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The Fast Changing Phase of Land Titling and Registration Using GIS Application and Its Benefits in Nasarawa State, Nigeria

Surv. Nathaniel Ibrahim
Assistant Chief Instructor, Department of Urban and Regional Planning, Nasarawa State Polytechnic, Lafia, Nigeria
Affan, Sule Eyigulu
Senior Lecturer, Department of Urban and Regional Planning, Nasarawa State Polytechnic, Lafia, Nigeria
Ebuga Emmanuel Attah
Lecturer, Department of Estate Management, Nasarawa State Polytechnic, Lafia, Nigeria

Abstract:
Federation of International Surveyors defined land administration as the process of determining, recording and disseminating information on ownership, value and use of land. Effective and efficient land titling registrations depend on the availability of a good and viable land information system. The need to have a reliable and strong information base is more important in developing and emerging state like Nasarawa as the absence of proper land records creates difficulties in the real estate market. This paper focuses on the process of land titling and registration existing in the state and advocates the need for continuous computerization process through the state established information system (NAGIS). The importance and benefits in fast changing phase of land titling and registration using GIS application are also discussed. Data used for this study were obtained from the State Ministry of Lands and Urban Development and also secondary sources. The paper concludes by recommending the continuous computerization to replace the manual process which will create land market for strong revenue generation and enhance accessibility to credit facilities by individual in the state. GIS application has helped in the creation of a strong land data base where information related to land are analyzed and distributed at ease as against the manual process.

Keywords: *Land Registration, Land Administration, GIS, NAGIS, Computerization.*

1. Introduction

Land is the ultimate resource for without it life on earth cannot be sustained. Land is both a physical commodity and an economic good that has value. Good stewardship of the land is important for present and future generations. It is often referred to as one of the most important factors of production in economics and over time has proven to be a serious source of revenue for governments in both developing and developed economies in the world. Access and use of land for agriculture, habitation, wealth creation, employment and recreation is the basis of civilization. Land management is the process by which the resources of land are put into good effect (UNECE 1996). Land administration encompasses all activities associated with the management of land in terms of recording of existing land tenure arrangements and also natural resources that are required to achieve sustainable development (Enemark, 2004). Therefore, there is need for effective management of the relationship. This duty could only be succeeded by effective land administration system through land titling and registration in Nasarawa State. NAGIS in this context, having appropriate land administration system is seen as a modern tool in sustaining and achieving proper land titling and registration. Since land resource is seen as a valuable asset to any society, there is a growing need for a better means of securing land rights. Government through NAGIS have to reposition the land and make it attractive and viable. Access to land and other natural resources are essential basis for livelihood of all people around the state. The accessibility to land and other natural resources must be stable and secured if it is to provide an opportunity for economic growth and the incentive to invest (Sida, 2008). Land resources are used for a variety of purposes which may include organic agriculture, reforestation, Water Resource Management and eco-tourism project. Government generate revenue on land, from titling fees, ground rent and tenement rates among others. For that reason, a formal and modern system is necessary to register land and property and hence, to provide secure ownership in land, investments and other private and public rights. A system for recording land ownership, land values, land use and other land related data is an indispensable tool for a marketable economy to work properly as well as for sustainable management of land.

It is imperative to know that, the advancement in digital and satellite technology have revolutionized data collection, processing, dissemination and display of mapping and other purposes (Atilola, 1998). This paper is aim at discussing the manual system of land

titling, registration and disposition and also making contrast with new tool of GIS application in land management in the state. The paper further makes appropriate recommendations for improvement in enhancing the sustainability of the system.

2. The Study Area

Located in the central region of Nigeria, Nasarawa State was created out of Plateau state on October 1st 1996 with its headquarters at Lafia. The State lies between latitude 7^0 45' and 9^0 25'N of the equator and between 7^0 and 9^0 37'E of the Greenwich meridian and it covers a land mass of 27,862km2 with a population of 1,863,275 people according to 2006 provisional census spread in the thirteen (13) local government areas of the state namely Akwanga, Awe, Doma, Karu, Keffi, Kokona, Lafia, Nassarawa Eggon, Nassarawa, Obi, Toto and Wamba. The state shares boundary with Kaduna state in the North, Plateau state in the East, Taraba and Benue states in the south and Federal Capital Territory and Kogi state in the west.

