

## Internet application for online cadastral services : A case study in Nigeria

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### ABSTRACT

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The new innovative of technology by (GIS) Geographic Information System, (LIS) Land Information System and (CIS) Cadastral Information System has been playing a leading role in the development of cadastral and land administration in this study area. The Customary ways and approach to the land titling and registration in the time past has resulted in the delay in the processes of obtaining title to the land. Land administration system in Nigeria includes the processes of land registration, cadastral mapping, land valuation and land inventory. Most of developing nation particularly Nigeria is faced with the problem of poor land administration and management. Technology is paramount in acquiring a proper technological development in land administration. This study tried to encourage land title registration by providing web technologies that are faster and suitable with a low rate and minimum delay. The need to develop a dynamic web for the processes in the land registration arises from the dynamic relationship to the land of the people. The delay in time and process of land registration couple with the exploitation in land related activities has called for the urgent intervention of all the stakeholders in land administration. PHP programming language was used as a server side scripting languages together with MyAdmin SQL, a website was developed for the processes involved in the land registration having examined the fastest way to solve the problem. A robust dynamic database that is reliable and easy to use was also developed which is capable of accommodating several numbers of applicants. The applicants, monitoring agency and the government have the advantage of checking all the processes on line without any contact with the officers working on the certificate.

#### Keywords:

Sporadic, systematic, adjudication, dynamics web, static web

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## 1. Introduction

Web designing is that responsibilities related with creating sites for facilitating the Internet, the method of which comprise of Web content advancement, Web outline, customer side/server-side scripting and system security arrangement, and database innovation. There are fundamental two

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sorts of site generally utilized, the static web and dynamic web. The dynamism of a web is reliant on the utilization of scripting language, in another word, a dynamic web must contain a scripting language associated with the database [1]. This technology, be that as it may, has been utilized by bunches of business undertaking to make a business opportunity for their organizations. Additionally, the innovation has been stretched out to all callings due to the innovation headway in this century. Technology changes as the days and the hours of the clock are moving. Given this, studying geo-informatics likewise have transformed from the period of simple to the advanced age and online conveyance of cadastral administrations and services.

In the study area, the problem during the land registration processes has been a matured long issue exuded from the act of the arrangement and the practice of Land Use Decree of 1978 [3]. Likewise [4], reviewed land information and management with regards to land titling in Nigeria. He distinguished that the issue of land titling and registration emanated from a portion of the arrangement of Land Used Act of 1978. This Decree is a subsequent Act controlling the exercises in land administration and management in Nigeria. According to [4], [5] and [6] put Nigeria as the nation with the highest number of stages, days and the amount expected to get the land registered as show in table 1.

**Table 1**  
 World Bank Report 2009 [3]

S/N	Country	Stages	Days	Cost %
1.	Thailand	2	2	1.1
2.	U.K	2	8	1.4
3.	U.S.A	4	12	0.5
4.	Switzerland	4	16	0.4
5.	China	3	5	6.2
6.	Singapore	3	5	2.8
7.	Japan	6	14	5.0
8.	Georgia	2	3	0.0
9.	Ghana	5	34	1.1
10.	Finland	3	14	4.1
11.	Equatorial Guinea	6	23	6.2
12.	Canada	6	17	1.8
13.	Australia	5	5	4.9
14.	Nigeria	13	82	20.9

Nuhu [7] was of the opinion that it is important to assemble and propose a superior method for registering the little to land to support a legitimate utilization of land, limit the rate at which individuals conflict with land strategies and to upgrade a suitable exchange ashore. With a right land registration, the government can without much of a stretch know for each term, each exchange and formative work to be completed on the land. Additionally, some great strategies should be possible to control the utilization of Land assets, and this will in the long run prompt a solid tenable condition. Akingbade [8] trusted that, the cadastral information ought to be available to manage the land market, for example, home loans, tax collection, and planning processes. The expansion in land used and land activities everywhere throughout the world had made the land management and administration became complicated [2]. In this manner this study aimed at encouraging the land proprietors, the government and the partners in land management and land administration to register the normal endowment of nature in order to convey the market esteem.

Nonetheless, it is fascinating to express that few writings have highlighted the issues and difficulties however no solid exertion have been made towards tending to them. While the verbiage and literary works on title registration is copious, and in addition its proposals, examination of the

written works and past investigations has uncovered a nonattendance of any powerful, extensive and simple to-utilize system that is practical in land registration in the study area.

