

UM- 30

DATA STORAGE AND RETRIEVAL SYSTEM

ON

PERSONAL COMPUTER

NATIONAL INSTITUTE OF HYDROLOGY
JAL VIGYAN BHAWAN
ROORKEE - 247 667
1988-89

PREFACE

Management of large volumes of hydrological data observed under variable exploitation and replenishment condition needs a scientific basis of mass storage alongwith facilities for selected retrieval. A computerised Data Storage and Retrieval System system for hydrological data has therefore been developed using dBASE-III plus. The system is capable of adding new records and modifying/retrieving the existing data from the data base.

The report has been prepared by Smt. Deepa Chalisgaonkar, Scientist 'B', Sh. S.K.Jain Scientist 'C' and Sh. P.K.Mittal, SRA (Programming).

Satish Chandra
(SATISH CHANDRA)

CONTENTS

	Page
List of figures	(ii)
Abstract	(iii)
1.0 Introduction	1
2.0 Purpose of the Report	6
3.0 Hardware and software requirement	7
4.0 Data Storage and Retrieval System	8
5.0 Conclusion	25
6.0 References	26
Appendices	
(A) Listing of program	A1-A47
(B) Structure of Databases	B1-B9

LIST OF FIGURES

<u>Fig. No.</u>	<u>TITLE</u>	<u>Page No.</u>
1	Hierarchical representation of data	11
2	Network representation of data	11
3	Relational database model	13
4	Format of the code	13
5	Map of major river basins in India.	16

ABSTRACT

This report gives details of a Data Storage and Retrieval System for hydrological data developed on IBM compatible Personal Computer at NIH, using dBASE III - Plus for its implementation.

Using the DSR system, data can be stored in such a way that the storage of data is independent of the programmes which use them. A common and controlled approach has been adopted in adding new data and modifying/retrieving the existing data from the data base. The data have been structured so as to provide future application development simpler, faster and easier.

The major tasks performed by this package are:

- i) Validation of incoming raw data, their organization and thereby creation of the master file.
- ii) Retrieval of data from the master data file.
- iii) Maintenance and updation of the master data file.

These functions are performed with the help of simple commands developed specially for this purpose.

1.0 Introduction

The term data refers to symbols used to represent a fact, event, or entity. Information is the meaning given to a set of data. The data can be treated as coded information which has a definite and predecided interpretation. For example, the group of digits '17041962' may not give any explicit meaning but in fact it may be the date of birth of a person, a bank account number, discharge of a particular stream, or enrolment number of a student and so on. Therefore the group of digits '17041962' can be considered as a data item having different possible interpretations depending upon applications.

The past few decades have witnessed tremendous growth in utilisation and management of water resources. The successful and efficient execution of these studies/decisions requires a vast amount of data of interrelated phenomenon. The accuracy of results obtained depends upon the quality and quantity of data used. Although techniques are available for synthetic generation of data, the generated data cannot be perfect substitute of the observed data.

Once data are collected, the next important and necessary step is their proper storage. In the conventional ways, the data are mostly kept in manuscript form in registers or files. This form of data storage is easiest, does not require any technical skill and is independent of such factors like capital investment, availability of

sophisticated machines and electricity. Usually no preprocessing is done before the data are stored in the registers/files.

In spite of its simplicity, this practice of storing the data has a number of limitations and disadvantages. It is very difficult to keep an up-to-date inventory of data. Many times, data are lost due to physical damage to the storage media. Further, whenever, data are required for any application they are manually copied which has possibility of introduction of human errors besides being time consuming. Any change of format of data requires complete rewriting of the data in the desired format.

1.1 Need of Data Storage and Retrieval System

Hydrology is an applied natural science and therefore hydrologists have to deal with vast amount of data. Moreover, with the increase in population and industrial activities, water is gradually becoming a scarce commodity rather than a freely available natural resource. Due to this, the analysis of water resources systems is becoming more and more complicated and detailed and this demands, inter alia, more frequent observations of larger number of variables. It has been estimated that the annual volume of primary information received from a single gauging station is in the neighbourhood of 150,000 characters. Other observations such as water quality might produce between 300 to 600,000 characters. The summarization of these data

in year books is a time consuming and voluminous job. Moreover, several types of statistical information is required for the analysis of hydrological systems, i.e., flood frequency determination, design flood estimation, low flow analysis and reservoir operation. The proper storage of these data in conventional way is next to impossible because of sheer volume of labour involved.

In the conventional way, data are mostly kept in registers or files and whenever demanded, they are manually copied and supplied. Usually, no data inventory is available and many times, data are lost with the passage of time due to several reasons like physical damage to the storage media. With the introduction of digital computers, data handling is done more rapidly, easily and economically.

The punched cards may be used for storing the data but this type of data storage has a number of limitations like the cards may be damaged, they are inconvenient to carry, visual checking is difficult and time consuming and proper sequence is to be maintained.

Another possible way of data storage is by use of computer files. In the simplest way, data are organised in sequential files which are stored on magnetic media. Whenever needed the data are picked up from this media and are used. To access a specific data record from a sequential file, it is required to check each record in sequence until the desired one is encountered. Clearly, sequential access holds a distinct disadvantage for a user interested only in

specific record. The contents of a record on tape cannot be changed, nor can the records be added or deleted in between.

To overcome the drawbacks of magnetic tapes, magnetic disks may be used as the storage devices. The magnetic disks are the direct access medium on which data are recorded in concentric circles and a read/write head is used to directly locate, the place where the read/write operation is to be performed. While handling large sequential files on disks, the access to data in several files is awkward and time consuming. Further, there is little assurance that the same data items on different files are defined similarly. This results in lack of data integrity. Program and data are dependent which means that a change in one causes corresponding changes to be made in the other.

In the sequential files, there is no data independence. If a change is made to the data organization, the user has to modify his programme accordingly, recompile it and then test the modifications. The files thus maintained are useful for one application only. Other applications requiring the same data in a different form cannot use the same data file. There is, therefore, a high level of redundancy with many different files containing the same data element in different form.

Since the same data are stored in different files, any change in data requires that all files should be simultaneously updated. This does not happen always and this creates confusion since different files will have different

values of the same data. Further the data on files are mostly updated by use of editing programmes and as the size of the files increases, larger disk space is required to edit them.

In view of these problems of data handling, it is essential to use a systematic approach for storage and retrieval of the data. The software which is employed to manage this task is known as Data Storage and Retrieval System.

2.0 Purpose of the Report

A Data Storage and Retrieval (DSR) system specifically suited for hydrometeorological data has been developed at the National Institute of Hydrology, Roorkee. The purpose of this report is to describe and document this package. The fundamentals of Data Storage Retrievals have been briefly described in this report. The technique adopted in the DSR system of NIH has been discussed followed by description of the package.

3.0 Hardware and software requirement

The package has been developed on IBM compatible personalcomputer, having minimum of 256K of memory, a floppy drive and a winchester disk drive, using dBase III Plus software. The disk operating system DOS must be version 2.0 or later for the program to operate. Any printer compatible with the computer can be used with the program.

dBase III Plus is a file management system with relational features added. dBase III Plus contains its own programming language.

Some of the features of dBase III Plus are :

- i) Program and data are largely independent of each other. The user can change the structure of the database without making many program changes.
- ii) The user can easily add, edit, delete, sort, index or report data using minimum of programming.
- iii) The user can quickly create many reports from the data, using as necessary, mathematical operators such as multiplication and division. Average, totals, subtotal and subsubtotals can be generated easily.

4.0 Data Storage and Retrieval System

A Data Storage and Retrieval (DSR) system may be defined as a collection of interrelated data stored together without harmful or unnecessary redundancy to serve multiple applications. Specific data item(s) may be searched/retrieved from this system very quickly and easily.

The concept of a DSR system is that an organization keeps all its possible items of data in a large reservoir from which a number of users with different data requirements can retrieve the data. Each user will have his own view of the data which is derived from a common overall data structure. However, their methods of accessing or searching the data may differ. Such a DSR system would be highly complex because of a wide variety of requirements. In reality, today most of the DSR systems serve a limited set of applications.

The data in a DSR system are stored in such a way that they are independent of the programmes which use them. A common and controlled approach is used in adding new data and modifying/retrieving the existing data within the designed database. In fact a DSR system is a software interface between a database and a user. The data is structured so as to provide future application development simpler.

4.1 Characteristics of a Data Storage and Retrieval System

The immediate objective of DSR System is to make application development easier, cheaper, faster and more flexible. Some of the features of a DSR system are as follows:

- A. Performance:- A DSR system designed for interactive use must give quick response.
- B. Minimum Cost:- To keep the cost down, the data should be represented in such a way so that the total storage requirement is minimum.
- C. Minimal Redundancy:- The DSR system should eliminate redundant data where it is economical to do and should control the inconsistencies that are caused by redundant data values.
- D. Search Capability:- The DSR system should achieve fast and flexible search capability.
- E. Integrity:- The storage, updating and retrieval procedures must be such as to avoid harm to the data. Range checks and other controls should detect data inaccuracies where possible.
- F. Privacy and Security:- Data must be kept secure and private. The data must be protected from a person who may falsely update them. Unauthorized access to the data must be prevented.

In practice, no software package gives all the characteristics that an ideal Data Storage and Retrieval

System should have and the designer has to compromise among different qualities.

4.2 Database Models

The three major models used for organizing a data base are hierarchical, network and relational. A particular DSR system is generally designed to support only one of these models. The examples of each kind of model are shown in Fig 1, 2 and 3 representing data regarding flow, temperature and rainfall observed at three different stations lying in one river basin.

The first model shows a hierarchical representation of the data. It is ordered by station name and then the observed values of flow, temperature and rainfall. The hierarchical data structure, also called a tree structure, has a "one-to-many" relationship among the data records. This means that a higher level data record, called a parent (for example river basin) can be related to one or more of the next lower-level records (for example stations), each called a child. Each parent can have one or more children, but each child can have only one parent.

A different way of structuring the data is possible in the network model using multiple links specifying relationships between data items. The network database structure allows "many-to-many" relationships among parent and child records as shown in figure 2. If in the fig.1 ,

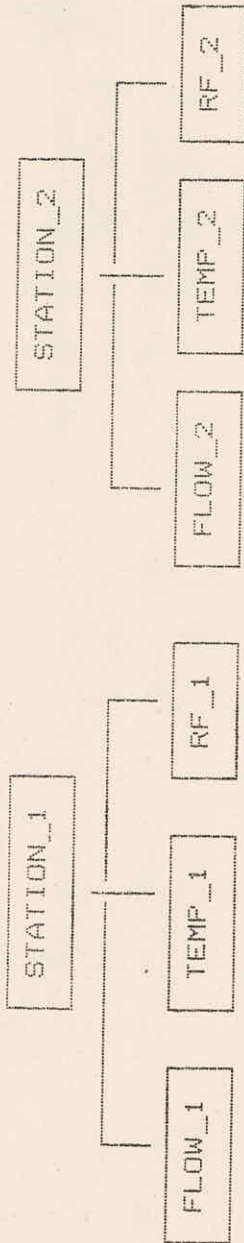


Fig. 1

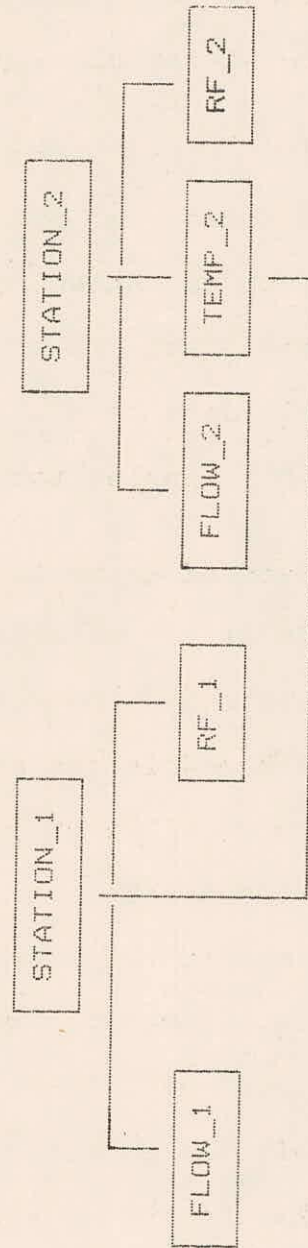


Fig. 2

the temperature at STATION_1 is same as TEMPERATURE_2, this can be represented using network model as shown in fig.2. The temperature at STATION_2 can be equated to temperature at STATION_1 or vice versa. In all other respects this is similar to hierarchical model.

The third data base model is the relational model which is based on presenting data in the form of tables or relations as shown in fig 3. Each horizontal row is a record and data items are shown in the columns. The relational data base structure shows relationships among records by linking tables together as needed.

