A COMPUTERISED AGRICULTURAL DATA MANAGEMENT SYSTEM:

A CASE STUDY OF NATIONAL AGRICULTURAL DATA BANK, ABUJA.

BY

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APPROVAL PAGE

This project has been read and approved for the award of Post Graduate Diploma in Computer Science of the Federal University of Technology, Minna, Niger State, Nigeria.

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D E D I C A T I O N

This project is dedicated to my wife, Enobong and my son, OwoidohoAbasi.

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ABSTRACT

This project is aimed at solving the data management problem of the National Agricultural Data bank, Abuja.

In carrying out this project, a feasibility study was conducted to determine the viability of the proposed system. The report of the study favoured a replacement of the manual method with a computerised system.

On the basis of these recommendation, a system software is developed with a detail account of the various phases of software development. The database management system is considered as a language of choice in the writing of the various programs and in modules. These modules serve as the options available to the operators to either add record, edit record, delete record, view record, search record and generate report or an option of quit.

Finally, a database is created for crops subsector which will ensure adequate, reliable and timely dissemination of information.

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CHAPTER ONE

1.0 INTRODUCTION.

1.1 Background of the study

Reliable data are indispensable for policy formulation and development planning in every sector of any nation's economy. Clearly thoughtout and well formulated policies are necessary for setting development priorities and initializing new programmes. Accurate data reflect the true relationships in a system. Planning without accurate, reliable, consistent and timely data has constituted a major bottleneck to policy making in all sectors of the economy. It has also been identified as a major limitation to proper agricultural development in the Country. In recognition of this constraint and as a way of finding lasting solution to the problem of disseminating reliable agricultural data, the National Agricultural Data Bank (NADB) was set up by the Federal Government of Nigeria in 1988 along with other four Sectoral Data Banks with National Data Bank as the apex Data Bank in the country.

1.2 HISTORY OF THE NATIONAL AGRICULTURAL DATA BANK (NADB).

Although National Agricultural Data Bank was set up as one of the Sectoral Data Banks in 1988, it did not commence operation until 1991 due to logistic problems. The NADB domiciled at Federal Ministry of Agriculture - Abuja, is aimed at developing an agro-statistics and information centre with

properly organised information feeder, retrieval and dissemination system.

The immediate objectives of the NADB include:-

i. The establishment and development of an in-house professional statistical capability in the Federal Ministry of Agriculture, for an effective role in the organisation, co-ordination and guidance of agricultural statistical activities and the building up of a data processing expertise and facilities for a dynamic agricultural database management system.

ii. The development and implementation of a periodic reporting system through the involvement of available field extension staff in the specified priority area.

iii. The conduct of agricultural census for obtaining up-to-date information on the structure of agriculture and creating the statistical sampling frame for follow-up survey.

Since NADB commenced operation, it has established four Zonal Offices at Ibadan, Owerri, Kaduna and Maiduguri for effective data collection coverage. The Zonal offices are responsible for data retrieval and collation from the States in the Zone and they partially process the data before transmission to the Headquarters at Abuja. But the NADB major bottlenecks include lack of expertise in software development, inadequate funding, inadequate processing facilities and lack of operational vehicles and communication equipment. These

problems made it impossible for the establishment of a computerised database. Most of the work such as collection, collation, analysis and storage are done manually. The few available computers are used for wordprocessing.

1.3 STATEMENT OF PROBLEM.

The traditional method of keeping records and filing system in offices are being use. For instance, a clerical staff search for the files in the file cabinet (retrieve), add another information, that is putting another record in the file before forwarding it to the appropriate officer for necessary action. This method is not economically and technically feasible. Shortcomings of the present system include data redundancy, waste of time in data retrieval, misplacement of data etc.

The result of the above shortcomings coupled with the growing needs for effective data storage and retrieval system in order to achieve the objective of the NADB, we have made it a relevant issue to search for a computerised data management system.

1.4 OBJECTIVES OF A COMPUTURISED AGRICULTURAL DATA MANAGEMENT SYSTEM.

Before embarking on the design of any system, there is need to have a clearly defined objectives. These objectives will have to reflect goals set by management for the entire organisation. It is also imperative that the system meets the needs of the organisation.

The goals from which objectives are derived represent the results of management projection. In the someway, objectives are vehicles for achieving the goals. Some of the objectives of the proposed computerised agricultural data management system are:-

i. To create database for crops subsector

ii. To reduce problem of data storage redundancy.

iii. To provide accurate method of data updating record.

iv. Reduce time for data retrieval and hence minimise processing time.

v. To establish an efficient and flexible computerised system which will be controlled, monitored and enhanced by the installation of the Local Area Network.

CHAPTER TWO

2.0 DEVELOPMENT OF AN AGRICULTURAL INFORMATION MANAGEMENT SYSTEM.

2.1 BACKGROUND INFORMATION

Agriculture is perhaps the largest traditional industry in Nigeria with more than 70 percent of her population involved in some form of agriculture for a living. This ranges from growing food and cash crops, through storage, transportation, processing to merchandising farm produce. Time was in Nigeria when agriculture was the main source of foreign exchange earning. The discovery of petroleum resources in Nigeria subsequently and inadvertently led to a share crop in Government's interest in agriculture initially. However, with the realisation of the potential danger in the nation's inability to at least feed itself in the 1970s, in particular, witnessed renewed and determined effort by government to revitalise the agricultural sector in a revolutionary manner.