The state is highly prospective for growth and development considering its strategic location and proximity to Abuja, the Federal Capital Territory of Nigeria and enormous land resources, abundant tourism potentials, abundant solid mineral deposits, predominant tropical climate, rich agricultural potentials. This paper therefore aims at ascertaining the fast-changing phase of land titling and registration using GIS application and some of the benefits attached to this application system. See figure 1 below for map of Nasarawa state.

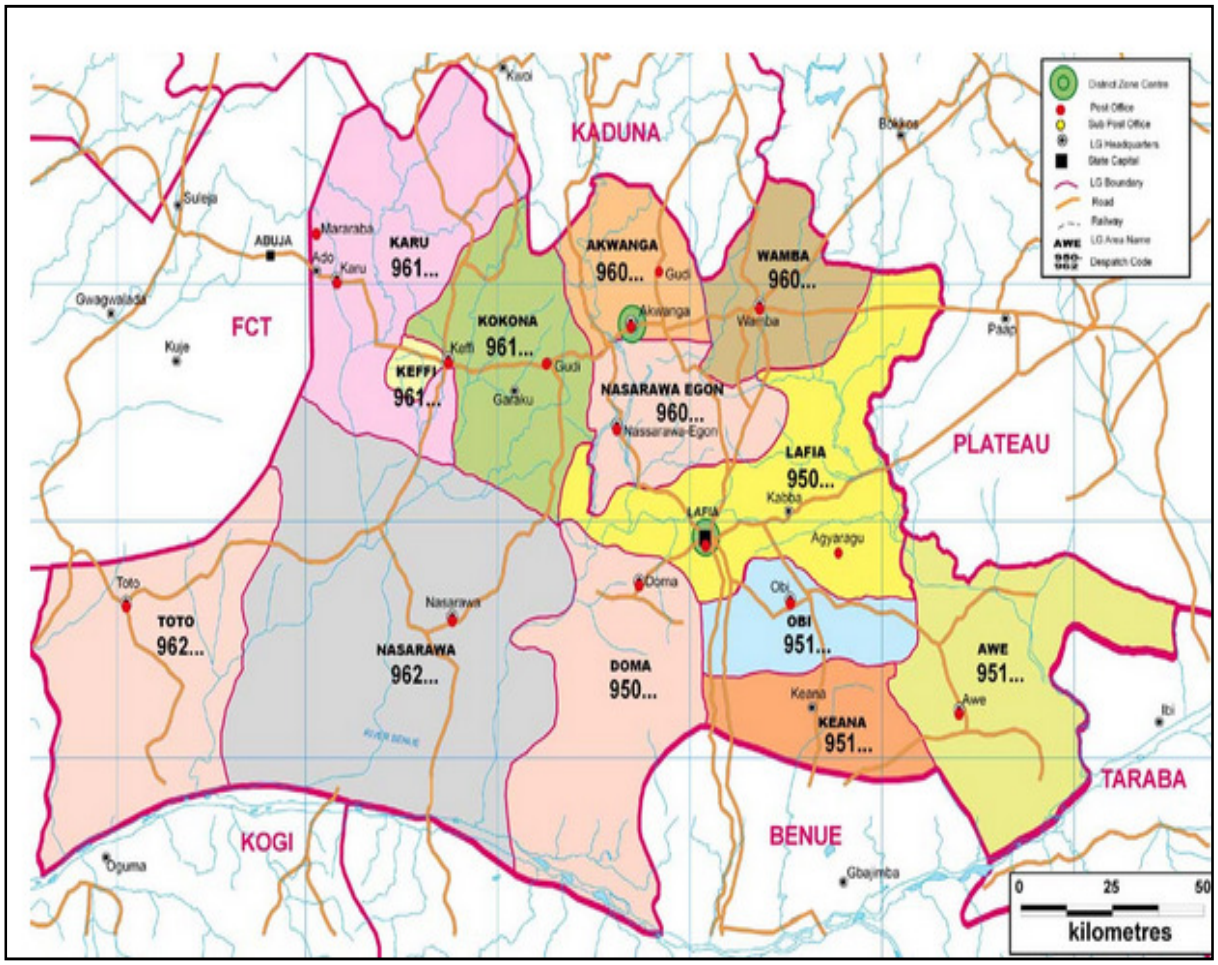

Figure 1: Map of Nasarawa State Showing Local Government Areas
Source: https://www.google.com/search=map