Each of these models has its strengths and weaknesses and needs to be matched to the data base requirements of an organization. The major advantages of the hierarchical and network models are economy and speed. The network model allows the addition of lateral connections to the tree. In general, these models, in comparison to the relational model, have less data redundancy and allow faster access to the information. However, these data base models are complex to update since all affected links must be reconfigured. The design of the database using these models require that the links be built into the design of the data base. Programs must follow the established paths to find information. These paths are designed to quickly retrieve the desired information but retrieval may be slow for information that requires access not directly supported by

STATION_1	FLOW_1	TEMP_1	RF_1
STATION_2	FLOW_2	TEMP_2	RF_2
STATION_3	FLOW_3	TEMP_3	RF_3

Fig.3

BASIN CODE	SUB BASIN	STATION TYPE	STATION NO
---------------	--------------	-----------------	---------------

Fig.4

the built-in links.

The major advantage of the relational model is that any combination of data in the database can be easily retrieved. Links between data records can be established by user's commands. This great flexibility allows the relational database to be easily configured to answer new and unanticipated questions.

In the present DSR system, a relational model has been used. This model has been preferred over other models because it, generally, includes powerful tools for selecting, indexing, sorting and reporting the data. Besides this, the relational structure is the simplest, easily extendable, less redundant and therefore economical. Further, addition of new data to the existing database is also easiest in this structure.

4.3 System Design

The developed system is an interactive type of menu driven, user friendly package. Password control has been provided in the system to prevent the unauthorized access to the data. The system can display in multiple colours if the colour monitor is used.

The hydrological data has been divided into 8 categories :

- i) Station Description,
- ii) Meteorological Data

- iii) Land Use & Vegital Cover Data
- iv) Surface Water Data
- v) Ground Water Observations
- vi) Geological Parameters
- vii) Water Quality Data

These data have been again subdivided in to different categories and so on. Each type of data have been stored in its own format.

The basic operations which can be performed on these data are :

- i) Edit Data
- ii) Delete Data
- iii) Add More Data
- iv) Get Report (Retrieve Data)

The data have been stored Stationwise. A five digit code has been developed for storing the station name. The advantages of using the code are:

- i) A code requires less space for storage.
- ii) Two stations may have the same name. Such type of stations may be distinguished using the codes.
- iii) The station names may be misspelled. The use of code avoids it.

The entire country has been divided in to 10 major river basins and a single digit numeric code has been assigned to each river basin. The map of major river basins of India is shown in fig.5. The codes of the river basins

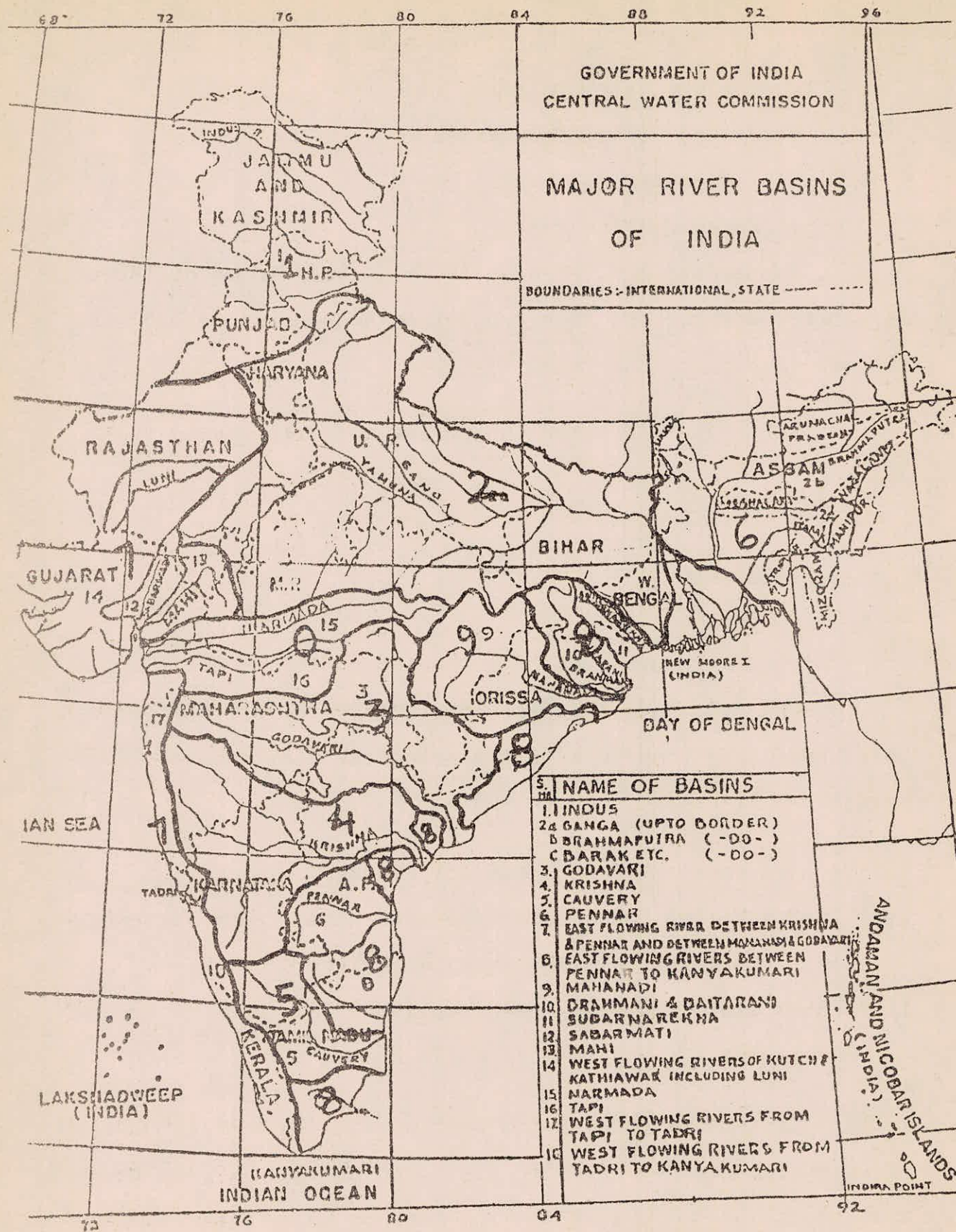


Fig. 5

are:

S.No. -----	Basin -----	Code -----
1.	Indus	1
2.	Ganga	2
3.	Godavari	3
4.	Krishna	4
5.	Cauvery	5
6.	Brahmaputra	6
7.	Sabarmati & Mahi	7
8.	Brahmani, Subarnarekha & Pennar	8
9.	Mahanadi	9
10.	Tapi & Narmada	0

The river basins have been divided into subbasins and because the number of subbasins in a particular river basin may be more than 10, a single digit alphanumeric code has been assigned to them.

The codes of the subbasins are as follows:

Basin code: 1

(Indus Basin)

Sub-basin -----	Code -----
Gilgit river	A
Free catchment of Indus river	B
Shyok river	C

Free catchment of Indus river	D
Jhelum river	E
Chenab river	F
Ravi river	G
Beas river	H
Sutlej river	I

Basin code: 2

(Ganga Basin)

Sub-basin -----	Code -----
Free catchment of river Gange	A
Mandakini & Alaknanda river	B
Ramganga river	C
Gomati river	D
Sarda & Ghaghara river	E
Gandak river	F
Burhi Gandak river	G
Kosi river	H
Phalgu, Punpur & Bhagirathi river	I
Free catchment of Ganga & Yamuna (Surrounding Allahabad area)	J
Son river (including N.Keel & Rihand rivers)	K
Tons river	L
Free catchment of river Yamuna	M
Ken river	N

Betwa & Dhasan rivers	O
Free catchment of river Yamuna	P
Sind river	Q
Chambal river	R
Free catchment of river Yamuna	S
Kali river	T
Hindon river	U

Basin code: 3

(Godavari Basin)

Sub-basin -----	Code ----
Free catchment of river Godavari	A
Penganga & Wainganga, Pranhita rivers	B
Indravati river	C
Savari river	D
Free catchment of river Godavari	E
Maner river	F
Manjra river	G

Basin code: 4

(Krishna Basin)

Sub-basin -----	Code ----
Bhima river	A
Free catchment of river Krishna	B
Dindi river	C
Free catchment of river Krishna	D
Musi river	E

Palleru river	F
Muneru river	G
Free catchment of river Krishna	H
Tungabhadra river	I
Free catchment of river Krishna	J
Malprabha river	K
Ghatprabha river	L
Free catchment of river Krishna	M

Basin Code : 5

(Cauvery Basin)

Sub-basin -----	Code -----
Free catchment of river Cauvery	A
Hemavati river	B
Shimsha river	C
Free catchment of river Cauvery	D
Arkavati river	E
Free catchment of river Cauvery	F
Amaravati river	G
Free catchment of river Cauvery	H
Bhavani river	I
Kabbani river	J
Lakshmantirtha river	L

Basin code: 6

(Brahmaputra Basin)

<u>Sub-basin</u>	<u>Code</u>
Jaldhaka & Dharla river	A
Manas river	B
Free catchment of river Brahmaputra	C
Kameng river	D
Subansiri river	E
Dihang river	F
Dibang river	G
Lohit river	H
Burhi Dihing river	I
Jorhat river	J
Dhansiri river	K
Kalang river	L
Free catchment of river Brahmaputra	M

Basin code: 7

(Sabarmati & Mahi Basin)

<u>Sub-basin</u>	<u>Code</u>
Free catchment of river Sarmati river	A
Meshwa & Hatmati rivers	B
Free catchment of river Mahi	C
Ana river	D

Basin code: 8

(Brahmani & Subarnarekha Basin)

Sub-basin -----	Code -----
Free catchment of river Brahmani	A
Sankh river	B
South Koel river	C
Kharkai river	D
Free catchment of river Subarnarekha	E

(Penner Basin)

Free catchment of river Penner	F
Kunderu river	G
Free catchment of river Penner	H
Cheyyeru river	I
Papagni river	J
Chitravati river	K

Basin code: 9

(Mahanadi Basin)

Sub-basin -----	Code -----
Seonath river	A
Free catchment of river Mahanadi	B
Hasdo river	C
Mand river	D
Lb river & basundhar river	E
Free catchment of river Mahanadi	F
Free catchment of river Mahanadi	G
Tel river	H
Sandhur & Jonk river	I

Basin code: 0

(Tapi Basin)

<u>Sub-basin</u>	<u>Code</u>
Free catchment of river Tapi	A
Purna river	B
Free catchment of river Tapi	C
Girna river	D
Panjhra river	E

(Narmada Basin)

<u>Sub-basin</u>	<u>Code</u>
Orsang river	F
Free catchment of river Narmada	G
Barna river	H
Free catchment of river Narmada	I
Tawa river	J
Free catchment of river Narmada	K
Chhota Tawa river	L
Kundi river	M
Free catchment of river Narmada	N
Goi river	O
Free catchment of river Narmada	P

The format of the code is shown in fig. 4. The range of different digits is as follows:

- i) BASIN_CODE may vary from 0 to 9.
- ii) SUBBASIN_CODE may vary from 0 to 9 and A to Z.
- iii) STATION_TYPE may vary from 0 to 9 and
- iv) STATION_NO may vary from 0 to 99.

The system is a user friendly system. If a user forgets the code for a particular station, with the help of the package he can know it. The user need not to remember the the commands because it is a menu driven package.

Some validation checks are also available in the system, which checks the format and range of the inputs supplied by the user. If the format is incorrect the input is out of the range, the system displays the error message.

4.4 Running the package on IBM compatible personal computer

- i) Boot the personal computer.
- ii) Check whether dBASE III Plus software is available on the personal computer. If it is not available, load the software
- iii) Change Directory to dBASE III Plus.
- iv) Execute dBase III Plus.
- v) Type SET DEFAULT TO A
- vi) Type DO DSR1

The menu for the data will appear. Select the desired item and execute the package.

5.0 Conclusions

A computerised Data Storage and Retrieval System has been developed using the physical and logical data descriptions to extract the data items required by the users from the data base.

The characteristics of the developed System are:

- * Physical and logical data independence
- * Protection from loss or damage
- * Easy data updating procedure
- * Accuracy and consistency
- * Privacy of use
- * Timely data availability
- * Integrity controls
- * Controlled redundancy
- * Fast Searching and retrieval.

6.0 References

1. Dec, VAX-11 FORTRAN Language Reference Manual, Digital Equipment Corporation, maynard, massachusetts
2. Martin J., Computer Database Organization, prentice Hall of India private Limited, New Delhi, 1984
3. Townsend C., Mastering dBase III Plus, A Structured Approach.
4. Unesco, Hydrologic Information Systems UNESCO - WMO, Paris, Geneva 1972.
5. Wisar, E.H., HISARS Hydrologic Information Storage and Retrieval System Reference Manual,
6. WMO, Case Studies of National Hydrological Data Banks, Operational Hydrology Report No. 17, World Meteorological Organisation, Geneva, 1981.

APPENDIX A

***** THIS PROGRAM IS FOR MAIN MENU

```
* DSRI.PRG
SET STATUS OFF
SET HEAD OFF
SET SAFE OFF
SET TALK OFF
SET ECHO OFF
CLEAR ALL
DO DSRPSW
SET PROCEDURE TO DSRPROC
SET COLOR TO BR+*
RUN CD\
RUN MODE C040
```

TEXT

```
* * * * *
*           *
*   W E L C O M E   *
*           *
* * * * *
```

ENDTEXT

SET COLOR TO GR+

TEXT

TO

DATA STORAGE AND RETRIEVAL SYSTEM

ENDTEXT

SET COLOR TO G+

TEXT

DEVELOPED AT :- N.I.H., ROORKEE

ENDTEXT

SET COLOR TO R*

WAIT

RUN MODE C080

RUN CD\DBASE3P

SET COLOR TO W

STORE ' ' TO MV1

DO WHILE .T.

