THE APPLICATION OF COMPUTERS TO LAND INFORMATION MANAGEMENT:
A CASE STUDY OF BUREAU OF LANDS AND SURVEYS MAKURDI

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DEDICATION

To Nguamo, my wife, Kwaghdoo and Idyondun my daughters, Saanmoiyol and Sughnen my sons.

ABSTRACT

Effective data management necessary for generating information for management decision-making has been identified as a penacea for any result-oriented organisation. The Bureau of lands and survey generates a lot of revenue but more could have been generated if a computer based land Information management were employed.

A System Analysis and Design has been carried out with the view to computerising the Land Management functions of the Bureau.

A system design based on the analysis has been recommended. The programs for the design are to ensure data entry, editing and output. The system design uses a dBase III plus software which is a modern data management software.

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CHAPTER ONE

INTRODUCTION

1.0 ISSUES OF RECORD KEEPING

The Bureau of Lands and survey like most government establishments in the State has to contend with the problem of poor public image due to her inability to provide valuable data and information as and when needed for planning, control, decision making and public consumption. This is as a result of poor data and information handling and record keeping.

The inability of government organisations, for instance, to audit their accounts regularly cannot only be explained as an attempt at concealing their skeletons in the cupboards, but may be due to inaccurate and unreliable record keeping. For auditing to be done, records must be well kept and easily accessed. Record keeping media such as ledgers, files, invoices and registers must be well maintained.

Effective planning is paramount for the attainment of an organisation's goals. Planning is projecting an organisations activities, responsibilities and/or achievements that must be attained within the projected time frame. Planning therefore requires accurate and dependable data and information to work with. Most organisations have had their plans scuttled because such plans have been based on unreliable information. Proper record keeping is thus quite vital for effective planning. Be that as it may, it has been observed that proper record keeping is the bane of most government establishments in Benue State and hence planning objectives have been unachieved.

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In planning, control mechanisms only work when accurate data is used. Planning and control therefore oscilate on a static pivot of accurate information. We can only control and obtain good results in a system that is built on authentic data.

The frequent cases of double allocation of one plot to two or more people at the Bureau or the frequent cases of poor revenue generation can be attributed to the problem of insufficient or inaccurate data which the Bureau maintains.

There is a lack of proper data entry and retrieval methods regarding plot allocation. Data entry does not only mean the use of files but how such data entered on files can be made easily available as and when needed. Accessing files by manual procedure is a cumbersome exercise that can be frought with inherent problems of missing files and file misplacement.

When data is improperly kept it is not easy to retrieve it. Most planning problems in the State and the country in general has revolved around the issue of insufficient data. Even when such data exists, the mechanism for prompt retrieval is not in place. For data to be useful, it must be organised, sorted and indexed and easily retreavable. Most manual media of data storage available lack these characteristics. At the Bureau of Lands and Survey for instance, it is not possible for one to walk in and obtain records of how many plots were allocated in the past one year or six months ago without spending 2 days. This is because the files and registers used and the personnel that handle these records cannot cope with the complex method of sorting records into appropriate data types.

The point we have been trying to make so far is that all organisations need data and information for efficient management. But these must be maintained. We have however seen that manual methods of data capturing and maintenance are grossly insufficient due to the volume of data involved. Herein lies thee need for computers.

The computer is capable of maintaining and manipulating volumes of data very speedily, accurately and efficiently. It can order, update and retrieve millions of data in seconds. The maintenance of data by computers is called Data Base Management. It is probably true to state that most modern data bases are among the most highly ordered collection of data ever conceived by man (Bradley, 1983). Complex software products known as Data Base Management Systems are used to create and maintain these data bases.

Thus, the way forward for the government and indeed the Bureau of Lands and Survey to come to grips with the problem of Land Information Management is by the application of computers. For, as Hirschhem(1993) noted, in order for all types of organisations to succeed, they need to be able to process data and use information effectively. This has become especially true in today's rapidly changing environment. For, in conducting their day-to-day operations, organisations use information for functions such as planning, controlling and decision-making. Information therefore is unquestionably a critical resource in the operation of all organisations. Any means, mechanical, or otherwise, which can help organisations process and manage information presents an opportunity they can ill afford to ignore.

The arrival of the computer and its use in data processing has therefore

been one of the most important organisational innovations in the past thirty years (Hirschhem, 1993). The advent of computer-based data processing and information systems has led to organisations being able to cope with the vast quantities of information which they need to process and manage to survive.

The Bureau of Lands and Survey must therefore pursue the initiative of computerization with all vigour. Apart from information processing, the financial benefits expected from the exercise are quite obvious. Sanders (1982) observed that no matter what size the organisation, professionals and business people with computers system have found that the computer regularly pays for itself within a year. The steps therefore taken by the Bureau to computerised her land records is therefore commendable and in the right direction.

1. 1 BACKGROUND TO STUDY

The creation of Benue State from the defunct Benue Plateau State in 1976 and the consequent establishment of the then Ministry of Lands and Surveys vested the management of both rural and urban lands in the ministry. With succeeding governments, the nomenclature of the ministry has also been changing. The present name, i.e Bureau of Lands and Surveys came into use in 1993.

However, in whatever name the Bureau has operated before, its role and functions have never changed. These are:-

- The provision of plots for residential, commercial, industrial and other

uses in all urban and semi urban centres in the State.

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- The management of all lands in the State both rural and urban.

- The processing of application for mortgages.

- Arbitrating in land disputes.

- Arbitrating in sale, conversion or transfer of land.

Since its establishment in 1976, the Bureau has processed over 40,000 application for plots and over 25,000 plots for different uses have been issued with Certificate of Occupancy.

The organisational structure of the Bureau consists of the Director General as the Chief Accounting Officer. Below him are seven directors responsible for Town Planning, Lands, Survey, Personnel, Finance and Supply, Environment, and Planning, Research and Statistics. Each department also has units.

