MANAGEMENT INFORMATION SYSTEM ON BULL MOTHER HERDS

By

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THESIS

Submitted in partial fulfilment of the
requirement for the degree

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Department of Livestock Production Management
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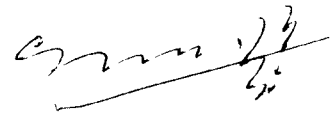MANNUTHY, THRISSUR
1995

DECLARATION

I hereby declare that the thesis entitled "Management Information System on Bull Mother Herds" is a bonafide record of research work done by me during the course of research and that the thesis has not previously formed the basis for the award to me of any degree diploma associateship fellowship or other similar title of any other University or Society

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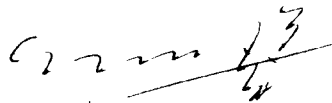
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We the undersigned members of the Advisory Committee of Shri C P Devanand a candidate for the degree of Master of Veterinary Science in Livestock Production Management agree that the thesis entitled **"Management Information System on Bull Mother Herds"** may be submitted by Shri C P Devanand n partial fulfilment of the requirement for the degre

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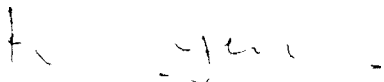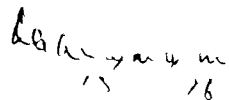Department of Livestock Production Managemer

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In the Loving Memory of my Father

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C.P. DEVANAND

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Introduction

INTRODUCTION

Modern management begins with a broad look at the nature and scope of the functions of the managers who are expected to perform varied duties in their day to day operations Management as such is a relatively new discipline but it developed rapidly in size, quality and method of approach over the last two or three decades and is spreading acros national and cultural boundaries as a result of the quick development of communication and international trade The business environment underwent stupendous changes with the emergence and growth of multinational and large local companies, the face of management had to change to suit their requirements These changes will inevitably continue and even accelerate

The objective of management is perfection and this can be attained only through precise decisions resulting from coordination of activities Because of the increasing importance of management as well as the new challenges it faces it is no longer enough that managers be skilled in a functional speciality such as engineering or marketing and that they understand the traditional functions of planning, organizing and controlling To make management efficient, the managers must be equipped with the most up-to-date knowledge or know how of various categories - decision making, planning staffing

organizing, communicating directing, controlling, buying selling, marketing, advertising, sales management etc It is imperative that he understands and adopts the systems approach to management and develop the ability to participate in the design and utilization of computer based information systems

The scope and purpose of Management Information Systems (MIS) is better understood if each part of the term is defined Management comprises the processes or activities that describe what managers do in the operation of their organization plar organize, initiate and control operations Because decision making is a fundamental pre-requisite to each of the foregoing processes the job of an MIS becomes that of facilitating decisions necessary for planning organizing and controlling the work and functions of the business

Information consists of data that has been retrieved processed or otherwise used for informative or inference purposes, argument or as a basis for forecasting or decision making It is the catalyst of management and the ingredient that coalesces the managerial functions of planning operating and controlling

A system can be described as a set of elements joined together for a common objective All systems are parts of larger systems The organization can be considered the system

and the parts (divisions, departments, functions, units etc) are the sub-systems   The systems concept of MIS is one of optimizing the output of the organization by connecting the operating   sub-systems   through   the   medium   of   information exchange   The systems approach to management is designed to utilize   scientific   analysis   in   complex   organizations   for developing   and   managing   operating   systems   and   designing information   systems   for   decision   making   A   basic   and fundamental notion of the systems approach to organization and management is the inter-relationship of the parts or subsystems of the organization

The objective of a MIS is to provide information for decision   making   on   planning,   initiating,   organizing   and controlling the operations of the sub-systems of the firm and to provide a synergistic organization in the process   Thus we are concerned with three systems   namely   the social system called organization   a system of management that is used in practice to improve the operations and productivity of the organization and the management information system which provides the information for   making   decisions   regarding   the   integration   of   the organization   through   the   process   of   management   MIS   is concerned with all three levels of the management process i e strategic level, tactical level and the operational level   The strategic level concerns itself with the top management tasks of deciding the objectives of the organization   the levels and the

kinds of resources required to attain the objectives and the
policies that govern the acquisition, use and disposition of
resources This level faces the environment emits and receives
responses to and from outside variables such as government
agencies and institutions

The tactical level is concerned with making and
monitoring short term plans It reduces the strategic long term
plan to its own short term plans, and then translates its own
short term plans into operational plans and programmes
Further, it feeds processed information generated at operational
levels to the strategic levels and help it build sound and
realistic long term plans

The operational level is concerned with the day to day
activities of the organization For the operational level MIS
supplies information for implementing plans sent down from the
tactical level and to reduce the short term plans into operation
plans, programmes and schedules The systems for handling each
of these categories differ as a result of the varying degrees to
which these tasks can be defined Normally the top management
will spend more time on strategic decisions middle level
managers on management control and lower level managers on
operational control The information requirements for each
level varies and hence appropriate information systems for

each category must be designed taking into account the characteristics of information requirements

A major difficulty in designing an MIS is to identify the systems needs' and correlate it with the needs of the operational system The design of information system in an organization must begin with a thorough understanding of the company s economics strategy and organisation The process begins with a proper and careful study of opportunities and associated risks in the environment and their relation with the organization's resources and distinctive strength The framework of Management Information System must be able to govern the essential economic and technical characteristics of the industrial unit and monitor the trends that suggest future changes in these characteristics It should take into account the nature of competition both within the industry and across and determine the range of strategies available to the company The MIS designed must be flexible and not merely tailored to the present status of the business enterprise but also elastic to its future evolution Further, since an enterprise functions within its own limitations and under certain constraints imposed by the environmental system, it is necessary to identify and establish all such constraints and problem boundaries so that the design of the system is realistic

Information needs and style also vary with the level of management   The MIS should be patterned to match the kind of information needed by each level of management   At senior levels, more emphasis will be on abstracts and summaries with an element of interface with the environment and a range into the future   At lower levels, more details with bias on the physical content of the communication are appropriate   If the organisational structure is elaborate, dispersal of authority and decentralization is large and the decision centres are loosely bound   the information needs will be complex and i ѣ defined   If the scalar chain is clear   products and perating units   few   decision   centres   well   knit   and   imited   rit communication and information pattern will be simple   itrolled and well defined   The attitude of the manager   and their management style also influence the information needs

The information systems can be sub divided   nto four categories,   namely   the Transaction processing system Information providing system   Decision support system and the Programmed decision making system   Each category of the system is aimed at catering to the specific requirement of the unit However   since MIS has a functional approach   i e   it works under a sub system designed to take care of the needs of a particular function, a break-up of the information systems on the basis of management activity is necessary   This includes the Production   Marketing   Financial and Personnel Information

Systems   Each of the functional system has its own data files which may be required by other applications also   While integrating the Management Information System Structure   these data   files can   be combined into a common data base and a common software can be created by integrating all applications

Once the structure and plan for MIS for the organisation are developed   the plan can be executed   Generally   a small module   is   designed   and   implemented   Detailed   analysis procedure tools and techniques of system analysis would help the manager in understanding a problem, sorting out a solution and applying it at the situation   The two common approaches for the development   of   MIS   are   the   Bottom-up   approach   and   Top   down approach

MIS   is   a   growing   division   of   the   science   of   business management   The   introduction   of   computers   in   business management   marks   the   beginning   of   a   definite   epoch   in   the history   of   management   development   Before   computers   MIS techniques   existed   to   supply   manager   with   information   that would permit them to plan and control operations   The computer has   added   other   dimensions   such   as   speed   accuracy   and processing   of   increased   volumes   of   data   that   permit   the consideration of more alternatives in a decision making   The technical   advancements   in   computer   systems   has   pushed   the technocrats from hardware to software   This rapid incre s ra

made possible the dissemination of computerised information and made management decision comprehensive and economical   Even in production or manufacturing processes computers are being used at various stages   By touching various aspects of business like manufacturing organisation, research etc the computer provides necessary information for management decision making, thus becoming a part and parcel of modern business management   The combination of computer development and growth of Management Information Systems will go a long way in establishing a methodology through which the quality of management can be raised to a greater height

The concept of MIS in Livestock Production and allied enterprises can be said to have been of recent origin in the world and still in its infancy in India   Taking into consideration, the special nature of farming in general and livestock production in particular marked by the predominance of fragmented holdings and subsistence farming, it is very difficult to establish MIS for Indian livestock farms as there is lack of sufficient and appropriate data from the most important site, namely the farm gate   With the development and use of micro computers this problem can be surmounted but the implementation of this technology at grass roots level is a major task fraught with numerous problems   It is necessary to formulate and integrate this technology to suit the special conditions in our country   This will entail reorienting and

rescheduling the type and scope of education in our Agricultural Universities. This is a time consuming process as it involves an overhauling of the present system of education. Th s can be complemented by initiating development of information systems at the field level by training the field level personnel. However this too requires frequent refresher training. Also this might generate *ad hoc* development of information system that only have limited or short term use.

Whatever be the problems associated with the above, they have to be overcome. Because of the increasing complexity of the technical knowledge required of a production manager r agriculture today, it raises serious questions as to whether an individual manager possesses within himself the multip e competencies required to ensure the survival of the production unit. The application of modern computer technology s the most promising vehicle through which the agricultural manager a expand his managemental abilities over the large number of complex disciplines with which he must cope. Computerized Managemental Information Systems can provide dairy farm managers with accurate timely information in a form that is most useful for today's management decisions. The significance of such an Information System is more so in the present day environment in India where the agricultural sector is showing great dynamism to organise itself in the lines of viable industries.

Through five year plans the government controls and
directs agricultural policy and for the past few decades
crossbreeding has been a major operational item for dairy
development throughout the country employing artificial
insemination as a major technological tool When breeding
activities of such massive scale are in operation it is
imperative to apply principles and practices of MIS to ensure
proper direction and provide required feed back for future
planning Bull mother farms form the corner stone of dairy
development strategy Proper data collection and evaluation at
various levels as well as provision of standardized management
guidelines can significantly enhance the effective utilization
of bull mother farms The objective of a bull mother farm is
the production of bull calves with superior genetic qualities at
the earliest and also most economically The manager of such a
farm will be benefited much if he is armed with an MIS that
supplied him accurate and timely information regarding he
various aspects he has to consider and analyse while aking a
decision in routine management of the farm The information
generated in these farms, also has to reach various levels of
decision making in a processed and condensed form An MIS
set up can make such transmission of information simple and
authentic

Only very few attempts have been made to develop such systems in the dairy sector in the country   The need for developing and further refining such an information system for bull mother herds stimulated this project

Review of Literature

REVIEW OF LITERATURE

Management is becoming increasingly important in today's livestock farming Management information systems (MIS) can play an important role in this context (Jalvingh, 1992)   Davis and Olson (1985) defined an MIS as an integrated user machine system for providing information to support operations, management and decision making functions in an organization The system utilizes computer hardware and software manual procedures, model for analysis, planning, control and decision making, and a data base   The fundamental notion of such a system is one of providing information that allows the manager to evaluate the past, monitor, adapt and control the present and plan and direct the future state of the business (Bywater 1980)   This requires record processing capabilities systems for monitoring current activities and aids for planning and decision making

Management information systems can be efficient tools for better management on the farms (deHoop, 1987)   He presented an information model based on which MIS could be constructed The information model describes the functions, the processes, the information flow and the data which are all important for the management of the farm

Beqed Dov (1967) presented an overview of management science and information system Blackie (1975) developed a model for management information system for individual farm firm Bywater (1980) considered the extent to which   ~ept f an integrated MIS might be developed for applicati n n dairy production Major features of such a system were des~iibed as capabilities to process records for evaluating urrent and historical states of the business to project anticipated events and performance in the immediate future, as a means of monitoring and controlling activities and to piovide both lo·q and short run projections of physical and financial performance as an aid to planning and decision making These concepts were discussed in relation to types of decision aids and system analyses that have been developed tor and of dairy production Chandler and Martin (1975) outlined a management system that provided accurate genetic production, inventory and financial reports and forecasts on a timely basis to the manager of a modern dairy farm They have attempted to provide an outline of the basic software needed for a management information system for a dairy operation Speicher (1981) probed the potential for computerization within dairy herd and farm management and speculated on the forms in which computer-assisted management systems might be employed to maximise managerial output Connor and Vincent (1970) presented a framework for developing a computerised farm management information A computer assisted dairy herd management system has been described (Speicher 1981)

as one in which the herd is monitored and pertinent information on individual animals entered into storage for retrieval at appropriate times and in a form designed to facilitate decision making The ultimate goal of such a computerized data acquisition system is to be fully informed on the production nutrition, reproduction, health and economic status of all animals at all times and to initiate and carry out or notify the manager of any appropriate action to be taken

Information processing is an important activity for the farm manager since it provides essential information for making the right decision (Boehlje and Eidman, 1984) Computers have become an essential part of organizational information processing because of the complex nature of large modern organization, the volume of data to be processed and the advantage it will provide in management The broad category of computer systems that realize the collection, maintenance and use of information for organizational purposes are classified as management information systems (Jalvingh, 1992) Despite the fact that the computer is nothing more than a tool for processing data, many managers view it as the central element in an information system (Murdick et al , 1994) Its real role is to store and process data and provide information for decisions and for planning and controlling operations

Computer and Management

The first use of computers as a management tool in dairy farming was by milk recording services started in the 1950 s in the United States (Voelker 1981) Collectively these organizations became known as the Dairy Herd Improvement Association (DHIA) It was during 1960's that computers were first used by the DHI programmes in Canada (Moxley 1986 With the advent of official milk recording and computerized records DHI programmes promoted the need for, and use of unique individual animal identification The records that were produced were intended to provide information to farmers on individual cow production From this information decisions could be made about feeding management and culling Voelker 1981) The official milk records collected by DHI associations were maintained in large centralized mainframe computers These data bases also provided the information needed by the artificial insemination industry to develop sire proofs and aid in genetic selection programmes The use of milk recording services by farmers resulted in large advances being made in production and in the genetic potential of the dairy cow This has resulted from the use of DHI information as a management aid to dairy producers and in providing a large research data base to develop new techniques (Moxley 1986) Growth in the use of DHI programmes resulted in an expansion of the services they provided (Bywater, 1980) Most DHI programmes now offer

addition to individual cow production records somatic cell count data, reproductive performance parameters nutrition information, and management worklists This information can be summarized and reported at the herd level state level or country level through the use of computers

Mainframe Computer Systems

Although the DHI programmes were the first source of computer generated information for dairy farmers and veterinarians they initially provided reports only of production During the 1970 s several computer based data handling systems were developed that essentially dealt with reproductive performance These systems were intended to supplement production information received from the DHI programme (Britt and Ulberg 1970 Erb *et al* 1975 Kelly and Holman 1975) At the same time programmes designed to monitor both th health and reproduction of dairy herds were developed (Meek *et al* 1975 Lineweaver and Spessard 1975)

The need for a workable system to provide herd level analysis of all aspects of Australian commercial dairy operations, and the ability to compare this to herd targets led to the development of data collection and analysis system (Blood *et al* 1978) It began as an inefficient manual records and analysis service that led to the use of on farm diaries and

computer generated monthly analysis reports (Canno t al   978
Enhancements made to the programme have been des r be i t
Willamson et al (1980)

Through a co operative effort with the Uni ei it) of
Melbourne the MELBREAD herd health and fertility re oit ii c
scheme was developed by the Veterinary Epiden ol gy and
Economics Research Unit, University of Peading in i9 i
(Esslemont et al 1982) Over several years its use resulted in
extensive redevelopment into a more integrated system that
incorporated milk yields and was known as the DANDATP
programme Operational difficulties resulting from use of tne
system on a mainframe computer necessitated trancr-iring t ie
programme to a mini computer system in 1979 The la tei s stem
became known as DAiSi (Esslemont et al 1981) Tre ise of t t
system on a mini computer greatly aided the turn around time or
reports compared to using the central mainframe computer which
relied on mail service The programme was implemeited and was
utilized successfully to serve about 250 dairy operations

Other mainframe based programmes capable of creating
herd management action lists and herd analysis reports developed
include programmes described as VIRUS (Martin et al 1982) and
COSREEL (Russel and Rowlands, 1983) The COSREEL programme
differed from others in that it utilized a remote terminal and

telephone lines for both data input and output   This was done to improve information transfer, but was limited by the technology of the time with respect to speed of data transmission   Neither of these two programmes were developed nd utilized to the extent of either the Melbourne system or the DAISY programme   It was emphasised by Cannon *et al* (1978) and Erb *et al* (1975) that data recording and input must be simple and convenient for both the farmer and the veterinarian   In order to facilitate these functions   the use of codes was developed (Cannon *et al* 1978)   Recommendations for data standards if data are to be used from different systems were put forward by Rowlands   (1983)   Dill   (1992)   outlined   the   technical specifications of an information data base

These initial computer based herd programmes allowed for the collection and processing of health as well as production data   Various methods have been described for obtaining farm level information   However   they all required the functions of a centrally located computer for the analysis of the data   In essence   they were all operated from a remote centralized facility with their main limitation being the distance of the computer from the source of the data

Microcomputer system

The rapid development of microcomputer technology in recent years led to the introduction of dairy herd management software programmes that were no longer dependent on centrally located mainframe computers   Microcomputers increased the efficiency and timeliness of the information that was produced and   made possible the creation of dairy herd management software programmes specific for its use   This has allowed the decentralization of information processing (Hutt and Hutt 1993)   The availability of dairy herd management software for the microcomputer has increased during the last decade   Essentially, all such programmes provide the capability of producing   management   worklists and herd level analysis reports

A   standardized   assessment   of   several   of   the microcomputer programmes available was conducted by Etherington *et al* (1984)   This study involved entry of a standard set of herd data and evaluation of each programme on its ease of input format   of   output   and   accuracy   of   analysis   The   overall conclusion reached from the study was that no one product stood out in all of the areas that were evaluated   It was recommended that these types of software programmes needed to be implemented in a field setting to further evaluate their usefulness   As a follow up study by the same researchers   Menzies *et al* (98

implemented the Dairy Herd Management System (DHMS) as both an on-farm and bureau system   In the on-farm setting the producer was responsible for all aspects of data manipulation whereas the bureau system involved collection of the data from the farm with input and analysis performed at the Veterinary Clinic Reports on the use and usefulness of the DHMS programme indicate that it performed well and that the information was well received by producers in both settings (Menzies *et al* 1988

The development of herd health programmes created the need for a system to record data collected from a farm   The use of the individual animal card has formed the basis of on farm manual recording schemes   However the analysis of data at the herd level has been tedious and not commonly done Cannon *et al* 1978, Radostits, 1986)   Herd programmes, if they are to achieve their full potential, require the use of computers for analysis of the large amount of farm data collected (Meek *et al* 1975, Blood *et al* 1978)   Lissemore (1989) has reviewed the use of computers in dairy herd health programmes   The use of the computer to generate information from farm data as a part of herd health programme has been described by several authors (Cannon *et al* 1978, Martin *et al* 1982, Russell and Powlands, 1983 Noordhuizen *et al*, 1986, Bartlett *et al* 1986, Udomprasert and Williamson, 1990, Ko, 1992)

Lissemore *et al* (1992) have described the implementation and use of a microcomputer based herd management information system to monitor dairy herd performance in South Western Ontario During the two year study, data were collected from on-event diaries veterinary visit reports and production testing information and selected indices of reproduction udder health production and heifer performance were worked out and reported It was concluded that the implementation of a microcomputer based information management system operated as a bureau service was feasible Another microcomputer application programme Dairy base developed with data base management system technology, for the management of animal inventory reproduction, genetic improvement, feeding milk production and health records of dairy cattle was described by Spahr *et al* (1992) This programme utilizes electronic transfer of milk production data from electronic milk meters and has the capability to minimise manual entry of other data by electronic updating of the data base Use of the programme in a 300 cow herd enhanced the details of data available for management of individual cows and provided an improved method of monitoring the current status of individual cows and planning herd management

Although the amount of information provided through the DHI programmes increased they could not totally meet the needs of the dairy practitioners These deficiencies ed to the

development of new herd monitoring tools Fetrow *et al* 1988

have described a system which utilizes a commercial spread

sheet programme to monitor information available from the DHI

report and health data that are recorded separately by the

farmer The programme can display herd trends graphicall

Technological advances have resulted in the practical

applications of electronic data transfer A system known as

DART, available in some parts of the United States has allowed

the producer and veterinarian as part of an integrated herd

health programme, to transmit and receive data from the central

data base via an on farm micro computer and modem The DART

system makes use of the storage capacity of large mainframe

computers yet accommodates the immediacy of access to the

information as required by producers for day to day management

activities or the veterinarian as part of a herd monitoring

programme (Fetrow *et al* 1988) Incorporated with a microcomputer

programme to monitor the health aspects of the herd this type

of system has the potential to become a truly integrated herd

monitoring scheme

Computer technology has been also found useful in

feeding formulation and evaluation of rations (Dean *et al* 1969

Stallings *et al* 1985 Galligan *et al* 1986 Ely *et al* 1991 Bloom *et al*

1991 Spahr *et al* 1992 Malt *et al* 1992) in Veterinary

ep demiology (Frankena *et al* 990) and in veterina educa io

(Erb *et al* 1975 Johnson *et al* 1992 Whitehear *et al* 994   ⌐ts

application in beef production has been described by various

authors (Ringwall and Boggs 1992, McGrann and Rupp 1992

Menzies 1992)   Use of computerised management system for

broiler production (Mcilroy *et al* 1988) and for pig herds

(Kilpatrick and Walker, 1990) have been reported   The use of

microcomputer systems in farm budgeting (McGrann and Rupp, 1992)

and preparing accounts (Williams and Ward, 1989) have also been

described

Information systems in India

Livestock production is an integral part of agricultural

systems in India (Chopra, 1993)   The contribution of the

livestock sector of about Rs 37,000 crores to gross national

product ranks fourth after agriculture, industry and service

sectors (Bhat, 1993)   It is among the fastest growing sectors

and yet apparently untouched by the information revolution

that has influenced greatly the other sectors especially of

industry and service   Our universities and colleges are large

repositories of information which is not utilized fully The

reason for this was that we failed to realize the powers of the

personal computer and the changes it could bring about in the

way we conduct research and development and extension activities

(Bhat, 1993) Recent experiences of development workers and

researchers indicated that there was an urgent need for

developing information systems to improve livestock production in India (Maru and Itty, 1993)

