

# Statistical Analysis of Registered Live Birth in Nigeria, A Case Study of Tarka Local Government Area, Benue State

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**Abstract-** This study examines the statistical analysis of registered live births in Tarka Local Government Area, Benue State, Nigeria, with a focus on trend analysis, seasonal variation, and forecasting. The objective of the study is to assess the registration of live births in Tarka Local Government between 2017-2022, determine the trend in live birth registration, and make projections for future registered live births. The methodology employed includes time series analysis, using techniques such as moving average, semi-average, and least square methods. Data on birth registration were sourced from the National Population Commission (NPC), Tarka Local Government. The results show an upward trend in live birth registration, with a seasonal index indicating highest registration in September (128.76%) and lowest in June (72.21%). The forecast for 2022-2025 indicates a continued increase in birth registration. The study concludes that birth registration is essential for population planning, education, and healthcare. Recommendations include educating the masses on the importance of birth registration, establishing more registration centers in rural areas, and enforcing compulsory birth registration.

**Keywords:** Statistical Analysis, Registered Live Birth, Forecasting, Birth Registration

## I. INTRODUCTION

Vital registration is the formal recording of the occurrence of vital events which are births, stillbirths, marriage divorces e.t.c. These events are referred to as "Vital since they relate to all events which have to do with individual entrance into or departure from life together with the changes in civil status, which may occur during his/her life time. In Nigeria unlike in developed countries, laws on registration of vital events exist but since they are not enforced, registration of vital events occurs only in few locations. For the purpose of this study, the main

interest is solely on Birth. Birth is a term used in demography to indicate the actual number of children born alive. It is also referred to as fertility. The process of registration of birth in Nigeria involves obtaining form B1, and form B1 is a live birth registration form issued by National Population Commission (NPC). The NPC has their units in all the government hospitals all over the states and local government areas. The form is then completed and submitted for the issuance of birth certificates. Such birth might not necessarily have taken place in such General Hospitals. The completion of this process shows that the birth has been registered.

Since the main interest in this study is solely on birth, it will be established whether birth registration is increasing or decreasing through the use of "Time series analysis". Data on birth registration when applied to the base population at a point in time is useful for population and estimations. Also, data from birth registration is most important tool for an effective planning of education system at the pre-primary, primary, secondary and tertiary institutions. In other words, the knowledge of the number of births allows for better estimation of the educational facilities in terms of the number of teachers, classrooms and other expendable materials required for our educational system. Furthermore, data from birth registration will be useful in formulating population control programmes and for effectiveness of such programmes. The Tarka Local Government Area of Benue State was created on 1<sup>st</sup> of October, 1996 by Head of States, Major Gen. Sani Abacha. Its headquarters and is Wannune town. It has an area of 371Km<sup>2</sup>. The law that makes it compulsory for an individual to register births in Tarka Local

Government is known as “Births and Death Decree 39 of 1979” The decree stipulate 1<sup>st</sup> September, 1979 as the effectiveness data of its application. According to the 2006 provisional census result, the Tarka Local Government has a population of 79, 494 out of a national estimation of 8.1 million population with a growth rate of 2.9% per annum. By this, Tarka Local Government is not thickly populated but the rate of population growth is about 10.800 per annum (Annual abstract of statistics – F.O.S).

#### Problem Statement

Increasing rate of death of fetus which affects births in Nigeria has caused a lot of concern to Nigerians thereby causing researchers to investigate the vital registration as the source of birth rate.

#### Objective(s) of the Study

The main purpose of this study is to assess the registration of live birth in Tarka Local Government between 2017 – 2022. At achieving the following objectives;

- a. To determine the trend in the live birth registration, if increasing or decreasing.
- b. To show the seasonal effects on live birth registration from year to year.
- c. To make projections as to the future registered live birth.

