The Use of a Food Animal Health Resource Management System for Dairy Herds

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Summary

The objectives of this paper are to describe a farm record system used on a sample of Michigan dairy farms and to report on the incentive mechanism used to maintain the farmer's interest in data collection from 1981-1985 while the program was developed.

Associated with the above objectives, an animal health management system (FAHRMX) was developed to collect and utilize data on production, animal management, health, and economics. The system was designed to serve multi-veterinarian practices and their clients, and also for other agri-business support systems.

Dairymen provided events data on a daily basis and veterinarians provided data on services to their clients as it occurred. DHIA production data were added at monthly intervals and epidemiologic data were added annually to the data base. A computer system was developed which represented a hierarchical-distributive network which placed processing capabilities, data storage, and retrieval functions at the appropriate level such that it supplied decision makers information on a cost-effective manner.

Management aids and reports were generated for use by the veterinarian and dairyman upon demand, but were most often requested weekly. Herd health reports were generated monthly and contained management, health, and reproductive indicies. The evaluation of 2847 lactations and 21 herds revealed an average occurrence of 1.8 services per conception, 117 days open and a lactational disease incidence rate of 17.5% for reproductive tract infections, 15.1% for clinical mastitis, 12.5% for cystic ovaries, and 7.5% for retained placenta. Most striking was herd-to-herd variation in disease incidence.

The value of the information to the user contributed to the quality of data input and was a motivation to the participants to maintain the program during its development.

Introduction

In 1980, a project was begun to determine the feasibility of combining and processing disease, production, management and economic data. It was determined prior to the initiation of the project (1) and has been more recently confirmed (2) that much usable data and information is available, and that if animal health management is to be improved and made more efficient and effective, methods should be developed to better use existing data. It was also apparent early in the project that a large amount of data from various sources had relevance to animal health. Although collected from a variety of available sources, users of potential information such as dairymen, veterinarians, Dairy Herd Improvement Associatins (DHIA), and extension economists agreed that the data could be used for improved livestock production efficiency.

In North America there are many programs available for specific animal management needs. Many programs developed by veterinarians devote the majority of their effort to reproductive and nutritional concerns. Dairy Herd Improvement Associations concern themselves primarily, but not exclusively, with milk production. Most management organizations emphasize economic evaluation. All have recognized the value of computer capabilities (3, 4).

The objectives of this paper are to: 1) report the findings of five years of research and development of an animal health management system which combines data and information from several sources; 2) describe its use by dairymen, veterinarians, and others who work with the dairy industry; and 3) describe the incentive mechanism used to maintain the farmer's interest and accuracy in data collection and record keeping.

Systems Development

A Food Animal Health Resource Management System (FAHRMX) was initially proposed with the intent to comprehensively collect, combine, and utilize available data regarding animal production, animal management, health and economics on twenty Michigan farms (5). Field testing began in 1983 and with minor alterations, enhancements and additions remains basically as initially proposed. FAHRMX was developed to serve multi-veterinarian practices which serve herds of 50 to 500 dairy cows. Veterinarians collected data regarding diagnosis, treatment and reproductive examinations; while dairy managers recorded calvings, breedings, culled cows, certain disease occurrences, estrus and other

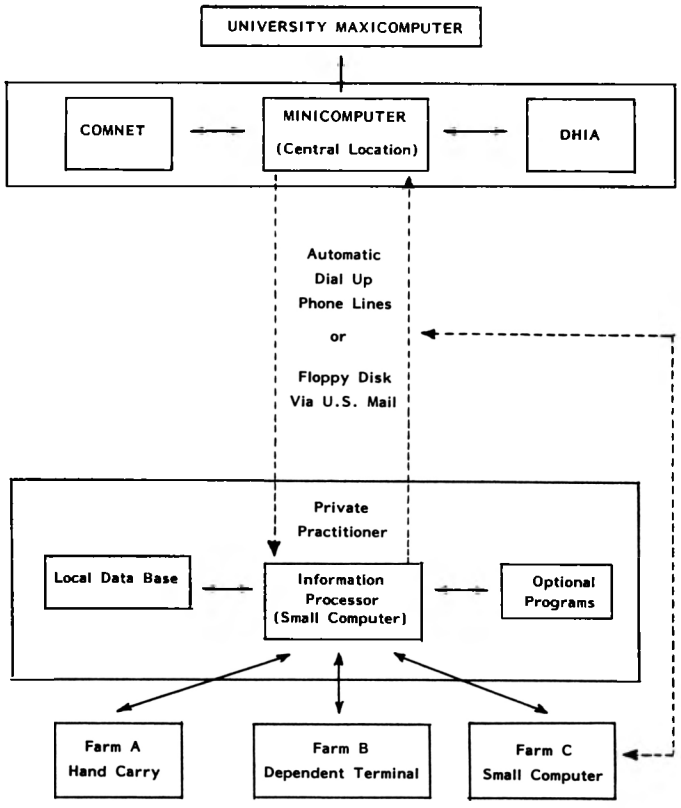

Fig. 1 - The hierarchical-distributive network used by FAHRMX for organization and information flow.

animal events. Data from both sources were encoded into microcomputers, located either on the form or in the veterinary clinic, which then produced management reports. The microcomputers used were MS-DOS or CP/M operating systems. When using the veterinary clinic's microcomputer, dairymen transferred data by a variety of routes, including U.S. mail, hand-carrying, or on-farm terminal entry. The above data transfer between veterinarian and dairyman was done at a local level and represents the lower level of a hierarchical system. Communication at that level was frequent, efficient, and quickly accomplished (Figure 1).