3. Conceptual Framework

3.1. Land Titling and Registration

Land Registration plays a vital role in the society provided they function efficiently and effectively. Three principal systems of land registration which deals with recording of right to ownership of land exist in Nigeria. These include; private conveyance, registration of titles and registration of deeds.

Title describes the land in terms of location or boundary with reference to bearing and distance, survey description, metres and bound description, public land survey system reference and plot number in plated subdivision coordinates.

Secondly, methods of conveyance with reference to warranty deeds and quit claim.

Deed is an instrument which entails registration of land transactions with a public authority (Register of Deeds).
Nuhu, (2009) asserts that the global interest and process in system of registration of title should take into consideration security, simplicity, accuracy, cheapness, expenditure and suitability to proper titling and registration.
Modern methods, however involves the use of GIS tools for land registration, data storage, information management, quick and easy data access, in addition to retrieval of land data and updated information.

3.2. Registration of System in Nigeria

Land Registration Act No. 36 of 1924 is the law regulating registration of instrument in Nigeria which is enacted for the whole country adopted and re-enacted in some states under different names. The Land Registration Act of 1924 defined an instrument as a document affecting land whereby one party called the grantor confers, transfers, limits, charge or extinguishes in favour of another party called the grantee any right or title to the interest in land. The law prescribes registration of any instrument executed before or after the commencement of the law. To facilitate land registration, the law established in every state a land registry under a land registrar charge with the responsibilities of registering instruments affecting land in the state and to keep records of the registration.

3.3. Registration Process in Nasarawa State

The Land Use Act of 1978 does not clearly state the processes or procedures of land registration in Nigeria. However, the registration in Nasarawa state before the establishment of NAGIS is characterized by ordinary file system, information card system and manual procedures which are normally accompanied by some challenges. Among these challenges are:

(1) Slow, tasking and time consuming
(2) Lack of openness and trust in land administration process
(3) Encroachment into right of ways
(4) Paper based records which is susceptible to termites, wear and tear due to constant handling
(5) There was no comprehensive data base with regard to land ownership and land uses in the state
(6) Data related to revenues generation and land uses was not comprehensive for reference making
(7) With the manual process, revenue tracking was cumbersome and prone to all sorts of errors of commission and omission.
(8) Constant and continuous disputes on land and related transactions.
(9) The process only gave rise to minimal revenue going to government coffer
(10) Payments of compensation to landowners were not logically determined, processed and implemented.
(11) There was no database for disputes resolution, disaster management and loss assessment in times of natural disasters like erosion, floods etc.

The above challenges have directly or indirectly affected the revenue base due for government resulting from a shortfall and unguided expenditures. However modern methods involve the computerization of the whole process of land registration through the establishment of NAGIS and the use of Geographic Information System (GIS) as a modern tool in land administration process. The process has eased and helped to enhance the process of registration and defined details, measurements and design efficiency. The use of this GIS application in land titling and registration in Nasarawa state is the focus of this paper.

3.4. Geographic Information System (GIS)

According to (Burrough, 1986: p 132) GIS is defined as a powerful computer system with in-built data base management component. Thus, GIS is a powerful set of tools for collecting, storing, retrieving at will, transformation and displaying spatial data from the real world for a particular set of purposes. Or a data base system in which most of the data are spatially indexed, and upon which set of procedures operated in order to answer questions about spatial entities in the database (Smith, Menon and Este, 1987).
GIS is a computer system for capturing, storing, checking, manipulating, analyzing and displaying data which are spatially referenced to the earth (DoE 1987: p 132).
GIS is also seen as any manual or computer based set of procedures used to store and manipulates geographically referenced data (Aronoff 1989: p 3).
GIS has something more than a computer system. It is a decision support system which involve the integration of spatially referenced data in problems solving environment or over “an institutional entity” that “integrates technology with database expertise” (Carter, 1989). Keeping in view of the present capabilities of GIS and whole role it plays, we can define GIS as an information system used to store, organise, retrieve, analyze, output and update geo-referenced (or spatially referenced) data, in order to support decision making for planning and management of activities like natural resources and environmental management, transportation and telecommunications utilities, commercial and business affairs, defence service and various administrative management.