The Bureau maintains a registry system of file handling. Land records especially from the technical departments of Town Planning, Lands and Survey are kept in the central registry.

Information pertaining to land application including status of application; whether approved or not approved or being processed are maintained by the registry. At the same time bills on plots and land allocated including fees for mortgages and sale of land are also obtained from the registry.

Files relating to application of land are stored on the wooden shelves in the registry. The shelves have been filled up. Presently some files can be seen heaped on the floor in the registry. There is also frequent attack of files by

termites. Files retrieval method is slow and inefficient due to the congested registry and due to the manual file tracing method.

Calculation of land bills is done manually. This is slow and takes much time to prepare, thereby causing delays. Applicants or land owners wishing to settle their payments do not get the bills on time. This results to high default rate on land rates payment. A loss of revenue by government. Many names are often omitted and faulty calculations are not uncommon due to large volumes of data involved.

Applicants or members of the public wishing to obtain information on their applications or other land-related information do not easily get them as information retrieval method is manual.

Thus the Bureau not only losses large sums of revenue as a result of poor data handling, but applicants suffer from information malaise

To address these problems and other related issues, the Bureau, in 1994 awarded contract for the computerization of lands records. The computers are yet to be installed.

This study is therefore aimed at designing a computer -based Land Information Management system that would optimise the use of the vast facilities of a computer system. This will be achieved by designing computer programmes for data entry, retrieval and editing of land records to ensure that land information is easily processed, rapidly accessed and sufficiently made available to users.

1.2 STATEMENT OF PROBLEM

The Bureau of Lands and Survey is considered one of the key government establishment for economic and social development of the State. It is one of the high income-generating organs of government. In 1996 alone, it generated over N10 million revenue through land applications and processing, thus winning the state's merit award as the highest revenue - earning government establishment.

It must also ensure that applicants for land obtain such land without undue delay. This will serve the purpose of speedy development of the state. At present there are a backlog of applications yet to be allocated plots.

Observations at the Bureau show that these two key functions of the Bureau-i.e revenue generation and speedy allocation of plots for developement cannot be easily attained. The issue of poor information processing has been responsible for huge loss of revenue by government. Bills are not prepared on time and applicants have complained of missing files.

Manual record keeping has been identified as the root cause of these problems. Therefore, for government to maximise revenue, information must be speedily processed. Therein lies the issue of computerization which has been identified as the penacea of solving the intractable problems identified.

1.3 OBJECTIVES OF THE STUDY

The following objectives are considered in the study, namely:-

(i)   To design a computer-based information management system

that will ensure speedy data entry, retrieval and editing for all

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aspects of the Bureau.

(ii)   To implement a computer-based file handling system that would eliminate the issue of missing and misplaced files.

(iii)   To ensure that information is easily processed and made available to users.

1.4 PURPOSE OF THE STUDY

The Bureau in 1994 awarded contract for the computerization of the Land Registry. The project is yet to be completed. This study is aimed at providing the technical details for the final take-off of the computer unit. It is acknowledged here that this study will serve the Bureau immensely as no consultant has been involved in the actual implementation of the computer system. The contractor's responsibility is to install the computers only.

This study is therefore aimed at looking at the real issues involved in the computerization based on careful system analysis and design procedures. The problems of the computer system and its prospects will be highlighted.

1.5 JUSTIFICATION OF STUDY

The global application of computers has created a new information order. We are at the threshold of Information Technology. Organisations have discovered that the use of computers has increased productivity and reduced cost. For those who can afford the computer, it is imperative.

Benue State government has taken a bold state in revenue generation. The Bureau of Lands and Survey remains one of the highest revenue generating

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establishments of government in the state. Land application and land rates are sources of revenue. Better information management of these sources are important. The computer serves that purpose. It is a tool that provides such fast, reliable and accurate information.

1. 6 SCOPE OF STUDY

This study is limited to the activities of Bureau of Lands and survey. Particular attention is paid to the land registry where most land files are kept. Computerization of the land registry is seen as a first step to total computerization of other departments of the Bureau.

Therefore, with the complete computerization of the land registry, other departments like accounts and personnel will follow.

1.7 SYSTEMS DESIGN CONSIDERATIONS

To be able to attain the objectives in 1.4 a system design covering the three areas will be done. Namely:- Entry routines, Retrieval routines and reports and forms.

1.7.1 ENTRY ROUTINES

This is considered the most basic part of any database system. It will be used to enter land information, on the standard Land Form 1 used by the Bureau.

Entry routines will involve the creation of formatted screen displays, verification of data, setting of default values, performance of calculations and maintenance of necessary indexes.

1.7.2 RETRIEVAL/EDIT ROUTINES

These are routines that will enable the location of data to be made after they have been entered into the database file. The importance of this routine is that it will enable the Bureau the advantage of retrieving as fast as possible, records that have been stored in the files.

1.7.3 REPORTS AND FORMS

This will enable the computer system to generate printed materials based on the data in the files. The printing can take the form of column reports, single-page printing etc.

CHAPTER TWO

2.0

FEASIBILITY STUDY

In chapter one, we were able to define the problem of Land Information Management in Bureau of Lands and Survey. We also came up with the objectives for establishing a Computer-based Information Management System. The next stage in System Development Life Cycle involves conducting a feasibility study of the system.

The purpose of a feasibility study is to investigate the project in sufficient depth to be able to provide information that either justifies the development of the new system or shows why the project should not continue (French, 1993).

Feasibility study enables management to decide on whether to go ahead with the project or not. It is however not the terminal point of System Development Cycle. The result of the feasibility could enable management to redefine the problem and objectives of the system.