Though we have been slow in adopting information for the livestock sector, we have had some developments in the area (Bhat 1993) The National Dairy Development Board has devoted considerable efforts in developing computer systems for their farm business operations (Trivedi and Patel 1993) Under Operation Flood I, a computer based information system was developed on the mainframe system for its bull mother farms and named it the Farm Recording System With the advent of PC compatible computers, this system was modified and renamed as Dairy Herd Management System (DHMS) DHMS is a PC based user friendly integrated on-line management information system for the management, planning and control of dairy herds Under Operation Flood I, NDDB also developed a system for monitoring the performance of production enhancement activities in the field, referred to as Field Recording System Finding it difficult to manage collection and processing of a large amount of data the programme of field recording was narrowed down to more purposeful programme of progeny testing of bulls This new well focussed and comprehensive programme of progeny testing of bulls was named as 'Dairy Herd Improvement Programme Actions' (DIPA) It is a comprehensive breed improvement programme initiated with the main purpose to achieve desired genetic changes through a systematic field based proge test n

programme in the few selected milk sheds in the country and also to accomplish parallel changes in feeding and management practices

The Indo Swiss Project Andhra Pradesh, have developed computer programmes, namely the 'Herd Book System' Progeny Testing System' and 'Herd Fertility System' for processing and analyzing livestock information collected in the various institutions of the Department of Animal Husbandry (Maehl and Suryaprakasam, 1993) The 'Herd Book System' was designed for livestock information from bull stations and Bull mother farms while the 'Herd Fertility System' was designed with an aim to process information on female fertility and reproductive performance 'Progeny Testing System' is used to collect edit and report field information on monthly milk recordings and based on these to calculate total lactation yields The Animal Husbandry Department in Kerala in association with National Informatics Centre has developed a computer based information system for various programmes and activities of the department (Nair 1994) The software named 'DISNIC MISAH is used to process the data on health status of various species of livestock and morbidity pattern obtained from institutions located in various parts of the state on monthly/*ad hoc* basis The data resources relating to environment like climate rainfall, temperature etc can be made use of in analysing the animal health situation so as to take corrective and control in

decisions at the appropriate level In addition to 'MISAH' the following information systems have been developed and implemented by Department of Animal Husbandry in association with National Informatics Centre, Kerala

* CABRIS   for monitoring cattle breeding activities,

* ROCMIS   for monitoring and evaluating the Rearing of Calves Scheme of Special Livestock Breeding Programme,

* PLANMIS   -   for monitoring the implementation of Plan schemes, and

* APRMIS   for monitoring and analysing the prices of livestock, livestock products and by products and feed

    The National Dairy Research Institute, Karnal has developed packages and data storage systems to store and manage performance data of cattle and buffaloes (Sadana 1993) These include,

* Buffpack   Buffalo Data Management Package,
* KsPack   - Karan Swiss Data Management Package
* PTNDRI   - Data Management for Progeny Testing under Field conditions

* Male NDRI   Male Calf and Bull Selection Package

* Vet NDRI   Veterinary Di pensary Data Management and

* AI   Calving Data Storage System

deGroot *et al* (1993) have given an overview of the experiences made in the Indo Swiss Goat Development and Fodder Production Project (ISGP) on collection and processing of data from its field performance recording scheme base farm extension programme, and action research   The set up of the performance recording scheme and the developed computer application 'BAKRI' for the purpose are elaborated in detail Maru (1993) has detailed the experiences of the Central Sheep and Wool Research Institute Avikanagar in managing information systems   Information systems development at the Institute was initiated in 1984 and it has been managing a data base of more than 30 000 sheep life-time records since 1987 Software developed at CSWRI have been described, namely

* CSWRI-Clostridia   A pro type knowledge base system for illustrating knowledge base generation for application in animal disease diagnosis, using the example of Clostridium infections,

* CSWRI-SRD   Sheep Research Data base (Version 3)
a complete system for managing
life-time records of an animal for the
All India Co ordinated Research
Project on Sheep improvement and All
India Co-ordinated Research Project on
Goat Improvement and

* CSWRI-DDIS   A disease data and information system
for organized sheep and goat farms

Livestock information systems have been developed throughout the world with varying degrees of success The advent of small computers and user friendly software have enabled its implementation at individual farm level (Bhat 1993) where it matter most (Chopra, 1993) The benefits of computer assisted information system in herd management have been reported by several authors (Bartlett et al 1986, Lazarus and Smith, 1988, Menzies et al 1988, Stein, 1989, Ko and Stalheim 1992) The ability of microcomputers to simulate an entire livestock operation and monitor the results of policy decisions on a regular basis will change the livestock manager's approach to management tasks substantially (Bywater and Goodger, 1985) The livestock manager will become a data user rather than data recorder and will adopt a multi-disciplinary approach to management and decision making

With the progress in computer technology sophisticated facilities for data processing and analysis became accessible at field level which have been utilised by various organizations and institutions in India for developing livestock software programmes Such programmes should be developed indigenously as programmes developed elsewhere do not meet all requirements of the users

The need still exists for research into implementation and development of computerized record keeping systems for on-farm data collection (Magwood, 1983) Such systems must be simple to use provide accurate data for analysis and generate useful information There is also a need to assess their use and usefulness with respect to needs of farm manager the veterinarian and potentially higher level agencies

Materials and Methods

MATERIALS AND METHODS

The data collected from the bull mother farms of Kerala Livestock Development Board at Dhoni and Madupett, were utilized as base material for the study The prevailing system of management and data collection at these farms were observed and relevant data with respect to various aspects of management were collected Informations that were generated from the data collected were critically studied so as to get necessary insight with respect to a management information system (MIS) for bull mother farms in developing countries

3.1 Farm Details

3 1 1 Farm details in general

The details of the farm with respect to its time of inception, total area, area under cultivation, cattle strength under various heads man power   technical and non tecnnical were noted

3 1 2 Farm Routine

The daily routine followed in the farms with regard to operatiors like feeding watering milking washing grooming worker's duty allotment etc were studied

3.2. Meteorological data

The climatic variables recorded and the freq ency of recording were studied The types of information generated from these data collected were noticed

3.3. Housing

The details of the housing provided to each class of animals were studied The items of observation included the number of sheds, type of housing, floor space given per animal manger details roofing flooring ventillation provided degree of tree shade available and degree of soil coverage in the vicinity of the sheds

3.4 Animal details

3 4 1 Pedigree

The pedigree details recorded and the pertinent registers/records were studied   Information generated from these data were noted

The process of decision making based on the pedigree information was analysed

3 4 2   Growth

The growth parameters recorded were studied and the time and frequency of recording noted   Informations available from the growth data collected were noted   The types of decisionstaken based on these outputs were analysed

3 4 3   Feeding

The feeding schedules and routines practised in the farms in each   ection viz   calf   heifer and cow were studied

3 4.3 1   Calf feeding

The feeding management of the calves was observed Schedules of feeding colostrum milk concentrates and roughages were studied

3 4 3 2   Heifer and cow feeding

The feeding schedules adopted for heifers and cows were studied   The various criteria that were taken into consideration   in formulation and daily allocation of rations were also noted

3 4 4   Production

The data collected with respect to production of cows was studied

3 4 4 1   Cow production details

The milk and fat production details recorded and the frequency of recording were studied   Details of the use and sale of milk were noted

The various registers and records maintained to record these events were studied   Informations generated from the production data were observed and the decision making process analysed

3.5   Reproduction

The data pertaining to the reproductive status routinely collected from cows were studied

3 5 1   Reproductive status

The different criteria used to evaluate the reproductive status of the cows were studied and the data collection with regard to these aspects observed

The records and registers maintained to record the data/events as and when they occurred were scrutinised and the informations generated studied Decisions taken based on these informations were noted

3.6 Health

The herd health programme adopted in the farms viz daily disease monitoring, treatment diagnostic tests conducted preventive inoculations done quarantine measures observed and general sanitation were studied

Records/Registers concerned with the maintenance of the relevant data were studied and the types of information generated that assist in the decision making process were noted

3.7 Management procedures

Other management procedures followed in the farms like methods of identification, milking system hygienic measures adopted exercise provided summer management of animals etc ere also studied

On the basis of the above analysis the lacunae and weaknesses in the present register and report based MIS were identified   Suitable modification in individu

made to make the system more comprehensive and meaningful   In
doing so   the anticipated future requirements were also given
due consideration

Based on the information required and incorporating the
improvements and modifications a flow chart for a computerised
management   information   system   for   bull   mother   farms   was
developed   This was translated into a Foxpro Software package
adaptable to personal computer (PC) with systematically designed
data base files   in which all   the relevant   information with
regard to a bull mother herd can be stored   Foxpro programmes
were developed based on these data base files to get certain
relevant informations as output   The efficacy of the management
information system was tested using the data on a sample of
animals in the bull mother herd kept in the KLDB farm   Dhoni

Results

RESULTS

The flowchart depicting the sequence in which conditions were tested and calculations performed for developing the management information system (MIS) is presented (Table 1) The models and structure of data base files, and the formats of inputs and outputs developed for the MIS of a bull mother herd are furnished

4.1. Main menu

Table 2 depicts the main menu which consists of data entry, report, utilities and exit options

4 1 1 Data entry

The formats developed for data entry are presented from Table 3 0 to 3 19

The birth details of each calf are entered in the format shown in Table 3 The data entered are the calf number (CALFN), sire number (SIREN), dam number (DNUM), date of birth of calf (DOB), sex, breed, birth weight (WEIGHT), significant birth details (BIRTHDETS) and genetic defects if any (GENETICSD)

Table 1 FLOWCHART

C

D

is
select
= 1
?

Yes → Calf birth details

No

is
select
= 2
?

Yes → Calf growth details

is
select
= 11
?

Yes → Exit from calf report

No

E

is
select
= 1
?

Yes

Young tock growth
details

No

is
select
?
?

Yes

Young stock growth
report

is
select
= J1

Fxit

No

Γ

is
select
= 1
?

Yes → Cow growth details

No

is
select
= 11
?