The multi-disciplinary nature of agriculture, coupled with the facts of its being the world's oldest industry, the vast expanse of land available for agriculture with diverse climatic condition, the variety of crops produce and abundance of agricultural information available, the application of COMPUTER in agriculture in Nigeria, is not only beneficial but inevitable. Certainly, the use of computer holds enormous potentials for substantially improving agricultural productivity particularly from the points of view of

facilitating information interchange among farmers, researchers, scientists, consumers and policy planners.

The analyst could not lay hand on any past work done on the study. However, there are past work done generally on software development and information management system. These general ideas are being employed for the purpose of this study specifically.

2.2 AGRICULTURAL INFORMATION MANAGEMENT SYSTEM

An information system is the organised agents involved in information production, processing, dissemination and use. By this definition, information system is a collection of people, methods, computer hardwares, computer softwares as well as database organised to develop the information required to achieved objectives. The people refer to all those involved in operations of the information system as well as end users. The methods refer to steps used in gathering, storing, updating, analysing and management of the information. Computer hardware and software refer to electronic devices for data processing and storage. Database is a stock of data which may be related to each other or not. A database may be computerised or not and it is the link between the hardware and the software as well as between the software and the operators of the system. It is made up of the data produced from primary and secondary sources, projections, transformations, maps, graphs etc. The data is in machine readable form. The system should obviously contain devices for

update, review and maintenance of database.

An information management system consists of interrelated components namely:-

i. System management;

ii. Input devices and storage modes;

iii. Hardware and software processing;

iv. Output processes and

v. Users.

2.2.1 System Management

This involves the setting up of management procedures for the design, supervision, control of data collection, storage, analysis, retrieval, update of database and output of system management. System management also ensures efficient performance of other components through proper and effective co-ordination. To ensure the effectiveness of the system, we idenify two types of skill viz:

i. those competent in data production and

ii. those competent in the design and management of computer based management systems.

DATA PRODUCTION

Data production is concerned with the sources of data collection - primary, secondary; modes of data collection - census, surveys frame, lists, maps, sample design etc. This component organises and supervises the data collection exercise, prepares the possible analytical modes, tables and cross tables to give direction to the computer personnel.

DATA MANAGEMENT

Data management is an inevitable starting point for any survey data analysis if the end result is to be meaningful. This is even more apparent where computer capabilities is to be applied to the data analysis. Regardless of the software package to be used, a perfect analysis can only be arranged in a specified, orderly manner, with logical format on some type of machine readable medium. This involves conversion from written information on the questionnaires to a coded information on punched cards in order to create a tape or disk onto which the data will be stored. Therefore, one of the problems of using computer to process survey data is the design of the data management operations which will move the data through various steps required in a construction of the tapes or disk file.

To ensure a reasonable high quality of input data, management operations should be efficient. In technically sound survey, Statistician and Computer Personnel should work as a team to produce higher quality results.

2.2.2 INPUT AND STORAGE

The input devices and storage modes refer to the mechanism by which the clean data is entered and stored in a computer. Data can be entered through keyboards, terminal, scanning etc.

The storage of data on the other hand can be done in various ways such as in disk drives, tapes drives diskettes, magnetic

tapes etc. The input formats and storage modes together determine the variable and their aggregation levels e.g. Local governments, enumeration areas and States etc.

The input devices and storage modes create files of data which are basic forms in which groups of information are stored, retrieved and analysed. Data files consist of all relevant information required for solving a particular problem. It could include total farming populations, population of animal farmers, poultry keepers, fish farmers, acreage planted, area under a particular crops etc.

2.2.3 SOFTWARE AND PROCESSING

The software and processing component is concerned with the acquisition of computer software, and to processing of data. The main software for this exercise would include data input and data query programmes, database management programmes, programmes for data transformation and analysis.

A database management system is a set of computer programs which stores, retrieves and modifies data in databases. It guards the data's consistency and provides management services regulating access to the database and ensuring data integrity, accuracy and timeliness. Most current database management systems are either network, hierarchical or relational although other architecture can be found. Most major hierarchical database management systems (DBMS) now also offer a relational interface. Relational database management systems (RDBMS) have matured in the last ten years and are now

being accepted as general purpose DBMS. Of course the implementation of relational database management systems will depend on the performance of available computer processors. Several relational DBMS now achieve 400 to 500 transactions per second. New hardware developments, like parallel computers, will close the gap further between hierarchical and relational database implementations.

One of the key issues to be addressed in the management of data assets is obviously the updating process. This must preserve the consistency and integrity of data every time data may need to be modified, replaced or deleted. In some exceptional cases several versions of the data may be held although this practice is to be avoided as much as possible. The update facility must include provision for an audit trail so that the update history id preserved and the situation can be reversed if necessary.

A repository of data is not beneficial unless the data being stored can be accessed, extracted and analysed for information needed to support decision making in the enterprise. Most relational database management systems use a structured query language - SQL. SQL is now the most widely used query language. The importance of SQL has changed from being a query language to establishing a standard protocol for database access.