#### Literature Review

Consequent on several attempts at conducting an accurate census and the need to have an alternative source of demographic data on a national basis, the Federal Military Government, recognizing this need, promulgated decrees for the establishment of a nationwide basis of the registration of births and deaths in 1976. The decree is referred to as the “birth and deaths (compulsory registration) decree 89 of 1979”. The decree stipulates 1<sup>st</sup> September 1979 as the effective date of its application. This for the first time aims at establishing a uniform national and state level registration hierarchy including the appointment of a registration general. Furthermore, the decree projects the law relating to the registration of births and deaths that now exist in the various states in the country.

This act clearly spelt out the registration, hierarchy and their responsibilities, establishments of registration counters, time limited for registration/documentation

of vital events, which include births, deaths, stillbirths, marriages, divorces, founding and the procedures for registration. It also specified penalties for act or non-registration of vital events.

At inception, implementation of the law of births registration. Nationwide was preceded by two experimental phases undertaken in eight (8) local government areas in four (4) selected states namely: Anambra, Oyo, Plateau, and Kano from 1988 – June 1990. A manual was then developed.

While preparing for an expansion phase I to cover L.G.A the experience gained during the experimental period contributed immensely of the 2<sup>nd</sup> edition of a manual on registration of births and deaths which was a great improvement upon the one used during the experimental phases. The expansion phase I lasted from July 1990 to December 1992, a second expansion phase was embarked from January 1993 during which at least two registration centre were established in each of the 774 local government areas nationwide.

Although the response rate before period of the introduction of the two experimental phases was not as impressive as expected due to shortage of funds and lack of awareness campaign. The data collected are usually left unprocessed or unanalyzed due to shortage of well qualified personnel.

Consequently, the federal government had to seek for assistance from the United Nation Fund for Population Activities (UNFPA). So many states benefited immensely from the project that has conducted by UNFPA registration centres were increased and virtually all LGAs nationwide have registration centres. Remember that in the past, registration was done essentially revenue collections which ranged between N5 and n15 for births, while some institutions such as Teaching Hospitals and Government Hospitals registered events for statistical purposes, but were not issuing certificate presently, almost every LGA vital registration department is involved in issuing of certificates and compilation of data on births.

#### Methodology

Tarka Local Government Area of Benue State lies between Longitude 8045’ and 9000’E and Latitude 7030’ and 7045’N. About 95% of the population of the

entire Tarka Local Government is rural with a density of about 213 inhabitants per square kilometer. The settlement pattern in the area has changed in compound or village settlement to isolated hamlets settlement.

The population of the study consists of Birth Registration in Nigeria.

The method of data collection is documentary from the vital registration department of the National Population Commission (NPC), Tarka Local Government.

For the purpose of this study, two statistical model or tools (Time) series analysis and statistical design of experiment are used.

Time Series: Time series are observed values over a period of time. The following methods are used to estimate the parameter in time series analysis.

1. Method of Moving Average: A moving average for a time period is the arithmetic mean of the values in that time period and those use to it. For example, to compute the three-period moving average for any time period, we would average the time series values in that time period, the previous period, and the following period. We compute the three-period moving averages for all time periods except the first and last. To calculate the five-period moving average, we average the value in that time period, the values in the two proceeding periods, and the two following time periods. We can choose any number of periods with which to calculate the moving averages.

The following steps should be noted when considering a moving average trend;

Step 1: The period of the moving average must coincide with the length of the natural cycle of the series.

Step 2: Each moving average trend value calculated must correspond with an appropriate time point. This can always be determined as the median of the time points for the values being averaged. For moving averages with an odd-numbered period, 3, 5, 7 etc, the relevant time point is that corresponding to the 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, etc value. If the moving averages has a period of 5

and thus each average obtained will set against the 3<sup>rd</sup> value of the respective set being averaged.

2. Semi Average Method: The technique consists of splitting the data into two equal groups, plotting the mean point for each group and joining these two points with a straight line. The procedure for obtaining the y on x time series line using this method is described as follows;

Step 1: Sort the (bivariate) data into size order by x – value.

Step 2: Split the data up into two equal groups, a lower half and an upper half.

Step 3: Calculate the mean point for each group.