2.1 ORGANISATIONAL STRUCTURE OF THE BUREAU

The Bureau of Land, and survey consists of seven departments, namely:-

(1)   Town Planning

(2)   Lands

(3)   Survey

(4)   Finance and Survey

(5)   Planning Research and Statistics

(6)   Personnel

(7)   Environmental Management

The director general is the Chief Executive and Accounting Officer.
There are three main technical departments that are involved in the day-to-day
management of land. They are:-

(1)   Town Planning

(2)   Lands

(3)   Survey

Files involving land management circulate around these departments. The
department of Planning, Research and Statistics serves as the co-ordinating
department. Its main responsibility is to ensure plan implementation and
monitoring.

There are currently 263 staff on the payroll of the Bureau after the last
retrenchment exercise.

2.2   **FUNDING**

The Bureau is funded through the monthly subventions of the state
government. It also generates a lot of internal revenue from the following
areas:-

(1)   Ground rents

(2)   Processing of applications for land allocation

(3)   Mortgages

(4)   Sales and transfer of land transaction

(5)   Leases

(6)   Granting of temporary permits

(7)   Conversion of title deeds.

Indeed, the Bureau in 1996 earned a merit award as the highest in come generating government establishment.

2.3   **INFORMATION STORAGE**

The Bureau maintains a Land Registry in which all records of land transactions are kept.   The system of information storage is mannual.   Land applicants obtain land forms which contain relevant information regarding their Name, Income, State of Origin, purpose for which land is being applied and so on. File folders are used to hold these information for such applicant.

Any other form of transaction is also processed in an applicant's individual file.

Due to the volume of files the registry maintains, and also as a result of manual processing, there are frequent cases of file loss, missing files and inproper evaluation of rents and rates.

The result of poor method of information storage usually hinders speedy and accurate retrieval and updating of records.   These has caused the Bureau losing so much revenue annually. At the same time, members of the public find it difficult obtaining land information as and when needed.

2.4   **RECOMMENDATION**

It is therefore recommended that the present mannual method of information is not adequate to meet the challenges of modern Information Technology. A computer-based system is thus suggested.

The Bureau of Lands and Survey has the financial capacity to support and maintain a computer system since it can be funded directly by the State Goverment. It also has the resources to go generate local revenue which will support the daily operations of the computer system.

CHAPTER THREE

3.0   SYSTEM INVESTIGATION AND FACT RECORDING

3.1 INTRODUCTION

In chapter one, we attempted to define the problem of Land Information Management at the Bureau of Lands and Surveys. Based on the conventional System Development Cycle, we will attempt in this chapter to carry out a system investigation and fact recording procedure. The result will bring out in more details, the processes involved in land information recording, retrieval and organisation of land records and the problems associated with these processes.

Investigation and fact recording exercise aims at understanding in details, the functions and operations of a system, and to identify the basic information requirements. Consideration in this exercise is given to range of data types, volumes of data that are to be processed and some exceptional conditions that may arise. It will also consider problems associated with working with the present method.

3.2 THE SYSTEM

The activities and processes that are responsible for providing records of land is referred to here as a system. These processes include opening of new land files, movement or processing of files, storage of files and retrieval of files. These processes are controlled largely by the land records registry together with the departments that are involved in land processing.

System investigation and fact recording have therefore been done in the land records registry and the key departments of Town Planning, Survey and Lands that are directly responsible for Land Information Management.

3.3 FACT FINDING TECHNIQUES

System investigation employs some techniques some of which have been used in studying Land Information System of the Bureau of Lands and Survey. Fact finding techniques ensure that essential information about the current system is gathered with a view to discovering its strenghts and weaknesses. Thus, when a new system is designed, as many of the weaknesses as possible are eliminated, while retaining the strengths. There are four main techniques available. These are; Interviewing, questionnaires, observation and record inspection. In this study, however, only three of the techniques are used. These are Interviewing, observation and record inspection. Questionnaire techniques, which is particularly useful when the system under study is large enough to make it uneconomical for reasons of time or funds to observe or interview, has been discarded. This is because the system under study can best be done through interviews and observation considering its small size.

3.3.1 INTERVIEWS

This is the most widely used tool of investigating a system and also the most productive. Because it involves physical interaction. During interviews, facts about a system and what is happening come to light together with the opinions of the interviewer regarding the weakness of the system. Personal

contacts are very important in getting the co-oporation of people involved in giving them the feeling of having made substential contribution to wards the study of the system.

This technique has been used in studying the Land Information System of the Bureau. Through interviews, information about the workings of the system, its short comings, problems and possible prospects have been obtained. These information are recorded on form A1-A5 (appendix1-5).

3.3.2 OBSERVATIONS

This method can best be employed in conjunction with other techniques such as interviews and carried out after the observer has had an understanding of the procedures involved.

In this study, this method has been used in studying the process of filing new land records. The process of file movement, the methods of file retrieval and maintenance of the 'morning list'. The use of this method together with interviews conducted has helped us in understanding the processes and procedures of Land Information Management of the Bureau of Lands and Survey.

The main areas that have been observed are:-

(i)   Physical arrangement of storage medium

(ii)   Space availability

(iii) Sitting requirements

(iv)   General working environment

Some of these information is recorded on form A2(appendix 2)

3.3.3 RECORD INSPECTION

To substantiate the observations and interviews conducted, additional efforts have been made by inspecting certain land records that are relevant to the procedures under study. The records inspected are:-

(i)   File movement registers

(ii)   Morning list files

(iii)   Organisational chart of the Bureau.

These records have provided additional information and help to buttress the already obtained information. Some of the information inspected are produced on form A3 and A4.(appendix 3 and 4).

3.4 FACT GATHERING

Facts gathering in a system design and analysis is the next stage in system investigation. It represents the methods of recording facts obtained from interviews, observation and record inspection techniques. It is observed that during the fact-finding stage, unless the investigator has formulated a plan for keeping of notes of the facts, he will end up with a mass of notes on all areas, which will be difficult to examine. A good practice therefore is to divide the notes into areas of investigation. Thus, the recording of results have been done on predesigned forms.