2.2.4 OUTPUT PROCESSES

This component concerns the various possible outputs expected from the input data and the available software such as tables, charts, maps, figures etc. The most important equipment required in the output process are the hardwares or peripherals used in demonstrating the various forms of outputs.

Micro-computer, either operated on a stand-alone basis, arranged in a multi-user framework or networked, supply quite an appropriate computer environment both in terms of speed of execution and available memory capacity. In addition most of the commercial softwares that has been developed in the past decade have been developed for large and growing market of micro-computer users. Therefore, software products aimed at the micro-computer market are abundant, very diversified and generally cheap. In many cases, it is the right choice in terms of both cost and benefit to opt for micro-computers. The other options, particularly the acquisition of a mini-computer which has a much more limited scope in terms of commercial software availability and therefore carries much higher software costs, are unlikely to prove satisfactory.

2.2.5 THE USERS

This component refers to users such as Federal Government, State Governments, Local Governments, International Organisations, Local Private Organisations and individuals. The aim of the producer of data is to satisfy as much as possible the data needs of all users. It is however not always possible to satisfy the needs of all users but in most cases, the feedback from users help to reduce the data demand gaps.

CHAPTER THREE

3.0 SYSTEM ANALYSIS

3.1 FEASIBILITY STUDY

The aim of carrying out this is to carefully examine the existing system and to determine whether the system would be enhanced or a new system can be developed.

3.2 METHODOLOGY

The techniques employed for the fact finding were oral interview, document review and observation.

(i) **Oral interview:-** This is a fact finding technique used to collect information from individuals/groups. The respondents are the current users of the existing system and potential users of the proposed system.

(ii) **Document review:-** The records reviewed, using this technique include Project Document, Handbook on Data Management, Written Policy Manuals and other relevant documents. This provides an introductory knowledge and later acts as a basis for comparing actual operation with what the records indicated.

iii) **Observation:-** This fact finding technique gives first hand information on how the activities are carried out. It enables the observer see how the processes are carried out.

3.3 OPERATION OF THE EXISTING SYSTEM

The existing system is manually operated. Most of the data are stored in files in the cabinet and updating of the

data are done manually.

The existing system poses the problem of:-

(i) **Storage:-** Information stored on files makes files appear bulky and occupying more space in the cabinet.

(ii) **Retrieval:-** The speed of retrieval is very slow as one has to search for a particular file (among many) from which the information is to be obtained.

(iii) **Updating:-** It is always difficult as information has to be entered into the file about changes that occurs. It poses boredom and inefficiency as different files have to be updated virtually everytime.

3.4 THE PROPOSED COMPUTERISED AGRICULTURAL DATA MANAGEMENT SYSTEM

The computerised agricultural data management system is to develop overall plan for an integrated data management system. As the plan proves economically and technically feasible, particular phases of integrated system can be computerised in planned sequence.

This approach entails integrating by using the system approach and the multiple files (millet, cocoyam, yam, cocoa etc.). It also attempts to keeps up-to-date records so that inquiries may be answered with timely and accurate information. As a result, a great deal of duplication and inconsistencies in existing files should be eliminated.

3.5 BENEFITS OF THE PROPOSED SYSTEM.

The benefits accruing from the proposed system include:-

(i) **SPEED:-** The most obvious benefit of using a computer is speed. The computer can perform calculations and data processing more quickly than alternative methods can. Work that might take human being months or even years to complete manually may be accomplished in hours or at most days by computer. For example, some computers can do hundreds of thousands or even millions of arithmetics operations per second.

(ii) **ACCURACY:-** The computerised agricultural data management system with accurate data, will do the intended work with a very high degree of accuracy. The computer does exactly what the program tells it to do. In addition, the computer does not get bored or fatigue thus avoiding the errors human being might well make under the same circumstance.

(iii) **RELIABILITY:-** Modern electronic computers perform at high level of reliability and equipment failures are very few.

(iv) **RETENTION:-** The computer can store and search massive files of data and programs. The content of the files does not fade or get lost and it can be used time and again.

(v) **ECONOMY:-** The advantage of speed and accuracy can often be translated into Naira savings realised. Usually the per unit cost of processing data or doing computation by computer is considerably lower than by manual methods.

Also accurate record can reduce the frequency of bad decisions that are made because of unreliable or unavailable information.

(vi) **WIDE APPLICABILITY:-** A computer can be used to solve a wide variety of problems that arise in science and business. The boundaries of what the computer can accomplish are limited only by the ability and imagination of its users.

CHAPTER FOUR

4.0 SYSTEM DESIGN AND SOFTWARE DEVELOPMENT

4.1 SYSTEM DESIGN

The system design is based upon the findings obtained from the feasibility study conducted. In designing the new system, the objectives are :-

i. To specify logical design elements. These include detailed specification for the new system describing features such as input, output, procedures, files and database to meet system requirement.

ii. To ensure that the system supports the organisation's performance.

iii. To meet users requirements on performing appropriate procedure correctly, present proper form of information, getting result and to be seen as a reliable system.

iv. To provide ease of usage and meet up with the expectation.

v. To provide software specification.