This situation should be turned around; changes can be inside incited or remotely roused. Change might be a sensational takeoff from what we know; changes can be expected or startling. Change can likewise be a consistent activity, and it is constantly called for when there are ineptitude and incapability in procedures, frameworks and projects. Subsequently, this investigation gone for empowering land title registration by giving web innovations that are quicker and appropriate with a low rate and least deferral. In every one of these cases, the basic idea of progress is a transit from the present state to a development state to a future state. It is, subsequently, important to define and propose a superior method for registering the title to land to support a decent utilization of land, diminish the rate at which individuals' conflict with land property approaches and to upgrade an outstanding exchange ashore.

## 2. Material and Method

Programming Language; PHP= PhP Hypertext Processor  
Style Sheet; CSS3=Cascading template  
Page Structural Language; HTML 5.0=Hyper Text Markup Language  
HTTP Server; Localhost/babalola.php  
SQL Server; PhP My Admin My SQL  
64 bit Operating System; Microsoft Window 8  
Dell Ram 2GB Laptop  
Hp laserjet M1530 MFP Series PCL6 Printer

### 2.1 Static and Dynamic Web Created

A Static web is the least complex site one can create; it is composed in Hypertext Markup Language (HTML) and Cascading Style sheet (CSS) just, with no programming language. The single type of connection on this sort of site is through hyperlinks. It can be created effectively than dynamic sites since they required less coding and clear procedural information, however they are extremely unusual nowadays.

A dynamic web is a website that uses HTML, CSS, and scripting language too. It is an intuitive web that can have the capacity to disperse HTML code among the pages. In spite of the fact that it is not an all-out web application like Facebook or Google, it has intuitive components, for instance, contact shapes, seek boxes and furthermore shares a similar HTML code for the header, menu, and sidebar on every one of the pages of the webpage. The two sorts of intuitiveness on a dynamic site are front-end scripting (customer side) and back-end scripting (server-side).

A composed site scripts keep running in one of two spots – the customer side, (front-end) or the server side (back-end). The customer of a web alludes to the site program that is screening and utilizing it. The server of the system on the web is the server that hosts it. Most site programming languages are intended to take a shot at either the server side or the customer side. This essentially portrays the way they work. A few cases of scripting languages are given below.

JavaScript-(Client side Language).  
PHP-PHP Hypertext Processor-(Sever side Language).  
Ruby on Rails-(Sever side Language).  
ASP.NET-(Sever side Language).

C-(Sever side Language).  
Python (Sever side Language).

### 2.1 Client-side (front-end) and Server-side (back-end)

Customer side or front end configuration is accomplished pretty much exclusively in JavaScript in addition to basic HTML and CSS code. JavaScript is known as a front end or customer side language since it works scripts on the PC in the wake of stacking the website page. Back-end or server side dialect generally PHP runs its scripts before the HTML is stacked. There are a few server side languages being used on the web today apart from PHP, however PHP is a standout amongst the most shared and current. It is called server side language in light of the fact that their scripts are working not on the claim PC, but rather on the opposite side which facilitated the site that is sent to the HTML code.