Form A2 is used to enter physical observation of the land registry. The observations include storage medium, physical layout of the registry, furniture requirements and general space availability.

Form A3 is the procedure form that describes the procedures of file movement within a department. These departments are Town Planning Department, Lands Department and Survey Department.

Form A4 is used to represent the organisational chart of the Bureau. It enables us see the rationship of the system with other sub-systems

Form A5 lists the problems obtained from interview in land registry staff.

The information on these forms have helped us in understanding and carrying out a detailed analysis of the system which will be considered in chapter four.

CHAPTER FOUR

4.0 SYSTEM ANALYSIS AND PRESENTATION

4.1 INTRODUCTION

Generally, the analysis of a system is the procedural study of its operations with an attempt to discover what its basic problems are. The analyst has the obligation of examining all the facts he has gathered in order to make a proper assessment of the existing system

In the preceeding chapter, we discussed the method of gathering facts. The facts gathered are presented in this chapter in an analytical manner. A critical assessment of the Bureau's Land Information Management system is examined based on the principles of procedure generally used in analysing a system. These principles are considered in the following areas:

4.2 PURPOSE OF THE SYSTEM

The purpose of establishing a land record registry is to provide an organised system of keeping land information, retrieving it easily and making information accessable to management and other users of information.

Our investigation has shown that the purpose of maintaining a land information system has not been optimised. The land record registry in particular has not made it possible for these goals to be achieved due to so many factors amongst which are; improper handling of land record files, lack of adequate storage medium and poor working environment.

4.2.1 IMPROPER RECORD KEEPING

There exist within the land records registry, "Private registries" maintained by record attendants. These private registries are for their friends, relation or interest groups. Thus, most files are not keep on the designated coded shelves but privately kept by these staff. Such files therefore cannot be retrieved except by the knowledge of such a staff. This situation has been brought about due mainly to the over congested registry. Therefore the maintenance of private registries by these staff to them is a way of serving their friends better in an overcongested registry where files are easily misplaced, lost or improperly stored.

4.2.2 LACK OF ADEQUATE STORAGE MEDIUM

The existing storage media consist of 10 wooden shelves and 4 filing cabinets. There are 3 rooms of 3x3.5m that comprise the land record registry. The wooden shelves are divided into cells. Each cell holds 99 files. Two out of the three rooms hold these shelves. The third room has no shelves, hence files are kept on the floor.

The shelves are in poor physical condition, most of them in rickety state. The two rooms containing the shelves are overcrowded with files, most of them kept on the floor. This arrangement makes maintenance, retrieval and sorting of files cumbersome and usually boring and hence sometimes impossible.

4.2.3 POOR WORKING ENVIRONMENT

The seven records attendants are cramped in one of the two record rooms already congested with files. The two tables and two benches serve as the

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furniture for both staff and visitors. There is hardly any space for free movement within the registry. Access to the shelves require squeezing between shelves. Poor lighting and ventilation do not provide conducive working environment under which the registry staff work daily.

These physical constraints have largelly affected the performance of these staff and consequently created great apathy in the discharge of their duties.

These three problems have thus adversely played against the realisation of the duties and purposes of the registry. Consequently the purpose is yet to be achieved.

This has therefore brought to the fore, the inadequacy of a manually operated Land Information Management System, hence providing a basis for a proposal for a computer-based system that would be able to address the problem of a mannual system.

4.3. THE EXISTING SYSTEM

This is the analysis of the current system and the measures of the effect it will have on a new system if introduced. We have found that the current registry handles over 27,740 files on shelves, 2,800 files are kept on the floors and 3,400 files are transit files, i.e they are been processed by schedule offices.

The rigristry maintains the following codes for various forms of files:-

(i)   BP code for Benue Plateau

(ii)   BPG code for Benue Plateau Government titles.

(iii)   LPM code for Land Policy Matters

(iv)   BNG code for Benue Government titles

(v)   BN code for Benue first series files

(vi)   BNA code for Benue second series files

(vii)   BNB code for Benue third series files

(viii)   QLS code for Quarry License Survey.

The first, second and current third series of BN files are maintained in volumes of 12,000 files each.

The 10 shelves in the record registry are divided into cells each of which is given an alphabetic reference code. Each cell contains 99 files. The four filing cabinets contain unspecified number of files in each drawer.

Outside the registry, land files undergoing processing in the main departments of Town Planning, Survey and Lands are kept in movement trays labelled IN and OUT. There is no special system of arranging files on the trays. Each officer maintains a file movement register. Once a file has been treated the officer concerned enters the file number in his movement register and passes the file to the next officer.

The length of time a file stays on an officers table depends on his wilingness, his state of mind, and the pressure or availability of the applicant. Thus a file may stay on an officers table as long as he deems convenient. Therefore morning list taken could indicate the presence of a particular file on an officers table for an upward period of 3 months.

It is thus observed that a mannual system is inherent with the problems of

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physical intervention which makes processing slow. For instance a file that is kept on an officers table for 3 months without processing or passed back to the record registry creates a problem of retrieval when information from it is requisted.

Therefore an automated system that would ensure that the information is stored on a medium while the physical file moves around will ensure the availability of information from such a file.

4.4 RELIABILITY OF THE SYSTEM

A measure of reliability of the procedures of Land Information Management obtained from investigating the system has been analysed. The analysis is based on the following procedures:-

(i)   Opening of new land files

(ii)   Retrieval of files from the registry

(iii) Maintenance of the Morning List

Two of these procedures have been found reliable considering the constraints of the system. These are procedures for opening of new files and retrieval of files from the registry.

