166663.537		
2019	14410717.83	7003608.865	7407108.965		
2020	14894205.18	7238583.717	7655621.463		
2021	15393913.8	7481442.107	7912471.693		
2022	15910387.91	7732448.524	8177939.386		
2023	**16444190**	**7991876.34**	**8452313.66**	**5921370**	**2530943.66**

2024	16995901.44	8260008.1	8735893.34		
2025	17566123.1	8537135.827	9028987.273		
2026	18155476	8823561.336	9331914.664		
2027	18764602.01	9119596.577	9645005.433		

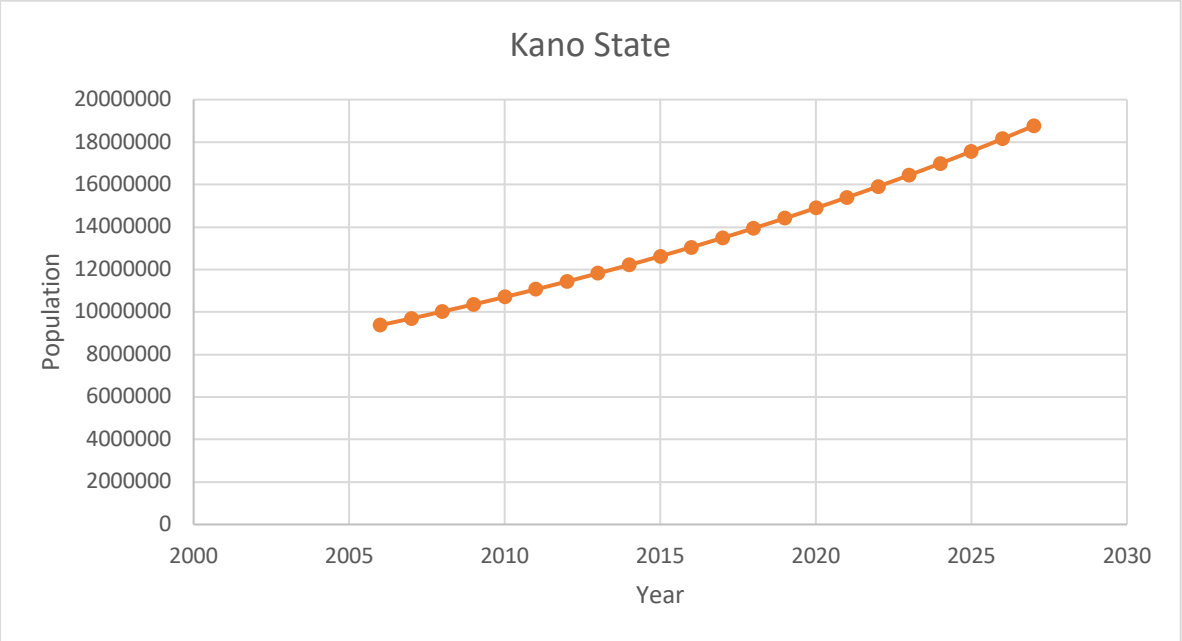


Figure 20: Plot of Population Projection for Kano State

Table 22: Population Projection for Katsina State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	5792578	2815192.908	2977385.092		
2007	5968988.263	2900928.296	3068059.967		
2008	6150771.019	2989274.715	3161496.304		
2009	6338089.884	3080311.684	3257778.2		
2010	6531113.458	3174121.141	3356992.317		
2011	6730015.474	3270787.52	3459227.954		
2012	6934974.959	3370397.83	3564577.129		
2013	7146176.389	3473041.725	3673134.664		
2014	7363809.861	3578811.592	3784998.269		
2015	7588071.258	3687802.631	3900268.627		
2016	7819162.432	3800112.942	4019049.49		
2017	8057291.38	3915843.611	4141447.769		
2018	8302672.434	4035098.803	4267573.631		
2019	8555526.453	4157985.856	4397540.597		
2020	8816081.024	4284615.378	4531465.646		
2021	9084570.663	4415101.342	4669469.321		
2022	9361237.029	4549561.196	4811675.833		
2023	**9646329.139**	**4688115.962**	**4958213.177**	**3516719**	**1441494.18**

2024	9940103.598	4830890.349	5109213.249		
2025	10242824.82	4978012.863	5264811.957		
2026	10554765.28	5129615.926	5425149.354		
2027	10876205.73	5285835.985	5590369.745		

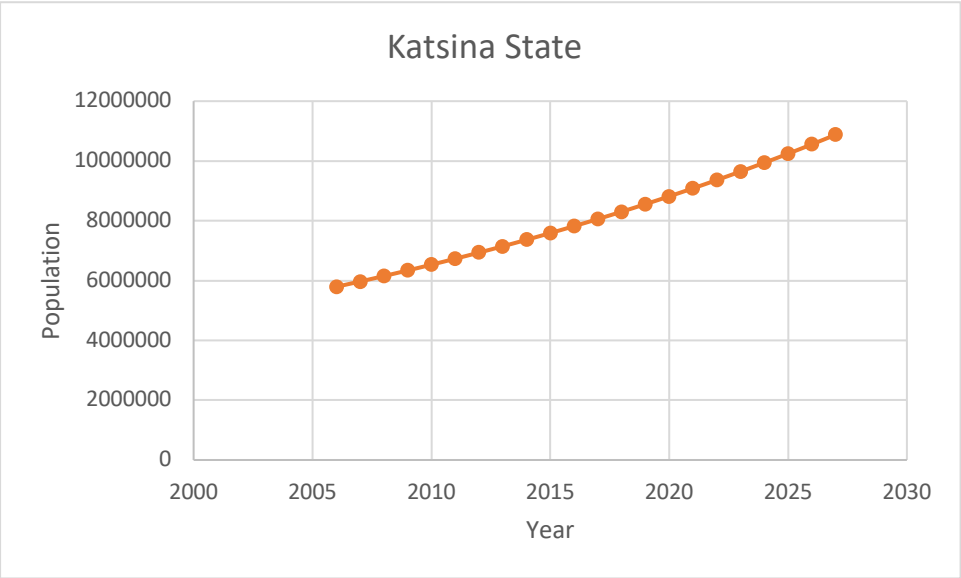


Figure 21: Plot of Population Projection for Katsina State

Table 23: Population Projection for Kebbi State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	3238628	1573973.208	1664654.792		
2007	3340597.834	1623530.547	1717067.287		
2008	3445778.241	1674648.225	1771130.016		
2009	3554270.305	1727375.368	1826894.937		
2010	3666178.296	1781762.652	1884415.644		
2011	3781609.767	1837862.347	1943747.42		
2012	3900675.656	1895728.369	2004947.287		
2013	4023490.395	1955416.332	2068074.063		
2014	4150172.017	2016983.6	2133188.417		
2015	4280842.274	2080489.345	2200352.929		
2016	4415626.751	2145994.601	2269632.15		
2017	4554654.984	2213562.322	2341092.662		
2018	4698060.591	2283257.447	2414803.144		
2019	4845981.396	2355146.958	2490834.438		
2020	4998559.562	2429299.947	2569259.615		
2021	5155941.729	2505787.68	2650154.049		
2022	5318279.152	2584683.668	2733595.484		
2023	**5485727.851**	**2666063.736**	**2819664.115**	**2032041**	**787623.115**

2024	5658448.756	2750006.095	2908442.661		
2025	5836607.867	2836591.423	3000016.444		
2026	6020376.406	2925902.933	3094473.473		
2027	6209930.991	3018026.462	3191904.529		

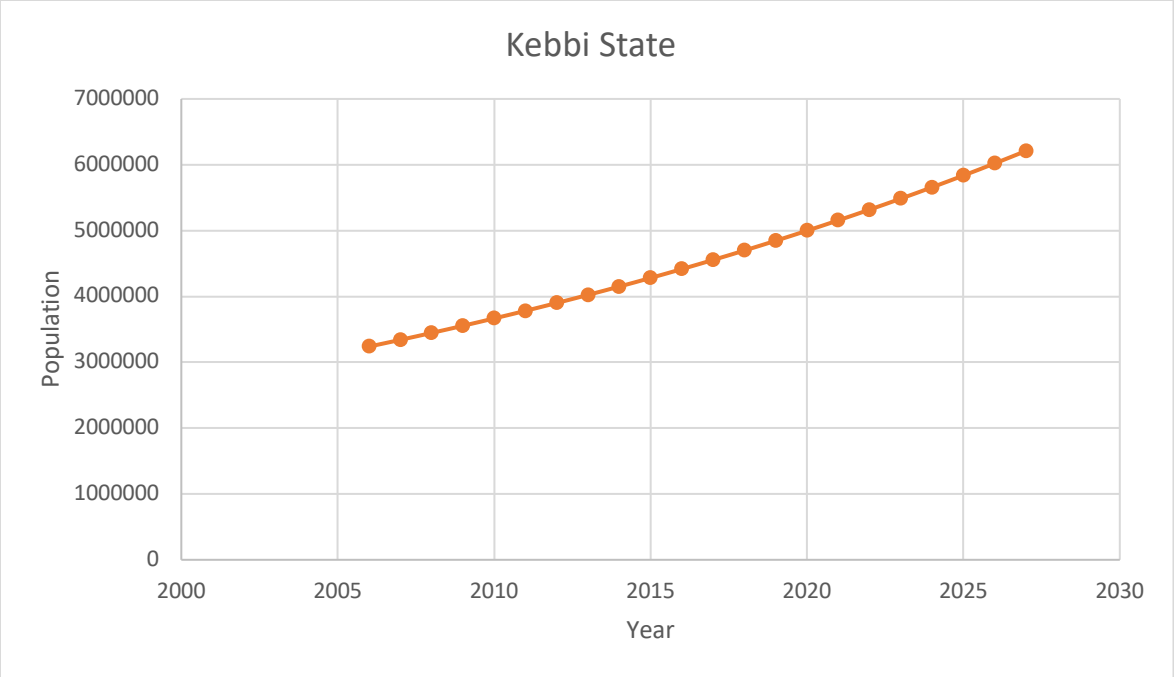


Figure 22: Plot of Population Projection for Kebbi State

Table 24: Population Projection for Kogi State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	3278487	1593344.682	1685142.318		
2007	3378331.794	1641869.252	1736462.542		
2008	3481217.314	1691871.615	1789345.699		
2009	3587236.165	1743396.776	1843839.389		
2010	3696483.77	1796491.112	1899992.658		
2011	3809058.461	1851202.412	1957856.049		
2012	3925061.561	1907579.919	2017481.642		
2013	4044597.482	1965674.376	2078923.106		
2014	4167773.813	2025538.073	2142235.74		
2015	4294701.422	2087224.891	2207476.531		
2016	4425494.552	2150790.352	2274704.2		
2017	4560270.927	2216291.671	2343979.256		
2018	4699151.852	2283787.8	2415364.052		
2019	4842262.332	2353339.493	2488922.839		
2020	4989731.175	2425009.351	2564721.824		
2021	5141691.112	2498861.88	2642829.232		
2022	5298278.919	2574963.555	2723315.364		
2023	**5459635.534**	**2653382.87**	**2806252.664**	**1932654**	**873598.664**

