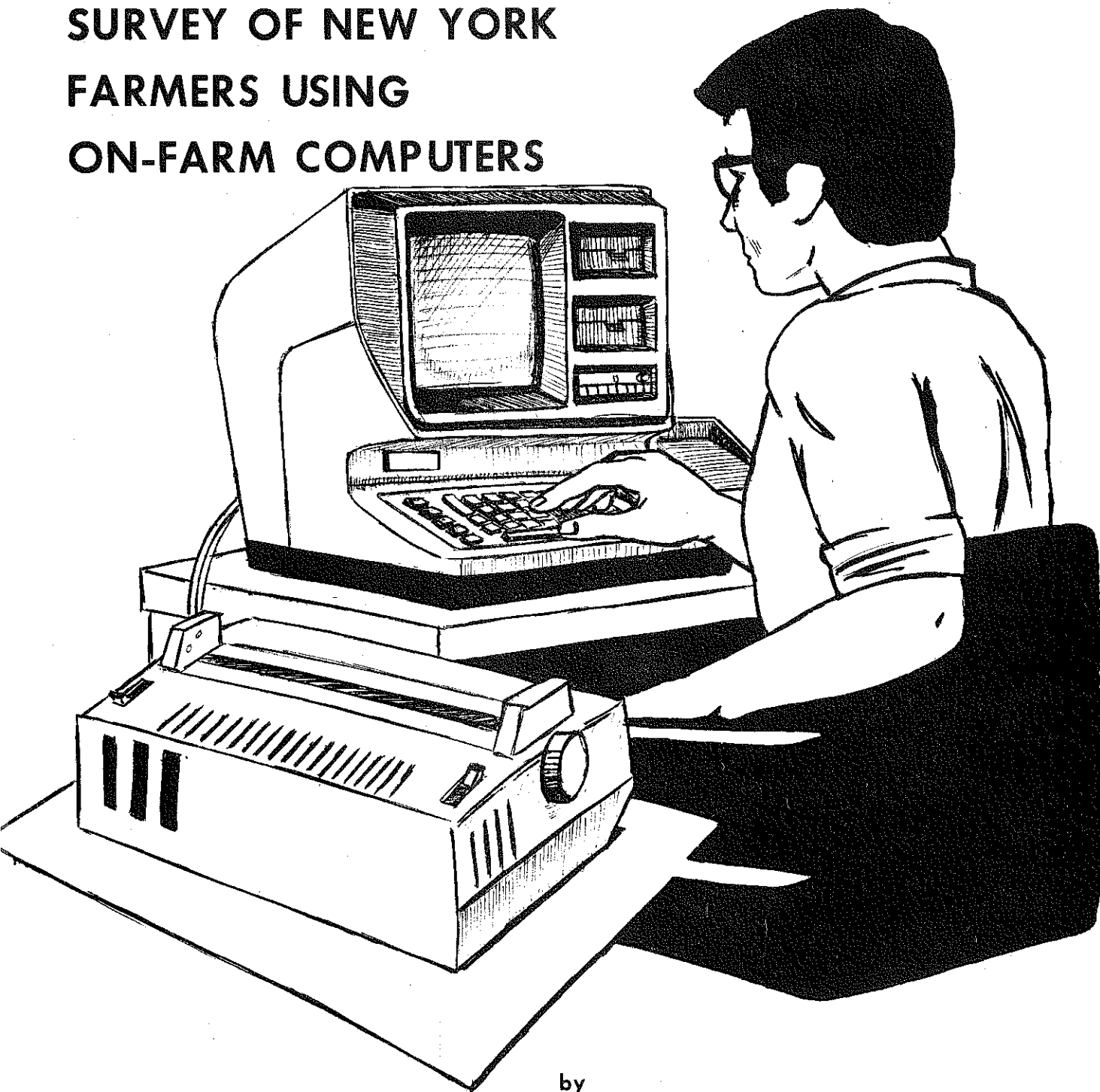# SURVEY OF NEW YORK
FARMERS USING
ON-FARM COMPUTERS

by

James M. Aldrich

Wayne A. Knoblauch

Department of Agricultural Economics
New York State College of Agriculture and Life Sciences
A Statutory College of the State University
Cornell University, Ithaca, New York 14853

Manufacturer and model names used herein are for description only. No endorsement of products is intended nor criticism of unnamed products implied.