STORE 1 TO CTR

STORE CHR(205) TO X

DO WHILE CTR < 74

STORE X+CHR(205) TO X

STORE CTR+1 TO CTR

ENDDO

STORE CHR(201)+X+CHR(187) TO Y

STORE CHR(200)+X+ CHR(188) TO Z

STORE CHR(186)+SPACE(74)+ CHR(186) TO W

CLEAR

```

DO WHILE .T.
SET COLOR TO GR+
@ 1,2 SAY Y
@ 2,2 SAY CHR(186)+SPACE(21)
SET COLOR TO BG+
@ 2,25 SAY 'DATA STORAGE AND RETRIEVAL SYSTEM'+SPACE(21,
SET COLOR TO GR+
@ 2,77 SAY CHR(186)
@ 3,2 SAY CHR(186)+X+CHR(186)
@ 4,2 SAY W
@ 5,2 SAY CHR(186)+SPACE(23)
SET COLOR TO G+
@ 5,26 SAY '----- MAIN MENU -----'
SET COLOR TO GR+
@ 5,48 SAY SPACE(14)+'DATE:'+DTOC(DATE())+SPACE(2)+CHR(186)
@ 6,2 SAY W
@ 7,2 SAY CHR(186)
SET COLOR TO R+*
@ 7,3 SAY      Select an Option
SET COLOR TO GR+
@ 7,34 SAY  SPACE(43) + CHR(186)
@ 8,2 SAY W
@ 9,2 SAY CHR(186)+' STATION DESCRIPTION          .. 1 ' + ' METEOROLOGICAL      .. 2 ' + CHR(186)
@ 10,2 SAY W
@ 11,2 SAY CHR(186)+' LAND USE AND VEGITAL COVER    .. 3 ' + ' SURFACE WATER DATA .. 4 ' +CHR(186)
@ 12,2 SAY W
@ 13,2 SAY CHR(186)+' GROUND WATER OBSERVATIONS    .. 5 ' + ' GEOLOGICAL DATA   .. 6 ' +CHR(186)
@ 14,2 SAY W
@ 15,2 SAY CHR(186)+' PHYSICAL PARAMETERS (slopes etc.) .. 7 ' + ' WATER QUALITY     .. 8 ' +CHR(186)
@ 16,2 SAY W
@ 17,2 SAY W
@ 18,2 SAY CHR(186)+SPACE(15)+' EXIT FROM DSR -- .. / ' +SPACE(33)+ CHR(186)
@ 19,2 SAY W
@ 20,2 SAY Z
SET COLOR TO BR+
STORE ' ' TO MV2
@ 24,2 SAY ' ENTER YOUR CHOICE : ' GET MV2 PICT 'X'
READ
SET COLOR TO
DO CASE
CASE MV2 = '/'
CLEAR ALL
RUN CD\
RUN MODE C040
SET COLOR TO GR+*
TEXT
GOOD BYE

ENDTEXT
SET COLOR TO
STORE 136 TO A

```



```
DO WHILE A <> 0
  STORE A-1 TO A
ENDDO
RUN CD\
RUN MODE C080
RUN CD\DATABASE3P
RETURN
CASE MV2 = '1'
  DO DSR11
CASE MV2 = '2'
  DO DSR12
CASE MV2 = '3'
  DO DSR13
CASE MV2 = '4'
  DO DSR14
CASE MV2 = 'x'
  DO DSR15
CASE MV2 = 'X'
  DO DSR16
CASE MV2 = 'X'
  DO DSR17
CASE MV2 = 'X'
  DO DSR18
ENDCASE
ENDDO
ENDDO
```

```

*****this program is for password
*DSRPSW.PRG
SET TALK OFF
CLEAR
STORE "F" TO FLAG
STORE 3 TO XX
DO WHILE FLAG = "F"
USE DSRPASS
STORE PASS TO MPASS
STORE WORD TO MWORD
STORE " " TO XPASS
IF MPASS
CLEAR
SET COLOR TO BG+
@ 15,4 SAY "ENTER PASSWORD "+STR(XX,1)+" CHANCE(S): "
SET CONSOLE OFF
ACCEPT TO XPASS
SET CONSOLE ON
CLEAR
IF UPPER(XPASS) # UPPER(MWORD)
STORE 0 TO X1
DO WHILE X1 < 12
@ 18,4 SAY "PASSWORD IS INCORRECT "
X1 = X1 + 1
ENDDO
CLEAR
XX=XX-1
IF XX = 0
DO NONPASS
ENDIF
ELSE
STORE "T" TO FLAG
ENDIF
ELSE
STORE "T" TO FLAG
ENDIF
ENDDO
RETURN

```

***** THIS PROGRAM IS FOR PROCEDURE COLLECTION

* DSRPROC.PRG

***** PROCEDURE FOR EDITING RECORDS

PROCEDURE dsredt

PARA mfile,mcode

USE &mfile

CLEAR

SET COLOR TO BR+

@ 5,2 TO 11,70 DOUB

SET COLOR TO BG+

@ 7,8 SAY 'ENTER THE STATION CODE FOR RECORD TO BE EDITED : ' GET mcode

SET COLOR TO R+*

@ 9,10 SAY 'WHEN YOU COMPLETE THE EDITING THEN PRESS 'W TO SAVE IT'

READ

SET COLOR TO G+

EDIT FOR STCODE = '&mcode'

CLOSE DATA

RETURN

***** PROCEDURE FOR DELETING RECORDS

PROCEDURE dsrdlt

PARA mfile,mcode

USE &mfile

CLEAR

STOR 'Y' TO msure

SET COLOR TO BG+

@ 5,2 TO 11,70 DOUB

SET COLOR TO GR+

@ 7,8 SAY 'ENTER THE STATION CODE FOR RECORD TO BE DELETED : ' GET mcode

SET COLOR TO R+

@ 9,8 SAY 'ARE YOU SURE (Y/N)' GET msure

READ

SET COLOR TO G+

IF UPPER(msure) = 'N'

ENDCASE

ELSE

DELE FOR STCODE = '&mcode'

PACK

ENDIF

CLOSE DATA

RETURN

***** PROCEDURE FOR ADDING RECORDS

PROCEDURE dsradd

PARA mfile

USE &mfile

CLEAR

SET COLOR TO GR+

@ 5,2 TO 9,70 DOUB

SET COLOR TO BR+*

@ 7,8 SAY 'WHEN YOU HAVE NO MORE DATA TO ADD THEN PRESS 'W TO SAVE'

SET COLOR TO G+


```
@ 22,1 SAY ""  
WAIT  
APPEND  
CLOS DATA  
RETURN
```

```
***** PROCEDURE FOR OPERATION SELECTION
```

```
PROCEDURE OPERATION
```

```
PARA mtitle,mfile,mrep,mflag
```

```
DO WHILE .T.
```

```
CLEAR
```

```
SET COLOR TO BG+
```

```
@ 1,2 TO 4,75 DOUBLE
```

```
@ 2,22 SAY "DATA STORAGE AND RETIVAL SYSTEM"
```

```
@ 4,2 TO 19,75 DOUB
```

```
@ 5,15 SAY "&mtitle"
```

```
@ 7,12 SAY "SELECT OPTIONS :"
```

```
@ 9,12 SAY "TO EDIT DATA - (1)"
```

```
@11,12 SAY "TO DELETE DATA - (2)"
```

```
@13,12 SAY "TO ADD MORE DATA - (3)"
```

```
@15,12 SAY "TO GET REPORT [O/P] - (4)"
```

```
@17,12 SAY "RETURN TO PREVIOUS MENU - (/)"
```

```
STORE " " TO MV
```

```
SET COLOR TO BR+
```

```
@23,7 SAY " ENTER YOUR CHOICE : " GET MV
```

```
READ
```

```
STORE " " TO mcode
```

```
DO CASE
```

```
CASE MV = '/'
```

```
CLEAR
```

```
mflag = 'T'
```

```
RETURN
```

```
CASE MV = '1'
```

```
DO dsredt WITH mfile,mcode
```

```
CASE MV = '2'
```

```
DO dsrdlt WITH mfile,mcode
```

```
CASE MV = '3'
```

```
DO dsradd WITH mfile
```

```
CASE MV = '4'
```

```
DO &mrep
```

```
ENDCASE
```

```
RETURN
```

```
ENDDO
```

```

**** THIS PROGRAM IS FOR THOSE PERSONS WHO DON'T KNOW THE
**** PASSWORD , THEY CAN ONLY RETRIEVE THE DATA
**** NONPASS.PRG
CLEAR
STORE " " TO mans
@ 5,5 TO 13,75 DOU"
@ 7,10 SAY "YOU ARE NOT AUTHORISED TO EDIT,DELETE OR APPEND DATA"
@ 9,10 SAY "BY THE SYSTEM. YOU CAN ONLY RETRIEVE THE INFORMATION"
@11,10 SAY "DO YOU WANT TO CONTINUE (Y/N) : " GET mans
READ
IF UPPE(mans) <> "Y"
  CANCEL
ENDIF
SET TALK OFF
SET ECHO OFF
SET SAFE OFF
SET HELP OFF
SET STAT OFF
SET MENU OFF
SET PROCEDURE TO DSRPROC
SET COLOR TO BR+*
RUN CD\
RUN MODE CO40
TEXT
  * * * * *
  *           *
  *   W E L C O M E   *
  *           *
  * * * * *
ENDTEXT
SET COLOR TO GR+
TEXT

```

TO

DATA STORAGE AND RETRIEVAL SYSTEM
(RETRIEVAL ONLY)

```

ENDTEXT
SET COLOR TO G+
TEXT

```

DEVELOPED AT :- N.I.H., ROORKEE

```

ENDTEXT
SET COLOR TO R*
WAIT
RUN MODE CO80
RUN CD\DATABASE3P
SET COLOR TO W
STORE " " TO EV1
DO WHILE .T.

```

```

STORE 1 TO CTR
  STORE CHR(205) TO X
DO WHILE CTR < 74
  STORE X+CHR(205) TO X
  STORE CTR+1 TO CTR
ENDDO
STORE CHR(201)+X+CHR(187) TO Y
STORE CHR(200)+X+ CHR(188) TO Z
STORE CHR(186)+SPACE(74)+ CHR(186) TO W
CLEAR
DO WHILE .T.
  SET COLOR TO GR+
  @ 1,2 SAY Y
  @ 2,2 SAY CHR(186)+SPACE(21)
  SET COLOR TO BG+
  @ 2,25 SAY 'DATA STORAGE AND RETRIEVAL SYSTEM (RETRIEVAL ONLY) '+SPACE(21)
  SET COLOR TO GR+
  @ 2,77 SAY CHR(186)
  @ 3,2 SAY CHR(186)+X+CHR(186)
  @ 4,2 SAY W
  @ 5,2 SAY CHR(186)+SPACE(23)
  SET COLOR TO G+
  @ 5,26 SAY '----- MAIN MENU -----'
  SET COLOR TO GR+
  @ 5,48 SAY SPACE(14)+'DATE: '+DTOC( DATE())+SPACE(2)+CHR(186)
  @ 6,2 SAY W
  @ 7,2 SAY CHR(186)
  SET COLOR TO R+*
  @ 7,3 SAY '      Select an Option
  SET COLOR TO GR+
  @ 7,34 SAY SPACE(43) + CHR(186)
  @ 8,2 SAY W
  @ 9,2 SAY CHR(186)+' STATION DESCRIPTION          .. 1 '+' METEOROLOGICAL      .. 2 '+' CHR(186)
  @ 10,2 SAY W
  @ 11,2 SAY CHR(186)+' LAND USE AND VEGITAL COVER          .. 3 '+' SURFACE WATER DATA .. 4 '+CHR(186)
  @ 12,2 SAY W
  @ 13,2 SAY CHR(186)+' GROUND WATER OBSERVATIONS          .. 5 '+' GEOLOGICAL DATA    .. 6 '+CHR(186)
  @ 14,2 SAY W
  @ 15,2 SAY CHR(186)+' PHYSICAL PARAMETERS (slopes etc.) .. 7 '+' WATER QUALITY      .. 8 '+' CHR(186)
  @ 16,2 SAY W
  @ 17,2 SAY W
  @ 18,2 SAY CHR(186)+SPACE(15)+' EXIT FROM DSR -- .. / '+'SPACE(33)+ CHR(186)
  @ 19,2 SAY W
  @ 20,2 SAY Z
  SET COLOR TO BR+
  STORE ' ' TO NV2
  @ 24,2 SAY ' ENTER YOUR CHOICE : ' GET NV2 PICT 'X'
  READ
  SET COLOR TO
DO CASE
  CASE NV2 = '/'
    CLEAR ALL
    RUN CD\