2024	5625906.19	2734190.408	2891715.782		
2025	5797240.541	2817458.903	2979781.638		
2026	5973792.8	2903263.301	3070529.499		
2027	6155721.875	2991680.831	3164041.044		

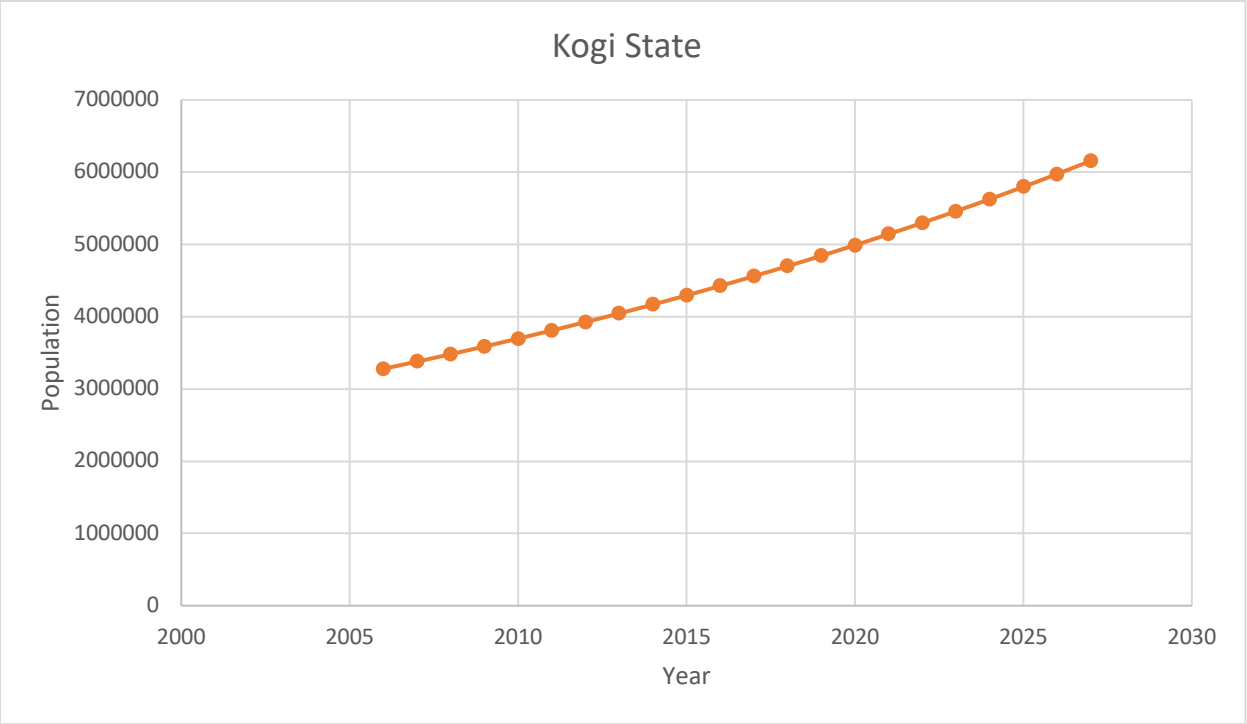


Figure 23: Plot of Population Projection for Kogi State

Table 25: Population Projection for Kwara State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	2371089	1152349.254	1218739.746		
2007	2443299.41	1187443.513	1255855.897		
2008	2517708.955	1223606.552	1294102.403		
2009	2594384.608	1260870.919	1333513.689		
2010	2673395.382	1299270.156	1374125.226		
2011	2754812.393	1338838.823	1415973.57		
2012	2838708.92	1379612.535	1459096.385		
2013	2925160.478	1421627.992	1503532.486		
2014	3014244.877	1464923.01	1549321.867		
2015	3106042.3	1509536.558	1596505.742		
2016	3200635.37	1555508.79	1645126.58		
2017	3298109.229	1602881.085	1695228.144		
2018	3398551.608	1651696.081	1746855.527		
2019	3502052.914	1701997.716	1800055.198		
2020	3608706.303	1753831.263	1854875.04		
2021	3718607.772	1807243.377	1911364.395		
2022	3831856.238	1862282.132	1969574.106		
2023	**3948553.634**	**1918997.066**	**2029556.568**	**1695927**	**333629.568**
2024	4068804.995	1977439.228	2091365.767		

2025	4192718.555	2037661.218	2155057.337		
2026	4320405.844	2099717.24	2220688.604		
2027	4451981.791	2163663.15	2288318.641		

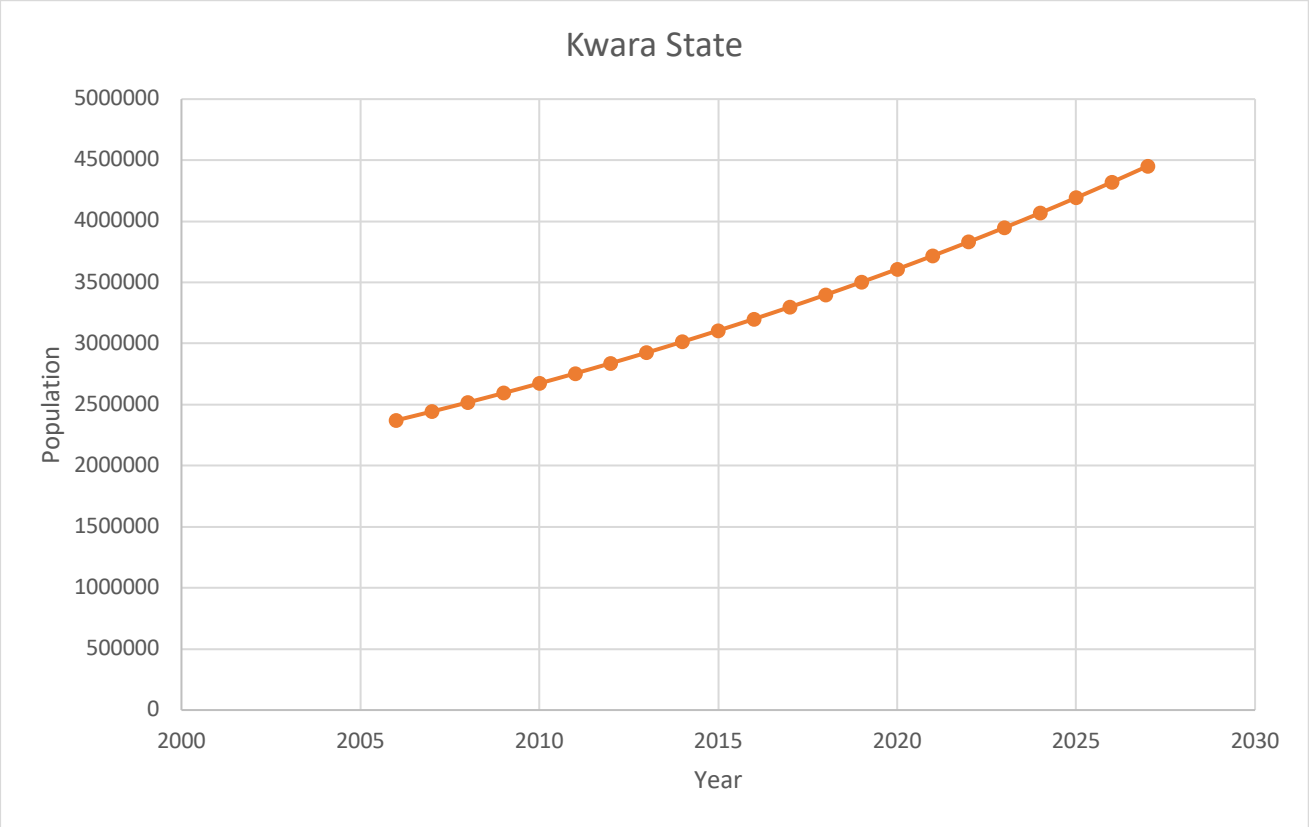


Figure 24: Plot of Population Projection for Kwara State

Table 26: Population Projection for Lagos State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	9013534	4380577.524	4632956.476		
2007	9306631.64	4523022.977	4783608.663		
2008	9609260.083	4670100.4	4939159.683		
2009	9921729.249	4821960.415	5099768.834		
2010	10244359.13	4978758.537	5265600.593		
2011	10577480.14	5140655.348	5436824.792		
2012	10921433.4	5307816.632	5613616.768		
2013	11276571.17	5480413.589	5796157.581		
2014	11643257.13	5658622.965	5984634.165		
2015	12021866.81	5842627.27	6179239.54		
2016	12412787.93	6032614.934	6380172.996		
2017	12816420.82	6228780.519	6587640.301		
2018	13233178.86	6431324.926	6801853.934		
2019	13663488.82	6640455.567	7023033.253		
2020	14107791.39	6856386.616	7251404.774		
2021	14566541.57	7079339.203	7487202.367		
2022	15040209.16	7309541.652	7730667.508		
2023	**15529279.24**	**7547229.711**	**7982049.529**	**7060195**	**921854.529**