TABLE OF CONTENTS

SURVEY OF NEW YORK FARMERS USING
ON-FARM COMPUTERS

James M. Aldrich[a]
Wayne A. Knoblauch

INTRODUCTION

The advent of relatively inexpensive microcomputer technology has brought computing capability into the office or headquarters of many businesses previously unable to afford computing. Agricultural production is one of those businesses. Many farmers are inquiring about computer purchases and program availability.

The purpose of this survey was to determine the current "state of the art" in the use of microcomputers on farms; to gather information on types of equipment being used, programs in use and their source; and to identify areas where computer program development is needed for on-farm computers.

By identifying those farmers currently using computers, we could facilitate a sharing of ideas, programs, and experiences among those who responded to the survey.

SURVEY METHOD

Survey questionnaires were provided to Cooperative Extension Agents in each county. They in turn sent a survey form to any farmer(s) in their county whom they knew had acquired a computer. No attempt was made to count the number of forms sent out. An informal survey of agents that sent out forms indicate about an 80 percent return rate.

SURVEYS RETURNED

Thirty-four farmers returned completed survey forms. Twenty-seven were identified as Dairy and/or Dairy Cash Crop farms. Other types of farms indicated were Cash Crop (5), Fruit (3), Hogs (2), Beef (1), and Poultry (2). (Total number is higher because of those indicating more than one enterprise.)

[a]James M. Aldrich is a Cooperative Extension Dairy and Livestock Agent, Washington County, and Wayne A. Knoblauch is Assistant Professor, Department of Agricultural Economics, Cornell University.

There is a wide distribution by county of farms using computers in New York State, but a concentration of those responding are located in Washington and Saratoga counties (Figure 1).

HARDWARE OWNED

Encompassing 65 percent of the respondents, the Radio Shack TRS-80 was the most common computer in use (Table 1). Apple and Commodore were the next most popular with a wide range in other models and manufacturers represented. Two farmers indicated use of an automated device to allocate grain to cows, both of these, the TeSa and DeLaval were equipped with printers to monitor grain amounts fed to individual cows.

Table 1.   COMPUTERS IN USE ON FARMS
                  New York State, 1981

Computer Brand	Number
Radio Shack	22
Apple	5
Commodore	2
Cromemco	1
Delaval[a]	1
IBM	1
North Star	1
Ohio Scientific	1
Tesa[a]	1
TI-59	1
Total	36[b]

[a]These units are single-function microprocessors and are not programmable.
[b]Two respondents were using two different types.

