

## Spatio-Temporal Factors and Dynamics of Population Growth in Ondo State Nigeria (1970-2010)

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**ABSTRACT:** Everyone is aware of space and place, of change over time and since everything exists in space and time, population is not an exception. This paper examines the influences of time on population growth and space. The study adopts both descriptive and quantitative statics and relied on secondary data source as a major means of data collection. The findings reveal that there is positive relationship between population growth and time and population density varies from area to area within the state. The practical implication of this study is that it provides an answer to whether population varies over time and space. Over the years Ondo state has witnessed increase in population. The implication of this increase in population in relation to space is overpopulation resulting to congestion in areas that are densely populated.

**KEYWORDS:** Population, Population density, Time, Space and Ondo States.

### INTRODUCTION

Population is the totality of persons in a place or area. It is dynamic by nature i.e. it either increases or decreases over a period of time as the case may be and has become an important research issue. This is so because population in terms of structure and dynamics has implications for change and development in every society. Nigeria is going through a demographic transition (declining death rates and high birth rates). With a rapid annual population growth of **2.8%** the population explosion that has been experienced in the last two decades in Nigeria cannot be compared with what it used to be.

In geography, where spatial and temporal distribution of issues and phenomena are of interest, population increase with reference to time could be seen as a factor of spatial differences. Everyone is aware of space and place and of changes overtime and since everything exists in space and time, therefore population is not an exception. Recent research, however, has pointed out that it is not sufficient to take into account simply the growth in population, as demographic effects are significantly more complex. Over the past 20 years, Nigeria has seen a rapid an annual population growth of 2.8% vis-à-vis with population figures unevenly distributed across the nation (UNFPA 1996). This population explosion is dynamic and seems so intractable.

The rapid growth of Ondo state as a result of mass exodus of people and increase in birth rate after the colonial era has continued to attract the attention of individual and government. The state which was under western region before its creation in 1976 then has now blossomed into full-fledge state with eighteen local governments' area and one state capital. Hence the state has since growth both spatially and demographically and is characterized by continuous change in population structure and distribution.

Matching population growth with development is the real object of global and country action towards improved welfare and human development and economic growth. The puzzling phenomenal difference in levels of welfare and development among the populations of countries are largely explained by the divergence in the nature and magnitude of the dynamics of

populations (Ogujiuba, 2006). The changing patterns in the size, structure and distribution of population provide useful leads into the persistent shifts in the choice of approaches for managing development. Among the causal factors that indicate the pattern of population growth is the pattern of change in population density.

Population density plays a vital role in explaining the land mass occupied by group of persons. As population increases, so does population density. Louis Wirth, (1938) holds that as population density increases, stress on the human will also increase. Manifestations of this could be overstretched of social amenities compared to less dense areas. However, most planners argue that increased population density is good because "there are economies of density in the production of certain services. This study seeks to analyze the growth trends of population in Ondo State over a period of forty years (1970-2010) and characterize population densities in the study area, to determining the relevance of the characteristics on development. The study achieves its objectives using population growth and its densities to test for the following hypotheses:

- (i) There is no significant relationship between population growth and time.
- (ii) There are no significance differences amidst population densities from area to area.

## **THEORETICAL FRAMEWORK AND RELEVANT LITERATURE**

### **THE SCOPE OF POPULATION DYNAMICS**

In analyzing the dynamics of population growth, three aspect of population growth are important. These are the size of a population; its growth rate, and its distribution. The relationship between population size, its growth rate and distribution is the subject to which optimum population theory has been addressed (Samuelson, 1975). The question of whether a given population is larger is very difficult to answer in any concrete situation. Thus, a population may be in a stage of sharply diminishing returns, whereas after a generation a population of the same size might be of optimum or even sub-optimum size. Therefore the size of population depends upon the availability of other factors.