Yes → Fxit from cow
details

No
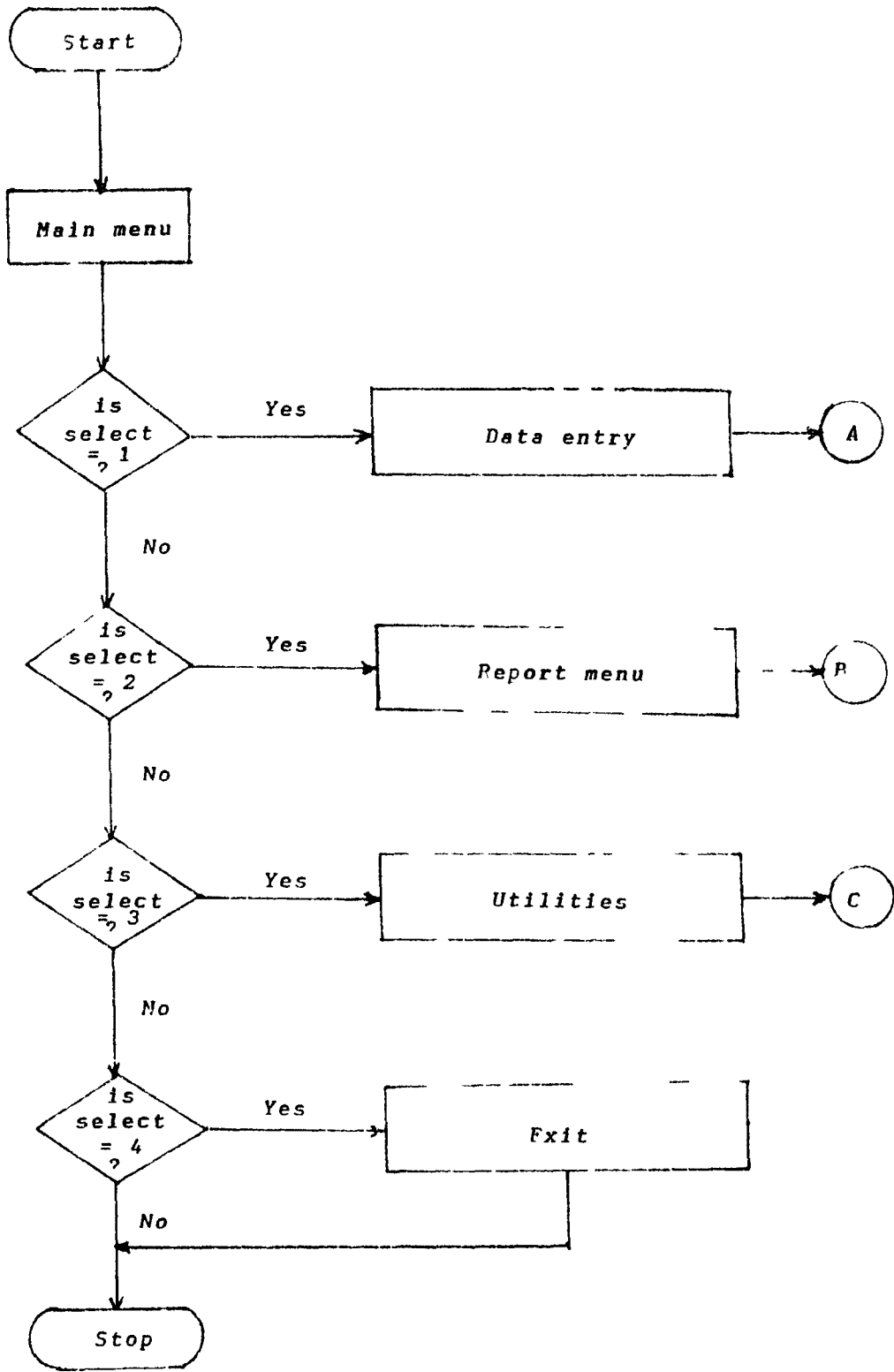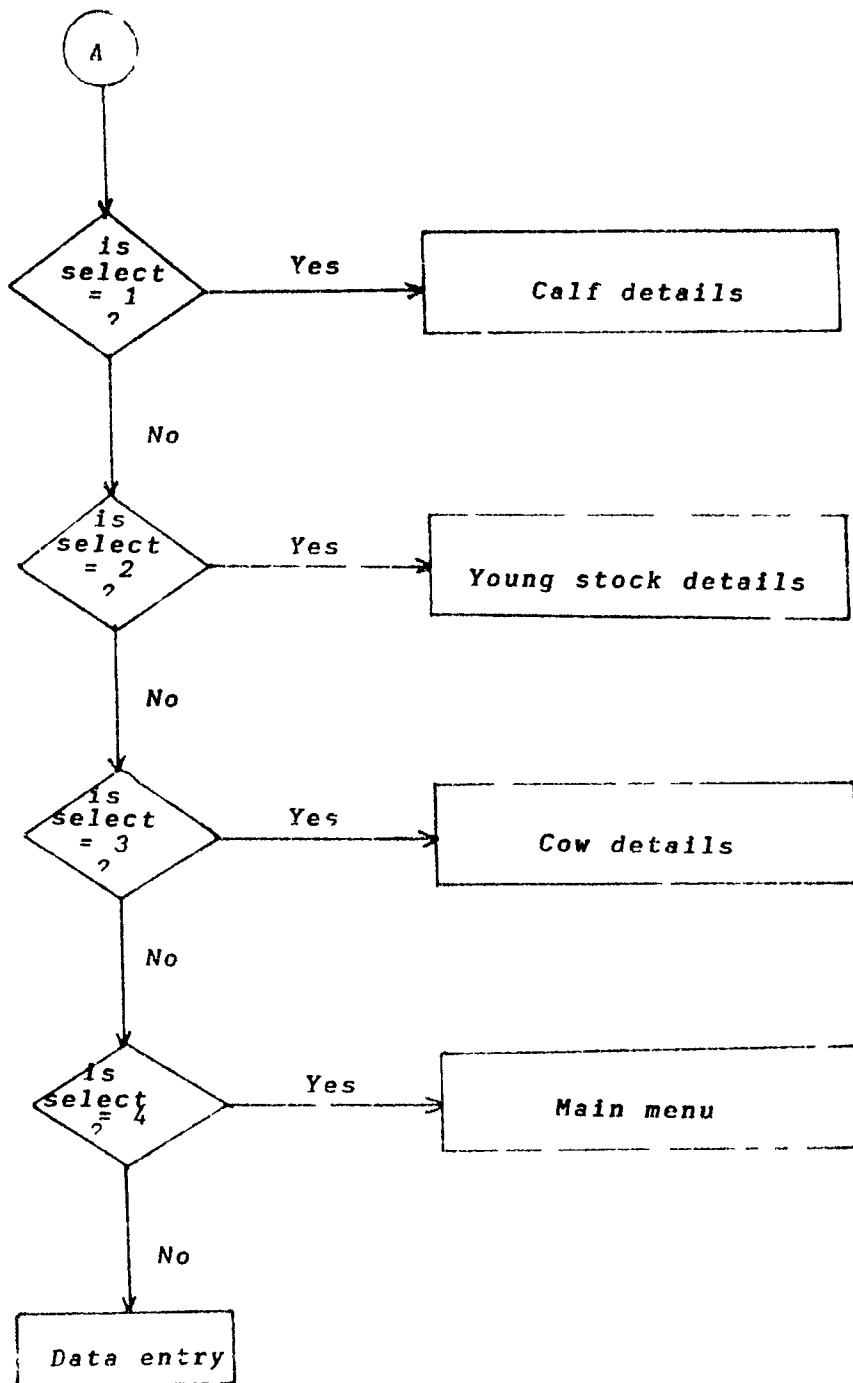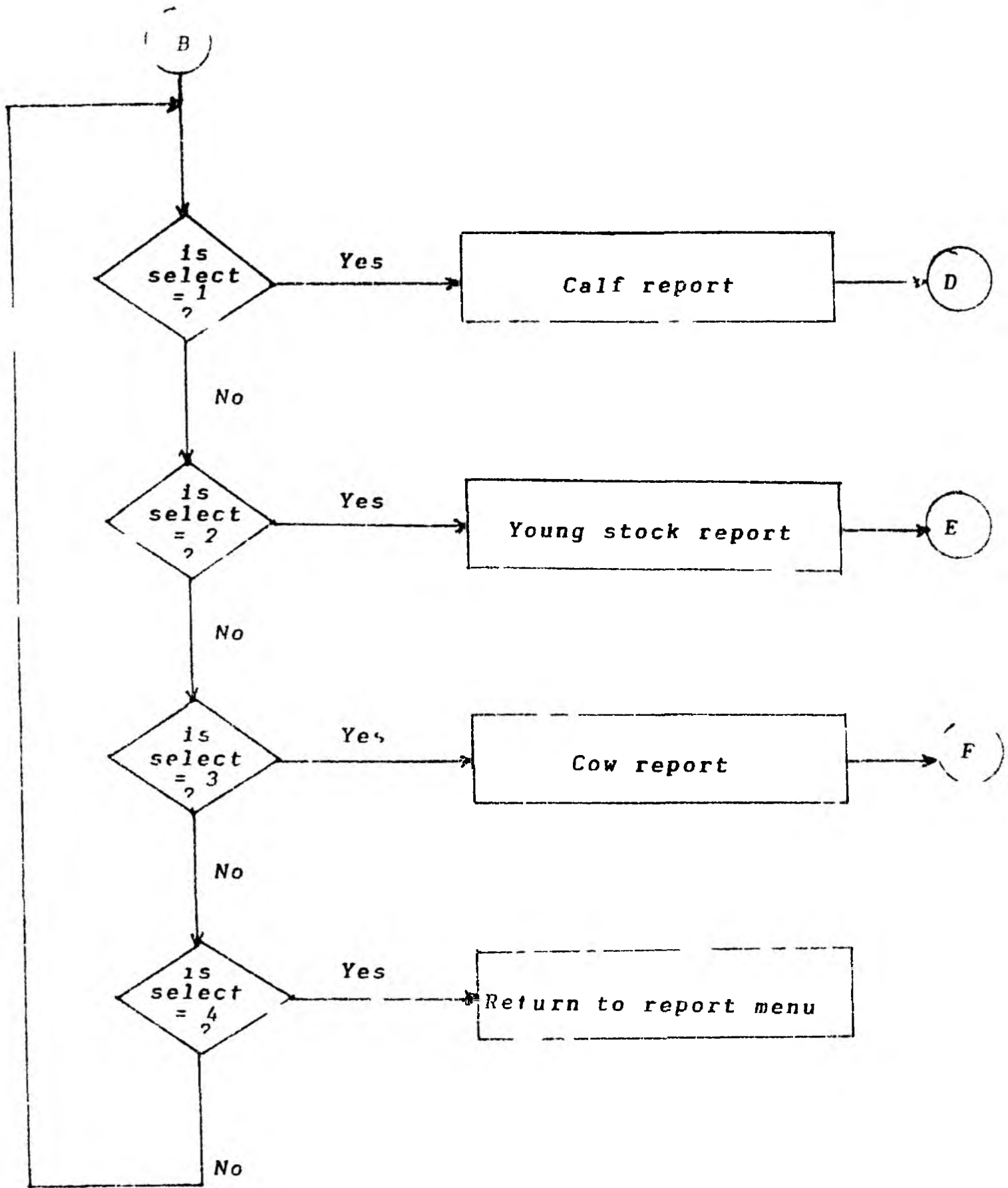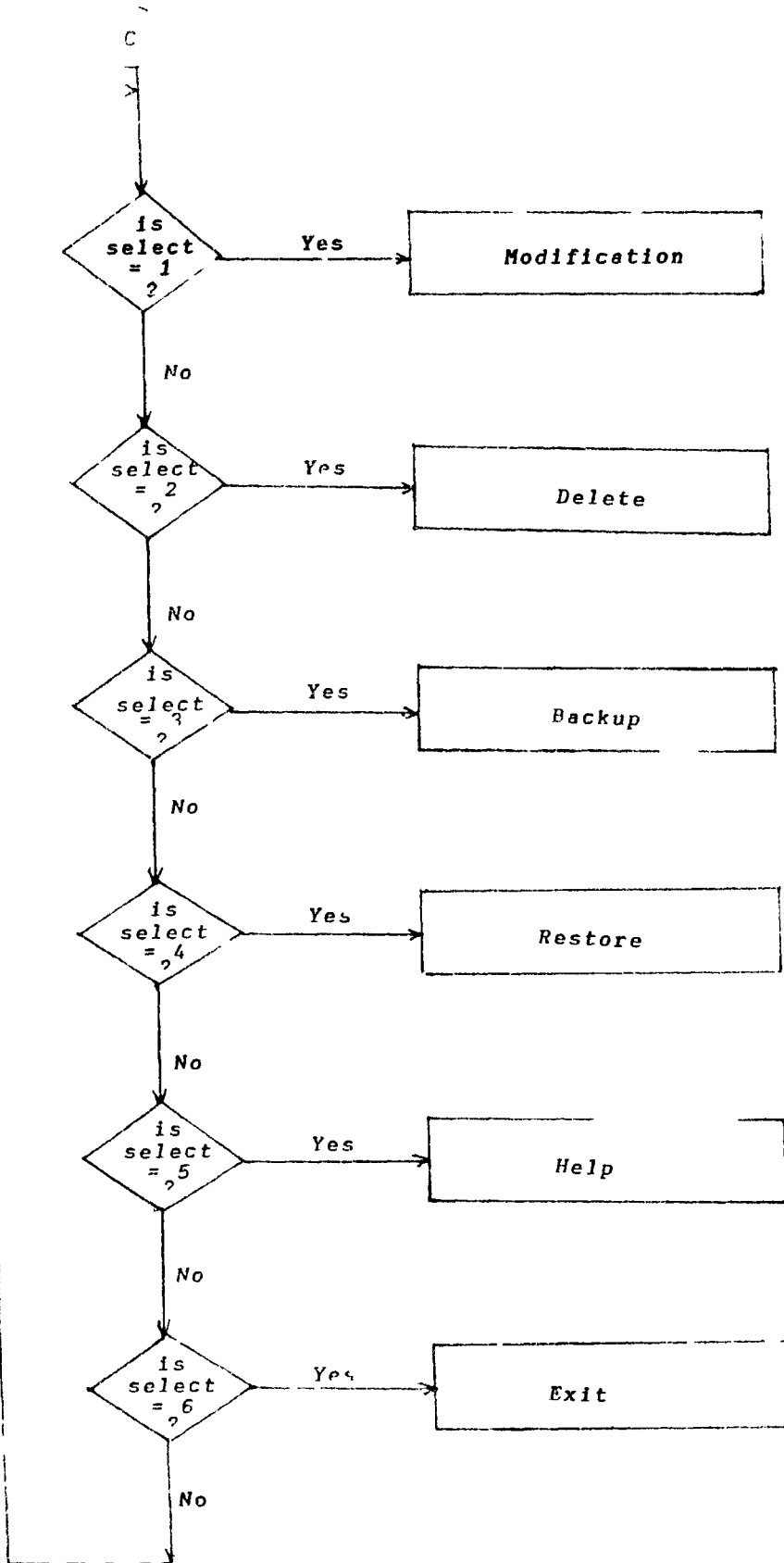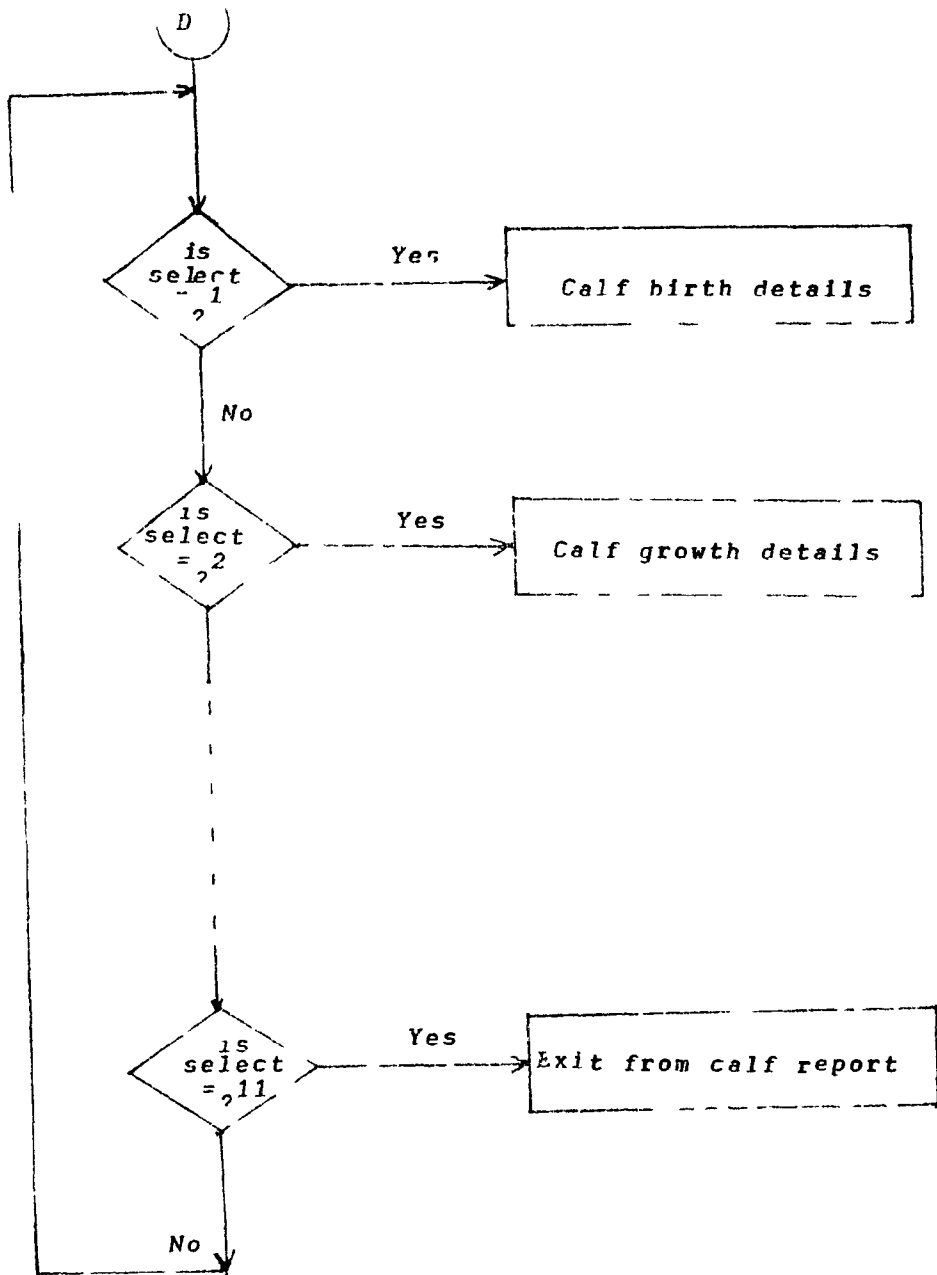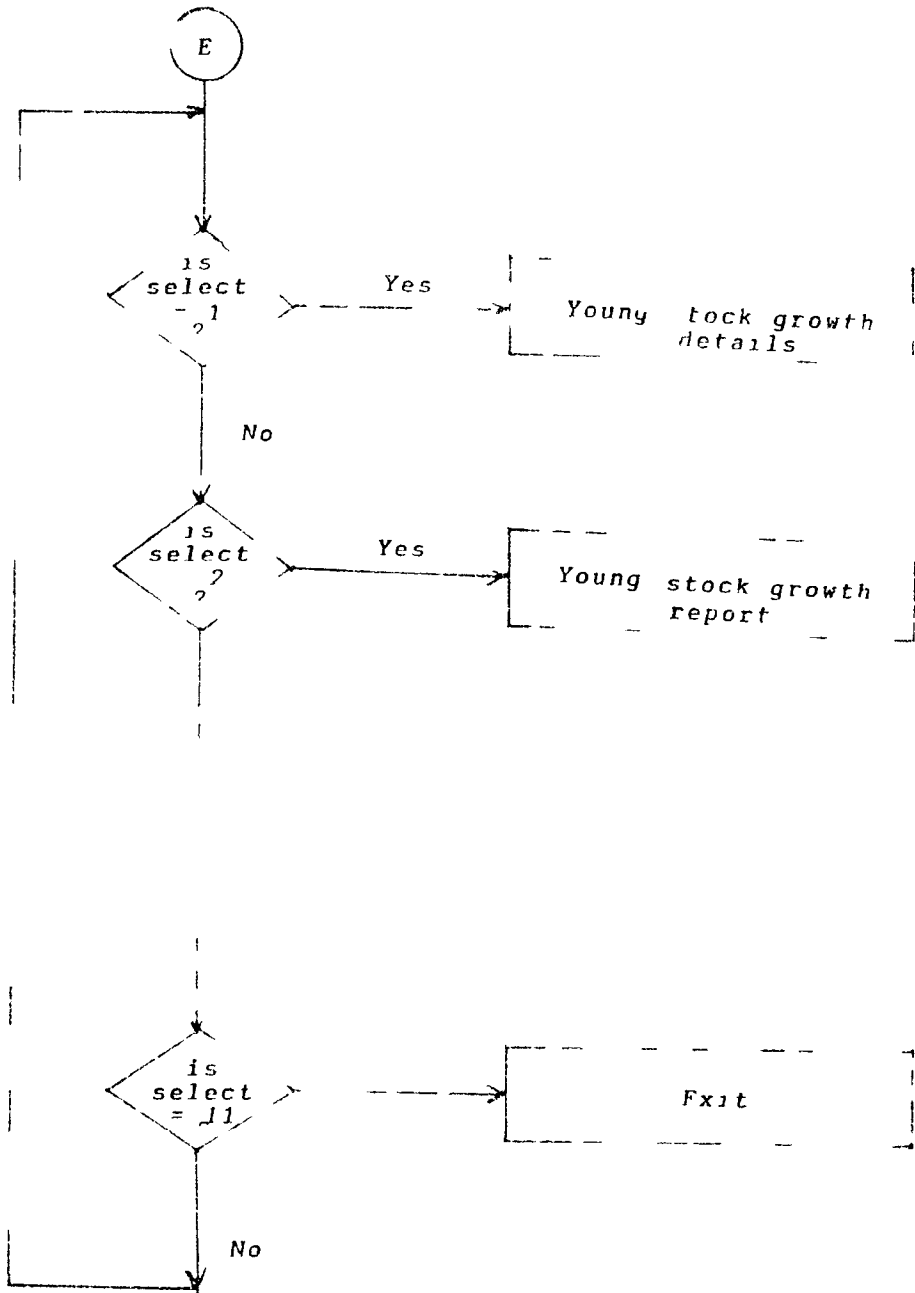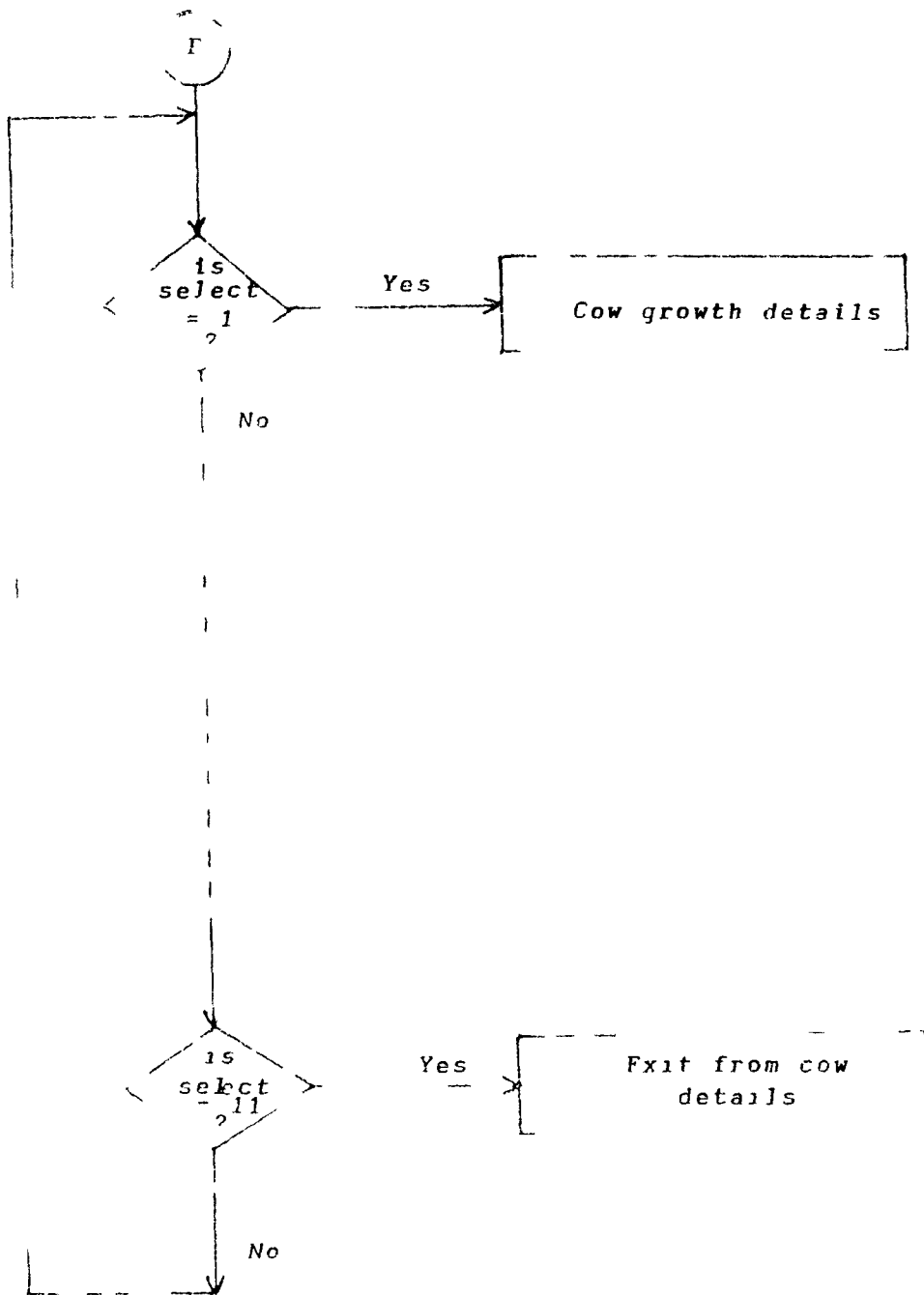
INFO ON BULL MOTHER FARM

Forms a part of MVSc thesis work of Dr C P Devanand Dept
of Livestock Production Management, College of Veterinary &
Animal Sciences Mannuthy

Dr C K Thomas   Dr C T Unacko
Major Advisor   Co-Major Advisor

                    Sri K Vimalan
                    Software Consultant
                    L B S Centre for Science & Technology
                    Thrissur

Table 2

```
┌─────────────────────────────────────────────────────────────┐
│                      M A I N   M E N U                       │
├─────────────────────────────────────────────────────────────┤
│          1      DATA ENTRY                                    │
│                                                               │
│          2      REPORT                                        │
│                                                               │
│          3      UTILITIES                                     │
│                                                               │
│          4      EXIT                                          │
│                                                               │
│                                                               │
└─────────────────────────────────────────────────────────────┘
```

The growth data of the animals as and when recorded are fed into the system in the format illustrated in Table 3 1 The growth data of the calves, the young stock and the cows are entered in the same format The data entered are the calf number/young stock number/cow number as the case may be, the date of recording (DR) and the length, girth, height and the weight recorded of the animals on that date

Table 3 2 illustrates the manner in which the feeding schedule for calves upto 90 days of age is to be entered The data input includes the ranges of the age of calf in weeks (AGEC), upper limit of the range in days (NOD), approximate body weight (ABW), quantity of milk to be fed (QOM), quantity of calf starter to be fed (QCS), and quantity of green grass to be fed (GG) Codes have been allotted for each range of age (F001 to F008)

The data input format for entering the details of vaccinations and diagnostic tests done on the herd are shown in Tables 3 3 and 3 4 The data entry format is the same for calves, young stock and the cows The vaccination/deworming details entered are the calf/young stock/cow number, date of vaccination (DOV), vaccine code (VCODE), vaccine name (VACCIN) and the expenses incurred (EXPENS) Code 1 has been allotted for Rinderpest, '2' for Anthrax and Black Quarter, '3' for Foot and Mouth Disease and '4' for deworming Similarly, the diagnostic test details entered are the calf/young stock/cow

Table 3. Input format for calf birth data

CALFN	SIREN	DNUM	DOB	SEX	BREED	WEIGHT	BIRTHDETS	GENETICSD
KA1347	KA2333	KA1730	02/01/92	F	CBJ	20 00		N
KA1343	KA3011	KA1736	02/05/92	F	CBHF	21 00		N
KA1348	KA1356	KA2793	01/02/92	F	CBBS	25 00		N
KA1344	KA3011	KA4236	04/12/92	M	CBHF	20 00		N
KA4228	KA2791	KA2061	05/13/92	F	CBJ	28 00		Y
KA1351	KA2033	KA1331	03/02/92	F	CBJ	21 00		N
KA1352	KA2033	KA3031	04/05/92	F	CBJ	20 00		N
KA1360	KA2031	KA1760	05/01/92	F	CBBS	22 00		N

Table 3.1 Input format for growth data

CALFN	DR	LENGTH	GIRTH	HEIGHT	WEIGHT
KA1347	03/14/92	35 00	20 00	25 00	36 00
KA1343	02/14/92	15 00	20 00	21 00	43 00
KA1348	03/14/92	37 00	30 00	45.00	38.00
KA1344	05/14/92	20 00	35 00	12 00	48.00
KA1347	04/14/92	20.00	36 90	12.00	49.00
KA1347	05/14/92			.	69.00
KA1347	06/14/92		.		96 00
KA1347	07/14/92				121 00
KA1347	08/14/92				150 00
KA1347	09/14/92				170 00
KA1347	10/14/92				185 00
KA1347	11/14/92				199 00
KA1347	12/14/92				217 00
KA1347	01/14/93				235 00
KA1347	02/14/93				250.00

Table 3.2 Input format for calf feeding schedule

CODE	AGEC	NOD	ABW	QOM	QCS	GG
F001	4 Weeks	28	25	2.5	25	Small Qt
F002	4-6 Weeks	42	30	3.0	75	Small Qt
F003	6-8 Weeks	56	35	2.5	175	0 50
F004	8-10 Weeks	70	40	2 0	300	0 75
F005	10-12 Weeks	84	45	1.5	425	1 0
F006	12-16 Weeks	122	55	0 0	625	1.5
F007	16-20 Weeks	140	65	0.0	875	2.0
F008	20-24 Weeks	168	75	0.0	1125	3.0

Table 3.3 Input format for vaccination data

CALFN	DOV	VCODE	VACCIN	EXPENS
KA1347	05/01/92	2	ANTHRAX	150.00
KA1343	06/07/92	2	BQ	25 00
KA1348	07/01/92	1	R P	45.00
KA1352	07/07/92	3	FMD	150.00
KA1344	03/01/92	4	DEWORMING	121.00
KA1360	08/07/92	1	R P	100.00
KA1351	06/05/92	1	R P	100 00

Table 3.4 Input format for diagnostic test data

CALFN	DOT	CODE	NTEST	RESULT	REMARK	COST
KA1347	02/01/92	1	TB	+		100.00
KA1344	05/01/92	1	JOHNE'S	+		105.00
KA1343	03/01/92	2	F.S.	-		50.00
KA1348	07/03/92	2	B.S	-		55 00
KA1352	10/05/92	1	TB	-		65 00
KA1351	06/01/92	1	TB	+		100.00
KA1360	09/08/92	2	BS	-		150 00

Table 3.5 Input format for disease and treatment data

Record No	1
CALFN	KA1343
DOO	01/04/92
SYMPT	PYREXIA
DOT	
RESULT	
AILMENT	
DRUG	ANALGIN
PERIODT	2
RESULTT	CURED
COST	25.00

number, date of testing (DOT), test code (CODE), name of test
(NTEST), result of the test (RESULT), remarks and the cost   Test
code 1 has been allotted for TB and Johnes and '2' for faecal
sample examination and Brucellosis

     The format for entering the disease and treatment
details of an animal is shown in Table 3 5   The data entered
are the calf/young stock/cow number, date of disease occurrence
(DOO), main symptoms noticed (SYMPT), diagnostic test conducted
in connection with the disease (DOT), result of the test
(RESULT), ailment, drug used for treatment (DRUG), period of
treatment (PERIODT), result of the treatment (RESULTT) and the
cost

     Table 3 6 illustrates the format for entering data
related to the movement of animals from the farm   The data
inputs are the animal number (CALFN), date of movement (DOM),
movement code (MOVECODE), reason for movement (RESON), agency to
whom sold or transferred (AGENCYS) and the income   The movement
codes given are 'S' for sale, 'T' for transfer, 'C' for culled
and 'D' for dead

     The general format for entering the data regarding the
work routine of the workers of each section, i e , calf, young
stock and cow are shown in Table 3 7 and 3 8   The details
entered are the employers code (ECODE), name of the employee
(NAME), designation (DESIGN) and place (Table 3 7)   Other data

