

# little package, big deal

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A programmable calculator is an 11-ounce, pocket-size computer. These programmable calculators are being used by Extension field staff in New York (Cornell), Iowa, and in several other states. This article describes New York State's experience in using the programmable calculator in Extension.

## **Between Pencil and Terminal**

The programmable calculator fits between solving a problem with pencil, paper, and reference books on one hand and using a terminal tied to a central computer on the other. The calculator can solve many of the problems that central computers are now used for. However, since the programming and storage capabilities of the programmable calculator are limited, it can't solve problems efficiently where a great amount of stored information is needed.

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## **TI-59**

A computer is only as useful as the programs written for it. Both Cornell and Iowa State provide subscription services to programs written for the Texas Instrument TI-59 programmable calculator.<sup>1</sup> A subscription costs \$20 to \$30 and provides the subscriber with a notebook containing current programs and the promise of any programs developed through 1980.

The programs being developed through these two institutions reflect the needs of their Extension audiences. The Cornell programs emphasize ag engineering, dairy cow feeding and energy-related problems. The Iowa State programs

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emphasize beef and swine production and grain marketing. Since the Extension Services in both New York and Iowa are using TI-59 programmable calculators, they can share programs.

### **Creating Interest**

The TI-59 programmable calculator became available during the summer of 1977. In September, a demonstration was held for interested Extension faculty.

In November, 1977, the idea of using the programmable calculator in Extension was presented to the agents and specialists. From reactions, it became clear that the programmable calculator would be used if programs were developed for a broad range of subjects.

### *Ad Hoc Committee*

Because of the interest in December, 1977, the director of Extension appointed an ad hoc committee on the Use of Computers in Extension. The committee was composed of Extension faculty from various departments in the College of Agriculture and Life Sciences. As a short-term goal, the committee decided to promote the use of the programmable calculator in Extension to:

1. Provide Extension agents with immediate portable computer capability not dependent on ownership of a computer terminal or the expense of telephone lines.
2. Remove the mystery of the computer. Many of the agents didn't use computers while studying for their college degrees.

As a long-term goal, the committee is trying to determine which computer system will best serve Extension in New York during the mid-1980s. Will it be terminals tied to a central computer, a microprocessor (home computer), or a combination of the two?

### *Administrative Support*

Meanwhile, Extension administration gave tangible support by hiring a programmer for five months. The programmer worked with faculty in developing programs. In retrospect, this was a crucial step, for it's necessary to have a core of useful programs ("software") before you can expect the county Extension Services to purchase programmable calculators.

Purchasing hardware is the easy part of using computers in Extension. Developing programs useful to agents is a difficult and time-consuming task. It's essential that the software be developed in collaboration with agents who'll be using it. Attention must be given to developing clear, concise instructions and input and output data sheets, since most of

the program users have little knowledge or interest in computer programming.

**Study Week** During March, 1978, agents and specialists were at Cornell for the annual "In-Depth Study Week." One of the courses offered was "Use of the Programmable Calculators in Extension." About 18 agents and specialists attended the course to learn programming of the TI-59 and the use of programs.

**Subscription Service** To distribute the programs, a subscription service was established through NRAES (Northeast Regional Agricultural Engineering Service), which currently prints and distributes plans and publications in the northeastern states. The service was initiated in October, 1978. Programs available as of January, 1979, are listed in Table 1.

How does an Extension agent use the subscription service? On receiving a copy of the program, the agent switches his calculator into the "learn" mode and keys in the program as listed. After keying in the program, a blank magnetic card about half the width of a common business card is inserted into the calculator and the program is recorded on the card. Programs require one or two cards depending on program length. Now, whenever the agent needs to use the program, he/she inserts the magnetic card into the calculator and programs it.

**Using a Printer** It's possible to attach the TI-59 to a printer. The printer is slightly smaller than a small portable typewriter and requires

**Table 1. Programs available.**

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Determination of Water Removal or Addition to Condition Feedstuffs	Simplified Feed Requirements for the Lactating Cow
Estimating Agricultural Aircraft Cost	Dairy Ration Balancer
Corn Crib Selection	Prediction of Daily Dry Matter Intake
Calculating Water Flow in a Pipe	Short Form Calculations for Animal Science Mimeo No. 25
Standardization and Statistical Analysis of Plot Samples	Calculation of Nutrient Allowances for Dairy Cattle
Comparing Fuel Costs	Estimating Operative Costs for Bulk Milk Assembly
Drying Fan Selection	Cost Evaluation of Dairy Feed Using Corn and Soybean Meal Constants
Estimating Farm Machinery Costs	Calculating Soil Loss
Manure Storage	Drive Belt Length and Center Distance
Produce Storage Refrigeration or Heating Load	Building Heat Loss and Heating Cost
Batch Size Calculations for Complete Feeds	
Complete Formulation and Ration Evaluation	

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a 110 a.c. power source. A program can direct the printer to print out captions and answers. However, few of the current programs are written to do so since the instructions for printing require a large amount of program space and require the agent to be within six feet of an electrical outlet when he/she wishes to run a program. But, the printer is useful when developing a new program, because it allows you to proof a program and print out the program instructions.

### **Where Programs Are Developed**

Where are the programs being developed? The first programs were written by Extension faculty at the university. However, now that field staff are using programmable calculators, some of the most useful programs are coming from agents and specialists.

For example, the program, "Batch Size Calculations for Complete Feeds" was developed by William R. Menzi, Jr., a regional specialist in south central New York. Menzi wrote the program in response to the needs of dairymen in his area. Although he was using a least-cost ration program via a computer terminal for some of the large dairies, many of the smaller dairy farmers have a limited choice of feeds and a sophisticated program isn't required. Furthermore, the programmable calculator doesn't require a telephone connection. Menzi's program will calculate the amount of feed needed per batch for up to five feeds, the total batch size, the percentage of dry matter in the blend, and the percentage of each feed in the total batch.

Now that a critical mass of programs and users have been established, it's anticipated that an increasing number of useful programs will be developed.

### **Footnote**

1. Information about these services can be obtained from NRAES, Riley-Robb Hall, Cornell University, Ithaca, New York 14853 and from Publications Distribution, Iowa State University, Ames, Iowa 50011.