2024	16034252.66	7792646.793	8241605.867		
2025	16555646.56	8046044.228	8509602.332		
2026	17093994.89	8307681.517	8786313.373		
2027	17649848.96	8577826.595	9072022.365		

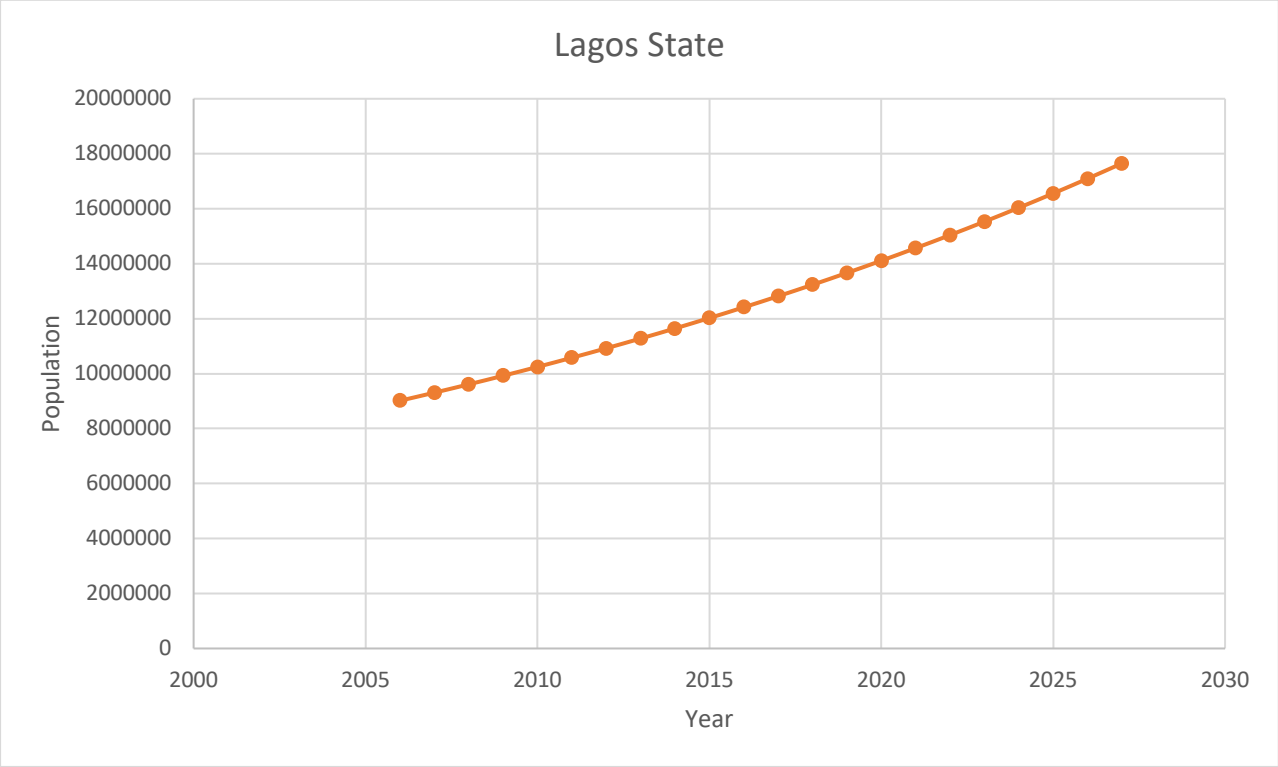


Figure 25: Plot of Population Projection for Lagos State

Table 27: Population Projection for Nasarawa State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	1863275	905551.65	957723.35		
2007	1920020.172	933129.8036	986890.3684		
2008	1978493.491	961547.8366	1016945.654		
2009	2038747.588	990831.3278	1047916.26		
2010	2100836.696	1021006.634	1079830.062		
2011	2164816.699	1052100.916	1112715.783		
2012	2230745.182	1084142.158	1146603.024		
2013	2298681.487	1117159.203	1181522.284		
2014	2368686.761	1151181.766	1217504.995		
2015	2440824.012	1186240.47	1254583.542		
2016	2515158.17	1222366.871	1292791.299		
2017	2591756.14	1259593.484	1332162.656		
2018	2670686.865	1297953.816	1372733.049		
2019	2752021.389	1337482.395	1414538.994		
2020	2835832.918	1378214.798	1457618.12		
2021	2922196.887	1420187.687	1502009.2		
2022	3011191.032	1463438.842	1547752.19		
2023	**3102895.451**	**1508007.189**	**1594888.262**	**1899244**	**304355.738**
2024	3197392.686	1553932.845	1643459.841		

2025	3294767.79	1601257.146	1693510.644		
2026	3395108.408	1650022.686	1745085.722		
2027	3498504.852	1700273.358	1798231.494		

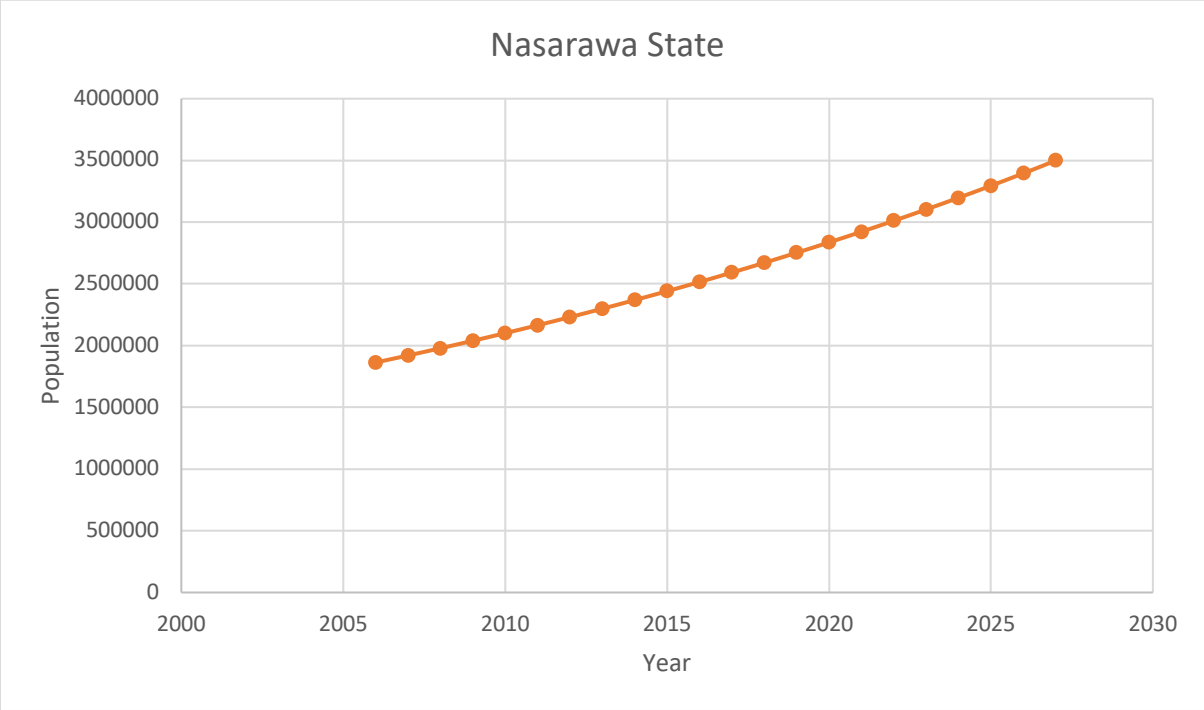


Figure 26: Plot of Population Projection for Nasarawa State

Table 28: Population Projection for Niger State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	3950249	1919821.014	2030427.986		
2007	4086866.808	1986217.269	2100649.539		
2008	4228209.489	2054909.812	2173299.677		
2009	4374440.452	2125978.06	2248462.392		
2010	4525728.754	2199504.174	2326224.58		
2011	4682249.304	2275573.162	2406676.142		
2012	4844183.054	2354272.964	2489910.09		
2013	5011717.22	2435694.569	2576022.651		
2014	5185045.489	2519932.108	2665113.381		
2015	5364368.248	2607082.969	2757285.279		
2016	5549892.815	2697247.908	2852644.907		
2017	5741833.675	2790531.166	2951302.509		
2018	5940412.735	2887040.589	3053372.146		
2019	6145859.573	2986887.752	3158971.821		
2020	6358411.709	3090188.091	3268223.618		
2021	6578314.878	3197061.031	3381253.847		
2022	6805823.311	3307630.129	3498193.182		
2023	**7041200.033**	**3422023.216**	**3619176.817**	**2698344**	**920788.816**

2024	7284717.167	3540372.543	3744344.624		
2025	7536656.246	3662814.936	3873841.31		
2026	7797308.538	3789491.949	4007816.589		
2027	8066975.387	3920550.038	4146425.349		