Table 3.6 Input format for movement data

CALFN	DOM	MOVECODE	RESON	AGENCYS	INCOME
KA1344	04/01/94	S	ILLNESS	KAU MANNUTHY	800.00
KA1347	01/14/95	T	POOR GROWT	KAU MANNUTHY	0 00
KA1343	01/06/94	S	FRACTURED	M/S MANY & CO	·00 00
KA1348	01/04/95	D	ILLNESS		0 00

Table 3.7 Input format for shed workers duty data

ECODE	NAME	DESIGN	PLACE
E0001	ANUP	LSA	MANNUTHY
E0002	RAJU	SWEEPER	VELLAYANI
E0003	JOHN THOMAS	CLEANER	MANNUTHY
E0004	TOM	LSA	THRISSUR
E0005	TOM VARGHESE	WORKER	MANNUTHi TCR
E0006	RAJAGOPALAN	SWEEPER	MANNUTHY,TCR
E0007	SHEELA	WORKER	MANNUTHY,TCR

Table 3.8 Input format for shed workers duty data

ECODE	DUTY	DATE
E0001	P	02/01/92
E0002	P	02/01/92
E0001	P	01/03/92
E0001	L	04/03/92
E0001	L	05/02/92
E0003	P	01/03/92
E0002	L	01/04/92
E0003	L	01/04/9ɔ
E0003	P	02/01/9?
E0004	P	02/01/92
E0005	P	02/01/92
E0006	L	02/01/92
E0007	P	02/01/92

inputs include the date and whether the employee was present (denoted as 'P') or absent (denoted as 'L') for duty on that date

The data regarding the animal housing existing in the farm are entered in format as shown in Table 3 9 The inputs include the shed code (SCODE), number of animals (NOOC), housing code (HCODE), flooring code (FCODE), length and width of the floor, roof code (ROOFC) and the manger measurements, 1 e , length (ML), width (MW) and depth (MD)

The format for entering the data regarding the shed management is illustrated in Table 3 10   The inputs are the shed code (SCODE), washing time (WASHT), grooming time (GROOMT), watering time (WATERT), feeding time (FEEDT), cleaning time (CLEANT) and remarks The format is the same for calf and young stock while that for cowshed includes the time of milking (MILKT) as shown in Table 3 11

Table 3 12 illustrates the format for entering the feeding schedule of young stock   The data entered are similar to that for the calf feeding schedule namely the ranges of the age in month (AGE), the upper range of age in months (AGEU), approximate body weight (APPBW), the ranges of the quantity of concentrate to be fed (CONM), the average quantity of concentrate to be fed (CONU), the ranges of the quantity of

Table 3.9   Input format for housing data

SCODE	NOOC	HCODE	FCODE	LENGTH	WIDTH	ROOF	ML	MV	
S0001	25	H01	FU1	25 00	20 00	R01	2 C0	1 20	7
S0002	30	H02	F02	50 00	40 00	R01	2 C0	1 00	10
S0003	45	H03	F02	60 00	40 00	R02	2 10	1 70	00

Table 3.10   Input format for calf and young stock shed management data

SCODE	WASHT	GROOMT	WATERT	FEEDT	CLEANT	REMARK
S0001	6 00 AM	3 30 PM	6,10 2 8	5AM,3PM	06 0 A	
S0002	8 30 AM	4 00 PM	6,10,4,8	5AM, PM	06 3 M	
S0003	8 30 AM	4 00 PM	6,10,1 8	5AM 3PM	04 20 F	

Table 3.11 Input format for cow shed management data

SNO	WASHT	GROOMT	WATERT	FEEDT	MILKT	CLEANT
S0007	8 00 AM	3 30 PM	6,10,2,8	5AM,3PM	5 15, 15	08 00 AM
S0008	8 30 AM	4 00 PM	6,10,4,8	5AM,3PM	5 30 30	08 0 AM
S0009	8 30 AM	4 00 PM	6,10,4,8	5AM,3PM	5 30 3 30	04 0 PM

green grass to be fed (GRASS), and the average quantity of green grass to be fed (GRASSU)

The challenge feeding schedule of young stock and cows, feeding management of dry cows and roughage feeding schedule are directly typed and are displayed on the screen as such as outputs

The details of heat observed, artificial insemination done and pregnancy diagnosis carried out of young stock and cows are inputs in the format shown in Table 3 13 The major inputs are the young stock/cow number, dates of heat (DOFH), date of examination (DOEX), details, remarks if any, dates of insemination (DOINS), number of the bull used for insemination (BULLNO), breed of the bull (BREED) and the result of pregnancy diagnosis (RESULT)

Table 3 14 illustrates the format for entering the calving details of the cows The data input includes the cownumber (COWN), date of calving (DOC), details of calving (DETAILS), whether the calf was alive or dead at birth (LIVE/DEAD), number of the calf if born alive (CALFN) and the sex of the calf (SEX)

The data pertaining to the lactation number (LACTN), date of last milking (DOLM) and reason for discontinuing milk recording (RFDMR) are inputs in the format as shown in

Table 3.12   Input format for young stock feeding schedule

AGE	AGEU	APPBW	CONM	CONU	GRASS	GRASSU
6-9	9	70-100	1 25 1 50	37	5-8	
9-15	15	100-150	1 50-2 00	75	8-15	2
15-20	20	150-200	2 00-2 25	7 12	15-20	17
Above 20	30	00 300	2 25 2 50	37	20-25	2

Table 3.13   Input format for heat, AI/PD data

CALFN	DOFH	DOEX	DETATI	REMARK	DOINS	BULLID	BREED	RESI
KA1349	05/01/92	05/03/92	IN HEAT		05/05/92	rA090F	CBJ	F
KA1350	05/02/92	05/03/92	IN HEAT		05/07/92	KA2033	CBBS	N
KA1351	02/09/92	02/11/92	IN HEAT		02/14/92	KA1797	CBHF	P
KA1353	03/10/92	03 12/92	WEAK HEA					
KA1354	05/20/92	05 21/92	IN HEAT		05 21 9	KA17	B	

Table 3.14   Input format for calving data

COWN	DOC	DETAILS	LIVEDEAD	CALFN	CEX
KA4228	02/25/95	NORMAL		KA4211	F
KA1248	07/11 95	NORMAL	L	KA1311	F
KA2678	07/20/95	NORMAL	L	KA1279	F
KA1250	05/28/9	NORMAL	L	KA1266	F

Table 3.15   Input format for drying data

COWN	DOB	DOC	LACTN	DOLM	RFDMR
KA4288	07/11/90	05/25/93	1	03/14/94	DRY
KA4211	08/01/90	12/18/92	2	12/20/93	DRY
KA3048	09/12/88	06/23/92	2	10/11/93	mastitis
KA2088	03/01/88	10/20/92	3	08/05/93	DRY
KA2983	08/09/86	10/10/92	4	08/03/9	DRY
KA4235	02/01/84	12/12/92	5	12 01/9	DR

Table 3 15 The other data entered in this format are the cow number, date of birth (DOB) and date of calving (DOC)

The daily milk production data of each cow are entered in the format shown in Table 3 16 The inputs include the cow number, date of milk recording (DOMR), morning milk recorded (MM) and the evening milk recorded (EM) The details of the milk fat recorded are inputs in the format shown in Table 3 17 The inputs include the cow number, date of fat recording (DOR), morning fat recorded (MFR) and the evening fat recorded (EFR)

The daily milk utilization details are entered in the format shown in Table 3 18 The data inputs are the date, quantity of milk issued to calf shed (ICALFS), quantity issued for internal use (ITUSE), rate at which milk is issued for internal use (RATE1), quantity of milk issued for external use (OUTUSE), and the corresponding rate (RATE2)

The format for input of weather data is shown in Table 3 19 The data entered are the date of recording, the maximum temperature (MaxT), the minimum temperature (MinT), the relative humidity (RH) and the rainfall (RF) recorded

Certain managemental tips for the routine management of the stock with respect to calf care at birth, colostrum feeding schedule, feeding of growing and milking animals, hygienic milk production, herd health control, sanitation and other

Table 3.16   Input format for milk data

```
COWN    DOMR          MM     EM
KA3048  01/02/93    8 30   6 50
KA3048  01/03/9     8 80   7 10
KA3048  0  04 9       20   6 00
KA3048   1/05 9        1   3  0
KA3048  01/06/9       70   6 10
KA3048  01/07 90       5   6 30
KA3048  01/08/93    8 00   5 70
KA3048  01/09/93    3 00   6 00
KA3048  01/10/9     3      6 50
KA3048  01 11, 9          7
```

Table 3.17   Input format for fat percentage data

```
COWN    DOR          MFR  FR
KA4288  08/04 90   4 5 0 5
KA4288  08/11/3    3 0 5 5
KA4288  08/18/30   5 0 5 5
KA4288  08/25/9    4 5 5 0
KA4288  09/01/93   4 5 5 0
KA4286  09/08/93   4 5 5 0
KA4288  09/15/9    3 0 0 5
KA4288  09/22/93   4 4 4 0
KA4288  09/29/3    5 0 1 5
KA4288  10/06/9    4 5 5 0
```

Table 3.18   Input format for milk sales and utilization data

```
DATE       ICALFS  ITUSE  RATE1  OUTUSE  RATE2
01/01/93        2      4   4 00      10   8 00
12/31/92       40     50   5 00      70   6 00
```

Table 3.19 Input format for weather data

```
DATE       MAXT   MINT      RH        RF
01/06/92  29 00  23 00   97 00   417 00
02/06/92  27 00  23 40   93 70   415 00
03/06/92  27 00  23 00   95 00   420.00
04/06/92  28 00  24 00   96 00   415 00
05/06/92  29 00  24 70   95.70   425 00
06/06/92  27.00  24.00   95 00   420 00
07/06/92  28 00  24 60   95 00   421 00
08/06/92  27 40  22 40   95 60   418 00
09/06/92  29 00  24 40   97 70   417 00
10/06/92  29 00  23 70   98 00   42  00
```

management practices are typed directly to be displayed as such on the screen as an output

The details of the infrastructure and objectives of the farm are also typed and are displayed as such as an output The details of input are the year of inception of the farm, total area, area under fodder, animal strength under various heads viz , calf, young stock and cows, details of man power namely technical, non technical and labourers and the main objectives of the farm

4 1 2 Output

The outputs from the data inputs in the formats developed for data entry are accessed by choosing the option 'Report' in the main menu   The report menu in the MIS developed is given in Table 4   The options given are   (1) objectives/ details of infrastructure, (2) weather details, (3) management tips, (4) animal details and (5) exit   The outputs from the test data of Dhoni farm entered in various formats are provided in Table 5 0 to Table 11

The details of the infrastructure and objectives of the farm are shown in Table 5 0   The input details are as such displayed on the screen

The output from the weather data input are shown in Table 6   The informations furnished include the mean maximum

Table 4

```
                    R E P O R T     M E N U
───────────────────────────────────────────────────────────────
        1     OBJECTIVES/DETAILS OF INFRASTRUCTURE

        2     WEATHER DETAILS

        3     MANAGEMENT TIPS

        4     ANIMAL DETAILS

        5     EXIT


───────────────────────────────────────────────────────────────
```

Table 5 Objectives/details of infrastructure

```
                        k L O B    D H O N I

    Year of Inception      1377
    Total Area            150 Ha
    Area Under Fodder      40 Ha

    Animal strength
    ----- ----------
    Calf (0-6)       18
    Young Stock      19
    Cows             21

    Man Power
    --------
    Technical          25
    Non Technical      22
    Labourers         105

    Objectives
    ----------
    1  Rearing of Bull Mother & Growing Stock
    2  Production of C B Young Bulls
    3  Study the Production & Reproduction parameters of C B Cows
```

Table 6

```
        WEATHER REPORT (From  01/02/92  to  07/10/92
        ---------------  -------  -----  ----------- --  --

    Mean Max  Temp (celsius)              28 04

    Mean Min  Temp (celsius)              23 72

    Mean Relative Humidity (%age)         95 87

    Mean Rainfall (mm)                   418 90
```

temperature, the mean minimum temperature, the mean relative humidity and the mean rainfall recorded for a definite period of time The averages for any period can be obtained by typing the first date and the last date of the period and then pressing the appropriate key

The guidelines for the routine management of the stock are accessed by choosing the option 'Management Tips' in the Report menu All the information pertaining to day to day management of the herd that were entered, are displayed on the screen

The outputs from the different data entered with respect to the herd are accessed by choosing the option 'Animal Details' The sub-menu 'Animal Report' has five options namely calf details, young stock details, cow details, animal card and exit (Table 7)

Table 8 shows the eleven options in the sub menu 'calf details' namely birth details, growth details, growth report, feeding details, health details, diseases and treatment, movement report, shed workers routine report, housing report, shedwise management and exit

Table 8 1 shows the birth details of all the calves born in the farm arranged in ascending order of their identification numbers The sire number (S/No), dam number (D/No), date of

Table 7

```
                         A N I M A L    R E P O R
─────────────────────────────────────────────────────
                 CALF DETAILS

        2        YOUNG STOCK DETAILS

        3        COW  DETAILS

        4        ANIMAL CARD

        5        EXIT



─────────────────────────────────────────────────────
```

Table 8

```
                         CALF  DETAILS
─────────────────────────────────────────────────────
        1        BIRTH DETAILS
        2        GROWTH DETAILS
        3        GROWTH REPORT
        4        FEEDING DETAILS
        5        HEALTH DETAILS
        6        DISEASES AND TREATMENT
        7        MOVEMENT REPORT
        8.   .   SHED WORKERS ROUTINE REPORT
        9    .   HOUSING REPORT
        10   .   SHED WISE MANAGEMENT
        11       EXIT


─────────────────────────────────────────────────────
```

Table 8.1

C A L F   B I R T h   D E T A I L S

Ca No	S/No	D/No	Dt Brt	Sex	Breed	Weight	Birth Det	G	Def
KA1348	KA1356	KA2793	02/01/92	F	CBBS	25 00			N
KA1347	KA2333	KA1730	01/02/92	F	CBJ	20 00			N
KA1343	KA3011	KA1736	05/02/92	F	CBHF	21 00			N
KA1351	KA2033	KA1331	02/03/92	F	CBJ	21 00			N
KA1352	KA2033	KA3031	05/04/92	F	CBJ	20 00			N
KA1344	KA3011	KA4236	12/04/92	M	CBHF	20 00			N
KA1360	KA2031	KA1760	01/05/92	F	CBBS	22 00			N
KA4228	KA2791	KA2061	13/05/92	F	CBJ	28 00			

birth (Dt Brt), sex, breed, birth weight (weight), birth details (Birth Det), and genetic defects (G Def) if any, of the calves born in the farm are obtained as output

The output from the calf growth details entered are shown in Table 8 2   The details of various calves in the farm with respect to their date of birth (D of Brt), sex, weight, length, girth, height, dates of recording (D Rec) and the age of the calf in days on the date of recording (Age, days) are furnished in increasing order of their identification numbers

Table 8 3   illustrates the growth report of the calves in the farm for a period   The information furnished are namely the average birth weight of the male calves born in the specified period,   the herd   average birth weight of male calves, the average birth weight of female calves born in the period and the corresponding herd average, the average 90th day weight of the calves in farm, the average 180th day weight of the calves in the farm, the 0-90 days growth rate of the herd, the 90-180 days growth rate of the herd and the number of calves with 0-90 days and 90-180 days growth rate below the corresponding averages for the herd

The sub-menu 'Calf feeding/Consumption' is shown in Table 8 4   This has three options namely calf feeding, calf consumption and exit   The option 'Calf feeding' if selected displays on screen the calf feeding schedule entered for calves

Table 8.2

C A L F   G R O W T H   D E T A I L S

Ca No	D of Brt	Sex	Weight	Length	Girth	Height	D Rec	Age(Days
KA1343	05/02/92	F	43 00	15 00	20 00	21 00	14/02/92	3
KA1344	12/04/92	M	48 00	23 00	35 00	12 00	14/05/92	32
KA1347	01/02/92	F	36 00	35 00	20 00	25 00	14/03/92	42
KA1347	01/02/92	F	49 00	20.00	36 90	12 00	14/04/92	73
KA1347	01/02/92	F	69 00	0 00	0 00	0 00	14/05/92	103
KA1347	01/02/92	F	96 00	0.00	0 00	0 00	14/06/92	134
KA1347	01/02/92	F	121 00	0.00	0.00	0 00	14/07/92	164
KA1348	02/01/92	F	38 00	37.00	30.00	45 00	14/03/92	72

Table 8.3

C A L F   G R O W T H   S T A T U S   (From 01/02/92 to 01/05/92)

```
Average Birth weight Male                20 00
Herd Average of male                     20 00

Average Birth Weight Female              20.80
Herd Average of female                   21.50

90 th Day Weight Herd Avg                52 00
180 th Day Weight Herd Avg              135 50

0-90 Days Growth Rate Herd Avg                        0 34
Calves with 0-90 Days Growth Rate<H Avg               0

90-180 Days Growth Rate H Avg.                        0 64
Calves with 90-180 Days Growth Pate<H.Avg             0
```

upto 6 months (Table 8 4 1) The output gives the ranges of the age of calf (Age of calf), the approximate body weight (App body weight), quantity of milk to be fed in kg (Qty of milk kg), quantity of calf starter to be fed (Qty of calf starter gm), and the quantity of green grass to be fed (Green Grass kg) The option 'Calf consumption' indicates the quantity of milk to be fed to each calf on a day based on the feeding schedule entered The output as shown in Table 8 4 2 gives the calf number (Calf No), its date of birth (D of birth), age in days (Age, days) on the specified day and the quantity of milk to be fed (Qty Milk kg) that day

The sub-menu 'Calf Health Details' is shown in Table 8 5 It has three options namely vaccination, diagnostic test and exit The calf vaccination details as displayed on screen is shown in Table 8 5 1 The details of vaccination/ deworming done on the calves in the farm namely the calf number (Ca No) arranged in increasing order, date of birth (D of Brt), name of the vaccinations done (VACCIN NAME), date of vaccination (Date of Vacc), the next vaccination date (Next Vacc Date) and the expenses incurred are furnished The calf diagnostic details are shown in Table 8 5 2 The details of diagnostic tests conducted on the calves namely the calf number (Ca No) arranged in ascending order, date of birth (D of Brt), date of testing (D of Test), test name (T name), results, remarks,

Table 8.4   67

```
┌─────────────────────────────────────────────────────────────┐
│                  CALF FEEDING/CONSUMPTION                      │
│  ───────────────────────────────────────────────────────      │
│     1        CALF FEEDING                                      │
│                                                                │
│     2        CALF CONSUMPTION                                  │
│                                                                │
│     3        EXIT        .                                     │
│                                                                │
│                                                                │
└─────────────────────────────────────────────────────────────┘
```

Table 8.4.1

Feeding shedule for Calves up to 6 Months
===

Age of Calf	App Body Weight	Qty of milk Kg	Qty of calf starter gm	Green Grass Kg
4 Days to 4 Weeks	25	2 5	25	Small Qt
4-6 Weeks	30	3 0	75	Small Qt
6-8 Weeks	35	2 5	175	0 50
8-10 Weeks	40	2 0	300	0 75
10-12 Weeks	45	1 5	425	1 0
12-16 Weeks	55	0 0	625	1 5
16-20 Weeks	65	0 0	875	2 0
20-24 Weeks	75	0 0	1125	3 0

Table 8.4.2

MILK FEEDING SCHEDULE

Date   02/06/92
===
Calf No	D of Birth	Age(Days)	Qty. Milk (Kg)
KA1343	05/02/92	118	0.0
KA1344	12/04/92	51	2 5
KA1347	01/02/92	122	0 0
KA1348	02/01/92	152	0 0
KA1351	02/03/92	92	0 0
KA1352	05/04/92	58	2 0
KA1360	01/05/92	32	3 0
KA4228	13/05/92	20	2 5

| | Total | | 10 0 |

Table 8.5

```
┌─────────────────────────────────────────────────────────────────┐
│                         CALF HEALTH DETAILS                       │
│   ────────────────────────────────────────────────  ── ── ── ──  │
│                                                                   │
│   1        VACCINATION                                            │
│                                                                   │
│   2        DIAGNOSTIC TEST                                        │
│                                                                   │
│   3        EXIT                                                   │
│   ─────────────────────────────────────────────────  ── ── ── ── │
│                                                                   │
└─────────────────────────────────────────────────────────────────┘
```

Table 8.5.1

C A L F   V A C C I N A T I O N   D E T A I L S

Ca No	D of Brt	VACCIN NAME	Date of vacc	Next Vacc Date	Expens
KA1343	05/02/92	BQ	07/06/92	07/06/93	25.00
KA1344	12/04/92	DEWORMING	01/03/92	31/03/92	121 00
KA1347	01/02/92	ANTHRAX	01/05/92	01/05/93	150 00
KA1348	02/01/92	R P	01/07/92	01/07/95	45 00
KA1351	02/03/92	R P	05/06/92	05/06/95	100 00
KA1352	05/04/92	FMD	07/07/92	05/01/93	150.00
KA1360	05/92	R P	07/08/92	07/08 95	00 00
			Total		691 00

Table 8.5.2

C A L F   D I A G N O S T I C   T E S T   D E T A I L S

Ca No	D of Brt	D of Test	T Name	Result	Remark	Expens	Next Test
KA1343	05/02/92	01/03/92	F S	−		50 00	15/03/92
KA1344	12/04/92	01/05/92	JOHNE'S	+		105 00	30/07/92
KA1347	01/02/92	01/02/92	TB	+		100 00	01/05/92
KA1348	02/01/92	03/07/92	B.S	−		55.00	17/07/92
KA1351	02/03/92	01/06/92	TB	+		100.00	30/08/92
KA1352	05/04/92	05/10/92	TB	−		65 00	03/01/93
KA1360	01/05/92	08/09/92	BS	−		150 00	22/09/92
			Total			625.00	

expenses incurred (Expens) and the date of next test (Next Test) are obtained as output

The details of all the diseases encountered by, and the treatment provided for each are obtained as output on entering the calf number whose details are required (Table 8 6)   The information furnished are namely the disease name (Dis/Name), date of occurrence (Dt Occ), symptoms noticed (Sympt), diagnostic test done (DT), result, drug used for treatment (Drug), period of treatment (Dur), result of treatment (Result) and the cost of treatment