At monthly intervals, data were transferred from the dairyman's or veterinarian's microcomputer to a central mainframe computer. The transfer was accomplished by using a communication network that utilized an automatic electronic dial-up phone system or by simply mailing a floppy disk with monthly updates of data. For multiple herds served by the veterinarian, the data could be combined and sent as a batch.

Also at month intervals, cow records from the DHIA data base for each participating herd was added to the FAHRMS central computer data base. In addition, data collected by a veterinarian from an annual epidemiologic survey of each farm were added to the central data base. The annual survey reported physical facilities, disease control procedures, labor arrangements, feeding and nutrition and programs and other facts relative to animal health management.

Monthly reports were generated at the top level of the hierarchical system using software developed on a mainframe computer and adapted to a microcomputer. Additional minicomputer software facilitated combining and retrieval of information for specific needs or request. A communication system (COMNET) established at Michigan State University utilized minicomputers to distribute data between the campus mainframe computers and microcomputers. COMNET was also utilized to distribute information generated from the project to the Cooperative Extension Service throughout the State of Michigan.

Microcomputer software was developed to generate management reports for "on-farm" use at the request of a dairyman or his veterinarian. The reports could be generated upon demand but were usually requested at weekly intervals. These reports included herd inventories, action lists, and reminders for each herd and dairymen's needs.

All herds in this study were enrolled in Dairy Herd Improvement Associations and used veterinary services on a programmed and regular basis. Twenty-one similar herds were studied over a two year period which had an average of 95 milking cows but varied from 30 to 186.

Results and Discussion

The indices depicted in Table 1 represent a search of 2,847 complete lactations. These indices have been used by both veterinarians and dairymen to identify and correct variant individual herd problems.

Each dairyman was appraised in the monthly reports as to how their performance compared to that of their FAHRMS peers. Each lactation was also examined for the occurrence of diseases as shown in Table 2. Disease incidence was expressed in terms of lactational incidence rate and represented the percentage of lactations which had one or more cases of the indicated disease during the lactation.

An apparent association exists in the findings of similar studies (6). Data from previous studies have utilized individ-

TABLE 1. Reproductive and management indicies from 21 dairy herds reported from December 1983 to December 1984.

Index	Average Value*
Pregnancies resulting from 1st service (%)	56.2
Services per pregnancy	1.8
Cows bred 3 or more times (%)	12.5
Days open per pregnancy	117
Cows open over 150 days (%)	25.0
Months between calvings	12.8
Cows culled due to reproductive problems (%)	18.7
Calving to estrus (days)	76
Calving to first service (days)	88
Days dry	61
Days in milk	324
Cows culled from milking herd (%)	33.7

* Averages were computed as arithmetic means.

TABLE 2. Incidence rates of various diseases reported through October 1984 from 21 herds and 2847 lactations.

Disease	Lactational Incidence		
	Overall (Average)*	Highest Herd	Lowest Herd
Abortion	2.2	5.2	0
Diarrhea	1.9	32.3	0
Displaced Abomasum	2.5	3.2	0
Respiratory	1.1	5.2	0
Injuries	4.3	17.4	.8
Traumatic reticulitis	.7	3.4	0
Foot problems	7.3	17.6	0
Mastitis	15.1	28.1	0
Metritis	17.5	45.3	3.4
Cystic ovaries	12.5	22.3	3.5
Retained placenta	7.5	16.2	.4
Ketosis	1.9	5.4	0
Milk fever	4.5	11.6	0
Dystocia	8.8	28.7	.6

* Averages were computed as arithmetic means.

uals trained and hired to collect specific data while data in this study was generated as part of a dairyman's routine duties as a herdsman and during the veterinarian's routine employment in herd health practice. It appears that reliable data can be obtained if the data collector is also an "end-user" and realizes its value.

Participating farmers found that weekly and monthly reports were useful in evaluating their performance in relation to their own goals and the performance of their peers. This distributive feedback information system, from FAHRMS to farmers, was a motivating force in encouraging farmers to continue collecting data and continuing in the program. It was also noted that the average number of days open following calving steadily improved over the period of the study for the total of all FAHRMS herds. This particular parameter has been recorded to be a most useful measure of reproductive performance and is of considerable economic significance (7, 8, 9). Others report that with the help of current records, systematic joint effort of both the veterinarian and dairyman can be effective in resolving problems and improving performance (10, 11, 12).

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