FIGURE I. LOCATION OF FARMERS RESPONDING TO COMPUTER USE SURVEY, 1981
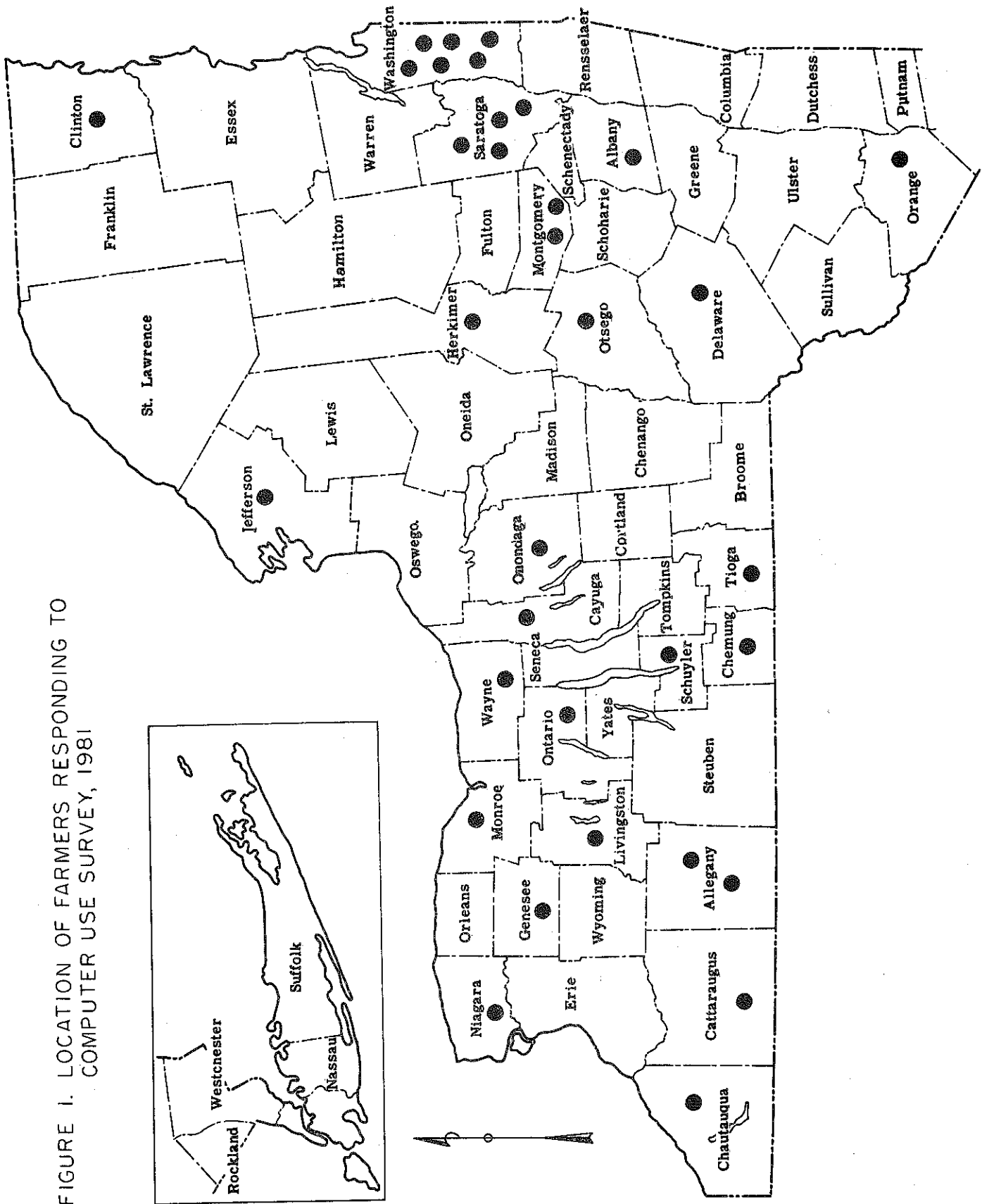
Sixty-eight percent of the farm managers were using machines with 32k memory capacity or greater (Table 2). Thirty-two percent were using 16k or less.

Table 2.
CORE CAPACITY OF HARDWARE
34 New York Farms, 1981

Size	Number	Percent
<10 k	2	6
16 k	9	26
32 k	4	12
48 k	13	38
64 k	6	18
Total	34	100

[a]Two models – Tesa and Delaval – not included because memory size not applicable.

Of those identifying the drive system, 62 percent were using disc drive (Table 3). The other 24 percent were using cassette drives and the remaining 15 percent did not know or indicated it did not apply to them.

Table 3.
MASS STORAGE SYSTEMS
34 New York Farms, 1981

Type of Drive	Number	Percent[a]
Cassette	8	24
Disc Drives, One or More	21	62
Multiple Disc Drives	15	44
Unknown or Not Applicable	5	15

[a]Percent column indicates percent of total respondents. Total will not equal 100 percent because of multiple responses.

Disc operating systems being used were generally those marketed with the computer hardware (Table 4).

Table 4.   OPERATING SYSTEMS
34 New York Farms, 1981

Disc Operating System	Number
C.P.M.	1
D.O.S. 3.2.1.	1
D.O.S. 3.3	4
North Star D.O.S.	1
TRS DOS	22
Commodore System 3.0	2
Cromemco Operating System	1
No Response	2
Total	34

Printers were the most popular peripheral equipment in use, again those marketed with the computer were used most times. Twenty-seven of the 34 respondents were using printers (Table 5).