The calf movement report (Table 8 7) provides details about the number of calves dead, number of calves sold and the income, number of calves transferred and the number of calves culled in a specified period

The calf shed workers routine report provides details regarding the duty performed by the workers   The output shows the date of report, the employee's code, name, designation and duty details i e , whether he was present (P) for duty on that date or absent (L) (Table 8 8)

The calf shed housing details is shown in Table 8 9 The output shows the shed code (Sh/Cd), number of calves (No/Ca), housing code (Hs/Cd), flooring code (Fl/Cd), length and

Table 8.6

DISEASE AND TREATMENT REPORT OF CALF NO KA1347

Dis/Name	Dt Occ	Sympt.	DT	Result	Drug	Dur	Result	Cost
COCCIDIA	03/01/92	DIARROHEA	FSE	+VE	SULPHA	4	CURED	50 00
CALFSCOUR	25/02/92	DIARRHOEA	FSE	+VE	DIADIN,DEXTRO	2	CURED	100 00
BRONCHITIS	01/03/92	COUGH			SULPHA	5	CURED	250 00
STRONGYLOS	02/04/92	DIARRHOEA	FSE	+VE	ALBENDAZOLE	3	CURED	100 00
AMPHISTOME	05/06/92	DIARRHOEA	FSE	+VE	ALBENDAZOLE	3	CURED	100 00
INDIGEST.	12/07/92	ANOREXIA	FSE	−VE	RUMBION TAB	2	CURED	25 00
					Total			625 00

Table 8.7

C A L F   M C V E M F N T   R E P O R T (From 01/02/92 to 07/10 95

No of Calves Dead	1
No of Calves sold and Income	2 and Rs 900
Nc of Calves Transfered	1
No. of Calves Culled	0

Table 8.8

CALF SHED WORKERS ROUTINE REPORT ON   01/02/9

EMP CODE	NAME	DESIGNATION	PRESENT/LEAVE
E0001	ANUP	LSA	P
E0002	RAJU	SWEEPER	P
E0003	JOHN THOMAS	CLEANER	P
E0004	TOM	LSA	P
E0005	TOM VARGHESE	WORKER	P
E0006	RAJAGOPALAN	SWEEPER	L
E0007	SHEELA	WORKER	P

Table 8.9

C A L F   H O U S I N G   R E P O R T

Sh/cd	No/ca	Hs/cd	Fl/cd	length	width	Sp/calf	Rf/ca	Manger[L, W D]		
S0001	25	H01	F01	25 00	20 00	20 00	R01	2 00	1 20	75
S0002	30	H02	F02	50 00	40.00	66 66	R01	2 00	50	90
S0003	45	H02	F02	60 00	40.00	53 33	R02	2 10	1 0	0

Table 8.10

C A L F   S H E D   M A N A G E M E N T

Sh No	Wash time	Groom time	Water time	Feed time	Clean time	Remark
S0001	8.00 AM	3 30 PM	6,10,2,8	5AM,3PM	08 00 AM	
S0002	8 30 AM	4 00 PM	6,10,4,8	5AM,3PM	08 30 AM	
S0003	8.30 AM	4.00 PM	6,10,4,8	5AM,3PM	04 30 PM	

width of the floor, floor space per calf (Sp/Calf), roof code (Rf/Cd) and manger measurements i e , length, width and depth

Table 8 10 shows the calf shed management The output furnishes details of calf shed routine namely the washing time, grooming time, watering time, feeding time and the cleaning time

The   sub-menu 'Young Stock Details' is presented in Table 9   Like the sub-menu on 'Calf Details', this has also eleven options namely growth details, growth report, feeding details, health details, diseases and treatment, reproduction, movement report, shed workers routine report, housing report, shed-wise management and exit

Table 9 1 illustrates the growth details of young stock in the farm The informations furnished are namely the young stock number (An No), date of birth (D of Brt), sex, weight, length, girth and height recorded, date of recording (D Rec) and the corresponding age in months (Age, month) on the date of recording

The growth report for a specified period generated on the basis of the growth data input is shown in Table 9 2   The informations provided are the mean 180th day weight of the herd, the mean 365th day weight of the herd, the mean 180-365 days

Table 9.0

```
┌─────────────────────────────────────────────────────────────────┐
│                        YOUNG STOCK DETAILS                        │
├─────────────────────────────────────────────────────────────────┤
│     1        GROWTH DETAILS                                       │
│     2     .  GROWTH REPORT                                        │
│     3   .    FEEDING DETAILS                                      │
│     4  .  .  HEALTH DETAILS                                       │
│     5        DISEASES AND TREATMENT                               │
│     6        REPRODUCTION                                         │
│     7     .  MOVEMENT REPORT                                      │
│     8   .  . SHED WORKERS ROUTINE REPORT                          │
│     9        HOUSING REPORT                                       │
│    10        SHED WISE MANAGEMENT                                 │
│    11        EXIT                                                 │
│                                                                   │
│                                                                   │
└─────────────────────────────────────────────────────────────────┘
```

Table 9.1

YOUNG STOCK GROWTH DETAILS
===

An No	D of Brt	Sex	Weight	Length	Girth	Height	D Rec	Age(Month
KA1347	01/02/92	F	170.00	0 00	0 00	0 00	14/09/92	
KA1347	01/02/92	F	185 00	0 00	0.00	0 0C	14/10/92	9
KA1347	01/02/92	F	199 00	0 00	0 00	0 00	14/11/92	9
KA1347	01/02/92	F	217 00	0 00	0.00	0 00	14/12/92	1C
KA1347	01/02/92	F	235 00	0 00	0 00	0 00	14 01/93	11
KA1347	01/02/92	F	250 00	0 00	0 00	0 00	14/02/93	1

Table 9.2

YOUNG STOCK GROWTH REPORT (From 01/02/92 to 01/05/9₃)

180 th Day Weight Herd Avg	135 50
365 th Day Weight Herd Avg	242 50
180-365 Days Growth Rate H Avg	0 5ª
Calves with 180-365 Days Growth Rate<H Avg	0

growth rate of the herd and the number of calves with 180 365
days growth rate below the herd average

The sub-menu 'Young Stock Feeding-Consumption' is
presented in Table 9 3   This has four options namely young
stock feeding, young stock consumption, special feeding and
exit   The   young stock feeding schedule is illustrated in
Table 9 3 1   The informations exhibited in the output are
namely the ranges of the age in months (Age, months),
approximate body weight (App body weight, kg), the range of the
quantity of concentrates to be fed (concentrate, kg), the
average quantity of concentrate to be fed (Con avg), the range
of the quantity of green grass to be fed (grass, kg) and the
average quantity of grass to be fed (grass, avg)

The young stock feed consumption report indicates the
quantity of concentrate mixture and green grass to be fed to
each young stock on a day based on the feeding schedule entered
The output shows the date of feeding, the young stock number
(Anml No), date of birth (D of birth), age in months on the
date of feeding (age, month), the quantity of concentrate
mixture (Con mixt) and green grass to be fed that day
(Table 9 3 2)

Table 9 3 3 gives details of special feeding and the
challenge feeding schedule of young stock   The data input are
as such displayed on the screen as output

Table 9.3

```
┌─────────────────────────────────────────────────────────────┐
│              YOUNG STOCK FEEDING/CONSUMPTION                  │
│─────────────────────────────────────────────────────────────│
│        1      YOUNG STOCK FEEDING                            │
│                                                              │
│        2      YOUNG STOCK CONSUMPTION                        │
│                                                              │
│        3      SPECIAL FEEDING                               │
│                                                              │
│        4      .EXIT                                         │
│                                                              │
│                                                              │
│                                                              │
│─────────────────────────────────────────────────────────────│
│                                                              │
└─────────────────────────────────────────────────────────────┘
```

Table 9.3.1

Feeding schedule for Young Stock

Age (months)	App Body Weight(kg)	Concentrate mixture(kg)	Con avg	grass (kg)	Grass avg
6 9	70-100	1 25-1 50	1 37	5-8	7
9-15	100-150	1.50-2 00	1 75	8-15	12
15-20	150-200	2 00-2 25	2 12	5-20	17
Above 20	200-300	2 25 2 50	2.37	20 25	22

Table 9.3.2

```
Y O U N G    S T O C K    F E E D    C O N S U M P T I O N    R E P O R T
                         ON   01/12/92

   Anml No    D of Birth      Age(month)      Con mixt     Grass
   =========================  =================  =========  =========
   KA1343    05/02/92           10                 75         12
   KA1344    12/04/92            7              1  37          7
   KA1347    01/02/92           10              1  75         12
   KA1348    02/01/92           11              1  75         12
   KA1351    02/03/92            9              1  75         12
   KA1352    05/04/92            8              1  37          7
   KA1360    01/05/92            7              1  37          7
   KA4228    13/05/92            6              1  37          7
   =======  =================  =================  =========  =========
                      Total                       12 48        76
```

Table 9.3.3

```
+-------------------------------------------------------------------+
|                                                                   |
|              SPECIAL FEEDING TIPS FOR YOUNG STOCK                  |
|              -------------------------------------                 |
|                                                                   |
|                                                                   |
|                                                                   |
|    If 90-180 & 180-365 days growth rate is less than herd ave age |
|    add 1Kg  cattle feed extra                                     |
|                                                                   |
|    From the 7 th month of pregnancy add 1Kg  to the ration as     |
|    gestation allowance                                            |
|                                                                   |
|                                                                   |
|    Challenge feeding                                              |
|    -----------------                                              |
|                                                                   |
|    To be started from the 266th day of pregnancy. Add 500gms.     |
|    cattle feed to the ration on the 266th day and increase 300g   |
|    daily to a maximum of 3.5 kg and then maintain that level of   |
|    feeding.                                                       |
|                                                                   |
+-------------------------------------------------------------------+
```

The sub-menu 'Young Stock Health Details' is shown in Table 9 4 Like the sub-menu on 'Calf Health Details', this has three options namely vaccination, diagnostic test and exit The formats of the outputs are similar to that developed for calf and are shown in Table 9 4 1 and Table 9 4 2

Table 9 5 illustrates the disease and treatment report of the young stock which furnishes details about all the diseases encountered by the young stock with the treatment provided and its cost The format of the output is similar to that developed for the calf which has already been described

The sub-menu 'Youngstock Reproduction' is presented in Table 9 6 This has three options namely heat details, AI/PD details and exit The informations furnished as output when option 'heat details' is selected are namely the Young Stock number (Anml No), date of occurrence of heat (Dt heat), date of examination (Dt Exam), details of examination, remarks, and the next expected date of heat (Table 9 6 1) Table 9 6 2 illustrates the format of the output providing AI/PD details of the young stock The details displayed as output on the screen are the young stock number (An No), date of heat (Dt heat), date of insemination (Dt insm), number of the bull used for insemination (Bull No), breed of the bull, date of pregnancy diagnosis (Date PD), result of pregnancy diagnosis (Rslt) and the expected date of calving (Exp dt Clv)

Table 9.4

```
╔══════════════════════════════════════════════════════════════╗
║                   YOUNG STOCK  HEALTH DETAILS                  ║
║                                                                ║
║     1       VACCINATION                                        ║
║                                                                ║
║     2       DIAGNOSTIC TEST                                    ║
║                                                                ║
║     3       EXIT                                               ║
║                                                                ║
╚══════════════════════════════════════════════════════════════╝
```

Table 9.4.1

Y O U N G   S T O C K   V A C C I N A T I O N   D E T A I L S

An No	D. of Brt	Vaccin name	Date of vacc	Next Vacc Date	Expens
KA1343	05/02/92	BQ	07 06/92	07 06/95	25 0
KA1344	12/04/92	DEWORMING	01/03/92	3 /03/9	12 30
KA1347	01/02/92	ANTHRAX	01 05/92	01/05/3	150
KA1348	02/01/92	R P	01/07/92	0 7 9	4
KA1351	02/03/92	R P	05/06/92	05/06	10
KA1352	05/04/92	FME	07 07/92	03/01 9	150
KA1352	05/04/92	FME	03 01/33	02	10
KA1360	01/05/92	R F	07/08/92	07 05 9	0
				Total	741

Table 9.4.2

Y O U N G   S T O C K   D I A G N O S T I C   T E S

An No	D of Brt	D of Test	T Name	Result	Remar			
KA1343	05 02 9	01 0 9	F 9					
KA1344	12/04/92	1/05/92	JOHN 9			105 00	30/07 9	
KA1347	01 02/92	01/02/3	TB	+		100 00	01/05 9	
KA1348	02/01/92	03/07/92	B			55 00	17	4
KA1351	02/03/92	01/06/92	TB	+		100 00	30 08 92	
KA1352	05/04/92	05/10/92	TB			65 00	03/01 93	
KA1352	05/04/92	03/01/93	TB	–		100 00	03/04/93	
KA1360	01/05/92	08/09/92	BS	–		150 00	22/09/92	
				Total		725 00		

Table 9.5

DISEASE AND TREATMENT REPORT OF YOUNG STOCK NO KA134

Dis/Name	Dt Occ	Sympt	Dl	Result	Drug	Dur	Result	C	o+
COCCIDIA	03/01/92	DIARROHEA	FSE	+VE	SULPHA	4	CURED	5	CC
CALFSCOUR	25/02/92	DIARPHOEA	FSE	+VE	DIADIN,DEXTRO	2	CURED	10C	9C
BRONCHITIS	01/03/92	COUGH			SULPHA	5	CURED	25C	OC
STRONGYLOS	02/04/92	DIARRHOEA	FSE	+VE	ALBENDAZOLE	3	CURED	10	OC
AMPHISTOME	05/06/92	DIARRHOEA	FSE	+VE	ALBENDAZOLE	3	CURED	10u	OC
INDIGEST	12/07/92	ANOREXIA	FSE	-VE	RUMBION TAB	2	CURED	2u	00
EPH FEVER	12/10/92	PYREXIA			NOVALGIN	3	CURED	125	0u
BRONCHITIS	16/01/93	COUGH			SULPHA	5	CURED	25C	CO

| | | | | Total | | | | 1)0 | 0 |

Table 9.6

```
┌─────────────────────────────────────────────────────────────────┐
│                    YOUNG STOCK REPRODUCTION                       │
├─────────────────────────────────────────────────────────────────┤
│        1.    HEAT DETAILS                                         │
│                                                                   │
│        2.    AI/PD DETAILS                                        │
│                                                                   │
│        3  .  EXIT                                                 │
│                                                                   │
└─────────────────────────────────────────────────────────────────┘
```

Table 9.6.1

H e a t   D e t a i l s

Anml No	Dt. Heat	Dt.Exam	Detail	Remark	D Exp Ht
KA1351	09/02/92	11/02/92	IN HEAT		01/03 92
KA1353	10/03/92	12/03/92	WEAK HEAT		31/03/92
KA1349	01/05/92	03/05/92	IN HEAT		22/05/92
KA1350	02/05/92	03/05/92	IN HEAT		23/05/92
KA1354	20/05/92	21/05/92	IN HEAT		10/06 92

Table 9.6.2

A I/P D   D E T A I L S

An No	Dt Heat	Dt insm	Bull No	Breed	Date ~ D	Rslt	Exp dt c v
KA1353	10/03/92	/ /			/ /		
KA1351	09/02/92	14/02/92	KA1797	CBHF	14/04/92	P	20/11/92
KA1349	01/05/92	05/05/92	KA0905	CBJ	04/07/92	P	09/02/93
KA1350	02/05/92	07/05/92	KA2033	CBBS	06/07/92	N	
KA1354	20/05/92	21/05/92	KA1779	CBJ	20/07/92	P	25/02/93

The output formats developed furnishing information about young stock movement, young stock workers routine, young stock housing and young stock shed management are presented from Table 9 7 to Table 9 10   They are identical to the output formats developed for the calf and have been described along with the calf details

The sub-menu 'Cow details' is presented in Table 10 This has eleven options namely the growth details, feeding details, health details, diseases and treatment, reproduction, movement report, shed workers routine report, housing report, shed wise management, milk production and exit

The details of cow growth are presented in Table 10 1 The output format is identical to that developed and described for calf and young stock

The sub-menu 'Cow feeding' is shown in Table 10 2   This has four options, namely, feeding milch cows, feeding dry cows, feeding roughages and exit   The quantity of concentrates to be fed to each cow in the farm is obtained as an output on selecting the option feeding milch cows   The output displays, cow number   (Cow No), lactation number and the quantity of concentrates to be fed (Table 10 2 1)   The feeding of dry cows and the challenge feeding schedule input are as such displayed on   the   screen   on choosing the option 'Feeding Dry Cows' (Table 10 2 2)   The roughage feeding schedule for cows is shown

Table 9.7

YOUNG STOCK MOVEMENT REPORT (From 01/02/9ᴠ to 01/05/95

```
No  of Y Stock Dead              1

No  of Y Stock sold and Income   2 and  Rs   200

No  of Y Stock Transfered        0

No  of Y Stock Culled            0
```

Table 9.8

YOUNG STOCK SHED WORKERS ROUTINE REPORT 01/02/92

EMP CODE	NAME	DESIGNATION	PRESENT/LEAVE
Y0001	HARIDAS	LSA	P
Y0002	RAJEEV	SWEEPER	P
Y0003	MOHAN	CLEANER	P
Y0004	ROY	LSA	
Y0005	VARGHESE	WORKER	P
Y0006	RANI	SWEEPER	L
Y0007	SHEELA	WORKER	P

Table 9.9

Y O U N G   S T O C K   H O U S I N G   R E F

Sn/cd	No/ys	Hs/cd	Fl/cd	length	width	Sp/ys	Rf cd	Manger[L, W C]		
S0004	25	H01	F01	25 00	20 00	20 00	R01	2 00	2C	J 75
S0005	30	H02	F02	50 00	40 00	66 66	R01	2 0C	50	1 3C
S0006	45	H02	F02	60 00	40 00	53 33	R0_	2 10	1 70	2C

Table 9.10

Y O U N G   S T O C K   S H E D   M A N A

oh No	Wash time	Groom time	Water time	Feed time	Clean time	Remark
S0004	8 00 AM	3 30 PM	6,10 2,8	5AM,3PM	06 00 AM	
S0005	8 30 AM	4 00 PM	6,1U,4 8	5AM,3PM	08 0 AM	
S0006	8 30 AM	4 00 PM	6,10,4 8	5AM,3PM	04 3 PM	

Table 10

```
                    C O W     C E T A I L S
    1         GROWTH DETAILS
    2         FEEDING DETAILS
    3         HEALTH DETAILS
    4         DISEASES AND TREATMENT
    5         REPRODUCTION
    6....     MOVEMENT REPORT
    7....     SHED WORKERS ROUTINE REPORT
    8         HOUSING REPORT
    9         SHED WISE MANAGEMENT
   10         MILK PRODUCTION
   11         EXIT
```

Table 10.1

COW GRLWTH DETAIL ⌐

An No	D of Brt	Sex	Weight	Length	Girth	Height	J Re	Age M	Tr
KA1343	05/02/92	F	400 00	0 00	0 00	0 0C	14/0./95	⌐6	
KA1344	12/04/92	M	449 00	0 00	0 00	0 00	14/02/95	34	
KA1347	01/02/92	F	370 00	0 00	0 00	0 ⌐0	14/02/95	3⌐	
KA1347	01/02/92	F	375 00	0 00	0 00	0 00	14/03/95	3⌐	
KA1347	01/02/92	F	380 00	0 00	0 00	0 00	14/04/95	38	
KA1347	01/02/92	F	383 00	0 00	0 00	0 00	14 05/95	39	
KA1347	01/02/92	F	386 00	0 00	0 00	0 00	14/06/95	4C	
KA1347	0⌐/02/92	F	390 00	0 00	0 00	U 0C	14/07/95	4⌐	
KA1348	02/01/92	F	438 00	0 00	0 00	J 00	1⌐ 0⌐ 95	⌐C	

Table 10.2

LLW FF I^G

1	FEEDING MILCH COWS	
2	FEEDING DRY COWS	
3	FEEDING ROUGHAGE	
4	EXIT	

Table 10.2.1   97

```
        M I L C H   C O W   F E E D I N G   R E P O R T
========================================================

        Cow No      Lact  No           Qty  Con  (Kg

        KA2088         3                  1 80
        KA2983         4                  0 63
        KA3048         2                  5 03
        KA421          2                  4 28
        KA4235         5                  1 80
        KA4288         1                  3 91

                Total                    17 46
========================================================
```

Table 10.2.2

```
        F E E D I N G   O F   D R Y   C O W S
        ---------------------------------------
```

> 1 Kg Cattle feed should be given from the date of last milking
>
> 1 Kg Cattle feed should be given as allowance if the condition
> of the cow at the time of drying is poor
>
>
> Challenge feeding
> -----------------
>
> To be started from the 266th day of pregnancy Add 1 0kg
>   ttle feed to the ration on the 266th day and increase 0kg
> daily to a maximum of 3 5 kg and then maintain that   v   of
> feeding

Table 10.2.3

```
        R O U G H A G E   F E E D I N G
        -------------------------------
```

Grass/silage feeding schedule			
Animal wt / feeding	<250 Kg	250-300 Kg	300-350 Kg
Grass to be given	25 Kg.	30 Kg	35 Kg
When silage is available	15 Kg	20 Kg	

in Table 10 2 3   The roughage feeding details fed as inputs are viewed on the screen when this option is selected

The output formats developed for furnishing cow health details and disease and treatment report are identical to the output formats developed to render similar information in case of calf and the young stock   These are presented in Table 10 3 and 10 4   The disease and treatment report of a cow gives details of all the diseases encountered by the cow in her life with the treatment provided and cost

The sub-menu 'Cow Reproduction' is presented in Table 10 5   This has five options namely heat details, AI/PD details, calving details, reproduction card and exit   The output format developed to furnish heat details and AI and PD details of cows are similar to the ones developed and described for young stock   The formats are presented in Tables 10 5 1 and 10 5 2