This brings us to the second factor that may be considered in analyzing the dynamism of population. The significant feature of population growth as such is that a higher rate of population growth implies a higher level of resources development. The relationship between population growth and resources has served as one of the principal underpinnings for the theory of stagnation that was popular in the 1930s (Galor, 2004). Here the point was made that economic stagnation is caused by inadequate level of new development, and that new development is sometimes deficient in part because of the slow growth of population

The third factor, in an analysis of dynamics of population growth, is the distribution of population in term of its age and sex, which turns out to be strongly influenced by the same elements that determine the rate of population growth. If one deals with a closed population (namely, one in which gains or losses by migration are negligible), the principal determinant of the distribution is the course of fertility. Persistent high levels of fertility give a broad -based distribution that tapers rapidly with age; persistent low levels of fertility give a narrow - based age distribution. If fertility is low enough, even irregularities such as gaps and humps in an age distribution are usually the result of variations in fertility.

The three demographic factors identified as basic in an analysis of the dynamism of population i.e. size, rate of population growth, and distribution effects are never independent. A continuation of a more rapid population growth inevitably produces, in a closed population, larger numbers. A slower rate of population growth brought by a reduction in birth rate inevitably has age - distribution effects.

### **DEMOGRAPHIC TRANSITION**

It has long been realized that population growth varies over space. Therefore, Ondo State is not an exception. All demographic transition models emphasized the synchronization of respective mortality and fertility patterns. Placing mortality decline as a pre-condition for fertility decline formed the cornerstone of the theory. The experience of some African countries also shows that fertility can decline independently of the degree of socio-economic development (Kirk, 1996).

According to the theory of demographic transition (ECA 2001 and Cowgil 2002), the shift towards low mortality and fertility rates occurs when there is a process of overall modernization resulting from industrialization, urbanization, education, as well as substantial overall socio-economic development. Such a shift leads initially to a drop in mortality through progress in hygiene and medicine and, subsequently, to a decline in fertility occasioned by economic growth.

Although the theory has experienced a great deal of critical analysis, it remains a useful framework for discussing the dynamics of fertility and mortality changes and population changes in general. The theory is silent on the role of migration even though the experience of Europe has demonstrated that external migration provided a relief for internal population pressure. Europe, which experienced remarkable population growth in the nineteenth century, had the historic possibility of spilling over its surplus population through migration and transfer to the colonies. Currently, however, with so many restrictions on international migration, the opportunity of spilling over its surplus population to other regions through migration is not available to Africa.

Available data show that Nigeria has started the demographic transition. A major issue, however, is whether the decline in fertility is real or due to problems with the data. While some evidence suggests that there has been an underestimation of births, data on other proximate determinants of fertility appear to be inconclusive. Economic difficulties in maintaining large families as a result of the economic crisis is forcing people to change traditional beliefs in large family sizes and the traditional system of African extended family that had hitherto led to high fertility rates.

At the same time, the desire for child bearing is still strong in Nigeria particularly in the rural areas. This has given rise to the strong view that the levels of fertility and contraception use are not likely to change until there is a drop in desired family size and until the idea of reproductive choice is widely accepted. Rapid population growth has had many adverse effects on the economy. Nigeria has some of the fastest rates of urbanization in Africa mainly as a result of natural population increase and rural-urban migration. Poverty and unemployment have increased. An estimated 28.9 per cent of the population lived on less than \$1 a day between 1981 and 1995 while the unemployment rate is estimated to have averaged 2.8 per cent in 1996 (World Bank, 1997). Excessive pressure on social services, rapid increase in imports of food and consumer goods and the emerging phenomenon of street children are some of the other impacts of rapid population growth in Nigeria.

#### POPULATION SITUATION IN NIGERIA

The rapid increase in Nigeria population is attributed mainly to fertility, mortality and migration. Recently there has been increase in birth rate while the mortality rate has reduced. The total fertility rate (TFR), the average number of children a woman is expected to bear during her lifetime was 7.2 in 1990. Survey shows that only 7.6% of Nigerians reported using any contraceptives, modern or traditional. Only 45.7% of married women of reproductive age reported ever knowing of contraceptive method. Currently 15% of married women use any type of contraceptives, while 7% use modern method. (Afolayan 1999)

Due to improved standard of living and public health the trend of events indicates that mortality is declining. This is particularly true of infant mortality. In 1960s the crude death rate (CDR) was about 27 deaths per 1000 population, this has declined to about 14 deaths per 1000 at present. Infant mortality has dropped from 187 in the 1960s to about 65 deaths per 1000 live births by 2006. Life expectancy has increased from 37 years to 52 years within the same period. (NPC 2006) In terms of population density, there are about 136 people per square kilometer on the average while 36.3% live in urban area and the remaining 63.7% live in rural area.