Step 4: Plot the above mean points on a graph within suitable scaled axes and join then with a straight line. This is the required y on x time series line.

3. Least Square Method: The most commonly used method for estimating the parameters of the linear trend r odd is the least square method.

$$Y_i = a + bt + e$$

The random error (e) is always assumed to be negligible (stochastic assumption). Then the equation becomes fitting the first-degree equation i.e. n = 1 the normal equation of the model is given as;

$$\sum y = na + b \sum x \dots (1)$$

$$\sum xy = n \sum x + b \sum x^2 \dots (2)$$

In time series, the time variable x, can be coded such that  $\sum x = 0$  holds, the equation 1 and above becomes

$$\sum x = an + b (0)$$

$$\sum_{a-n}^x xy = n(0) + b \sum x^2$$

While equation 2 becomes;

$$b = \frac{\sum yx}{\sum x^2}$$

From the equation  $y_1 = a + bt + e$ ,  $y_1$  = estimated value of the dependent variable x = independent variable (Time in trend analysis).

a = The trend value at time zero (i.e. intercept)

bt = Change in trend per unit time (slope).

e = Irregular fluctuation away from trend line at time t

4. Forecasting Method: Forecasting a value of a future time point involves the following steps;

Step 1: Estimate a trend value for the time point. There are a number of ways of estimating future trend values and some of these are described as follows;

- a. Linear trend: Whether the method of least squares or semi-averages has been used, the projection involves simply extending the trend line already calculated.
- b. Moving average trend: There is no one universal method. Three common means of projecting are used below;
  - ‘By eye’ (or inspection) from the graph. This involves adding a projection free hand in a manner that seems most appropriate. This might seem fairly arbitrary, but remember that any form of projection (no matter how technical) is still only an estimate. This particular method can be employed when the calculated trend values are distinctly, non-linear.
  - Using the method of semi-averages on the calculate trend values to obtain a linear projection of the trend. This method can be employed with fluctuating linear trend value.
  - Using the first and last of the calculated trend values to obtained a linear projection of the trend.

This method can be employed with fairly ‘steady linear’ trend values.

Step 2: Identify the seasonal variation value appropriate to the time point.

Step 3: Add (or multiply, depending on the model) these two values together, giving the required forecast.

Time series can be attempted using the simple additive or multiplicative model in the following adapted form.

Additive:  $Test = test + s$

Multiplicative:  $Test = test \times s$

Where  $Y_{est}$  = estimated data value

Test = projected trend value

s and S = appropriate seasonal variation value notice that there is no provision for residual variation in the above forecasting model.

#### Presentation and Analysis of Data

##### 1. Data Presentation

Table 01: Monthly Birth Registration in Tarka Local Government (2017-2021)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
2017	1339	1390	1247	1268	1528	1374	1557	1769	1952	1846	1454	1191	17915
2018	2380	2225	2323	2560	2266	2725	2587	2547	3056	2760	2487	2150	30066
2019	2629	1830	1399	2005	2116	2027	2282	2971	3938	2923	2060	2278	28458
2020	2280	1915	2381	2376	2241	1610	1642	1523	1795	1645	2011	1290	22709
2021	1663	2041	2090	1809	2282	2533	2443	2316	3163	2205	2001		24546
Total	10291	9401	9440	10018	10433	10269	10511	11126	13904	11379	10013	6909	123694

Source: National Population Commission TARKA LOCAL GOVERNMENT

Table 02: Annual Birth Registration in Tarka Local Government (2017-2021)

Year	Registered Live	Equivalent Percentage
2017	17915	14.48
2018	30066	24.31
2019	28458	23.01
2020	22709	18.36

2021	24546	19.83
Total	123694	100.00

Source: National Population Commission TARKA LOCAL GOVERNMENT

Table 03: Quarterly Birth Registration in Tarka Local Government (2017-2022)