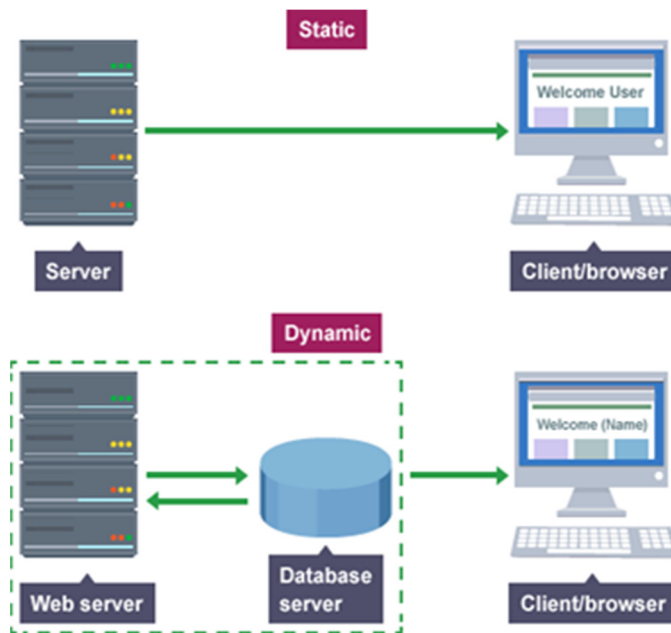


Fig. 1. Static and dynamic Website

Having considered the two strategies, the decision to build up a dynamic server-side site for land registration in Nigeria in view of the various focal points of its dynamic substance, the database and the adaptability in the connection of the substance. The new innovation has ruled the world; there are bunches of sites working together online on the web. Be that as it may, it takes a rate of endeavors and right approach to make a site professionally and fit for web gauges to address the issue of the general population. A web improvement is the most critical piece of a web composition. In this current hyper financial and focused market, there is a requirement for an expert web advancement and very much outlined that effortlessly conveys the web data to the clients. Obviously, this is the place the part of a dynamic web advancement becomes possibly the most important factor.

A created dynamic site gives refined and trendy sites that lure the guests. It is coordinated with extraordinary server side programming dialect which gave simple controlling through the site. In the time past the static medium of data spread was utilized. Presently, it has gone to the period of

dynamic sites that are more worried about making items and connection with the client by giving choices, for example, propelled designs, live visits, recordings, et cetera.

In this study, PHP is utilized as the scripting language. The decision of the PHP to be utilized lies in the way that PHP is known as a server-side scripting language or server-side programming language. A Dynamic programming language to create site used to make shell program and application to interface with the database. It acts like tuner between stuff on the server side and the stuff on the customer side while keeping the code secured at the server side. It works perfectly on the platform of XAMPP (Cross stage Apache MySQL Processor).It is free and open access, from PHP to an Apache server to MySQL to phpMyAdmin - they have everything required to get going in a matter of minutes.

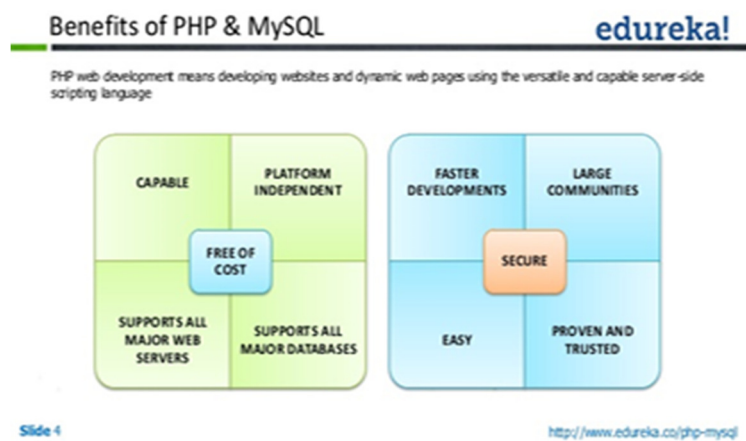


Fig. 2. Benefits of PHP ([www.edureka.co/php-mysql](http://www.edureka.co/php-mysql))

PHP is a robust programming or scripting language that fits stylishly and correctly into HTML and puts the tools for building dynamic websites for the use by the people. PHP Code is embedded in HTML for posts enables one to add own PHP code to pages, posts, and custom post types (posts) and even sidebars without customizing the templates [9].

A screenshot of a text editor showing PHP code for an "admin-login.php" file. The code includes a header with a logo and navigation menu, followed by a form for user login. The form has fields for "username" and "password" and a "login" button. The code uses HTML, CSS, and PHP to structure the page and handle the login process.

Fig. 3. PHP Coding

PHP coding like any other programming language depends on the function it is needed to perform in any coding. Also, individual coding depends mostly on the in-depth knowledge of one in the program or scripting language been used. In the study, PHP is used to a large extent on the dynamism of the system. The PHP coding below is the login through admin that needs to register all other staffs that are also semi administrator of this site.