Given the above conditions there is every indication that Nigeria has a high rate of population growth. The rate of growth of population increased from 2.5% in the period between 1965-1980 to 3.3% between the periods 1981 to 1988. At present the growth rate is about 2.8%. (National Population Commission)

The existence of towns of moderate size in Nigeria predates the coming of the colonialist into Nigeria. (Mabogunje 1968 and Adepaju 1983) Adepaju however assert that Nigeria has experienced centuries of urban experience but many factors (political, economic and ecological) have transformed the early growth pattern to contemporary urban development. Though the rate of urbanization is more in less developed countries, it is occurring at faster rate in Nigeria than anticipated (Fadamiro, Babadoye and Adelowo 2005). Generally urbanization in Nigeria can be classified historically into pre-colonial, colonial and post-colonial periods. Some towns existed before the tenth centuries such as Kano, Zaria, Ondo and Ile-Ife. They grew rapidly either as a result of their location along the major trade routes.

Some towns adjust themselves to the physical settings. It may be said that the settlement pattern of most parents' towns in Ondo is closely associated with relief features which provided suitable means of refuge during emergencies. Smiles (1965) describes the geographical context of towns in terms of location, site and situation. The site is a function of physical features that have favoured the sitting of towns. These features remain the basin and a dominant figure in the setting of towns in Ondo which is the basic origin of the growth of urban characteristics (Adedibu, Adindu and Ogbonna, 1998).

**METHODOLOGY**

The study adopts descriptive analysis and relied on secondary data source. Secondary data include population density of Ondo state, actual and projected population figure of Ondo state was used in order to appreciate the rate of population growth with time in the study area. This was gotten from publications and National Population Commission (NPC) Akure. Correlation analysis was employed to test the relationship between population growth, time and space. In addition, time series analysis was also employed in order to know the relationship between population and time.

**RESULTS**

**RELATIONSHIP BETWEEN POPULATION GROWTH AND TIME**

The population estimates used was the ones gotten from National Population Commission and Demographic and Vital Statistics Department Ministry of Economic Planning and Budget, Akure Ondo State. From the estimates on Table 1, the population of Ondo state which was 903,309 in 1970 increased to 987,199 in 1980. It further increased to 2,249,548 in 1991 as a result of consequent influx of people to the city. The population increased rapidly to 3,460,877 in 2006 and by year 2015, it is projected to reach about four million if the current growth rate of 3.0 per annum is maintained.

*Table 1: Actual and Projected Population of Ondo State: 1970 -2015*

	Male	Female	Total
1970 (projected)	475,558	427,751	903,309
1975 (projected)	499,633	454,774	954,407
1980 (projected)	517,749	467,550	987,199
1985 (projected)	610,254	543,877	1,154,131
1991 (census)	1,121,898	1,127,650	2,249,548
1995 (projected)	1,132,953	1,332,887	2,465,840
2000 (projected)	1,527,812	1,310,405	2,838,217
2005 (projected)	1,660,563	1,572,218	3,232,781
2006 (census)	1,745,057	1,715,820	3,460,877
2010 (projected)	1,962,302	1,933,065	3,895,367
2015 (projected)	2,323,756	2,193,271	4,517,027

Source: National Population Commission 2013

For further analysis of the above observation, time series analysis was created to analyze the trends of population growth in Ondo state over the period of forty years (1970-2010)