Table 5.   PRINTERS IN USE
34 New York Farms, 1981

Type	Number
Radio Shack Models III, IV, VI, and VII	8
DATEL	1
EPSON	3
Commodore	2
Okidata	2
Apple	1
NEC Spinwriter	1
Not Using a Printer	7
Total	34

COMPUTER PROGRAMS USED

All farmers were using programs written in some form of BASIC as the computer language. In addition, three farmers were using FORTRAN and one identified DBMS as the language used. (Disc Operating Systems are listed in Table 4.)

Farmer response in regard to software programs and packages varied from only one program being used per farm to those where five or six different programs were in operation (Table 6). The major source of software programs specifically designed for farms came from the farmers themselves. Thirty-eight percent indicated they had written one or more programs for their own use. For many, this was their only source of programs. Two respondents were using their computer to connect with a mainframe computer at a distant location.

Cornell, Mississippi State, Clemson University, and Oklahoma State were identified as sources of software programs specifically designed for farms (Table 6). Only three respondents identified sources of commercially available farm software. The most popular type of program being used by the respondents were programs dealing with ration development and evaluation. The Cornell Dairy Ration Analyzer was identified as the single, most used, agriculturally related program on respondent farms. Respondents were making use of commercially developed computer programs for general use. The most popular of these was Visicalc, developed by Personal Software (Table 6).

Table 6.   COMPUTER PROGRAMS USED
                              34 New York Farms, 1981
_____

 I. Programs Written By Farmers.

- -

     Thirteen farmers (38 percent) indicated they had written their own
         programs, the programs fall into the following general
         categories.

     1. Dairy Ration balancing and evaluation.
     2. Financial record type programs, including cash flows, checkbook
         balancers, tax and financial summaries, paycheck calculation.
     3. Animal records, including herd charts, feeder pig worksheets, sow
         and litter records, cow and calf statistics, calendar.

II. Farm Related Programs Obtained Commercially Or Through Universities.

- -

Agway   Clemson University

     Crops   Accounting
     Milk Production
     Herd Health   Custom Program
     Farm business Summary
                                                  Check Data
Mississippi State University
                                             Consulagr
     Ration Balancer
     Farm Records   Growing Degree Days
                                                  Soil Recommendations
Cornell University
                                             Oklahoma State University
     Dairy Ration Analyzer
     Beef Gain   Farm Record
     Feed Form   Cash Flow
     TI-59 Programs   Machine Cost

III. General Programs In Use Not Specifically Developed For Farms.

- -

Program	Number	Program	Number
MDBS (A Data Base		Accounts Payable	2
Management System)	2	Accounts Receivable	1
Profile	4	Inventory	1
Payroll	3	General Ledger	3
Visicalc	10	Scripsit	2
File Whiz	1	Controller	1
Tax Preparer	1	New Script	1
Paddle Graphics	1	Versifile	1
Personal Filing System	1	Euclid Geometry	1
Data Capture	1	Tax Saver	1
_____

AREAS WHERE COMPUTER PROGRAMS NEED TO BE DEVELOPED

Respondents were asked to list programs they are not currently using, which would be most beneficial to their farm operations. The list of these programs was twice as long as the list of programs currently in use. Program types could be broken down into five major categories: Financial Management Programs, Animal Record Programs, Crop Related Programs, Nutritional Management Programs, and Remote Management System Programs (Table 7).

Financial management programs were most frequently listed by respondents as the type of program which would be most beneficial to their operations. Programs developed for assisting in keeping animal records and evaluating performance also had a high priority. Unlike financial management programs, very few respondents were using any type of animal record programs. Crop Production Management programs were the next most frequently cited type of programs farmers would like to use.

Nutritional management programs and programs enabling farmers to tie into DHIC and CAMIS were also listed as needed. Nutritional management programs probably were not listed as often because these types of programs were listed most frequently as programs already in use.