## 2.2 Database Creation

One of the essential capacity of a dynamic web is the ability to hold a better database. In creating the database in this study, there are several factors considered so as to make the site a reliable one [10]. Database Management System (DBMS) and Design is the Database advance development that needed examination of a problem and definition (requirements and specifications) and make available all significant verdicts for constructing a logical structure of data [11]. This study considered that the problem definition specified the need, requirements, purpose and even the constraints for data in the database and used them to address the problem. MySQL better expressed in data definition language (DDL) and structural query language SQL was used for SELECT and search which has produced a good result in the implementation and validation of this system. Although, the database created was simple relational database system with DDL consisting of SQL such as search that creates a database along with their views and tables. Tables, database, and new users are created as shown in the figure below together with the addition of PHP codes.

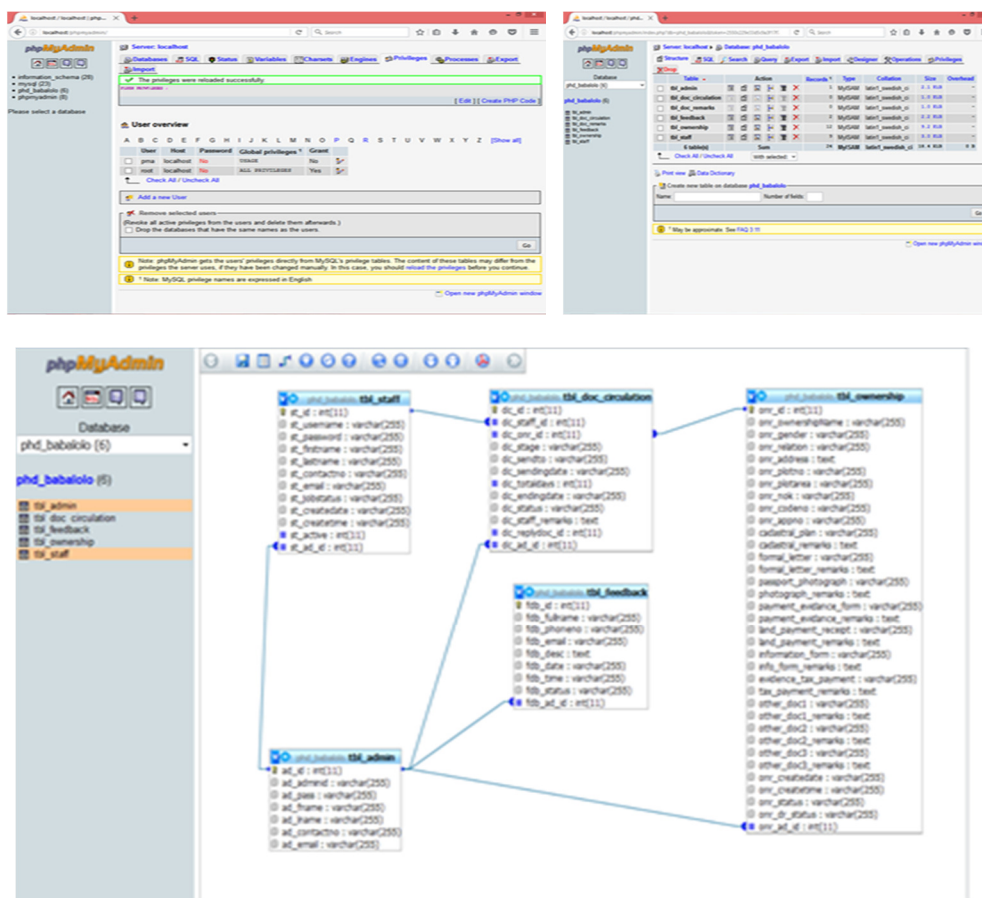


Fig. 4. Database Creation and Design Using PhpMyAdmin

There are two types of registration that are frequently practice in the study area, the Sporadic Land Registration, and Systematic Land Registration. We may say the later started 2009 in full when the Federal Government inaugurated Land Reform committee to see to the reform of all lands in the Federation [12]. Sporadic adjudication has been the usual method used all over the Federation. However, it's nice to know that the dynamic web for online delivery of cadastral services for land registration in Nigeria is designed to work for the two methods of land adjudication.