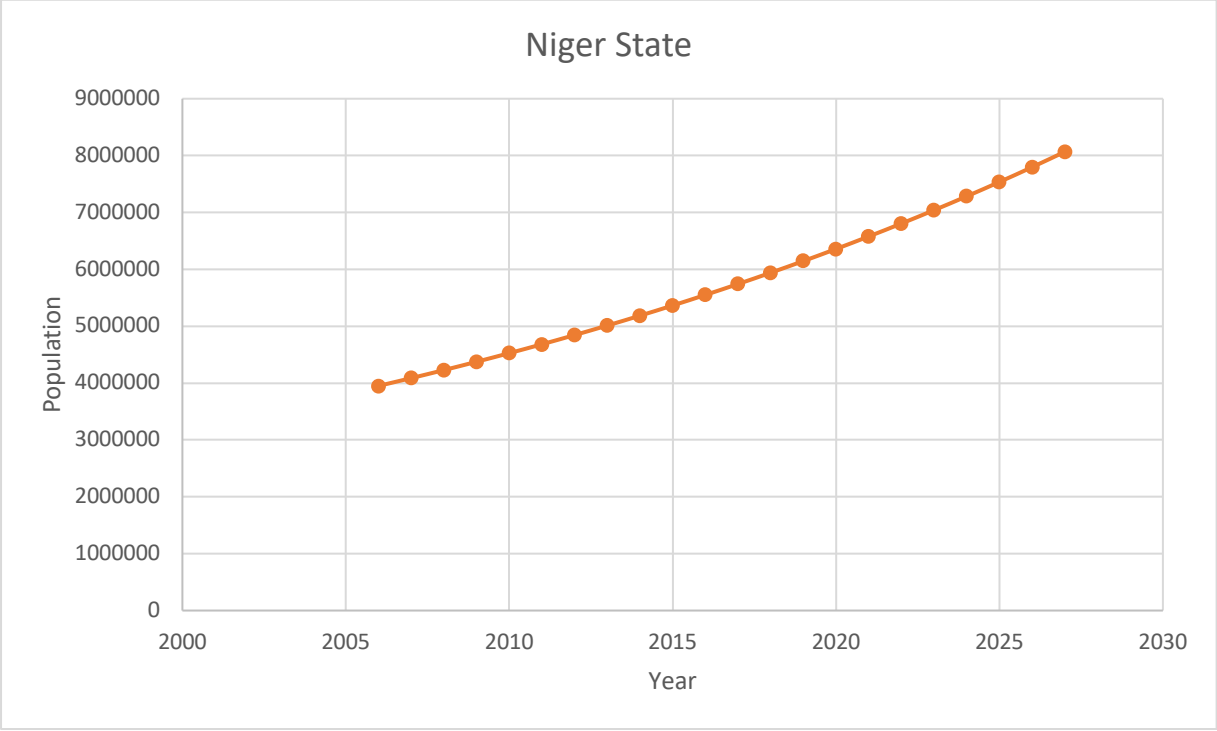


Figure 27: Plot of Population Projection for Niger State

Table 29: Population Projection for Ogun State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	3728098	1811855.628	1916242.372		
2007	3853177.698	1872644.361	1980533.337		
2008	3982453.888	1935472.59	2046981.298		
2009	4116067.363	2000408.738	2115658.625		
2010	4254163.643	2067523.53	2186640.113		
2011	4396893.127	2136890.06	2260003.067		
2012	4544411.262	2208583.873	2335827.389		
2013	4696878.711	2282683.054	2414195.657		
2014	4854461.524	2359268.301	2495193.223		
2015	5017331.326	2438423.024	2578908.302		
2016	5185665.498	2520233.432	2665432.066		
2017	5359647.372	2604788.623	2754858.749		
2018	5539466.431	2692180.685	2847285.746		
2019	5725318.517	2782504.799	2942813.718		
2020	5917406.04	2875859.335	3041546.705		
2021	6115938.204	2972345.967	3143592.237		
2022	6321131.229	3072069.777	3249061.452		
2023	**6533208.59**	**3175139.375**	**3358069.215**	**2688305**	**669764.215**

2024	6752401.261	3281667.013	3470734.248		
2025	6978947.965	3391768.711	3587179.254		
2026	7213095.432	3505564.38	3707531.052		
2027	7455098.674	3623177.956	3831920.718		

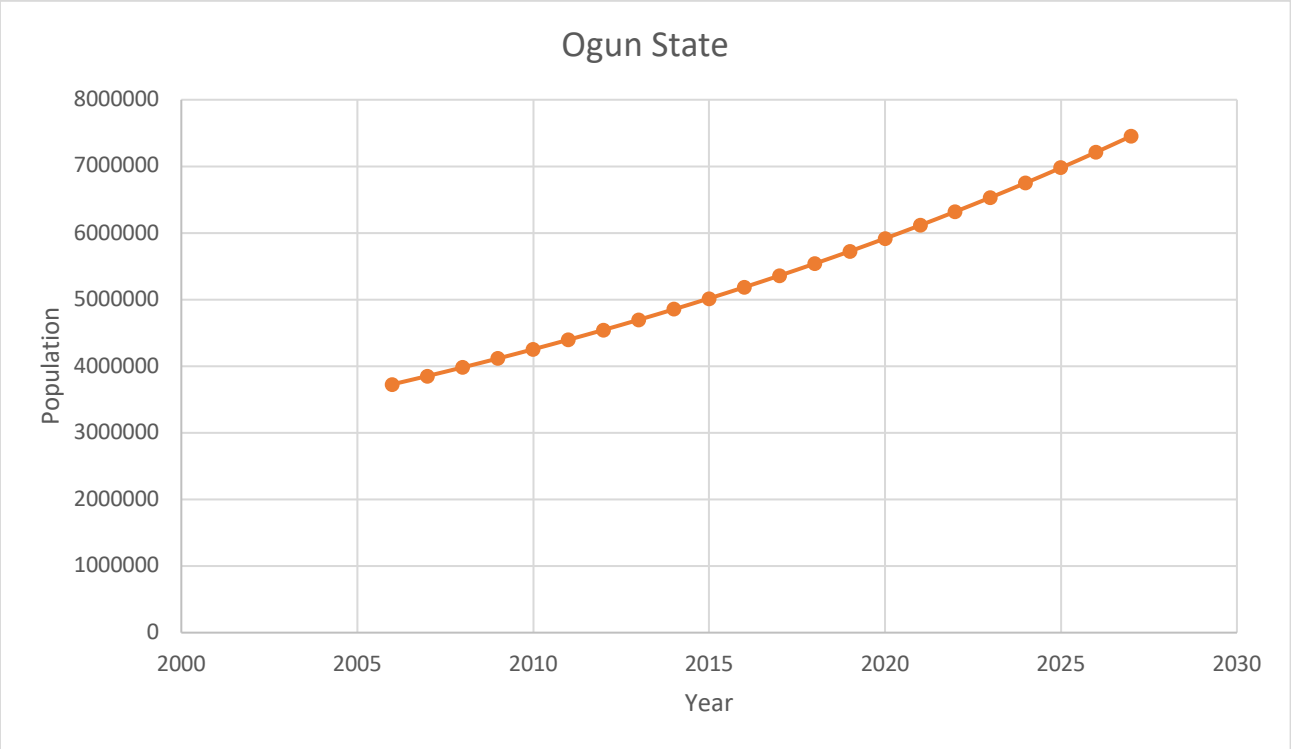


Figure 28: Plot of Population Projection for Ogun State

Table 30: Population Projection for Ondo State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	3441024	1672337.664	1768686.336		
2007	3545818.782	1723267.928	1822550.854		
2008	3653805.041	1775749.25	1878055.791		
2009	3765079.97	1829828.865	1935251.105		
2010	3879743.726	1885555.451	1994188.275		
2011	3997899.513	1942979.163	2054920.35		
2012	4119653.68	2002151.688	2117501.992		
2013	4245115.813	2063126.285	2181989.528		
2014	4374398.836	2125957.834	2248441.002		
2015	4507619.114	2190702.889	2316916.225		
2016	4644896.553	2257419.725	2387476.828		
2017	4786354.713	2326168.391	2460186.322		
2018	4932120.915	2397010.765	2535110.15		
2019	5082326.359	2470010.61	2612315.749		
2020	5237106.24	2545233.633	2691872.607		
2021	5396599.87	2622747.537	2773852.333		
2022	5560950.804	2702622.091	2858328.713		
2023	**5730306.969**	**2784929.187**	**2945377.782**	**1991344**	**954033.782**

2024	5904820.797	2869742.907	3035077.89		
2025	6084649.362	2957139.59	3127509.772		
2026	6269954.523	3047197.898	3222756.625		
2027	6460903.066	3139998.89	3320904.176		

