Computers in Agriculture
University of Minnesota
Technical College, Waseca
March 22-23, 1984

PROGRAM

Conference Objectives:
1. To determine is a computer is feasible for my farm or agribusiness enterprize.
2. To understand computer state-of-the-art technology. An assessment of computer technology for farm operator/managers, agribusiness, consumers and educators in future utilization.

Conference Audience:
Farm operator/managers, agribusinesses, agricultural educators and service personnel.

Thursday, March 22

8:00 a.m. Registration - Coffee and refreshments
8:30   Exhibits Open
10:00   Opening Session - Dr. Curtis Norenberg, Office of Special Programs
          Moderator- Roger Wilkowski, Waseca County Extension Director
          Keynotes - Earl Fuller, Extension Farm Management Specialist, "What Priority Should I Give On Buying A Farm Computer". Discussion on: Do I need a computer? How and where are computers being used in Agriculture? What factors should I consider in deciding if a computer is for me?
11:00   Steve Zimmerman, Northfield - "SOFTWARE- Its Selection, Availabiltiy and Uses". A discussion on compatability, availability, reliability, questions to ask when shopping, and problems a user should be aware of in buying software.
12:00 p.m. Lunch
          Exhibits Open
2:00   Moderator- Arnie Sandager, District Program Leader, Agricultural Extension Service.
          "Farmer User Panel Discussion" Experienced users will discuss how and where computers are being used in their farm businesses. they will talk about the rewards - as well as the trials and tribulations - which are associated with integrating a computer into the farm business. This is followed by audience discussion.
3:30   Break (Refreshments served)
3:45   Al Brudelie, Truman - "Utilization- What I Can Do With And Without It On My Own". Discussion and demonstration of common computer uses to include on electronic spreadsheet and data base programs.
5:00   Adjourn
          Exhibits open until 5:30

8:30   Exhibits Open

9:30   Moderator - John Peterson, Sibley County Extension Director.
          Will Marsh, University of Minnesota - "Dairy Management
             Applications".   Session on specific and practical
             applications for dairy operations.

10:30   Refreshment Break

10:45   Dr. Thomas Stein, University of Minnesota-   "Swine
             Management Procedures". Presentation on ideas and
             procedures appropriate for swine producers.

12:00   Lunch
          Exhibits open

1:00   Moderator - Floyd Bellin, Martin County Extension Director.
          Dr. Hal Everett, University of Minnesota - "Marketing
             Techniques". Discussion on marketing programs and some
             new applications available in the near future.

2:00   James Wilkus, Kenyon - "Fundamentals of Agricultural
             Computing". Discussion of the problems and procedures in
             hardware and software services, compatability, and
             reliabiltiy.

2:45   Refreshment break

3:00   Jan Zielke, Agricultural Extension Service, EXTEND staff,
             "Your County Extension Agent and His Computer".
             Presentation on policies, interfacing, what software is
             available, how agents will use the micro computer, and
             future assessing plans.

4:00   Adjourn
          Exhibits open

5:00   Exhibits close

SPEAKER LISTING

Bellin, Floyd- Martin County Extension Director, 115 S. Park St., Fairmont, Mn. 56031.

Brudelie, Al - Adult Vocational Agriculture Instructor, Truman, Mn. 56088.

Everett, Hal- Associate Professor, Extension Marketing Specialist, Dept. of Agricultural and Applied Economics, 130 Classroon Office Building, University of Minnesota, St. Paul, Mn. 55108.

Fuller, Earl - Professor, Extension Farm Management Specialist, Dept. of Agricultural and Applied Economics, 249 Classroom Office Building, University of Minnesota, St. Paul, Mn. 55108.

Hankerson, Richard - Farm Operator, New Richland, Mn. 56072.

Marsh, Will- College of Veterinary Science, University of Minnesota, St. Paul, Mn. 55108.

Norenberg, Curtis D. - Professor and Program Director, Office of Special Programs, Agricultural Extension Service, University of Minnesota, St. Paul, Mn. 55108.

Peterson, John - Sibley County Extension Director, Courthouse, Box 207, Gaylord, Mn. 55314

Sandager, Arnie- Agriculture District Program Leader, Agricultural Extension Service, 146 Classroom Office Building, University of Mineesota, St. Paul, Mn. 55108.

Stein, Thomas - College of Veterinary Medicine, 361 An. Sci./Vet. Med. Building, University of Minnesota, St. Paul, Mn. 55108.

Weist, Mark - Farm Operator, Rt. #3, Box 30, Le Seuer, Mn. 56058.

Wilkus, James - J.L. Wilkus and Associates, Kenyon, Mn. 55946.

Vreize, Cliff - Farm Operator, Trimont, Mn. 56176.

Zielke, Jan - EXTEND Project, Computer Information System, Agricultural Extension Service, 415 Coffey Hall, University of Minnesota, St. Paul, Mn. 55108.

Zimmerman, Steve - Plan-A-Farm, 220 Division St. Northfield, Mn. 55057.

FLOPPY DISK DOS AND DON'TS

by Earl Fuller

DRIVES

1. Do not place your disk drives near sources of electro-magnetic radiation such as a color television or display monitor. Keep the drives as far from such sources as possible--at least three feet.

2. Do not attempt to clean the read/write heads of a disk drive with anything other than a "cleaning diskette" designed for that purpose.

3. Clean a read/write head manually only when problems develop. Cleaning, no matter how carefully done, can scratch a head slightly. If you're using a cleaning diskette, follow manufacturer's instructions.

4. Have your drives checked by a qualified technician every six months. There are several delicate adjustments that should be made periodically. Moving the drives around, or just the vibration from normal operations, throws these adjustments off, cutting down the reli-ability of the drive, thereby causing read/write errors to occur more frequently.

5. Avoid plugging your system into non-constant or fluctua-ting power sources. Ideally, your computer system should be the only appliance drawing power from its circuit. However, as this is not usually possible, at least avoid putting the computer on a circuit with appliances such as air conditioners or refrigerators which may cause sudden power fluctuations.

6. Keep your drives away from: moisture or extreme heat or cold; all chemicals; any small foreign objects such as room dust, smoke, ashes, etc.

7. If a drive develops a problem (read errors, scratched diskettes, etc.), have it serviced as soon as possible or valuable software may be lost.

8. When a drive has been aligned, it may have difficulty reading software used with the drive prior to its being adjusted. Copy files on the aligned drive as soon as possible.

9. If you have multiple drives, it is best to have them aligned at the same time so that all alignments "lean" in the same direction.

DISKETTES

10. Use only the stickers provided to write protect a diskette. Do not use masking tape or other kinds of tape for this function because drives utilizing LEDs to sense the protect status can read through the tape. While some drives use a mechanical means of sensing the write protect status of a diskette, most use LEDs.

11. Keep diskettes away from electrical and magnetic equipment (use Rule 1 as a guide). Do not put disks on televisions, monitors or digitizing tablets.

12. When using a bulk eraser on a diskette, stay far away from diskettes you do not wish to erase.

13. As a general rule, do not turn your drives on and off with diskettes inside them. With the Apple, the CPU controls the read/write head but in the TRS-80, the CPU has no control of the head during power up and that lack of control can cause problems. Read your owner's manual but when in doubt, power up first, then put the diskettes into the drives.

14. Keep your diskettes in a protected environment when not in use. There are various products designed for the protection and storage of diskettes.

15. Never place any object on a diskette.

16. Store diskettes in a vertical position (within the mentioned protected environment).

17. Avoid writing on a diskette. If you must change a label, make up the label first and put it over the old label or make your changes with a felt tip pen only.

18. If a diskette has been in a cold environment, allow it to remain at room temperature for one-half the time (to a maximum of 2 hours) it has been exposed to the cold before using it in a drive.

19. If a diskette is scratched inadvertently, copy those files recoverable to a new diskette and discard the damaged diskette. If you then have problems reading your new diskette, have the head cleaned as it may have picked up particles from the damaged diskette.

20. Never touch the exposed surface of a diskette; handle a diskette by the jacket only.

Glossary of computer terms

This glossary is provided to assist you in the interpretation and clarification of terms commonly used in the computer industry which you may encounter in vendor's proposals or in some of our articles.

ACCESS TIME. The amount of time it takes from the instant data is requested from storage memory, to the time the program gets the data. Also referred to as read/write time.

APPLICATION. The procedure or problem to which a computer is applied. Common applications include payroll, general ledger, material requirements planning and inventory control.

APPLICATION SOFTWARE. A computer program or set of programs that tells a computer how to perform a function such as accounts receivable or inventory control.

AUXILIARY STORAGE. A storage device in addition to the core or main storage of the computer. Auxiliary storage is the permanent storage for information. It includes magnetic tapes, cassette tapes, cartridge tapes, hard disks, floppy disks. Auxiliary storage can't be accessed as fast as main storage.

BACKUP. Duplicate data files, redundant equipment or procedures used in the event of failure of a component or storage media.

BASIC. Beginner's All-purpose Symbolic Instruction Code. An easy-to-learn high level language used most frequently with mini-computers. Originally it was developed as an algebraic time-sharing language. More recently a number of minicomputer manufacturers have extended the limits of BASIC so that it can be used for minicomputer business applications.

BATCH PROCESSING. An approach to computer processing where groups of like transactions are accumulated (batched) to be processed at the same time.

BINARY. Base 2 numbering system used extensively by digital computers. In computer usage 0 usually means "NO" or "OFF" and 1 means "YES" or "ON."

BIT. Common abbreviation for binary digit (0 or 1). A number of bits together are used to represent a character to the computer.

BUG. A mistake in the design or makeup of a computer system or program.

BYTE. A group of bits or binary digits processed as a unit. In most computers a byte equals eight bits and can represent one alphabetic character or two number digits.

CARTRIDGE DISK. Cartridge disk is a term used to describe a specific kind of disk drive and disk pack. The cartridge refers to the packaging of the disk pack. It consists of two magnetic disks in a plastic container. The container has two doors that are opened by the drive mechanism so that the read-write heads can access the disk. The cartridge is generally of much larger storage capacity than floppy disks. It normally can be removed from the drive by the operator.

CASSETTE TAPE. An audio or data cassette tape which looks like the kind you buy for your home cassette recorder. It is most often used to store data or programs on some microcomputers.

CHARACTER PRINTER. A device attached to the computer that prints much like a typewriter. It prints one character at a time. It's speed is measured in characters per second (CPS).

CHIP. A chip is commonly used to mean an integrated circuit (IC), or a silicon chip. A computer is usually made up of several IC's or chips.

COBOL. Common Business Oriented Language. A high level procedural computer language used for business programming.

CODE. Or coding is a common term used to mean writing a computer program. It may also refer to the program itself.

COMPILER. A program that translates a high level computer language into machine understandable codes.

CONFIGURATION. A term used by computer people in referring to the equipment that will be assembled to work as a unit for a business. It includes the options chosen as well as peripheral devices.

CONSOLE. A CRT or teletypewriter used to control and monitor computer operations.

CONTROLLER. A device used to manage a peripheral device such as CRT's, printers, disk drives or tape drives.

CORE. A particular type of main computer memory. Another kind is MOS.

CPU. Central Processing Unit. Usually used to refer to the computer's main memory and the part of the computer that runs a program called the processor.

CRT. Cathode Ray Tube. A television like screen used to display data from the computer. Add a typewriter keyboard and it's sometimes called a terminal. Often CRT and terminal are used as interchangeable terms.

DASD. Direct Access Storage Device. Examples are: floppy disk, cartridge disk and disk drives.

DATA BASE. A set of data records that are organized in a logical manner so they can be easily accessed and used.

DATA SET. Refers to one of two things. Modems are often referred to as data sets. Files are also referred to as data sets.

DBMS. Data Base Management System. A DBMS is a set of programs which are used to manipulate and use a data base.

DEBUG. The process of finding and correcting errors in computer programs.

DEDICATED LINE. A communication line link between a terminal and a computer that is dedicated to a single terminal as opposed to a dial-up line.

DEGRADATION. Slow down in the response of a computer system in the operator's eyes. This phenomenon is seen when the number of terminals trying to use the system increases beyond the ability of the CPU to respond.

DIAL-UP LINE. A line that is given to the first terminal that dials in to the computer as opposed to a dedicated line.

DISK DRIVE. The mechanism within which the disk storing information used by the computer system, rotates. It is connected to the CPU and contains electronic circuitry that feeds signals from the disk to the computer and back.

DISKETTE. A circular piece of flexible mylar, about the size of a 45 rpm record coated with magnetic film and encased in a square protective jacket. It is used to store information, such as an accounts receivable file, to be used with a computer. Standard sizes are 8" and 5¼.

DISPLAY SCREEN. Same as CRT.

DP. Data Processing. Use of a computer to process data.

DISTRIBUTED PROCESSING. Use of computers at various locations each of which is tied to a central computer. This allows preliminary processing to be handled by the "distributed" computers and eases the load on the central computer.

DUMP. Mass copying of memory or a storage device such as a disk to another storage device or a printer so it can be used as a backup or analyzed for errors.

EXECUTE. Act of running a computer program.

FIELD. A data item in a record or file. Examples would be a customer number or a telephone number.

FILE. A group of related data records usually arranged in some sequence according to a key in each record. For instance, a payroll file would contain one record for each employee. It would probably be arranged by the employee number contained in each record.

FILE MAINTENANCE. Updating the file to reflect changes in information. Data might be added, altered or deleted. File maintenance also refers to reorganizing files, deleting records in mass that are no longer in use, etc.

FIXED DISK. A device in which the disk pack is sealed and cannot be removed. Being sealed it cannot be exposed to dust and dirt and therefore can be operated at higher speeds than removable units with greater reliability.

FLEXIBLE DISK. Same as diskette.

FLOPPY DISK. Same as diskette.

FLOWCHART. A diagram representing the logical flow of a program or system.

FORTRAN. FORmula TRANslator. Fortran is a high level language used primarily for coding mathematical or engineering problems for the computer.

HARD COPY. Printing data on a printer instead of displaying it on a CRT.

HARD DISK. A term used to refer to a disk to differentiate it from a floppy disk. The reference may be to either a cartridge disk or a fixed disk.

HARDWARE. The computer and the peripheral devices attached to it.

HEX. Short for hexadecimal. A numbering system based on 16 rather than 10. Most

computers oprate using hexidecimal numbers.

HIGH LEVEL LANGUAGE. A computer programming language that approaches English in its syntax. Usually easier to learn than a low level language such as assembly language. BASIC, COBOL and RPG are examples of high level languages.

INPUT/OUTPUT or I/O. Writing to or reading data from a computer's memory or the computer writing to or reading from one of its peripheral devices.

INTERACTIVE. Commonly used to describe a software program that provides give and take between the operator and machine. The program may ask a question to elicit a response from the operator or present a series of choices from which the operator can select. May also be referred to as "conversational" mode.

KB. Kilobyte. One thousand bytes of information. Commonly used to refer to the memory size of the CPU. A 64KB computer would contain 64 thousand bytes of memory in the CPU.

KEYBOARD. An input device usually attached to a CRT or teleprinter. It looks like a typewriter keyboard. The data typed into it using its keys goes into the computer.

KEYSTROKE. A keystroke is each time a key on a keyboard is depressed. A count or estimate of keystrokes is often used to determine how long a function will take or to price data entry services.

LEASED LINE. Usually synonomous with dedicated line.

LETTER QUALITY PRINTER. One which forms whole characters and provides output much like a standard office typewriter in quality.

LINE PRINTER. A printer that composes and prints a whole line at a time. Its speed is measured in lines per minute (LPM).

MACHINE LANGUAGE. Hexadecimal code the machine has built to be able to interpret directly. Compilers and assemblers translate programmer's code into machine language.

MAG TAPE or MAGNETIC TAPE. A mass storage device that uses reels of magnetic tape much like the tape used in home tape recorders. Mag tape usually refers to a specific 3/4 inch reel tape as opposed to cassette tape.

MAIN FRAME. The computer itself not including peripherals.

MASS STORAGE DEVICE. A disk, cassette or mag tape that has the capacity to store a number of records.

MASTER FILE. A file that contains the main, permanent information used in a system. Other files are transaction files or files used as temporary work areas.

MATRIX PRINTER. A matrix printer prints using a grid of dots usually 5 by 7. Characters are formed by striking certain dots in the grid.

MB. Megabyte. One million bytes or characters. Commonly used to refer to the amount of information that can be stored on a mass storage device such as a disk or tape. A 10MB disk would hold ten million characters of information.

MICROPROCESSOR. A single miniaturized circuit that contains complete computer processing logic. The circuit is typically ½ inch by 1 inch or smaller in several layers.

MINI-FLOPPY. A 5¼" diskette.

MODEM. A device attached between a computer device and a phone line that translates in the other direction depending on the circumstances. MODEM stands for MOdulate-DEModulate.

MOS. There are currently two kinds of computer memory in use, core and MOS. MOS stands for metal oxide semiconductor. MOS is found in hand calculators. It is cleared when power is turned off. Core retains data even after power is turned off.

MTBF. Mean time between failures. A way of gauging the general reliability of a piece of gear.

MULTIPROCESSING. A system with two or more computer units that can work together.

MULTIPROGRAMMING. A computer operating system that can handle two or more computer programs at the same time. Actually no two programs are executed at the same time. Their execution is interleaved. Because the computer is so fast, it appears to the user as though more than one program is executing.

OBJECT LANGUAGE. Machine language put out by a program translating system such as a compiler or assembler.

OBJECT PROGRAM or OBJECT CODE. A program that has been compiled or assembled and is ready to be run. Source language is what you start with before translation.

OEM. Original Equipment Manufacturer. A term commonly used to refer to a computer sales organization that has an arrangement to sell a manufacturers product in other industries they would be referred to as dealers or distributors.

OFFLINE. A device that isn't currently attached to the computer is said to be offline. Offline storage is data on disks or tapes where the disk or tape isn't currently mounted on a drive.

ONLINE. The opposite of offline.

OPERATING SYSTEM. A set of very complex computer programs normally supplied by the vendor that controls, monitors and executes programs. It can schedule and load programs, produce the computer log, control multi-programming and handle routing and scheduling of terminal communications.

PASCAL. A high level programming language gaining popularity on microcomputer systems and some minis.

PASSWORD. A code word or group of characters a computer system might require to allow that operator to perform certain functions. An operator's password might allow him to update payroll hours, but not run checks.

PERIPHERAL. A device other than the computer itself used in computer processing. Disk drives, tape drives, CRT's and printers are peripheral devices.

POS. Point Of Sale. Capturing data at the time of the original transaction rather than at some later time. Most common uses are in the retail environment.

PROGRAM. A set of computer routines used to solve a problem. The instructions are executed in the order they're written.

PROGRAMING LANGUAGE. A set of rules and conventions used to prepare the source program for translation by the computer. Each language has its own rules. Examples of programing languages are BASIC, COBOL and RPG.

RAM. Random Access Memory. The portion of computer memory generally available to execute programs and store data. Memory locations can both be read from and written to at high speeds.

RECORD. A set of related data items such as an employee's name, employee number, marital status, pay rate, date of employment, etc. This record is then one element of a file containing records on each of a company's employees.

RECOVERY. Procedure used to get back on track if you encounter a hardware problem or program problem. Backup is used in the recovery process.

REPORT GENERATOR. A computer program designed to be used with very little training. They are designed to allow the user to retrieve information from files in various report formats.

ROM. Read Only Memory. A portion of computer memory where information is permanently stored. This information can be read at high speed but can never be altered. It is not available to execute programs or to store data.

RPG. Report Program Generator. A programing language used on some small business computers. It is usually considered a high level language.

RUN. Execute a program.

SCREEN. Same as CRT.

SOFTWARE. Computer programs including application programs, generators, operating systems, compilers, assemblers, and interpreters.

SORT. Arranging records in order by a key.

SOURCE LANGUAGE. The code a programmer produces in either a high or low level language before it is translated into object or machine language.

SOURCE PROGRAM or SOURCE CODE. A program written in source language.

SYSTEM. A set of programs, a set of hardware or a set of programs and hardware that work together for some specific purpose.

TELECOMMUNICATIONS. Transmission of data over long distances using phone lines, microwave, etc.

TERMINAL. A device used to enter information into the computer system and to retrieve information from it. With many systems this would refer to a CRT but it may also be a printing terminal.

TIMESHARING. A method whereby several users can use the same computer at the same time.

TUBE. Same as CRT.

TURNKEY VENDOR. One who provides a complete system including the computer, software, training and installation.

GLOSSARY

Microcomputers come complete with an extensive vocabulary. This glossary includes some of the most common terms which you are likely to encounter. It is reprinted by permission of Popular Computing, Inc., a wholly owned subsidiary of McGraw-Hill. Copyright December 1981.

acoustic coupler: A mechanical device that allows a telephone handset to be connected to a modem (see **modem**). The term is sometimes used to refer to the entire modem.

address: A way of identifying any location in the memory of a computer.

application program: Software designed for a specific purpose (such as accounts payable or receivable, payroll, inventory, etc.).

artificial intelligence: A specialized field of research in computer science. The term refers to the ability of a computer to perform functions normally carried out by the human brain (such as reasoning and learning).

ASCII: The American Standard Code for Information Interchange. The most generally used format for representing and exchanging textual information among computers. Under the code, each of 96 characters (letters, numbers, and symbols) is given a unique binary number code (1s and 0s).

assembly language: A means of communicating with a computer at a low level. Assembly language lies between high-level languages (such as BASIC and Pascal) and machine language (the 1s and 0s the computer understands at its most basic level). Programmers use assembly language to make efficient use of memory space and to create a program that runs quickly.

backup: An extra copy of software, normally kept on file in case the original program is damaged or lost.

BASIC: Beginner's All-purpose Symbolic Instruction Code. The most used high-level language for small computers.

baud: A measure of the speed at which data travels (normally between a com-

puter and a peripheral or between two computers).

binary: A numbering system that uses only 1s and 0s. It is an efficient way of storing information in a computer since the hundreds of thousands of microscopic switches in the computer can only be on (1) or off (0).

bit: A binary digit (1 or 0).

bootstrap: A piece of software, usually stored permanently in memory, that activates other pieces of software in order to bring the computer from "off" into readiness for use.

bps: Bits per second. A measure of data-transmission speed showing the number of bits of information that pass a given point in one second. In small computers, the most common bps used is 300.

break: An interruption of a transmission. Most small computer keyboards have a Break key that tells the computer to stop what it's doing and wait for further instructions.

bubble memory: A new method of storing information for a computer using microscopic magnetic bubbles. Although the technology was developed almost a decade ago, it is still expensive and not yet generally available for small computers.

buffer: An area in the computer's memory used to temporarily store information. When using a printer, a buffer is needed because the printer operates much more slowly than the computer.

byte: A sequence of bits that represents a single character. In most small computers, a byte is eight bits.

CAD/CAM: Computer-Aided Design/Computer-Aided Manufactur-

ing. CAD/CAM is normally done on large computers because large amounts of memory and processing power are required.

CAI: Computer-Aided Instruction. Computers used to teach normally involve a two-way "conversation" between the student and the computer; the computer informs the student of mistakes as he makes them, and is able to respond to the student's demonstrated lack of knowledge.

channel: A path for the transmission of information between two points.

character: A single letter, number, or other symbol. In a small computer, a character is normally represented by eight bits (one byte).

chip: A generic term for an integrated circuit (IC), a single package holding hundreds or thousands of microscopic electronic components. The term comes from the slices (chips) of silicon of which they are composed.

clock: In a small computer, a repeating signal (usually in the range of millions of cycles per second) that controls the microprocessor "brain." Each time the clock sends a pulse, the computer performs a single task.

command: A word or character that causes a computer to do something.

compiler: A piece of software that takes a series of commands written in a high-level language and translates them into a lower-level language more efficient for the computer to use.

computer network: Two or more connected computers that have the ability to exchange information.

computer program: A series of commands, instructions, or statements put together in a way that tells a computer

to do a specific thing or series of things.

core memory: An outdated term for the main memory of a computer. Although core memory has been replaced by semiconductor memory, the term is often used to represent main memory.

CP/M: Control Program for Microprocessors. One of the oldest and most popular *operating systems* for small computers. An operating system is a group of programs that is often compared to a traffic cop because it actually controls what the computer is doing by acting as an intermediary between the hardware and the software. Any piece of applications software must be written for a specific operating system. CP/M was introduced in 1975 and has become one of the most popular operating systems; an estimated 250,000 small computers use it. Thousands of specialized application programs have been written to be used with CP/M.

CPU: Central processing unit. The heart of a computer that controls all operations of all parts of the computer and does the actual calculations.