```



```

**** THIS PROGRAM IS FOR FINDING CODE FOR A CERTAIN STATION
**** CODE.PRG
@ 8,5 TO 10,60 DOUBLE
STORE " " TO mcode,seemore
@ 9,10 SAY "DO YOU KNOW STATION CODE (Y/N) " GET mcode
READ
DO WHILE UPPER(mcode) = "N"
  STORE " " TO mcode0
  USE BASIN
  STORE "F" TO MFLAG
  DO WHILE MFLAG = "F" .AND. .NOT. EOF()
    COUNT FOR SUBS(STCODE,1,1)<>"[" .AND. SUBS(STCODE,2,1)=" " TO mx
    CLEAR
    GO TOP
    @ 2,50 TO mx+5,76 DOUB
    @ 3,51 SAY "BASIN NAME          CODE"
    mx1=5
    DO WHILE SUBSTR(STCODE,1,2) <> "[" .AND. .NOT. EOF()
      IF STCODE <> "["
        @ mx1,52 SAY NAME+SPACE(4)+STCODE
        SKIP
      ENDIF
      mx1 = mx1 +1
    ENDDO
    STORE " " TO mcode1
    @ 12,5 SAY "ENTER THE BASIN CODE :" GET mcode1
    READ
    mcode0 = mcode1
    @ 21,5 SAY "REQUIRED STATION CODE IS : "
    SET COLOR TO /W
    ?? mcode0+SPACE(4)
    SET COLOR TO
    MFLAG = "T"
    ENDDO
    COUNT FOR SUBS(STCODE,2,1)<>"[" .AND. SUBS(STCODE,1,1)=mcode1 .AND. SUBS(STCODE,3,3)=SPACE(3) TO my
    CLEAR
    @ 21,5 SAY "REQUIRED STATION CODE IS : "
    SET COLOR TO /W
    ?? mcode0+SPACE(4)
    SET COLOR TO
    go top
    SET FILT TO SUBS(STCODE,2,1)<>"[" .AND. SUBS(STCODE,1,1)=mcode1 .AND. SUBS(STCODE,3,3)=SPACE(3)
    GO TOP
    IF my < 18
      @ 2,50 TO my+5,76 DOUB
    ELSE
      @ 2,50 TO 23,75 DOUB
      my1 = my - 18
    ENDIF
    @ 3,51 SAY "SUBBASIN NAME          CODE"
    mx1=5

DO WHILE SUBS(STCODE,2,1)<>"[" .AND. SUBS(STCODE,1,1)=mcode1 .AND. .NOT. EOF() .AND. seemore <> "N"

```

```

IF STCODE <> "[["
  @ mx1,52 SAY NAME+SPACE(4)+SUBSTR(STCODE,2,1)
ENDIF
IF .NOT. EOF()
  SKIP
ENDIF
mx1 = mx1 + 1
IF EOF().AND. my > 18
  DO WHILE mx1 < 23
    @ mx1,52 SAY SPACE(20)
    mx1 = mx1 + 1
  ENDDO
ENDIF
IF mx1 > 22 .AND. .NOT. EOF()
  SET COLOR TO BR*
  @ 20,5 SAY "DO YOU WANT TO SEE MORE (Y/N) :-" GET seemore
  READ
  @ 20,5 SAY SPACE(40)
  mx1 = mx1-18
  SET COLOR TO
ENDIF
ENDDO
STORE " " TO mcode2
@ 12,5 SAY "ENTER THE SUB BASIN CODE :-" GET mcode2
READ
STORE mcode1+mcode2 TO mcode0
@ 21,5 SAY "REQUIRED STATION CODE IS : "
SET COLOR TO /W
?? mcode0+SPACE(3)
SET COLOR TO
COUNT FOR SUBS(STCODE,3,1)<> "[" .AND. SUBS(STCODE,1,2)=mcode0 TO my
CLEAR
@ 21,5 SAY "REQUIRED STATION CODE IS : "
SET COLOR TO /W
?? mcode0+SPACE(3)
SET COLOR TO
GO TOP
STORE " " TO seemore
SET FILT TO SUBS(STCODE,3,1)<> "[" .AND. SUBS(STCODE,1,2)=mcode0 .AND. .NOT. EOF()
GO TOP
@ 2,50 TO my+5,76 DOUB
@ 3,51 SAY "STATION NAME      CODE "
mx1 = 5
DO WHILE SUBS(STCODE,3,1)<> "[" .AND. SUBS(STCODE,1,2)=mcode0 .AND. .NOT. EOF().AND. seemore <> "N"
IF STCODE <> "[["
  @ mx1,52 SAY NAME+SPACE(4)+SUBSTR(STCODE,3,3)
ENDIF
IF .NOT. EOF()
  SKIP
ENDIF
mx1 = mx1 + 1
IF EOF()
  DO WHILE mx1 < 23 .AND. my > 18
    @ mx1,52 SAY SPACE(20)

```

```

    mx1 = mx1 + 1
  ENDDO
ENDIF
IF mx1 > 22 .AND. .NOT. EOF()
  SET COLOR TO BR+*
  @ 20,5 SAY "DO YOU WANT TO SEE MORE (Y/N) :-" GET seemore
  READ
  @ 20,5 SAY SPACE(40)
  mx1 = mx1-18
  SET COLOR TO
ENDIF
ENDDO
STORE " " TO mcode3
@ 12,5 SAY "ENTER THE STATION TYPE CODE : " GET mcode3
READ
STORE mcode0+mcode3 TO mcode0
CLEAR
@ 21,5 SAY "THE REQUIRED STATION CODE IS : " + mcode0
mcode = "T"
ENDDO

```



```

**** THIS PROGRAM IS FOR PRINTING THE STATION REPORT
**** DSR11.PRG
CLEAR
SET COLOR TO BG+
mflag = 'T'
DO WHILE mflag = 'T'
  nxi = 0
  STORE ' ' TO mstcode
  STORE "N" TO mprint,mchoice,mcode
  DO CODE
  @ 8,5 TO 16,78 DOUBLE
  SET COLOR TO G+
  @ 11,13 SAY "ENTER THE STATION CODE :-" GET mstcode
  @ 13,13 SAY "DO YOU WANT TO PRINT IT (Y/N)" GET mprint
  @ 15,13 SAY "RETURN TO PREVIOUS MENU (Y/N)" GET mchoice
  READ
  IF UPPER(mchoice) = 'Y'
    CLEAR
    RETURN
  ENDIF
  IF UPPER(mprint) = 'Y'
    SET DEVICE TO PRINT
  ENDIF
  USE STATDESC
  GO TOP
  LOCATE FOR STCODE = mstcode
  IF .NOT. FOUND()
    CLEAR
    SET DEVICE TO SCREEN
    @ 16,5 TO 20,75 DOUBLE
    SET COLOR TO R+
    @ 17,12 SAY "THERE IS NO SUCH STATION ---- PLEASE CHECK IT"
    @ 22,5 SAY ""
    WAIT
    CLEAR
  ELSE
    mflag = 'F'
  ENDIF
ENDDO
CLEAR
@ 1,15 SAY " STATION DESCRIPTION "
@ 2,15 SAY " ===== "
@ 3,5 SAY "STATION CODE" :- " + stcode
@ 4,5 SAY "NAME OF THE STATION" :- " + st_name
@ 5,5 SAY "LATITUDE" :- " + STR(latitude,6)
@ 6,5 SAY "LONGITUDE" :- " + STR(longitude,6)
@ 7,5 SAY "RIVER BASIN" :- " + riverbasin
@ 8,5 SAY "SUB BASIN" :- " + sub_basin
@ 9,5 SAY "CATCHMENT AREA AT GAUG.STATH." :- " + STR(catcharea,7,1)+ " Sq.Km."
@ 10,5 SAY "RIVER DISTANCE" :- " + STR(river_dist,6,1)+ " Km."
@ 11,5 SAY "DATE OF STARTING" :- " + DTCC(date_start)
@ 12,5 SAY "INSTRUMENT TYPE" :- " + instr_type
@ 13,5 SAY "DATUM" :- " + STR(datum_rl,8,3)+ " H"

```

```
@ 14,5 SAY "METHOD OF OBSERVATION      :- " + method_obs
@ 15,5 SAY "MAINTAINED BY             :- " + maintd_by
@ 16,5 SAY "REMARKS                   :- " + remarks
SET COLOR TO R+*
@ 20,5 SAY ""
WAIT
CLEAR
SET COLOR TO BG+
SET DEVICE TO SCREEN
RETURN
```

```

***** THIS PROGRAM IS FOR METEOROLOGICAL SECTION
* DSR12.PRG
CLEAR
DO WHILE .T.
SET COLOR TO GR+
@ 2,2 TO 6,70 DOUB
SET COLOR TO G+
@ 4,12 SAY "---- SUB MENU FOR METEOROLOGICAL SECTION ----"
SET COLOR TO GR+
@ 6,2 TO 19,70 DOUB
SET COLOR TO R*
@ 7,10 SAY " OPTION                CODE"
SET COLOR TO BG
@ 09,4 SAY " DAILY RAINFALL DATA           .. 1"
@ 11,4 SAY " DAILY PAN EVAPORATION VALUES  .. 2"
@ 13,4 SAY " DAILY EVAPOTRANSPIRATION      .. 3"
*@ 15,4 SAY " MEAN MONTHLY TEMPERATURES    .. 4"
@ 15,4 SAY " RETURN TO PREVIOUS MENU       .. /"
STORE ' ' TO MV15
SET COLOR TO BR+
@ 24,2 SAY ' ENTER YOUR CHOICE : ' GET MV15
READ
SET COLOR TO
DO CASE
CASE MV15 = '/'
CLEAR
RETURN
CASE MV15 = '1'
DO DSR121
CASE MV15 = '2'
DO DSR122
CASE MV15 = '3'
DO DSR123
CASE MV15 = '4'
DO DSR124
ENDCASE
ENDDO

```


***** THIS PROGRAM IS FOR METEOROLOGICAL [DAILY RAIN FALL DATA] SECTION

* DSR121.PRG

STORE " SUB MENU FOR DAILY RAINFALL DATA " TO mtitle

STORE 'F' TO mflag

STORE "MET1" TO mfile

STORE "REP121" TO mrep

DO WHILE .T.

DO operation WITH mtitle,mfile,mrep,mflag

IF mflag = 'T'

CLEAR

RETURN

ENDIF

ENDDO

```
**** THIS PROGRAM IS FOR METEOROLOGICAL (PAN EVAPORATION DATA) SECTION
* DSR122.PRG
  STORE " SUB MENU FOR PAN EVAPORATION DATA "TO mtitle
  STORE 'F' TO mflag
  STORE "METZ" TO mfile
  STORE "RNP122" TO mrep
  DO WHILE .T.
  DO operation WITH mtitle,mfile,mrep,mflag
  IF mflag = 'T'
  CLEAR
  RETURN
  ENDIF
ENDDO
```

***** THIS PROGRAM IS FOR METEOROLOGICAL [DAILY EVAPOTRANSPIRATION DATA] SECTION

```
* DSRI23.PRG
STORE " SUB MENU FOR DAILY EVAPO TRANSPIRATION DATA "TO mtitle
STORE 'F' TO mflag
STORE "MET3" TO mfile
STORE "REP123" TO mrep
DO WHILE .T.
DO operation WITH mtitle,mfile,mrep,mflag
IF mflag = 'T'
CLEAR
RETURN
ENDIF
ENDDO
```


**** THIS PROGRAM IS INCOMPLETE
**** DSR124.PRG
**** FOR MEAN MONTHLY TEMPRATURES
CLEAR
SET COLOR TO BR+*
@ 12,12 SAY "SORRY YOU CANN'T GET THIS RIGHT NOW"
SET COLOR TO
WAIT
RETURN

```

***** THIS PROGRAM IS FOR LAND AND VEGITAL SECTION
* DSR13.PRG
CLEAR
DO WHILE .T.
SET COLOR TO BG+
@ 1,2 SAY Y
@ 2,2 SAY CHR(186)+SPACE(20)+'DATA STORAGE AND RETIEVAL SYSTEM'+SPACE(22)+CHR(186)
@ 3,2 SAY CHR(186)+Y+CHR(186)
@ 4,2 SAY W
@ 5,2 SAY CHR(186)+' --- SUB MENU FOR LAND AND VEGITAL COVER SECTION ---'+SPACE(18)+CHR(186)
@ 6,2 SAY W
@ 7,2 SAY CHR(186)+' Select option '+SPACE(54)+CHR(186)
@ 8,2 SAY W
@ 9,2 SAY CHR(186)+' CROPPING PATTERNS .. 1 '+SPACE(30)+CHR(186)
@ 10,2 SAY W
@ 11,2 SAY CHR(186)+' CANAL COMMANDWISE CROPPING PATTERNS .. 2 '+SPACE(30)+CHR(186)
@ 12,2 SAY W
@ 13,2 SAY CHR(186)+' LANDUSE DATA .. 3 '+SPACE(30)+CHR(186)
@ 14,2 SAY W
@ 15,2 SAY CHR(186)+' TO PREVIOUS MENU .. / '+SPACE(30)+CHR(186)
@ 16,2 SAY W
@ 17,2 SAY Z
STORE ' ' TO MV15
SET COLOR TO BR+
@ 24,2 SAY ' ENTER YOUR CHOICE : ' GET MV15
READ
SET COLOR TO
DO CASE
CASE MV15 = '/'
CLEAR
RETURN
CASE MV15 = '1'
DO DSR131
CASE MV15 = '2'
DO DSR132
CASE MV15 = '3'
DO DSR133
ENDCASE
ENDDO