**Table 2**

The differences between Systematic and Sporadic Land Registration system

Serial No	Systematic Land Registration	Sporadic Land Registration
1.	Systematic Land Registration is a government-initiated process of adjudicating land rights on a whole of municipality basis, progressing boundary by boundary and aiming to register all untitled land in the locality. Activities are undertaken by a Systematic Adjudication Team which works within the community from an office known as the field base camp. The Systematic Adjudication Team takes the collection of evidence from applicants, cultivators, neighbours and officials to determine the validity of a claim for the issue of a patent.	Sporadic Land Registration is a client-initiated application for adjudication of one parcel of land. Here a potential applicant gathered the evidence in support of a claim of ownership of the parcel and presented it to the Department for assessment. The Department carries out the office and field-based reviews, and either accepts or rejects the application.
2.	In Systematic Land Registration, the application for a free patent is initiated by the Department (the government)	Whereas in sporadic Land Registration, the applicant initiates the application (the individual)
3.	Systematic Land Registration seeks to title all untitled land in a Systematic Adjudication Area	Sporadic Land Registration will proceed parcel by parcel according to the location and demands of applicants.
4.	Systematic Land Registration is undertaken from a systematic adjudication field office so this field staffs are accessible to members of the community and applications for public land may be filed there.	In sporadic Land Registration, applications are lodged in the office in the locality of the land in the application which has jurisdiction over the land subject of the application
5.	Systematic Land Registration is preceded by an extensive community mobilization process to ensure transparency and to identify disputes and counter-claims.	Sporadic Land Registration has no accompanying community mobilization program.
6.	In Systematic Land Registration, members of the community assist in defining land parcels and identifying appropriate applicants by providing corroborative evidence in support of applications.	In Sporadic Land Registration, does not need any member of the community to assist in defining land parcels and identifying appropriate applicants
7.	In Systematic Land Registration, if the land is not surveyed, a cadastral survey is organized by the Department (the government).	In Sporadic Land Registration, the individual applicant arranged for the survey from the registered Surveyor or the Department and shouldered the expenses for the survey.
8.	In systematic adjudication, the Systematic Land Registration Team helps the applicant to organize and compile evidence.	Whereas in sporadic adjudication thus responsibility rests on the applicant.

### 3. Results, Validation and Discussion

The figure below is the framework of the system developed for land registration processes within the study area. The ownership is the candidate that applied for the certificate of occupancy. The certificate of occupancy is evidence of the document that proves one to be the right owner of a particular parcel of land. The title of the property is only valid for 99 years renewable after the period of 99 years. The PHP code and the database are kept safe at the server side while the client uses the computer to access whatever he needed to get from the system. The server serves as the back end for accessibility for all the stakeholder in the business of land transactions and cadastral services which are provided online. The proposed sequences is as presented in the flow chart below.