CRT: Cathode-ray tube. A TV-like display used with most small computers to show the information the computer has output.

cursor: A position indicator on a CRT. It's normally a flashing or nonflashing square or rectangle.

data: A general term meaning any and all information, facts, numbers, letters, symbols, etc., which can be acted on or produced by a computer.

data base: A collection of related data that can be retrieved by a computer (such as a mailing list or list of accounts).

debug: To go through a program to remove mistakes.

diagnostic: A specialized program that checks the computer for problems and tries to isolate any problems that it finds.

disk: A round piece of magnetic-coated material used to store data with greater

density, speed, and reliability than is available on cassettes (see **floppy disk**).

diskette: See disk.

display: A method of representing information in visible form. The most common displays used with popular computers are CRTs and printed paper.

documentation: (1) The instruction manual for a piece of hardware or software. (2) The process of gathering information while writing a computer program so that others using the program are able to see what was done.

downtime: Any period of time when the computer is not available or not working.

dump: To copy all information available from one form of storage to another.

edit: To modify or add data to an existing document or program.

emulation: A process by which some computers can run programs not specifically written for them.

execute: To carry out an instruction or series of instructions.

firmware: A term referring to software that has been permanently placed in memory — usually into a ROM (read-only memory).

floppy disk: A disk storage device made from a thin, circular piece of magnetic material. The usual disk sizes used with small computers are 5¼ inch and 8 inch.

flowchart: A common method of graphically planning what a piece of software should do before the actual writing process begins, or for describing what it does after it is written.

FORTRAN: FORmula TRANslation. A high-level computer language used primarily for mathematical computations. Although FORTRAN is available for some small computers, it is mainly used with large commercial systems.

garbage: Meaningless information.

graphics: Pictorial information in two dimensions.

hard copy: A printout of information produced by the computer.

hardware: The physical part of the computer (such as the CRT, CPU, memory, etc.), as opposed to software.

hexadecimal: A number system with the base of 16. It is commonly used by programmers to indicate locations and contents of a computer's memory.

high-level language: A method of programming that allows a person to give instructions to a computer in a form using letters, symbols, or English-like text, rather than in the 1s and 0s code which the computer understands.

impact printer: A printer that produces hard copy by physically striking a ribbon and paper.

input: The transfer of data into the computer.

input/output: Called I/O for short, this is a general term for the equipment (such as modem or printer) connected to a computer and the two-way exchange of information that goes on between the computer and the peripheral.

instruction: A command to the computer telling it to do one specific thing.

integrated circuit: Also known as a chip, this is a group of interrelated circuits in a single package.

interactive: Describes a computer system where a two-way conversation goes on between the user and the computer.

interface: A piece of hardware or software used to connect two devices (computers and peripherals) that cannot be directly hooked together.

interpreter: A computer program which translates a single line of a high-level language at a time for the computer. Interpreters are more convenient but less efficient than compilers.

iteration: A series of steps in a program that is repeated until a condition is satisfied. (Also called a loop).

line printer: A type of high-speed computer printer that prints an entire line at a time (instead of a character at a time).

load: To put data and/or programs into a computer.

location: A single specific place within computer memory where a piece of data is stored. A location is usually identified by a number (known as an address).

LSI: Large-scale integration. A single integrated circuit which has more than 100,000 circuits on it.

machine language: The "native language" of a computer; those fundamental instructions the machine is capable of recognizing and executing. The instructions are represented by binary code (1s and 0s).

memory: Circuitry and devices that hold the binary 1s and 0s the computer can access. Examples are main memory (integrated circuits), floppy disks, cassette tape, etc.

microprocessor: The central processing unit of a computer (usually in a single integrated circuit) that holds all the elements for manipulating data and performing arithmetic calculations.

MIS: Management information system. The use of a computer for providing information useful to managers (such as inventories, sales, accounts payable and receivable, etc.).

modem: Short for MOdulator/DEModulator. An electronic device that allows computer equipment to send and receive information through telephone lines. There are two major types: direct-connect modems and acoustic couplers. Direct-connect modems usually plug directly into a telephone wall jack; acoustic couplers use the telephone handset for sending and receiving information.

network: An interconnected system of computers and/or terminals. The components do not have to be physically close to one another and are often connected by telephone lines.

node: A station on a network. A node can be a computer or terminal.

operating system: "Traffic cop" software that oversees the overall operation of a computer system.

Pascal: A high-level programming language named after the seventeenth-century French mathematician Blaise Pascal.

peripherals: Equipment (usually hardware) that is external to the computer itself. The most common peripherals used with popular computers are disk drives, printers, and cassette-tape recorders.

printer: An output device that produces hard copy.

printout: Hard copy produced by a printer.

program: (1) A set of instructions that tell a computer to do something. (2) To prepare the set of instructions.

RAM: Random-access memory. The main type of memory used in a small computer. The time required for the computer to find one piece of information in RAM is essentially the same no matter where the information is stored. Also known as read/write memory because data in RAM can be easily changed.

ROM: Read-only memory. Memory where information is permanently stored and cannot be altered. This form of memory is also random-access.

RS-232C: A technical specification published by the Electronic Industries Association which specifies one way in which a computer communicates with a peripheral (such as a modem or terminal).

service contract: A repair contract. Computer failure insurance.

software: Programs or segments of programs. The term was coined to contrast with hardware—the actual mechanics and circuitry of a computer.

software house: A company that writes programs or customizes programs specifically to the needs of an individual customer.

system: An organized collection of hardware and software that works together.

system software: General-purpose programs that allow programmers to write or modify applications programs. BASIC may be considered part of the system software; so is the computer's operating system.

telecommunication: Transmission of data between a computer and another computer or terminal in a different location. It can be done with phone lines, satellites, radio waves, optical fibers, or other means.

terminal: A piece of equipment with a keyboard for input and an output device such as a CRT or printer. A terminal is used to communicate with the computer.

timesharing: A process whereby the facilities of a single (usually large) computer are shared by a number of users. Timesharing requires large amounts of memory and special software to make it appear that each user has the whole computer to himself.

track: A section of a disk or tape.

turnkey system: A computer system in which all the hardware and software has been installed. Theoretically, all you have to do is turn it on.

volatile memory: Hardware which requires continuous electrical power to keep from losing information. Most RAM is volatile; ROM is not.

word: A group of characters or data that occupies one location in the computer's memory.

word processing: The entry, manipulation, editing, and storage of text using a computer.

THE FUTURE IN ON-FARM COMPUTING: 1983 AND BEYOND*

by
Earl I. Fuller
University of Minnesota

Next year will be 1984, once proclaimed to be the time when we become

the captives of a controlled society. Meanwhile, other writers have declared

that we live in an "information age" or in the time of a "post industrial

revolution". Some, speaking more simply, say we are seeing a "computer

revolution" where the economics of low investment cost, powerful capability,

easy access and available software are impacting every aspect of our daily

lives.

Certainly something is going on. But then something always has! Change

is normal. It's stability that isn't. But without change, life--and more

specifically farm management--would be dull and without challenge. American

farming has changed a lot in the last 50 years. Why would anyone expect that

it won't in the next 50? Historical parallels can help us understand change

in our lives; in this case the tractorization investment decisions of farming

50 years ago compares to the computerization ones of today.

A Historical Perspective

By 1933 row crop tractors had been around for a good 5 years. But the

majority of the farmers didn't own one; a depression was delaying purchase.

Horse breed association people were concerned, though horses were still the

major "mechanical power" source beyond the family's own strength to operate

the farm. Farmers where faced with when and whether to buy a tractor.

In 1983 microcomputers have been on farms a good 5 years. The majority have not yet decided to buy one; a recession is delaying purchase. Farm cooperatives are trying to find a way to be helpful as are many others who supply advisory services to farm managers.

In 1933 steam tractors had a 30 year history behind them. By 1983 farm management applications of computers also has a 30 year history tracing to Fred Waugh of the USDA. First, in batch (stationary) mode where the data (material) was taken to the machine not unlike old time threshing. Since about 1968 farm managers have "custom hired" time share computing to evaluate alternatives and otherwise aid in the decision process. High plains feedlots have kept lot records and used computerized control system procedures for at least 15 years.

Systems Reclassified and Computerized

Farmers knew then and know now that it takes more than a fancy power unit to get a task done. It takes tools that harness the use of that power--whether it is tillage or software. It takes management too; decisions about when to use, how to fix, how to adjust, measure, hook up, etc. Together the elements make a system; a mechanized farming or a computerized farming system.

Systems thinking in mechanized farming hadn't come very far by 1933 compared to where it is today. Cultivators took a long time to attach to the tractor they were designed for and often couldn't be adapted to any other. Most implements were still horse drawn designs with the adjusting levers lengthened and turned forward. Hydraulic controls, electronic sensors and "ergonomically" grouped controls or designed operator work spaces were at best only dreams.

Implement companies sold bright red, green, yellow and orange models as they attempted to lock the buyer into their color line. The little grey one with its "farming system" and today's defacto standard 3-point hitch hadn't

appeared. The talk of a "systems approach" to mechanization which it later
illustrated was not yet common.

Farmers viewed the choices about how to compare tractors as confusing.
Many saw at least one job where a tractor had strong merit. But few thought
they could replace the older way—the horse. Few were yet ready to risk taking
a mechanized farming approach to the way crops were grown. There were
drawbacks; mechanical reliability, new skills needed, acceptance in the
community and many others.

Life in 1983 has its parallels. Many see at least one task a computer
system could help do. Few have spent the time necessary to take a computerized
systems approach to the costs and benefits of a greater formalization of the
farm's management information and activity control systems. There are still
drawbacks. Some, but not all, are ready to risk the first steps of adoption
of computing power to the set of tools used in managing the business.

Five years ago a farmer had few choices in software tools to "harness" a
microcomputer. Most were adaptations of an earlier generation of time share
(horse drawn? steam powered?) tools; or one could build his own tools. Many
more specifically designed and user friendly (egronomically sound) software
packages can be found today to do many decision aiding management tasks.
Some vendors today offer rather complete lines of software which do work
together as a system.

Progress is observable in making farm software work into a system. Several
work from the same data base for more than one type of use. A greater degree
of software transferability is also noted. More applications are being written
in fairly standard language dialects and know-how now eases their transfer even
when the floppy disks are not interchangeable. (Remember the early power lifts
and P.T.O. linkages weren't very interchangeable either without adapters.)

In short, there are many parallels between considerations today's managers need to recognize in deciding when and how to move into computerized farming and those our parents or grandparents faced in mechanizing 50 years ago. How did they do it?

Take A Systems Approach To The Decision

Most of them did not take a systems approach, but we should. We should do a management audit. A systems approach makes sense. Before computerizing is a good time to review the family's and the management team's objectives and goals. Why do you farm? How do you weight income and/or growth in both psychic and dollar terms? How important is feeling in control and/or making life simpler? How action oriented are you? Are you action oriented, i.e. how do you like to spend time -- thinking, planning, directing or doing? Are communications between people in your business and/or with your vendors (creditors) a problem? Where do you see you and your farm to be 5 years from now?

No matter what your answers to these questions, there are alternatives besides joining the computer era just yet to deal with them and to reach your goals. Goals change just as the feasibility of computerizing as an aid to attaining them will.

What Others Are Doing About Computerization

In today's setting, the majority of farmer-purchasers have as a first objective the creation of a historical data base of some type of records. For some it is financial records; for most of the rest it is physical enterprise records. In both instances the interest is often on day to day control of operations rather than the more strategic issues of a longer run.

But for those who start one, even before the record system is complete other potential uses are often seen. Many are workable with "off-the-shelf"

software. Thus a standard recommendation for most purchasers holds for farmers too. <u>Acquire a data base manager, an electronic worksheet, personal word processing, and a hardware-software communications package the day you buy the hardware.</u>

Simple application installations are justified. Many are paying their way; but the potential is much greater. A systems approach similar to what happened in farm mechanization is the way to go.

The major cost to get there is time not hardware and software. It is management type time, either your own or that of consultant's doing a "systems analysis" for you. In the latter case, you may pay for it by buying software, but it's really all the thought and care in making it work in your operation that runs up the cost.

Software developments further improve and integrate the component applications each year. A systems approach is making the computer a productive tool to aid in controlling and planning the farm business. (Fuller, 1 and 2).

To make it happen smoothly requires an understanding of control modeling with its use of "cybernetic loops" and "management by exception" rules. The idea that data contains "noise" and at best can only be structured so as to increase its "potential information content" is essential. The principles of the management sciences are sound. Economic marginality, risky decision approaches, present value, etc., as opposed to "cost of production" and "factors affecting profits" to name a few. (Fuller, 3 and 4).

These ideas are necessary if progress is to be made. They are crucial to solving the riddle of how to relate the felt need and many applications to the firm's data base and other data. Without them, data of little or no value (noise) will obscure the crucial elements necessary to decision making. Progress is being made in this work on farms by software vendors and in the

land grant universities. What one is doing is increasing the formalization of the firm's management information systems.

At this point a note of caution is in order. Even after start up, most people will say that the computer is not saving them time. Keying in data takes about as long as recording it any other way. Most people are now recording more data and taking more time to analyze it than they used to. Within 5 years more electronic sensed semi and fully automated data collection devices will be involved. They will cut the time to use the system.

For now, it means less time for other activity, often the action oriented activity of running the farm. Computing is often a productive use of limited time. But the caution should be noted. So should a caution that unless the time is committed to computing the investment will not have a high probability of paying out.

Farm Computing In The Years Ahead

To this point, this paper has drawn some parallels with mechanization to better understand where farming is today with computerization. More parallels are observable, but seem unnecessary in this context. Then a brief description of the current situation was offered. It is now appropriate to look ahead 5 to 10 years.

To look ahead means going beyond specific applications to a time of broader and better integrated control and planning systems. It means going from keeping, sorting and printing livestock records to computing as a component of livestock enterprise control systems with predictions of performance and monitor input use. It means using (a) decision aids, (b) data base managers, (c) time share accessed data base sources and (d) word processors in combination as the situation requires. It means cutting costs by substituting electronic

data sensing and recording devices whenever economic technology will allow.
It also means avoiding a data overload with its associated large noise factor.
Only a systematic analysis of objectives, problems, opportunities and a clear
distinction between information and data will do this.

The direction that farm financial management (FFM) is taking illustrates
many of these ideas. FFM once meant just the keeping of financial records to
many. Various groups did gather and use the data as a financial diagnostic
tool based on between-farm comparisons or farm business analysis. The state
of the art is now beyond that.

Some workers argue for uniformly specified accrual accounting procedures
which can produce standard financial statements (Frey). These are said to be
necessary to tell lenders where the business has been and is now. Perhaps so;
but from a FFM perspective, a forward looking perspective is also needed.

A set of computerized financial tools has been widely used and carefully
refined over the last 10 years. They will be operable on microcomputers
within a year. They work with most currently available record systems. But
the user has to review the data in the data base before each new projection.
Projections include measures of (1) profitability, (2) liquidity and (3) solvency
so as to be applicable to various sets of objectives concerning income, growth,
security or risk, as well as more personal factors. Financial and physical
sensitivity analysis is automatic.

The system deals with the "where am I?", "where do I want to be?", and
"how can I get there?" questions of planning (Thomas et.al., 5). One data base
drives all modules which are:

(1) FINAN - Financial analysis of a set of "standard" income statement,

balance sheet and prior year's sources and uses of funds.

(2) FINLRB - Financial long range budgeting - a projection and comparative

            evaluation of the existing plan and two alternative organizational

            plans 3 to 5 years ahead.

(3) FINTRAN - Transitional planning projections by quarters and/or years of the

            selected plan over 3 years.

(4) FINFLO - Monthly cash flow projections and their financial implications

            of the selected plan for the next year.

Much of the data used is physical or technical. Default data banks exist

to help one get started. They can be combined with projected planning prices

and the current financial condition as appropriate. The system also has the

ability to review actual performance with that previously planned. Sources of

error can be noted and sometimes reduced (Nordquist & Hawkins, 6).

This system, when integrated with an accounting record system for purposes

of tax records and controlling the cash flow, is a prototype of FFM system of the

future. It will be available and useful to lenders and borrowers alike. Its

use has already shown an ability to rationalize credit use, to put money where

it can be productive at reasonable risk. Further, it helps communications

between the management team and the lender. It encourages setting goals and

measures progress towards them. It helps control cash flow and the other

aspects of FFM.

Livestock record systems are evolving in the same direction. New

developments in data collection devices will speed development. Marketing

management and crop record applications show similar developments. It should

be interesting both to watch and to be a part of it. Perhaps in another 50

years our children will be drawing parallels between the computerization of

farms in the 1980's and some yet to be seen next major change in American

farming!

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USING THE DESKTOP COMPUTER IN FARM MANAGEMENT

AT THE UNIVERSITY OF MINNESOTA*

by
Earl I. Fuller

Developmental Activity

The Minnesota Agricultural Extension Service is installing desktop computers
in all offices over the next several years. These machines will serve as
both word and data processors. They will handle data base management operations
for mailing lists, 4-H enrollees, etc. They will do computer decision aid
analysis on a variety of topics. As time-share accessing terminals, they will
be able to retrieve data files maintained at the state level on a variety of
hardware configurations.

Staff in farm management have access to Vector 4's and IBM PC's
as MSDOS and CPM. An Apple II is used in the same way. All are used as dumb
and smart terminals into various timeshare systems. The Apple II, through
softcard, is also being tried under the CP/M operating system with microsoft
BASIC and FORTRAN as well. The accuracy and speed of these machines are being
developed. Software has been successfully transferred to a variety of machines.
A software tool system to speed development and assist in transfer between
machines is in use.

A variety of data base management packages, accounting packages, and electronics
worksheets have been tried. Several word processors have been tried as well.
Evaluation of these various purchased packages has not proceeded to a place
where strong recommendations of preference can be made. However, many of them
appear to be quite workable and, while each may have its strengths and weaknesses,
it does appear that there is a substantial amount of useable software available
which is applicable to many applications on farms and small businesses as well
as extension offices.

A substantial number of farm application programs have been developed or modified
from other sources. Most are computer decision aids, not the accounting and
DBMS software that are the major applications farm people see immediately for
desktops. They do enhance the capability of people to do sound planning once
the purchase has been made. Further, they are the type of programs which are
educationally and economically sound and useful from a decisionmaking standpoint.
An attempt has been made, for instance, to develop these programs to deal objec-
tively with risk and uncertainty. They also use gross margin concepts. They
do not calculate the average cost of production, nor do they require allocating
overhead, neither of which is useful from a decisionmaking standpoint. They
are consistent with the partial budget approach. Further, they tend to encourage
sensitivity analysis following the calculation of an initial answer.

Educational Materials Developed For Farmers
And Other Similar Size Businesses

Computers For Business, B.G. Crewdson, Department of Agricultural and Applied
    Economics, University of Minnesota.

DECAIDS - Catalog Of Computer Decision Aids, Robert Craven, et. al., Department
    of Agricultural and Applied Economics and Agricultural Extension Service,
    University of Minnesota, CDA 1, January 1981.

Farm Management DECAIDS - Fundamentals Of Their Development And Use, Earl I. Fuller,
    Department of Agricultural and Applied Economics, University of Minnesota.

Farm Oriented MINN-AIDS - Software For Small Computers Available Or Under Test And
    Development, Earl I. Fuller, Department of Agricultural and Applied Economics,
    University of Minnesota, CDA 60.0-60.5, revised March 1982.

Purchasing A Desktop Computer For Use In The Farm Business, Earl I. Fuller,
    Department of Agricultural and Applied Economics and Agricultural
    Extension Service, University of Minnesota, CDA 61, March 1982.

Using Generalized Data Base Management Software To Formalize The Control Of
    Ongoing Farm Operations, Earl I. Fuller, Department of Agricultural and
    Applied Economics, University of Minnesota, December 1980.

User documentation is internal for many of these programs; in others, docu-
mentation only exists in an earlier version for the IBM 5100--even though the
program is now operational on the Apple II or in microsoft under CP/M.

Release And Availability Conditions

You may request a list from Extension Farm Management staff, Agricultural
Extension Service and Department of Agricultural and Applied Economics,
University of Minnesota, St. Paul, Minnesota 55108.

The software packages listed here are developed or enhanced by workers in the
land grant system or elsewhere in the public sector. This means that they are
in the public domain. Such packages are usually released without guarantees
in their use or maintenance (the correction of errors). There are minimal
limitations on redistribution, but recipients are expected to share modifications
with the developers and may be asked to pay nominal fees to cover the direct
cost of distribution. ACCEPTANCE AND/OR USE OF THIS SOFTWARE CARRIES WITH IT AN
IMPLICIT AGREEMENT TO SHARE ANY MODIFICATIONS MADE WITH THE DEVELOPERS.

This list should not be considered exhaustive. Updates of this document will
be made. The University of Minnesota Extension Farm Management staff would
appreciate hearing from people who know of additional items which should be
listed here. Potential users may want to contact the land grant colleges and/or
Extension Services of other states as well.

MINN-AIDS Diskette For Apple II
DOS 3.3 (Applesoft)

Minnesota Ag Experiment Station and
Extension Service Software From
Extension Farm Management In
Agricultural and Applied Economics

100-199 General Problem Solvers

No.	File Name
1	TIME VALUE
2	DATECALC
3	SMALLP1
4	SMALLP2
5	MINNAIDS DOCUMENTATION*
6	RISKTREE
7	TRIPROB

200-299 Financial Planning & Analysis

No.	File Name
1	FARMBID
2	TIME VALUE
3	ACRS CALC
4	TAXPLAN

FINAN...Financial Analysis 6/82
WY-BASIC

Designed by University of Minnesota
Programmed by University of Wyoming

400-499 Crop Enterprise Related

No.	File Name
1	BESTCROP*
2	FARMBID*
3	FERTMIX
4	CROPROG 83*
5	GRAIN DRYSTORE*
6	STORE GRAIN BREAKEVEN
7	SET-UP
8	BUDGET WRITER
9	CASH COST
10	MARKET PACK I
11	FARM PLAN

500-599 General Livestock Tools

No.	File Name
1	BEEF BUY
2	DAIRY FORAGE
3	DAIRY GUIDE
4	DATECALC
5	FEED PIGS? *
6	FEED VALUE*
7	FEED IN SILO
8	HMCORN
9	NECGAIN*
10	PEARSON SQUARE*
11	STEER BIDS
12	STEER MKT INFO
13	SOWINDEX*

General Machinery & Buildings

No.	File Name
1	OWN OR HIRE?
2	MACHINE SIZE?
3	CUSTOM
4	ACRS CALC
5	RAFTER
6	STAIRS
7	TANK CALIBRATE
8	TRACTOR
9	RAFTER COMPTS
10	RESCUE

* Exists in a new enhanced
  version since its initial
  release.

The user should also note that in some instances private domain software performing comparable functions also exist. These are usually sold subject to contractual limitations concerning performance and disallowing further release to other parties (or CPU's).

Packages available in Applesoft may be obtained by sending disc(s) with your name and address on them (to assure return) to Extension Farm Management, Room 249 Classroom Office Building, University of Minnesota, St. Paul, Minnesota 55108. Compiled MICRO-soft versions will be available through the Extension Bulletin Room as they are converted to the IBM dialect.

Steps To Take In Considering Purchase
Of An On-Farm Computer

DO YOUR HOMEWORK

What Are Your Management Goals?

How Or Can A Computer Help Attain Them?

Count The Costs--Especially Your Time

Consider The Alternatives: Do By Hand
    And Hire Others To Do

KNOW WHAT FARMERS ARE DOING WITH THEM

    Accounts And Cash Flow

    Payroll And Inventory

    Swine And Dairy Control Systems

    Crop And Machinery Records

    Farm Financial Planning Control

    Market Management

KNOW THE NEEDED DESKTOP FEATURES
FOR FARM USE

At Least 64K Memory

Two Disk Drives

A Printer, 132 Characters/Line

An 80 x 24 Screen (CRT) Preferred

Communications (Over Phone Lines)

A "Standard" System: S-100 Bus-CP/M
-MSDOS

KNOW WHAT SOFTWARE IS AVAILABLE

Accounting Systems

Specialized Farm Software

Data Base Management

Electronic Worksheets - Cash
Flow Calculator

Word Processors For Farms!

Download/Upload Communications

Payroll

INVESTIGATE THE KEY USE THOROUGHLY

Day-To-Day Control Of_____?

How To Capture Information And Filter
Out Noise From The Data

What Are The Benefits And The Costs?