Table 10 5 3 presents the details of the calvings that occurred in the farm during a specified period   The details presented are the cow number (Anl No), date of calving (Dt Calving), details of calving (Details), whether the calf was live or dead at birth, the calf number if live and the sex of the calf

Table 10.3

```
┌─────────────────────────────────────────────────────────────┐
│                     COW HEALTH DETAILS                        │
├─────────────────────────────────────────────────────────────┤
│   1      VACCINATION                                          │
│                                                               │
│   2      DIAGNOSTIC TEST                                      │
│                                                               │
│   3      EXIT                                                 │
│                                                               │
└─────────────────────────────────────────────────────────────┘
```

Table 10.3.1

C O W   V A C C I N A T I O N   D E T A I L S

An No	D of Brt	Vaccin name	Date of acc	Next Vacc Date	Expens
KA1343	05/02/92	B Q	07/06/95	06 06/96	150 00
KA1344	12/04/92	DEWORMING	01/03/95	1/03 95	121 00
KA1347	01/02/92	ANTHRAX	01/05/95	30/04/96	150 0
KA1348	02/01/92	R P	01/07/95	30/06 95	45 0
KA1351	02/03/92	R P	05/06/95	04 06/96	00 00
KA1352	05/04/92	FMD	07 07/95	03 0 4	50 0
KA1360	01/05/92	R P	0 08/95	06 06/95	100 0
				Total	816 00

Table 10.3.2

C O W   D I A G N O S T I C   T E S T   D E T A I L S

An No	D of Brt	D of Test	T Name	Result	Remark	Expens	Next est
KA1343	05/02/92	01/03/95	F S			0 00	15 00
KA1344	12/04/92	01/05/95	JOHNE'S	+		5 0	30/0 95
KA1347	0 /02/92	01/02/95	TB			00 00	02 06 95
KA1348	02/01/92	03/07/95	B S			55 00	17/07/95
KA1351	02/03/92	01/06/95	TB	+		00 00	30/08/95
KA1352	05/04/92	05/01/95	TB	−		65.00	05/04/95
KA1352	05/04/92	03/10/95	TB	−		100 00	01/01/96
KA1360	01/05/92	03/09/95	BS	−		150 00	22/09/95
					Total	725 00	

Table 10.4

DISEASE AND TREATMENT REPORT OF COW NO KA1347
--- --

Dis/Name	Dt Occ	Symot	DT	Result	Drug	Lu	Re ı ᵗ	C	
COCCIDIA	03/01/92	DIARROHEA	FSE	+VE	SULPHA	‑	CURED	5C	
CALFSCOUR	25/02/92	DIARRHOEA	FSE	+VE	DIADIN,DEXTRC	⌐	CURED	OC	00
BRONCHITIS	01/03/92	COUGH			SULPHA	5	CURED	25C	OC
STRONGYLOS	02/04/92	DIARRHOEA	FSE	+VE	ALBENDAZOLE	⌐	CUREL	100	00
AMPHISTOME	05/06/92	DIARRHOEA	FSE	+VE	ALBENDAZOLF	⌐	CURED	10C	00
INDiGEST	12/07/92	ANOREXIA	FSE	‑VE	PUMBION TAB	‑	CLRED	25	0C
EPH FEVER	12/10/92	PYREXIA			NOVALGIN	⌐	CUPED	125	
BRONCHITIS	16 01 93	COUGH			SU PHA		CUREC	⌐	
MAS ITI	21/10/93	INFL UDD	CMT	+VE	GENTAMYCIN	4	UREJ	500	00
MILK FEVER	10/12/95				MIFEX		CURED	7	00

| | | | | Total | | | | 1575 | 00 |

Table 10.5

```
┌─────────────────────────────────────────────────────────────────────┐
│                                                                       │
│              C O W    R F P R O    _ T I O N                          │
│              ─────────────────────────────────────────               │
│        1      HEAT DETAILS                                            │
│                                                                       │
│        2      AI/PD DETAILS                                           │
│                                                                       │
│        ⌐      CALVING DETAILS                                         │
│                                                                       │
│        4      REPRODUCTION CAPD                                       │
│                                                                       │
│        5      EXIT                                                    │
│                                                                       │
│                                                                       │
│        ─────────────────────────────────────────────                 │
│                                                                       │
└─────────────────────────────────────────────────────────────────────┘
```

Table 10.5.1

H E A T   D E T A I L S

Anml No	Dt Heat	Dt Exam	Detail	Rema k	D Exp Ht
KA1248	10/04/91	10/04/91	IN HEAT		01 05 91
KA4228	09/03/92	10/03/92	IN HEAT		30 03/32
KA2678	17/C8/92	17/08/92	IN HEAT		)/ 09 ~
KA1250	20/08/92	21/08/92	IN HEAT		1J 03 3
KA 3	01/12/94	02/12/94	IN HEAT		22/12 34

Table 10.5.2

A I/P D   D E A I L S

An No	Dt Heat	Dt Insm	Bull No	Breed	Date P D	Rslt	Exp dt clv
KA1248	10/04/91	10/04/91	KA2979	CBJ	09/06/91	P	15/01/92
KA4228	09/03/92	10/03/92	KA3011	CBHF	09/05/92	P	15/12/92
KA2678	17/08/92	17/08/92	KA2791	CBBS	16/10/92	P	24/05/93
KA1250	20/08/92	21/08/92	KA3011	CBHF	2 10/		~
KA1360	01/12 94	02/12 94	KA2 79	CBJ	1		

The 'Cow Reproduction Card' is presented in Table 10 5 4 This yields information regarding the reproductive performance of a cow namely the cow number (Animal No), lactation number, age at calving, gestation period, days in which first post partum heat was observed in each cycle (First PPH), AI index, service period and inter-calving period

The output formats developed to yield information about cow movement, cow shed workers routine, housing and cow shed management are presented from Table 10 6 to Table 10 9 The formats are identical to those developed for the calf and the young stock except in case of cow shed management where the milking time is also indicated in addition to other details (Table 10 9)

The sub-menu 'Milk Production' is presented in Table 10 10 This has seven options namely 100 days' yield, lactation yield, persistency of milk, milk comparison chart, milk utilization day, milk utilization period and exit

The details of the first hundred days of production of the cows whose milk records have been entered are shown in Table 10 10 1   The cow number (Cow No), lactation number (Lact No) 100 days' yield (100 D yield), peak yield, days in which peak was attained (P days) and the projected lactation yield (P Lact Yld) are displayed on the screen as outputs The lactation details of a cow namely the lactation number,

Table 10.5.3

C A L V   N G   R E P O R T   from 1 /03/95 to 1   of

Anl No	Dt Calving	Details	Live/Dead	Calf No	Sex
KA1250	28/05/93	NORMAL	L	KA1266	F
KA4228	25/02/95	NORMAL	L	KA4211	-
KA1248	11/07/95	NORMAL	L	KA1211	F
KA2678	20/07/95	NORMAL	L	KA1279	F

Table 10.5.4

C O W   R E P R O D U C T I O N   C A R L

Animal No	KA4228
Lactation No	1
Age at calving	1018
Gestation period	240
First PPH	0
AI index	1
Service Period	0
Inter Caving Period	0

Table 10.6

C O W   M O V E M E N T   R   F   ᴉ ʜ   ɪ ᴜm   0ᵗ/ᴜ   ᴉ   ᴉ

No of Cows Dead		
No of Cows sold and Income ᴸ and Rs ᶠ		
No of Cows Transfered	0	
No of Cows Culled	0	

Table 10.7

COW SHED WORKERS ROUTINE REPORT ON   ᴸ

EMP CODE	NAME	DESIGNATION	PRES ᵥ	ᵥ
CC0C1	DAS	LSA		
C0C01	DAS	LSA		
C0003	MOHANKUMAR	CLEANER		
C0C04	ROY VARGHESF	SA		
C0005	JOSE	WORKER		P
C0006	RAMKUMAR	SWEEPER		
C0007	SHEENA	WORKER		F

Table 10.8

C O W   H O U S I N G   R   P O R T

Sh/cu	No/co	Hs/cd	Fl/cd	length	w dth	Sp/cow	Rf/cd	langer[L	W	D]
0007	25	H01	F01	25 00	20 00	20 00	R01	0 1		F
0008	30	H02	F02	50 00	40 00	66 66	R01	1		90
0009	45	H02	F02	60 00	40 00	53 33	RC			

Table 10.9

C O W   S H E D   M A N A G E M E N T

Sh No	Wash time	Groom time	Water time	Feed time	Milk time	Clean time
S0007	8 00 AM	3 30 PM	6,10,2,8	5AM,3PM	5 15, 1	08 00 AM
S0008	8 30 AM	4 00 PM	6 10 4 8	5AM,3PM	5 30 0	08 30 AM
S0009	8 30 AM	4 00 PM	6,10,4 8	5AM,3PM	5 30	4 FM

Table 10.10

```
┌─────────────────────────────────────────────────────────────────┐
│                     MILK PRODU        C                          │
│      1      100 LA   YIELD                                       │
│      2      LACTATION YIELD                                      │
│      3      PERSISTENCY OF MILK                                  │
│      4      DAILY MILK COMPARISON                                │
│      5      MILK JTILIZATION DAY                                 │
│      6      MILK  ITLIZATION PER OD                              │
│      7      EXIT                                                 │
└─────────────────────────────────────────────────────────────────┘
```

Table 10.10.1

100 DAYS YIELD DETAIL

Cow No	Lact No	100 D Yield	Peak Yield	P Days	P Lact
KA3048	2	402 60	5 90	11	3180 0
KA4211	2	243 90	13 40	26	2080 0
KA4288	1	343 30	14 10	29	2820 00

lactation length (L Leng), lactation yield (L yld), the standard lactation yield (Std L yld), the average fat per cent recorded (A fat%), the fat yield in kilogram (Fat KG), the 4 per cent fat corrected milk (4% FCM) and the standard fat corrected lactation yield (C 4% FCM) (corrected for lactation number and fat percentage) are shown in Table 10 10 2   The standard lactation yield, the 4% fat corrected lactation yield and standard fat corrected lactation yield are calculated using certain correction factors incorporated in the programme developed

Details of persistency of milk production of the herd are another output calculated from the milk records of cows that are entered daily   Table 10 10 3 furnishes details of persistency coefficient (Perst Coff) animal wise and for each lactation (Perst lact)

A chart comparing the daily milk yield of cows corrected for lactation number is shown in Table 10 10 4   The output displays the date, cow number, lactation number (Lact No), milk yield on that date and the yield corrected for lactation number (Correct yield)   Correction factors for arriving at the corrected yield are incorporated in the basic programme developed

The milk utilization/sales report for a day is presented in Table 10 10 5   The informations furnished are the opening

Table 10.10.2

w .	NC	L e ng	L yl a	ud l ,ld	iat % Fat		
rA4211	2	?01	72 4(	428 25	+ 42	' 3	
KA?24~		1?6	0 0 ?0	6 2/ (	00	0	
KA4?83	1	0	+42 '0	698 5?	1 5 1	1 4	

Table 10.10.3

PERSISTENCY OF M   PRODUCTION

cCW Nu	a t NO	e L CtT		
KA3048			A	
KA4211	1	_ e6		
A4288				

Table 10.10.4

DAILY MILK YIELD C I PAR I HART)

Cow No	aci	N I		
KA2088		14 0		
KA298_	4	11 _0		C
KA3048	2	9 50	3 6A	
KA4211	2	6 20	5 66	
KA4235	5	14 00	_ 33	
KA4288	1	14 C0	1 C	

balance of milk on that day, milk produced on that day, the total milk in stock, the quantity of milk issued to calf shed, the quantity supplied for internal use in the farm, the rate of issue, the quantity issued for external sales, the rate of issue, the stock balance of milk at the end of that day and the income from sale of milk on that day Table 10 10 6 shows the milk utilization/sales report for a specified period The opening balance of milk at the beginning of the specified period, milk production during the period, the total milk in stock, the total quantity issued to calf shed during the period, the total quantity issued for internal use in the farm, the total quantity sold, the balance milk in stock at the end of the period and the total income from sale of milk during the period are displayed on the screen as output

The 'Animal Card' is displayed on screen when Option 4 in the 'Report Menu' is selected The output format is shown in Table 11 The informations with respect to pedigree, growth, production, reproduction and disposal of an animal are furnished in the animal card These include the animal number, date of birth, breed, sire number, dam number, birth weight, 0-90 days growth rate, 90-180 days growth rate, 180-365 days growth rate, number of completed lactation, average peak yield, average 100 days yield, average standard lactation yield, total production, the age at first calving (AFC), the average AI index, the average service period (Avg Serv prd), average intercalving

Table 10.10.5

```
M I L K    U T I L I Z A T I O N / S A L E S    R E P O R T
              On  31/12 92
```

Opening Balance		239 90
Milk product on 31/12/92		26 70
Total milk	266 60	
Issued to Calf Shed	40	
Internal Use	50	
Rate		5 00
External Sales	70	
Rate		6 00
Balance Milk	106 60	
Total Income	670 00	

Table 10.10.6

```
M I L K    U T I L I Z A T I O N / S A L E S    R E P O R T
        From  31/12/92  to  03/03/93
```

Opening Balance	239 90
Milk production	681 50
Total milk	921 40
Issued to Calf shed	42
Internal Use	54
External Sales	80
Balance Milk	745.40
Total Income	760 00

Table 11
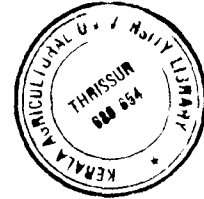
ANIMAL CARD

Animal N	KA1810	No of Completed L	
Date of Birth	22/03/86	Avg peak yield (kg)	8
Breed	CBJ	Avg 100 D yield (Kg)	948
Sire No	K1992	Avg std L yield (kg	150/
Dam No	KA1086	Total production (kg)	7074

Growth

		Reproduction	
90 Days	) 43	AFC (Days)	
90 - 180 Days	0 56	Avg AI Index	7
180 - 365 Days	0 51	Avg serv prd	'0
		Avg Int Cal pr	t

Disposal
-- --

Date	26/10 90
Mode	Sale
Reason	Infertility

period (Avg Int clv prd), the date of disposal, reason for disposal and the mode

4 1 3 Utilities

The third option in the main menu is utilities This provides the user facilities for modification, deletion, backup, restore and help

4 1 4 Exit

The fourth option in the main menu is exit Similar exit option is also provided in the various sub-menus developed

Discussion

DISCUSSION

The management information system on bull mother herd (MIS-BMH) developed has been designed to be user friendly It is a menu driven program and so does not require special computer skills to operate it The programme is structured under a 'Main Menu' which has four options (Table 2) The 'Main Menu' is automatically presented to the user upon starting the 'management information system - bull mother herd' (MIS-BMH) programme The first option in the 'Main Menu' is 'data entry' for on line entry of events as it occurs in the farm The various input formats developed for data entry have been presented in Tables 3 to 3 19 The data base files storing information on birth, growth, feeding, health, disease and treatment, production, reproduction, movement, workers routine, shed management, housing and weather are thus continuously updated

The 'Report Menu' is accessed by selecting Option 2 'Report' This has five options (Table 4) If Option 1 in the 'Report Menu' is selected by the user by typing 1, he will view on the screen the brief objectives and details of infrastructure of the farm The input that is entered is as such displayed on the screen as the output Table 5 illustrates the format in

which the details of the objectives and infrastructure of the farm are stored in the data base file Relevant and composite information on the farm such as the year of inception, total area of the farm, area under cultivation, the animal strength under various heads, viz , calf, young stock and cow, brief details of man-power, i e , number of technical hands, non-technical hands and labourers and the prominent objectives of the farm are displayed on the screen as the output The user of the information system thus gets a brief insight about the composition of the farm   Besides, it may be necessary to include in periodic progress reports an updated statusquo information and main objectives as a preamble The output from this report menu will be quite handy for such purposes

When   Option 2 in the 'Report Menu' is selected by typing 2, the user is presented with an analysis of the weather data recorded in the farm The weather data entered daily include the maximum temperature, minimum temperature, relative humidity and the rainfall recorded in the farm (Table 3 19) The output obtained based on the data input for a specific period is shown in Table 6   The means of the maximum temperature, minimum   temperature, relative humidity and rainfall recorded for the specified period are calculated and furnished as the output For example, the mean maximum temperature for a period is calculated by adding the maximum temperatures recorded daily for the period specified and then

dividing the sum by the number of recordings The user has to specify the period for which he requires the information by entering the beginning and ending dates Reports of this kind make possible studies relating animal performance to the climate With further development of the package, the user can be supplied with graphical representations depicting the influence of climate on the various parameters of animal performance Further, a knowledge about the climatic conditions helps in planning operations especially fodder production and conservation

Some salient guidelines for the routine management of the stock with respect to calf care at birth, colostrum feeding, feeding of growing and milking animals, hygienic milk production, herd health control, sanitation and other management practices are displayed on the screen by selecting Option 3 in the 'Report Menu' This is primarily intended to brush up the user's knowledge on the finer aspects of animal management and instruct lower level functionaries However, he is free to make modifications in the guidelines consistent with the management policy adopted and facilities available in the farm

'Animal Details' is Option 4 in the Report Menu When this is selected, the sub-menu 'Animal Report' appears on the screen This has five options namely calf details, young stock details, cow details, animal card and exit (Table 7) Option 1

in the 'Animal Report' if chosen, presents to the user details on calves in the farm and when the option is used a sub menu 'Calf Details' appears on the screen (Table 8)   All the relevant details of animals in the zero to six month age group are included in this section   There are eleven options in the sub-menu 'Calf Details'

The birth details of all the calves born in the farm with respect to its identification number, sire number, dam number, date of birth, sex, breed, birth weight, genetic defects and the birth details are presented to the user on choosing Option 1 in the sub-menu on 'Calf details'   These details can also be generated for a specified period of time in which case the user has to enter the starting date and the ending date of the period for which he requires the information   The calf birth details   as   displayed on the screen is presented in Table 8 1   Details of twins born, male, female or male and female, degree of nasal blockage encountered at the time of birth etc   are the information that may be given under the column heading 'Birth Dets'   If twinning, nasal blockage etc are not encountered, the column is seen blank   Based on the birth details entered in the input format (Table 3 0), further reports like the number of male/female calves born in a period, number of calves born with genetic defects (and the percentage of such calves), number of male twins, female twins and male and female twins born, number of calves born breedwise etc can be

generated on a monthly/yearly basis with minor modifications in the software

Growth details can be obtained from Option 2 on the sub-menu 'Calf details' Table 8 2 illustrates the output as it appears on the screen The growth details entered in the input format shown in Table 3 1 updates the data base file storing growth data of calves The data base file on calf growth details stores data with respect to the weight, length, girth and height of calves with the dates of recording The age of the calf on the date of recording is calculated by linking the growth data base file to the data base file storing calf birth details which contains details of the date of birth and sex of the calf The age of the calf in days on the date of recording is calculated by deducting its date of birth from the date of recording The linking of the data base files in this manner precludes the necessity to input the date of birth and sex of the calf repeatedly

The report on the growth status of the calves in the farm for a specified period of time is accessed by selecting Option 3 in the sub-menu on 'Calf Details' The informations generated are based on the growth data entered in the input format shown in Table 3 1 Table 8 3 presents the informations generated, namely, the average birth weight of the male calves and female calves born during a specified period, the herd average birth weight of male calves, the herd average birth

weight of female calves, the mean 90th day weight and 180th day weight of female calves, the mean 0-90 days and 90-180 days growth rate of the herd and the numbers of female calves with their growth rates below the herd mean during each period (0-90 and 90-180 days) The user has to specify the period for which he requires the report by supplying the beginning and ending dates The average birth weight for a specified period is calculated by adding the individual birth weights of male and female calves separately and then dividing the sum by the number of calves born of each sex during the specified period The herd average birth weight of male calves is calculated by taking into account the birth weights of all the male calves born in the farm till that date and then dividing the sum of birth weights obtained by the number of calves born The herd average birth weight of female calves is calculated similarly The 90th day weight and 180th day weight are derived by extrapolation because the age of the animal on the date of recording may not be exactly 90 or 180 days as it is not easy to weigh and measure each calf exactly on the 90th and 180th day In practical management, all the calves are weighed on particular days in which a calf may exceed or fall short of the target age by a few days The 90th and 180th day weight of each calf are predicted by extrapolation using average daily gain in that interval of age The 0-90 and 90-180 days growth rate of each calf is calculated and the corresponding mean growth rate is obtained by dividing the sum of individual growth rates of

the calves for each period (0-90 and 90 180) by the number of calves Further, the calves with their growth rates below the herd average for each period (0 90 and 90-180 days) are found out and their numbers displayed With minor alterations in the software the 90th day weight, 180th day weight, 0-90 days growth rate and 90-180 days growth rate of each calf can be obtained as an output and the calves performing badly can be listed out separately The informations generated from the growth data input help to monitor the growth performance of the calves continuously A similar facility is provided in the package developed by NDRI (1993), which stores data on male calves at birth and the gain in body weight as the calf grows The listing of the calves performing badly enables adoption of quick and timely corrective measures in routine calf management

Feeding details is Option 4 in the sub-menu 'Calf Details' The sub-menu ' Calf feeding/consumption' is displayed on typing 4 (Table 8 4) This has three options namely calf feeding, calf consumption and exit Option 1 is calf feeding which displays on the screen the feeding schedule for calves upto six months of age that has been entered as the input (Table 8 4 1) This prescribes the quantity of milk, calf starter and grass to be given based on the age and bodyweight of the calf The feeding schedule has been adopted from the 'Package of Practices - Recommendations for Livestock, Poultry, Elephant, Rabbit and Dog' published by the Kerala Agricultural