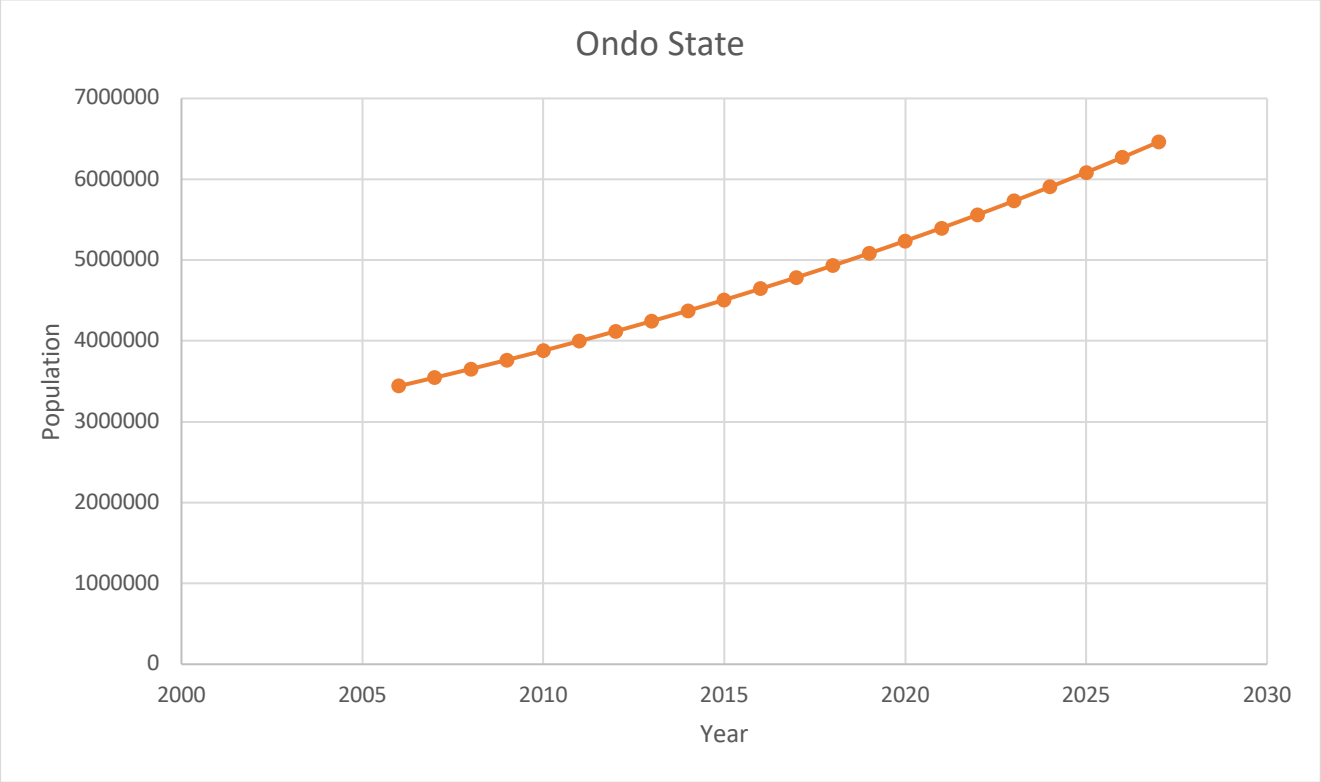


Figure 29: Plot of Population Projection for Ondo State

Table 31: Population Projection for Osun State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	3423535	1663838.01	1759696.99		
2007	3534859.818	1717941.872	1816917.946		
2008	3649804.64	1773805.055	1875999.585		
2009	3768487.182	1831484.77	1937002.412		
2010	3891028.984	1891040.086	1999988.898		
2011	4017555.54	1952531.992	2065023.548		
2012	4148196.423	2016023.462	2132172.961		
2013	4283085.422	2081579.515	2201505.907		
2014	4422360.675	2149267.288	2273093.387		
2015	4566164.812	2219156.099	2347008.713		
2016	4714645.101	2291317.519	2423327.582		
2017	4867953.598	2365825.449	2502128.149		
2018	5026247.305	2442756.19	2583491.115		
2019	5189688.328	2522188.527	2667499.801		
2020	5358444.046	2604203.806	2754240.24		
2021	5532687.279	2688886.018	2843801.261		
2022	5712596.466	2776321.882	2936274.584		
2023	**5898355.852**	**2866600.944**	**3031754.908**	**1954800**	**1,076954.91**

2024	6090155.67	2959815.656	3130340.014		
2025	6288192.339	3056061.477	3232130.862		
2026	6492668.667	3155436.972	3337231.695		
2027	6703794.055	3258043.911	3445750.144		

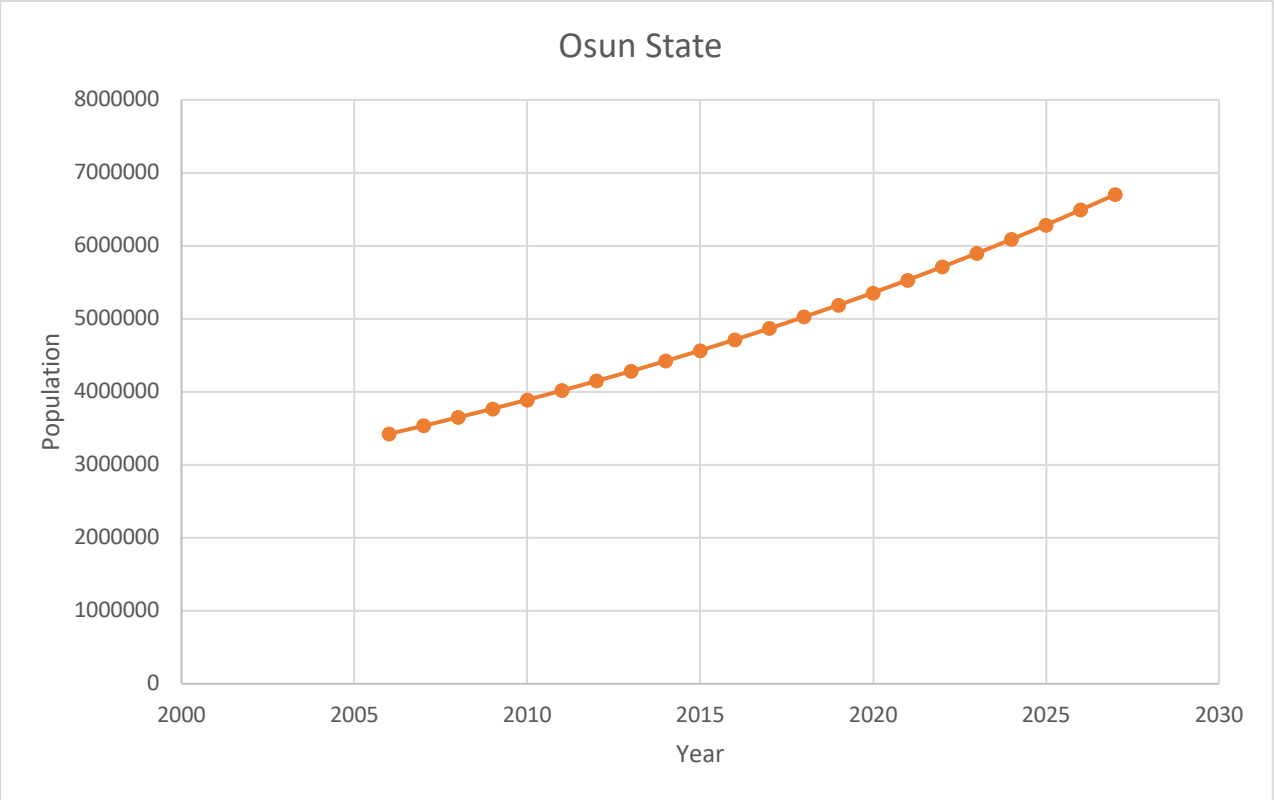


Figure 30: Plot of Population Projection for Osun State

Table 32: Population Projection for Oyo State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	5591589	2717512.254	2874076.746		
2007	5784971.907	2811496.347	2973475.56		
2008	5985042.885	2908730.842	3076312.043		
2009	6192033.239	3009328.154	3182705.085		
2010	6406182.274	3113404.585	3292777.689		
2011	6627737.568	3221080.458	3406657.11		
2012	6856955.266	3332480.259	3524475.007		
2013	7094100.367	3447732.778	3646367.589		
2014	7339447.038	3566971.26	3772475.778		
2015	7593278.927	3690333.559	3902945.368		
2016	7855889.493	3817962.294	4037927.199		
2017	8127582.342	3950005.018	4177577.324		
2018	8408671.581	4086614.388	4322057.193		
2019	8699482.18	4227948.339	4471533.841		
2020	9000350.35	4374170.27	4626180.08		
2021	9311623.927	4525449.229	4786174.698		
2022	9633662.779	4681960.111	4951702.668		
2023	**9966839.218**	**4843883.86**	**5122955.358**	**3276675**	**1846280.36**

2024	10311538.43	5011407.677	5300130.753		
2025	10668158.93	5184725.24	5483433.69		
2026	11037113.01	5364036.923	5673076.087		
2027	11418827.23	5549550.034	5869277.196		

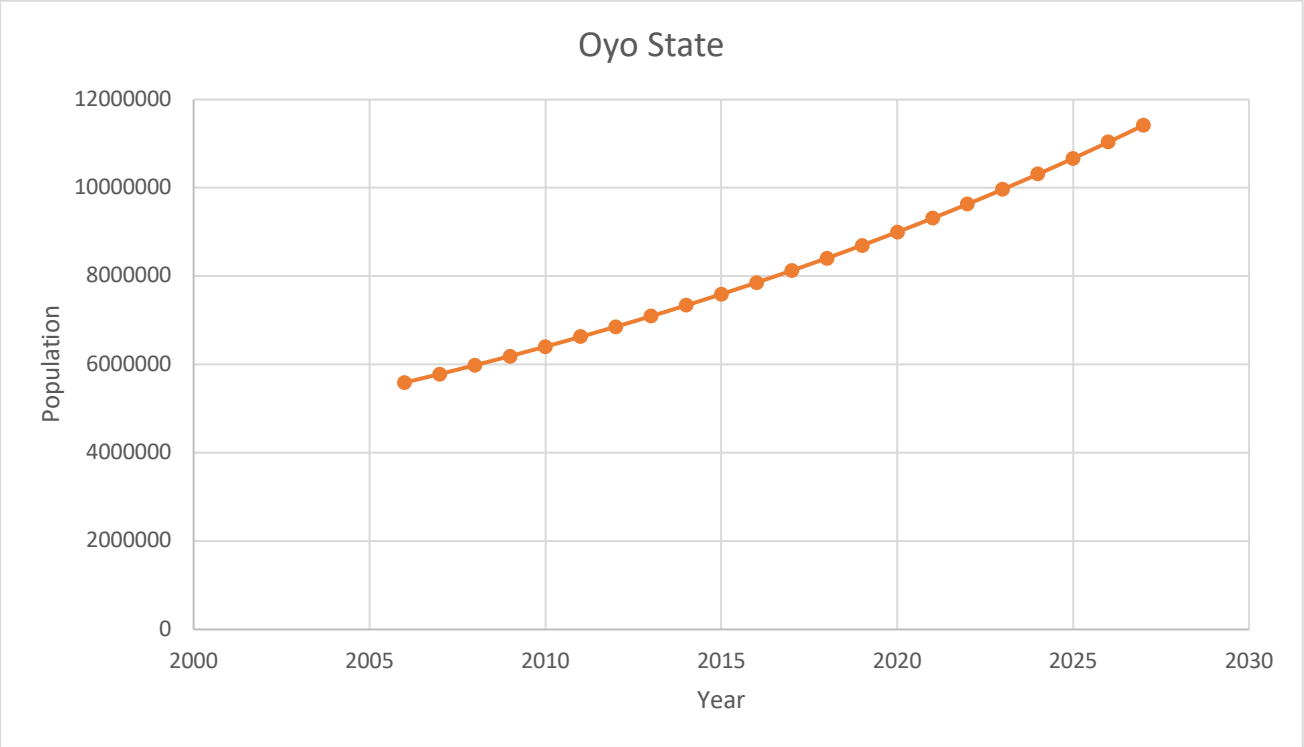


Figure 31: Plot of Population Projection for Oyo State

Table 33: Population Projection for Plateau State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	3178712	1544854.032	1633857.968		
2007	3265706.363	1587133.292	1678573.071		
2008	3355081.571	1630569.644	1724511.927		
2009	3446902.781	1675194.752	1771708.029		
2010	3541236.937	1721041.151	1820195.786		
2011	3638152.811	1768142.266	1870010.545		
2012	3737721.059	1816532.435	1921188.624		
2013	3840014.272	1866246.936	1973767.336		
2014	3945107.025	1917322.014	2027785.011		
2015	4053075.936	1969794.905	2083281.031		
2016	4163999.719	2023703.863	2140295.856		
2017	4277959.242	2079088.192	2198871.05		
2018	4395037.587	2135988.267	2259049.32		
2019	4515320.109	2194445.573	2320874.536		
2020	4638894.499	2254502.727	2384391.772		
2021	4765850.849	2316203.513	2449647.336		
2022	4896281.715	2379592.913	2516688.802		
2023	**5030282.187**	**2444717.143**	**2585565.044**	**2789528**	**203962.956**