CONSIDER OTHER USES SUCH AS
MARKETING MANAGEMENT

Charting - Technical Analysis

Fundamental Analysis

Market Data Retrieval

Outlook Retrieval

UNDERSTAND IMPERATIVES FOR PRODUCTIVE USE

Spend The Time To Set Up

Spend The Time To Use

Key Data In Regularly

Back-Up Files

Use The Analysis To Manage

Be Familiar With System

Maintain Software And Data

CONSIDER THE SIDE BENEFITS OF OWNERSHIP

Family Recreation

Education

Personal Record Maintenance

Home-Side Economics

Hobby Use

THE COMPUTER & FARM MARKETING MANAGEMENT

by
Earl I. Fuller
University of Minnesota

I. First and foremost, one needs a farm marketing plan to even call it
marketing management, presumably after the "What to Produce?," "How
to Produce?," and "How Much to Produce?" plan has been roughed out.

II. A marketing plan is a plan that:

   a. Is a risk management plan.

      Deals objectively with risk & profits trade offs.

      Allows both you and yours, plus your creditors, to "rest easy" in
an uncertain world.

      Requires thinking in terms of odds and probabilities.

   b. It includes analysis of:

      Storage and delivery options and economics.

      Nearby and time patterns to basis: knowledge and odds that it will pay to store?

      Spreads between futures contracts.

   c. Data on price levels and supply and demand fundamentals:

      Trends--more use in "What to Produce?"

      Cycles--still mostly "What to Produce?"

      Seasonality--of primary use in marketing management.

         Supply fundamentals--stocks, movement, production.

         Demand fundamentals--consumer disposable income, competing supplies.

         Be your own analyst--balance sheets, etc.

   d. Requires:

      Setting reasonable pricing objectives, such as, pricing production
at $\underline{x}\%$ over the seasonal average price.

      Balancing profitability and liquidity.

III. Data and analysis of use:

   a. Monitoring market activity data.

         Data types.

         Balance sheet projection.

Rates of use.

Intentions to farrow, feed, plant, cull, etc.

State of the national economy.

Developing a marketing plan as a system.

Requires access to data from a variety of off-farm sources..

b. Requires optimistic, most likely, and pessimistic projections of market conditions.

c. Requires projection of their on-farm impacts on gross margins and cash flows.

IV. The "Bottom Line."

Market projections, goals (price and otherwise), risk attitudes, and financial conditions must all be considered in developing a market plan.

V. Some definitional foundations to marketing management.

a. At any given moment:

To the degree you are priced, you are a hedger.

To the degree you aren't, you are speculating.

A mixed position is usually consistent with a reasonable risk management plan.

b. Two kinds of errors you can make:

Pricing before you should have.

Delaying pricing when you shouldn't.

c. The costs--consequences of each kind can be very different in terms of survival and profitability.

d. Plans are of little use unless they are either carried out and/or revised as new (fundamental) data suggests it.

e. Following the plan is tactical management.

VI. What can a computer assist with in marketing management?

a. Projecting cash needs flow.

b. Accessing fundamental market data.

c. Analyzing the impacts of risk management strategies.

d. Monitoring on-farm inventory or stock levels.

e. A computer can help (providing you use it):

Acquire market activity data.

Analyze it technically.

For price movement.

For open interest and volume.

Do charting.

Compute pricing (buy/sell) signals.

Help select the day or scale-up conditions upon which to act (price) and/or deliver.

f. Comments:

A computer won't provide you with a marketing plan.

A computer won't help if you don't put data in it.

A computer won't help if you don't use it to analyze.

A computer will take more time to manage your marketing--not less!

A computer encourages marketing discipline.

A computer can take the "noise" out of the data; "enhance its potential informational content."

A computer helps reduce some uncertain situations to risky ones with a clearer perception of the odds involved and potential error costs.

VII. Other kinds of computer software to consider:

a. General purpose

Word processing

Data base management

Electronic spread sheet

Communication to access public/private data base concerning market, weather, and policy activity.

b. Gross margins computer decisions aids--to calculate the worth of acting versus not acting as given current conditions.

c. Risk analysis calculators--to project the odds of various pay offs and their consequences.

d. Storage costs, drying costs, and deliver cost calculators to calculate the added gross margin potential of changing the form, place, and time utility of the product.

e. Farm financial planning systems to project profitability liquidity
    and solvency of alternative farming systems.

f. Sort accounts into cost centers and gross margin profit centers.

g. Basis calculators to determine alternative patterns and the odds
    thereof.

h. Computerized charters for daily description.

i. Mechanical pricing calculators--to assist with the decisions of what
    day to (tactically) price, given the overall strategic marketing plan.

j. Futures account status--to assist with tax reporting and broken
    communications.

PURCHASING A DESKTOP COMPUTER

FOR USE IN THE FARM BUSINESS

by

Earl I. Fuller

Below are suggestions concerning factors to consider if you are thinking about purchasing a small computer to help you manage your farm business. There is no simple prescription for making such a purchase; the "state of the art" does not allow it. Still, the ideas herein should help you in making such a purchase.

WHAT ARE YOUR BUSINESS OBJECTIVES?

The place to begin any investment analysis in any kind of business is with some kind of re-examination of what your objectives are—first as a business and then as a business investor. A computer system is no exception.

Are you trying to increase profits? Are you trying to cut costs? Are you trying to make life easier for yourself in terms of keeping track of things? Are you trying to combine the purchase with some other uses, such as enhancing the skills and education of yourself and others (family members) in this computer age? Likely, your answer is some combination of the above. The weight you put on the various component parts of these objectives or any others you might have in mind should influence your decision. The more thought put into dealing with such questions, the easier it will be to judge alternative systems and to get what you want in the way of both software and hardware.

Other considerations include knowing yourself and your co-workers. Do you like to tinker with things? Do you like to solve crossword puzzles? Or, are you a "lets get the job done and the show on the road" and a "seat of the pants decisionmaker" kind of manager? Is going through an involved process of finding and correcting bugs in such tasks as tuning engines or computer programming something you enjoy doing, or does it annoy you a great deal?

Further, with the capability of software with direct application to your farm available today, are you confident in your own mind that purchasing and installing a computer in your operation will not cost more than it will benefit you? Costs include your time and that of your co-workers as you go through the process of learning how to use this machine.

Benefits are not all in dollars and cents—some of them may occur in terms of personal satisfaction and pride in a job accomplished. (Or, to be perfectly frank, in being the first person in the neighborhood to have one!) Still, if the cash flow will not stand the purchase or if competitive needs for cash offer greater promise in payoff, then maybe a computer still isn't for you—even if you would like to have one. There are other devices which could help control the farm business and which cost less. They include programmable calculators[1], perhaps breeding wheels for swine or dairy herds, or various kinds of farm record books for cash flow and other farm accounting functions.

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[1] Programmable calculators, while having the advantage of portability for people who find it inconvenient to do their computing in an office, have some disadvantages: (1) lack of prompting on input, (2) capacity, (3) file maintenance problems and (4) lack of detail on hard copy output.

Small computers are not likely to save labor or management time on a farm. For the most part, the people involved are likely to be as busy as ever. What is likely to happen is that the day-to-day managerial control of on-going business operations will likely improve. There may be some easing of drudgery in terms of working with basic data and in seeing that the basic data is somehow recorded and retained for further use. But, with the current state of the art, the entry of that basic data into a computer is still likely to be somewhat of a chore. If a person dislikes recording numbers on worksheets, cards or record books, he is not likely to find that keying them into a computer is any more interesting.

Some Potential Applications

The potentials in application are varied. Yet, the central theme of controlling on-going business operations seems to be in most people's minds. This means that the component parts should be viewed as moving towards the development of a management information system for that firm. It means that the controlling systems, be they resource control systems such as improving machinery maintenance or enterprise control systems such as improving the reproductive performance of a swine or dairy herd, should be viewed as being components to an eventually more formalized management information system.

Software systems should be viewed as being components of the control and/or information systems. They should be developed (or purchased) with linkages which have been carefully thought through so that the pieces will add up to something greater than the sum of the parts in terms of the creation of an information system.

Below is a list of some of the kinds of software systems or applications a farmer-purchaser of a small computer might want to consider.

- Financial accounting systems

- Payroll records by employee

- Data base management systems for data storage and retrieval such as:

  Enterprise control systems for swine, dairy or irrigation operations

  File index of material retained in a traditional filing system

  Memorandum accounts and files, including field or crop histories, livestock records, etc.

  Inventory status with physical units and value

- Electronic worksheet calculations such as:

  Cash flow with periodic balances and projections

  Arithmetic calculations of engineering formulas, ration balancers, etc.

- Forward planning decision aids--both partial and complete farm budgets

- Project or task control, such as critical path method (CPM) or program evaluation review techniques (PERT)

- Buy-sell signals and price basis calculators with graphic capabilities

New hardware components come on the market almost daily. Yet, certain guide-
lines appear valid for farm business use. To begin with, in the judgement of
the author, a minimal investment in a personal computer--while it might get the
first job that you have in mind done--will soon become inadequate in terms of
your perceptions as to what you could use the computer for within most farm
businesses.

Processor and Random Access Memory (RAM)

A processor memory size of 64K should be adequate for most applications. Speed
within the processor, while a good talking point by various small computer vendors,
is not a great concern for most applications. If a lot of sorting needs to be done,
slower memory chips will become annoying after a while; yet, the rate and power of
even the minimal specifications on these chips is far in excess of what people are
now trying to do by hand.

New chips are becoming available all the time. It is nice to have a system
where all chips can be replaced along with the boards. Further, the "mother
board" should have room for additional chips and peripheral equipment if one
needs to expand capacity. S-100 bus specification compatibility offers some
standardization between machines.

Read Only Memory (ROM)

Read only memory offers a place to locate the fundamental operating system
compilers, interpreters, etc., which really operate the computer. It is a
lot handier to have operating software in ROM than it is to have to read them
in each time from a disk. But, sometimes it is less flexible and less adaptable
to new systems as they come along. PROM, or programmable read only memory, is
becoming more and more common to allow updating.

Keyboard and Screen

The bigger the display area on the screen, the better in many respects. Some
are as narrow as 40 characters; others are 80 or even 132 characters wide. A
normal page (72 to 80 characters) width is recommended. Regular computer
monitors are much clearer and display more characters than do TV screens. Some
are easier on the eyes than others. A screen adjustable for distance from the
viewer and one that tilts is preferred. Green or amber is preferred to white.

Some display as few as 8 lines at a time; others as many as 60. As a general
thing, the more the better. A display of 24 lines is minimal for general appli-
cations. The display should show a complete "menu" of options or instructions
when inputting and operating any system one is using.

A separate keyboard is also a very nice feature.

If any software needs to be written, then good (text) editing capability is worth the extra cost involved. The ability to quickly and easily move the cursor location (input location) and to insert or delete characters as changes are made without retyping a whole line is most useful. So are "macro's" of key words which cay be keyed in with a single key stroke.

A number of software systems are becoming available to do word processing (i.e. letter and manuscript editing on a small computer). This type of activity makes a good editing capability even more important.

Reliable Floppy Disk Drives

A minimum of two reliable floppy disk drives are needed in most business installations. As a general thing, the program and operation system will be loaded on one drive. The other would then be used to input and/or output data files. (Most farm applications will include either farm accounting, inventory or other control of operation systems which need several data files to run.) In addition, a "backup file system"--even if you do have quite reliable disk drives--is necessary considering people'e propensity to destroy files through error. A two disk drive system makes backup easy to do . You will need double copies of virtually everything you record on these media.

If substantial file capacity is needed, small fixed or hard disk drives are available. Double density drives increase storage capacity and are a great convenience. Hard disk drives are faster than floppy drives. They also are convenient and fast. They store much more data per disk. The backup problem remains. Floppy disks' rate of reading and writing, while not fast by large computer standards, will likely be adequate. If your application has to read and write these disks every day, six or seven days a week; even they, because of wear, may be inadequate storage media. However, in most farm applications, this probably will not be a problem with proper equipment management.

Printer Features To Consider

Unless one intends to do high quality word processing, matrix type printers are satisfactory. They are faster than letter quality ones, and they also tend to have less maintenance problems. They are usually less costly. If plans call for accounting type sheets as part of controlling operations, then a printer is a necessity.

Accounting type applicaitons and mailing list labels should be done on printers which have traction paper feed systems and which use the perforated edge computer type paper.

Hardware In Summary

The farmer-businessman should seriously consider the following:

- Two 5¼" (or 3"?) floppy disc drives (one for programs, the other for data)

- A screen which will display 80 columns wide by 24 lines high, and with good editing capability.

- A hard copy printer-traction-feed is a minimum for many applications.

- A minimum of 64K of user accessible memory with at least 8 bit bytes. (It appears that much of the industry is moving to a 16 bit byte.)

- An easy to use and relatively standard disc operating system like CP/M, MSDOS, or UNIX, along with a BASIC interpreter.

Such a system will probably go beyond the need for current computing plans; however, one will grow into it in time. Hardware cost for such a system tends to run from $2,000 to $5,000.

SOFTWARE AND ITS AVAILABILITY

Every system has to have a disc operating system (DOS) package. Some operating systems are imbedded in ROM (Memory). Others operating by being read in from discs when the system is started up. If the system has the later capabilities, operating systems can be changed in order to change the languages the system uses, or to adjust to new configurations. When one is read in each time, the system should automatically take care of any additional operating steps involved.

Some attempts are being made to standardize operating systems, at least by particular kinds of memory chips. The greater the standardization, the greater the flexibility of the system. With standardization comes the opportunity to purchase software which can be transferred to your system easily. If a standard exists, it is among the three mentioned here.

The desktop computer magazines advertise a wide variety of vendors with software packages of various kinds for sale. However, indications are that documentation is often not very complete on many of these packages. Little exists to illustrate how to use the available general purpose packages for farm applications.

At this time, one can consider one of four routes in purchasing software. One would be to buy software written in BASIC or some other user-oriented language, with the expectation that it will need to be modified in order to be acceptable for one's particular use. In the process, it may be advisable to buy two or three similar packages and plan to spend time to determine which seem to be the most appropriate. This option would include buying (1) accounting, (2) data base management, and (3) electronic worksheet packages designed for general application.

Another alternative would be to purchase at least some farm application software packages which are sold on the basis of being guaranteed to be up and running within a specified period of time with full documentation on your system. This could mean paying more for the software, but buying the services of someone (the vendor) who would install it, check it out and instruct you as to how to use it.

Many people should consider a third option, the purchase of so-called turn-key installation. A turnkey installation includes both the computer hardware and software or program that will do the specific tasks that the purchaser has in mind at the time of the purchase.

The fourth option is to hire a "software house" or an individual to do a "systems analysis" of your problem and then develop a package to fit. You should do your homework carefully with this option. Specify your objectives carefully. Outline the input needed and output desired before you involve a systems analyst. This is usually a costly option; it is best delayed until after others are at least tried. Few farm people are selecting this option.

Even so, in most instances, one will want to do additional programming on their own or with the help of local people. In Minnesota, many people know how to program in the BASIC language. The availability of a good BASIC is an additional consideration worth checking out. MINN-AIDS includes some tools to speed the tasks of input and output development.

Developing Software Packages

As indicated at the beginning of this paper, specifying the tasks that need to be done with considerable care is the first step in developing useful software packages. This means that one should first outline and set down on paper his objectives in developing software. What is the package really supposed to do? What questions is it supposed to provide answers for? In other words, define the computer task which is to be done, then develop steps in the computing task. Specify the steps to be done and the order in which they are to be done. Make a pictorial representation of these steps. In systems analysis work this is known as a flow diagram. The various computing magazines provide illustrated examples.

The next step is to lay out on paper what the output is supposed to look like. Do this as pages of material just as you would like to have them displayed on a screen or printed on a page. Next lay out the input needed in order, just as the input questions should be asked of the user of the system. Once this is done, the remaining task of specifying the arithmetic and logic required to get from input to output should not be too difficult. Once these tasks are done, then someone who understands the system and understands the BASIC language should be able to proceed with the actual development of the program.

Encourage the programmer to use a "structured approach". This means to record a dictionary of all variables used. It also means to write in self-contained units: controlling unit, input unit, calculations unit, file handling unit and a results unit. Structuring helps in debugging and modifying the program.

Once the program is moving along in development, one should begin to ask himself what will happen under various circumstances of erroneous input or other situations which might lead to errors in the analysis. What if one put in decimal fractions rather than percents, for instance? What if one entered a zero for a crucial number which was needed for division? Undoubtedly, some elaboration of the system would be in order to insure that such situations do not stop the analysis completely, but would rather lead to a condition whereby the user would be permitted to modify the input in order to obtain the answer desired.

Encourage programmers to use "tricks" like having the computer count the lines in an input file (check for end-of-file) rather than having the operator instruct the computer for the number that is supposed to be there.

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Fuller, Earl, _Using Generalized Data Base Management Software To Formalize The Control Of Ongoing Farm Operations_, Department of Agricultural and and Applied Economics, University of Minnesota, December 1980.

Freiberg, Charles, "A Small Business Computer Directory," _On Computing_, Spring 1980.

Magruder, Bob and Dave Barstow, "Buying A Small Business Computer: An Introduction," _On Computing_, Spring 1980.

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TERMINAL:  324, P 20/TTY
PF STORAGE EXCEEDS LIMIT.
 ALL USERS SEE WRITEUP(NOTE) (3/12).
 ALL USERS, SEE WRITEUP(NOTE) (3/7).
RECOVER /SYSTEM: -DECAID

 PROGRAM NAME (CR=STOP/HELP)     ? HELP

            PERMANENT            PROGRAMS
             PROGRAMS            IN TESTING
            ----------           ----------
             BCOW                 COMPUTE
             BESCROP              ENVLIST
             BUYLAND              FACILTY


             FBEEF                IRRCOST
             FINAN                MINNLP
             FINFLO               PVBUDGT
             FINLRB               SHERD
             FINTRAN
             FIN
             FINPACK
             FINISM
             MACHINE
             OUTLOOK
             PIGFIN
             TAXMGT
             WTGROW

For information more detail than the 'HELP' feature provides
       write : COMPUTER INFO
               249 Classroom Office Building
               University of Minnesota
               St. Paul, MN     55108
       or call : (612) 373-1145