Similarly, to ensure that the system functions effectively, the following criteria are also considered.

i. Efficiency: Controls that ensure that data entered correctly and validated.

ii. User friendliness: This allows the operator a choice of different operations for implementation.

iii. Maintainability: The criterion of maintainability recommends regular servicing of the hardware as well as replacement of deficient parts and also ensuring that the appropriate spare parts are used all the time.

4.2 SELECTION OF LANGUAGE FOR SOFTWARE DEVELOPMENT

In the development of this application software, a number of available computer languages was open to the analyst. Some of these computer languages include BASIC, FORTRAN, PASCHAL, COBOL and DBASE to mention but a few. While it is possible to use any of these languages in developing this application, the Dbase IV was selected as the language used. It was selected because of its powerful and useful features. The following are some of the features:

i. **Information storage and retrieval:** Dbase IV handles storage, retrieval and organisation of information in an efficient manner better than other micro-computer Database Management System.

ii. **Programming commands:** Dbase IV commands are short, easy to coordinate and remember.

iii. **Debugging:-** This includes some features for tracking unwanted program bugs.

iv. **Report generation:-** It allows for customisation of reports.

4.3 DESIGN OF THE NEW INPUT AND OUTPUT SYSTEM

INPUT

Under the new system, we will require complete computerisation. However, data records about each crops will be entered into the computer via the computer keyboard manually. The data to be entered will include all relevant information about crop and this will form the database. The new input form always prompts the user a question or questions and waits for response. This is done either by pressing key strokes or typing in a word.

OUTPUT

On successful response to the questions asked, the computer will now prompt the operator to a menu list of options to select from. These options include add record, edit record, delete record, view record, search record, generate report or quit depending on the alternative options selected by the Operator. The computer now responds to any of these options.

4.4 File creation process

In creating files, a database structure is first created in which data items are grouped into their data name, types and width.

After this, series of programs are now written in modules to generate the required output. Elements that are highly related are kept in the same module in order to maximise cohesion. The following shows the field names, type and width.

All these formed the database files.

DATABASE STRUCTURE

FIELDNO.	FIELD DESCRIPTION	FIELD NAME	FIELDTYPE	FIELDWIDTH
1.	Period	Period	Date	8
2.	Crop code	Cropcode	Numeric	6
3.	Crop name	Cropname	Character	12
4.	Planted Area	Plantarea	Numeric	12
5.	Harvested Area	Harvestar	Numeric	14
6.	Crop production	Cropprod	Numeric	14
7.	Crop yield	cropyield	Numeric	14
8.	Source	Source	Character	20

4.5 Documentation

This has to do with providing adequate information about the software component. The specification of this application software is as follows:-

Author: **F. E. Akpan**

Program: **Computerised Agricultural Data Management System.**

Environment: **Both source and object computer.**

Date Written: **March 1998.**

Remarks: **The program is written to solve the problem of storage and retrieval of crops data.**

HOW IT FUNCTIONS

The application program comes in floppy diskette and it needs to be loaded into the computer memory before operation.

Step 1

Insert Ms-Dos diskette in drive A and close the drive. On the other hand, if Ms-Dos is already installed in the hard disk (C:>) do not insert in drive A. You can then go to the

next step.

Step 2. Switch on power from the main socket and then switch on the computer (CPU) and the monitor to boot the system. On the other hand, if in the hard disk, the same procedure should be followed until C:> appears on the screen.

Step 3. At the DOS prompt, C:>

type: dbase and press enter key.

Step 4. At the prompt, C:\dbase>

type: dbase and press enter key, again.

Step 5. Press ESC key and choose 'Yes' and press Enter key to get you to dbase prompt.

Step 6. At the dbase prompt, insert a working diskette in drive A and set default to A. Press Enter key.

Step 7. Type: do cropmain and press Enter key.

The user is welcome to the Computerised Agricultural Data Management System package and the software will display on the screen a number of tasks to perform and then prompt you to make a choice of the subroutine to be executed.

The main menu enables the user to select within the message listed below:-

A Add Record

E Edit Record

D Delete Record

V View Record

S Search Record

R Report Record

Q Quit Record

On successful typing of this first letter of the option a screen is opened and this will allow the user to perform any of the tasks listed above or return to the DOS prompt.

The programs for the various modules are attached in the appendix.

4.6 Cost Analysis

The estimated cost of implementing the design system is as follows:-

i.	Hardware with the following component	
	a) 486 micro-processor (VGA)	
	b) 4 MB RAM	
	c) 540 MB hard disk	
	d) 1.2 MB 5.25" floppy disk drive	
	e) 1.44 MB 3.5" floppy disk drive	₦100,000.00
ii.	Implementation (installation)	10,000.00
	Maintenance	10,000.00
	Dot matrix printer	35,000.00
	Stationery	8,000.00
	Uninterrupted Power Supply (UPS)	28,000.00
iii.	Training	25,000.00
	Total	₦216,000.00

CHAPTER FIVE

5.0 SYSTEM IMPLEMENTATION

The implementation phase has to do with the actual execution of the design. This is to allow for a test of the effectiveness or otherwise of the input and output data items used in the system. Under the system implementation, the needs for training, hardware and software supports and the changeover plans are discussed.