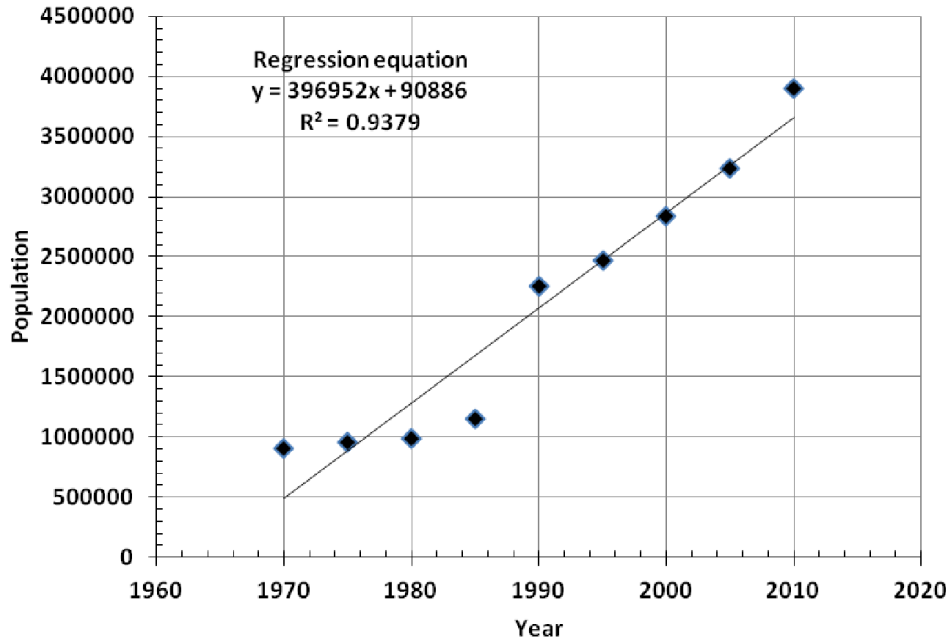


Figure 1: Scatter Diagram and the Best-Fit Regression Line for the Population of Ondo State with Year.

With reference to Figure 1, population has significantly increased with year. The prediction model ( $y = 396952x + 90886$ ) explains about 94% of the relationship between population and time, and therefore reliable. Population increase was however slow between 1970 and 1985, it however became spontaneous from 1990, and has been rapid thereafter.

**Hypothesis i:**

In addition a null and alternate hypothesis ( $H_0$  &  $H_1$ ) was stated:

$H_0$ : there is no significant relationship between population growth and time.

$H_1$ : there is significant relationship between population growth and time.

Pearson correlation method of analysis was adopted to determine the type of relationship that exist between the two variables i.e. population growth and time. Time (Year) was used as a parameter to measure population growth. Time (Year) is the dependent variable while population growth is the independent

Table 2: Hypothesis Result

		year	pop
year	Pearson Correlation	1	.968**
	Sig. (2-tailed)		.000
	N	9	9
pop	Pearson Correlation	.968**	1
	Sig. (2-tailed)	.000	
	N	9	9

\*\* Correlation is significant at the 0.01 level (2-tailed).

Sources: Author's compilation 2013.

A Pearson correlation value of 0.968 was obtained at an approximate significance level of 0.01. The Pearson correlation value of 0.968 signifies a direct relationship. A comparison of the significance level of 0.968 with the standard value in social science research (i.e. 0.050 suggests that this relationship is significant. From the foregoing,  $H_1$  is accepted and  $H_0$  rejected. Hence, there is significant relationship between population growth and time.