 FOR FURTHER DESCRIPTION TYPE THE PROGRAM NAME
 (ALL=COMPLETE LIST OF PROGRAM DESCRIPTIONS; CR=DONE)       ? ALL
```

BCOW   A program designed for projecting returns from a beef cow herd under different management strategies, efficiency levels, cattle prices and production costs. Given feed requirements, other input costs and expected cattle prices, it permits the user to to look at what his return to labor and facilities will be under different feeder prices, weaning weights and calf crop percentages. It also shows how after-tax returns would vary given different income tax brakets and cow replacement rates.

BESCROP   This program provides an equal return yield and price analysis between two, or with successive analyses, several alternative cropping choices based on the expected yield and price for each and the difference in direct cash flow expense. "Direct cash flow expense" is sometimes termed the directly associated cash cost escapable, if production does not occur. The analysis assumes that other resources required for crop production are not more limiting for one crop than they are for another.

BUYLAND   This program is designed to help potential buyers and sellers to establish a relevant range of expected bid prices for a particular farm and to help people understand the relative importance of the many factors which affect land prices. The program also projects cash flows expected with any partucular set of income, financing and tax circumstances.

FBEEF   Given current feed and feeder cattle prices along with expected future slaughter cattle prices the FBEEF decision aid permits the user to look at projected returns to labor and facilities under various cattle and grain prices. It shows what selling prices would be required to cover all costs including the desired return to labor and facilities.

FIN   This program is designed for the Teletype 43 to allow you to run FINAN, FINTRAN, FINFLO,and FINLRB and set paged output.

FINPACK   This program is designed to run FINAN, FINTRAN, FINFLO and FINLRB with terminals that accept <CTRL> L as a form feed (for paged output). These include the Televideo (with printer) and the TI 82

FINIBM   This program allows you to run FINAN, FINLRB, FINTRAN and FINFLO using the IBM-PC as a terminal and set paged output.

FINAN   A computerized procedure for analysing the past performance of your farm business. Before looking into the future, it is important to ask yourself "Where am I now?" FINAN1 will help you answer this question by analysing last year operations in terms of profitability, liquidity, solvency and efficiency. Version 3.0 is the current version.

FINTRAN   A computerized procedure for projecting quarterly and annual cash flows for a three year period. It allows the farm manager to take an in-depth look at his farm business over the next three years, detailing the physical and financial aspects of his plans with the overall objective of determining whether cash will be available when needed. Version 3.1 is the current version (2/10/84).

FINFLO   A computerized procedure for projecting monthly, bimonthly or quarterly farm cash flows. It allows the farm manager to take an in-depth look at his farm business over the next twelve months, detailing the physical and financial aspects of his plans with the overall objective of determining whether cash will be available when needed. Version 3.1 is the current version. It is also compatible with the 3.0 input forms.

FINLRB   A computerized procedure for comparing the profitability and debt payback charateristics of two alternative long-range plans with a continuation of your current plan. Alternative plans can involve new enterprises, different sizes or combinations of current enterprises, or changes in efficiency. Version 3.0 is the current version.

MACHINE   This program is designed to estimate farm machinery costs in the accomplishment of some function, such as plowing, discing, combining, etc. The program calculates the per hour costs associated with owning (fixed) and operating (variable) a tractor or power unit such as a combine. An operator and implement or header can also be included with the tractor or power unit to estimate the costs associated with operating the selected set of machinery on a per hour and per acre basis.

OUTLOOK   A program designed to provide an information source. It provides suggested planning prices for crops and livestock, recent USDA reports, and commentaries on the USDA reports by Extension Economists at the University of Minnesota.

PIGFIN   Given current feed and feeder pig prices and expected future slaughter prices the PIGFIN decision aid projects returns to labor and facilities over a range of hog and grain prices.

TAXMGT   This program is designed to help you estimate your taxes due in the current and immediately following year. It then evaluates various tax strategies--income and expense shifting, depreciable asset purchases and Federal income averaging--to aid you in making year-end tax management decisions.

WTGROW   A program designed to make available the complete 'What To Grow' budgets. It will determine the soil areas in your county, list the budgets available in the soil area you choose and will allow you to print the budgets of your choice.

COMPUTE   Environmental data can be used in simple statistical models to
            project agronomic and energy related conditions, such as season-
            al water budgets; crop and insect development rates; crop water
            use and irrigation scheduling; germination rates of planted seed;
            harvest drying conditions; and heating and cooling degree days
            for estimating power usage. COMPUTE is designed for making such
            projections by utilizing the environmental data which is stored
            in the University computer.

ENVLIST   The University of Minnesota Ag Extension Service, in conjunction
            with the National Weather Service, maintains and updates a comput-
            er data base, consisting of climatic information from around the
            state. A network of 41 climate stations record daily weather dur-
            ing the year. This information is updated weekly during the grow-
            ing season, monthly during other times of the year. The types of
            atmospheric variables recorded vary from location to location, but
            consist of anything from temperatures, to precipitation, to solar
            radiation and more. ENVLIST allows quick and simple retrieval of
            this information for use in making weather related assessments.

FACILTY   This is a computer based data retrieval system which provides
            estimates of investment costs and labor requirements for alter-
            native livestock facility systems. Currently, only files for
            the dairy enterprise are available.

IRRCOST   Irrigation Cost Estimator--
            For Serious Inquiries Contact: Vern Eidman
                                           218 Classroom Office Building
                                           University of Minnesota
                                           St. Paul, MN   55108

MINNLP   A linear program that chooses the optimal plan (profit max or cos
            min) from a number of different activities and resource constrain
            The output is divided into four sections which are 1) activities
            solution, 2) constraining resources, 3) activities not in solutio
            and 4) non-constraining resources. Output includes prices and re-
            source stability information.

PVBUDGT   A net present value partial budgeting program. This program
            adds a time dimension to the partial budgeting of investment
            projects. Is is used to compare both the profitability and
            cash flow effects of one or more alternative investments one
            might make. Alternative investments often have different time
            characteristics. Some are more risky than others. Some assests
            wear too sooner than others. PVBUDGT takes such time characteris-
            tics into account.

SHERD   Given feed requirements, prices and performance information,
            SHERD is able to give an itemized analysis of the feeder pig
            operation. This program has two aims. The first is to show where
            the sow herd is falling short in production efficiency, and the
            second is to project return and profitability as factors change.
            NOTE: SHERD was programed at New Ulm Sr. High School and is not
            a product of the University of Minnesota.

FOR FURTHER DESCRIPTION TYPE THE PROGRAM NAME
(ALL=COMPLETE LIST OF PROGRAM DESCRIPTIONS; CR=DONE)   ? OUTLOOK

OUTLOOK   A program designed to provide an information source. It provides
           suggested planning prices for crops and livestock, recent USDA
           reports, and commentaries on the USDA reports by Extension
           Economists at the University of Minnesota.

FOR FURTHER DESCRIPTION TYPE THE PROGRAM NAME
(ALL=COMPLETE LIST OF PROGRAM DESCRIPTIONS; CR=DONE)   ?

PROGRAM NAME (CR=STOP/HELP)   ? OUTLOOK

DO YOU WANT HELP WITH THIS PROGRAM (1=YES,CR=NO)? 1

        THIS PROGRAM HAS BEEN CREATED TO HELP THOSE PEOPLE WHO NEED TO
HAVE AN UP-TO-DATE LISTING OF AGRICULTURAL OUTLOOK MATERIALS THAT
PERTAIN TO THEIR FIELD OF INTEREST.

        THE FIVE MAIN LIBRARIES IN THIS PROGRAM ARE:
                1.   COMPLETE LIBRARY
                2.   LIVESTOCK INFORMATION
                3.   CROP INFORMATION
                4.   WEATHER INFORMATION
                5.   UPCOMING REPORTS

        THIS INFORMATION WILL CONSIST OF SHORT ANALYSIS OF RECENT USDA
OUTLOOK RELEASES, BUDGETING INFORMATION, LONG-RANGE PLANNING GUIDES,
PRICES, ETC.   THE FOLLOWING STEPS ARE TO BE USED:
                CR=HIT THE CARRIAGE RETURN KEY

        1.   AFTER THE QUESTION "WHICH NUMBER DO YOU WANT TO SEE (1-5)"
              APPEARS, TYPE IN THE NUMBER WHICH CORRESPONDS TO THE LIBRARY
              YOU WISH TO SEE. (CR)

        2.   AFTER THE QUESTION "NAMES OF REPORTS--1 PER LINE" APPEARS
              TYPE IN THE NAMES OF THE REPORTS YOU ARE INTERESTED IN. (CR)

        3.   AFTER THESE REPORTS ARE COMPLETELY PRINTED OUT, THE "REPORTS"
              QUESTION WILL ONCE MORE BE ASKED.   IF YOU WANT MORE
              REPORTS FROM THIS LIBRARY, TYPE IN THE NAMES AT THIS POINT.
              IF YOU WISH TO STOP AT THIS POINT, HIT THE CARRIAGE RETURN
              KEY.

        4.   AFTER THE QUESTION "DO YOU WISH TO SEE ANOTHER LIBRARY(1=YES
              CR=NO)" APPEARS, TYPE A ONE(1) TO SEE THE OTHER LIBRARIES,
              OR HIT THE CARRIAGE RETURN KEY TO STOP THE PROGRAM.
              IF YOU TYPED IN A ONE(1), THE LISTING OF THE LIBRARY NUMBERS
              WILL BE PRINTED OUT AND YOU SHOULD REPEAT STEPS 1 THRU 4 TO
              CONTINUE WITH THIS PROGRAM.

THE FOLLOWING LIBRARIES ARE AVAILABLE:

        1. COMPLETE LIBRARY (CROPS & LIVESTOCK)
        2. LIVESTOCK
        3. CROPS
        4. WEATHER
        5. UPCOMING REPORTS
        CR=NO LIBRARIES LISTED

WHICH NUMBER DO YOU WISH TO SEE (1-5)   ? 1

THIS IS A COMPLETE LIBRARY LISTING OF OUTLOOK REPORTS.

REPORT NAME	DESCRIPTION OF REPORT	RELEASE DATE
SOYBEANS	USDA SUPPLY AND USE ESTIMATES FOR SOYBEANS	2/13/84
CORN	USDA SUPPLY AND USE ESTIMATES FOR CORN	2/13/84
WHEAT	USDA SUPPLY AND USE ESTIMATES FOR WHEAT	2/13/84
BARLEY	USDA SUPPLY AND USE ESTIMATES FOR BARLEY	2/13/84
OATS	USDA SUPPLY AND USE ESTIMATES FOR OATS	2/13/84
PLPRICES	ANNUAL AND LONG RANGE PLANNING PRICES BY: DEPT. OF AG & APPLIED ECONOMICS, U OF M	10/10/83
GRNSTCKS	USDA U.S. GRAIN STOCKS	10/25/83
QTPRICES	ESTIMATED QUARTERLY CROP & LIVESTOCK PRICES BY: DEPT. OF AG & APPLIED ECONOMICS--U OF M	1/ 3/84
HOGSPIGS	U.S. HOGS AND PIGS	1/ 3/84
BEEFFED	U.S. CATTLE ON FEED -- 13 STATE BY: USDA	1/21/84
STOCKS	USDA U.S. GRAIN STOCKS	1/23/84

CINVENT   USDA ANNUAL CATTLE INVENTORY   1/30/8-

PROSPECT   USDA 1984 U.S. PROSPECTIVE PLANTINGS   02/16/84

NAMES OF REPORTS--1 PER LINE (MAX OF 10)
CARRIAGE RETURN = DONE ENTERING REPORT NAMES
?

DO YOU WISH TO SEE ANOTHER LIBRARY (1=YES,CR=NO)? 1

THE FOLLOWING LIBRARIES ARE AVAILABLE:

    1. COMPLETE LIBRARY (CROPS & LIVESTOCK)
    2. LIVESTOCK
    3. CROPS
    4. WEATHER
    5. UPCOMING REPORTS
    CR=NO LIBRARIES LISTED

WHICH NUMBER DO YOU WISH TO SEE (1-5)   ? 4

THIS IS A LIBRARY OF REPORTS CONCERNED WITH WEATHER.

REPORT NAME	DESCRIPTION OF REPORT	RELEASE DATE
WEATHER	WEATHER FORECAST AND RELATED ASSESSMENTS BY: MARK SEELEY & GREG SPODEN-AG EXT SERVICE	10/18/8J
NWSSUM	WEEKLY CLIMATIC SUMMARY BY: NATIONAL WEATHER SERVICE	3/12/84
SNOWDEP	SNOW DEPTH AT MOST RECENT SAMPLING BY: NWS AND DNR COOPERATIVES	3/14/84
WEEDSIN	INFO ON WEATHER-HERBICIDE RELATIONSHIPS BY: JEFF COULTAS, DEPT. OF AGRONOMY	3/24/8J

NAMES OF REPORTS--1 PER LINE (MAX OF 10)
CARRIAGE RETURN = DONE ENTERING REPORT NAMES
?

DO YOU WISH TO SEE ANOTHER LIBRARY (1=YES,CR=NO)?

USING DATA BASE MANAGEMENT SOFTWARE
TO FORMALIZE THE CONTROL OF SWINE FARM OPERATIONS*

by
Earl I. Fuller
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University of Minnesota

INTRODUCTION

This paper discusses ways to relate the use of formalized control procedures to intensively operated swine farms. The same general approach could focus on other intensively operated enterprises, such as dairy herds, irrigated crops, and specialty crops or enterprises where frequent adjustments in inventory or input use are considerations. The approach generally relates to market management and cash flow projections; however, the latter activities may not be so easy to see.

This paper has two major parts. The first is a generalized discussion of control theory and modeling techniques as related to farm management and the potential of increasing the formalization of the farm manager's information system. It draws from a variety of sources found in operations research, industrial management and business management. It provides a way of thinking about the control of day to day operations.

The second part discusses how general purpose data base management systems (DBMS) software on a microcomputer can be used as part of a control system on a swine farm. The general approach outlines techniques and requirements for the utilization of a DBMS; then applications to illustrate how the concepts might be applied to controlling the farrowing operation are introduced.

The reader should be forewarned that this is only an illustrative discussion. Even today there are commercially developed turnkey systems of software and hardware in place on farms which are working well. This effort should be considered a "first cut" at the development of such a system for managers wanting to design their own system for whatever reason.

CONTROL OF FARM OPERATIONS; THE PROBLEM

The complexity of the management task is increasing. One reason is the "knowledge explosion". There is an increasing knowledge base from science and technology along with other fields of human endeavor. With new knowledge comes new opportunities. New opportunities mean new alternatives for analysis. New alternatives mean complex choices must be made in terms of the feasibility and profitability of use on the farm.

Managerial time and comprehension capability are limiting resources. Economies of size and the advantages of new technology can only be captured if management is able to "plan their work and work their plan". Effective planning is a prerequisite to effective controlling. But a farmer who gives serious attention to planning may not necessarily be successful. Plans must be carried out through effective action; the farm must operate.

Plans focus action on purposes or objectives. It is not possible to control without reference to plans. Without plans, action becomes disorganized; then it becomes impossible to perform the control function since the objective of control is to give assurance that events or actions conform to plans. For instance, if we change the ventilation system will, does or did it change the health, gain or number of pigs per litter?

The people who manage farms use but a small fraction of their time in planning. The major demand on managerial time and intellect is the control of ongoing operations. An operating style for many farm managers in such an environment is to allocate their limited management time wisely with due consideration to the multiple objectives to be fulfilled.

Presumably a manager weighs the costs and benefits of each such allocation of available time. The opportunity cost of using time to formalize a control system is time which might more productively be used in another activity; this is a cost of controlling the operation.

Given the complexity of swine herd management and given the time constraint, what are the potentials of systems analysis approaches towards improving the ability of the farm manager to stay on top of (his) operations management? Can time be freed from operations by such systematic procedures to be effectively used for longer range planning? Can improvement in control over the production and marketing activities themselves provide payoffs sufficient to justify investing time to improve them? This paper is based on the premise that it is. Therefore, the discussion now turns to the development of such control systems for swine herd management.

CONTROL SYSTEM CONCEPTS AND SYSTEM ANALYSIS

A system is defined as a set of objects (the farrowing operation) and its attributes. The user of the term is obligated to define the set and, thus, distinguish (specify) the system separately from all other objects (the rest of the farm and world) which make up the environment of that system.

A system analysis approach is then defined as a process of classification, rational description, observation and study of the set of objects and their attributes. Systems are often complex and require further classification into subsystems in order to be comprehensible at a level useful to management. System analysis recognizes components, interactions and feedback relationships.

Schematically, the steps of systems analysis require: (1) Separate the environment (and its attributes) from the objects of the system (and their attributes). (2) Diagram or chart the relationships and interactions involved. More simply, systems have inputs (feed, water, boars, sows, music, air, etc.), a transformation process, and outputs (pigs, manure, weight gain).

inputs   environment   outputs

process or operations

feedback
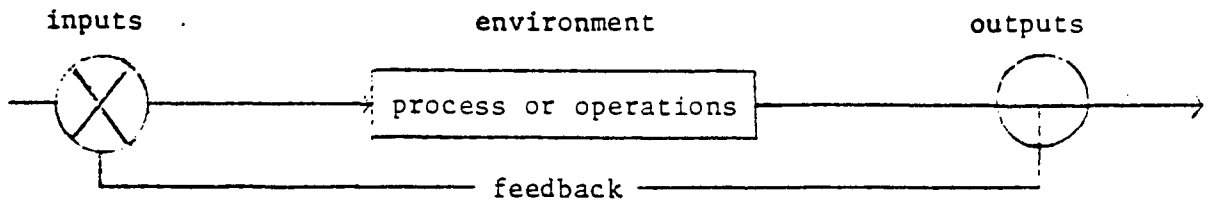
A systems approach is a modeling technique. It abstracts a model of a system (the farrowing operation) from the perceived environment. Presumably, all that is not included in the system is then defined as being part of the environment.

A formalized systems approach is being used in the management of government, industry, education and wherever else new ideas in management are being tried today.

The presumed (or assumed) advantages of a formalized systems approach as usually noted include: (1) The relationships between inputs, the process and outputs are made explicit (expected feed use, weight gain and/or pigs per litter). (2) Complex phenomenon is reduced to an understandable and definable unit (in this case defined according to the manager's interests). (3) A logical patterned way of thinking concerning what the nature of specified phenomenon used is, and focused on the important parts thereof. For instance, what can you control by regulation of inputs--pigs weaned, pig weight, sow weight, breeding, etc.

The systems approach should not be viewed in a static context; instead, it should be viewed as a dynamic (evolving) management tool. Once a systems approach to management is established, it begins to decay to something less unless plans are made to modify it as needs and management style change. One must continually think in terms of a systems approach and continue to develop it and himself as a manager. He needs to learn and modify the specified system model just as he would any other aspect of managerial problem solving.

A dynamic perspective of systems implies a continual learning mode on the part of the manager. A computer based set of hog records are of little use to control operations and learning how to improve them unless they are used. Learning comes at a cost in terms of time, effort and

(opportunity) use of other resources. It also implies the use of a
problem solving approach to management and implies that management defines
problems/opportunities as differences between "what is" and "what ought
to be". It then takes steps to change the situation, these steps include:
(1) observation, (2) analysis of the viable alternatives, including the
do nothing alternative. It also includes (3) the selection of a course of
action and (4) taking that action. Taking action implies controlling the
installation and supervision of the direction of that action through
time. With the freedom to decide and act comes (5) an associated
responsibility to bear the consequences of that action (and, further,
reaping the benefits). Finally, in a dynamic world, a creative approach
to management implies (6) learning from the results that occur which, in
turn, clarifies new problems and enhances one's skills to do further
managerial decisionmaking and/or problem solving. A computerized swine
control system is a base to increase learning--if it is used to do so.

The primary interest of this paper is with management information systems
as a subset of the firm's production system. Further, in certain sub-
systems of a management information system there is a need for control
systems. These interests require a division or breakdown of the defined
production systems into a family of subsystems. As noted before, a sub-
system can be conceptualized in the same way as the overall system
except that it is contained within the original definition of the overall
system. Consequently, the rest of the main system becomes part of the
environment for the defined subsystem; for instance, the breeding herd,
the farrowing operation and the finishing facility. Linkages can then
exist between subsystems through inputs and outputs which flow to and
from each subsystem and its environment and, thus, within the overall
system.

MANAGEMENT INFORMATION SYSTEMS (MIS)

The idea of a management information system requires an understanding
of some additional concepts; these include learning, cost of learning,
value of information and the problem solving approach. These concepts
have been developed elsewhere in the farm management literature and

will not be repeated here to any degree. However, the terms "information" and "data" need to be defined here as they are found in the information and management sciences. These terms are used somewhat differently in these sciences than they are for popular usage or in the popular press. Data can be judged on the basis of its information content. Data includes both noise and information as these terms are used. Information is defined as being that which influences behavior (decisions), has a "surprise value" or "intelligence value". It is processed data that has been developed in a comprehensible and understandable form which is relevant to a problem to be solved or an evaluation of the alternatives faced by a decisionmaker. Information communicates to the decisionmaker and changes decisionmaking behavior in the process.

A management information system may then be defined as a system designed to facilitate the filtering, collection, classification, storage, retrieval, processing, display and dissemination of data useful in the management process and/or in the performance of the management functions. A MIS processes data to reduce the noise and enhance information content.

The distinctions made above between data and information are important distinctions when designing a swine management control system. They are distinctions that a manager and the developer of MIS systems should note carefully; they should be kept in mind as decisions are made about what data to record and in what form as operations control systems are developed.

Parenthetically, it can be argued that every swine farm has an information system. It may be a quite informal one; but, for many, a more formally structured MIS system may not be worth the cost. Yet, some real issues exist: What parts of the system are most amendable to formalization? Where would a greater degree of formalization actually indicate payoffs greater than the cost of implementation for a specific operation? It is likely to be a long time before anyone will claim the development of a global MIS system for a farm business. Yet, the complexity of the technology in use on American farms and the size of the enterprises in operation call for a greater degree of formalized use of these concepts than has previously been the case in American agriculture.

All farm production systems have control subsystems. Even in cases where the control systems are totally informal, where no managerial effort has been put forth to formalize them in any way, they still exist. And in some instances, for some managers, given some environments, operating some kinds of productive activities, they may function very well as informal systems. In other instances their informality requires more managerial time and effort than good opportunity cost pricing would suggest is in the best interest of either the manager or the firm. Hence, in such cases, it would be well worth the high start-up cost of the required time necessary to design a more formalized system.

DEVELOPING FORMALIZED CONTROL SYSTEMS

In the development of formalized operations control systems for farm firms, several approaches can be considered. Various ones are appropriate under different circumstances. One is an enterprise approach. In the enterprise approach it is useful to define production by the kinds of products produced (pigs, pork, gain, manure), and then specify unit budgets for each enterprise (sow herd, nursery, finishing). From a control standpoint, the unit gross margin budgets could then be detailed in terms of the inputs (feed, water, care) by time period of their use and output (gain) by time period also. The monitoring of the production process at these same time intervals could be specified, so could actions (options) which managers and workers could take in order to ensure the controlled operation of the production processes (ration mix, ventilation, medication). A series of steps useful in developing an enterprise control system are listed below.

Developing A Control System

1. Define the production system and subsystems
2. List (order) outputs or inputs to be recorded
3. Specify events that require recording
4. Identify a sensing procedure for each item to be monitored
5. Specify the "in control" standard for each item and acceptable range about that standard, while recognizing the uncontrollable nature of related considerations.

6. Establish rules of action to bring a process back into control if monitoring suggests it has moved outside of the specified control range.

7. Outline the records (reports) which are to be used by time interval of record, form of record, and frequency of recording.

8. Detail control correction procedures to the extent possible in regulating input according to the items monitored.

9. Test the control systems and operations--identify the source, impacts and ways of reducing potential recording errors.

10. Refine steps 1 through 5 as required throughout the life of the system.

Installing a formalized control system requires an appreciation of management by exception and attention to the questions raised in the figure below.

Figure 1. Management By Exception
_____

What is the acceptable range of controlled activity?

If results are superior, why? What can we learn from it?

If results are less than acceptable, what action is required?

Is there a previously established decision rule?

Is correction possible?

How long will it take?

Do we need to change plans?

_____

Management by exception rules help a manager spend time wisely on problems requiring attention and discovering opportunities for improvement.

CONTROL SYSTEMS FOR THE SWINE ENTERPRISE PRODUCTION SUBSYSTEMS

Animal scientists have developed detailed (and calendarized) lists of approved practices for various livestock operations. Many of the recommended practices require that the herdsman continually monitor the behavior of the individuals in the herd. When monitoring, the herdsman is obliged to mentally trace through a checklist of conditions or symptoms to delineate the desired course of corrective action. A herdsman then takes a corrective action and notes that he did so for later

reference. If such an action was taken in isolation from the complexities of other activities, it should not be burdensome in most farm situations. However, this is not the case. Other routine work must continue at the same time. Other enterprises must also be attended to. But, the key questions remain: "Under what conditions is a move to a more formalized system of control justified?" and "Are the gains in so doing sufficient to pay for the additional cost involved?".

Worker coordination and supervision whenever two or more people are involved and there is any specialization of effort at all requires some coordination in communication. The necessary general line of developmental reasoning is outlined in figure 2.

Figure 2. Enterprise Control System
_____

Premises

Production is a dynamic process changing through time

Process conditions or characteristics are measurable

Production process standards exist and can be found

Management by exception rules exist

Production process intervention can control

Components

Sensor - measures process activity (output)

Controlling unit - compares measurement to standard

Activating unit - starts intervention (input)

_____

Figure 3 provides a flow diagram schematic of the generalized structure of an enterprise control system.

Formalized control systems for farms need not and, in fact probably should not, be prescriptively stated and put in place overnight--they should evolve. At this state of the art they need to be tested and implemented step by step over a period of time. There is neither sufficient experience with them nor solid enough research analysis behind their development to encourage a more prescriptive approach.

Figure 3.
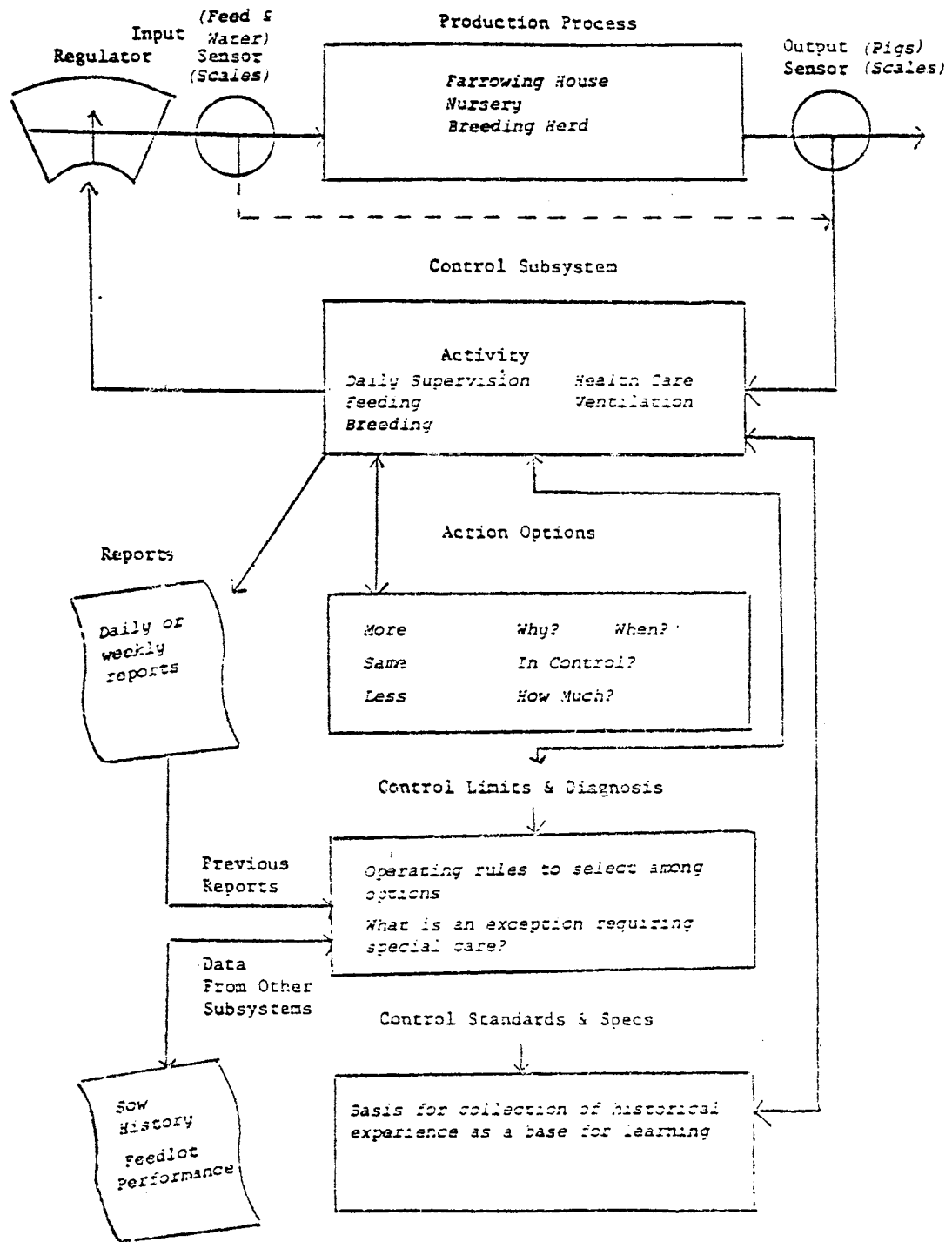
Consequently, a manager might begin something as follows. To start with, he might specify the more-or-less key components to managing the swine operation. He could select key components or elements on the basis of the frequency of observation required, and on the frequency of adjustment in production possibilities based upon the incorporation of these components into a control system. As he does this, he should consider the potential benefits as compared to potential costs. The selected components should offer opportunity for production improvement. This would imply that correction or adjustment in inputs is possible based upon these observations which would, in turn, make operations more stable and/or profitable.

A SOW HERD EXAMPLE IN OUTLINE

Let us now consider the farrowing operation. This is a complex management task requiring substantial herdsmanship to attain good performance. At certain times in the lactation cycle, special care is required for individual animals; on other occasions, group care is sufficient.