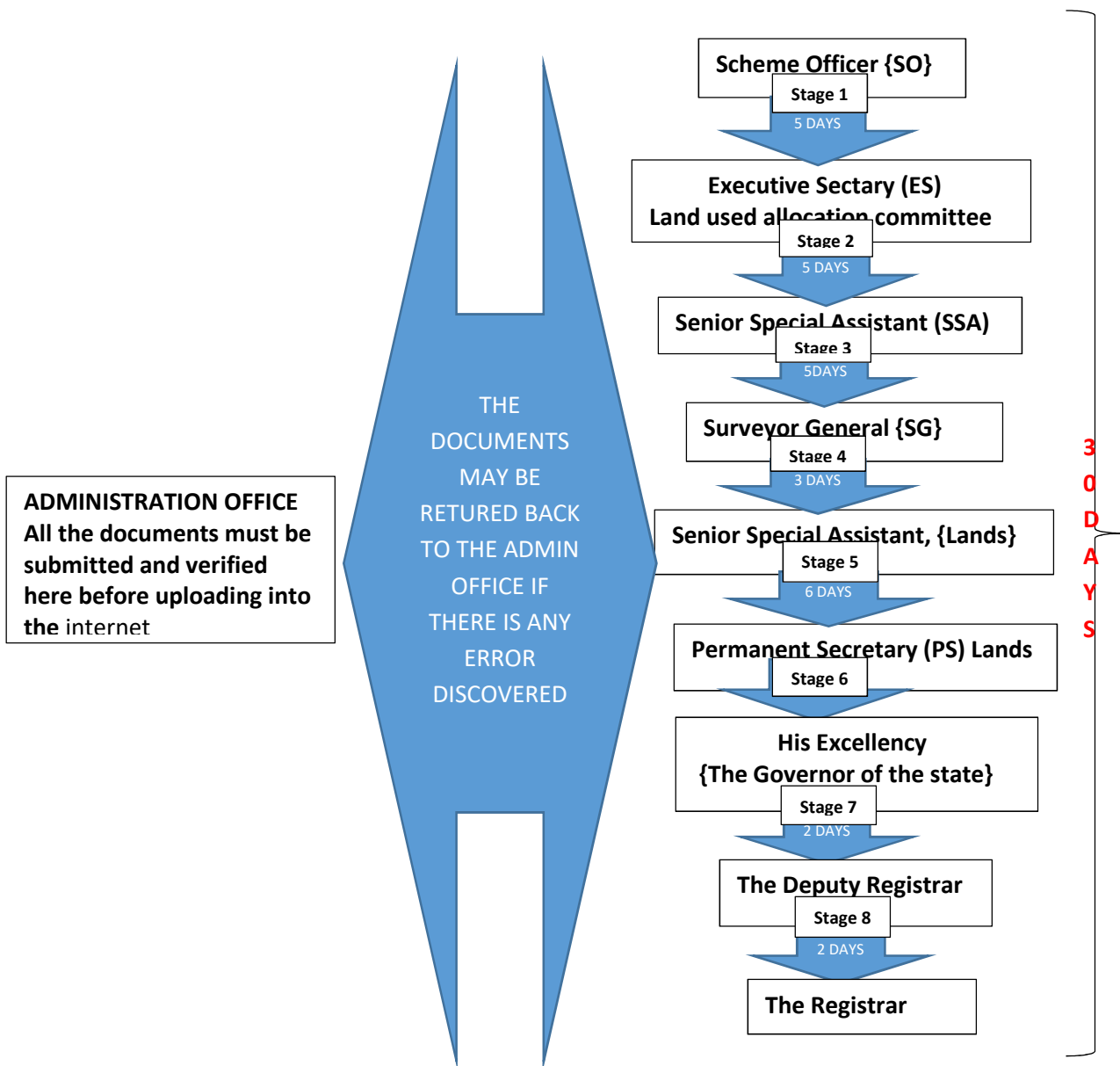
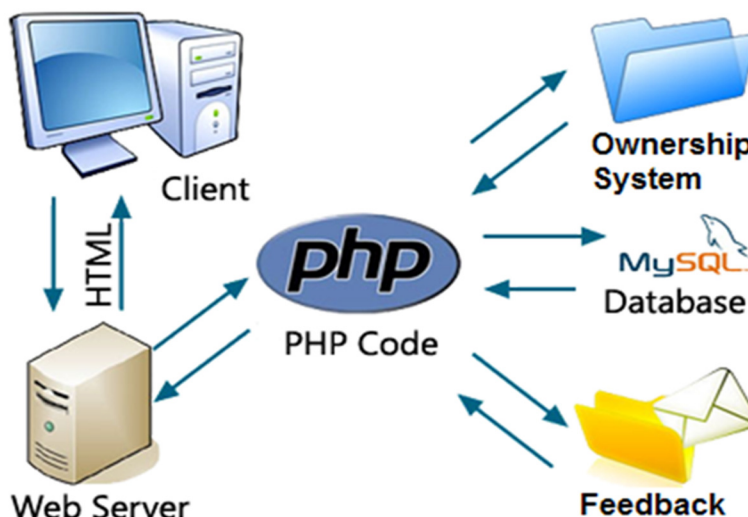


Fig. 5. The Sequences of the process of land Registration





**Fig. 5.** PHP Application on web server side

The figure shows the operational framework of the system. The Processes and stages of land registration as recommended in this study.

**Table 3**

The Processes and stages of land registration as recommended

Serial No	Officer in charge	Schedule of Duties	Periods/ Days
1.	The Scheme Officer (SO)	Prepares the application for the Certificate of Occupancy (C of O), signs off on the file and forwards the files to Executive Secretary (ES) Land Use Allocation Committee (ES LUAC)	5 Days
2.	ES LUAC	Approves processing and signs letter of allocation. ES LUAC signs off on the file and sends the file to the Senior Special Assistant (SSA) to His Excellency, Lands (SSA Lands)	5 Days
3.	Surveyor General	The Surveyor General provides Scheme Officer with digitized survey	5 Days
5.	The SSA, Lands	Vets the entire file and sends it with a covering memo to the Permanent Secretary (PS) Lands Bureau (PS Lands)	3 Days
6.	The PS, Lands	Signs off on the memo and sends the file to His Excellency	3 Days
7.	His Excellency	Approves file and electronically signs the C of O	3 Days
7.		Upon approval and signing of the C of O by His Excellency, He signs off and sends it to the Deputy Registrar for further processing	2 Days more
8.	The Deputy Registrar	Processes the file further, signs off and sends it to Registrar of Titles for final registration	2 Days
9.	The Registrar	The Registrar of Titles registers the C of O, signs off and request for printing of C of O and signed it for collection.	2 Days