```

```
***** THIS PROGRAM IS FOR L&V (BLOCKWISE CROPPING) SECTION
* DSR131.PRG
  STORE " SUB MENU FOR BLOCKWISE CROPPING PATTERN" TO mtitle
  STORE 'F' TO mflag
  STORE "L&V1" TO mfile
  STORE "REP131" TO mrep
  DO WHILE .T.
  DO operation WITH mtitle,mfile,mrep,mflag
  IF mflag = 'T'
  CLEAR
  RETURN
  ENDIF
  ENDDO
```



```
***** THIS PROGRAM IS FOR L&V [CANAL COMMANDWISE CROPPING] SECTION
* DSR132.PRG
  STORE " SUB MENU FOR CANAL COMMANDWISE CROPPING PATTERN" TO mtitle
  STORE 'F' TO mflag
  STORE "L&V2" TO mfile
  STORE "REP132" TO mrep
DO WHILE .T.
DO operation WITH mtitle,mfile,mrep,mflag
  IF mflag = 'T'
  CLEAR
  RETURN
  ENDIF
ENDDO
```

```
***** THIS PROGRAM IS FOR L&V SECTION
* DSR133.PRG
  STORE " SUB MENU FOR LANDUSE DATA " TO mtitle
  STORE 'F' TO mflag
  STORE "L&V3" TO mfile
  STORE "REP133" TO mrep
DO WHILE .T.
DO operation WITH mtitle,mfile,mrep,mflag
  IF mflag = 'T'
    CLEAR
    RETURN
  ENDIF
ENDDO
```

```

***** THIS PROGRAM IS FOR HYDROMETRY SECTION
* DSR14.PRG
CLEAR
DO WHILE .T.
SET COLOR TO BG+
@ 1,2 SAY Y
@ 2,2 SAY CHR(186)+SPACE(20)+'DATA STORAGE AND RETRIEVAL SYSTEM'+SPACE(21)+CHR(186)
@ 3,2 SAY CHR(186)+X+CHR(186)
@ 4,2 SAY W
@ 5,2 SAY CHR(186)+SPACE(15)+'--- SUB MENU FOR SURFACE WATER DATA ---'+SPACE(20)+CHR(186)
@ 6,2 SAY W
@ 7,2 SAY CHR(186)+'      Select option '+SPACE(54)+CHR(186)
@ 8,2 SAY W
@ 9,2 SAY CHR(186)+' STAGE                .. 1 '+SPACE(45)+CHR(186)
@ 10,2 SAY W
@ 11,2 SAY CHR(186)+' DISCHARGE                .. 2 '+SPACE(45)+CHR(186)
@ 12,2 SAY W
@ 13,2 SAY CHR(186)+' TO MAIN MENU                .. / '+SPACE(45)+CHR(186)
@ 14,2 SAY W
@ 15,2 SAY Z
STORE ' ' TO MV14
SET COLOR TO BR+
@ 21,2 SAY ' ENTER YOUR CHOICE : ' GET MV14
READ
SET COLOR TO
DO CASE
CASE MV14 = '/'
CLEAR
RETURN
CASE MV14 = '1'
DO DSR141
CASE MV14 = '2'
DO DSR142
ENDCASE
ENDDO

```



```
***** THIS PROGRAM IS FOR HYDROMETRY [STAGE] SECTION
* DSR141.PRG
  STORE " SUB MENU FOR THE STAGE DATA" TO mtitle
  STORE 'F' TO mflag
  STORE "STAGE" TO mfile
  STORE "REP141" TO mrep
DO WHILE .T.
DO operation WITH mtitle,mfile,mrep,mflag
  IF mflag = 'T'
    CLEAR
    RETURN
  ENDIF
ENDDO
```

```
***** THIS PROGRAM IS FOR HYDROMETRY (DISCHARGE) SECTION
* DSR142.PRG
STORE " SUB MENU FOR DISCHARGE DATA" TO mtitle
STORE 'F' TO mflag
STORE "DISCHARGE" TO mfile
STORE "REP142" TO mrep
DO WHILE .T.
DO operation WITH mtitle,mfile,mrep,mflag
IF mflag = 'T'
CLEAR
RETURN
ENDIF
ENDDO
```

```

***** THIS PROGRAM IS FOR GEOLOGICAL SECTION
* DSR16.PRG
CLEAR
DO WHILE .T.
SET COLOR TO BG+
@ 1,2 SAY Y
@ 2,2 SAY CHR(186)+SPACE(20)+'DATA STORAGE AND RETRIEVAL SYSTEM'+SPACE(22)+CHR(186)
@ 3,2 SAY CHR(186)+X+CHR(186)
@ 4,2 SAY W
@ 5,2 SAY CHR(186)+' --- SUB MENU FOR GEOLOGICAL SECTION ---'+SPACE(30)+CHR(186)
@ 6,2 SAY W
@ 7,2 SAY CHR(186)+' Select option from 1 to 4'+SPACE(43)+CHR(186)
@ 8,2 SAY W
@ 9,2 SAY CHR(186)+' LITHOLOGS - (1)'+SPACE(50)+CHR(186)
@ 10,2 SAY W
@ 11,2 SAY CHR(186)+' FORMATION - (2)'+SPACE(50)+CHR(186)
@ 12,2 SAY W
@ 13,2 SAY CHR(186)+' AREAL EXTENT - (3)'+SPACE(50)+CHR(186)
@ 14,2 SAY W
@ 15,2 SAY CHR(186)+' TO MAIN MENU - (4)'+SPACE(50)+CHR(186)
@ 16,2 SAY W
@ 17,2 SAY Z
STORE 0 TO MV13
SET COLOR TO BR+
@ 24,2 SAY ' ENTER YOUR CHOICE : ' GET MV13 PICT '9' RANGE 1,4
READ
SET COLOR TO
DO CASE
CASE MV13 = 4
CLEAR
RETURN
ENDCASE
ENDDO

```


***** THIS FILE IS FOR DAILY RAINFALL DATA

***** REP121.PRG

CLEAR

STORE ' ' TO mstcode

STORE ' ' TO mx1

STORE ' ' TO mprinat,mesc

STORE 0 TO my1,my2,mn1,mn2,XX

STORE ' ' TO mcheck

STORE 'T' TO mflag,mflag1,mflag2,mflag3,mflag4,mflag5

SET COLOR TO R+

DO WHILE mflag = 'T'

@ 5,2 TO 17,78 DOUB

SET COLOR TO BR+

@ 7,7 SAY 'ENTER THE STATION CODE ' GET mstcode

SET COLOR TO G+

@ 9,7 SAY 'DO YOU WANT HARD COPY (Y/N):' GET mprint

SET COLOR TO BR+

mflag1 = 'T'

DO WHILE mflag1 = 'T'

@ 11,7 SAY 'ENTER THE YEAR AND MONTH FROM WHEN YOU HAVE TO GET DATA' GET my1 PICT '99'

@ 11,65 SAY ' GET mn1 PICT '99' RANGE 1,12

@ 13,7 SAY 'ENTER THE YEAR & MONTH TO WHEN YOU HAVE TO GET DATA' GET my2 PICT '99'

@ 13,62 SAY ' GET mn2 PICT '99' RANGE 1,12

SET COLOR TO R+

@ 15,20 SAY 'PRESS '/' TO EXIT : ' GET mesc

READ

STORE UPPR(mstcode) TO mstcode

IF mesc = '/'

RETURN

ENDIF

SET COLOR TO

IF my2 < my1

@ 23,5 SAY 'ERROR IN YEAR ----- PLEASE REENTER'

ELSE

IF my2 = my1

IF mn2 < mn1

@ 23,5 SAY 'ERROR IN MONTH ----- PLEASE REENTER'

```

ELSE
  mflag1 = 'F'
ENDIF
ELSE
  mflag1 = 'F'
ENDIF
ENDIF
ENDDO
CLOSE ALL NDX
ERASE TEMP.NDX
USE NET1
INDEX ON stcode TO temp
FIND &stcode
IF .NOT. FOUND()
  CLEAR
  @ 22,5 SAY stcode + ' IS NOT IN FILE PLEASE CHECK IT'
  ?? CHR(7)
  DO WHILE XX < 35
    XX = XX+1
  ENDDO
ELSE
  STORE 'F' TO mflag
ENDIF
ERASE NEWHT1.DSP
ERASE TEMP1.NDX
INDEX ON stcode+STR(year,2)+STR(month,2) TO TEMP1
COPY TO NEWHT1 FOR A->STCODE = '&stcode' .AND. A->YEAR >= mY1 .AND. A->MONTH >= mM1 .AND. A->YEAR <= mY2 .AND. A->MONTH <= mM2
USE NEWHT1
IF mprint = 'Y'
  SET DEVICE TO PRINT
ENDIF
CLEAR
SET COLOR TO G+
@ 3,21 SAY "DAILY RAINFALL DATA FOR STATION :- " + &stcode
@ 4,21 SAY "-----"
GO TOP
SET COLOR TO GR+

```

```

IF KOF()
  @ 6,10 SAY "THERE IS NO DATA AVAILABLE BETWEEN GIVEN TIME LIMIT"
  CLEAR
  SET DEVICE TO SCREEN
  RETURN
ENDIF
I = 5
GO TOP
DO WHILE .NOT. KOF()
  @ I,10 SAY "MONTH:-" + STR(MONTH,2) + " YEAR :- " + STR(YEAR,2) + " UNIT :- MM"
  @ I+1,10 SAY "-----"
  @ I+2,1 SAY STR(D1,7,2) + STR(D2,7,2) + STR(D3,7,2) + STR(D4,7,2) + STR(D5,7,2) + STR(D6,7,2) + STR(D7,2) + STR(D8,7,2) + STR(D9,7,2) + STR(D10,7,2)
  @ I+3,1 SAY STR(D11,7,2) + STR(D12,7,2) + STR(D13,7,2) + STR(D14,7,2) + STR(D15,7,2) + STR(D16,7,2) + STR(D17,7,2) + STR(D18,7,2) + STR(D19,7,2) + STR
  (D20,7,2)
  @ I+4,1 SAY STR(D21,7,2) + STR(D22,7,2) + STR(D23,7,2) + STR(D24,7,2) + STR(D25,7,2) + STR(D26,7,2) + STR(D27,7,2) + STR(D28,7,2) + STR(D29,7,2) + STR
  (D30,7,2)
  @ I+5,1 SAY STR(D31,7,2)
  SKIP
  IF I+5 > 18
    SET COLOR TO R*
    WAIT
    SET COLOR TO GR+
    CLEAR
    I = 5
  ELSE
    I = I+6
  ENDIF
  ENDDO
  SET COLOR TO R*
  IF I > 5
    WAIT
  ENDIF
  SET COLOR TO
  RETURN

```



```

**** THIS FILE IS FOR DAILY PAN EVAPORATION DATA
**** RPI22.PRG
CLEAR
STORE ' ' TO mstcode
STORE ' ' TO mx1
STORE ' ' TO mprint, mesc
STORE 0 TO my1, my2, mx1, mx2, YX
STORE ' ' TO mcheck
STORE 'T' TO mflag, mflag1, mflag2, mflag3, mflag4, mflag5
SET COLOR TO R+
DO WHILE mflag = 'T'
  @ 5,2 TO 17,78 DOUB
  SET COLOR TO BR+
  @ 7,7 SAY 'ENTER THE STATION CODE ' GET mstcode
  SET COLOR TO G+
  @ 9,7 SAY 'DO YOU WANT HARD COPY (Y/N) : ' GET mprint
  SET COLOR TO BR+
  mflag1 = 'T'
DO WHILE mflag1 = 'T'
  @ 11,7 SAY 'ENTER THE YEAR AND MONTH FROM WHEN YOU HAVE TO GET DATA' GET my1 PICT '99'
  @ 11,65 SAY ' ' GET mx1 PICT '99' RANGE 1,12
  @ 13,7 SAY 'ENTER THE YEAR & MONTH TO WHEN YOU HAVE TO GET DATA' GET my2 PICT '99'
  @ 13,62 SAY ' ' GET mx2 PICT '99' RANGE 1,12
  SET COLOR TO R+
  @ 15,20 SAY 'PRESS '/' TO EXIT : ' GET mesc
  READ
  IF mesc = '/'
    RETURN
  ENDIF
  SET COLOR TO
  IF my2 < my1
    @ 23,5 SAY 'ERROR IN YEAR ----- PLEASE REENTER'
  ELSE
    IF my2 = my1
      IF mx2 < mx1
        @ 23,5 SAY 'ERROR IN MONTH ----- PLEASE REENTER'
      ELSE