One useful place to start with a sow herd would be a sow index calculation. This requires the recording of several items of data either on paper or into a computerized data base. However, from an immediate impact on profitability standpoint, perhaps a system more directly focused on increasing litter size and survivability might have a higher payoff.

An expanding sow herd also suggests a comparable calendarization and identification of the status of individual animals. Here a status wheel or computerized data base type system with individual animal records seems to be the key element. Certain actions are required for individual animals or groups of animals at different times in the reproduction cycle. There is a time to flush sows; there is a time to breed them; there is a time to check for pregnancy and/or to rebreed; and there is a time to cull unbred sows.

The ration needs to be controlled by the nutritive needs of the various animals and groups. Farrowing is an important time. Records need to be retained on the number of pigs born at that time. Shortly

after farrowing there is a need to handle the baby pigs, providing iron shots, clipping teeth and castrating. In short order, there is a need to wean and separate the pigs. There is a need to sort out replacement gilts based on the performance of their mothers.

There is a continuing need for action sheets on a daily basis. Some action procedures for care of the herd can be identified as specific days of the week in the ongoing farrowing operation. So doing will reduce the complexity of the task and allow what otherwise might be individual care to be handled more on a group basis.

A SITUATIONAL CASE EXAMPLE

A swine producer was in the following situation. He had read a more general version of this paper. He wanted to more formally organize his sow herd record system. He wanted to use a computer to do it; in part because his family had been using computers in school and were urging him to.

The "systems approach," "control systems," and "management information systems" ideas in the paper made sense to him. He began by looking at where he was now record-wise. He was using a set of sow history cards, updated after weaning and breeding. He also had a set of litter cards upon which he recorded data on events and actions as each litter was handled in the farrowing house. They were modified by him to contain data he thought of as having "high informational potential" from a worksheet prepared by swine specialists at Ohio State University. Modifications included the calculations of four performance indexes, none of which he felt fit his situation perfectly. The card also contained a space for written notes which were sometimes transcribed to the sow history card along with other data.

He was reluctant to purchase special swine herd software, given what he could find at that time and the costs of doing so. There were 95 sows in the herd.

He, instead, purchased a general purpose data base management (DBMS) package. He found one (there are several) which allows the user to drop or add data items to the data base as experience (learning) might dictate; this is a must for effective (dynamic) control system development.

The data field labels and definitions used are shown in figure 4. These were taken directly from his index card. The hard and time consuming job had already been done--the actual development of a card or set of items important enough to be put on it.

Running the DBMS to set up the file was easy. Putting in new or modified data is also easy, but does take discipline and time on a regular basis.

Once the data is in the file(s), sorting it and printing it out as job lists, performance reports, or "management by exception" alerts is easy. The major problem is reading the manual in order to instruct the file setup and to store the data for later use--this took several days.

The general DBMS ended up doing 35 to 90 percent of what he would have liked to do then. He has not yet modified his files, but may someday. He wished now that he had not asked for separate shot treatment as five items; they are all done together anyway. He wants to automatically abstract data to a yet to be computerized sow history file-- changed somewhat from his card file. Some day he may want to use the system to schedule breedings in order to make the most effective use of the farrowing room(s).

His particular DBMS lacked several useful features for farm use. It does not allow "one key" entry of today's date; a real timesaver and convenience. Nor does it automatically record the date of last file use. It does not have very good data value entry checking either--some do. Some check for whole number only items. Some permit entry of minimum and maximum values to guard against reports of 22 pigs per litter!

He has found other uses for a DBMS also. He keeps a machinery parts inventory on it. He also keeps field history records with it. He finds tractor driving time a good time to plan such uses, and uses a tape recorder to "get them down on paper."

While it would be hard to prove, he feels the effort was worthwhile. In fact, he plans to once again look at available specialized swine software and perhaps purchase one--if it will do things his way. He now feels that it makes life easier and swine production enough more profitable to justify the time spent.

Figure 4. Litter Production Records - 9/9/80 (Data Kept On Each Litter)

Field ID Labels	Explanation
SOWID	alpha or number
LITTERNO	as desired
LOC	pen - stall number
BORNDATE	for sow
HERDDATE	for sow
DAMID	for sow
SIRE/SON	for sow
BREDDATE	latest date
BOARID	boar used
BRD/CHCK	date to do - done
FRWNO	farrowing number for sow
DUE/DATE	
MOVEDATE	to farrowing house
BNLV	born live - no.
BNDE	born dead - no.
TRIN	transferred in - no.
TROT	transferred out - no.
NURS	number nursed
FE	date iron shots
MA	
SC	
ST	
PU	
SOWPINDX ⎤	
MPSPINDX ⎬	calculated
BVSPINDX ⎦	
NOTES/MEMO	

Figure 5

DATA BASE FILE SET UP SHEET

File Name _____ Page_____ of_____

<div align="center">Instructions</div>

Field No.   _____   (leave blank until file   )

Field Code   _____   (few characters key code nomen)

Field Length _____   (maximum number of numbers/characters)

Field Type   A/I/R/date   (alphabetic, integer or real with decimal

Field Title   _____   after or date mm/dd/yy)

                                    (descriptive label for data field)

Characters in title _____   (include blanks)

Field No.   _____   _____   _____

Field Code   _____

Field Length _____

Field Type   A/I/R _____

Title   _____ (units of measure_____)

No. Characters _____

Computation Formula _____

Field No.   _____   _____   _____

Field Code   _____

Field Length _____

Field Type   A/I/R _____

Title   _____ (units of measure_____)

No. Characters_____

Computation Formula_____

Field No.   _____

Field Code   _____

Field Length _____

Field Type   A/I/R _____

Title   _____ (units of measure_____)

No. Characters_____

Computation Formula_____

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Blackie, M.J. 1975. Management information systems for the individual farm firm. Agricultural Systems 1:23.

Fuller, E.I. 1981. Farm Oriented MINN-AIDS. University of Minnesota. CDA 60.0

Fuller, E.I. 1982. Purchasing a desktop computer for use in the farm business. University of Minnesota. CDA 61.

Are Your Records Hogwash?

Dr. Tom Stein
University of Minnesota
College of Veterinary Medicine

The following are a set of brief, concise, and to the point recommendations and observations on record-keeping for swine farms, distilled from four years of trying to make sense out of farm records.

DO:

Use an individual sow record system, using cards, paper, computers, or cardboard. An individual sow system is simple, straightforward, and is the only way to use records to their best advantage.

Have a record-keeping plan. Know why you keep the records you do, and how you do it. Cull useless or time-consuming data, like the percent of pigs born deformed unless your farm has a specific problem or you feel a special fondness for trivial information.

Have professional interpretation of the information you put together from your farm. Veterinarians are trained to interpret information and solve problems based on herd profiles.

Make the record system formal. Use either commercial data collection forms, or, better yet, design your own based on the way you do things. Have these forms typed and mimeographed. Use "non-carbon" paper and you'll always have a

copy. Keep copies of important records (sow cards, 5-year herd summary information) somewhere besides the barn in case of catastrophe.

Develop a record-keeping detail. Make records a habit: write, record, analyze, and review. If you don't like to do it, hire or convince someone else.

Analyze the records or use your advisor (read: veterinarian) to analyze for you. Interpret the information.

Keep a variety of records. Yearly and 5-year summary reports are best for trend analysis. Monthly and weekly reports are best for here and now information; compare this month's production with this year's rolling average. Keep a daily diary of important events, like the entry of new boars and gilts or the diagnosis of a problem (E. coli, coccidiosis, Haemophilus pneumonia).

Use records to take action and make decisions. If they don't lead you to action and make it easier to decide to do something (or do nothing), then they are not being used. Wring as much information as possible from records.

Have a foolproof method for individual identification of the sows, or make it at least as foolproof as the pigs will let you. Do not duplicate numbers. Do not give incoming gilts numbers rescued from culled sows.

Write to the National Pork Producers Council and request a copy of the standard definitions and calculations for pork production, a dictionary for record-keeping. Know what you mean when using terms like farrowing rate, pigs

per sow per year, litters per sow per year, and culling rate. Understand the calculations, or talk to people who understand them.

Develop a working set of manual records that keep you close to the action, even if you have a computer.

Be a detective. Use records to discover things about your herd you've never known. Track down problems and find a solution or cause.

Set targets and goals for the herd, where appropriate. Be nice to yourself and your employees. Set reachable goals designed not to frustrate.

Look for patterns in your records. Swine herds are like quilts, with many unseen patterns.

Use records to evaluate and communicate. Both are the natural function of useful and friendly records. Challenge feed salesmen and veterinarians to make a change on your farm, one that is measurable.

DO NOT

...let individual sow cards pile up, unused, unloved, and gathering dust in the corner of the office.

...use an individual sow system without adequate identification for each sow.

...believe only your eyes when evaluating the herd.

...believe only the records when evaluating the herd.

...hastily glance at reports, then set them aside never to be seen again.

...concentrate on one index to the exclusion of all others (read: pigs per sow per year)

...buy a computer if your record system is marginal. A computer will not organize you, but will respond to your organization.

...use a computer to schedule your activities. Humans are better at it.

Questions to ask about swine record systems
Tom Stein, DVM
University of Minnesota
College of Veterinary Medicine

1. How are the indexes and calculations defined? Is there a list?
2. How are the specific rates (like farrowing rate) calculated?
3. What kind of backup is required/recommended?
4. How many sows? why?
5. How many litters for each sow, and is there a tradeoff?
6. What to do with "archived data"?
7. Animal identification?***** each animal on the system uniquely identified
8. What kind of documentation is available?
9. Which version of the program: 1.0 or 1.2 ?
10. What is the most current version?
11. What about updates to the original purchased version?
12. Is a help line available?
13. Any users' groups around?
14. Demonstration available for your use?
15. Installation—what do you get, any training?
16. What kind of service contract?
17. What kind of company;will it be in business five years from now?
18. References of users, especially long-term users (more than one year)

about yourself:
how easily frustrated?
how impatient?
how much time do you have?
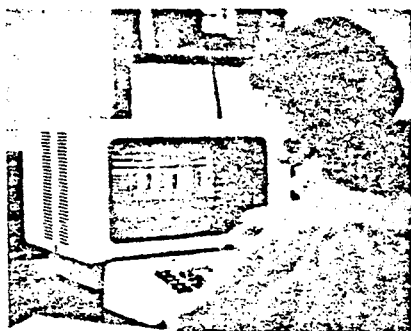what kind of record system do you have now?

---

be very concerned about vendors who say things like this:

"The file cleans itself automatically as new data is stored..." (Where does the old data go?)

"Each data disk can be analyzed for...." (How many disks are needed, usually means you'll be "swapping" disks)

"Don't worry about....." (Worry about everything, like the address and telephone number)

A computer service improves hog producer management decisions using accurate computer information — without having to own the computer. National Swine Computer Service offers a monthly profit-loss production report and cash and inventory costs for the past 12 months. The service automatically updates number, weight and market value of hog inventory monthly. A sow report lists sows to farrow, organizes and evaluates production data and ranks each sow based on performance.
National Swine Computer Service, Box 7657, Jackson. MS 39204/800-892-8324, 601-352-7258 (MS only).
Circle no. 118 on Reply Card.

A sow records system for 50 to 200 sows is offered by Betterway Ag. Marketing Inc. The Sow Merit Record & Management System ranks sows in several areas. Yearly totals give you a record of herd averages. Records combine with schedules to improve herd efficiency. A management calculator provides for on-the-spot decisions. Two books are included, one for the barn, the other for the office.
Betterway Ag Marketing Inc., 5801 Charlotte. Kansas City, MO 64110, 816-363-2287.
Circle no. 105 on Reply Card.

A swine computer system, Hogman gives the producer with 100 or more sows information for herd improvement including individual and herd summaries. The Agri-Data system also provides management and health information and daily work reports.
Agri-Data Inc., Box 625, Alamo, GA 30411/912-568-7102.
Circle no. 114 on Reply Card.

A computer pork production system offered by U/NO Agri-Systems records not only sow and boar genetic data, breeding information, farrowing and litter reports, but also relates them to costs and benefits. The system sets up schedules for staff, equipment, feed and medicine and keeps a five-year archive for comparisons.
U/NO Agri-Systems Inc., Box 396, Rockport, TX 78382/1-800-531-3109.
Circle no. 115 on Reply Card.

Swine management computer program contains individual records on sows, boars and notched piglets. Reports tell breeding success, litter size and weight, survivability and sow and boar performance. The software program's production and inventory reports give numbers and values by animal category and feed efficiency by groups. The program from Computer Agri Venture fits the 48K Apple II Plus Computer.
Computer Agri Venture, 105 S. Third, St. Peter, MN 56082.
Circle no. 129 on Reply Card.

A hog computer program, HAM provides 20 key summaries of herd data from the past year. Hog Analysis and Management offers production records for up to 492 sows and work schedules for production and health programs. The software program holds a year's worth of data recorded on individual sow records. The file cleans itself automatically as new data is stored. It takes just an hour a week to update records, estimates Land O' Lakes, maker of the Proware line of computer programs.
Land O' Lakes Inc., 800-53rd Ave. NE, Box 1395, Minneapolis, MN 55440/612-571-2110.
Circle no. 117 on Reply Card.

A swine computer software program, Hog Producer, provides a complete management system for farrow to finish operations. It keeps records on individual herd animals and develops vaccination/health programs for pigs. Feed consumption can be tracked at every stage of the operation. It requires an Apple computer, disk drives, video monitor and 80-column printer. Each data disk holds data for about 490 sows. Gestation sow records show heat checks, pregnancy checks, shot and drug schedules. Sows are ranked based on production and breeding values and replacements by overall herd improvement, live births, milking ability, growth rate and backfat thickness. Herd analysis details death loss and feed efficiency. Overall analysis gives 20 key points for best herd management. Summary production and breeding reports are available anytime.
Decision Center, Inc., 116 Kellogg, Ames, IA 50010/515-233-1206.
Circle no. 116 on Reply Card.
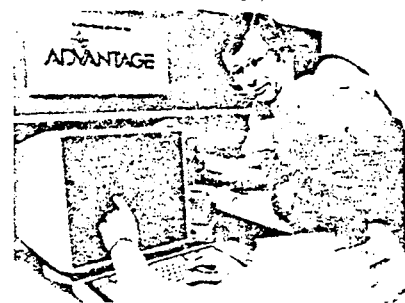
Computer services for hog producers are part of the Advantage program offered by Control Data Corp. through local dealerships. Services will be available by the end of 1983 in Minnesota, Iowa, South Dakota, Indiana and Wisconsin. SwineTrak helps producers record, monitor and manage critical phases of production. Detailed herd performance and health data are provided. The computer also tracks and ranks each animal. Also offered is the firm's Plato computer educational program. The 36-hour feeder pig program gives sow and feeder pig management information for new and experienced producers. It covers health, nutrition, housing and equipment, selection and breeding, gestation, farrowing, marketing and records management. A similar program is available for finishing production and management.
Control Data Corp., 8100 34th. Ave. S, Bloomington, MN 55420, 612-853-3886 or 6974.
Circle no. 119 on Reply Card.

How to use the directory

The following directory of farm software suppliers appears alphabetically. For readers interested in locating software for a specific application, we have categorized companies as to types of software offered.

The following code can be used to find the companies that offer:

(a) swine management software,
(b) farm accounting software,
(c) spread sh.et programs; or
(d) data base managers.

The letters corresponding to the various types of software will appear respectively after each listing, denot-ing the programs available from each company.

The following listing does not serve as an endorsement of individual products or services. The directory is designed as a service to our readers, as they shop for software to fit their individual needs. ▨

Computerized Recording Schemes
Directory of Suppliers

AAA Ag. Services
RR 1, Box 88A
Leland, IL 60531
815/495-9335
(a)

Ag Com
PO Box 706
Muscatine, IA 52761
319/264-8781
(b)

Agratron Ltd.
6914 Dillon
Houston, TX 77061
713/641-1255
(a) (b) (d)

Agri Computing Systems, Inc.
Rt 1, Box 43
Royalton, IL 62983
618/984-7793
(a) (b) (c)

Agri Data Resources, Inc.
205 W. Highland
Milwaukee, WI 53203
414/278-7676
(d)

Agri-Management Services, Inc.
PO Box 6429
Athens, GA 30604
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AgriSoft
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Altamont Computers
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Tracy, CA 95380
209/335-2400
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AMS
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Computer Agri-Venture
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Computerized Farm Information Systems, Inc.
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Computone Systems, Inc.
One Dunwoody Park
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Countryside Data, Inc.
718 N. Skyline Dr., Suite 201
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Decision Center, Inc.
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Farm Business Services
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309/582-5628
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Farm Management, Inc.
1208 S. Cedar Rd.
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Farm Management Systems of MS, Inc.
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601/684-4602
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Griffith Data Services
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Harris Labs, Inc.
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Hi-Plains Systems, Inc.
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Evanston, IL 60201
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Missouri Agrisoft
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Red Wing Business Systems
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Red Wing, MN 55066
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Salba Software
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Small Business Computer Systems
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Specialized Data Systems, Inc.
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U/No Agri-Systems, Inc.
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THE FUTURE IN ON-FARM COMPUTING: 1983 AND BEYOND*

by
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Next year will be 1984, once proclaimed to be the time when we become the captives of a controlled society. Meanwhile, other writers have declared that we live in an "information age" or in the time of a "post industrial revolution". Some, speaking more simply, say we are seeing a "computer revolution" where the economics of low investment cost, powerful capability, easy access and available software are impacting every aspect of our daily lives.

Certainly something is going on. But then something always has! Change is normal. It's stability that isn't. But without change, life--and more specifically farm management--would be dull and without challenge. American farming has changed a lot in the last 50 years. Why would anyone expect that it won't in the next 50? Historical parallels can help us understand change in our lives; in this case the tractorization investment decisions of farming 50 years ago compares to the computerization ones of today.

A Historical Perspective

By 1933 row crop tractors had been around for a good 5 years. But the majority of the farmers didn't own one; a depression was delaying purchase. Horse breed association people were concerned, though horses were still the major "mechanical power" source beyond the family's own strength to operate the farm. Farmers where faced with when and whether to buy a tractor.

In 1983 microcomputers have been on farms a good 5 years. The majority have not yet decided to buy one; a recession is delaying purchase. Farm cooperatives are trying to find a way to be helpful as are many others who supply advisory services to farm managers.

In 1933 steam tractors had a 30 year history behind them. By 1983 farm management applications of computers also has a 30 year history tracing to Fred Waugh of the USDA. First, in batch (stationary) mode where the data (material) was taken to the machine not unlike old time threshing. Since about 1968 farm managers have "custom hired" time share computing to evaluate alternatives and otherwise aid in the decision process. High plains feedlots have kept lot records and used computerized control system procedures for at least 15 years.

Systems Reclassified and Computerized

Farmers knew then and know now that it takes more than a fancy power unit to get a task done. It takes tools that harness the use of that power--whether it is tillage or software. It takes management too; decisions about when to use, how to fix, how to adjust, measure, hook up, etc. Together the elements make a system; a mechanized farming or a computerized farming system.

Systems thinking in mechanized farming hadn't come very far by 1933 compared to where it is today. Cultivators took a long time to attach to the tractor they were designed for and often couldn't be adapted to any other. Most implements were still horse drawn designs with the adjusting levers lengthened and turned forward. Hydraulic controls, electronic sensors and "ergonomically" grouped controls or designed operator work spaces were at best only dreams.

Implement companies sold bright red, green, yellow and orange models as they attempted to lock the buyer into their color line. The little grey one with its "farming system" and today's defacto standard 3-point hitch hadn't

appeared. The talk of a "systems approach" to mechanization which it later illustrated was not yet common.

Farmers viewed the choices about how to compare tractors as confusing. Many saw at least one job where a tractor had strong merit. But few thought they could replace the older way—the horse. Few were yet ready to risk taking a mechanized farming approach to the way crops were grown. There were drawbacks; mechanical reliability, new skills needed, acceptance in the community and many others.

Life in 1983 has its parallels. Many see at least one task a computer system could help do. Few have spent the time necessary to take a computerized systems approach to the costs and benefits of a greater formalization of the farm's management information and activity control systems. There are still drawbacks. Some, but not all, are ready to risk the first steps of adoption of computing power to the set of tools used in managing the business.

Five years ago a farmer had few choices in software tools to "harness" a microcomputer. Most were adaptations of an earlier generation of time share (horse drawn? steam powered?) tools; or one could build his own tools. Many more specifically designed and user friendly (egronomically sound) software packages can be found today to do many decision aiding management tasks. Some vendors today offer rather complete lines of software which do work together as a system.

Progress is observable in making farm software work into a system. Several work from the same data base for more than one type of use. A greater degree of software transferability is also noted. More applications are being written in fairly standard language dialects and know-how now eases their transfer even when the floppy disks are not interchangeable. (Remember the early power lifts and P.T.O. linkages weren't very interchangeable either without adapters.)

In short, there are many parallels between considerations today's managers need to recognize in deciding when and how to move into computerized farming and those our parents or grandparents faced in mechanizing 50 years ago. How did they do it?

Take A Systems Approach To The Decision

Most of them did not take a systems approach, but we should. We should do a management audit. A systems approach makes sense. Before computerizing is a good time to review the family's and the management team's objectives and goals. Why do you farm? How do you weight income and/or growth in both psychic and dollar terms? How important is feeling in control and/or making life simpler? How action oriented are you? Are you action oriented, i.e. how do you like to spend time -- thinking, planning, directing or doing? Are communications between people in your business and/or with your vendors (creditor a problem? Where do you see you and your farm to be 5 years from now?

No matter what your answers to these questions, there are alternatives besides joining the computer era just yet to deal with them and to reach your goals. Goals change just as the feasibility of computerizing as an aid to attaining them will.

What Others Are Doing About Computerization

In today's setting, the majority of farmer-purchasers have as a first objective the creation of a historical data base of some type of records. For some it is financial records; for most of the rest it is physical enterprise records. In both instances the interest is often on day to day control of operations rather than the more strategic issues of a longer run.

But for those who start one, even before the record system is complete other potential uses are often seen. Many are workable with "off-the-shelf"

software. Thus a standard recommendation for most purchasers holds for farmers too. <u>Acquire a data base manager, an electronic worksheet, personal word processing, and a hardware-software communications package the day you buy the hardware.</u>

Simple application installations are justified. Many are paying their way; but the potential is much greater. A systems approach similar to what happened in farm mechanization is the way to go.

The major cost to get there is time not hardware and software. It is management type time, either your own or that of consultant's doing a "systems analysis" for you. In the latter case, you may pay for it by buying software, but it's really all the thought and care in making it work in your operation that runs up the cost.

Software developments further improve and integrate the component applications each year. A systems approach is making the computer a productive tool to aid in controlling and planning the farm business. (Fuller, 1 and 2).

To make it happen smoothly requires an understanding of control modeling with its use of "cybernetic loops" and "management by exception" rules. The idea that data contains "noise" and at best can only be structured so as to increase its "potential information content" is essential. The principles of the management sciences are sound. Economic marginality, risky decision approaches, present value, etc., as opposed to "cost of production" and "factors affecting profits" to name a few. (Fuller, 3 and 4).

These ideas are necessary if progress is to be made. They are crucial to solving the riddle of how to relate the felt need and many applications to the firm's data base and other data. Without them, data of little or no value (noise) will obscure the crucial elements necessary to decision making. Progress is being made in this work on farms by software vendors and in the

land grant universities. What one is doing is increasing the formalization of the firm's management information systems.

At this point a note of caution is in order. Even after start up, most people will say that the computer is not saving them time. Keying in data takes about as long as recording it any other way. Most people are now recording more data and taking more time to analyze it than they used to. Within 5 years more electronic sensed semi and fully automated data collection devices will be involved. They will cut the time to use the system.

For now, it means less time for other activity, often the action oriented activity of running the farm. Computing is often a productive use of limited time. But the caution should be noted. So should a caution that unless the time is committed to computing the investment will not have a high probability of paying out.

Farm Computing In The Years Ahead

To this point, this paper has drawn some parallels with mechanization to better understand where farming is today with computerization. More parallels are observable, but seem unnecessary in this context. Then a brief description of the current situation was offered. It is now appropriate to look ahead 5 to 10 years.

To look ahead means going beyond specific applications to a time of broader and better integrated control and planning systems. It means going from keeping, sorting and printing livestock records to computing as a component of livestock enterprise control systems with predictions of performance and monitor input use. It means using (a) decision aids, (b) data base managers, (c) time share accessed data base sources and (d) word processors in combination as the situation requires. It means cutting costs by substituting electronic