The procedure for maintenance of the morning list has not been reliable because of the exegenous problems from other department. For instance an officer who decides to keep a file and locks it in his drawer will create problems for the record staff taking the morning list. This is because even though previous recording will indicate that the file is on his table, but the mere fact that he

locked the file away will cause confussion and could result in declaring the file as missing.

The procedure for opening new file takes the following steps:-

(i)   Purchase of Land Form I from accounts office.

(ii)   Payment of processing fees and submission of forms with accompanying relevants documents at the accounts office.

(iii)   Obtaining of a file number from the accounts office.

(iv)   Forms forwarded to Lands Department for filing and issuance of a file jacket.

(v)   File passed to Land Records Registry for storage until requested.

The primary aim of this procedure is to ensure that record about revenue are properly maintained by the accounts section. In an automated system however, it will not be convinient for this procedure to work well. It will be suggested that the information be passed immediately to the computer for documentation before been sent to the registry.

In the case of file retrieval, the procedure consists of the following:-

(i)   Request for retrieval of a file is usually passed to any record staff or file tracer.

(ii)   He checks for the file in the cell corresponding with the file number presented.

(iii)   If file is found he retrieves it.

(iv)   If file is not found he verifies from the morning list to know the officer processing it.

 (v)   If he finds it from the morning list, he retrieves it from the officer.

(vi)   Else he checks generally in areas of likely possibility.

(vii)   If not found the file is declared missing.

(viii) If file is missing, a temporary file is opened.

In most cases the problems associated with this procedure include, poor filing of files, maintenance of private registry, lack of space for filing and unorganised method of keeping files in trays.

These problems are usually associated with a mannual based information management system which is currently in use. A computer-based system, apart from human error and mischief will greatly improve the existing system and ensure better management of land information. Procedures of detecting and controlling irregular tempering of files shall be built into the new system.

4.5 ECONOMY OF THE EXISTING SYSTEM

This relates to the benefits and the cost of running such a system. Such benefits are measured against the economic methods of operating the existing system.

Economy of running the existing system has been considered against the processes it takes to achieve the results, the timeliness of the results and the usefulness of such results. It has been observed from investigation that the manual system is uneconomical and expensive in the long run.

For instance, investigation has shown that much revenue is lost due to the inability of retrieving files for computation of land rents. Incorrect computation based on human error has resulted to under valuation of land rents and mortgages.

Loss or missing files have also resulted to late actions to be taken on issues of prompt financial gain to the Bureau.

Clumsy processes result to time wasting in processing or retrieval operations which have a negative effect on decision taking and financial gains to the Bureau.

It is therefore suggested that for the Bureau to optimise its large revenue opportunities the present mannual method of Land Information Management should give way to a computer-based information management which, in the long run is relatively more economical.

4.6 SPECIALISATION/SIMPLIFICATION/STANDARDIZATION OF THE EXISTING SYSTEM

This aspect looks at the areas of applying machines or computers to the existing system. It decides whether the complex procedures could be simplified and whether standard practices are observed in the running of the existing system.

On the aspect of specialization, it has been observed that the existing records staff could be trained as data entry staff in the new computer system. There are presently seven records staff headed by a Chief deeds registrar. These staff could be given on-the-job training in techniques of data entry and

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manipulation.

On simplification, it is possible to reduce the present complex mannual procedures into a simpler machine-orientated process to achieve even better results; particularly in areas of file processing and retrieval.

On standardization of procedures, the present manual procedure could be standardised to ensure that file movement and tracing is less cumbersome and fast. The existing procedures of file movement in the three departments is as follows:-

4.6.1 FILE MOVEMENT PROCEDURE IN TOWN PLANNING DEPARTMENT

(i)   File arrives from Director of Town Planning(DTP).

(ii) If file is for Makurdi Urban Area and is a BN or BNA where number is from 10,999,file is sent to Dr. Hwakar (Assistant Director of Town Planning).

(iii) If file is BN or BNA and has No. from 11,000 and above file is sent to S.I. Kwanga (Deputy Director of Town Planning).

(iv) If file comes from Task Force or the 6 L.G.As in Idoma land, file is sent to Mr. P.E. Aruta (Assistant Director of Town Planning).

(v)   Processes (ii-iv) are processed and passed to Director of Town Planning.

(vi) DTP passes file to Lands Department.

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4. 6.2 FILE MOVEMENT IN LANDS DEPARTMENT

(i)   File arrives from DTP to Director of Lands (DOL).

(ii)   If file is for Land use and Allocation Committee (LUAC), file is

sent to E.Adamu (Assistant Director of Land).

(iii)   If it is for Task Force, file is passed to E. Sende (Assistant

Director of Lands)

(iv)   From Adamu file could be sent to the following:-

     (a)   Land Administration Unit

     (b)   Estate report

(v)   Processes (ii-iv) are sent back to DOL

(vi)   DOL sends file to Survey Department.

4.6.3 FILE MOVEMENT IN SURVEY DEPARTMENT.

RIGHT OF OCCUPANCY (R. OF O.) CASES

(i)   File passed to Surveyor General (SG).

(ii)   SG passes to Officer Incharge of field (OCF).

(iii)   OCF passes to cartographic section for charting and reporting.

(iv)   File is processed and sent to OCF.

(v)   OCF to Director of Town Planning.

(vi)   DTP to DOL.

(vii)   DOL sends to Land use and Allocation Committee (LUAC).

4.6.4 FILE MOVEMENT IN SURVEY DEPARTMENT.

CERTIFICATE OF OCCUPANCY (C OF O) CASES

(i)   File comes from Lands Department to Surveyor General (SG)

(ii)   SG passes to Officer Incharge of Examinations (OCX).

(iii)   OCX sends to Officer Incharge of Field (OCF)

(iv)   OCF assigns field officers to carry out survey.

(v)   Field Officer passes file to OCX.

(vi)   OCX passes to Officer Incharge of cartography (OCC).

(vii)   OCC passes for preparation of Title Deed Plan (TDP).