```

```

mflag1 = 'F'
ENDIF
ELSE
mflag1 = 'F'
ENDIF
ENDIF
ENDDO
CLOSE ALL NDx
ERASE TEMP.NDx
USE NET2
INDEX ON stcode TO temp
FIND &mscode
IF .NOT. FOUND()
CLEAR
@ 22.5 SAY mscode + ' IS NOT IN FILE PLEASE CHECK IT'
?? CHR(7)
DO WHILE xx < 35
xx = xx+1
ENDDO
ELSE
STORE 'F' TO mflag
ENDIF
ERASE NEWNET2.DBF
COPY TO NEWNET2 FOR A->STCODE = '&mscode' .AND. A->YEAR >= mY1.AND.A->MONTH >= mM1 .AND. A->YEAR <= mY2 .AND. A->MONTH <= mM2
USE NEWNET2
IF mprint = "Y"
SET DEVICE TO PRINT
ENDIF
CLEAR
SET COLOR TO G+
@ 3,21 SAY "DAILY PAN EVAPORATION DATA FOR STATION :- " + '&mscode'
@ 4,21 SAY "-----"
GO TOP
SET COLOR TO GR+
IF EOF()
@ 6,10 SAY "THERE IS NO DATA AVAILABLE BETWEEN GIVEN TIME LIMIT"
CLEAR

```

```

SET DEVICE TO SCREEN
RETURN
ENDIF
r = 5
GO TOP
DO WHILE .NOT. EOF()
@ r,10 SAY "MONTH:- " + STR(month,2) + " YEAR :- " + STR(year,2) + " UNIT :- mm"
@ r+1,10 SAY "-----"
@ r+2,1 SAY STR(D1,7,2) + STR(D2,7,2) + STR(D3,7,2) + STR(D4,7,2) + STR(D5,7,2) + STR(D6,7,2) + STR(D7,7,2) + STR(D8,7,2) + STR(D9,7,2) + STR(D10,7,2)
@ r+3,1 SAY STR(D11,7,2) + STR(D12,7,2) + STR(D13,7,2) + STR(D14,7,2) + STR(D15,7,2) + STR(D16,7,2) + STR(D17,7,2) + STR(D18,7,2) + STR(D19,7,2) + STR
(D20,7,2)
@ r+4,1 SAY STR(D21,7,2) + STR(D22,7,2) + STR(D23,7,2) + STR(D24,7,2) + STR(D25,7,2) + STR(D26,7,2) + STR(D27,7,2) + STR(D28,7,2) + STR(D29,7,2) + STR
(D30,7,2)
@ r+5,1 SAY STR(D31,7,2)
SKIP
IF r+5 > 19
SET COLOR TO R*
WAIT
SET COLOR TO GR+
CLEAR
r = 5
ELSE
r = r+6
ENDIF
ENDDO
SET COLOR TO R*
WAIT
SET COLOR TO
RETURN

```


***** THIS FILE IS FOR DAILY EVAPOTRANSPIRATION DATA

***** REP123.PRG

CLEAR

STORE ' ' TO mstcode

STORE ' ' TO mx1

STORE ' ' TO mprint,mesc

STORE 0 TO my1,my2,mn1,mn2,XX

STORE ' ' TO mcheck

STORE 'Y' TO mflag,mflag1,mflag2,mflag3,mflag4,mflag5

SET COLOR TO R+

DO WHILE mflag = 'Y'

 @ 5,2 TO 17,78 DOUB

 SET COLOR TO BR+

 @ 7,7 SAY 'ENTER THE STATION CODE ' GET mstcode

 SET COLOR TO G+

 @ 9,7 SAY 'DO YOU WANT HARD COPY (Y/N):' GET mprint

 SET COLOR TO BR+

 mflag1 = 'Y'

 DO WHILE mflag1 = 'Y'

 @ 11,7 SAY 'ENTER THE YEAR AND MONTH FROM WHEN YOU HAVE TO GET DATA' GET my1 PICT '99'

 @ 11,65 SAY ' ' GET mx1 PICT '99' RANGE 1,12

 @ 13,7 SAY 'ENTER THE YEAR & MONTH TO WHEN YOU HAVE TO GET DATA' GET my2 PICT '99'

 @ 13,62 SAY ' ' GET mx2 PICT '99' RANGE 1,12

 SET COLOR TO R+

 @ 15,20 SAY 'PRESS '/' TO KEY : ' GET mesc

 READ

 IF mesc = '/'

 RETURN

 ENDIF

 SET COLOR TO

 IF my2 < my1

 @ 23,5 SAY 'ERROR IN YEAR ---- PLEASE REENTER'

 ELSE

 IF my2 = my1

 IF mn2 < mn1

 @ 23,5 SAY 'ERROR IN MONTH ---- PLEASE REENTER'

 ELSE

 @ 23,5 SAY 'ERROR IN MONTH ---- PLEASE REENTER'

 ENDIF

```

mflagl = 'F'
ENDIF
ELSE
  mflagl = 'F'
ENDIF
ENDIF
ENDDO
CLOSE ALL NDX
ERASE TEMP.NDX
USE NET3
INDEX ON stcode TO temp
FIND &stcode
IF .NOT. FOUND()
  CLEAR
  @ 22,5 SAY mstcode + ' IS NOT IN FILE PLEASE CHECK IT'
  ?? CHR(7)
  DO WHILE XX < 35
    XX = XX+1
  ENDDO
ELSE
  STORE 'F' TO mflag
ENDIF
ERASE NETNET3.DBF
COPY TO NETNET3 FOR A->STCODE = '&stcode' .AND. A->YEAR >= my1 .AND. A->MONTH >= mm1 .AND. A->YEAR <= my2 .AND. A->MONTH <= mm2
USE NETNET3
IF mprint = "Y"
  SET DEVICE TO PRINT
ENDIF
CLEAR
SET COLOR TO G+
@ 3,15 SAY "DAILY EVAPOTRANSPIRATION DATA FOR STATION :- " + &stcode
@ 4,15 SAY "-----"
GO TOP
SET COLOR TO GR+
IF EOF()
  @ 6,10 SAY "THERE IS NO DATA AVAILABLE BETWEEN GIVEN TIME LIMIT"
  CLEAR
  SET DEVICE TO SCREEN

```

```

RETURN
ENDIF
I = 5
GO TOP
DO WHILE .NOT. KOF()
@ r,10 SAY "MONTH:- " + STR(month,2) + " YEAR :- " + STR(year,2) + " UNIT :- mm"
@ r+1,10 SAY "-----"
@ r+2,1 SAY STR(D1,7,2) + STR(D2,7,2) + STR(D3,7,2) + STR(D4,7,2) + STR(D5,7,2) + STR(D6,7,2) + STR(D7,7,2) + STR(D8,7,2) + STR(D9,7,2) + STR(D10,7,2)
@ r+3,1 SAY STR(D11,7,2) + STR(D12,7,2) + STR(D13,7,2) + STR(D14,7,2) + STR(D15,7,2) + STR(D16,7,2) + STR(D17,7,2) + STR(D18,7,2) + STR(D19,7,2) + STR
(D20,7,2)
@ r+4,1 SAY STR(D21,7,2) + STR(D22,7,2) + STR(D23,7,2) + STR(D24,7,2) + STR(D25,7,2) + STR(D26,7,2) + STR(D27,7,2) + STR(D28,7,2) + STR(D29,7,2) + STR
(D30,7,2)
@ r+5,1 SAY STR(D31,7,2)
SKIP
IF r+5 > 19
SET COLOR TO R*
WAIT
SET COLOR TO GR+
CLEAR
I = 5
ELSE
I = r+6
ENDIF
ENDDO
SET COLOR TO R*
WAIT
SET COLOR TO
RETURN

```


***** rep131.prg***** THIS PROGRAM IS FOR CROPPING PATTERNS

```
CLEAR
STORE ' ' TO HBLCK
STORE ' ' TO NP1
SET COLOR TO R+
@ 7,5 TO 13,72 DOUB
SET COLOR TO RG+
@ 9,10 SAY "ENTER BLOCK NAME"          * GET HBLCK
@ 11,10 SAY "DO YOU WANT HARDCOPY (Y/N)" * GET NP1
SET COLOR TO G++
READ
IF HBLCK =
  RETURN
ENDIF
CLEAR
USE LAY1
GO TOP
INDEX ON STCODE TO TRMP
FIND HBLCK
IF .NOT. FOUND()
  CLEAR
  @ 10,2 TO 14,75 DOUBLE
  SET COLOR TO R+
  @ 12,15 SAY "THERE IS NO SUCH BLOCK NAME PLEASE CHECK IT"
  @ 22,5 SAY ""
  WAIT
  RETURN
ENDIF
IF UPPER(NP1) = 'Y'
  SET DEVICE TO PRINT
ENDIF
SET COLOR TO
STORE " Sq. Km." TO U
STORE 1 TO XX
@ XX,5 SAY ""
@ XX+1,12 SAY "BLOCKWISE CROPPING PATTERNS"
@ XX+2,5 SAY ""
```

```

@ XX+4,5 SAY "BLOCK NAME
@ XX+6,5 SAY "(i) AREA UNDER KHARIF
@ XX+8,5 SAY " (a) AREA UNDER RICE
@ XX+9,5 SAY " IRRIGATED AREA
@ XX+10,5 SAY " UNIRRIGATED AREA
@ XX+12,5 SAY " (b) AREA UNDER SUGARCANE
@ XX+13,5 SAY " IRRIGATED AREA
@ XX+14,5 SAY " UNIRRIGATED AREA
@ XX+16,5 SAY " (c) AREA UNDER OTHERS
@ XX+17,5 SAY " IRRIGATED AREA
@ XX+18,5 SAY " UNIRRIGATED AREA
IF NP1 <> 'Y'
  WAIT
  CLEAR
  XX --5
  ELSE
  XX = XX+14
  ENDIF
@ XX+6,5 SAY "(ii) AREA UNDER RABI
@ XX+8,5 SAY " (a) AREA UNDER WHEAT
@ XX+9,5 SAY " IRRIGATED AREA
@ XX+10,5 SAY " UNIRRIGATED AREA
@ XX+12,5 SAY "(b) AREA UNDER SUGARCANE
@ XX+13,5 SAY " IRRIGATED AREA
@ XX+14,5 SAY " UNIRRIGATED AREA
@ XX+16,5 SAY "(c) AREA UNDER OTHERS
@ XX+17,5 SAY " IRRIGATED AREA
@ XX+18,5 SAY " UNIRRIGATED AREA
@ XX+20,5 SAY "
IF NP1 <> 'Y'
  WAIT
  CLEAR
  ENDIF
  SET DEVICE TO SCREEN
  CLOSE ALL
  ERASE TEMP.MDX
  RETURN

```

```

:-- + STCODE
:--+STR(AREA_KHARIF,8,3)+U
:--+STR(AREA_RICE,8,3)+U
:--+STR(RICE_IRRI1,8,3)+U
:--+STR(RICE_UNIR1,8,3)+U
:--+STR(AREA_CANE1,8,3)+U
:--+STR(CANE_IRRI1,8,3)+U
:--+STR(CANE_UNIR1,8,3)+U
:--+STR(AREA_OTH_1,8,3)+U
:--+STR(OTH_IRRI1,8,3)+U
:--+STR(OTH_UNIR1,8,3)+U

```

```

:--+STR(AREA_RABI,8,3)+U
:--+STR(AREA_WHEAT,8,3)+U
:--+STR(WHEAT_IRRI,8,3)+U
:--+STR(WHEAT_UNIR,8,3)+U
:--+STR(AREA_CANE2,8,3)+U
:--+STR(CANE_IRRI2,8,3)+U
:--+STR(CANE_UNIR2,8,3)+U
:--+STR(AREA_OTH_2,8,3)+U
:--+STR(OTH_IRRI_2,8,3)+U
:--+STR(OTH_UNIR_2,8,3)+U

```

***** rep132.prg***** THIS PROGRAM IS FOR CROPPING PATTERNS

```
CLEAR
STORE      TO MBLCK
SYONE     TO HP1
SET COLOR TO R+
@ 7,5 TO 13,72 DOUB
SET COLOR TO BG+
@ 9,10 SAY "ENTER BLOCK NAME
@ 11,10 SAY "DO YOU WANT HARDCOPY (Y/N)
SET COLOR TO G+*
READ
IF MBLCK =
    RETURN
ENDIF
CLEAR
USE LAV2
GO TOP
INDEX ON STCODE TO TEMP
FIND &MBLCK
IF .NOT. FOUND()
    CLEAR
    @ 10,2 TO 14,75 DOUBLE
    SET COLOR TO R+
    @ 12,15 SAY "THERE IS NO SUCH BLOCK NAME PLEASE CHECK IT"
    @ 22,5 SAY ""
    WAIT
    RETURN
ENDIF
IF UPPER(HP1) = 'Y'
    SET DEVICE TO PRINT
ENDIF
SET COLOR TO
STORE "Sq. Km." TO U
STORE 1 TO A
@ A,5 SAY ""
@ A+1,12 SAY "CANAL COMMANDWISE CROPPING PATTERNS"
@ A+2,5 SAY ""
```



```

@ A+4,5 SAY "BLOCK NAME
@ A+6,5 SAY "(1) AREA UNDER KHARIF
@ A+8,5 SAY " (a) AREA UNDER RICE
@ A+9,5 SAY " (b) AREA UNDER SUGARCANE
@A+10,5 SAY " (c) AREA UNDER OTHERS
@A+12,5 SAY "(11) AREA UNDER RABI
@A+14,5 SAY " (a) AREA UNDER WHEAT
@A+15,5 SAY " (b) AREA UNDER SUGARCANE
@A+16,5 SAY " (c) AREA UNDER OTHERS
@A+18,5 SAY "
-----