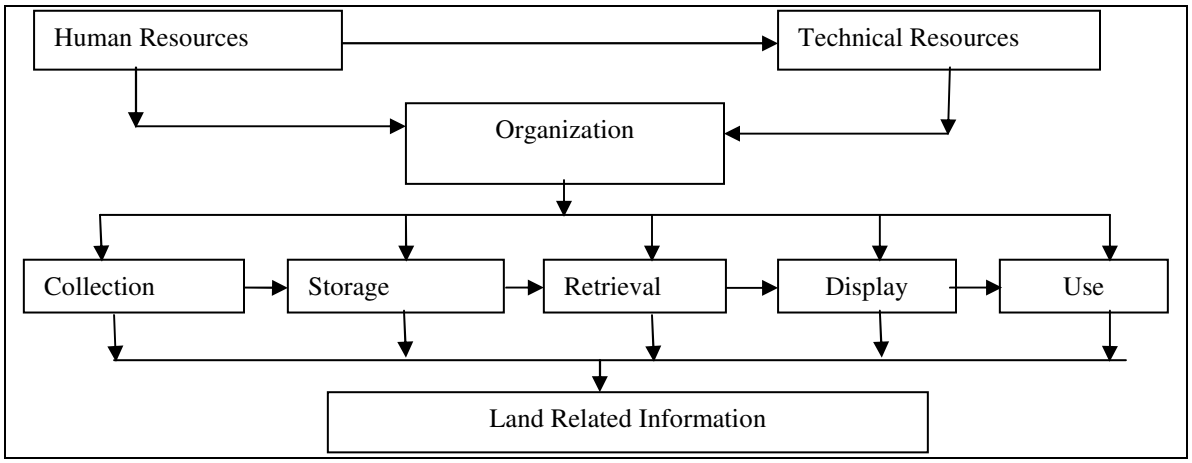

Figure 2: Showing Concept of GIS Application
Source: (Obansa, 2007)

3.5. Benefits of GIS to Land Titling and Registartion

According to Obansa, (2007) cited in Nuhu and Tunde (2012) asserts that with the emergence of this GIS tool, data collection, retrieval, security and data sharing has been simplified and made easier. It has also helps in checking the activities of quacks and criminals in land titling and registration. Insufficient information and fake documents can easily be checked. Obansa (2007) further identified some of these benefits to include:

i. To enhance good and transparent process of registration
ii. Speed up the process
iii. Decreases the cost of and space of storing information
iv. Prevent unnecessary duplication
v. Reduction in data redundancy and improvement of response time, thus development is within the budget
vi. Greater efficiency and economies of scale
vii. Improvement in the management of resources
viii. Work process are automated and streamlined
ix. More clear visualization and establishment of relationship between professional in the environmental cycle
x. More reliable analysis of trends and documentation
xi. Bring about sustainable land reform
xii. Reduce cost in land administration process.
xiii. Drastic reduction of disputes in land transactions.

4. Methodology of the Study

The data used in this study were primarily generated from Nasarawa State Ministry of Lands and Urban Development. The data covers the period of land titling and registration in some selected Local Government Areas in the state namely Akwanga, Karu, Keffi and Lafia and also the revenues generated between the periods 2006 – 2015 under study. Other secondary sources are websites, journals, textbooks and unpublished materials. Data organisation, analysis and presentation were made with the use of table, graphs and a T- test statistical method.

4.1. Data Presentation, Discussions and Findings

Datacollected from Ministry of Lands and Urban Development consist of sample data from four (4) Local Government Areas (Akwanga, Karu, Keffi, and Lafia) showing number of titles given out and the annual revenue generated within the span of ten (10) years signifying five (5) years period of manual processing of titles between the year 2006 to 2010 and the digital method between the 2011 to 2015 which is the year NAGIS started operation. The five years' difference between the analogue and digital was adopted for easy statistical analysis. Also, T- Student test was used to study the mean variation (Omotoyo, 1992).