2024	5167949.958	2511623.68	2656326.278		
2025	5309385.393	2580361.301	2729024.092		
2026	5454691.605	2650980.12	2803711.485		
2027	5603974.529	2723531.621	2880442.908		

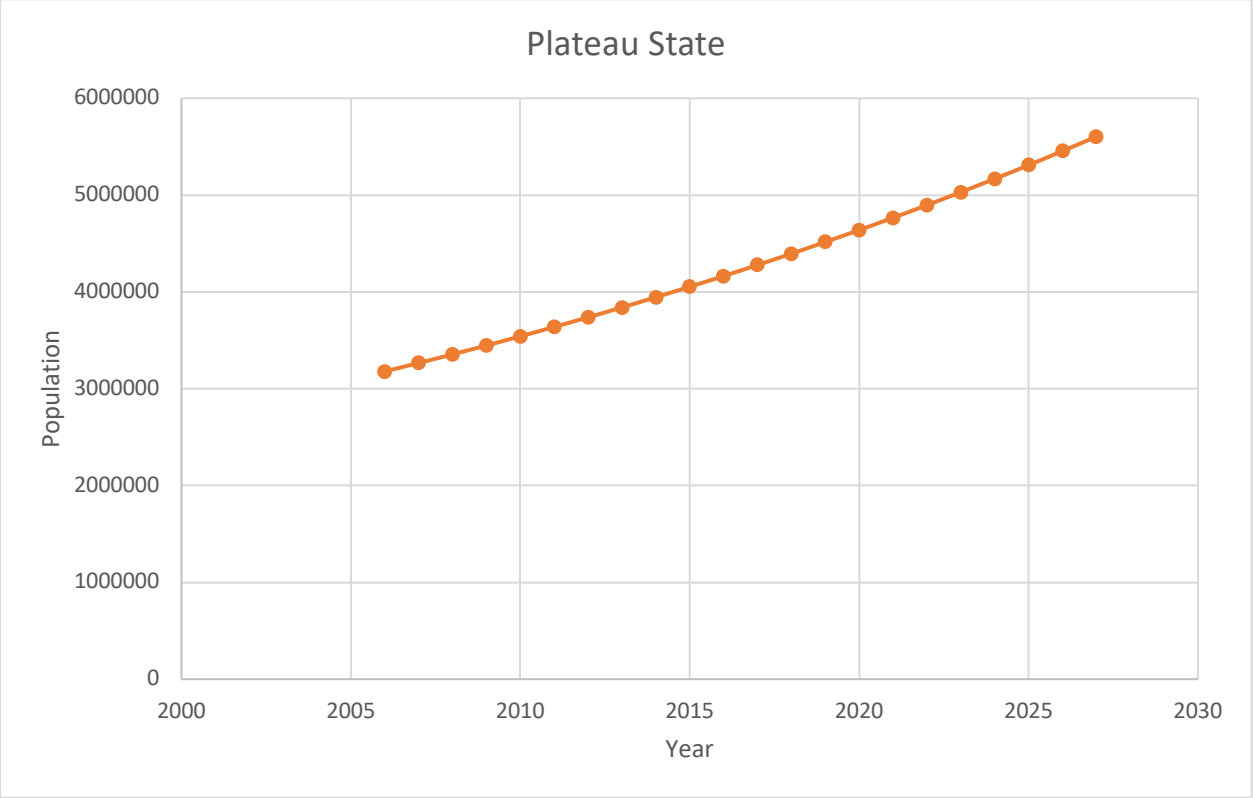


Figure 32: Plot of Population Projection for Plateau State

Table 34: Population Projection for Rivers State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	5185400	2520104.4	2665295.6		
2007	5364735.02	2607261.22	2757473.8		
2008	5550272.271	2697432.324	2852839.947		
2009	5742226.254	2790721.959	2951504.295		
2010	5940818.891	2887237.981	3053580.91		
2011	6146279.776	2987091.971	3159187.805		
2012	6358846.445	3090399.372	3268447.073		
2013	6578764.648	3197279.619	3381485.029		
2014	6806288.637	3307856.278	3498432.359		
2015	7041681.452	3422257.186	3619424.266		
2016	7285215.236	3540614.605	3744600.631		
2017	7537171.54	3663065.368	3874106.172		
2018	7797841.654	3789751.044	4008090.61		
2019	8067526.94	3920818.093	4146708.847		
2020	8346539.187	4056418.045	4290121.142		
2021	8635200.962	4196707.668	4438493.294		
2022	8933845.992	4341849.152	4591996.84		
2023	**9242819.542**	**4492010.297**	**4750809.245**	**3537190**	**1213619.25**
2024	9562478.821	4647364.707	4915114.114		

2025	9893193.39	4808091.988	5085101.402		
2026	10235345.59	4974377.957	5260967.633		
2027	10589330.99	5146414.861	5442916.129		

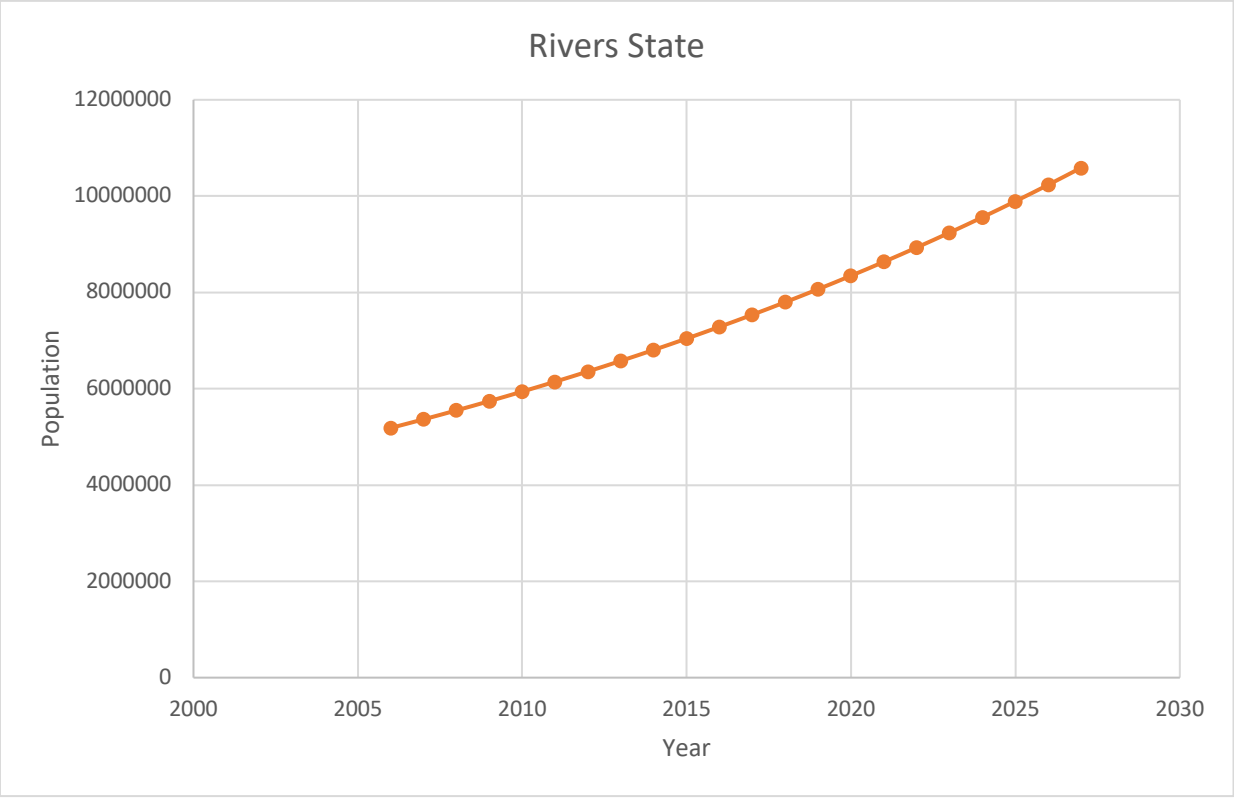


Figure 33: Plot of Population Projection for Rivers State

Table 35: Population Projection for Sokoto State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	3696999	1796741.514	1900257.486		
2007	3809589.382	1851460.44	1958128.942		
2008	3925608.651	1907845.804	2017762.847		
2009	4045161.233	1965948.359	2079212.874		
2010	4168354.733	2025820.4	2142534.333		
2011	4295300.034	2087515.817	2207784.217		
2012	4426111.394	2151090.137	2275021.257		
2013	4560906.554	2216600.585	2344305.969		
2014	4699806.837	2284106.123	2415700.714		
2015	4842937.264	2353667.51	2489269.754		
2016	4990426.662	2425347.358	2565079.304		
2017	5142407.78	2499210.181	2643197.599		
2018	5299017.412	2575322.462	2723694.95		
2019	5460396.518	2653752.708	2806643.81		
2020	5626690.349	2734571.51	2892118.839		
2021	5798048.581	2817851.61	2980196.971		
2022	5974625.449	2903667.968	3070957.481		
2023	**6156579.882**	**2992097.823**	**3164482.059**	**2172056**	**992426.059**