```

```

:-- + STCODE
:--+STR(AREA_KHARIF,6,2)+0
:--+STR(AREA_RICE,6,2)+0
:--+STR(AREA_CANE1,6,2)+0
:--+STR(AREA_OTH_1,6,2)+0
:--+STR(AREA_RABI,7,2)+0
:--+STR(AREA_WHEAT,6,2)+0
:--+STR(AREA_CANE2,6,2)+0
:--+STR(AREA_OTH_2,6,2)+0

```

```

IF NP1 <> 'Y'
  WAIT
  CLEAR
  ENDIF
  SET DEVICE TO SCREEN
  CLOSE ALL
  ERASE TEMP.NDX
  RETURN

```

```

***** REP133.PRG
***** THIS PROGRAM IS FOR LANDUSE DATA
CLEAR
STORE      TO HBLCK
STORE      TO HP1
SET COLOR TO R+
@ 7,5 TO 13,72 DOUB
SET COLOR TO BG+
@ 9,10 SAY "ENTER BLOCK NAME"
@ 11,10 SAY "DO YOU WANT HARCOPY (Y/N)"
SET COLOR TO G+*
READ
IF HBLCK =
RETURN
ENDIF
CLEAR
USE LRV3
GO TOP
INDEX ON STCODE TO TEMP
FIND HBLCK
IF .NOT. FOUND()
CLEAR
@ 10,2 TO 14,75 DOUBLE
SET COLOR TO R+
@ 12,15 SAY "THERE IS NO SUCH BLOCK NAME PLEASE CHECK IT"
@ 22,5 SAY ""
WAIT
RETURN
ENDIF
IF UPPER(HP1) = 'Y'
SET DEVICE TO PRINT
ENDIF
SET COLOR TO
STORE "Sq. Km." TO U
STORE 1 TO XX
@ XX,5 SAY ""
@ XX+1,12 SAY "REPORT FOR LANDUSE DATA"

```

```

*****
@ XX+2,5 SAY " "
@ XX+4,5 SAY " BLOCK NAME "
@ XX+6,5 SAY " (1) YEAR "
@ XX+7,5 SAY " (II) GEOGRAPHICAL AREA "
@ XX+8,5 SAY " (III) FORESTED AREA "
@ XX+9,5 SAY " (IV) NON AGRI. & FALLOW LANDS "
@ XX+10,5 SAY " (V) USHAR SOILS "
@ XX+11,5 SAY " (VI) ORCHARDS "
@ XX+12,5 SAY " (VII) UNIRRIGATED AREA "
@ XX+13,4 SAY " (VIII) IRRIGATED AREA "
@ XX+14,5 SAY " (a) CANALS "
@ XX+15,5 SAY " (b) WELLS "
@ XX+16,5 SAY " (c) OTHERS "
@ XX+18,5 SAY " "
IF NP1 <> 'Y'
  WAIT
  CLEAR
  ENDIF
  SET DEVICE TO SCREEN
  CLOSE ALL
  ERASE TEMP.NDX
  RETURN
*****
:~" + STCODE
:~"+STR(YEAR,4)
:~"+STR(GEO_AREA,6)+U
:~"+STR(FORST_AREA,6)+U
:~"+STR(NON_AGRICUL,6)+U
:~"+STR(USHAR_SOILS,6)+U
:~"+STR(ORCHARDS,6)+U
:~"+STR(UNIRRIGATED,6)+U
:~"+STR(IRRIGATED,6)+U
:~"+STR(CANALS,6)
:~"+STR(WELLS,6)
:~"+STR(OTHERS,6)

```



```

**** REP141.PRG***** THIS FILE IS FOR STAGE
CLEAR
STORE ' ' TO mstcode
STORE ' ' TO mx1
STORE ' ' TO mprint, mesc
STORE 0 TO my1, my2, mm1, mm2, XX
STORE ' ' TO mcheck
STORE 'Y' TO mflag, mflag1, mflag2, mflag3, mflag4, mflag5
SET COLOR TO R+
DO WHILE mflag = 'Y'
  @ 5, 2 TO 17, 78 DOUB
  SET COLOR TO BR+
  @ 7, 7 SAY 'ENTER THE STATION CODE ' GET mstcode
  SET COLOR TO G+
  @ 9, 7 SAY 'DO YOU WANT HARD COPY (Y/N):' GET mprint
  SET COLOR TO BR+
  mflag1 = 'Y'
DO WHILE mflag1 = 'Y'
  @ 11, 7 SAY 'ENTER THE YEAR AND MONTH FROM WHEN YOU HAVE TO GET DATA' GET my1 PICT '99'
  @ 11, 65 SAY ' ' GET mm1 PICT '99' RANGE 1, 12
  @ 13, 7 SAY 'ENTER THE YEAR & MONTH TO WHEN YOU HAVE TO GET DATA' GET my2 PICT '99'
  @ 13, 62 SAY ' ' GET mm2 PICT '99' RANGE 1, 12
  SET COLOR TO R+
  @ 15, 20 SAY 'PRESS '/' TO EXIT : ' GET mesc
READ
IF mesc = '/'
  RETURN
ENDIF
SET COLOR TO
IF my2 < my1
  @ 23, 5 SAY 'ERROR IN YEAR ---- PLEASE REENTER'
ELSE
  IF my2 = my1
    IF mm2 < mm1
      @ 23, 5 SAY 'ERROR IN MONTH ---- PLEASE REENTER'
    ELSE
      mflag1 = 'F'

```

```

ENDIF
ELSE
  mflag1 = 'F'
ENDIF
ENDIF
ENDDO
CLOSE ALL NDX
ERASE TEMP.NDX
USE STAGE
INDEX ON stcode TO temp
FIND &stcode
IF .NOT. FOUND()
  CLEAR
  @ 22,5 SAY stcode + ' IS NOT IN FILE PLEASE CHECK IT '
  ?? CHR(7)
  DO WHILE XX < 35
    XX = XX+1
  ENDDO
ELSE
  STORE 'F' TO mflag
ENDIF
ERASE NEWSTAGE.DBF
ERASE TEMP1.NDX
INDEX ON stcode + STR(year,2)+STR(month,2) TO TEMP1.NDX
GO TOP
COPY TO NEWSTAGE FOR A->STCODE = '&stcode' .AND. A->YEAR >= mY1;
USE NEWSTAGE
IF mprint = 'Y'
  SET DEVICE TO PRINT
ENDIF
CLEAR
SET COLOR TO G+
@ 3,21 SAY "DAILY STAGE DATA FOR STATION :- " + '&stcode'
@ 4,21 SAY "-----"
GO TOP
SET COLOR TO GR+
IF EOF()
  @ 6,10 SAY "THERE IS NO DATA AVAILABLE BETWEEN GIVEN TIME LIMIT"

```

```

WAIT
CLEAR
SET DEVICE TO SCREEN
RETURN
ENDIF
r = 5
GO TOP
DO WHILE .NOT. EOF()
@ r,10 SAY "MONTH:- "STR(month,2)+ " YEAR :- " + STR(year,2)+ " UNIT :- M"
@ r+1,10 SAY "-----"
@ r+2,1 SAY STR(STAGE1,8,3)+STR(STAGE2,8,3)+STR(STAGE3,8,3)+STR(STAGE4,8,3)+STR(STAGE5,8,3)+STR(STAGE6,8,3)+STR(STAGE7,8,3)+STR(STAGE8,8,3)+STR(STAGE9,8,3)+STR(STAGE10,8,3)+STR(STAGE11,8,3)+STR(STAGE12,8,3)+STR(STAGE13,8,3)+STR(STAGE14,8,3)+STR(STAGE15,8,3)+STR(STAGE16,8,3)
R(STAGE16,8,3)
@ r+4,1 SAY STR(STAGE17,8,3)+STR(STAGE18,8,3)+STR(STAGE19,8,3)+STR(STAGE20,8,3)+STR(STAGE21,8,3)+STR(STAGE22,8,3)+STR(STAGE23,8,3)+STR(STAGE24,8,3)
@ r+5,1 SAY STR(STAGE25,8,3)+STR(STAGE26,8,3)+STR(STAGE27,8,3)+STR(STAGE28,8,3)+STR(STAGE29,8,3)+STR(STAGE30,8,3)+STR(STAGE31,8,3)
SKIP
IF r+5 > 19
SET COLOR TO R*
WAIT
SET COLOR TO GR+
CLEAR
r = 5
ELSE
r = r+6
ENDIF
ENDDO
SET COLOR TO R*
IF r > 5
WAIT
ENDIF
SET COLOR TO
RETURN

```



```
**** THIS FILE IS FOR DISCHARGE
**** REP142.PRG
```

```
CLEAR
STORE ' ' TO mstcode
STORE ' ' TO mx1
STORE ' ' TO mprint, mesc
STORE 0 TO my1, my2, mm1, mm2, YX
STORE ' ' TO mcheck
STORE 'T' TO mflag, mflag1, mflag2, mflag3, mflag4, mflag5
SET COLOR TO R+
DO WHILE mflag = 'T'
  @ 5, 2 TO 17, 78 DOUB
  SET COLOR TO BR+
  @ 7, 7 SAY 'ENTER THE STATION CODE ' GET mstcode
  SET COLOR TO G+
  @ 9, 7 SAY 'DO YOU WANT HARD COPY (Y/N): ' GET mprint
  SET COLOR TO BR+
  mflag1 = 'T'
DO WHILE mflag1 = 'T'
  @ 11, 7 SAY 'ENTER THE YEAR AND MONTH FROM WHEN YOU HAVE TO GET DATA' GET my1 PICT '99'
  @ 11, 65 SAY ' ' GET mm1 PICT '99' RANGE 1, 12
  @ 13, 7 SAY 'ENTER THE YEAR & MONTH TO WHEN YOU HAVE TO GET DATA' GET my2 PICT '99'
  @ 13, 62 SAY ' ' GET mm2 PICT '99' RANGE 1, 12
  SET COLOR TO R+
  @ 15, 20 SAY 'PRESS '/' TO EXIT : ' GET mesc
  READ
  IF mesc = '/'
    RETURN
  ENDIF
  SET COLOR TO
  IF my2 < my1
    @ 23, 5 SAY 'ERROR IN YEAR ---- PLEASE REENTER'
  ELSE
    IF my2 = my1
      IF mm2 < mm1
        @ 23, 5 SAY 'ERROR IN MONTH ---- PLEASE REENTER'
      ELSE
```

```

        mflag1 = 'F'
    ENDIF
ELSE
    mflag1 = 'P'
ENDIF

ENDDO
CLOSE ALL NDX
ERASE TEMP.NDX
USE DISCHARGE
INDEX ON stcode TO temp
FIND &stcode
IF .NOT. FOUND()
    CLEAR
    @ 22,5 SAY mstcode + ' IS NOT IN FILE PLEASE CHECK IT'
    ?? CHR(7)
    DO WHILE XX < 35
        XX = XX+1
    ENDDO
ELSE
    STORE 'F' TO mflag
ENDIF
ERASE NEWDISCH.DBF
ERASE TEMP1.NDX
INDEX ON stcode + STR(year,2)+STR(month,2) TO TEMP1.NDX
GO TOP
COPY TO NEWDISCH FOR A->STCODE = '&stcode' .AND. A->YEAR >= m1 .AND. A->YEAR <= m2 .AND. A->MONTH <= m2
USE NEWDISCH
IF mprint = "Y"
    SET DEVICE TO PRINT
ENDIF
CLEAR
SET COLOR TO G+
@ 3,21 SAY "DAILY DISCHARGE DATA FOR STATION :- " + &stcode
@ 4,21 SAY "-----"
GO TOP
SET COLOR TO GR+