5.1 Training

This involves the training needs to be provided to some personnel who will operate the new system. Such personnel include Computer Operators, Data Processing Officers, Data Processing Assistants and others. This training will include the storage, retrieval, editing and probing of data. During the training, some days will be set aside to make sure that all the people concerned are taught some basic commands of the package.

5.2 Hardware Support

These are the physical components found in the computer environment. Their support is important for the execution of this application program. These include:-

i. Micro-Computer P.C, configuration of IBM compatible.

ii. 3.5" and 5.25" floppy drive and floppy diskettes are also required to process the job.

iii. Computer stationery such as computer papers for processing hardcopy of the processed data.

iv. An uninterrupted power supply (UPS) stablisher for regulating power supply.

v. The laser printer or a dot matrix printer for print out.

5.3 **Software Support**

Software is a collection of programmes that are made to work together for a specific purpose. Without the software, a computer system cannot function. The software support required for the execution of the program are Operating System and Database Management System softwares.

The Disk Operating System (DOS) uses program and procedure written to run a computer system. It is a series of programmes such that when executed controls the operating of the computer. The functions of the Disk Operating System include:-

i. Communicates with computer operators by means of the keyboard.

ii. Supervises multi-programming operations such as running of each program, protecting each program's working store from overwriting.

iii. Allocates peripherals to programs and checks for availability

A database is a collection of data usually in files, arranged in such a way that it is independent of any particular program or application. The arrangement eliminates data redundancy. Access to files is provided by Database Management System (DBMS). A Database Management System is an

organised collection of inter-related data and set of programs to access that data. The aim of a database management system is to create an environment that is efficient and convenient for retrieving information from stored database.

5.4 **System Changeover**

This entails changing from the old system to the newly developed one. Due to the similarity between the manual and the computerised system, it has been suggested that both should be run side by side for a period of time. This method of conversion is called PARALLEL CONVERSION, by this, the old system is phased out slowly. This method of conversion also offers the opportunity of comparing the result of the old manual system and the new computerised system.

5.5 **Recommendation**

The newly developed computerised agricultural data management system is hereby recommended for immmediate implementation by the National Agricultural Data Bank. This is because its implementation will provide the management with accurate and reliable data for agricultural planning and effective coordination of agricultural programmes. Suffice it to say that by implication, agricultural planners will imbibe the culture of planning with data.

Also, research on the topic is highly recommended for Livestock and Forestry Sub-Sectors since agriculture is the main stay of the nation's economy.

5.6 Conclusion

The principal goal of this project is to effectively design and develop a computerised database for Crops Sub-Sector that would grossly reduce inefficiency, data duplication associated with manual operation. The system is designed, developed and tested with some of the existing data with National Agricultural data Bank and is found to be working.

A database management system is used as the language in the software development. Various files are created, based on the database structure and programs are written in modules to carryout different functions in the data storage and retrieval.

The software system has the facility to add record, edit record, delete record, view record, search record as well as generate report and finally an option to get quit or return to the DOS prompt.

LIMITATION

The study could not contain all agricultural data. The scope is narrowed down to crops production data in Crops Sub-Sector because of time constraint and financial involvement.