Year	Titles given in Akwanga	Titles given in Karu	Titles given in Keffi	Titles given in Lafia	Annual Revenue Generation (₦)	Annual Title of Four LGAs
2006	47	490	57	41	36,947,612.00	635
2007	16	267	17	69	39,640,500.00	369
2008	16	384	29	116	47,045,410.51	545
2009	1	59	7	18	48,236,430.16	85
2010	0	21	2	7	47,916,620.19	30
2011	4	22	4	5	20,368,021.61	35
2012	8	382	66	130	317,426,306.60	586
2013	10	375	38	61	448,020,842.70	484
2014	3	458	40	92	608,689,414.30	593
2015	5	249	26	98	534,238,852.30	379

Table 1: Showing title and annual revenue generated from 2006-2015.
Source: Nasarawa State Ministry of Lands and Urban Development, 2016

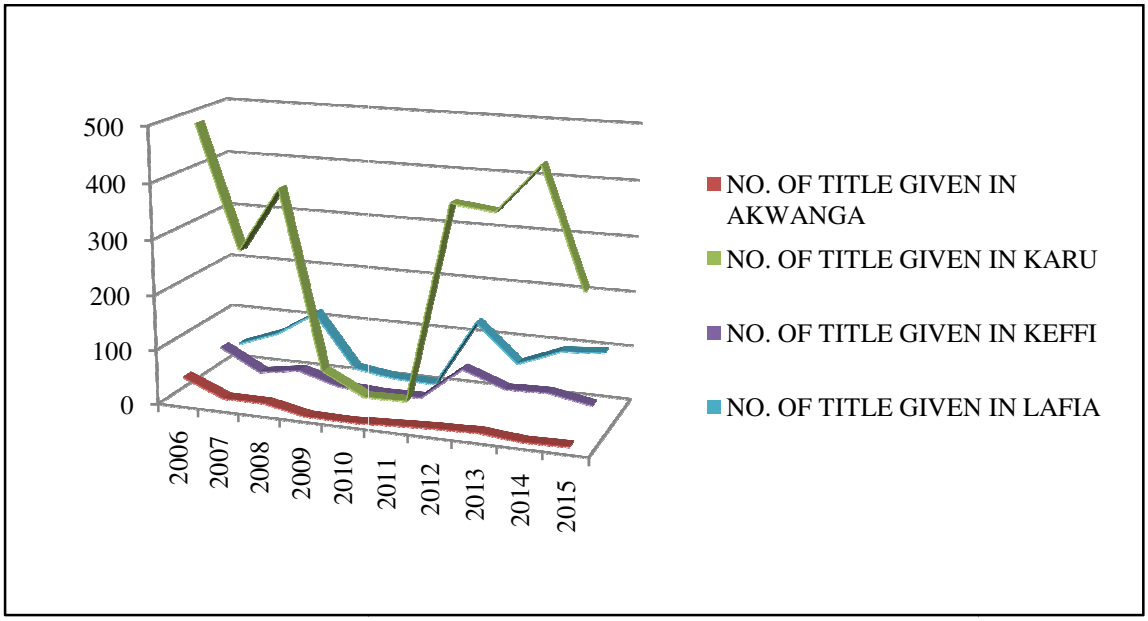

Figure 3: A line graph of LGAs showing titles produced annually

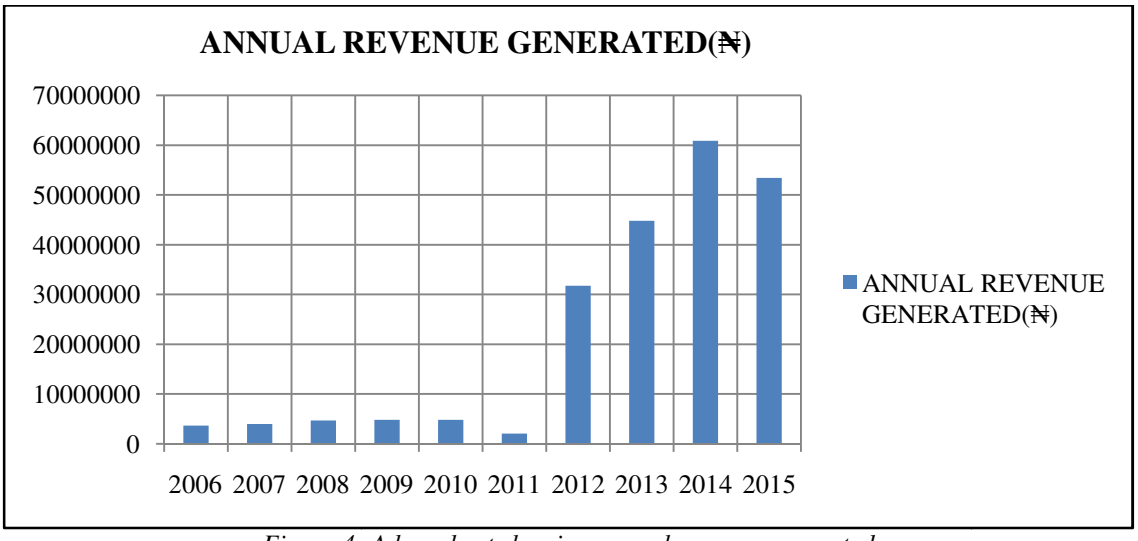

Figure 4: A bar chart showing annual revenue generated

From figure one above shows that Karu has the highest production of titles, next to Karu is Lafia. However, between 2009 and 2011 all the local government experience low production of titles as shown in the graph.

Similarly, between 2007 and 2010, there were high profit in annual revenue; this is due to change in ground rent increase within the state, from three naira per metre square to thirty naira per metre square.

4.2. Assumptions

- Collected data of two independent sample
- Normal distributed population of each is drawn

4.3. Hypothesis

This is to know whether there is difference in land titling between the involvements of NAGIS and the analogue land titling data collected, where the two means are $\dot{m}_1$ and $\dot{m}_2$.

H_o: $\dot{m}_1 = \dot{m}_2$ (Null hypothesis)