data sensing and recording devices whenever economic technology will allow. It also means avoiding a data overload with its associated large noise factor. Only a systematic analysis of objectives, problems, opportunities and a clear distinction between information and data will do this.

The direction that farm financial management (FFM) is taking illustrates many of these ideas. FFM once meant just the keeping of financial records to many. Various groups did gather and use the data as a financial diagnostic tool based on between-farm comparisons or farm business analysis. The state of the art is now beyond that.

Some workers argue for uniformly specified accrual accounting procedures which can produce standard financial statements (Frey). These are said to be necessary to tell lenders where the business has been and is now. Perhaps so; but from a FFM perspective, a forward looking perspective is also needed.

A set of computerized financial tools has been widely used and carefully refined over the last 10 years. They will be operable on microcomputers within a year. They work with most currently available record systems. But the user has to review the data in the data base before each new projection. Projections include measures of (1) profitability, (2) liquidity and (3) solvency so as to be applicable to various sets of objectives concerning income, growth, security or risk, as well as more personal factors. Financial and physical sensitivity analysis is automatic.

The system deals with the "where am I?", "where do I want to be?", and "how can I get there?" questions of planning (Thomas et.al., 5). One data base drives all modules which are:

(1) FINAN - Financial analysis of a set of "standard" income statement,

balance sheet and prior year's sources and uses of funds.

(2) FINLRB - Financial long range budgeting - a projection and comparative evaluation of the existing plan and two alternative organizational plans 3 to 5 years ahead.

(3) FINTRAN - Transitional planning projections by quarters and/or years of the selected plan over 3 years.

(4) FINFLO - Monthly cash flow projections and their financial implications of the selected plan for the next year.

Much of the data used is physical or technical. Default data banks exist to help one get started. They can be combined with projected planning prices and the current financial condition as appropriate. The system also has the ability to review actual performance with that previously planned. Sources of error can be noted and sometimes reduced (Nordquist & Hawkins, 6).

This system, when integrated with an accounting record system for purposes of tax records and controlling the cash flow, is a prototype of FFM system of the future. It will be available and useful to lenders and borrowers alike. Its use has already shown an ability to rationalize credit use, to put money where it can be productive at reasonable risk. Further, it helps communications between the management team and the lender. It encourages setting goals and measures progress towards them. It helps control cash flow and the other aspects of FFM.

Livestock record systems are evolving in the same direction. New developments in data collection devices will speed development. Marketing management and crop record applications show similar developments. It should be interesting both to watch and to be a part of it. Perhaps in another 50 years our children will be drawing parallels between the computerization of farms in the 1980's and some yet to be seen next major change in American farming!

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THE COMPUTER'S HOME
by Earl Fuller

Be forewarned: Static electricity, sudden power surges or just seemingly random sparks can damage your computer, wipe out any program you have loaded into memory or destroy your program tape or floppy disk. All computers meet or exceed federal standards and can generally absorb a lot of current without damage, but mishaps are possible. So, it's essential that you find a safe, well-grounded home for your computer.

A few simple precautions to take:

—Do not put a computer in a room with a wool rug -- simply walking across the rug with leather sole shoes and touching the computer can send a damaging charge through it.

—Do not plug a computer into the same circuit as an air conditioner, heater, washer and dryer combo, or any appliance that draws a lot of current or turns off and on while running.

—Make sure the room does not get too dry in the winter. Computers like moderate humidity, abhor very dry or very damp air.

—Leave enough room around the computer for good ventilation. Computers (and disk drives, especially) do not use much current, but they generate a lot of heat.

—Do not let direct sunlight shine on the computer regardless of the outside temperature. Direct sunlight easily can overheat the microprocessor and memory chips and cause a burnout.

—Protect all of your computer paraphernalia. Tapes and disks are especially susceptible to abuse and poor handling. Never spill any liquids on a tape or disk; never bend a disk or stretch a tape; avoid magnetic currents. However unlikely it is that a small magnetic force, such as that generated by a radio, will damage a tape or disk, it is hardly worth the risk. Keep anything that generates a magnetic force at least a foot or two away.

A DESKTOP COMPUTER WORK SPACE

SOME CONSIDERATIONS WHICH LEAD TO COMPUTER OPERATOR COMFORT, FATIGUE REDUCTION AND PRODUCTIVITY

by
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The principles of human engineering or "egromonics" have been put to use designing work stations of the right height and with materials within reaching distance. Many of the principles are the same whether one is designing (industrial) work spaces or home kitchens. There are others, however, which are somewhat unique, namely the appropriate procedures for locating or installing a cathode ray tube (CRT) and data entry keyboard.

The height of the keyboard for a seated operator of average height should be 26½ inches. In order to accommodate different people and their body size and posture, adjustable posture chairs should be used. Height adjustment of both should be possible.

The CRT should usually be above and in front of the keyboard--but not attached to it. The CRT location should be from 18 to 30 inches in front of the operator. Whether or not an operator uses bifocal glasses makes a difference in how high above the keyboard the center of the CRT should be. It should also be possible to adjust its height independently from the keyboard. A height adjustable paper-holder should be placed adjacent to the CRT.

Operators need to be able to "control" the location of all three. Different operators will prefer different adjustments. On occasion, some even want to put the keyboard on his or her lap for a while.

The CRT should be positioned so that glare from outside windows or other light sources does not reflect on the screen. Tilting it downwards (negatively) tends to avoid that glare. On the other hand, tilting it upward tends to be preferable for some other situations and operators. If a person has to continually move his or her head up or down to (a) read input source material, (b) see the keyboard, and (c) check the CRT, then the work space can be termed a fatigue and error causing environment.

Many of the fans used to cool the electronics are annoying and a fatigue-causing noise source as are noisy printers, particularly on letter quality printers. For these reasons, acoustical covers or other noise absorbing materials should be considered to reduce errors, fatigue, and increase productivity. A separate printer stand will help as well.

Specially designed terminals or computer work stations are now commercially available that facilitate incorporation of these ideas into the work environment. One permits separate adjustment of the keyboard work surface height from CRT height. In addition, the CRT base may be tilted plus or minus 15 degrees from the horizontal.

Station designs exist for placing the computer components and/or the disk drives below the desktop on shelves but within easy reaching distance of the operator. Such a design permits the location of the printer on or in the same desk as the keyboard; if the printer is quiet, this is a good location. Plan to put an accoustical pad under the printer wherever it is placed. If it is necessary for the operator to see the printing as it occurs, desktop height is a good height; if it is not necessary, the printer may be raised sufficiently to store the printer paper supply underneath the printer. If the printer is located on the desktop itself, a paper slot needs to be put in the desk in order that supplies can be put underneath. If this is done, it modifies the characteristics and potential use of the below desk-top storage.

The knee-hole space should be fronted with a "modesty" panel at least nine inches from the front edge. This panel adds stability to the table design. The backside of the modesty panel creates an additional shelf and storage space for the less frequently used, but required, supplies as well as a location to put the table clutter out of sight. This usually requires the drilling of some holes through the desk top in order to locate the wires in that space.

An additional feature of use in most installations is a front mounted master switch for all power. This should be easily accessible. It should contain a power surge suppressor and a light to indicate when the switch is on.

The above stated characteristics have been translated into a portable work station mounted on casters for use in various offices, laboratories and class-rooms, as well as among small businesses by extension farm management and small business economists at the University of Minnesota. An additional considera-tion in this case was a design to permit easy passage through doors and hallways and in and out of elevators. Construction was of wood and formica for reasons of ease of construction and compatibility with other office furniture. The unit has been in use for several years and the specifications indicated below differ only slightly from the original design. The unit has performed very well in its intended purpose. Commercial designs of similar nature exist today which are constructed primarily of metal. Prices range from $100 to $800. Most are priced in the $200 to $400 range. Features are related to price.

<u>Modifications of the portable unit to a permanent location installation</u>

Eliminate the casters, but be sure to keep the height the same or, perhaps, modified for a specific operator. Place the printer on a separate stand to reduce the vibration and noise (typewriter cushion pads and carpeting help). Put the modesty panel at the rear and leave an open shelf for front access to an infrequently accessed storage space.

WHAT YOU NEED TO KNOW ABOUT FLEXIBLE DISKS?
By Earl Fuller

Diskette: Is composed of a thin, circular, flexible piece of polyester film that has been coated with iron oxide. It's on this magnetic surface that information is recorded.

Jacket Liner: Made of a lint-free fabric, it helps keep the diskette free from dust and other surface contaminants that can interfere with recording quality.
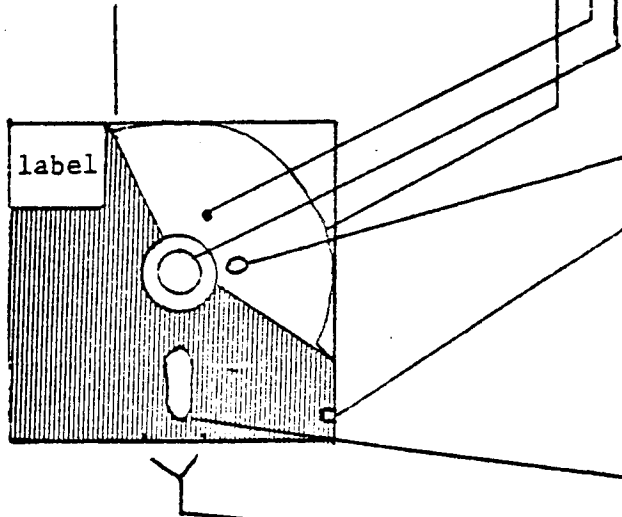
Sector Holes: Divides the diskette into "sectors" or portions so that data can be easily located according to its position within a particular sector.

Hub Ring: Extends the life of your diskette by protecting the center hole from warps, tears and burrs caused by your drive's clamping hub.

Index Hole: Light from an LED shines through this hole and provides a beginning point from which the disk drive will start all recording or reading operations.

Write-Protect Notch: When covered with an adhesive strip, it ensures that data on the diskette cannot be accidentally recorded over.

Read/Write Window: This opening lets the disk drive head come into contact with the recording surface of the diskette.

Stress-Relief Notches: Helps prevent creases which could crimp and ruin your disk.

label

The purpose of the notches in the disk jacket:

8" and 5¼" flexible disks are engineered with a "write-protect" notch (see diagram).

For 5¼": when this notch is covered the disk cannot be written on.

For 8": when this notch is left uncovered the disk cannot be written on. These notches provide protection from accidental erasure of your valuable data.

(Pressure-sensitive pads are provided to cover the notches)

Floppy disk density made perfectly clear:

Single sides: for single head drives. Data is recorded on one side only, one index hole in disk jacket. (100-250 K per 5¼ disk)

Reversible: For single head drives. Data is recorded on both sides. Two index holes in disk jacket. (200-500 K per disk)

Single density: Data recorded at 3408 bpi.

Double sided: For double head drives. Data is recorded and read from both sides. There are two index holes in the disk jacket. May be either single or double density on each side: hence, quad-density. (500-750 K per disk)

A recent innovation which puts chromium oxide crystals on the surface of the diskette promises to increase the density by about a factor of five at reasonable cost. This new technology promises to maintain the competitive advantage of diskettes and the introduction of new and smaller sizes for some applications.

A simple guide to sectors:

Here's a way to determine how many sectors are on disks.

1. Put your thumb through the hub and grasping it between thumb and forefinger rotate the diskette jacket. Do not touch the read/write window where data is read and recorded.

2. Count how many holes in the diskette go past the round ¼" sectoring window cut into the jacket in one full revolution. On diskettes with more than one hole per revolution there's a place where the holes are closer together. One is the index sector hole, a good place to start.

Remember, the number of sectors is always "1" less than the number of physical sector holes punched into your disk.

Disk Size	No. of holes per revolution	No. of Physical Sectors
5¼"	1	Soft sector-actual sectoring determined during formatting (or initialization)
5¼"	11	10 hard (physical) sectors plus index hole
5¼"	17	16 hard (physical) sectors plus index hole
8"	1	Soft sector-actual sectoring determined during formating (or initialization)
8"	33	32 hard sectors plus one index hole. Holes are located between the hub and data recording area.

Suggested Dimensions For A
Mobile Computer Desk Or Work Station

DESKTOP:
    Length: 52 inches
    Width: 26 inches OD (3/8 inch raised lip on two sides and one end)
    Extension wings: 13 inches on both ends with sturdy folding
                    supports (150 pounds)

HEIGHT:
    26½ inches (for any size operator)
    Casters 1¼ inches wide by 3 inches diameter (about 4¼ inches
        effective height)

MATERIAL:
    Top: formica covered particle board
    Undercarriage: Veneer covered particle board; both legs and top are
                    double for strength
    Standard cabinet hardware used
    Shelf supports are adjustable

SPECIAL FEATURES:
    Plan for but do not mount a surge protected switch and fused four-electrical
    receptacle bar (a) near front of desk or (b) in knee-hole or (c) in storage
    mounting. Cut 1½ inches by 3½ inches rounded end wire slots through the desk-
    top, modesty panel, and back storage to side storage compartment walls.

    The inside side to side length of the side storage area is to be 22 inches
    clear. It should have one adjustable shelf. This storage area may be
    planned for (a) disks on the shelves, manuals on the bottom and (perhaps)
    a paper box at the rear. If paper is stored there, a 20 inch paper slot out
    through the desktop centered between the side walls of the storage area and
    3 inches OC from the back edge is needed. If designed this way, the adjust-
    able shelf should be shortened at the rear to accommodate the passage of the
    paper up from the bottom shelf.

    The storage area may instead be planned for component storage, particularly
    disk drives, CPU and/or a backup battery pack.

ALLOW ROOM FOR VENTILATION OF THE COMPONENTS
    If the side storage areas are used for component storage, there may not be
    room for paper or need for a slot; it may be necessary to raise the printer
    off the desktop to provide paper storage. If so, allow for attaching the
    printer to its supporting surface to permit moving the desk around.

    If the computer CRT requires a mounting height above the keyboard unit,
    consider a tilting and rotating mounting shelf. This is perhaps best
    attached to the rear of the desk with adjustable steel shelf supports.
    Locate the supports far enough apart to permit use of the doors on the
    rear storage area.

    The rear storage area behind the modesty wall should be big enough to hold
    an extra box of paper plus keep the component-connecting wires-clutter out
    of sight, perhaps even in a separated-off partially walled compartment.

COMPUTERS IN DAIRY HERD MANAGEMENT[1]

by Will Marsh, Animal Health Economist,
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The outline of this short course includes two objectives :

1. To determine if a computer is feasible for my farm or agribusiness enterprise.

2. To understand computer state of the art technology.

Looking at these objectives it seems to me that we need to switch things around and investigate computer technology before we can determine if a computer is a feasible proposition as a business partner. Also, we have to take a long, cool look at the business to determine where the adoption of computer technology could yield the most benefit for the minimum investment.

The primary reason that many farm operators have purchased a microcomputer has been to help them with their financial accounting. Once that aspect of the business has been mastered, attention turns toward the next area of information management which is often herd records. A great deal of development work has been done in the area of dairy herd management over the past decade, and we are now beginning to see the emergence of a new generation of hardware and software. Besides day to day management, the computer can have many other functions on the dairy farm: Ration formulation and analysis, management of feed stocks, budgeting procedures, and cash flow planning are only a few of the things that can be done with one computer.

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[1] Paper given at "COMPUTERS IN AGRICULTURE SHORT COURSE" at University of Minnesota, Technical College, Waseca, MN. March 23rd. 1984

STATE OF THE ART TECHNOLOGY

The technology to automate data collection in the dairy herd has already been developed to a high level of sophistication, but mass production and implementation has tended to lag behind. The tendency has been to see partial systems such as electronic grain feeders, milk yield recorders, or office computers appear on the dairy farm at different times without too much attention being paid to building a totally integrated system.

For instance, a grain feeding system might have its own dedicated computer and printer which do a fine job of reporting consumption and non-consumption of concentrate feed for all the animals in the herd. When one of these machines has been installed, the dairyman at once has a overwhelming feeling of satisfaction that he is doing a great job of monitoring feed usage and does not really mind transcribing daily consumption figures from the supermarket-type printout to the keyboard of his office computer. The same might be the case for the in-parlor milk recording reports.

As with many other things, as the novelty begins to wear off, the dairyman gets to thinking that life would be a whole lot easier for him if all the electronic boxes would only talk to each other, rather than him having to play the part of the go-between all the time. What's more, they would probably make far less mistakes than he does, especially when he is rushing to get the records caught up before it is time to milk the cows again.

After ten years of selling isolated systems, the equipment manufacturers are finally beginning to respond to the need to allow their various pieces of equipment to communicate with each other, and to at least supply interfaces to allow them to communicate those of other companies. Naturally, they prefer to sell you more of their own, but it is often more practical to tie in with your existing equipment or that of another manufacturer.

There is an integrated dairy information system shortly to be marketed which includes automatic cow identification, milk yield recording, and grain feed monitoring, which ties into an office computer through cables. The office computer also contains theherd records which are continually updated during the day. The office computer can be any one of many currently on the market which will support a concurrent operating system which allows it do a number of tasks at the same time.

As the office computer is multi-tasking, another individual can use it do perform other jobs such as accounting or ration formulation while events in the milking parlor and feed stations are being monitored. This level of integration means that there does not have to be a separate computer at every site, and the data base is updated more quickly and more accurately than before.

Of course this type of system is not justified for every herd at present, nor do I advocate that those who do adopt the technology rush out and buy all the component parts at once. What I would like to stress is the critical need to take a systematic approach to defining your needs and goals, and devising a plan of how to get there. Adopting computer technology for the first time can

be a traumatic experience for some people, although it often need not be. A computer is merely a tool to be used like any other tool. It is up to you whether you use it well or badly. The poor manager who purchases a computer system as a panacea for all his troubles will very quickly find himself in deeper trouble; while the good manager can quickly see a return on his investment and see his business grow.

DEFINING YOUR NEEDS

Most people usually think they know what they want to do, but when it actually comes down to actual implementation, they often find that their ideas are much too vague. A written plan is very useful to the decision maker, as well as others who need to share the ideas (such as advisors, salesmen, employees, employers etc.).

Begin by specifying what data items you want to keep track of, and how they should be analysed, and in what form the analysis should be presented to the persons who make the decisions and implement the subsequent actions. Try to get a good estimate of the amount of time and effort that will be needed for data collection, data entry, analysis, and report generation. Who is going to do it? The size of the computer memory (Central Processing Unit) and mass storage (Disc Drives) will have a bearing on these figures and should be considered at this time.

The development plan should include a a consideration of timing, for a number of reasons:

1. Financial:

a) You or your business may not be able to stand a heavy cash drain.

b) Tax credits may allow you to expense items of office equipment. You may wish to spread this over a number of tax years.

2. Practical:

Beware of trying to learn how to use too much new computer software at once, especially if you are a beginner. It is easy to get confused and frustrated if you jump between different programs while you are learning. It is much easier to learn one application thoroughly before moving on to a new one. Also, when you know the capabilities of the programs you already own, you may decide that some of the proposed purchases are unnecessary.

3. Technological:

Technology moves so fast in the computer world, that it is always hard to make the decision to buy. On the other hand if you are always going to "wait till next year", then you will never get started. Look for a system which is expandable. Expandability includes the ability to swap hard disc drives for floppy drives, or bigger hard drives for smaller hard drives, or adding more memory and/or operating systems. Get an estimate of the cost of upgrading at the time of purchase of the initial system, and include this in your plan. Business computer systems are not going to get a whole lot cheaper, but you are going to be able to get more for the same price as technology marches on.

MONITORING SYSTEMS FOR HEALTH AND PRODUCTION

The ideal monitoring system is quick to use, accurate in its analysis, and informative about whether or not a problem exists. Moreover, if a problem does exist, there should be some indication of the likely cause or causes. There is an unfortunate tendency for computer systems to throw back too much data in the direction of the user in the same form as it was entered. If this relegates the computer to the role of an expensive filing cabinet, then most of the benefit of computerization has been lost.

The value of the computer monitoring system is to begin with a large amount of data, and to distill a relatively small number of indicators which provide the key information necessary for decision-making and action. To clarify this point, it is convenient to divide these indicators into two groups: **Performance Indicators** and **Diagnostic Indicators**.

PERFORMANCE INDICATORS

These are the evidence which tell how closely the herd is performing to the desired targets. For example:

+ Calving to Conception Interval.
+ Lactation Length.
+ Age at first Calving.
+ Length of dry period.

While performance indicators show what is happening, they give us no insight into why those levels of performance are being achieved.

DIAGNOSTIC INDICATORS

Diagnostic indicators are the clues that help to identify the causes of sub-optimal (and super-optimal performance). They require a little more detective work to construct than performance indicators, but they focus attention on what must be done to improve a poor level of performance, or to continue a satisfactory or good track.

Examples are:

+ Calving to first estrus interval.

+ Ratio of single estrus cycles to double cycles.

+ Q-sum graphs.

+ First service pregnancy rate.

INTERPRETATION

While it is often interesting and useful to look at indicators for individual animals, much greater value can be derived by calculating indicators for a group of cows, or even the whole herd. Further, while an average value for the herd is informative, a little further computation can yield an analysis of how much variation exists within the herd, and how the patterns are changing with time.

For example, a herd with an average calving interval of 400 days and a standard deviation of 30 days may be more profitable than a herd with a calving interval of 380 days but a standard deviation of 50 days, due to the fact that there is much less variation within the herd. Looking at the average value alone without consideration of the amount of variation may be, to say the least misleading.

Under the current government compromise program, and later if it is extended or replaced by a quota system, the dairyman needs to know well in advance what his likely production level will bebased upon reproductive performance, feeding policy and disease incidence. The computer is well equipped to provide this type of forecast if it is provided with sufficient, accurate information. Building a detailed record system allows this to be achieved, but care must be taken to allow for changing trends in performance to be considered in the analysis. Generally, the further into the future we try to predict, then the less confidence we have in our predictions. However, the computer can help to "fine-tune" the herd management by indicating the likely consequences of delaying first services, feeding less grain or drying-off cows prematurely.

Characteristically, dairy herds in Minnesota, Wisconsin, and Iowa, are much smaller than those on the west coast of the United States. Many of the dairy herd management programs currently available have been developed to address the needs of the larger herds, and care is needed in interpreting the output under Midwest conditions.

For example, a periodic conception rate can be a useful statistic. It is defined as:

C.R. = <u>Number of cows later confirmed pregnant to service that period.</u>
<div align="center">Number of services in period.</div>

Let's compare the interpretation between a 500-cow and a 100-cow herd:

In a 500 cow herd, an average of 10 cows might be served in any week or 40 in

any month, while in a 100 cow herd the numbers are lower.

PERIOD	HERD SIZE	# SERVICES	POSSIBLE OUTCOMES
Weekly	500	10	0%, 10%, 20%, 30% 100%
Monthly	500	40	0%, .4%, .8%, 1.2% 100%
Weekly	100	2	0%, 50%, or 100% ONLY.
Monthly	100	8	0%, 12.5%, 25%, 37.5% .. 100%

With the larger herd, the range of possible outcomes is much larger, because a greater number of individuals are considered in the analysis. The statistic generated has some meaning to the herd manager. But how about the weekly conception rate for the hundred cow herd? Are you going to believe that your herd's conception rate is bouncing around between 0%, 50%, and 100% just because "the computer says so"?..... or can you recognize that the computer is simply faithfully obeying instructions and doing exactly what was asked of it?

This example may seem trivial, but it serves to show how computer output can be misleading without being wrong. When choosing at herd management software, look for the ability to design your own reports and set your own parameters. This will give much flexibility and perhaps avoid you paying for extra

features that are of no use to you.

WHAT IF I DON'T KNOW OR CAN'T FIND WHAT I WANT?

Many microcomputer manufacturers are currently bundling software as a package with the hardware, usually a word-processor, a spreadsheet, and a data base management program.

With a little patience and imagination, it is not difficult to set up your own monitoring system which you can work with for a year or two. An added benefit is that you will soon have a better understanding of how a computer handles data, but more important, you will have a much better idea of what you want when the time comes to purchase a "canned program".

The data base management program should include a number of minimal features:

1. Basic mathematical functions:

        Addition.
        Subtraction.
        Multiplication.
        Division.
        Square root.
        Date calculation ability.

2. Enough fields per record:

        As it is usually convenient to group all events which occur to
        each animal in one lactation into one record. If you keep track
        of all health, fertility, and production information for each
        lactation, then it is easily possible to exceed sixty items or
        pieces of data per record. Less detail will require less fields
        per record.

3. Ability to easily change data base definitions at a later time.

> No matter how well you think you may have defined your data base,
> sometime you will reach a point where you will want to change the
> way you do things. You might want to start to track some data
> item which you neglected to include at the outset, or perhaps you
> will decide that you have no use for another item which you have
> been monitoring for a while.

> Many of the better data base management programs permit the way
> in which the data base is structured to be changed once data has