(viii)   TDP is sent back to OCX.

(ix)   OCX passes to SG for signature.

(x)   SG signs and sends to OCC for printing and verging of

       Plans.

(xi)   OCC passes to OCX for certification and stamping of Plans.

(xii)   File passed to DOL for preparation of C of O.

(xiii)   C of O passed to SG after registration of title Deed.

(xiv)   File sent to cartography.

(xv)   File finally passed to Lands Records Registry for safe keeping.

It is possible in an automated system to cut down on these procedures as

is shown in chapter five, System Design and Inplementation.

4.7. CONTINUOUS CONTROL OF EXISTING SYSTEM

This principle considers the type of errors that are occuring in the present system. It examines how satisfactory the controls in the system are being met while operating it and any type of control that may be used.

Generally, the errors in land records keeping have been found to be associated with the physical storage of files, the inadequate space available and some aspect of human malpractices.

Since the present method is not convinient for determining of controlling file movement, frequent cases of loss of files, sometimes occassioned by misconduct of staff, makes it difficult for effective control mechanism to be effected.

In a computerised system however, control mechanisms like file protection, use of password and other systems of data security are employed to ensure reliability of data.

4.8 TIMELINESS OF THE EXISTING SYSTEM

One of the most important principle of procedure considered in a system analysis is that of time. Timeliness of a procedure describes how fast information is obtained for decision-making. Investigation of the present system reveals that information retrieval is slow due to problems already identified, some of which include inadequate storage medium, poor storage, incorrect indexing and apathy.

It is, however, appreciated that some of these problems can also be encountered in an automated system, but suffice it to say that they are more

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pronounced in a manual system which rely mostly on the human ability to perform jobs that are routine in nature.

4.9 PROBLEMS OF THE LAND REGISTRY

The problems identified in running the existing system are a reflection of the problem of lands records registry which form the core of the system.

These problems include:-

(i)   Lack of proper maintenance of the morning list which has been attributed to lack of funds to buy stationaries.

(ii)   Inadequate shelves to keep the files.

(iii)   Inadequate space for provision of shelves.

(iv)   Poor office furniture.

(v)   Lack of space between shelves.

(vi)   Poor lighting of the record rooms.

(vii)   Apathy of record staff.

We have been able to analyse the existing system against the background of previous investigation. The analysis provides us with a tool to designing a new computerized system that will address the issues in the existing mannual system.

CHAPTER FIVE

5.0   <u>SYSTEM DESIGN AND IMPLEMENTATION</u>

In the preceeding chapter we presented an indepth analysis of the Land Information Management System of the Bureau of Lands and Survey. We arrived at the conclusion that the present manual system of Land Information Management is inadequate, slow and out of tune with present realities. A computer-based system has therefore been recommended.

In this chapter therefore, the design and implementation of such a computer-based information processing has been presented. The design of the system is aimed at amiliorating the proplems identified in the last chapter.

System design essentially evolves the ability of working from the <u>requirements specifications</u> identified in the previous chapter, to produce a <u>systems specification.</u> The systems specification is a detailed set of documents which provides indepth features of the system. It serves as communication to management, programmers, operating staff and users. It also provides complete record of the system used for evaluation, modification and training purposes.

The guiding principles considered in designing Land Information System include:-

(i)   Preliminary Information Contents.

(ii)   Objectives of the system

(iii)   System description

(iv)   Detailed system specification

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(v)   Time scale for getting the system working

(vi)   Change offer from old to new system

5.1   **PRELIMINARY INFORMATION CONTENT**

This stage of system design is concerned with deciding on the staff

functions, particularly in relation to staff that would be involved in running the

computer. We decided in chapter four that the morning list and land application

forms together with registers by the Bureau would form the main input media.

Record registry will provide data from tables of schedule officers on file

movement. Secondly, new application forms shall be entered on the computer

system.

Therefore the staff involved in these activities together with staff of the

department of Planning Research and Statistics (PRS) would form the core staff

of the computer department.

Detailed list of Data Entry staff is shown on appendix1

5.2   **OBJECTIVES OF THE SYSTEM**

This stage of systyem design determines the main objectives of the system

and the departments that would be involved in running it.

Hence, the objectives of the system include:-

(i)   Designing of data input routines that will accept or capture data

        relating to land administration and store it on computer disks or

        other storage media.

(ii)   Designing data editing routines capable of retrieving stored data for

editing and updating.

(iii)   Design routines for displaying stored data on computer screens or producing hard copies (printed copies) of such stored data.

The critical departments that are expected to play leading roles in the system are:-

(i)   Town Planning Department

(ii)   Lands Department

(iii)   Survey Department

(iv)   Department of Planning, Research and Statistics

5.3   SYSTEM DESCRIPTION

This stage defines the system or method of transfering land records kept in land files to computer disks. The following processes are involved:-

5:3:1   DATA TRANSFER

There exist over 30,000 files of land records either kept in the Land Registry or by various departments. Information in these files will be tranferred unto computer disks by trained data entry staff.

A data entry routine (Appendix 6) has been carefully designed to capture all details in the file using Land form 1 maintained by the Bureau (Appendix 9)

5.3.2   DATA EDITING

Once data have been entered or transferred into the system, it should be possible for validation checks to be made. This is to check the accuracy and validity of data, and also to enable editing. A data editing routine program (Appendix 7) has been designed to retrieve and diseplay data for editing.

5.3.3   OUTPUT

To be able to visually view the data either on the screen or hard copy, an output routine (Appendix 8) has been designed.

5.4   DETAILED SYSTEM SPECIFICATION

This phase involves the following activities:-

(i)   Designing of input, output and file formats

(ii)   Design of system controls

(iii)   Development of software for the system

(iv)   Conversion from oldt to new system

5.4.1   DESIGN OF INPUT, OUTPUT AND FORMAT FILES

The input file that has been designed to accept Land records is based on the standard application form known as Land Form1 which the Bureau uses. This form contains the information the Bureau needs about an application. It is on the basis of this form (Appendix 9) that the format file (Appendix5) has been developed.