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APPENDIX

********** MAIN PROGRAM **********

```
SET TALK OFF
SET STATUS OFF
DO WHILE .T.
CLEAR
SET COLO TO G/B+
@ 1,10 SAY 'WELCOME TO COMPUTERISED AGRICULTURAL DATA
           MANAGEMENT SYSTEM PACKAGE'
@ 2,10 SAY 'DESIGNED BY MR. F. E. AKPAN'
@ 3,10 SAY 'MAT. NO. PGD/MCS/017/96'
@ 4,10 SAY 'POST GRADUATE DIPLOMA IN COMPUTER SCIENCE'
@ 5,10 SAY 'FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA'
@ 6,10 SAY 'REMARKS:- THE PROGRAM IS WRITTEN TO SOLVE THE PROGRAM
@ 7,31 SAY 'OF CROP DATA STORAGE & RETRIEVAL'
@ 8,10 SAY 'DATE WRITTEN:- JULY, 1997'
@ 9,10 SAY 'ENTER CHOICE TO GO THROUGH THE PROGRAM OR QUIT'
CHOICE = ' '
SET COLO TO W/B+
@ 11,10 TO 15,70 DOUBLE
@ 12,12 SAY 'ADD'
@ 12,18 SAY 'DELETE'
@ 12,26 SAY 'EDIT'
@ 12,35 SAY 'VIEW'
@ 12,43 SAY 'SEARCH'
@ 12,53 SAY 'REPORT'
@ 12,60 SAY 'QUIT'
SET COLO TO R+
@ 12,12 SAY 'A'
@ 12,18 SAY 'D'
@ 12,26 SAY 'E'
@ 12,35 SAY 'V'
@ 12,43 SAY 'S'
@ 12,53 SAY 'R'
@ 12,60 SAY 'Q'
SET COLO TO W/B+
CH = SPACE (1)
@ 14,35 SAY 'ENTER CHOICE' GET CHOICE PICT '!'
 READ
DO CASE
CASE CHOICE = 'A'
 DO CROPADD
CASE CHOICE = 'D'
 DO CROPDEL
CASE CHOICE = 'E'
 DO CROPEDIT
CASE CHOICE = 'V'
 DO CROPVIEW
CASE CHOICE = 'S'
 DO CROPSEAR
```

```
CASE CHOICE = 'R'
 DO CROPRPT
OTHERWISE
 QUIT
ENDCASE
ENDDO
SET TALK ON
SET STATUS ON
RETURN.
```

```
****************** ADD SUB - PROGRAM ******************

SET TALK OFF
DO WHILE .T.
CLEAR
MPERIOD = CTOD('  /  /  ')
MCROPNAME = SPACE(12)
MSOURCE = SPACE(20)
STORE 0 MCROPCODE, MPLATAREA, MCROPYELD
@ 4,10 TO 20,66 DOUBLE
@ 5,31 SAY 'CROP ACTIVITIES'
@ 6,31 TO 6,45 DOUBLE
@ 7,12 SAY 'CROP CODE' GET MCROPCODE PICT '999999'
@ 7,35 SAY 'CROPNAME' GET MCROPNAME
@ 9,12 SAY 'CROP PRODUCTION (MT)' GET MCROPPROD PICT
          '99999999999999'
@ 9,46 SAY 'WHICH PERIOD' GET MPERIOD
@ 11,12 SAY 'PLANTED AREA (HA)' GET MPLATAREA PICT '999999999999'
@ 13,12 SAY 'CROP YIELD (MT)' GET CROPYELD PICT    '99999999999999'
@ 15,12 SAY 'SOURCE' GET MSOURCE
READ
CH = SPACE(1)
@17,12 SAY 'DO YOU WANT TO ADD THIS RECORD (Y/N)?' GET CH PICT '!'
READ
IF CH = 'Y'
USE CROPDATA
APPEND BLANK
REPLACE CROPCODE WITH MCROPCODE, PLANTAREA WITH MPLATAREA
REPLACE CROPPROD WITH MCROPPROD, PERIOD WITH MPERIOD
REPLACE CROPYIELD WITH MCROPYELD,SOURCE WITH MSOURCE
REPLACE CROPNAME WITH MCROPNAME
ELSE
ENDIF
ANS = SPACE(1)
@19,20 SAY 'DO YOU WANT TO ADD MORE RECORD (Y/N)?' GET ANS PICT '!'
READ
IF ANS = 'Y'
LOOP
ELSE
CLEAR
EXIT
ENDIF
ENDDO
SET TALK ON
RETURN
```

```
***************** DELETE SUB - PROGRAM *****************

SET TALK OFF
USE CROPDATA
DO WHILE .T.
GO TOP
CLEAR
MPERIOD = CTOD('  /  /  ')
@ 3,10 TO 20,68 DOUBLE
@ 4,31 SAY 'CROP ACTIVITIES'
@ 5,31 TO 5,45 DOUBLE
@ 6,15 SAY 'WHICH PERIOD' GET MPERIOD
READ
LOCATE FOR PERIOD = MPERIOD
IF .NOT. FOUND ()
@ 7,15 SAY 'RECORD NOT FOUND'
ELSE
@ 8,12 SAY 'CROP CODE:-'GET CROPCODE
@ 8,35 SAY 'CROPNAME:-' GET CROPNAME
@ 10,12 SAY 'CROP PRODUCTION (MT):-' GET CROPPROD
@ 12,12, SAY 'PLANTED AREA (HA):-' GET PLANTAREA
@ 14,12 SAY 'CROP YIELD (MT) :-' GET CROPYELD
@ 16,12 SAY 'SOURCE:-' GET SOURCE
CLEAR GETS
CH = SPACE(1)
@ 17,12 SAY 'DO YOU WANT TO DELETE THIS RECORD (Y/N)?' GET CH
             PICT '!'
READ
IF CH = 'Y'
DELETE
PACK
@ 18,12 SAY 'RECORD IS DELETE'
ENDIF
ENDIF
ANS = SPACE(1)
@ 9,12 SAY 'DO YOU WANT TO DELETE RECORD (Y/N)?' GET ANS
            PICT '!'
READ
IF ANS = 'Y'
LOOP
ELSE
CLEAR
EXIT
ENDIF
ENDDO
CLOSE DATABASE
SET TALK ON
RETURN
```

```
***************** EDIT SUB - PROGRAM *****************

SET TALK OFF
USE CROPDATA
DO WHILE .T.
GO TOP
CLEAR
MPERIOD = CTOD('  /  /  ')
@ 3,10 TO 20,68 DOUBLE
@ 4,31 SAY 'CROP ACTIVITIES'
@ 5,31 TO 5,45 DOUBLE
@ 6,15 SAY 'WHICH PERIOD' GET MPERIOD
READ
LOCATE FOR PERIOD = MPERIOD
IF .NOT. FOUND ()
@ 7,15 SAY 'RECORD NOT FOUND'
ELSE
@ 8,12 SAY 'CROP CODE:-'GET CROPCODE
@ 8,35 SAY 'CROPNAME:-' GET CROPNAME
@ 10,12 SAY 'CROP PRODUCTION (MT):-' GET CROPPROD
@ 12,12, SAY 'PLANTED AREA (HA):-' GET PLANTAREA
@ 14,12 SAY 'CROP YIELD (MT) :-' GET CROPYELD
@ 16,12 SAY 'SOURCE:-' GET SOURCE
READ
ENDIF
ANS = SPACE(1)
@ 19,12 SAY 'DO YOU WANT TO EDIT THIS RECORD (Y/N)?' GET ANS
             PICT '!'
READ
IF CH = 'Y'
 LOOP
ELSE
CLEAR
EXIT
ENDIF
ENDDO
CLOSE DATABASE
SET TALK ON
RETURN
```

```
***************** VIEW SUB - PROGRAM *****************

SET TALK OFF
USE CROPDATA
DO WHILE .T.
GO TOP
CLEAR
MPERIOD = CTOD('  /  /  ')
@ 3,10 TO 20,68 DOUBLE
@ 4,31 SAY 'CROP ACTIVITIES'
@ 5,31 TO 5,45 DOUBLE
@ 6,15 SAY 'WHICH PERIOD' GET MPERIOD
READ
LOCATE FOR PERIOD = MPERIOD
IF .NOT. FOUND ()
@ 7,15 SAY 'RECORD NOT FOUND'
ELSE
@ 8,12 SAY 'CROP CODE:-'GET CROPCODE
@ 8,35 SAY 'CROPNAME:-' GET CROPNAME
@ 10,12 SAY 'CROP PRODUCTION (MT):-' GET CROPPROD
@ 12,12, SAY 'PLANTED AREA (HA):-' GET PLANTAREA
@ 14,12 SAY 'CROP YIELD (MT) :-' GET CROPYELD
@ 16,12 SAY 'SOURCE:-' GET SOURCE
CLEAR GETS
ENDIF
ANS = SPACE(1)
@ 18,12 SAY 'DO YOU WANT TO VIEW ANOTHER RECORD (Y/N)?' GET
             ANS PICT '!'
READ
IF CH = 'Y'
 LOOP
ELSE
CLEAR
EXIT
ENDIF
ENDDO
CLOSE DATABASE
SET TALK ON
RETURN
```

```
***************** SEARCH SUB - PROGRAM *****************

SET TALK OFF
DO WHILE .T.
CLEAR
USE CROPDATA
MPERIOD = CTOD('  /  /  ')
STORE 0 TO MCROPCODE, MCROPPROD, MPLANTAREA, MCROPYIELD
@ 3,10 TO 20,68 DOUBLE
@ 4,31 SAY 'CROP ACTIVITIES'
@ 5,31 TO 5,45 DOUBLE
@ 7,13 SAY 'CROPCODE' GET MCROPCODE
READ
LOCATE FOR CROPCODE = MCROPCODE
IF FOUND ()
@ 9,13 SAY 'PERIOD/YEAR' GET PERIOD
@ 9,38 SAY 'CROPNAME' GET CROPNAME
@ 11,13 SAY 'CROPPROD (MT)' GET CROPPROD
@ 13,13, SAY 'PLANTED AREA (HA)' GET PLANTAREA
@ 15,13 SAY 'CROP YIELD (MT)' GET CROPYELD
@ 17,13 SAY 'SOURCE' GET SOURCE
READ
ELSE
 @ 18,13 SAY 'RECORD NOT FOUND'
ENDIF
CH = SPACE(1)
@ 19,13 SAY 'DO YOU WANT TO CONTINUE TO SEARCH MORE RECORD
        (Y/N)?' GET CH PICT '!'
READ
IF CH = 'Y'
 LOOP
ELSE
CLEAR
EXIT
ENDIF
ENDDO
CLOSE DATABASE
SET TALK ON
RETURN
```

```
***************** REPORT SUB - PROGRAM *****************
SET TALK OFF
USE CROPDATA
DO WHILE .T.
GO TOP
CLEAR
MPERIOD = CTOD('  /  /  ')
STORE 0 TO MCROPCODE, MPLATAREA, MCROPPROD, MCROPYIELD
@ 3,10 TO 20,68 DOUBLE
@ 4,31 SAY 'CROP ACTIVITIES'
@ 5,31 TO 5,45 DOUBLE
@ 6,15 SAY 'WHICH CROPCODE' GET MCROPCODE
READ
LOCATE FOR CROPCODE = MCROPCODE
IF .NOT. FOUND ()
@ 7,15 SAY 'RECORD NOT FOUND'
ELSE
@ 8,12 SAY 'PERIOD/YEAR:-'GET PERIOD
@ 8,35 SAY 'CROP NAME:-' GET CROPNAME
@ 10,12 SAY 'CROP PRODUCTION (MT):-' GET CROPPROD
@ 12,12, SAY 'PLANTED AREA (HA):-' GET PLANTAREA
@ 14,12 SAY 'CROP YIELD (MT) :-' GET CROPYELD
@ 16,12 SAY 'SOURCE:-' GET SOURCE
CLEAR GETS
OS = SPACE(1)
@ 17,12 SAY 'DO YOU WANT TO PRINT THIS REPORT (Y/N)?' GET OS
             PICT '!'
READ
IF OS = 'Y'
SET DEVICE TO PRINTER
@ 8,12 SAY 'PERIOD/YEAR:-'GET PERIOD
@ 8,35 SAY 'CROP NAME:-' GET CROPNAME
@ 10,12 SAY 'CROP PRODUCTION (MT):-' GET CROPPROD
@ 12,12, SAY 'PLANTED AREA (HA):-' GET PLANTAREA
@ 14,12 SAY 'CROP YIELD (MT) :-' GET CROPYELD
@ 16,12 SAY 'SOURCE:-' GET SOURCE
ELSE
ENDIF
ENDIF
ANS = SPACE(1)
@ 18,12 SAY 'DO YOU WANT TO REPORT ON MORE RECORD (Y/N)?'
             GET ANS PICT '!'
READ
IF ANS = 'Y'
LOOP
ELSE
EXIT
ENDIF
ENDDO
CLOSE DATABASE
SET TALK ON
RETURN
```