Table 7.   TYPES OF PROGRAM RESPONDENTS FEEL WOULD BE
                  MOST BENEFICIAL TO THEIR OPERATION
                        34 New York Farms, 1981

Category/Program	Number	Percent
I. Financial Management Programs ---	26	76%

    These included:
        Accounting
        General Ledger
        Depreciation
        Tax Reporting
        Accounts Payable
        Accounts Receivable
        Payroll
        Cash Flow Analysis
        Cost and Returns of Crop Enterprises
        Lease versus Purchase Analysis
        Investment Analysis
        Commodity
        Milk Marketing Projections
        Equipment Repair and Parts Records

Category/Program	Number	Percent
II. Animal Record Programs ---	22	65%

        Herd Health Records
        Production Records
        Breeding Records
        Breeding and Performance Analysis
        Computer Grouping
        Production Graphs for Laying Birds
        Breeding Charts for Hogs
        Program Similar to DHIC

Category/Program	Number	Percent
III. Crop Related Programs ---	12	35%

        Crop and Field Records
        Analysis of Cropping Practices
        Crop Production Forecasting

Category/Program	Number	Percent
IV. Nutritional Management Programs ---	10	29%

        Feed Inventory
        Least-Cost Ration
        Ration Balancing

Category/Program	Number	Percent
V. Remote Management Systems Program ---	5	15%

        To DHIC
        To CAMIS

FARMERS' PLANS FOR COMPUTING

Asked about their future plans in using their computers, 95 percent planned some expansion in either equipment or in program use in the years ahead. Sample comments regarding future plans are listed below:

Table 8.   FARMERS PLANS FOR COMPUTING
                                  34 New York Farms, 1981

Hardware

"Plan to expand to hard disc with remote terminal in barn with cow health/ breeding on line and remote slave computer to control feeding system"

"telecommunication"

"Add disc drives and a printer"

Computer Programs

"Complete farm accounting, herd health and management records, field and crop records"

"enterprising various profit centers"

"to keep improving and expanding programs for dairy and field crop operations"

"Expanding to other programs"

"Use computer to keep farm business records"

"To have more time to use programs. Find programs at reasonable cost for a small farm"

"stick with what we have until costs come within our range"

Other Computer Applications

"develop real time applications - security system, equipment monitoring and control"

"tie in to general purpose computer to keep records (milk, etc.) automatically"

"Parlor control and milk weight acquisition"

"use micro to interface with mainframe for data base utilization"

"Interface capability to record automatically milk weights daily and update individual cow records"

"monitoring milk production on an individual cow basis"

Other Comments

"Probably increase use. Tendency to accumulate too much paper. Big job to weed out extraneous material"

"expand hardware and software to where the machine will keep all records and make the business more profitable"

"use a computer to improve efficiency"

"progress in all areaas"

"keep an open mind"

SUMMARY OF SURVEY RESULTS

This survey has provided a bench mark of farm computer ownership, programs in use and areas for future efforts. Information of this type will be valuable for assessing future directions of computer application in agriculture by universities, agribusiness, and farmers. Although not a large number of farms were found to own computers, the responses to questions for future plans were all very positive and indicated continued usage of the computer.

In reviewing the data, the following points can be made in summary:

I. Thirty-four farmers indicated they owned computer hardware, the most common brand was Radio Shack.

II. There appears to be a lack of commercially available useable farm programs as only three farmers identified sources of commercially available farm software and 38 percent of the farmers responding were writing their own programs.

III. Most farmers felt the area of greatest benefit from the microcomputer is in complete farm recordkeeping systems, both financial and physical records.

IV. A major objective of computer use is to gain control of the farm operation and thereby gain efficiency.

V. Most farmers looked forward to expansion of the use of the computer.

VI. Tie-in to data bases for management reports and decision making aids was cited as an important objective.

VII. There is a feeling that computer programs must be tailored to fit the individual operation.

VIII. Real time applications - milk monitoring, feed system control, equipment tie-ins were cited as future uses.

IX. All respondents expressed a desire to learn more about what other farmers are doing with computers, and share their own experiences.

WHY PURCHASE A COMPUTER?

Assistance to management can be provided by an on-farm computer. No, the on-farm computer will not manage the farm any more than the current large computers, but they will act as extremely accessible "facilitators". They will store enormous amounts of data on individual cows, fields, machinery, and on the financial status of the farm business. This data can be easily retrieved for examination, analyzed, and organized to detect business strengths and weaknesses. Data also could be transferred to larger mainframe systems, for example, the Dairy Herd Improvement Cooperative and Farm Business Summary Program of New York Cooperative Extension for additional performance comparisons. Transferring data in this manner also provides a much needed data base to enhance research.