> been entered. Some do not. Find out if the one you plan to use
> has this ability. Paying a little extra for this feature will
> avoid having to "start over" when you want to make changes later.

What you keep track of in the database is a matter of personal preference and

interest. Some of the more usual areas are:

> Individual milk yield and composition (DHIA)
> Reproductive events: heats, services, pd's, calvings.
> Vaccinations.
> Clinical Diseases and treatments
> Mastitis treatments.
> Culling dates and reasons.
> Heifer calf records.

Reports and action lists can be generated to assist in the daily management of

the herd, the scope and frequency of the reports depending upon the number of

"cow-days" that elapse, and the nature of the report. A rolling 12-month

average format for some reports helps to remove the effects of seasonality and

overcomes some of the problems with small numbers which were alluded to above.

ALTERNATIVES TO PURCHASING YOUR OWN COMPUTER

One alternative to adopting a health and monitoring system for your dairy herd

is not to purchase your own hardware and software. There are a number of

ways of obtaining the benefits of having herd records on a computer system

without having to purchase the hardware and software and enter the data

yourself.

DAIRY HERD IMPROVEMENT ASSOCIATIONS

The most obvious alternative is the DHIA which is more than just a milk yield
recording association. Most associations have the capability to track
reproductive information and help with ration formulation work. Some of the
more progressive allow members access to their herd records via telephone
lines to either a microcomputer or dumb terminal.

BUREAU SERVICES

There are certain organizations who are willing to provide a record-keeping
and analysis service to dairy farmers. These may be private individuals,
veterinary practitioners, or Universities. To make proper use of a bureau
service, there must be a way of conveying complete and accurate data to the
computer site in a timely manner, so that the analysis, reports, and often
management advice can be provided promptly. All events occurring to all
animals in the herd can be written down in a notebook with duplicate pages
which is carried in the herdsman's pocket. At the pre-arranged interval, the
filled pages can be torn out of the book and mailed into the data processing
center, leaving a duplicate record at the farm. Alternatively, the
information can be supplied by telephone and recorded on an answering machine.

There are many advantages if the veterinarian runs the bureau service. He has
almost as complete a knowledge of the herd as the dairyman, and can use this
information on regular health visits to help improve fertility and efficiency
of production. As in human medicine, there is now a emergence of the concepts
of "wellness" and "preventative medicine", which use animal records to spot
problems before they develop and keep production close to the desired targets.
Generally, veterinarians have been slower than farmers to purchase business

computers, but the amount of interest has increased over the last two years. Your veterinarian can run herd management software on the same computer that he does his accounts on, and a nucleus of four or five dairy clients on a bureau service may well be an attractive sideline and practice-builder for him.

SUMMARY

We have looked at a wide spectrum alternatives concerning computerization and dairy herd management. Options range from totally integrated feeding, milking, and management; through doing-it-yourself with a generic data base program; to paying someone else to do keep records for you. A very careful evaluation should be done before you purchase any equipment:

WHAT do you want a computer to do on you farm.

HOW will using a computer benefit you and your business.

WHO is going to run and maintain the system.

WHERE would be the most logical and useful place to start.

WHEN would be the best time to start.

First formulate your plan. Then start to look at alternatives, talk to dealers, other users (satisfied and unsatsified), and "experts". Whatever you eventually buy, you will soon be out of date with the latest technology; but if you concentrate on the systems approach and always leave room to expand your system, you will have a better chance of maintaining an effective dairy monitoring system.

MINNESOTA DairyCHAMP
(Computerized Health and Management Program)

Extension Open Day - March 16, 1984

Introduction

Dairymen can use DairyCHAMP programs in association with their veterinarians through a mail-in bureau service. DairyCHAMP is a series of computer programs run by the Department of Large Animal Clinical Sciences at the University of Minnesota. The program provides information for health monitoring and management of the dairy herd. Cow and heifer herds can be handled together or individually. The computer program accommodates any number of animals in a herd as well as any number of records for a given animal with up to 60 events in the current record. It analyzes cow records and produces indices which can be used to assess herd performance, reproduction and disease problems. It also produces useful tables which aid in herd management. Reports are produced monthly with annual reports providing a more complete review of herd performance.

CHAMP is a development of computer programs which have been used on farms for over 12 years and which have operated on 4 different continents. Scientific and economic studies of dairy herds using these programs have shown significant improvements in production efficiency and profitability. Consistently these programs and their associated improvements in herd management produce 500 to 700% average return on invested funds. Participation in these programs can help improve production efficiency in a time of increasing costs and stable or decreasing product returns as faced by dairymen now.

Getting Started

To start a herd on CHAMP, arrangements with your local veterinarian and the data lab are necessary. The program can only operate through veterinary cooperation. This arrangement is necessary for full use of the program. The cooperating veterinarian should contact the data lab to make arrangements for starting the herd and to obtain additional information about the program. The contact person for the program is:

Dr. Norm Williamson
College of Veterinary Medicine
385 AnSci/VM Bldg.
1988 Fitch Ave.
University of Minnesota
St. Paul, MN 55108
(612) 373-1854

Pocket diaries are provided as a convenient method for recording daily information about animals on the farm. They should be carried with the herdsman at all times. The date, animal identification, and event should all be recorded in the diary. The diary was designed with self-duplicating paper so one copy can be sent to the data lab and one copy kept by the herdsman. The information in the diary can be transferred to the data lab by mail or by telephone into a phone answering machine in the data lab.

The Cost of Participation in DairyCHAMP

The cost of operating the Minnesota DairyCHAMP is paid by the participants. Charges are set at a minimum and only allow the program to cover cost.

The charges to the participants are:

A. For cows
    1. A one-time joining fee of $2.00 per cow
    2. A user fee of $.40 per cow per month billed every 3 months

B. For Heifers
    1. A one-time joining fee of $1.00 per heifer
    2. A user fee of $.20 per heifer per month billed every 3 months

The potential benefits of the data service are high in view of the small costs. In an average Minnesota DHIA herd (producing 14,500 lb milk per cow), a 1-day reduction in calving interval would pay for the computer service. However, calving intervals typically decrease much more than 1 day. Most herds on the program improve by shortening their calving interval 20-40 days.

Another way of looking at the benefits of the program is to determine the number of saved milking days which would pay for the program in a whole herd. In an average Minnesota DHIA herd, only 37 saved milking days for 1 cow, averaging 50 lb per day will pay for the program. Typically when using the program, several problem cows are detected, saving many months of lost production potential.

The program does involve some costs but this investment can produce very large potential returns, thus making participation in the Minnesota DairyCHAMP an excellent investment alternative for dairymen.

SOFTWARE FOR AGRICULTURE[1]

by Will Marsh, College of Veterinary Medicine, University of Minnesota.

SOFTWARE

What is software? Software is basically a set of instructions that tells a digital computer how to perform various tasks. Software may be presented in a variety of different media such as printed listings, paper or magnetic tapes, punched cards, or more usually in the world of microcomputers, on magnetic "floppy" discs.

Whatever the medium, the set of instructions must be read into the computer's memory before they can become useful to you. Probably all of the software which you will see demonstrated today will be loaded into the computers' memories from floppy or hard discs, while some systems may still have the ability to interface with magnetic tape machines.

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[1]Paper given at the "Computers for farm and Family" Conference at the Earle Brown Continuing Education Center, St Paul, MN. August 26th, 27th, & 28th. 1983

There are three types or levels of software required to run a computer:

1. Operating System.

2. Software languages.

3. Application Programs.

THE OPERATING SYSTEM

The operating system is the environment in which the applications programs run. It provides the necessary instructions to ensure co-ordination between the hardware and software. It organises functions such as allocation of memory space, storage and retrieval of data, governing the printer and the display screen, and recovery from errors. Errors encountered might include the operator putting the wrong floppy disc into the computer, or worse still, not putting a disc in at all. The operating system allows an elegant recovery from the situation, without requiring the operator to switch the machine off and start over again.

The function of the operating system is similar in a way to the links that might exist between a farm tractor and an implement.

Imagine for a moment that the computer is the tractor: It provides the power and traction necessary to run implements, but unless it is attached to an implement, it won't get the fieldwork done. Likewise, think of the applications program as the implement, which is able to translate the power of

the tractor to get the job done, but cannot work without it. The operating system of the computer performs all the links between the two components, which you can think of as the drawbar hitch, the power take-off shaft, hydraulic hoses, electrical connexions, and more.

Fortunately we do not have to know very much about how an operating system works, especially in "turnkey" systems where the operating system is transparent to the user of applications programs.

The more important issue concerning operating systems is the subject of software transportability. Some operating systems are "hardware dependent", which means they will only run on one particular brand of computer. (Think about all the different types and sizes of hydraulic hose connectors). Others, such as CP/M and MSDOS are hardware independent, and will run on a number of different computers.

Applications software is generally written and sold in formats for operating systems rather than for brands of computers. Therefore the more widespread the use of the operating system(s) that you select, then the wider your choice of application software will be. Conversely, the purchase of a computer with an obscure, machine-dependent operating system will severely limit your options when you are looking for programs to help in the running of your business.

Traditionally, microcomputers have been limited to performing one task at a time. That is "they could not walk and chew gum at the same time". New multi-tasking operating systems such as concurrent CP/M, UNIX and OASIS are

now becoming available that permit a number of jobs to be carried out apparently simultaneously. Enhancements to single-tasking operating systems such as "spooling" allow certain tasks to be done when the computer has more time to do them:

For example, a farmer can ask for a list of reports from his dairy management program, before terminating that program and loading his ration formulation package. The computer will then continue to send the reports to the printer in the "background" while he carries out his ration formulation in the "foreground". In this way, the user is not left waiting for the print job to be finished before he can move on, so he is able to make the maximum use of his time at the keyboard.

Some brands of computers can run two or three different operating systems, but not at the same time. The operating system may be stored on a disc with the applications programs, and is loaded first into the computer memory when the system is "booted". Alternatively, the operating system may be added to the hardware by installing the appropriate "board" or "card" as an optional extra or a later addition.

Operating systems may be included in the base price of the computer,or sometimes can be priced separately. Be sure you know what is included for the price you are quoted. A computer without an operating system is like a car without an engine - it won't take you very far! The operating system disc should also include essential utility programs to format and copy discs and files. In many cases you may also get a program editor, as well as directory and status programs.

LANGUAGES

"High level" computer languages allow the programmer and the computer to understand each other. Each language has its own syntax of nouns, verbs, and punctuation just like English, French, Spanish or German do. Generally, computer languages are easier to learn because they have smaller vocabularies, operate in the present tense, and are written rather than spoken. Be warned though, that often "dialects" of the same language occur on different computers, just like people from different parts of the same country may have great difficulty in understanding each other.

BASIC

BASIC stands for Beginners All-Purpose Symbolic Instruction Code. It is probably the easiest language to learn, but the hardest to master. Many microcomputer companies include the BASIC language with the machine at no extra charge, so your first experience in computer programming will very likely be in BASIC. Some of the farm computer magazines print listings of programs in BASIC which you can type in from your keyboard and use yourself. But watch out for those tricky dialects!

FORTRAN

FORTRAN stands for FORmula TRANslation. This language is often applied to applications where many mathematical calculations are required.

APL

Simply enough **A Programming Language.** Used by mathematicians and statisticians.

PASCAL

Pascal is a favorite of computer science instructors as it forces good programming style, and teaches principles and good habits.

These are just a very few examples, as there are many other languages that you might hear of:

COBOL

FORTH

C

LOGO

LISP

PL/1

MODULA-2

CBASIC

...........and many more.

It is very important for you all to understand that you do not have to learn a computer language in order to used a computer in your home or on your farm. The languages are there for you to learn and use if you are interested enough,

but when you purchase an applications program all the programming work has

done by a professional programmer.

APPLICATIONS PROGRAMS

Applications programs are the true software that you might purchase to keep your books, animal records, crop records, or to play games. These programs are most often written in some "high-level" language such as we have discussed. The language chosen by the developer is often a matter of personal preference as well as suitability for certain tasks.

Computers that support only one operating system that support only one language are becoming less common as the users of business computers have become more discerning, and manufacturers have become more competitive. The need for the language to be supported depends on the form in which the software is distributed.

Some software, particularily that available as a "public good" requires the user to load the language interpretation instructions into memory before the program. The high-level language acts as an "interpreter" converting the language that the programmer understands into machine language that the computer understands. Usually the program can be listed out onto the computer screen or printer. If the user has some programming ability, he may be able to modify the program himself to suit his particular needs. Those with lesser ability may wreck the program completely. So always make a copy to experiment with - never modify the original.

More and more commercial software is being sold in a compiled form. This

means that the instructions have already been converted to computer-speak, and are stored permanently in this way in the disc files. This has several advantages:

1. Programs (usually) run much faster, because the middle-man (the interpreter) has been cut out.

2. The operating system does not have to support the language that the program was originally written in. It has been pre-translated for you.

3. You cannot list out the program (source code) on your printer. This may not appear advantageous to your point of view, but it provides a measure of security to the programmer who may have spent many man-years building an accounting system. It is important for the programmer to protect the programming tricks and secrets which might give a program a competitive edge over the competition.

4. Programs developed on different computers in different dialects of different languages are able to run on computers which support the same operating system. This makes your choice of hardware less critical, and your choice of software much wider.

SOFTWARE EVALUATION

HOW DO YOU KNOW WHAT YOU WANT YOUR SOFTWARE TO DO FOR YOU?

HOW DO YOU KNOW WHEN YOU HAVE FOUND WHAT YOU ARE LOOKING FOR?

WILL YOUR NEEDS STILL BE THE SAME NEXT YEAR?..TWO YEARS FROM NOW?

Finding the answers to these and other questions can be very perplexing. If farm businesses were not so diverse in nature then it would be easier to write software that would satisfy the majority of needs. But this is not the case.

We hope that we can help you in these matters. By attending this seminar and trade show today you are able to see, hear about, and get some hands-on experience of what is available. Best of all you can compare what each of the vendors has got to offer you.

The first step in software evaluation should always be to evaluate your own personal situation first. The capabilities of computers in processing data are very broad, but they are not productive unless they are harnessed and applied intelligently, so that the information provided is relevant to basic managerial needs in dealing with important problems.

There are four types of information that a farm manager uses:

1. DESCRIPTIVE - What is going on?

2. DIAGNOSTIC   - What is right? What is wrong?

3. PREDICTIVE   - What if?

4. PRESCRIPTIVE - What should be done?

It will help to keep these concepts firmly in mind as you try to evaluate your own needs, the needs of your business, and how computer software can help you fulfil those needs. I will try to help you with the software evaluation.

EVALUATION

Begin with the description of the application program. This may be in the form of printed promotional material, a verbal presentation by the vendor, or a report from a current user. If this pre-view shows that the program is capable of performing the functions that you require, it is time to take a closer look:

To clarify the evaluation process, it is convenient to divide the process into six main areas:

1. Documentation.

2. Data collection and preparation.

3. Data entry.

4. Analysis.

5. Reports.

6. Support and maintenance.

DOCUMENTATION

Good documentation is essential. Printed manuals should be clearly presented,
with plenty of examples and a comprehensive index. It can be very frustrating
to know that the help you need is somewhere within the manual, but you are
unable to find it quickly from the table of contents or the index. Ideally
the manual should be instructional as well as informational; so that by the
time you have worked your way through the manual you are proficient in running
the program and interpreting the results.

Another level of sophistication is on-line documentation. This means that an
electronic manual is loaded from the disc drives into the computer's memory at
the same time as the applications program. In this way, all the help that you
need is available at the touch of a key. This key may be a designated [HELP]
key if your computer has one, or sometimes the question-mark [?] or [H] key.

Often you are able to page through several screens of help information, or you
may request a particular help screen if you know exactly which screen you
need. Escaping from the HELP facility should return you to the point in the
program where you requested help, and allow you to continue running the
program. A further enhancement is to be able to request a calculator mode. A
part of the screen can be used as a scratch area where you can manipulate the
raw data into appropriate values for entry into the program.

There may also be data files provided with sample entries to help you

understand how to run the program yourself. Some programs will have default values already included on the entry screens. This means that you only have to enter those items that differ from the default values for your situation. Not only do you get an idea of what the program expects for entry values, but the data entry process can be speeded up considerably. Often the latest set of values that are entered become the new default values, so that repeated runs to get sensitivity analyses can be done very quickly.

DATA COLLECTION AND PREPARATION.

When running an accounting program, record-keeping system, or decision-aid program, the collection and entry of accurate data is the most important step.

In most agricultural applications, data must be collected around the farm and then entered into the computer in the farm office at a later time. Therefore it is very important that you know in advance exactly what the computer requires for input, and also the format it expects the entries to be in. This information should be readily available from the documentation. Also look for an option to print data collection forms which will help in the collection of complete and accurate data, as well as providing a permanent paper record of the input values.

Look especially at the types and detail of data that are required. If certain types of data are not collected, then reports that are dependent upon that data cannot be generated. Worse still, the program may have assumptions written into it which are totally incompatable with your farming system, which may be the cause of producing very misleading reports. Generally, the more detailed the input required, then the more detailed will be the analysis done by the software.

THE DATA ENTRY PROCESS

The best way to evaluate data entry is to sit down at the keyboard and enter data.

The usual form of input involves the computer posing a question to which the user types a response from the keyboard. There should be no ambiguity or confusion as to the format of the response. A common example occurs where the user is about to enter a percentage value. Should the value be a decimal or a whole number? The prompt should make this clear by giving an example. Dates are another instance where confusion can creep in.

Good software will trap all obvious errors at entry time: For instance, if a value that is entered is out of the acceptable range, then the computer will gently prompt for you to try again, at the same time displaying the range for acceptable values. It can be very annoying if the computer keeps refusing to accept your entries without explaining why you are wrong or what it wants. This is a good time to test the [HELP] button to see exactly how helpful it can be.

Try entering some nonsensical values such as negative numbers and zeroes. Does the program catch these, or does it proceed with the analysis anyway? Try to determine how fast the data entry process proceeds. Is the computer always ready for you, or are you constantly waiting for it to prompt for the next input?

A batch entry system will permit fast entry of data because it does not write to the disc after each case is entered, rather it stores entries in a memory buffer. The number of entries stored will depend on the amount of detail entered and the size of the buffer. The major disadvantage of this system is that if the power fails or "spikes", then all the entries stored in the buffer will be lost and will have to be entered again. It is a good idea to get in the habit of writing the buffer contents to the disc every ten minutes or so, so that if disaster strikes, then the amount of wasted effort is minimised.

The alternative to the batch system is the interactive data entry process. As each case is entered to the keyboard, it is written to disc as a permanent record. This may also permit extra verification to be done, but at the expense of speed, which may or may not be critical. For instance if you are updating your dairy herd records the interactive system might allow a check against historic information such as service dates to verify whether the calving date you have just entered is acceptable. If found unreasonable, you will be able to make a correction before moving onto the next animal. Also her whole record may be inspected at the time of updating, so you can be sure you have the correct animal.

Generally, if you are using a hard disc drive on your computer the interactive system will not keep you waiting excessively. Hard disc drives rotate at 3600 r.p.m., while floppy discs rotate at only 300 r.p.m. Therefore it is a good idea to evaluate software on the brand of computer with same drive configuration which you own or are planning to buy. Software performance may also vary surprisingly between different makes of computers.

THE ANALYSIS

This part is very hard to evaluate in a short time, as all the operations are done inside the computer's memory. Glaring errors in computations easy to find; but more subtle inconsistencies (called "bugs") may show up only infrequently, and may be very difficult to detect.

Pertinent questions to be asked about the analysis are:

1. HOW LARGE A FARM WILL THE SYSTEM SUPPORT?

For example the number of animals in a herd records program, or the number of enterprises or account numbers in an accounting system.

2. FOR HOW LONG IS DETAILED INFORMATION KEPT?

Are cow records kept for a lifetime or just the current lactation

Are detailed financial accounts kept on file, or are they summarised at the end of each month?

Does the program permit an audit trail?

3. HOW EASY IS IT TO MAKE MODIFICATIONS TO THE PROGRAM?

Does the vendor have "source code?

Does he have the ability to make changes?

Is he willing to work with you in this way?

If you make any changes yourself, will you void any warrenties or support agreements?

4. WHAT ARE THE DATA STORAGE REQUIREMENTS?

How much information can be stored on one floppy disc?

In what format are the data files set up?

Can they be read directly by other software for analysis?

How often do the data files have to be backed up? How long does this take?

5. HOW LONG DOES THE ANALYSIS TAKE?

The speed at which the analysis is done is very important, but again very difficult to evaluate in a demonstration situation. Accounting and

record-keeping programs build up great amounts of information in data files as they are used, and their performance under load can be extremely variable. Often demonstrations of such software are done with a small amount of data on file. Under such conditions, summary sheets, profit & loss accounts, and balance sheets can be composed and printed very quickly.

The problem is to know how the well the software runs when there is a year's worth of data on the disc drives. When you are test-driving a tractor that you are considering purchasing, your instinct tells you hitch up to your biggest plough, set it deep, and head for the steepest gradient on your farm, determined to stall it out if at all possible.

If you are sufficiently interested in a particular software products, it will be worthwhile to ask the dealer for the names of clients who have been using them for at least a year. Contact one or more and ask some questions:

HOW DOES THE SOFTWARE RUN WITH A YEAR'S WORTH OF DATA ON FILE?

WHAT DO YOU LIKE ABOUT THE SOFTWARE?

WHAT DON'T YOU LIKE ABOUT IT?

WHAT CAN'T IT DO THAT YOU WOULD LIKE IT TO DO?

WOULD YOU BUY IT AGAIN, OR IS THERE SOMETHING BETTER?

HOW EASY IS IT TO USE, HOW "FRIENDLY" IS IT?

WHO DO YOU CALL FOR HELP?

Having gained his confidence, it's a good time ask a few questions concerning the vendor:

HOW WELL DOES HE KNOW THE SOFTWARE HE SELLS?

DOES HE PROVIDE ANY TRAINING?.....WHERE AT?.....AT WHAT COST?

IS HE HELPFUL IN SOLVING PROBLEMS?.....DOES HE CALL BACK?

A few hours spent in this way can be very rewarding and enlightening!
Be careful if the person with whom you are talking has a different brand of microcomputer from the one you have, or are considering purchasing. The performance of software may vary between machines due to central processor size, capacity of disc drives, and whether it has hard or floppy disc drives.

REPORTS

The report section is relatively easy to evaluate, as samples of output can be printed and inspected. With some programs the output is pre-determined by the programmer, and cannot be changed.

More sophisticated software permits the user to design his own reports from the keyboard, and a library of report formats can be built up for repeated use. It is highly desirable that reports be routed to the screen for inspection before being printed. This will save the office floor from becoming littered knee-deep in surplus output; also a printed copy may not be required each time.

SUPPORT & MAINTENANCE

No computer program is ever finished. Software is constantly undergoing a process of revision and review. The real test of a computer program comes at the hand of the end user, and this is where "bugs" not detected at the development stage come to the surface. Also changes in hardware technology allow more memory to be addressed, permitting the software to run faster and become more sophisticated. Changes in the laws may affect financial management software.

Therefore you need to come to some agreement with your vendor such that you are kept up-to-date with the latest version of the software that you are

using. A very good way to do this is by means of a service agreement: By paying an annual service fee to the software supplier or your dealer, you will be entitled to receive updates as they are released, as well as help when you need it.