2024	6344075.653	3083220.767	3260854.886		
2025	6537281.521	3177118.819	3360162.702		
2026	6736371.383	3273876.492	3462494.891		
2027	6941524.434	3373580.875	3567943.559		

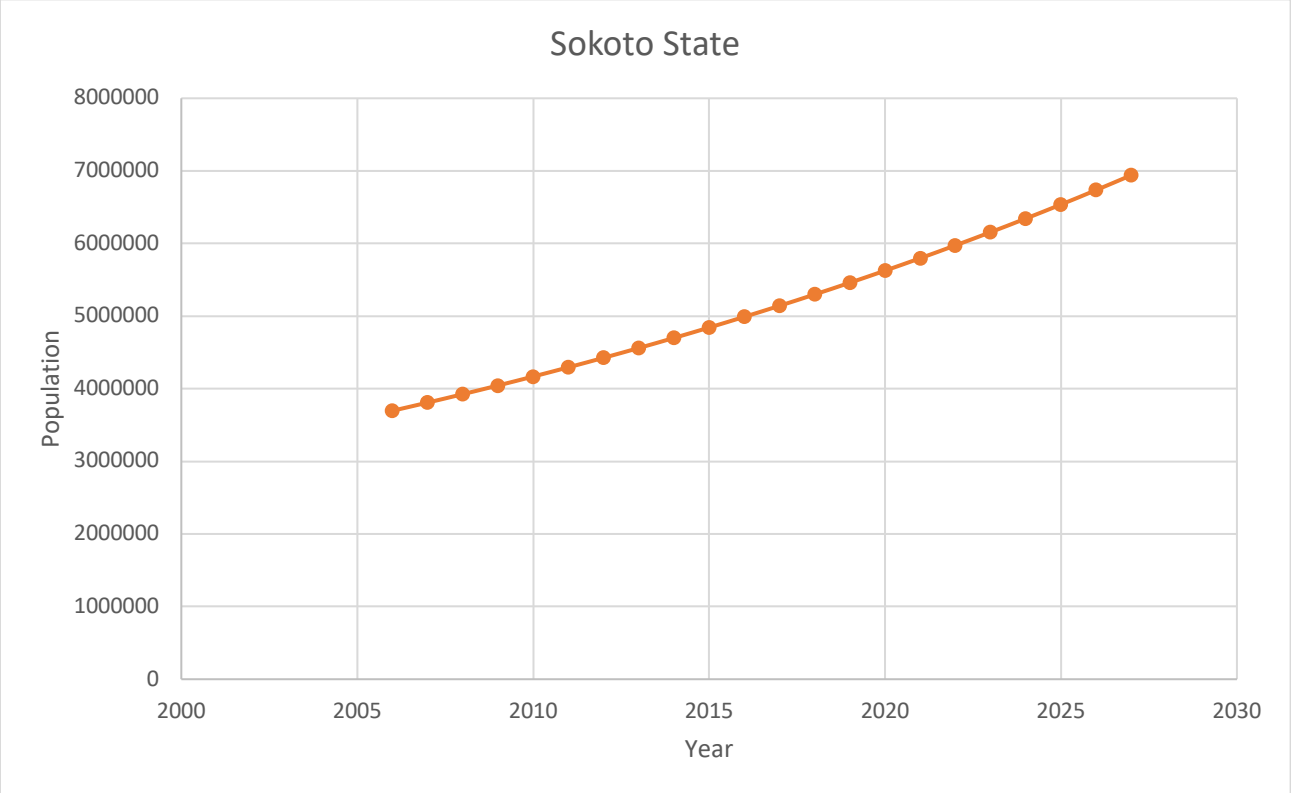


Figure 34: Plot of Population Projection for Sokoto State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	2280483	1108314.738	1172168.262		
2007	2347585.287	1140926.449	1206658.838		
2008	2416662.033	1174497.748	1242164.285		
2009	2487771.333	1209056.868	1278714.465		
2010	2560972.995	1244632.876	1316340.119		
2011	2636328.587	1281255.693	1355072.894		
2012	2713901.487	1318956.123	1394945.364		
2013	2793756.938	1357765.872	1435991.066		
2014	2875962.103	1397717.582	1478244.521		
2015	2960586.121	1438844.855	1521741.266		
2016	3047700.167	1481182.281	1566517.886		
2017	3137377.509	1524765.469	1612612.04		
2018	3229693.57	1569631.075	1660062.495		
2019	3324725.993	1615816.833	1708909.16		
2020	3422554.707	1663361.588	1759193.119		
2021	3523261.992	1712305.328	1810956.664		
2022	3626932.547	1762689.218	1864243.329		
2023	**3733653.566**	**1814555.633**	**1919097.933**	**2022374**	**-103276.067**
2024	3843514.808	1867948.197	1975566.611		
2025	3956608.673	1922911.815	2033696.858		
2026	4073030.279	1979492.716	2093537.563		
2027	4192877.543	2037738.486	2155139.057		

Table 36: Population Projection for Taraba State

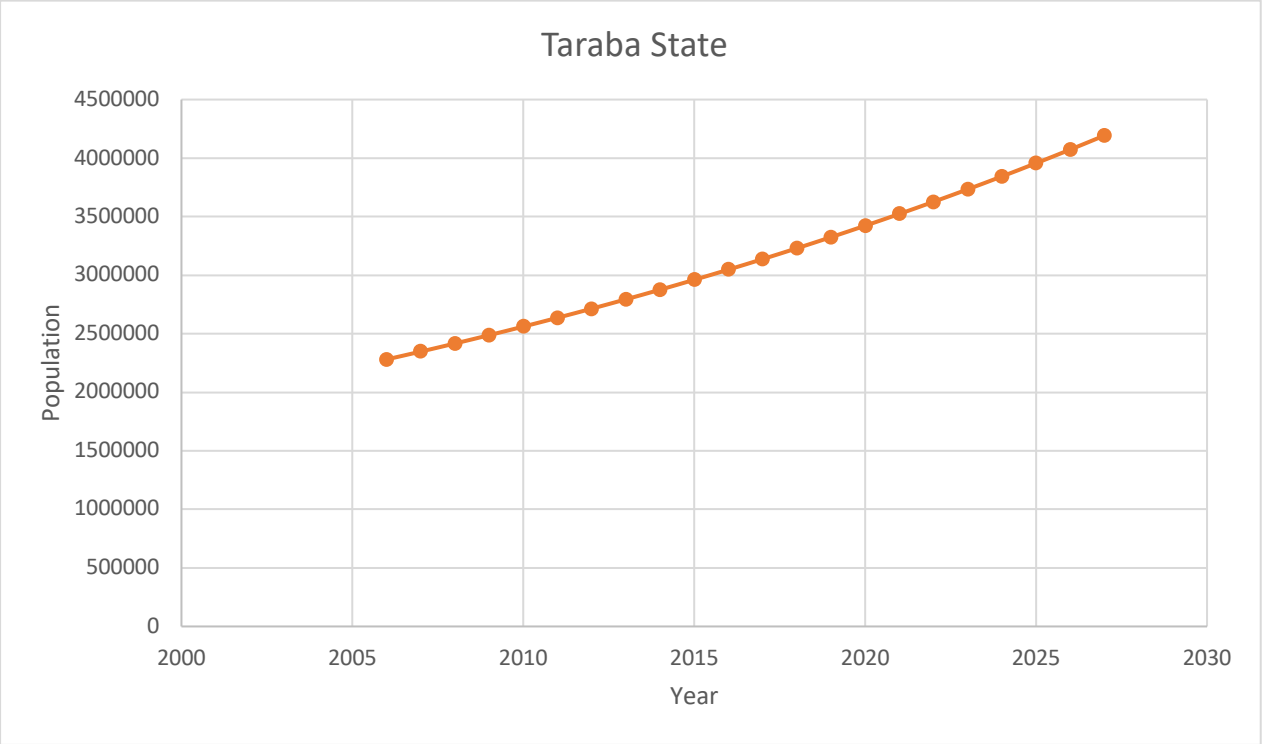


Figure 35: Plot of Population Projection for Taraba State

Table 37: Population Projection for Yobe State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	2321591	1128293.226	1193297.774		
2007	2404285.395	1168482.702	1235802.693		
2008	2489925.341	1210103.716	1279821.625		
2009	2578615.757	1253207.258	1325408.499		
2010	2670465.299	1297846.135	1372619.164		
2011	2765586.495	1344075.037	1421511.458		
2012	2864095.881	1391950.598	1472145.283		
2013	2966114.142	1441531.473	1524582.669		
2014	3071766.264	1492878.404	1578887.86		
2015	3181181.684	1546054.298	1635127.386		
2016	3294494.449	1601124.302	1693370.147		
2017	3411843.382	1658155.884	1753687.498		
2018	3533372.25	1717218.914	1816153.337		
2019	3659229.94	1778385.751	1880844.189		
2020	3789570.645	1841731.333	1947839.312		
2021	3924554.048	1907333.267	2017220.781		
2022	4064345.521	1975271.923	2089073.598		

2023	**4209116.325**	**2045630.534**	**2163485.791**	**1485146**	**678339.791**
2024	4359043.822	2118495.297	2240548.525		
2025	4514311.694	2193955.483	2320356.211		
2026	4675110.162	2272103.539	2403006.623		
2027	4841636.224	2353035.205	2488601.019		