Caps

```
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¤ WELCOME TO COMPUTERISED AGRICULTURAL DATA MANAGEMENT PACKAGE ¤
¤ DESIGNED BY MR. F. E. AKPAN                                  ¤
¤ MAT. NO. PGD/MCS/017/96                                      ¤
¤ POST-GRADUATE DIPLOMA IN COMPUTER SCIENCE                    ¤
¤ FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA, NIGER STATE         ¤
¤ REMARKS :- THE PROGRAM IS WRITTEN TO SOLVE THE PROBLEM OF    ¤
¤           CROP DATA STORAGE & RETRIEVAL                      ¤
¤ DATE WRITTEN:- JULY, 1997                                    ¤
¤ ENTER CHOICE TO GO THROUGH THE PROGRAM OR QUIT               ¤
àèëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëë£
 ¤ ADD   DELETE  EDIT    VIEW    SEARCH    REPORT QUIT         ¤
 ¤                                                             ¤
 ¤                       ENTER CHOICE                          ¤
 àëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëë¥
```

```
è[illegible]£
¤                    CROP ACTIVITIES                    ¤
¤                    [illegible]                        ¤
¤ CROP CODE    101       CROP NAME   MAIZE               ¤
¤                                                       ¤
¤ CROP PRODUCTION (MT)          4255 WHICH PERIOD? 12/31/96¤
¤                                                       ¤
¤ PLANTED AREA (HA)              465                    ¤
¤                                                       ¤
¤ CROP YIELD (MT)                3742                   ¤
¤                                                       ¤
¤ SOURCE  NABD - FMA                                    ¤
¤                                                       ¤
¤ DO YOU WANT TO ADD THIS RECORD (Y/N)?                 ¤
¤                                                       ¤
¤                                                       ¤
à[illegible]¥

                ¤              ¤              ¤      Caps
```

```
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¤                    CROP ACTIVITIES                          ¤
¤                    ëëëëëëëëëëëëëëë                          ¤
¤    WHICH PERIOD 12/31/94                                    ¤
¤                                                             ¤
¤ CROP CODE:-      102    CROP NAME:-   MILLET                ¤
¤                                                             ¤
¤ CROP PRODUCTION (MT):-          45670                       ¤
¤                                                             ¤
¤ PLANTED AREA (HA):-          1245                           ¤
¤                                                             ¤
¤ CROP YIELD (MT):-          56120                            ¤
¤                                                             ¤
¤ SOURCE:-  NADB -FMA                                         ¤
¤ DO YOU WANT TO DELETE THIS RECORD (Y/N)? N                  ¤
¤                                                             ¤
¤ DO YOU WANT TO DELETE MORE RECORD (Y/N)?                    ¤
àëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëë¥

A:\CROPDATA             ¤Rec 1/13         ¤File ¤        ¤      Caps
```