Year	Qi	Qii	Qiii	Qiv	Total
2017	3976	1470	5275	4491	17915
2018	6928	7551	8200	7399	30078
2019	5858	6148	9191	7261	28458
2020	6576	6227	4960	4946	22709
2021	5794	6624	7902	4206	24526
Tota	2913	2802	3552	2830	12098
1	2	0	8	3	3

Source: National Population Commission TARKA LOCAL GOVERNMENT

Data Analysis  
 Analysis of Trend

Table 04: Computing Trend Equation on Birth Registration

Year	Y	x	x <sup>2</sup>	xy	y <sup>2</sup>
2017	17215	- 2	4	-35830	23566.6
2018	30078	- 1	1	-30078	24151.9
2019	28458	0	0	0	24737.2
2020	22709	1	1	22709	25322.5
2021	24526	2	4	49052	25907.9
Total	123686		10	5853	

We need to estimate the value of the parameter of our model:

$$\sum y: 123686, \sum x^2 = 10, \sum xy = 5853, n = 5$$

$$Y = a + bX$$

Table 5: Table of Trend Value of Birth Registration Using a Growth Rate of 4.06

Year	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
2017	1939.6	1943.7	1947.7	1651.8	1955.8	1960.0	1964.1	1968.0	1972.1	1976.0	1980.0	1984.3
2018	1988.3	1992.4	1996.4	200.5	2004.6	2008.6	2012.7	2016.7	2020.8	2025.1	2029.0	2033.1
2019	2037.0	2041.1	2045.2	2049.2	2055.3	2057.3	2065.5	2070.0	2074.1	2075.0	2082.0	2086.1
2020	2090.0	2094.1	2098.0	212.0	2106.1	2110.1	2114.2	2118.2	2122.3	2126.4	2130.4	2135.5
2021	2138.5	2143.0	2147.1	2151.0	2155.0	2159.1	2163.0	2171.0	2171.0	2175.1	2179.1	2183.2

$$a = \frac{\sum Y}{n} = \frac{123686}{5} = 24737.2$$

$$b = \frac{\sum xy}{\sum x^2} = \frac{5853}{10^2} = 585.3$$

thus, the linear trend equation model becomes  
 $Y = 24737.2 + 585.3X$

Conversion of Annual Equation to Monthly Equation

The annual linear equation is:

$$Y = 24737.2 + 585.3X$$

Origin; 2017

X unit = 1 year

Since n = odd, the corresponding monthly equation becomes

$$\hat{y} = \frac{a}{12} + \frac{bx}{144}$$

$$\hat{y} = \frac{24737.2}{12} + \frac{585.3X}{144}$$

$$\hat{y} = 2061.4 + 4.06x$$

Origin: 2017

X unit = 1 Month

On shifting the origin as appropriate, the intercept becomes intercept a

$$2061.4 + 4.06X \times 0.5 \quad a = 2061.4 + 2.03 = 2063.4 = 2063.4 + 4.06X$$

Origin: July 15<sup>th</sup>, 2017

X unit = 1 Month

This implies that there is an increase of 4.06 units (growth rate)

Analysis of Seasonal Variation

Rate to Moving Average Method

Year and Month	Data	12 Months Moving Total	2 Months Moving Total	12 Months Centered Moving	Ratio-to Moving
Jan	1339				
Feb	1309				
Mar	1247				
Apr	1268				
May	1528				
Jun	1328				
		17915			
Jul	1557		36871	1536.3	101.35
		1856			
Aug	1769		38747	1614.5	109.57
		19791			
Sept	1952		40658	1694.1	115.22
		20867			
Oct	1846		43026	1792.8	102.97
		22159			
Nov	1454		45669	1902.9	76.41
		23510			
Dec	1191		48060	2002.5	59.48
		24550			
		2017			
Jan	2380		49878	2078.3	114.51
		25328			
Feb	2225		51760	2156.7	103.19
		26432			
Mar	2323		53692	2237.2	103.84
		27346			
Apr	2560		55727	2322.0	110.25
		28381			
May	2266		5521	2405.0	94.22
		29340			
Jun	2725		58929	2455.4	110.98
		29589			
Jul	2597		58783	2449.3	106.38
		29194			
Aug	2547		57464	2394.3	106.38
		28027			
Sept	3056		55985	2332.7	131.01
		27715			
Oct	2760		55280	2303.3	119.83
		27565			
Nov	2489		54432	2265.0	109.74
		26867			
Dec	2150		53419	2225.8	96.59
			2018		