**RELATIONSHIP BETWEEN POPULATION GROWTH AND SPACE**

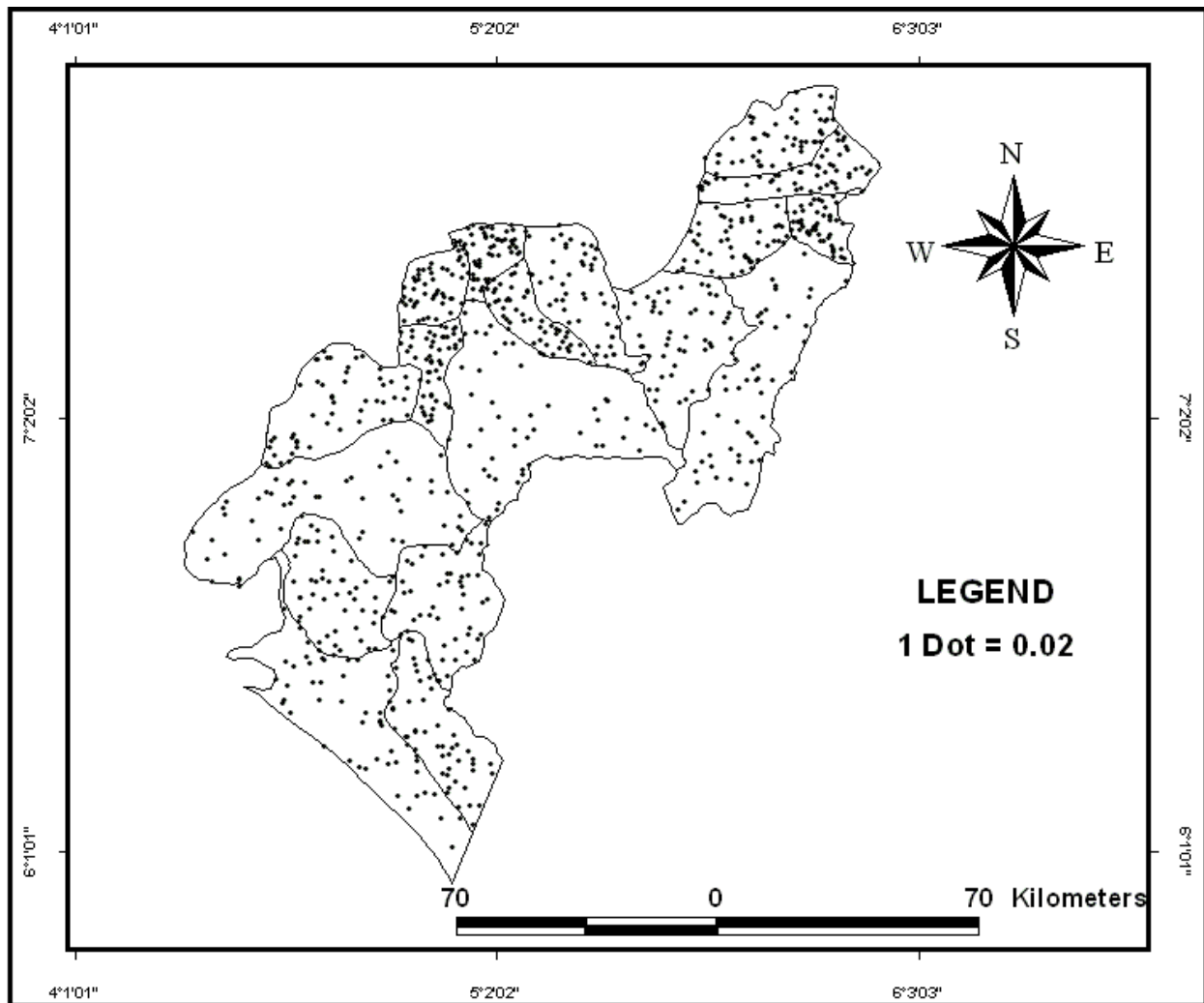
Table 3 shows Ondo state area and population density by local government based on 2006 population census. Between the year 1976 when the state was created and 2006, the state has witnessed a rise in population growth and this has also been reflected in the total land area of each local government and the population density. This may be attributed to the changes that took place in the socio-political life of the state.