All the document required for land registration is collected at the admin office and verified to check the authenticity and the accuracy of the cadastral plan attached before it will be upload. In order to perform proper validation, the documents are scanned in pdf format and uploaded by the Scheme officer. The admin registered all the officers that are working on the file so as to have access to the document uploaded online. Given this, there is safety in the information on the database as there are data integrity and security. The figure below indicates the ownership application circulation from the admin office to the registrar where the certificate will be collected after the final approval.

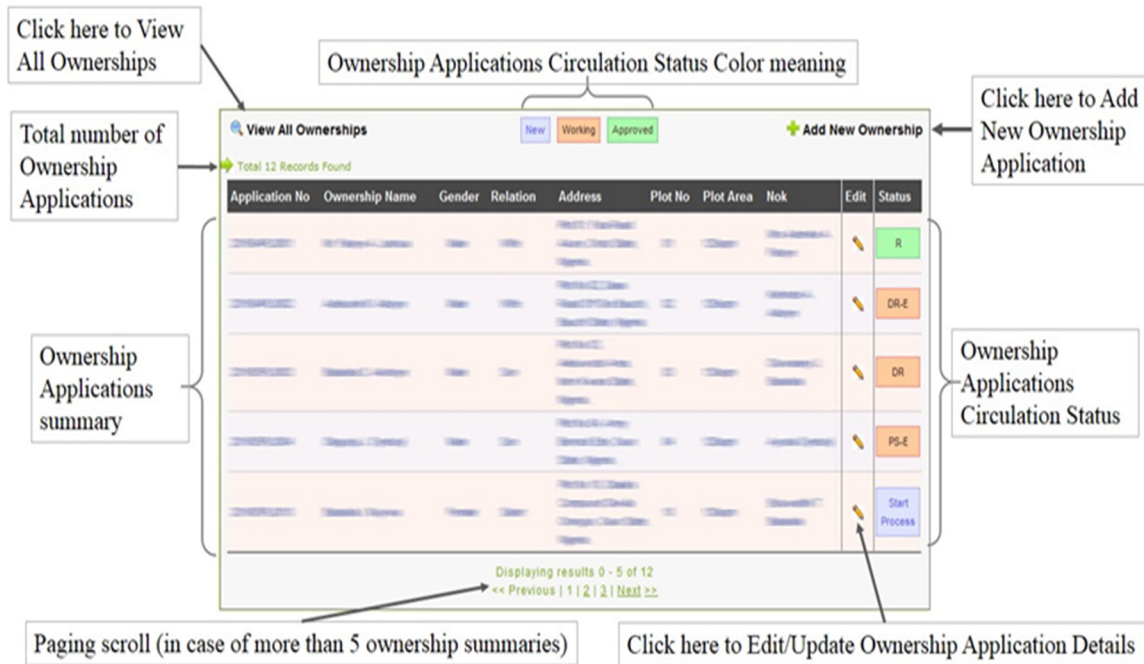


Fig. 6. Ownership Documents uploaded

Having checked the whole documents and make the fundamental proposals, stage 1 submit back to the Admin to ensure that the best thing has been done by stage 1. After verifying that the right thing has been done, the administrator send the record to stage 2. Stage 2 additionally got the transferred reports and makes the important remarks and submits back to the Admin, these procedures proceeded till the last staff where a candidate will be marked for the signing of C of O. On the framework, green light show the procedure is progressing, red pointer demonstrates the work over stayed or it is not done by the staff worried inside the farthest point of time while yellow marker in the framework implies, the work has been done and it has gone to the following stage.