Jan	2629		535528	2230.3	117.88
		26976			
Feb	1830		54834	2284.8	80.09
		27858			
Mar	1399		55879	238.3	60.09
		28021			
Apr	2005		55613	2317.2	86.53
		27592			
May	2116		55312	2304.7	91.81
		27720			
Jun	2027		55091	2295.5	88.30
		27371			
Jul	2282		54827	2284.5	99.91
		27456			
Aug	2971		55894	2328.9	127.58
		28438			
Sept	3938		57247	2385.3	165.09
		28809			
Oct	2923		57743	2406.8	121.49
		28934			
Nov	2060		57451	2393.8	86.06
		28517			
Dec	2278		56394	2349.8	96.94
		2019			
Jan	2280		54306	2262.8	100.76
Feb	1915		50715	2113.1	90.63
		24286			
Mar	2381		47294	1970.6	120.83
		23008			
Apr	2376		45967	1915.3	124.05
		22959			
May	2241		44930	1872.1	119.71
Jun	1610		43325	1805.2	89.19
		21354			
Jul	1642		42834	1784.8	97.03
		21480			
Aug	1528		42669	1777.9	85.66
		21189			
Sept	1795		41811	1742.1	103.04
		20622			
Oct	1645		41285	1720.2	95.63
		20663			
Nov	2011		42249	1760.4	114.24
		21586			
Dec	1290		43853	1831.4	70.44

		22367			
		2020			
Jan			45527	1897.0	87.66
		23160			
Feb	2041		476688	1987.0	102.72
		24528			
Mar	2090		49616	2067.3	103.10
		25088			
Apr	1809		50166	2090.3	
		25078			86.54
May	2282		48866	20361	112.08
		23788			
Jun	2533				
Jul	2423				
Aug	2316				
Sept	3163				
Oct	2205				
Nov	2001				
Dec	-				

Table 06: Table for Computing the Seasonal Index of Birth Registration

Year and Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2017							101.35	109.57	15.22	102.97	78.41	59.48
2018	114.51	103.19	103.84	110.25	94.22	110.98	106.03	106.38	131.01	119.83	109.74	96.59
2019	117.83	80.09	60.09	86.53	91.31	88.30	99.91	127.58	165.09	121.49	86.06	96.94
2020	100.76	90.63	120.83	124.05	119.71	89.19	92.06	85.66	103.04	95.63	114.24	70.44
2021	87.66	102.72	103.10	86.54	112.08							
Mean	105.20	94.16	96.97	101.84	104.46	76.16	99.83	107.30	128.60	189.98	97.11	8086
Seasonal index	105.34	94.28	97.09	101.98	104.60	72.21	99.96	107.44	128.76	10.13	97.24	80.96
Variation form 100%	5.34	-5.72	2.91	1.98	4.60	-27.97	-0.04	7.44	28.76	10.13	2.76	19.04

Comments: It can be highest seasonal index as the lowest seasonal index as observed from the table that September has the index of 128.27 which is an

increase of 28.76% while June has an index of 72.21 which is a decrease of 27.79%

Table of Deseasonalized Data on Birth Registration

Year and Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2017	1271.12	1474.33	1284.38	1243.38	1455.52	1902.78	1557.62	1646.50	1515.99	1676.20	1495.27	1472.92
2018	2259.35	2359.99	2392.63	2510.29	2166.35	3773.72	2598.04	2370.63	2373.41	2506.13	2559.65	2658.92
2019	2495.73	1941.03	1440.93	1966.07	2022.94	2807.09	2282.91	2765.26	3058.41	2654.14	2118.47	2817.15
2020	2164.42	2031.18	2452.36	2329.87	2142.45	2229.6	1642.7	1417.5	1394.1	1493.7	2068.1	1595.3
2021	1578.7	2164.8	2152.6	1773.9	2246.1	3507.8	2424.0	2155.6	2456.5	2002.2	2060.5	

Procedure for Deseasonalization of Data

Divide Monthly Data (birth registration) by the corresponding seasonal index and multiply by 100.