**Table 3 ONDO STATE AREA AND POPULATION DENSITY BY LOCAL GOVERNMENT AREA BASED ON 2006 POPULATION CENSUS**

S/N	LOCAL GOVERNEMENT AREA	2006 POPULATION CENSUS			AREA (SQ KM)	% OF TOTAL AREA	POPULATION DENSITY PER SQ KM
		M	F	T			
1	AKOKO NORTH EAST	92456	86636	179092	398.8	5.17	449.08
2	AKOKO NORTH WEST	107076	104791	211867	489.6	6.42	432.74
3	AKOKO SOUTH EAST	42175	40268	82443	462.0	2.38	178.45
4	AKOKO SOUTH WEST	114733	113650	228383	340.1	6.68	671.52
5	AKURE NORTH	66526	64239	130765	676.7	3.73	193.44
6	AKURE SOUTH	178672	181596	360268	318.0	10.41	1132.92
7	ESE ODO	79812	78444	158256	1,406.8	4.57	112.49
8	IDANRE	67531	62264	129795	1,543.4	3.75	84.10
9	IFEDORE	89574	86798	176372	583.0	5.10	302.62
10	ILAJE	146859	142979	289838	708.3	8.37	409.31
11	ILE-OLUJI OKEIGBO	87104	84772	171876	824.1	4.97	208.06
12	IRELE	72861	71275	144136	939.6	4.16	153.40
13	ODIGBO	116299	115988	232287	1,710.0	6.71	135.80
14	OKITIPUPA	117594	116544	234138	650.0	6.77	360.21
15	ONDO EAST	38851	37241	76092	360.0	2.20	211.37
16	ONDO WEST	141759	147109	288868	950.8	8.35	303.82
17	OSE	73119	71020	144139	1,44.3.8	4.16	99.83
18	OWO	112056	110206	222262	993.8	6.42	223.65
	<b>TOTAL</b>	<b>1745057</b>	<b>1715820</b>	<b>3460877</b>	<b>14,798.8</b>	<b>100</b>	<b>233.86</b>

Source:-National Population Commission, 2006

As can be seen from the Table above, there is a kind of relationship between population figure of each local government, aerial size and population density. For example the total population of Akure South was 360,268 persons with land area coverage of 318Km<sup>2</sup> and population density of 1132.92 persons per square kilometer. This local government i.e Akure South has the highest population density probably because is the state capital. Some local government has land area that is more than Akure south but their population density is less than that of Akure South. Odigbo, Idanre, Ese-Odo and Ilaje local government area falls in this category.



*Figure 2: Dot map showing population densities of Ondo state.*

Usually population densities tends to varies amidst the local government area as mentioned in the study Figure 2 some area are densely populated, some are moderately populated while other are sparsely populated. This could be as a result of environmental factors as the case of Idanre and Ose which are sparsely populated. Those that are densely populated could be as a result of economic and social advantage over others

#### **Hypothesis ii**

Furthermore, analysis of differences amidst population densities from area to area was carried out. A null and alternate hypothesis ( $H_0$  &  $H_1$ ) was stated thus:

**$H_0$ :** there are no significance differences amidst population densities from area to area.

**$H_1$ :** there are significance differences amidst population densities from area to area

T-test method of analysis was adopted to determine if there are differences amidst population density from area to area.

TABLE 4: HYPOTHESIS RESULT One-Sample Test

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Density	5.243	17	.000	314.60056	187.9917	441.2094

Source: Author's Compilation, 2013.

From table 4, T-test value of 5.243 was obtained at significance level of 0.000. (i.e. T =5.243, P =0.000) From the foregoing, H<sub>1</sub> is accepted and H<sub>0</sub> rejected. Hence there are significance differences amidst population densities from area to area

**CONCLUSION**

This study focused on the Spatio-temporal factors and dynamic of population growth in Ondo state. The study employed secondary data. The results of the research are revealing and point to the fact that Ondo state population has not only increase over the years, but has increased very rapidly which are attributed to both natural increase and rapid in-migration which is the characteristic of the state within the study period (1970-2010)

In addition the findings reveal that there is positive relationship between population growth and time and population density varies from area to area within the state. The practical implication of this study is that it provides an answer to whether population varies over time and space. Over the years Ondo state has witnessed increase in population. The implication of this increase in population in relation to space is overpopulation resulting to congestion (fig. 2) in areas that are densely populated.

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