H_a: $\dot{m}_1 \neq \dot{m}_2$ (Alternative hypothesis)

ANALOGUE YEARS	X1	X1-ṁ	(X1-ṁ) ^2	NAGIS YEARS	X2	X2-ṁ	(X2-ṁ) ^2	
2006	635	302.2	91324.84	2011	35	-380.2	144552.04	
2007	369	36.2	1310.44	2012	586	170.8	29172.64	
2008	545	212.2	45028.84	2013	484	68.8	4733.44	
2009	85	-247.8	61404.84	2014	593	177.8	31612.84	
2010	30	-302.8	91687.84	2015	378	-37.2	1383.84	
MEAN	332.8				415.2			
SUM(X1-ṁ)^2			290756.8				211454.8	
S'			58151.36				42290.96	
S			241.1459309				205.6476598	standard deviation

Table 2: T – Students distribution test

By using:

$$t = \frac{\dot{m}_1 - \dot{m}_2}{\sqrt{(S^2)} + \sqrt{(S^2)}}$$

$$= \frac{332.8 - 415.2}{\sqrt{\frac{290756.8}{5} + \frac{211454.8}{5}}}$$

$$= \frac{92.4}{219.33}$$

$$= 0.42$$

The degree of freedom = 5+5-2 = 8

This is a two-tail test: This was adopted to know the difference at a 95% confidence level.

't' value at (0.05, 8) = 2.306 from the t- Table.

Therefore 0.42 < 2.306

5. Result

The finding shows that computed t- value is less than the t-table value, which significantly shows that there is no difference. Where 0.42<2.306

When one refers to the line graph in figure 2, showing the same pattern of movement as all the titles seems to coincide between 2010 and 2011 at lower level, signifying the same pattern of growth based on economic situation in the country. Similarly, figure 3 shows economic growth as a result of increase in wages and also stability in land policies by increasing ground rent which makes the revenue to go up between 2012 and 2014. The effect of recession is also affecting the revenue as it shows rapid fall in 2015, the patronage of titling change it course.