University (1987) The user may follow any schedule of feeding and not necessarily the one incorporated in the program Feeding schedule for calves incorporating skimmed milk powder, milk replacer etc can be adopted with alterations in the software The quantity of milk to be fed to each calf on a specified day is displayed on the screen when the option 'Calf Consumption' is selected The milk feeding schedule for calves on a specified day is shown in Table 8 4 2   The user is required to specify the date for generation of the report The list of calves and their date of birth is obtained by linking the data base file storing details of calf milk feeding to the data base file containing the birth details of the calves   The age of the calf in days on the date of feeding is calculated by deducting the date of birth from the date of feeding The quantity of milk to be fed is calculated based on the feeding schedule input (Table 3 2) i e , 2 5 kg of milk for calves between 4 and 28 days of age, 3 kg of milk for calves between 28 and 42 days of age, 2 5 kg for those between 2 and 56 days of age, 2 kg for calves between 56 and 70 days of age and 1 5 kg for calves between 70 and 84 days of age Milk feeding is stopped after 90 days   The MIS developed indicates the quantity of milk to be fed depending on the age of calf on the date of feeding Copies of the list indicating the calf number and the quantity of milk to be fed on a day can be handed over to the workers in the calf shed which ensures efficient feeding and prevents overfeeding   The

facility for generating such an output is not available in most other herd management softwares of similar nature

When Option 5 'Calf Health Details' is selected a sub-menu having three options appears on the screen (Table 8 5) The calf vaccination and deworming details (Option 1 in the sub-menu) is presented in Table 8 5 1 The animal number, date of birth, vaccine name, date of vaccination/deworming, the date of next vaccination/deworming and the expenses incurred are displayed as output based on the inputs entered in the format shown in Table 3 3 Codes have been allotted for different vaccines namely '1' for Rinderpest, '2' for Anthrax and Black Quarter, '3' for Foot and Mouth disease and '4' for deworming The date of next vaccination/deworming is furnished based on the code entered i e , if the code input is 1, the date of next vaccination is arrived at by adding 1095 days to the date of vaccination, if the Code is 2, the date of next vaccination is arrived at by adding 365 days to the date of vaccination, if the code is 3, 180 days are added to the date of vaccination to arrive at the next vaccination date and if the code is 4, the date of next deworming is obtained by adding 30 days to the date of deworming The date of birth of the calf is obtained by linking onto the data base file containing calf birth details Thus a comprehensive knowledge of the immune status of each calf is obtained The software developed with minor modifications can be made to provide list of calves to be

vaccinated on a day and the list of those not vaccinated against a specific disease thereby ensuring vaccination of all animals A report on the vaccination of all animals done and the expenses incurred can also be obtained for a specified period Studies relating to the immune status of, and disease incidence in a calf are possible on further sophistication of the package A dairy health program furnishing details on vaccination and immunization was outlined by Chandler and Martin (1975) The program was envisaged to generate a vaccination and immunization report for each cow, a group of cows or all the cows within the herd The management information system for dairy herd improvement programme action (MIS-DIPA) developed by the National Dairy Development Board (NDDB, 1993) provides information on the vaccinations done and diagnostic tests conducted on bulls The details of the vaccination performed and the days under rest are furnished as the output

Option 2 when selected presents the details of the diagnostic test conducted on the calves The diagnostic test details namely the animal number, date of birth, date of testing, test name, result, remarks if any, expenses incurred and the date of next test furnished as outputs are presented in Table 8 5 2 These outputs are based on the diagnostic test data on calves entered in the input format described in Table 3 4 Codes have been allotted for different diagnostic tests namely, '1' for TB and Johnes, '2' for faecal sample examination, and

blood smear examination and '3' for Brucellin test   The date of next test depends on the diagnostic test code entered i e , if the code is '1' the date of next test is arrived at by adding 60 days to the date of testing, if code is 2, add 14 days to the date of testing to obtain the date of next test and if the code is '3' add 90 days to the date of testing to arrive at the date of next test   The frequency of performing vaccination and conducting diagnostic tests can be changed if the user so feels depending on the management practices followed in his farm The date of birth is obtained by linking on to the data base file containing calf birth details   Listing of calves to be tested on a day against a specified disease, calves tested positive for various tests, the diagnostic tests conducted calf-wise and period-wise with the expenses incurred for each are possible when the software is so modified   The MIS-DIPA developed by NDDB (1993) provides information on the diagnostic tests done on bulls and the days under rest

The disease and treatment details of calves are accessed by selecting the option 6 in the sub-menu on 'Calf Details' The disease and treatment report of a calf as displayed on the screen is presented in Table 8 6   The output provides an account of all diseases encountered by an animal in its calfhood The information furnished are the disease name, date of occurrence, symptoms, diagnostic test done in connection with the disease, result, and the details of treatment namely the

drug used, duration of treatment, result of treatment and the cost   The user has to supply the calf number whose disease and treatment details he requires   The system also provides the list of animals to be treated on a day

The MIS-DIPA developed by NDDB (1993) provides details about ailments and rest of bulls   The Dairy Herd Management System (DHMS) also developed by the NDDB (1993) is similar to the MIS-BMH developed in this case in some aspects   The DHMS can provide report on health care of each cow   The system can also provide list of animals suffering from a given disease "Virus", a computer program for herd health developed by Martin *et al* (1982) provided details of all the disease events of an adult dairy herd   The information is provided as a cumulative monitor, adding data for the current month to that for all previous months, and comparing the cumulative figures with those of the same months of the previous year   The present software MIS-BMH can be made more informative and modified to furnish lists of animals affected with a particular disease (to study the prevalence rate of that disease in the herd), animals dead/culled due to different diseases, and the diseases encountered in the herd for a specified period with the cost of treatment with minor alterations in the programme

The movement report is accessed by choosing Option 7 in the sub-menu 'Calf Details"   The calf movement report is presented in Table 8 7   The movement report provides

information on the number of calves dead, number of calves sold and the income from sale, number of calves transferred and the number of calves culled during a period which has to be specified by the user The informations generated are based on the inputs entered in the format shown in Table 3 6 The system can be made to provide separate lists incorporating details of calves dead with the reason for death, calves sold, agency to whom sold, reason for sale and income, calves transferred, agency to whom transferred, reason for transfer, and calves culled with the reasons for culling The movement report can be used to evaluate the herd performance in the sense that an abnormal increase in the number of calves dead, transferred, sold or culled during a specified period indicates a fault in management The MIS-DIPA developed by NDDB (1993) provides a similar report on the movement of bulls This furnishes details of the movement date, movement code (whether dead, sold, transferred culled etc) reason code (poor libido, poor semen quality, poor fertility, disabled, illness, old age, accident etc), agency, and the price Details of movement are also provided by the 'Herd Book System' (HBS), a software system designed for livestock information from bull stations and bull mother farms by the Indo-Swiss Project, Andhra Pradesh (1993)

The details about the daily work routine of calf shed workers are accessed by choosing option 8 in the sub menu on

'Calf Details' Table 8 8 shows the calf shed workers routine report on a specified date The output is generated from the data entered in the formats presented in Table 3 7 and 3 8 The report provides information regarding the duty performed by the workers on a specified date which has to be supplied by the user The total number of days worked and number of days on which leave was availed by a worker during a specified period can be calculated based on the duty details entered daily

Option 9 and 10, in the sub-menu 'Calf details' provides the user an insight into the various aspects of calf housing and shed management The calf housing report is presented in Table 8 9 Each calf shed is allotted a code Codes are similarly allotted for housing systems, floor types and roof types For example the code for loose housing is 'H01' and for conventional barns 'H02' The codes used for floor type are 'F01' for cement concrete and 'F02' for slabs Similarly, the roof types were coded as 'R01' for tiled roof and 'R02' for asbestos cement concrete The user is free to allot any code he likes The floor space per calf is calculated by dividing the area (length x width) of the shed by the number of calves housed in it The details of calf shed management are presented in Table 8 10 The report furnishes details of the routine followed at the calf shed in the farm

The information relating to the young stock is accessed by choosing option 2 in the sub menu on 'Animal Reports'

(Table 7)   The details of animals above 6 months of age and those that have not yet calved once are included in this section   A sub-menu titled 'Young Stock Details' is displayed on the screen (Table 9 0)   This has eleven options

Growth details is option 1 in the sub-menu 'Young Stock Details'   Table 9 1 illustrates the output as it appears on the screen   The growth details of young stock entered in the input format shown in Table 3 1 updates the data base file storing young stock growth details   The input format for calves and young stock is the same   However the software is so set that the details of the animals above six months on the date of recording are not included in the calf growth details but processed separately   The output format shown in Table 9 1 is similar to that described for calves, the only difference being that the age on the date of recording is furnished in months in the case of young stock

The young stock growth report is accessed by selecting option 3 in the sub-menu on "Young Stock Details'   The informations generated are based on the growth data entered in the input format shown in Table 3 1   Table 9 2 presents the informations generated namely the average 180th day weight of herd, the average 365th day weight of the herd, the mean 180 365 days growth rate of the herd and the number of calves with their 180-365 days growth rate below the herd mean for the period   As in the case of the calf growth report, the user has to specify

the period for which he requires the report by supplying the beginning and ending dates   The 365th day weight of each young stock is predicted based on the average daily gain and the mean 365th day weight of the herd is calculated   The 180-365 days growth rate of each young stock is then calculated and the corresponding mean growth rate of the herd is obtained by dividing the sum of individual growth rates of young stock by the number of young stock   Further the number of young stock with growth rates below the herd average are listed   As mentioned earlier, the system can be made to list the 365th day weight and 180 365 days growth rate of each young stock   The young stock performing badly can be identified and listed out separately   The information generated helps to analyse critically the growth performance of young stock in particular and the young stock management in general   Identification of the poor performers at an early stage facilitates earlier culling resulting in economic rearing

Feeding Details are given as option 3 in the sub menu on young stock details   The sub-menu 'Young Stock Feeding/ Consumption' is displayed on typing 3 (Table 9 3)   There are four options namely young stock feeding, young stock consumption, special feeding and exit   The first option if selected displays on the screen the feeding schedule for young stock (Table 9 3 1)   It prescribes the quantity of concentrates and green grass to be fed depending on the age and body weight

of young stock   Like the feeding schedules for calves, this has
also been adapted from the 'package of practices' published by
the Kerala Agricultural University (1987)   The user may change
the schedule to match the feed resources at his disposal   The
quantity of concentrates and green grass to be fed to each young
stock on a specified date is displayed on the screen, when the
second option 'Young Stock Consumption' is selected   The Young
Stock Consumption report is presented in table 9 3 2   The user
is required to specify the date for generation of the report
The list of young stock and their dates of birth are obtained by
linking to the data base file storing the birth details of young
stock   The age of the young stock on the date of feeding is
furnished in months   The quantity of concentrates and green
grass to be fed are calculated based on the feeding schedule
input (Table 3 12) which prescribes 1 3 kg of concentrates and
7 kg of green grass for young stock between 6 to 9 months of
age, 1 75 kg of concentrates and 12 kg of grass for those above
9 months and below 15 months of age, 2 1 kg of concentrates and
17 kg of grass for those above 15 and below 20 months of age and
2 3 kg of concentrates and 22 kg of grass for those above 20 and
below 30 months of age   Print-out of the list of young stock
with the quantity of concentrates and green grass to be fed on
a day can be distributed to the young stock sheds routinely
This will promote systematic feeding and consequently the
efficient use of feed resources   The option 'Special feeding'
if selected presents to the user details of special feeding

for young stock (Table 9 3 3) This includes details of concentrates to be given if the growth rate is poor, during pregnancy and at the time of challenge feeding

The sub-menu 'Young Stock Health Details' is presented in Table 9 4 This has three options namely the young stock vaccination details, young stock diagnostic test details and exit The structure of the output formats (Table 9 4 1, 9 4 2) and the informations generated from the health data input are similar to that for calf which have been already discussed

The disease and treatment details of young stock are accessed by selecting the options in the sub-menu on 'Young Stock Details' The disease and treatment report of a young stock as displayed on the screen is presented in Table 9 5 The output furnishes details of all the diseases encountered by a young stock with the brief details of the treatment given and the cost The output format is identical to that for the calf disease and treatment report The nature of the outputs obtained are also similar to that for the calf

The details of young stock reproduction are accessed by typing 6 A sub-menu 'Young Stock Reproduction' appears on the screen (Table 9 6) This has three options namely the heat details, AI/PD details and exit Table 9 6 1 presents the heat details of the young stock The informations furnished are namely the animal number, the dates on which it has come into

heat, the dates of examination done, details of examination done, remarks if any, and the next date on which the animal is likely to come into heat again   The expected date of heat is arrived at by adding 21 days to the date of heat   Table 9 6 2 presents the AI/PD details of young stock   The outputs are the animal number, dates of heat, dates of insemination, the number and breed of the bull used for insemination, the date on which the animal is to be examined for pregnancy, the result of examination and the expected date of calving   The date of pregnancy diagnosis is calculated by adding 60 days to the date of insemination   The expected date of calving is furnished if the result of pregnancy diagnosis is positive   This is arrived at by adding 220 days to the date of pregnancy diagnosis   The heat and AI/PD details of young stock generated are based on the data input in the format described in Table 3 13   Informations like the expected date of next heat, date on which pregnancy diagnosis is due and the expected date of calving helps to increase the efficiency of reproductive management   Listing of the animals likely to come into heat on a particular day, due for pregnancy diagnosis, and expected to calve on a particular day is possible which aids in planning and organizing the work schedule on the farm   The system can be further developed to monitor the length of oestrous cycle of each animal and list out those with irregular cycles   Similarly the age at puberty of each animal can be calculated from the heat details input and listed   Other possible outputs on further sophistication of

the software include the listing of animals above 18 months and not showing signs of heat, with abnormal reproductive system, with number of insemination per conception >n to name a few Reports can be generated that yield information about the number of fresh inseminations done, number of repeat inseminations done, number of pregnancy diagnosis done (with the number pregnant and number empty) in a specified period The MIS-DHMS developed by NDDB (1993) provides a detailed report on the reproduction of each animal It supplies action list on animals likely to come into heat, animals to be diagnosed for PD, animals not confirmed in calf, animals expected to calve etc Reports providing details of the number of inseminations done, pregnancy diagnosis carried out, number found pregnant etc are also furnished

Reports on young stock movement, shed workers' routine, housing and shed management are presented from Table 9 7 to Table 9 10 The structure of their output formats and the informations furnished based on the detailed input in the respective input formats are identical to that described and discussed for the calf

The details on cows can be accessed by choosing option 3 in the sub-menu 'Animal Report' A sub menu 'Cow Details' is displayed on the screen (Table 10) Like the calf and young stock sub-menu, this also has eleven options

The growth details of cows are accessed by selecting option 1   The output format is presented in Table 10 1   The structure is identical to the format described and discussed for calves

A sub-menu on 'Cow Feeding' is displayed on the screen when the user selects option 2 in the sub-menu 'Cow Details' The sub-menu has four options namely feeding milch cows, feeding dry cows, feeding roughage and exit (Table 10 2)   The quantity of concentrates to be fed to a milking cow is indicated to the user when he chooses the option 1   The output is calculated taking into consideration the average of the last 7 days milk yield, stage of lactation and the stage of gestation of each cow   An allowance of 1 kg of concentrate has been fixed for every 2 5 kg of milk produced, with an additional 1 kg concentrate for cows in the first and second lactations and for those entering the seventh month of gestation   The user is free to alter the feeding schedule by changing the parameters considered and the concentrate allowance fixed with consequent modifications in the software   The details of milk yield, stage of lactation and stage of gestation from the respective data base files are linked with that of milch cow feeding   The list of cows with the quantity of concentrates to be fed on a day is furnished as the output (Table 10 2 1)   A computerized feeding system of this kind based on the requirements of the producing cow ensures that the nutrient demands of the animals

are met   The feeding management is made easier since the system calculates and furnishes the daily ration to be fed to each cow thereby avoiding the cumbersome task of calculating the animals' ration   manually   Further, with feed costs constituting about 60 per cent of the total cost of producing milk, a computerized feeding based on the nutrient needs of the animal becomes all the more important since it aids in efficient use of the feed resources   Veritable accounting of feed stock becomes a possibility in such a system   A more comprehensive feeding regimen based on the nutrient contents of the feed supplied is a possibility for which the requisite routines are to be incorporated in the system   The software can be further modified to provide the user graphical outputs comparing the total production achieved with the total feed consumed in different periods   The software with minor modifications can also be used in automated feeding systems as and when a decision to introduce such a system in a farm is made   Option 2 presents to the user certain managemental tips for the feeding of dry cows (Table 10 2 2) while Option 3 presents the grass/silage feeding schedule (Table 10 2 3)   These can be altered by the user according to the resources available and the management practices on the farm

The sub-menu 'Cow Health Details' has three options namely vaccination, diagnostic test and exit (Table 10 3)   As discussed in the calf health details, this option provides the

user   information about the vaccinations performed and diagnostic tests conducted on the cows in the farm (Table 10 3 1, Table 10 3 2)

Disease and treatment is option 4 in the sub-menu on cow details   The user is presented with the details of the diseases that a cow has encountered and the treatment given with the cost of treatment (Table 10 4)   The user has to enter the cow number whose details he requires   The format for output and the informations generated are similar to that for calf and have been   discussed   earlier   Such a detailed background information on health and treatment of animals is hardly available in most of the conventionally managed farms Information of this kind will aid diagnosis and treatment to be more precise and effective

The details of cow reproduction are accessed by choosing the option 5 in the sub-menu 'Cow Details'   A sub-menu 'Cow Reproduction' is displayed on the screen   This has five options namely heat details, AI/PD details, calving details, cow reproduction card and exit   The heat and AI/PD details of cows are presented in Table 10 5 1 and Table 10 5 2   The informations generated based on the data input in the input format (Table 3 13) and the structure of the output format are similar to that for young stock   Table 10 5 3 presents the calving report for a specified period   The animal number, date of calving, details of calving, whether the calf was live/dead

at birth, calf number if live and sex are the informations
provided based on the calving details entered in the input form
presented in Table 3 14   The user has to specify the period for
which he requires the report by entering the beginning and
ending dates   The calving report for the period specified
displays the details of all the calvings that have occurred in
the farm in that period   The cow reproduction card is displayed
on screen by choosing option 4 in the sub-menu   The cow
reproduction card presents an overall picture of the
reproductive performance of a cow in each lactation/cycle
(Table 10 5 4)   The outputs are animal number, lactation
number, age at the time of each calving in days, the gestation
period in each cycle in days, the days in which the first post
partum heat was observed in each cycle (First PPH), the AI
index, service period and the intercalving period   The
informations are furnished by linking the data base files
storing details of heat, AI/PD, calving and dates of birth   The
cow reproduction card is continuously updated based on the
reproduction data entered and does not require any direct
inputs   For example, the age at each calving is calculated from
the date of that calving and the date of birth, the gestation
period in each cycle from the date of calving and date of
successful AI, the days in which the post partum heat was
observed from the date of first heat after calving and the date
of last calving, the AI index from the number of inseminations
required for a positive result to be entered on pregnancy

diagnosis, the service period from the date of successful AI and date of last calving, and the intercalving period from the two consecutive dates of calving The 'Herd Book System', the software used by the Indo-Swiss Project, Andhra Pradesh (1993) furnishes similar outputs like the age at calving, gestation length, service period and intercalving period for each cow lactation wise The MIS-BMH system can be further expanded to provide list of animals for variety of queries such as calving to first AI days >n, calving to first conception > n days, number of service/conception > n, animals due to calve between two given dates etc As mentioned earlier, the MIS-DHMS (1993) used by NDDB in their farms provides a detailed report on the reproduction of cows Similar reports and action lists are provided by the computer program 'Virus' - developed by Martin *et al* (1982) Fertility control action lists namely cows due to calve in next 30 days, cows not observed in oestrus by day 42 after calving, cows in target service period, cows due for pregnancy examination, cows served twice or more and not pregnant and cows confirmed pregnant are provided by the system The fertility performance of herds is also monitored month by month and is compared with the same months of the previous year in the following ways - number of cows calved, number of cows seen in oestrus, mean days calving to first oestrus, number of cows served, mean days calving to first service, number of cows conceived, mean days calving to conception, potential number of oestrus observations, actual number of oestrus observations,

mean days between oestrus observations and oestrus detection rate (per cent) The 'MIS-BMH' can provide such lists on further expansion by incorporating additional routines to the existing software

The cow movement report, shed workers routine report and housing report are presented from Table 10 6 to Table 10 8 The structure of the output format and the informations furnished based on the details of input in the respective input format are similar to that described and discussed for the calf The cow shed management report (Table 10 9) shows the milking time in the different cow sheds over and above the details shown in the calf and young stock management reports

The details of milk production are accessed by choosing option 10 in the sub-menu 'Cow Details' The sub menu on milk production is presented in Table 10 10 This has seven options namely 100 days yield, lactation yield, persistency of milk, daily milk yield comparison, milk utilization day, milk utilization period and exit, Table 10 10 1 presents the details of 100 days milk production of each cow arranged in the decreasing order of their yield The cow number, its 100 days yield, peak yield, the days in which peak was attained and the projected lactation yield are furnished as output The projected lactation yield is obtained by multiplying the peak yield by the factor 200 (Chacko, 1995) The complete lactation details of each cow are accessed by choosing the option 2 in the

sub-menu 'Lactation Details' The output is presented in Table 10 10 2 The cow number, lactation number, lactation length, standard lactation yield, average fat per cent, fat yield in kilogram, the 4 per cent fat corrected milk and the standard fat corrected lactation yield (corrected for lactation number and fat percentage) are the details furnished Correction factors have been used for the purpose of standardising the lactation length and/or yield The part lactation yields are thus extrapolated to a 305 day basis The four per cent fat corrected milk yield is calculated by using the formula of Gaines and Davidson (1923) The later lactation yields were converted to first lactation equivalent using the correction factors developed for crossbreds in the Sander's method cited by Thomas and Sastry (1991) The lactation length is calculated from the date of last milk recording and date of starting milk recording entered as inputs The average fat per cent is calculated by adding up the daily morning and evening fat percentages recorded in a lactation and then dividing the sum by the total number of recordings in the lactation The product of the average fat percentage recorded and standard lactation yield gives the fat yield in kilogram The animals are arranged in the decreasing order of their milk yield enabling the easy identification of the top and poor yielders in the farm The poor yielders can be marked for special care or proposed for culling Further, the system can provide the list of cows in milk and cows dry lactation wise The system can be

made to yield information like the mean 100 days yield, mean peak yield, mean standard lactation yield and mean fat per cent of the herd for each lactation on further perfection of the package The MIS-DHMS used in the NDDB farms has this provision and lists the animals performing below the prescribed standards or herd mean Such an information flow will help in a realistic appraisal of the productive performance of the herd The Herd Book System used by ISP Andhra Pradesh also provides output of similar nature, namely, the 100 days yield, peak yield, days of attaining peak yield, lactation length, total lactation yield, 305 day lactation yield, milk fat per cent and milk protein per cent However, the MIS-BMH developed has been further perfected by incorporating various corrections for lactation number, fat percentage and incomplete/longer lactations This makes available fat corrected standard lactation yield, which is a very useful parameter for genetic evaluation and breeding programmes Under 'registers and hand calculation' system of information generation, the tediousness of the calculations would have precluded the use of such refinements in techniques