For Jan 2017  

$$\frac{1339 \times 100}{105.34} = 1271.1$$

Forecasting

The annual monthly equation will be used for subsequent years and Months.

Annual Forecast

The annual equation is given as;

$Y = 24737 + 585.3x$

Origin: 2017

x Unit = 1 year

for 2022 (x=3)

$Y = 24737 + 585.3(3)$

$= 24737 + 1755.9$

$= 26492.9$

Therefore; cost for 2022 to 2025 is given below

Year	2022	2023	2024	2025
Forecast	26492.9	27078.2	27663.5	28248.8

Monthly Forecast

The Monthly equation is given as;

$Y = 2061.4 + 4.06x$

For January, 2019 (x=30)

$Y = 2061.4 + 4.06(30)$

$Y = 2061.4 + 121.8$

$= 2183.2$

The seasonal index for January is 1.0535

$= 2183.2 \times 1.0535 = 2300$

The Forecast for 2022 to 2025 (Monthly Forecast)

Year and Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2022	2299.8	2062.6	2127.6	2236.8	2300.6	1591.1	2206.8	2376.3	2852.9	2444.6	2162.4	1803.7
2023	2351.1	2108.1	2174.9	2288.5	2351.6	1626.3	2255.4	2428.5	2915.6	2498.3	2209.8	1843.1
2024	2402.4	2154.0	2222.2	2338.2	2402.5	1661.5	2304.1	2480.9	2978.4	2551.9	2257.2	1882.6

2025	2453.	2199.	2269.	2387.	2453.	2349.	2346.	2533.	3041.	2605	2304.	1922.
	7	9	5	9	5	7	7	2	1		5	0

Using the monthly equation

$$Y = 2061.4 + 4.06x$$

$$\text{The } 2061.4 + 4.06(30) = 2183.2 \times 1.0534 = 2299.8$$

For Jan 2017

$$Y = 2061.4 + 4.06(42) = 2231.1 \times 1.0534 = 2351$$

Statistical Design of Experiment

Two-way Classification of Analysis of Variation

CASE 1:

Test  $H_0: H_1 = H_2$  (there is no difference in the mean of the treatment effect)

$H_1: H_3 \neq H_4$  (there is difference in the mean of the treatment effect)

CASE 2:

Test:  $H_0: H_3 = H_4$  (there is no difference in the mean of the block effect)

$H_1: H_3 \neq H_4$  (there is difference in the mean of block effect) at  $\alpha = 0.5$  level of significance

Decision Rule

Reject  $H_0$  if  $F_{cal} \geq F_{tab}$ , otherwise reverse judgment

Test Statistic

$$F_e = \frac{MST}{MSE} \text{ and } \frac{MSB}{MSE}$$

Critical Value For Treatment

$$F_{\alpha} (b-1)(t-1)(b-1) = F_{(0.05)} 3, 12 = 3.49$$

Computation

Computation for the Two-way Analysis of Variance

Year	Qi	Qii	Qiii	Qiv	$Y_1$	$Y_1^2$	$Y_{1j}^2$
2017	39.76	41.70	52.78	44.91	179.15	32094.7	8122.4
2018	69.28	75.51	82.00	73.99	300.78	90468.6	22700.0
2019	58.58	61.48	91.91	72.61	284.58	80985.8	20931.1
2020	65.76	62.27	49.60	49.46	227.09	51569.9	13108.4
2021	57.94	66.24	79.02	42.06	245.26	60152.5	15758.0
$Y_1$	291.32	307.20	355.3	283.03	1236.86	315271.5	
$Y_{1j}^2$	17493.6	19485.7	26661.5	16979.0			80619.8
$Y^2$	84867.3	94371.8	126245.2	80106.1			