Based on the format file, the data entry routine program has been written to accept all information about the applicant. The program (Appendix 6) has two screens. The first screen displays part of the information about the applicant and the second displays the rest since it is not possible to display everything on one screen.

Out put format includes the design of forms for printing land records. The retrieval program ensures that records can be output by any other of the

criteria specified:-Name of applicant, purpose of application, use for which the land is being applied and occupation of the applicant.

These are then displayed on the computer screen or printed as hard copies. The program is flexible enough such that it can be edited to output other information other than the four mentioned above.

5.4.2 DESIGN OF SYSTEM CONTROLS

The system controls considered are:-

Security controls

Input controls

Output controls

Processing controls

Recovering procedures

Security controlss include the physical limiting of access to data by only authorised users. It is therefore recommended that entry into the computer building should be strickly controlled by ensuring that only staff of the computer unit have direct access to the computers.

Input controls check the validation of data. This has been accomplished by the design of an edit routine (program) which ensures that a user can cross-check his entry.

Output controls verify that results of the processing conform to expectations. This too has been incorporated in the data entry programs.

Processing controls which check the completeness and accuracy of data

between processing functions has also been incorporated in system design. The double-checking method in the main program ensures that data entered is correctly processed.

Recovery procedures entail steps to be followed if computer service is interrupted. The interruption could be as a result of power failure, crash of the system or absence of key computer staff.

To over come these bottlenecks, it is recommended that a stand by generator be installed, .An Uninterruptible Power Supply (UPS) which ensures that power to the computer is supplied for some time even if the public power supply goes off should also be installed. Also, assignment of staff should be done so that there is always a stand-by staff in case one is absent or falls sick suddenly.

5.4.3   DEVELOPMENT OF SOFTWARE FOR THE SYSTEM

Application software have already been installed on the system. The dbase software is one the most efficient software for data base management. Thus the input routines (programs), edit routines and output routines have all been designed using the dbase111 plus software. These routines are attached as (Appendix 6,7 and 8)

5.5   CONVERSION FROM OLD TO NEW SYSTEM

There are three approaches for converting from an old to a new system. These are; direct conversion, parallel and phased conversion.

(i)   Direct conversion. In this approach, the old system is cut off and the new one starts immediately.

Its' disadvantage is that it does not give room for error assessment and corrections. Therefore this approach is not recommended.

(ii) Phased conversion. This conversion takes place at selected locations, for example zonal offices or regional offices. The result of conversion at such offices is studied and gradually passed to other branches.

The Bureau does not intend computerizing zonal or branch offices, therefore this approach too is not recommended.

(iii) Parallel Conversion. This involves runing the old system along side the new one to ensure that lapses are corrected for some time before final cut off.

This approcah is therefore recommended. It will ensure that the old manual system is operated alongside the new computer-based system so that lapses and errors will be corrected as long as they exist before final cut-off.

APPENDIX 1
BUREAU OF LANDS AND SURVEY SYSTEM INVESTIGATION

FORM A1

STAFF LIST OF LAND RECORD REGISTRY

S/NO	NAME	RANK
1.	Taryaji	Chief Lands Assistant
2.	Yimaor	"
3	Timothy Yav	"
4.	Mrs. R. Kuku	"
5.	Job. Igir	"
6.	Christy Ejembi	Rcord Assistant

APPENDIX 2

BUREAU OF LANDS AND SURVEY SYSTEM INVESTIGATION
PHYSICAL INSPECTION OF LANDS RECORD REGISTRY
FORM A2

S/NO	ITEM DESCRIPTION	REMARKS

BUREAU OF LANDS AND SURVEY. SYSTEM INVESTIGATION
FORM A3
FILE MOVEMENT PROCEDURE FORM

DEPARTMENT: TO:

BUREAU OF LANDS AND SURVEY SYSTEM INVESTIGATION

PROBLEM INSPECTION

TYPE OF PROBLEM

APPENDIX 7
DATA EDITING ROUTINE

This program enables already entered data to be edited, based on the specific field names supplied.

To access the programm type Modi Comm LANBROW

```
CLEAR
SET TALK OFF
SET STATUS OFF
SET SCOREBOARD OFF
USE lanform1 INDEX plotnob,appl,purp. inc
TEXT
        BROWSING LAND RECORDS
        Choose an Index Order
        1. By Plot Number
        2. By Applicant Name
        3. By Purpose
        4. By Income


Ordernum = 1
@21,0 SAY "Enter Number" GET Ordernum PICTURE "9"
READ
SET ORDER TO Ordernum
 GO TOP
SET FUNCTION 2 TO "D"
SET FUNCTION 9 TO "N"
SET FUNCTION 10 TO "Q"
DO WHILE .NOT. EOF ()
        CLEAR
        @4,10  SAY "LAND FILE RECORDS"
        @4,40 SAY "Plot number :" + dtoc (date()) + "Time:" + time()
        @5,1  SAY "#"
        @5,5  SAY "PLOT NUMBER"
        @5.15 SAY "APPLICANT NAME"
        @3,40 SAY "PURPOSE".
        @5,65 SAY "INCOME"
        @2,0 to 5,79
*Next initialise variables
Line = 1
Startdisp = RECNO ()
@6,0 to 14,79
        DO WHILE LINE > 8.AND. .NOT. EOF ()
        @line + 6,1 SAY Str(line,2) + "
        @line + 6,5 SAY Plotnob
```
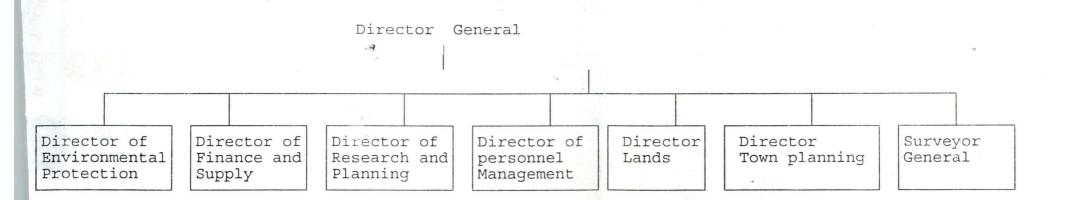
BUREAU OF LANDS AND SURVEY SYSTEM INVESTIGATION
ORGANISATIONAL CHART OF BUREAU OF LANDS
AND SURVEY