```

```

IF EOF()
@ 6,10 SAY "THERE IS NO DATA AVAILABLE BETWEEN GIVEN TIME LIMIT"
WAIT
CLEAR
SET DEVICE TO SCREEN
RETURN
ENDIF
r = 5
GO TOP
DO WHILE .NOT. EOF()
@ r,10 SAY "MONTH:- " + STR(month,2) + " YEAR :- " + STR(year,2) + " UNIT :- M3/Sec"
@ r+1,10 SAY "-----"
@ r+2,1 SAY STR(DISCH1,9,3) + STR(DISCH2,9,3) + STR(DISCH3,9,3) + STR(DISCH4,9,3) + STR(DISCH5,9,3) + STR(DISCH6,9,3) + STR(DISCH7,9,3) + STR(DISCH8,9,3)
@ r+3,1 SAY STR(DISCH9,9,3) + STR(DISCH10,9,3) + STR(DISCH11,9,3) + STR(DISCH12,9,3) + STR(DISCH13,9,3) + STR(DISCH14,9,3) + STR(DISCH15,9,3) + STR(DISCH16,9,3)
@ r+4,1 SAY STR(DISCH17,9,3) + STR(DISCH18,9,3) + STR(DISCH19,9,3) + STR(DISCH20,9,3) + STR(DISCH21,9,3) + STR(DISCH22,9,3) + STR(DISCH23,9,3) + STR(DISCH24,9,3)
@ r+5,1 SAY STR(DISCH25,9,3) + STR(DISCH26,9,3) + STR(DISCH27,9,3) + STR(DISCH28,9,3) + STR(DISCH29,9,3) + STR(DISCH30,9,3) + STR(DISCH31,9,3)
SKIP
IF r+5 > 19
SET COLOR TO R*
WAIT
SET COLOR TO GR+
CLEAR
r = 5
ELSE
r = r+6
ENDIF
ENDDO
SET COLOR TO R*
IF r > 5
WAIT
ENDIF
SET COLOR TO
RETURN

```


APPENDIX - B

Structure for database: C:\met1.dbf

Number of data records: 9

Date of last update : 07/18/89

Field	Field Name	Type	Width	Dec
1	STCODE	Character	8	
2	YEAR	Numeric	2	
3	MONTH	Numeric	2	
4	D1	Numeric	6	2
5	D2	Numeric	6	2
6	D3	Numeric	6	2
7	D4	Numeric	6	2
8	D5	Numeric	6	2
9	D6	Numeric	6	2
10	D7	Numeric	6	2
11	D8	Numeric	6	2
12	D9	Numeric	6	2
13	D10	Numeric	6	2
14	D11	Numeric	6	2
15	D12	Numeric	6	2
16	D13	Numeric	6	2
17	D14	Numeric	6	2
18	D15	Numeric	6	2
19	D16	Numeric	6	2
20	D17	Numeric	6	2
21	D18	Numeric	6	2
22	D19	Numeric	6	2
23	D20	Numeric	6	2
24	D21	Numeric	6	2
25	D22	Numeric	6	2
26	D23	Numeric	6	2
27	D24	Numeric	6	2
28	D25	Numeric	6	2
29	D26	Numeric	6	2
30	D27	Numeric	6	2
31	D28	Numeric	6	2
32	D29	Numeric	6	2
33	D30	Numeric	6	2
34	D31	Numeric	6	2
** Total **			199	

Structure for database: C:\met2.dbf

Number of data records: 6

Date of last update : 11/29/88

Field	Field Name	Type	Width	Dec
1	STCODE	Character	8	
2	YEAR	Numeric	2	
3	MONTH	Numeric	2	
4	D1	Numeric	6	2
5	D2	Numeric	6	2
6	D3	Numeric	6	2
7	D4	Numeric	6	2
8	D5	Numeric	6	2
9	D6	Numeric	6	2
10	D7	Numeric	6	2
11	D8	Numeric	6	2
12	D9	Numeric	6	2
13	D10	Numeric	6	2
14	D11	Numeric	6	2
15	D12	Numeric	6	2
16	D13	Numeric	6	2
17	D14	Numeric	6	2
18	D15	Numeric	6	2
19	D16	Numeric	6	2
20	D17	Numeric	6	2
21	D18	Numeric	6	2
22	D19	Numeric	6	2
23	D20	Numeric	6	2
24	D21	Numeric	6	2
25	D22	Numeric	6	2
26	D23	Numeric	6	2
27	D24	Numeric	6	2
28	D25	Numeric	6	2
29	D26	Numeric	6	2
30	D27	Numeric	6	2
31	D28	Numeric	6	2
32	D29	Numeric	6	2
33	D30	Numeric	6	2
34	D31	Numeric	6	2
** Total **			199	

Structure for database: C:\met3.dbf

Number of data records: 6

Date of last update : 11/29/88

Field	Field Name	Type	Width	Dec
1	STCODE	Character	8	
2	YEAR	Numeric	2	
3	MONTH	Numeric	2	
4	D1	Numeric	6	2
5	D2	Numeric	6	2
6	D3	Numeric	6	2
7	D4	Numeric	6	2
8	D5	Numeric	6	2
9	D6	Numeric	6	2
10	D7	Numeric	6	2
11	D8	Numeric	6	2
12	D9	Numeric	6	2
13	D10	Numeric	6	2
14	D11	Numeric	6	2
15	D12	Numeric	6	2
16	D13	Numeric	6	2
17	D14	Numeric	6	2
18	D15	Numeric	6	2
19	D16	Numeric	6	2
20	D17	Numeric	6	2
21	D18	Numeric	6	2
22	D19	Numeric	6	2
23	D20	Numeric	6	2
24	D21	Numeric	6	2
25	D22	Numeric	6	2
26	D23	Numeric	6	2
27	D24	Numeric	6	2
28	D25	Numeric	6	2
29	D26	Numeric	6	2
30	D27	Numeric	6	2
31	D28	Numeric	6	2
32	D29	Numeric	6	2
33	D30	Numeric	6	2
34	D31	Numeric	6	2
** Total **			199	

Structure for database: C:met4.dbf

Number of data records: 0

Date of last update : 01/07/88

Field	Field Name	Type	Width	Dec
1	STCODE	Character	8	
2	YEAR	Numeric	4	
3	JAN	Numeric	6	2
4	FEB	Numeric	6	2
5	MAR	Numeric	6	2
6	APR	Numeric	6	2
7	MAY	Numeric	6	2
8	JUN	Numeric	6	2
9	JUL	Numeric	6	2
10	AUG	Numeric	6	2
11	SEP	Numeric	6	2
12	OCT	Numeric	6	2
13	NOV	Numeric	6	2
14	DEC	Numeric	6	2
** Total **			85	

Structure for database: C:met5.dbf

Number of data records: 0

Date of last update : 01/07/88

Field	Field Name	Type	Width	Dec
1	STCODE	Character	8	
2	YEAR	Numeric	4	
3	JAN	Numeric	6	2
4	FEB	Numeric	6	2
5	MAR	Numeric	6	2
6	APR	Numeric	6	2
7	MAY	Numeric	6	2
8	JUN	Numeric	6	2
9	JUL	Numeric	6	2
10	AUG	Numeric	6	2
11	SEP	Numeric	6	2
12	OCT	Numeric	6	2
13	NOV	Numeric	6	2
14	DEC	Numeric	6	2
** Total **			85	

Structure for database: C:basin.dbf

Number of data records: 37

Date of last update : 01/02/89

Field	Field Name	Type	Width	Dec
1	STCODE	Character	5	
2	NAME	Character	15	
** Total **			21	

Structure for database: C:statdesc.dbf

Number of data records: 5

Date of last update : 11/29/88

Field	Field Name	Type	Width	Dec
1	STCODE	Character	8	
2	ST_NAME	Character	15	
3	LATITUDE	Numeric	6	
4	LONGITUDE	Numeric	6	
5	RIVERBASIN	Character	10	
6	SUB_BASIN	Character	10	
7	CATCHAREA	Numeric	7	1
8	RIVER_DIST	Numeric	6	1
9	DATE_START	Date	8	
10	INSTR_TYPE	Character	5	
11	DATUM_RL	Numeric	8	3
12	METHOD_OBS	Character	8	
13	MAINTD_BY	Character	8	
14	REMARKS	Character	15	
** Total **			121	

Structure for database: C:l&v1.dbf

Number of data records: 3

Date of last update : 11/29/88

Field	Field Name	Type	Width	Dec
1	STCODE	Character	8	
2	AREA_KHARF	Numeric	8	3
3	AREA_RABI	Numeric	8	3
4	AREA_RICE	Numeric	8	3
5	AREA_CANE1	Numeric	8	3
6	AREA_WHEAT	Numeric	8	3
7	AREA_CANE2	Numeric	8	3
8	AREA_OTH_1	Numeric	8	3
9	AREA_OTH_2	Numeric	8	3
10	RICE_IRRI1	Numeric	8	3
11	RICE_UNIR1	Numeric	8	3
12	WHEAT_IRRI	Numeric	8	3
13	WHEAT_UNIR	Numeric	8	3
14	CANE_IRRI1	Numeric	8	3
15	CANE_UNIR1	Numeric	8	3
16	CANE_IRRI2	Numeric	8	3
17	CANE_UNIR2	Numeric	8	3
18	OTH_IRRI1	Numeric	8	3
19	OTH_UNIR1	Numeric	8	3
20	OTH_IRRI_2	Numeric	8	3
21	OTH_UNIR_2	Numeric	8	3
** Total **			169	

Structure for database: C:l&v2.dbf

Number of data records: 3

Date of last update : 11/29/88

Field	Field Name	Type	Width	Dec
1	STCODE	Character	8	
2	AREA_KHARF	Numeric	8	3
3	AREA_RABI	Numeric	8	3
4	AREA_RICE	Numeric	8	3
5	AREA_CANE1	Numeric	8	3
6	AREA_WHEAT	Numeric	8	3
7	AREA_CANE2	Numeric	8	3
8	AREA_OTH_1	Numeric	8	3
9	AREA_OTH_2	Numeric	8	3
** Total **			73	

Structure for database: C:l&v3.dbf

Number of data records: 3

Date of last update : 01/07/88

Field	Field Name	Type	Width	Dec
1	YEAR	Numeric	4	
2	STCODE	Character	8	
3	GEO_AREA	Numeric	6	
4	FORST_AREA	Numeric	6	
5	NON_AGRCUL	Numeric	6	
6	USHAR_SOIL	Numeric	6	
7	ORCHARDS	Numeric	6	
8	UNIRRIGATE	Numeric	6	
9	IRRIGATED	Numeric	6	
10	CANALS	Numeric	6	
11	WELLS	Numeric	6	
12	OTHERS	Numeric	6	
** Total **			73	

Structure for database: C:\stage.dbf

Number of data records: 18

Date of last update : 11/30/88

Field	Field Name	Type	Width	Dec
1	STCODE	Character	8	
2	YEAR	Numeric	2	
3	UNIT	Character	2	
4	MONTH	Numeric	2	
5	STAGE1	Numeric	7	3
6	STAGE2	Numeric	7	3
7	STAGE3	Numeric	7	3
8	STAGE4	Numeric	7	3
9	STAGE5	Numeric	7	3
10	STAGE6	Numeric	7	3
11	STAGE7	Numeric	7	3
12	STAGE8	Numeric	7	3
13	STAGE9	Numeric	7	3
14	STAGE10	Numeric	7	3
15	STAGE11	Numeric	7	3
16	STAGE12	Numeric	7	3
17	STAGE13	Numeric	7	3
18	STAGE14	Numeric	7	3
19	STAGE15	Numeric	7	3
20	STAGE16	Numeric	7	3
21	STAGE17	Numeric	7	3
22	STAGE18	Numeric	7	3
23	STAGE19	Numeric	7	3
24	STAGE20	Numeric	7	3
25	STAGE21	Numeric	7	3
26	STAGE22	Numeric	7	3
27	STAGE23	Numeric	7	3
28	STAGE24	Numeric	7	3
29	STAGE25	Numeric	7	3
30	STAGE26	Numeric	7	3
31	STAGE27	Numeric	7	3
32	STAGE28	Numeric	7	3
33	STAGE29	Numeric	7	3
34	STAGE30	Numeric	7	3
35	STAGE31	Numeric	7	3

** Total **

232

Structure for database: C:discharg.dbf

Number of data records: 5

Date of last update : 11/30/88

Field	Field Name	Type	Width	Dec
1	STCODE	Character	8	
2	YEAR	Numeric	2	
3	UNIT	Character	2	
4	MONTH	Numeric	2	
5	DISCH1	Numeric	8	3
6	DISCH2	Numeric	8	3
7	DISCH3	Numeric	8	3
8	DISCH4	Numeric	8	3
9	DISCH5	Numeric	8	3
10	DISCH6	Numeric	8	3
11	DISCH7	Numeric	8	3
12	DISCH8	Numeric	8	3
13	DISCH9	Numeric	8	3
14	DISCH10	Numeric	8	3
15	DISCH11	Numeric	8	3
16	DISCH12	Numeric	8	3
17	DISCH13	Numeric	8	3
18	DISCH14	Numeric	8	3
19	DISCH15	Numeric	8	3
20	DISCH16	Numeric	8	3
21	DISCH17	Numeric	8	3
22	DISCH18	Numeric	8	3
23	DISCH19	Numeric	8	3
24	DISCH20	Numeric	8	3
25	DISCH21	Numeric	8	3
26	DISCH22	Numeric	8	3
27	DISCH23	Numeric	8	3
28	DISCH24	Numeric	8	3
29	DISCH25	Numeric	8	3
30	DISCH26	Numeric	8	3
31	DISCH27	Numeric	8	3
32	DISCH28	Numeric	8	3
33	DISCH29	Numeric	8	3
34	DISCH30	Numeric	8	3
35	DISCH31	Numeric	8	3
** Total **			263	

Director : Dr. Satish. Chandra

Div. Head : Dr. P V Seethapathi

Study Group : Smt. Deepa Chalisgaonkar

Sh. S.K.Jain

Sh. P.K.Mittal