Details regarding the persistency of milk production of the herd for each lactation are obtained by choosing option 3 in the sub-menu 'Milk production' The details of the persistency of production are presented in Table 10 10 3 The persistency coefficient animal wise and lactation wise are furnished as output The persistency index has been calculated according to

the formula of Mahadevan (1966) Persistency is more relevant to commercial milk production than just high peak yield, though a combination of both is ideal In a bull mother farm primarily meant for producing quality young bulls for progeny testing and genetic improvement in a large population of cows in the field, information on persistency along with other lactation parameters is very valuable

A chart showing the daily milk yield of cows corrected for lactation number is presented in Table 10 10 4 This is accessed by choosing option 4 in the sub-menu 'Milk Production' The daily milk yield of cows in different lactations can be compared on the basis of the corrected yield The list of cows yielding below a prescribed corrected daily yield can be obtained on expanding the software by adding suitable program modules

The outputs described, namely 100 days yield, lactation details, milk production persistency and chart showing the corrected daily milk yield are furnished based on the milk and fat data entered in the input format presented in Table 3 15, to Table 3 17

Details about the utilization and sales of milk on a particular day are accessed by choosing option 5 in the sub-menu and for a period by selecting option 6 The milk utilization/ sales report for a specified day is presented in Table 10 10 5

The informations provided include the opening stock of milk on that day, milk produced on that day, total milk (opening balance + milk produced on the day), quantity issued to calf shed, quantity issued for farm use and the rate of sale, quantity sold outside and the rate of sale, the stock balance of milk at the end of that day and total income from sales on that day The milk utilization/sales report for a period is presented in Table 10 10 6   This provides details of opening stock of milk at the beginning of the specified period, milk produced during the period, the total milk, total quantity issued to calf shed, total quantity issued for internal use, total quantity issued for external sales, the stock balance at the end of the period and the total income from sale during the period   The details are furnished using the data entered in the input format shown in Table 3 18   The details of milk production on a day or for a period is obtained from the data base file storing milk data of cows

Option 4 in the sub-menu 'Animal Report' provides information similar to 'Animal Card' or 'Cardex'   The structure of the animal card developed is presented in Table 11   This provides information about the pedigree, growth, production, reproduction and disposal of each animal in the farm   In the animal card, information like that on reproduction are continuously updated by the system by using the data entered and stored in the various data base files and does not require

any direct input   The informations provided are namely the animal number, date of birth, breed, sire number, dam number, birth weight, growth details (0-90, 90-180, 180-365 days growth rate), production details (number of completed lactations, average peak yield, average 100 days yield, average standard lactation yield and total production),   reproduction details (age at first calving, average AI index, average service period and average inter-calving period) and the date, mode and reason for disposal   The user thus gets accurate, uptodate and quick information on the status of each animal in the farm   Like the animal card, concise and pertinent information indicating the performance of the herd as a whole can be obtained on adding appropriate program modules to the existing software   The MIS-DHMS used in the NDDB farms has both these provisions which facilitates the performance   evaluations of the individual animal and the herd as a whole   The herd summary can be used to compare different herds in the same farm or herds in different farms

The third option in the main menu is utilities   This option presents to the user the following facilities

1   Modification   The user can change the structure of a file using this facility   He may add or delete fields to the records in a file or change the width of one or more fields

2   Deletion   for deleting unnecessary records from the data
     file

3   Back up   to make copies of data in the hard disk

4   Restore   to copy back the data backed up using 'Backup'
     command, from floppy to hard disk

5   Help   to provide assistance in using the package

The fourth option in the 'Main Menu' is the exit option
which enables the user to come out of the MIS-BMH programme
This option is also given in the various sub-menus developed

A computerized management information system can play a
vital role in the efficient management of a dairy farm   Use of
computer technology is perhaps the only means by which a farm
manager can cope up with complex problems he encounters in
routine management   The information system developed for bull
mother herds is an attempt in this direction   Like any system
in the early stages of development the package has many areas
in which changes will improve the usefulness of information
presented   Further programming work has to be done to meet all
the information requirements of the farm manager, at the same
time making the package more user friendly   Additional routines
have to be integrated into the existing system so that it can
better serve as a tool for herd management decisions

Milk production systems focus on the cow or buffalo as a biological system for transforming nutritious substances, directly consumable or otherwise by humans, into milk and milk products of greater value, chosen by human beings to meet their requirements of sustenance, satisfaction and status   To exploit the   biological system with greatest efficiency all the different   factors of production like breeding, feeding, housing, milk harvesting and disease control have to be integrated into an economic production system   This requires generation of information of various types by integrating and analysing data at various levels   The 'MIS-BMH' is a software developed for managing bull mother farms,   the primary purpose of which is to produce young bulls of merit to go into progeny testing programmes   Because of this, there is a need for collecting   accurate   data   and   developing   more   elaborate information   The software developed   is suitable for bull mother farms in India and similar developing countries and updates many similar packages available in the   country   No software is perfect, so also this one   In the discussion various possibilities of   further refinement and extension of the module to   obtain   additional information has been indicated   Testing of the module with data from a bull mother farm (Dhoni farm of KLD Board) indicated that the software can handle the type of data generated in such farms and provide required information   It may be stated here that this is the first attempt in this direction in Kerala and as such can form the harbinger of the modern era making use of advanced management techniques in the field of dairy development

Summary

SUMMARY

Flowchart for a computerised management information system for bull mother herds was developed keeping in perspective the management requirements, records kept and information need to be generated and reports to be compiled in such farms For this, the management system followed and information generated and reports filed in two bull mother farms of the Kerala Livestock Development Board, namely, the Dhoni Farm and Madupetty Farm were critically analysed and data compiled Simultaneously, making use of the flow-chart, a personal computer (PC) based user friendly package called 'Management Information System - Bull Mother Herds' (MIS-BMH) was developed in Foxpro software, for on line data entry, processing and information generation for day to day operations on the farm The development of the flow chart and the software progressed side by side in a complementary fashion so that each contributed to perfecting the other

The MIS-BMH is structured under a main menu with various sub-menus

The main menu has four options namely data entry, reports, utilities and exit Animal data collected from the farm was grouped primarily into three categories-calf details,

young stock details and cows details   Input formats were
developed to enter data pertaining to birth, growth, feeding,
health, disease and treatment, production, milk utilization and
sales, reproduction, movement, shed workers routine, housing,
shed management and weather

The outputs from the system are accessed by using the
option 'Reports' in the main menu   The report menu, a sub-menu,
has five options namely objectives/details of infrastructure,
weather details, management tips, animal details and exit

The composition of the farm with brief details of its
animal strength, man power and objectives are provided by using
the first option in the report menu   An analysis of the weather
data recorded in the farm was obtained on choosing the second
option in the report menu   The outputs include the mean maximum
temperature, mean minimum temperature, mean relative humidity
and the mean rainfall recorded for a specified period in the
farm

Details relevant and useful for the routine management
of the herd are furnished by choosing the third option in the
report menu   This comprises of certain guidelines with respect
to calf care at birth, colostrum feeding schedule, feeding of
growing stock and cows, hygienic milk production, herd health
control, sanitation and other management practices

The outputs from the various data entered related to the herd are obtained by choosing the fourth option 'Animal Details' in the report menu   Data on the animals are stored and processed by the system under 3 sections viz calf, young stock (heifer) and cow   The details on calf birth, growth, feeding, health, disease and treatment, movement, calf shed workers routine, housing and shed management are accessed by choosing the first option in the sub-menu 'Animal Reports'

The calf birth details are accessed by choosing the first option in the sub-menu 'Calf details'   The informations provided include the identification number, pedigree, birth weight, and details of birth and genetic defect if any   The growth details of the calves in the farm are obtained on choosing the second option in the sub-menu   The growth report of the calves furnishes information on the average birth weight of male and female calves born in the farm during a specified period, the corresponding herd averages, the growth rate during 0 90 and 90-180 days, with the herd averages for each period and the number of calves that had below average growth rates

'Feeding Details' is option 4 in the sub-menu 'Calf Details'   The sub-menu 'Calf feeding/consumption' has three options namely calf feeding, calf consumption and exit   The feeding schedule for calves upto the sixth month is furnished on choosing the first option   The calf consumption report

furnishes the quantity of milk to be fed to each calf on a day based on the feeding schedule input

When option 5, 'Calf Health details' is selected a sub-menu having three options namely vaccination, diagnostic tests and exit is presented The details of the vaccinations/ deworming performed and diagnostic test done on the calves are furnished as output with dates for the next vaccination/ deworming/diagnostic test for each calf and the cost

The details of all the diseases encountered by and the treatment provided for each calf are furnished in the disease and treatment report accessed by choosing the sixth option in the sub-menu 'Calf Details'

Details of calf movement are provided in the calf movement report (option 7) This furnishes information on the number of calves sold, transferred, culled and dead during a specified period The income from the sale of the calves is also provided

The details about the daily work routine of calf-shed workers are accessed by choosing option 8 in the sub-menu on calf details The report provides information regarding the duty performed by the workers on a specified date

The details of housing provided to the calves are accessed by choosing Option 9 in the sub-menu The calf shed

management report (Option 10) furnishes details of the routine
followed at the calf-shed in the farm

The informations relating to the young stock are
accessed by choosing the second option in the sub-menu 'Animal
Reports' A sub-menu entitled 'Young Stock Details' is
presented This has eleven options

The growth details of young stock are accessed by
choosing the first option in the sub-menu 'Young Stock Details'
The output format is similar to that developed for calf - the
only difference being that the age on the date of recording is
furnished in months in the case of young stock The young stock
growth report (Option 2), provides details of the average 365
days weight of the herd, the mean 180-365 days growth rate of
the herd and the number of young stock with their growth rates
below the herd average

'Feeding details' form option 3 in the sub-menu on young
stock details The sub-menu 'Young Stock Feeding/Consumption'
has four options, namely, young stock feeding, young stock
consumption, special feeding and exit The feeding schedule for
young stock is furnished on choosing the first option The
young stock consumption report (Option 2) indicates the quantity
of concentrates and green grass to be fed to each animal based
on the feeding schedule entered The details of the extra
concentrates to be fed if the growth rate is poor, during

pregnancy and at the time of challenge feeding are provided when the third option, 'Special Feeding' is chosen

The health details of young stock is option 4 in the sub-menu   The structure of the output format and the informations generated from the health data entered are similar to that for calf   The output format for young stock disease and treatment report (Option 5) is identical to that for calf disease and treatment report   The outputs obtained are also similar

The details of young stock reproduction are accessed by choosing the sixth option in the sub-menu   The sub-menu 'Young stock Reproduction' has three options namely the heat details, AI/PD details and exit   The heat details provided include the dates on which the animal has come into heat, date and details of examination done and the next date on which the animal is likely to come into heat   The AI/PD details furnished are the details of insemination, due date for pregnancy examination, results of examination and the expected date of calving   Lists of the animals likely to come into heat on a particular day, due for pregnancy examination and expected to calve are also obtained

As provided for the calf, reports on young stock movement, shed workers routine, housing and shed management are also furnished by the system   The structure of the output

formats and informations furnished are similar to that for calves

The details on cows can be accessed by choosing the third option in the sub-menu 'Animal Reports' The details of growth, health, disease and treatment, movement, cowshed workers routine, housing and shed management furnished are similar to that for calf and young stock

The feeding details of cow are accessed by choosing the second option in the sub-menu 'Cow Details' It has four options namely feeding milch cows, feeding dry cows, feeding roughage and exit The quantity of concentrates to be fed to a milking cow is indicated to the user taking into consideration its average last 7 days' milk yield, stage of lactation and gestation The second option presents to the user some tips for feeding of dry cows while the third option gives the roughage feeding schedule

The details of cow reproduction are accessed by choosing the fifth option in the sub-menu 'Cow Details' The sub-menu 'Cow Reproduction' has five options namely heat details, AI/PD details, calving details, reproduction card and exit The heat and AI/PD details furnished are similar to that for young stock The calving report furnished on choosing the third option in the sub-menu, provides details of all the calvingsthat have occurred in the farm during a specified

period   The cow reproduction card (Option 4) presents an overall picture of the reproduction performance of a cow   The informations furnished are the animal number, lactation number, age at the time of each calving in days, the gestation period in each cycle, the days on which the first post partum heat was observed in each cycle, the AI index, the service period and the inter-calving period which are continuously updated by the system based on the reproduction data entered

The details of milk production are obtained on choosing option 10 in the sub-menu 'Cow Details'   The sub-menu on milk production has seven options namely 100 days yield, lactation yield, persistency of milk, daily milk yield comparison, milk utilisation day, milk utilization period and exit   The lactation number, 100 days yield, peak yield, days in which the peak was attained, and the projected lactation yield of all the cows in the farm are furnished as outputs on choosing the first option   The lactation details namely the lactation number, lactation length, standard lactation yield, average fat per cent, fat yield in kilogram, 4 per cent fat corrected milk and the standard fat corrected milk yield (corrected for lactation number and fat percentage) are provided for each cow   The animals are arranged in the decreasing order of their milk yield enabling   easy   identification of the top and poor yielders in the farm   The details of persistency of milk production are furnished on choosing option 3 in the sub menu

'Milk Production'   The system calculates the persistency coefficient animalwise and lactation wise   Option 4 presents to the user the chart showing the daily milk yield of cows corrected for lactation number The details of milk utilization and sales for a day and a period are also provided by the system Details of stock of milk, quantity issued for use in calf shed, quantity issued for internal sales, quantity issued for external sales and the income generated from sale of milk on a day and for a period are furnished

Option 4 in the sub-menu, 'Animal Report' provides information similar to 'Animal Card' or 'Cardex' Details about the pedigree, growth, production, reproduction and disposal of each animal in the farm are provided in the animal card The animal card is continuously updated by the system using the data entered and stored in the various data base files and does not require any direct input

The MIS-BMH Software was tested using data collected from KLDB, Dhoni farm   It was observed that the informations furnished by the system were accurate and relevant for use in the daily management, planning and control of the herd

The system also provides facilities for modification, deletion, back up, restore and help to the user through the option 'Utilities' in the main menu

In this era of information revolution, computers and computerised information generation form the basis for management of the present day organisations The dairy sector can no longer afford to ignore this advance in information management   The MIS-BMH is an attempt to implement the use of computer in the basic unit of the dairy organization, the dairy farm, for the management, planning and control of dairy herd especially useful for bull mother farms for raising young bulls for progeny testing

The package developed is more complete and in many ways an improvement over already existing MIS programmes developed for Indian farms With further refinement and minor additions, the software can provide many more useful outputs   In nutshell, 'MIS-BMH' package developed now for bull mother farms can be one of the very valuable management tools that can usher the Indian dairy farming industry into the twenty first century

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MANAGEMENT INFORMATION SYSTEM ON BULL MOTHER HERDS

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ABSTRACT OF A THESIS

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ABSTRACT

The study was based on information gathered from the
Kerala Livestock Development Board farms at Dhoni and
Madupetty The existing systems of management and the records
maintained with respect to the pedigree, growth, feeding,
health, disease and treatment, production, reproduction,
movement, shed workers routine, housing, shed management and
weather were critically studied The prevailing system of data
collection and information management with respect to the
parameters mentioned above were observed Forming this as the
background, an attempt was made to develop a flow chart for a
computerized management information system for bull mother
herds Simultaneously, a PC based, menu driven, user-friendly
package entitled 'Management Information System - Bull Mother
Herds' (MIS-BMH) was evolved using Foxpro software giving
sperial emphasis on the management requirements, information
needs and the reports to be compiled in bull mother farms

The MIS-BMH programme is structured under a main menu
with various sub-menus The main menu has four options namely
data entry, reports, utilities and exit The first option is
used for the on line entry of events as it occurs in the farm
Data pertaining to the herd was grouped in three sections

viz , calf, young stock and cow   Input formats were developed for data entry thus continuously updating the data base files storing details on birth, growth, feeding, health, disease and treatment, production, reproduction, movement, workers' routine, shed management, housing and weather

The 'Report Menu' is accessed by selecting the second option in the main menu The report menu has five options Objectives and details of infrastructure is the first option in the report menu which provides brief details of the objectives and the composition of the farm   The user is presented with an analysis of the weather data recorded in the farm for a specified period on selecting the second option in the report menu Some guidelines for the routine management of the stock with regard to calf care at birth, colostrum feeding, feeding of growing and milking animals, hygienic milk production, herd health control, sanitation and other management practices are displayed on choosing the third option in the report menu

'Animal Details' is the fourth option in the Report menu   The sub menu 'Animal Report' has five options namely calf details, young stock details, cow details, animal card and exit The sub-menu 'Calf Details' has eleven options Option 1 if chosen presents the user the birth details of all the calves born in the farm   The growth details of the calves are presented on choosing   option 2   The report on the growth

status of the calves in the farm for a specified period is accessed by selecting option 3   Feeding details is option 4 The sub-menu   'Calf feeding/Consumption' has three options namely calf feeding, calf consumption and exit   The quantity of milk to be fed to calves in the farm upto 90 days of age based on the feeding schedule entered is indicated to the user The sub-menu on 'Calf Health Details' (option 5 sub menu) has three options namely calf vaccination, diagnostic test and exit The details of vaccinations and deworming performed and the diagnostic tests done on the calves in the farm are presented to the user   The disease and treatment report (Option 6 in the sub-menu) provides an account of all the diseases encountered by a calf with brief details of treatment and cost

The movement report is accessed by choosing the Option 7 in the sub-menu 'Calf Details'   It provides information on the number of calves dead, sold, transferred and culled during a   specified period   The calf-shed workers routine report providing details about the daily work routine of calf-shed workers is accessed by choosing option 8 in the sub-menu   Details of calf housing are presented on choosing option 9 and calf shed management on selecting option 10

The informations relating to the young stock are accessed by choosing option 2 in the sub-menu on 'Animal Reports' The sub-menu 'Young stock Details' has eleven options and are organised more or less in the same fashion as in the

case of calves with some additions such as options for reproduction

The details of young stock reproduction are accessed by choosing option 6 The sub-menu 'Young Stock Reproduction' has three options namely the heat details, AI/PD details and exit The details of heat observed, inseminations done and pregnancy examination of each animal are furnished

The details of cows can be accessed by choosing option 3 in the sub-menu 'Animal Report' The sub-menu 'Cow Details' displayed has eleven options

The output formats developed for and information furnished on cow growth (option 1), cow health (option 3), cow disease and treatment (option 4) movement (option 6), cowshed workers routine (option 7), cow housing (option 8) and cow herd management (option 9) are similar to that for calf and young stock

The feeding details of cows are accessed on selecting the option 2 in the sub-menu 'Cow Details' The sub-menu has four options namely feeding milch cows, feeding dry cows, feeding roughage and exit The quantity of concentrates to be fed to a milking cow based on its milk production, stage of lactation and gestation is indicated to the user on choosing option 2 The details of feeding dry cows and the roughage

feeding schedule are furnished on choosing option 2 and 3 respectively

The details of cow reproduction are presented on choosing option 5 in the sub-menu The sub-menu 'Cow Reproduction' has five options namely heat details, AI/PD details, calving details, cow reproduction card and exit The heat and AI/PD details furnished are similar to that for young stock The calving report accessed on selecting option 3 furnishes details of all the calvings that have occurred in the farm for a specified period The cow reproduction card is displayed on the screen by choosing option 4 in the sub-menu This presents an overall picture of the reproductive performance of a cow in each lactation/cycle

The details of milk production are accessed by choosing option 10 in the sub-menu 'Cow Details' The sub-menu on milk production has seven options namely 100 days' yield, lactation yield, persistency of milk, daily milk yield comparison, milk utilization day, milk utilization period and exit The informations furnished are the lactation number, 100 days' yield, peak yield, days on which peak was attained, lactation length, lactation yield, standard lactation yield, average fat per cent, fat yield in kilogram, 4 per cent fat corrected milk and standard fat corrected milk (corrected for lactation number and fat percentage) of each cow in the farm Further, details of the persistency of production and a chart showing the daily

milk yield of cows corrected for lactation number are presented on choosing option 3 and 4 respectively Details of the utilization and sales of milk on a day and for a period are also furnished (option 5 and 6)

'Animal Card' is option 4 in the sub-menu on animal report This provides uptodate, quick and accurate information on the status of each animal with respect to pedigree, growth, production, reproduction and disposal

The third option 'Utilities' in the main menu provides facilities for modification, deletion, back up, restore and help to the user The fourth option is exit

The software evolved was tested using data collected from the KLD Board bull mother farm at Dhoni The informations generated were found to be accurate, reliable and consistent with the managemental requirements of a bull mother farm thus making it suitable for use in bull mother farms in India and elsewhere Though it updates similar packages available in the country, possibilities of further refinement and sophistication still exists Depending on future processing and analytical requirements, the system can be further developed and expanded by adding on additional program modules or by altering and modifying existing ones