Be that as it may, the candidate has the chance to check for the status of the application anyplace on the planet by login through the possession page utilizing the application number consequently produced by the framework. The database was intended to keep the records throughout the years for the legitimacy of 99 years of the C of O when it might be renewed, between this periods the credibility of the C of O can be checked anyplace in the word as long as web is accessible

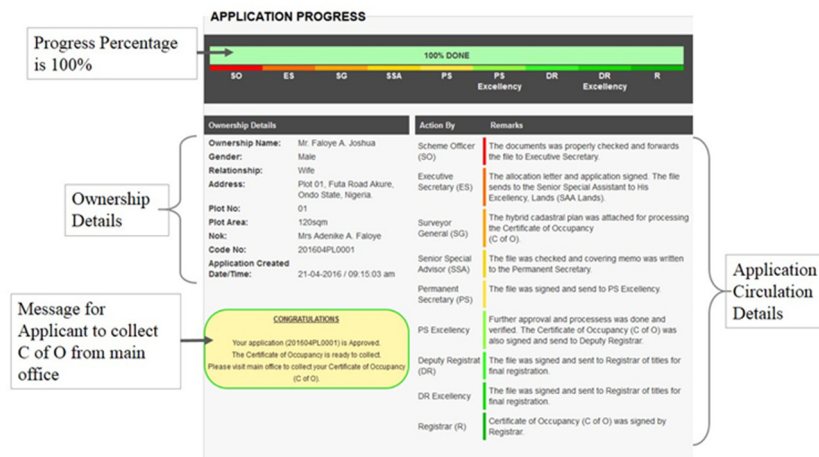
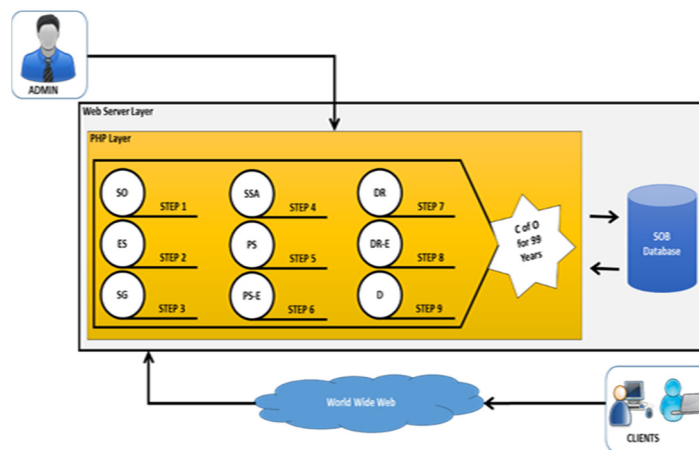


Fig. 7. Application progress



**Fig. 8.** Operational Framework

The framework is likewise designed in a way that an officer can't leave the work fixed in his framework in light of the fact that there a marker cautioning indicating the quantity of the day in a specific unit or division in which a document can be postponed. Following the means and the procedures as found in the figure over, the procedure is intended to be finished in 30 days. Nonetheless, if there is a mistake while handling the C of O, the record might be sent back to the administrator where all the report is stacked for revision. Be that as it may, while every one of the procedures are going on, the application can likewise check the advance of the application submitted for land registration and give criticism when essential. The C of O is allowed for a long time. The tallying begins quickly the Certificate is marked and recorded by the system. It is anything but easy to look or inquiry for a particular of C of O in the database.

#### 4. Conclusion

The land that is not titled can be said to be significant without esteem and has no financial matters esteem. Despite the fact that there are heaps of issues related with getting a title to a parcel of land in the study area, but it is an obligation that must be finished. One of the primary hindrances has been connected with the act of the practice of Land Use Decree of 1978. Be that as it may, the point of the investigation is accomplished having built up a web that is fit for dealing with land enrollment with less money related duty, supports land title registration, appropriate with a low rate and least deferral. The value of this investigation can't be overemphasized in light of the fact that it gives security to the possession and surety the honesty of the information. The framework has annihilated the punks and the brokers jumbling around in the Ministry and Lands Department for the illicit land exchange. Additionally, the study has added a change to Cadastral administration, and land enlistment in Nigerian Cadastre System. Therefore, the next investigation will be on how the generation of the cadastral management can be enhanced further in the computerization of the entire procedure of land enrollment in accordance with World Bank recommendations for the appropriation of ISO19152 Standard in the study area.

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