FORM A4

Director General

| Director of Environmental Protection | Director of Finance and Supply | Director of Research and Planning | Director of personnel Management | Director Lands | Director Town planning | Surveyor General |

APPENDIX 6
DATA ENTRY ROUTINE

This program accepts all data entered on Land Form 1 of the Bureau (appendix 9). To use the programm type MODI COMM LANDS

```
CLEAR
SET STATUS OFF
SET SCOREBOARD OFF
@ 10, 0
WAIT " Press any key to start entering new records"
USE lanform 1 INDEX plotnob, appl, purp, inc
Start = RECCOUNT()
Lands = .T.
DO WHILE Lands
      CLEAR
      APPEND BLANK
      SET FORMAT TO LANSPLIT'
      EDIT RECORD RECCOUNT()
      CLOSE FORMAT
      Check .T.
      @ 22, 0 SAY"the information entered correct? (Y/N)" GET check PICTURE"Y"
      READ
      DO WHILE .NOT. check
             SET FORMAT TO landsplit
             EDIT RECORD RECCOUNT()
             CLOSE FORMAT
             Check.T.
             @22,) SAY "Is the information correct? (Y/N)" GET check PICTURE "Y"
             READ
      ENDDO
      @22,0
      @22,0 SAY "*** RECORD ENTERED ***"
      @23,0 SAY "Enter another? (Y/N)" GET Lands PICTURE "Y"
      READ
ENDDO
CLEAR
@12,0 SAY "You have added " LTRIM(STR(RECOUNT()-START,10)) + "records"
WAIT "Press any key to exit entry program"
CLOSE DATA BASE
SET TALK ON
SET STATUS ON
SET SCOREBOARD ON
RETURN
```

```
        @line + 6, 15 SAY Appl
        @line + 6,40 SAY Purp
        @line + 6, 65 Say Inc
        IF DELETED ()
                @line + 6,70 SAY "***Deleted***"
        ENDIF
        SKIP
                line + line +1
        ENDDO
        IF eof()
                @line + 6,10 SAY "** Last Record in file **"
        ENDIF
        ACT= SPACE (1)
        @23,0 SAY "Enter Number to Edit Record"
        @24,0 SAY "F3, to delet| F7 Nextscreen| F10 to Quit" GET act
        READ
        DO CASE
                CASE act= "D"
                @23,0 CLEAR
                @23,0 SAY "Enter Number to Delete" GET act
                READ
                Move= (line-VAL(act))*.1
                Skip move
                DELETE
                GO TO Startdisp
        CASE act ="N"
                @4,0 CLEAR
                line= 1
        CASE act ="Q"
                EXIT
        CASE act > "Q"
                Move= (line-VAL(act))*-1
                SKIP move
                SET FORMAT TO lanform1
                READ
                CLOSE FORMAT
                GO TOP
                ENDCASE
ENDDO
SET STATUS ON
SET SCOREBOARD ON
SET TALK ON
CLOSE DATABASE
RETURN
```

APPENDIX 8

OUT PUT OR PRINTED REPORT ROUTINE

This program prints the data entered on the computer based on some selected field names. To access the program type MODI COMM REPORTS.

```
CLEAR
SET TALK OFF
SET STATUS OFF
USE lanform1
?"PRINTING......"
SET CONSOLE OFF
SET PRINT ON
DO WHILE .NOT. EOF ()
        IF DOW (date) = 1.OR. DOW (date) = 7
                ?"Weekend" + SPACE (2)
        ELSE
                ?SPACE (9)
        ENDIF
        ?? date, Plotno, Purp, Applname, Income
        SKIP
ENDDO
? REPLICATE (" = ", 60)
SET PRINT OFF
EJECT
SET CONSOLE ON
CLEAR
?"PRINTING COMPLETE"
CLOSE DATABASE
SET TALKON
SET STATUS ON
RETURN
```

BENUE STATE OF NIGERIA
PERSONAL APPLICATION FORM FOR STATUTORY RIGHT OF OCCUPANCY

To: The permanent Secretary, Ministry of Works, Transport, Housing, Lands and Survey, Makurdi (2 copies) accompanied with 2 passport photos.

1	What are your full names (Do not use initials) What is your age this year	
2	Are you a Nigerian? From which State and Town	
3	What is your mail official address in Nigeria?	
4	What is your permanent home (village) address in full	
5	What is your annual income and in what business(es)	
6	Who is your next of kin What is his/her mail address in Nigeria?	
7	Who should inherit this application if and when it becomes necessary (change unacceptable)	
8	Who should we contact in case you are not available at the above address	
9	What do you want the land for	
10	In what town or village is the area of your choice situated	
11	How much money do you hope to use in developing the plot and how long will it take you to finish deveopment	
12	Give the reference number of plots you already have in your name (directly or through assignment) and in which towns in Benue State	
13	How many plots have you developed in Benue State	
14	Give us photo-copy of your Tax Clearance Certificate which agrees with your annual income as declared by you in paragraph 5 above	

I hereby deposit ₦150/₦250/₦300 of which I agree to forfeit 1/8 of it if I withdraw my application.

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