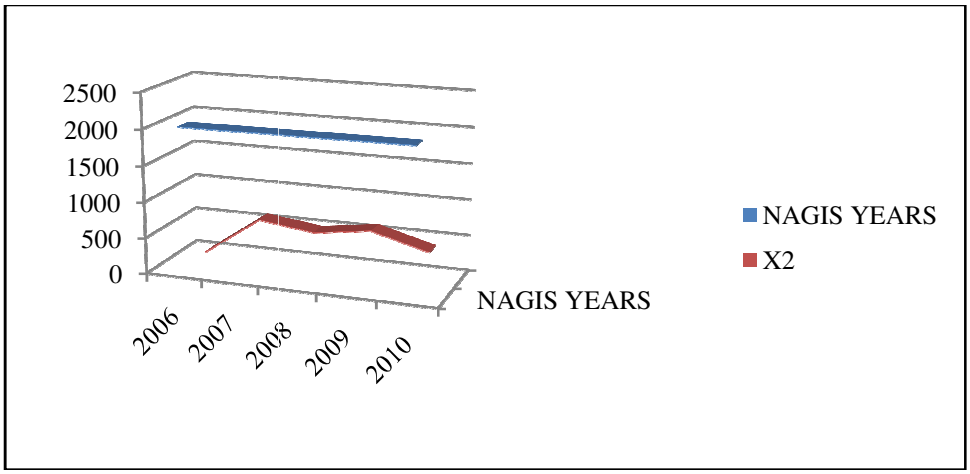

Figure 5: Showing analogue years of titles produced

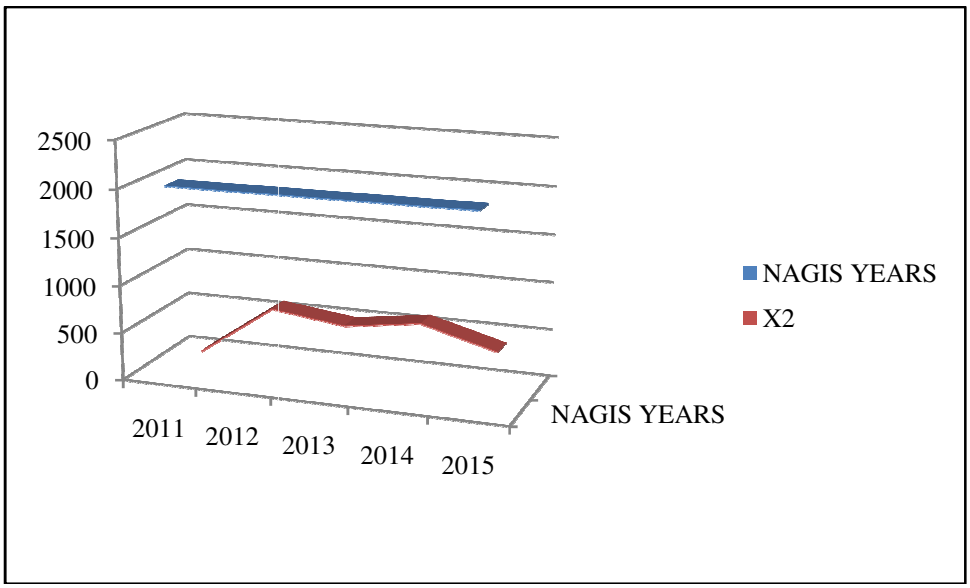

Figure 6: Showing NAGIS years of titles produced

Looking at figure 5 and 6, the graph clearly shows the relationship of no significant difference in the processing of titles except for computerised approach which has ease processing titles. However, the cost implication for establishing NAGIS is higher than analogue method.

6. Conclusion and Recommendation

The paper has exposed both the merits and demerits of manual and digital systems of land registration in Nasarawa state showing revenue generated by the two systems. However, for efficient and effective land management in the state, the paper recommend continues computerization of the process which will create land market for strong revenue generation and enhance accessibility to credit facilities by individual in the state. This can only be achieved by equipping NAGIS as a modern tool in handling land administration process.

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