The data, once collected, also allows the manager access to it for making decisions both on short run or tactical decisions and on long run or strategic decisions. Analysis techniques are developed, but the major obstacle to making informed decisions on the farm using these techniques has been the difficulty of obtaining and many times the lack of data specific to the individual farm. Combining the data in an on-farm computer with programs containing analysis techniques will greatly enhance the manager's ability to make informed and accurate decisions.

Benefits of an on-farm computer that is part of a network to other larger computers are (1) timely data to improve herd production management and monitor financial progress (2) improved information for better tactical and strategic decision-making (3) rapid access to large data bases and mainframe computer capacity for performance comparisons and use of sophisticated forward planning models and (4) the ultimate objective – an increase in dairy farm productivity.

SHOULD I BUY A COMPUTER?

The decision to purchase a computer necessitates that management do some serious long term creative thinking. Managers should take the time to develop a set of realistic goals and objectives for the farm business and a plan of how to attain those goals. Next, one should assess how a computer may help in attainment of the goals. Unfortunately, some persons view a computer as a goal or end in itself. This it is not. It is instead a facilitator, a means of accomplishing goals more rapidly and efficiently.

A review of the current management scheme would be most helpful in the decision process. How could current systems be improved without a computer? Thinking of ways to improve the current system in terms of needed data and collection procedures will be of great assistance if you do move to a computer system. If one decides to purchase a computer, it implies that the current method is unacceptable or needs improvement.

The task of determining if the computer is a good investment is not easily answered. A computer is <u>not</u> likely to save a lot of labor that can be used more productively somewhere else. The farm family will be just as busy as ever. The major benefit is that less time will be required to do the arithmetic—the totaling, the calculations, and the checking. More time will be available to analyze problems and study the results.

The real benefit of the computer system is that the information required to make decisions will be more readily available. The exact information will vary from one individual farm to another. However, it is this information that leads to more day-to-day control over the management of a business and that will determine whether a computer is a good or a poor investment.

If you decide to purchase a computer the next question you may ask is "What do I do now?" or "How can I get started in the use of computers on my farm?". An outline of a series of alternative means one could employ to make use of computer technology follows:

Alternative 1 - Buy a computer and play games. This is the option being followed by many families. The novelty of the machine, however, may soon diminish, yet valuable experience may be gained into terminology and use of computers.

Alternative 2 - Identify a small problem area in your farm operation that could benefit from using a computer. Locate a program which addresses that problem, review and evaluate the program and if it meets your needs, purchase a computer which will operate the program. This is the lowest cost means for most managers to use computer technology on their farm, and perhaps the best alternative for most farmers to follow.

Alternative 3 - Buy a computer and learn to program. This can be an exciting experince for some, but most times will result in long hours spent in program development or frustration and rejection of computers. For those with prior computer experience or who view programming as a hobby, this alternative could be very rewarding.

Alternative 4 - Buy a computer and have custom software developed. This is perhaps the most expensive option, but if a competent programmer knowledgeable in agriculture is hired, a very usable program may result.

Regardless of the alternative or system selected, expect some frustrations. If new innovations are enjoyable challenges, a computer could be a great investment. If a well-tested, "let someone else get the bugs out" piece of equipment is desired, then the purchase of a computer should perhaps be delayed. Given time, the computer is likely to become a powerful and useful decision-making aid in the management of the farm business.

THE FUTURE OF COMPUTER USE ON FARMS

The next explosion of technology to affect the American farm family may well be the on-farm computer. Some persons now foresee the impact of the computer equaling that of the farm tractor in the 1930's. Some are predicting that the well-managed commercial farm family cannot afford not to have one and that a computer in the farm office will be as common as a sugar bowl in the kitchen by the end of the 1980's. We don't foresee a computer being quite that common, but it will have an ever increasing impact. "Change" will again challenge every commercial farm oprator both today and tomorrow. On-farm computers as part of a larger network including links to Cooperative Extension offices, universities, government agencies, and business are a means for improving the efficiency and productivity of agriculture, but also will present many challenges to the agricultural community before the gains are fully realized.