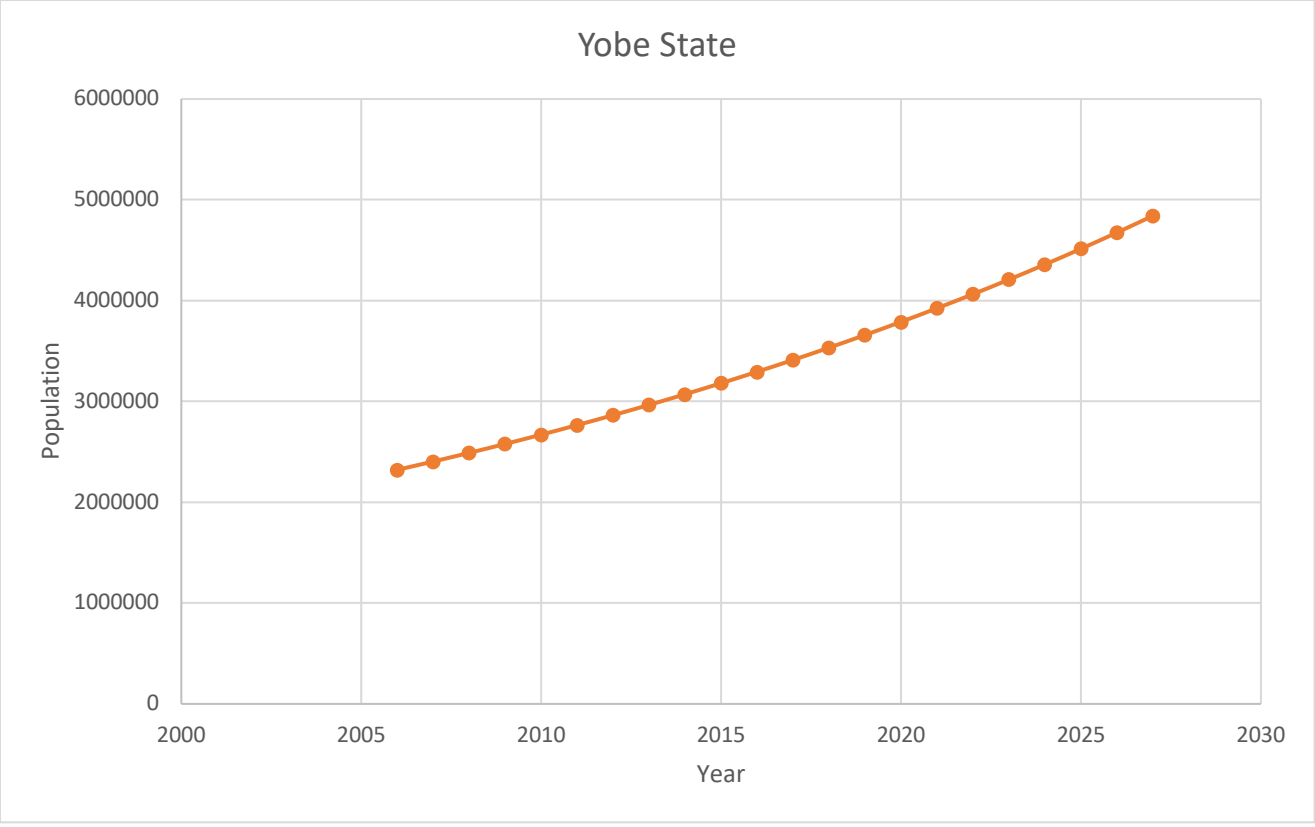


Figure 36: Plot of Population Projection for Yobe State

Table 38: Population Projection for Zamfara State

Year	Projected Population	Under 18 Population	Adjusted Projected Population	Number of Voter Registration	Difference
2006	3259846	1584285.156	1675560.844		
2007	3365848.06	1635802.157	1730045.903		
2008	3475297.042	1688994.362	1786302.68		
2009	3588305.032	1743916.246	1844388.786		
2010	3704987.76	1800624.051	1904363.709		
2011	3825464.719	1859175.853	1966288.866		
2012	3949859.288	1919631.614	2030227.674		
2013	4078298.858	1982053.245	2096245.613		
2014	4210914.963	2046504.672	2164410.291		
2015	4347843.413	2113051.899	2234791.514		
2016	4489224.434	2181763.075	2307461.359		
2017	4635202.813	2252708.567	2382494.246		
2018	4785928.045	2325961.03	2459967.015		
2019	4941554.486	2401595.48	2539959.006		
2020	5102241.51	2479689.374	2622552.136		
2021	5268153.676	2560322.687	2707830.989		
2022	5439460.891	2643577.993	2795882.898		
2023	**5616338.589**	**2729540.554**	**2886798.035**	**1926870**	**959928.035**

2024	5798967.909	2818298.404	2980669.505		
2025	5987535.879	2909942.437	3077593.442		
2026	6182235.608	3004566.505	3177669.103		
2027	6383266.488	3102267.513	3280998.975		

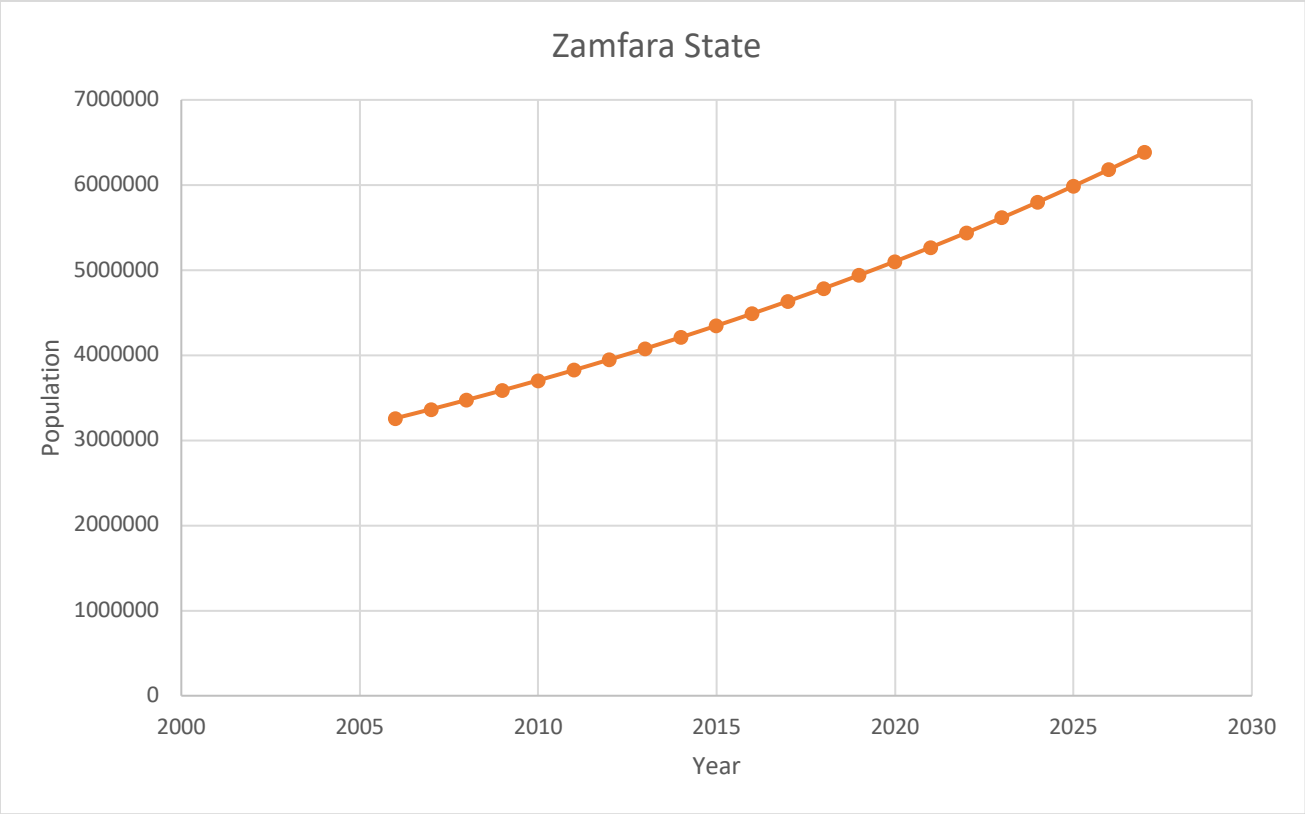


Figure 37: Plot of Population Projection for Zamfara State

Year	Total Population
2006	2833999
2007	2911559.326
2008	2991242.307
2009	3073106.036
2010	3157210.196
2011	3243616.102
2012	3332386.748
2013	3423586.851
2014	3517282.901
2015	3613543.206
2016	3712437.943
2017	3814039.213
2018	3918421.086
2019	4025659.661
2020	4135833.121
2021	4249021.786
2022	4365308.176
2023	4484777.069
2024	4607515.563
2025	4733613.141
2026	4863161.731

Recommendations

1. Improved continuous registration targeted at women and youths especially in the underrepresented communities.
2. Conduct continuous voter registration education and awareness across underrepresented communities.
3. Collaborate with local authorities to reach diverse population.
4. Bringing registration centres closer to especially underserved population.

References

Andrew, G. et al. Bayesian Data Analysis. Chapman & Hall/CRC.

Drovandi, C. C., McGree, J. M., & Pettitt, A. N. (2013). Sequential Monte Carlo for Bayesian sequentially designed experiments for discrete data. *Computational Statistics and Data Analysis* 57, 320–335.

Drovandi, C. C., McGree, J. M., & Pettitt, A. N. (2014). A sequential Monte Carlo algorithm to incorporate model uncertainty in Bayesian sequential design. *Journal of Computational and Graphical Statistics* 23, 3–24.

Jeff, G. (2015). Bayesian Methods. Chapman & Hall/CRC

Jim, A. (2011). Bayesian Computation with R (2nd ed.). Springer Dordrecht Heidelberg London New York.

Peter, C. (2003). Applied Bayesian Modelling. John Wiley & Sons, Ltd.

Simon, J. (2010). Bayesian Analysis for the Social Sciences. Wiley.