èëë£

¤ CROP ACTIVITIES ¤

¤ ëëëëëëëëëëëëëëë ¤

¤ WHICH PERIOD 12/31/95 ¤

¤ ¤

¤ CROP CODE:- 112 CROP NAME:- YAM ¤

¤ ¤

¤ CROP PRODUCTION (MT):- 22818 ¤

¤ ¤

¤ PLANTED AREA (HA):- 2126 ¤

¤ ¤

¤ CROP YIELD (MT):- 10732 ¤

¤ ¤

¤ SOURCE:- NADB - FMA ¤

¤ ¤

¤ DO YOU WANT TO VIEW ANOTHER RECORD (Y/N)? ¤

¤ ¤

àëëë¥

A:\CROPDATA ¤Rec 2/13 ¤File ¤ ¤ Caps

```
è[illegible]£
¤                    CROP ACTIVITIES                    ¤
¤                    ëëëëëëëëëëëëëë                    ¤
¤                                                       ¤
¤  CROPCODE        102                                  ¤
¤                                                       ¤
¤  CROPNAME  MILLET          WHICH PERIOD 12/31/94       ¤
¤                                                       ¤
¤  CROPPROD (MT)           45670                        ¤
¤                                                       ¤
¤  PLANTED AREA (HA)         1245                       ¤
¤                                                       ¤
¤  CROP YIELD (MT)          56120                        ¤
¤                                                       ¤
¤  SOURCE NADB -FMA                                     ¤
¤                                                       ¤
¤  DO YOU WANT TO CONTINUE TO SEARCH MORE RECORD (Y/N)  ¤
à[illegible]¥

:\CROPDATA          ¤Rec 1/13        ¤File ¤       ¤      Caps
```