NOTE: Figures are in 000's

Where  $b=4, t = S$

Correction factor (C.S)

$$C.F = \frac{(Y_{\dots})^2}{bt} = \frac{(1236.86)^2}{4 \times 5} = \frac{1529822.7}{20} = 76491.1$$

$$TSS = \sum_{i=1}^4 \sum_{j=1}^5 Y_{ij}^2 - ct$$

$$= 80619 - 76491.1 = 4127.9$$

$$SSB = \sum_{j=1}^5 \frac{Y_j^2}{j - cf}$$

$$= 385590.4 - 76491.1$$

$$SSB = 62.98$$

$$SST = \sum_{i=1}^4 \frac{Y_i^2}{i - cf}$$

$$= \frac{315271.5}{3} - 76491.1$$

$$78817.9 - 76491.1 = 2326.8$$

$$SSE = TSS - (SSB + SST)$$

$$= 4127.9 - (62.98 + 2326.8)$$

$$= 4127.9 - 2953.78$$

$$SSE = 114.12$$

ANOVA TABLE

Source of Variation	Degree of Freedom	Sum of Square	Mean of Square	FC
SSB	3	626.98	209.1	2.1380
SST	4	2326.8	581.7	5.9479
SSE	12	1174.12	97.8	
TSS	19	4127.9	217.3	

FOR TREATMENT

$$FC^* = 59479$$

FOR BLOCK

$$FC^* = 2.1380$$

Conclusion

Since  $FC^*$  is less than  $F_{\alpha}$  for block, we accept  $H_0$  and conclude that there is no difference in the mean of the block effect while for the treatment, we reject  $H_0$ , since  $FC^*$  is greater than  $F_{\alpha}$  and conclude that there is difference in the treatment effect for the quarterly registered birth.

### Results

The research will be able to address the following upon completion:

1. The grants that are given to developing countries by international institution, such as UNDP, ILO, UNICEF, UNESCO etc are based on current fertility role or the rate of population growth. In line with this government should endeavour to educate the masses on the need to register birth.
2. Based on the analysis of trend and seasonal variation, it is expected that government should put up a population control policy that will ensure that a woman has only one child.
3. It is also expected that more registration centres should be established in the interior rural areas of the state.
4. Registration of birth should be enforced and made compulsory since it is a determinant factor of a person's eligibility for admission to school, to obtain passport, to enter certain fields of employment to vote and be voted for in elections.

### Discussion of Findings

The live birth registration in any local division Registrar of Births and stillbirths properly authorized by the Government of Nigeria. These can be reached through the vital Registration Department of the National population commission and the medical records Director at your local hospital. This research work is concerned with the statistical analysis of live birth registration in Tarka Local Government of Benue State, Nigeria between 2017 – 2022. The trend analysis suggests an upward trend movement, and estimates of the parameters of the linear trend model derived by method of least square the knowledge of trend help in the conversion of annual registered birth to monthly, the monthly equation will later predict future estimate.

### Conclusion

The knowledge of hand helped in the conversion of annual registered birth to Monthly, the monthly equation was later used in predicting future estimate (2022 - 2025). The forecast shows that birth registration in Tarka Local Government as the tendency to increase every Month.

### Recommendation

1. The grants that are given to developing countries by international institution, such as UNDP, ILO, UNICEF, UNESCO etc are based on current fertility role or the rate of population growth. In line with this government should endeavour to educate the masses on the need to register birth.
2. Based on the analysis of trend and seasonal variation, it is recommended that government put up a population control policy that should ensure that a woman has only one child.
3. It is also recommended that more registration centres should be established in the interior rural areas of the state.
4. Registration of birth should be enforced and made compulsory since it is a determinant factor of a person's eligibility for admission to school, to obtain passport, to enter certain fields of employment and to vote and be voted for in election(s).

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