Remember that your computing needs are always going to be changing. New software is always being written, and the structure and nature of your farm business may be very different in a few years time. If you are derive the most benefit from your computer on the farm or in the home, you need to be kept informed of changes in hardware and software technology. We have now arrived at the time where the Agricultural Computing Vendor is just as much as a management consultant to the farm business as the banker, machinery dealer, nutritionist, veterinarian, or Extension agent.

THE INTEGRATED APPROACH

As agricultural software has been developed over the past few years, users have come to appreciate and demand integrated software. It makes sense that once the user has gone to the trouble of entering data into the computer to be used by one applications program, then he should be able to use the data files as input to another program. Conceptually, there are cases when the output from the first program can be used as input for a second. Wouldn't it be better to let the computer do the "busy work" rather than send the output to printer then type it all in again from the keyboard? Think of all the time that could be saved, not to mention all the typing errors which could be avoided.

For example, a farmer might be keeping his pig records on a data base management program. Based on his service information, and current performance levels he could very easily produce a report to forecast the number of farrowing crates he will need in three months time, and the number of market hogs which would be ready for sale in nine months time.

If he suspected a change in, or wanted to know the consequences of a change in the farrowing rate, or one pig less born live per litter, this would be very easy to analyse in a electronic spreadsheet program. So why not direct the output to the spreadsheet instead of the printer?

The integrated approach makes this possible by directing the report to a data file which can be read directly into the spreadsheet program by the computer. Once displayed in the spreadsheet format it is easy to make those types of changes, add pig and feed prices, and produce a projected cash flow statement. Often, the spreadsheet will be integrated with a word processing program, so the statement can be incorporated into a letter to a banker or loan officer which might discuss borrowing needs for the coming period. Once the procedure has been set up, it is stored by the computer for use at a later time. Many procedure files can be stored in a library at one time, and called upon when required.

The same principle applies to integration with statistical analysis, charting software, and even transmission of data files to and from another type of computer.

SOURCES OF SOFTWARE

1. COMMERCIAL VENDORS.

Mostly what we have been talking about today. Go see for yourselves.

Look for : Flexibility

Integration

Support & Training

2. PUBLIC GOOD SOFTWARE.

a) University Extension Service. AGNET, TELEPAN, EXTEND

b) Computer Users Groups.

On-line decision aids and information. If there isn't a computer user's group nearby then start one yourself. It only needs two people to start.

3. BOOKS AND MAGAZINES.

a) Farm computing magazines.

b) Computer magazines.

c) Bookstores.

4. WRITE YOUR OWN.

Lots of luck!

5. CUSTOM PROGRAMMERS.

Can get expensive. Often a last resort.

CLOSING REMARKS

Once you have acquired your computer system you will very quickly find that the investment in software will far exceed the investment in hardware. However, there is a third investment which is the most precious of all - your time. To make best use of your time at the computer you should take time to select the software that is best matched to your farming operation and your hardware.

Don't expect the computer to make you an instant success at farm management if you are doing a poor job at present. It won't, it will just make things worse much faster. Don't expect the computer to save you time. You will just find more things to do with your computer to fill the available time.

Used wisely and effectively, the microcomputer can be a valuable tool in the management and control of the farm business. But, like fire, it makes a poor master.

A Consumer's Guide to Selecting a

Farm Records System - Computer or Hand

by

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Abstract

This paper addresses the needs of both farm managers and rural appraisers to have farm records that are complete, accurate, and useful. Large numbers of record-keeping packages have recently become available for personal computers. Selecting a farm record system poses many problems in knowing user needs, knowing package capabilities, and comparing these needs and capabilities. This manuscript addresses these problems systematically with general discussion of selecting farm record systems, a survey of information and a set of test entries.

A Consumer's Guide to Selecting
A Farm Records System
(Computer or Hand)

INTRODUCTION

Selecting a farm records system for the farm business is important for all farmers. While the farm records system is an important component of farm computer software, all farmers have various needs--income tax information, farm business analysis, enterprise analysis--that can be satisfied by an appropriate farm records system. The considerations for selecting a farm records system for the farm business are important whether farmers (1) own and operate their own microcomputer; (2) subscribe to a hand or a computer accounting service; (3) have their own hand record system; or (4) have some mix of the first three alternatives.

In selecting a farm records system, farmers need to carefully examine their objectives, needs, capabilities, and alternatives. Such information can be used to determine the benefits of a system which can be weighed against its total costs. When shopping for a farm records system the first set of questions should examine: (1) a farmer's needs and wants; (2) other available services; (3) the general investment analysis of purchasing, installing and operating the system; (4) effective usefulness; (5) user instructions; and (6) program diagnostics or trouble-shooting guide. These considerations are particularly important when a farmer selects microcomputer software because it becomes an investment much like the purchase of the microcomputer and all other software.

This paper contains a discussion of the requirements of farm records; a description of basic farm financial records and farm business analysis; and a survey list of questions for general, required and desired information. A set of test entries is also included for farm managers to use in examining their needs within a particular farm records system.

FARM RECORDS - WHAT SHOULD THEY BE LIKE

Farm records should be complete, accurate, and used. A complete farm records system depends on the farmer's intended uses. Complete means that the system has the flexibility to handle all entries that occur in a particular application. This will be discussed in further detail once we develop the uses of farm records, types of systems available, and some considerations in selecting a system.

Accuracy in keeping records is obviously important when these records serve as documentation for income tax returns or as data for farm business decision-making. Any farm records system needs to contain accuracy checks on both farm accounts and any measures of profitability, solvency, or liquidity developed by the system. Accuracy can be enhanced by adequate documentation that explains entries to the system and output produced by it.

Farm records have four main uses - service tool, diagnostic tool, indicator of progress, and forward planning tool. As a service tool, farm records can be used to file income taxes, compute social security, document credit needs, provide information for estate planning and supply information for developing farm business arrangements. As a diagnostic tool, the records can show the strengths and weaknesses of the farm business as well as comparing actual against planned

performance. The records can also be used to show how the business is performing over time. Finally the records can provide data to be used in planning for the future. The past performance record of the business can be used as a predictor of future performance levels. A good farm record system is the foundation of all farm management work. Therefore, it is vitally important the farm manager selects the most appropriate system to fit the specific farm situation.

Types of Systems

Basically there are three types of record systems available - hand only, hand plus computer and computer only. The hand system can range from simple lines on paper to an accountant's format to a sophisticated, highly developed, and specially designed farm account book. Similarly the hand plus computer can mix the old hand technologies with the new computer technologies. In computer systems users can opt for (1) main frame programs accessed by terminals or by mail, (2) a microcomputer at the farm level, or (3) a mix of micro and main frame. Remember a well designed hand record system can do everything a well designed and properly programmed computer system can do. Only the computer system can do it faster and more accurately. Poor hand record keepers are generally poor computer record keepers. The level of technology used should fit the farm and the user. Sometimes evolving from hand to computer records should move slowly and change only when one level of record keeping is mastered and the end product is effectively used.

Some Considerations in Selecting a System

In selecting or developing a farm accounting package there should be a balance between general business accounting practices and

established farm accounting methods. One should take the best from the accountants and adapt it to the farm business. But, the accountants should not become too influential since farm accounting for income tax purposes in particular has unique characteristics. Also be careful that entrenched farm records systems and ideas about farm records systems prevent the adoption of sound business accounting.

Considerations should be given to such features as the ability to handle cash or accrual accounting and double or single entry accounting. The system should be able to accommodate different types of business arrangements such as sharing agreements, joint ventures, incentive plans, leases, partnerships and corporations. Also the system should have provisions so that it can be readily updated to conform to new tax laws and other required reporting needs. Further the system selected should enable the user to expand the capabilities of the system to meet changing needs for record generated information. This will let users adapt the system to fit their information management needs.

What is a Complete Farm Records System?

A complete farm records system depends on the applications. Developing a system designed for whole farm business analysis is based on two general types of records - (1) financial and business and (2) production. This article focuses on the financial and business records. Complete production records can then be used as supporting information and for diagnostic purposes.

There are three major business and financial accounting reports. The Net Worth Statement or Balance Sheet shows the financial position of a business at a point in time. This accounting report contains the net worth of the business along with the distribution of assets and

liabilities. The Farm Earnings Statement or Profit and Loss Statement shows the profitability of a business over a particular time period. Net cash farm operating income (cash accounting) and net farm income (accrual accounting) are the main measures of profitability included in this report. The Cash Flow Report or Sources and Uses of Funds Statement contains the cash inflows and outflows of a business over time. This report contains the amount and distribution of cash coming into or going out of the business.

In addition to these basic general reports several other kinds of financial and business records should be available to the farm manager. These could include accuracy checks - cash flow, profitability/net worth, and liabilities; enterprise accounts - crop and livestock; labor records; marketing records; feed records; experimental records; individual machine records; and family records. The above records are essential in doing a complete business analysis since the causes of financial problems can be found in these source documents.

The farm records system should also provide for a business analysis that develops measures of profitability, solvency and liquidity/cash flow. In addition, measures of business performance factors should be calculated that show the causes and effects underlying these measures. Data from the record system should be readily available for forward planning uses.

With this sort of a brief overview, potential and current users of farm records systems can begin to look at available farm records systems and make some judgements about the appropriateness of a specific system for their farm operation. The following survey can be a guide to checking those features user feel to be important in their operation.

The survey is divided into three sections each designed to obtain specific types of information. These three sections check general characteristics of the system and vendor, required information for income tax purposes, and desired information for farm business analysis. This survey is followed by several test entries that are designed to demonstrate how a particular record system handles specific entries.

SURVEY LIST FOR A FARM RECORDS SYSTEM

General

A good farm financial records system depends on records that are complete, are accurate, and can be effectively used. The records can be used as a (1) service tool, (2) diagnostic tool, (3) indicator of progress, and (4) forward planning tool. The selection of a particular system, however, is a process that depends on a great many variables. These include general characteristics of the vendor, required information, desired information, and the system's ability to accommodate various entries that may arise on the farm. This general overview section lets a farmer judge various characteristics related to both the vendor and the farm records system. Check either the yes or no column and make any appropriate comments. This checklist can be most helpful to farm managers if they first rank the system features according to their importance, and then complete the survey.

Item	Yes	No	Comments
1 Reliable and reputable vendor readily accessible to user			
2 Vendor updates system to accommodate changing tax laws			
3 Vendor updates system to meet changing needs of users			
4 Vendor provides general training in the use of the system and interpretation of the results			
5 System provides user opportunity to expand capabilities			

Item	Yes	No	Comments
6 System provides for cash and/or accrual accounting			
7 System provides for single and/or double entry			
8 System allows for user-specified fiscal year			
9 System provides for different types of business arrangements			
10 System provides for the separation of business and personal income and expenses			
11 System provides clear, concise user instructions which are well indexed			
12 System provides trouble-shooting guide to any errors due to family data entry or incorrect commands			
13 System has external storage devices (disks) and a printer to retain data in case of computer failure			
14 System is acceptable to your accountant or tax practitioner for tax filing			
15 Other features you feel are desirable or necessary (specify)			

Required Information

This required information represents output from the farm records

systems which is needed to meet minimum income tax needs. A user needs

to have information pertaining to income from (1) purchased items held

for sale, (2) capital items, and (3) ordinary income. Other information
concerning income entries is also required to complete income tax
requirements. Expense information about ordinary expenses, purchased
items held for sale, and capital items along with other considerations
completes the income tax requirements. Cash accuracy checks are
necessary if one is to trust the numbers received as output from the
farm records system.

Item	Yes	No	Comments
A. Income			
1. Items purchased "held for sale"	XX	XX	XXX
a. Tax information			
b. Cash flow information			
2. Capital items which	XX	XX	XXX
a. Do qualify for capital gains treatment			
b. Do not qualify for capital gains treatments			
3. Ordinary	XX	XX	XXX
a. Cash			
b. Noncash			
c. C.C.C. loans/sales - PIK etc			
d. Hedging			
e. Other items relevant to your situation (specify)			
_____ ___.			

Item	Yes	No	Comments
4. Other considerations	XX	XX	XXX
a. Trades and Exchanges			
b. Barter			
c. Casualty losses			
d. Credits			
e. Reimbursements, refunds, and so forth			
f. Exclusion from income			
g. Nontaxable income			
h. Other items relevant to your situation (specify) _____			
B. Expenses			
1. Ordinary	XX	XX	XXX
a. Operating			
b. "Held for Sale" items			
2. Capital	XX	XX	XXX
a. Purchases			
b. Depreciation or Cost Recovery			
3. Other considerations	XX	XX	XXX
a. Barter			
b. Soil and water conservation			
c. Land clearing			
d. Timber			
e. Sand, gravel, minerals, and so forth			

Item	Yes	No	Comments
f. Nondeductible items			
g. Payroll reports			
h. Provides 1099 Misc., Int., NEC, information			
i. Other items relevant to your situation (specify) _____.			
C. Other possible records	XX	XX	XXX
1. Social Security			
2. F.U.T.A.			
3. OSHA			
4. Workmen's Compensation			
5. Retirement plans			
6. Other (specify)_____.			
D. Cash accuracy check			

Desired Information

Additional desired information may not be necessary for income tax purposes, but will be required if you are going to complete the farm business analysis. This desired information includes the "Big Three" basic farm financial records; accuracy checks; enterprise and other accounts; and measures of business performance. In order to complete the analysis, a farm manager may want to measure a particular year's results against last year's budget; prior performance from the last three to five years; and the performance of the industry-locally, nationally and internationally. Consistent asset valuation and techniques of deriving financial measures of performance are essential if the analysis is to be meaningful.

Item	Yes	No	Comments
A. Net Worth Statement (Balance Sheet)			
1. Assets	XX	XX	XXX
a. Current; inventory records			
b. Intermediate; capital asset records			
c. Long term;capital asset records			
2. Liabilities	XX	XX	XXX
a. Current; Loan accounts			
b. Intermediate; Loan accounts			
c. Long term; loan accounts			
3. Valuation method used for:	XX	XX	XXX
a. Business management			
b. Income tax			
c. Credit			
d. Estate			
4. Personal and Business separated			
B. Farm Earnings Statement (Profit or Loss)			
1. Cash Operating Statement	XX	XX	XXX
a. Operating Income			
b. Operating Expenses			
2. Inventory Adjustments			
3. Capital Item Adjustments			

Item	Yes	No	Comments
C. Cash Flow Report (Sources and Uses Funds)	XX	XX	XXX
1. Inflows			
2. Outflows			
D. Accuracy Checks	XX	XX	XXX
1. Cash flow			
2. Profitability/Net Worth			
3. Liabilities			
E. Enterprise Accounts	XX	XX	XXX
1. Crop	XX	XX	XXX
a. Financial			
b. Production			
2. Livestock	XX	XX	XXX
a. Financial			
b. Production			
3. Other accounts	XX	XX	XXX
a. Labor			
b. Marketing			
c. Seed			
d. Experimental			
e. Individual Machine			
f. Family			

Item	Yes	No	Comments
F. Business Analysis	XX	XX	XXX
1. Profitability measures	XX	XX	XXX
a. Causes			
b. Effects			
2. Solvency	XX	XX	XXX
a. Causes			
b. Effects			
3. Liquidity	XX	XX	XXX
a. Causes			
b. Effects			
G. Forward planning data is readily available for budgeting.			

Test Entries for a Records System*

Following are a number of test entries by transaction that may be entered for a farm business. The intent is not to play "stump the vendor". Not every system can handle every test entry. The purpose of this list is to provide items that can be presented to the vendor as a test of a particular farm records system. Ideally, these will be used to demonstrate the capabilities or limitations of a particular system. When using these entries, they should be selected according to importance for the needs of the farm manager. Evaluate high priority entries first and then proceed to lower priority items.

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*   These entries were developed from the sources cited in the bibliography. Each of these entries does fit into the farm records contained in these sources.

Date	Description

Date   **Description**

X-12-8X Sold raised beef cow (Blocky) to Carl's Cow Carnage @ 1,000 lbs. @ 56 cents/lb. for $560 gross amount. Marketing charges are $2.80 with $7.20 hauling. Net check is $550. Held 26 months.

X-13-8X Purchased "held for sale" feeder pig died. Purchased the tenth month of the prior accounting year for $50. Purchase weight 45 lbs. Dead weight 125 lbs.

X-17-8X Sold purchased dairy cow (Fence Jumper), 1,400 lbs., to Packer's Inc. Cow was purchased in month 10 of prior accounting year for $1,000. Depreciation taken was $150. Sale price was $630. Marketing charges for $3.15; trucking was $6,85. Net check was $610.

X-18-8X Sold 10,000 board feet of timber to Len's Lumber @ $55/thousand. Gross and net check of $550. Timber grown on home farm since it was purchased 25 years ago.

X-19-8X Sold 20,000 board feet of timber to Lester's Long Lumber Co @ $65/thousand. Gross check and net check of $1,300. Cost basis of timber $300. Timber was held over 1 year.

X-20-8X Milk sold to Milky Dairy 47,000 lbs. @ 13 cents for $6,110 Test 3.7, 12 cents differential. Deductions: Milk house supplies $85, hauling $235, butter an cheese $40, life insurance $50, health insurance $75, health insurance for hired help $60, A.D.A. $25, milk check assignment $1,840. Net check $3,700. Total deductions $2,410.

X-21-8X Patronage dividends from Milk Dairy $200. Received $40 in cash.

X-24-8X Patronage dividends from A.B.C. Co-op $500. Received $100 in cash. Note: in the year in question it was determined that 10% of the dollar volume of business done with A.B.C. was for personal expenses.

X-25-8X You received $1,000 worth of fertilizer from the government for use on your farm.

X-26-8X You built a concrete structure for soil and water conservation purposes which cost $1,000 and received a check from the Federal government for $400 for cost sharing. Paid with check No. 1.

X-27-8X You received a credit of $200 as a Federal gas tax credit and a credit for lubricating oil of $5.

X-28-8X You receive a $50,000 insurance payment for Arson Anonymous Ins., Inc. for a fire that completely destroyed your barn which had an adjusted tax basis of $10,000 and was held for 120 months. In the same year you build a barn for $70,000. Paid be check No. 2.

Date	Description

X-03-8X   Sold 1000 Bu. corn to ABC Coop. fob farm at $3/bu. Received check for $3,000. This corn was under C.C.C. loan for $2,500 and was reported as month 11 income in the prior year. The corn was redeemed from C.C.C. on X-02-8X of this year.

X-04-8X   Sold 10 raised hogs to Packers, Inc. @ 220 lbs/head of 2,200 lbs. @ 56 cents/lb. Marketing charges were $6.16 with trucking charges of $15.84. Net checks was $1,210 and the gross amount was $1,232/

X-05-8X   Sold 5 head purchased "held for sale" steers @ 1,100 lbs/head or 5,500 lbs. @ 76 cents/lb. to Sam's Slaughter Salon. Marketing charges were $20.90 with trucking costs of $34.10. The gross amount was $4,180 but the net check was $4,125. These steers were purchased month 4 of the prior accounting year @ 450 lbs/head or 2,250 lbs @ 80 cents/lb delivered to the farm for a total of $1,800.

X-06-8X   Sold 1 raised brood sow (No. 123) to Arlin's Abattoir, 22 months old @ 600 lbs. @ 41 cents/lb. Marketing charges were $1.23 with $4.77 for trucking. The gross amount was $246 while the net check was $240.

X-09-8X   Sold 1 raised dairy heifer (Bashful) to Don;s Dairy Demise, 23 months old, held for dairy but found to be sterile. Weighed 1,000 lbs. @ 59 cents/lb. Gross sales amount was $590. Trucking expenses equalled $7.05 with $2.95 of marketing charges.

X-10-8X   Sold purchased dairy cow (No. 3X050) to Carl's Cow Carnage. Cow was purchased 42 months ago (before E.R.T.A. 1981) for $1,000, salvage value was estimated at $500 and a five year life was selected. Prior depreciation was $350 (3-1/2 yrs. x $100/yr). Cow weighed 1,300 lbs. and sold for 50 cents/lb. for a gross of $650. Marketing charges were $3.25 with $9.75 trucking charges. Net check was $637.

X-11-8X   Sold PIK corn which was received two weeks prior to sale. 1000 bu. at $2.95 per bushel. Received check for $2,950.

X-11-8X   Sold PIK corn which was received in a prior year. 1,000 bu. at $3.00 per bushel. Received check for $3,000.

X-11-8X   Sold purchased dairy cow (Pail Kicker) to Don's Dairy Demise. Cow was purchased 25 months ago (after E.R.T.A. 1981) for $1,000. Cow was five year class property. $150 of depreciation was taken in year 1 and $220 of depreciation was taken in year 2. The cow weighed 1,300 lbs. and sold for 50 cents/lb. for a gross of $650. Marketing charges were $3.25 with $9.75 trucking charges, Net check was $637.

X-02-8X   You had hail damage on your corn which reduced the crop yield. You received $1,000 insurance from the Hale and Hearty Ins. Co. for damage.

X-03-8X   You combined corn for your friendly neighbor Joe Friendly and received a check for $750.

X-04-8X   You had a gain of $500 on a 5000 bu. corn commodity futures contract which was a true hedge. You paid out $50 (check No. 4) in commission, had put in $1,000 (checks No. 3,7,9) in margin money. You sold at $3.00 and bought back that contract for $2.90.

X-05-8X   2 calves, 235 lbs. @ $1.00/lb. sold to Packers, Inc. $235. Marketing charges $1.18. Trucking $3.82. Net check $230.

X-06-8X   You borrowed $8,000 from the Friendly Finance Co., for 8 months at 15% interest.

X-02-8X   You paid your 12 year old son wages of $100, check No. 5, for one month. You are a sole proprietorship.

X-02-8X   You paid your hired help $24,000 annually and withhold $1,608 for Social Security tax purposes/ You also contributed $1,608 for Social Security taxes. The wages were paid monthly while the Social Security tax (withheld amount and employer's contribution) were made quarterly. Monthly hired labor received a $1,866 check and quarterly Social Security received a $804 check. You also contributed $100 monthly to pension plans for your employees and paid $65 of health insurance premiums for them monthly. No income tax was withheld.

X-03-8X   You paid your neighbor Sam Bean $700 for combining soybeans, check No. 6.

X-04-8X   You paid $2,000 interest to the Usurious Loan Co. for the mortgage on the farm real estate. Your personal residence represents 15% of the total value of the farm real estate, check No. 8.

X-28-8X   You receive $10,000 for a partially destroyed machine shed from the Wicked Wind Insurance Co. The shed had a $15,000 basis and you spend the $10,000 insurance payment on the repair of the shed. Check No. 10.

X-05-8X   You paid XYZ Parts Company $150 for mower repairs, Check No. 11.

X-05-8X   You paid XYZ Parts Co. $100 for manure spreader repairs, check No. 12.

X-05-8X   You paid the Knotty Lumber Co. $350 for fence posts and for lumber to repair shed door, check No. 13.

X-06-8X   You purchased a new Pullmore tractor from the New Paint
          Disease Co., for $50,000. The old tractor which was traded
          still had a $5,000 adjusted tax basis. You plan to use
          A.C.R.S. prescribed method. Check No. 14 was used.

X-06-8X   You purchased a used Turnover plow from the Steal and Rust
          Co., for $2,000, check No. 15. There was no trade in. You
          plan to use A.C.R.S. prescribed method.

X-07-8X   You purchase 100 50 lb. feeder pigs for $4,500, check No. 16,
          from Paul's Pig Palace. Trucking to the farm cost an
          additional $250.

X-09-8X   You paid Rollie Rollingacres, you part time farmer neighbor,
          $1,500 cash rent for his 30 acres of cropland. Check No. 17.

X-10-8X   You paid the A.B.C. Co-op $5,000 for $1,200 of dairy feed,
          $800 hog feed, $1,000 seed, $1,500 fertilizer and $500 for
          baler twine. Check No. 18 was used.

X-10-8X   You paid Pete's Purveyer of Powerful Pesticides $1,500, check
          No. 19, for herbicides and insecticides to be used on the
          crops.

X-11-8X   You paid Dr. Post Morten (a sole proprietorship clinic) check
          No. 20, $605 for veterinary service.

X-11-8X   You paid the Brown Swiss Breeders Association $60 for
          registration and transfer fees, check No. 21 was used.

X-12-8X   You paid the Ag Article Association $25 for items used in the
          farrowing house. Check No. 22.

X-12-8X   You paid the D.H.I. Association $40 for D.H.I. service. Check
          No. 24.

X-13-8X   You paid Jack Lawless $200 attorney fees for services rendered
          to the farm business. Check No. 25.

X-13-8X   You paid the Alky Gas Co. $1,000 for gasoline (1,000 gals) and
          $900 for diesel fuel (1,000 gals). Check No. 26 was used.

X-13-8X   You paid Carl's Corn Condominium $500 for storing your surplus
          corn using check No. 27.

X-16-8X   You paid $3,000 real estate taxes and $500 personal property
          taxes to Terrific Township. The farm personal residence
          represents 15% of the value of the farm real estate. Check
          No. 28 was used.

X-17-8X   You paid Paul's Perfect Protection Ins. Co., $500, check no.
          29, for insurance on the farm buildings. The house represents
          20% of the total insured value.

X-18-8X   You purchased a dairy cow (Milky One) from Don's Desired
           Disposal auction service for $1,500 with check No. 30.

X-18-8X   You paid Tom's Terrible Trucking $30, check No. 31, to haul
           the cow home.

X-19-8X   You paid the Current Electric Co. $200, check No. 32, out of
           the farm checkbook for this month's electric bill. The house
           has a separate meter and that charge by the Current electric
           Co. is $30. Check No. 001 was used.

X-19-8X   The phone bill from Ma Bell is $35 for this month. The base
           rate is $12 and you had $5 personal long distance calls and
           $10 of business long distance calls. The extension phones in
           the office and barn cost $8 per month. Check No. 32 was used.

X-20-8X   You paid self employment Social Security taxes and income tax
           on your farm income and other income in the amount of $2,500
           using check No. 34.

X-20-8X   You sell a 5000 bu. Dec. corn futures contract for $16,500 at
           $3.30/bu. for hedging purposes and pay your broker Charley's
           Commodity Corp. $50 with check No. 35. You put down $2,000
           for margin.

X-23-8X   You buy the 5000 bu. corn futures contract back for $17,000.
           check No. 36, in the same year.

X-23-8X   You pay Cecil's Conservation Construction $2,000, check No.
           37, for building a terrace and grass waterway.

X-23-8X   You pay Len's Land Leveling $1,000 for clearing a piece of
           land so that crops can be grown on that land. Check No. 38
           was used.

X-24-8X   You purchased baby chicks in the amount of $500 from Ingvald's
           Incubators Inc. check No. 39.

X-25-8X   You purchased paint for your house used by your hired labor
           for $225, check No. 40., from Peter's Paint Palace.

X-25-8X   Your total auto expenses for the month are $225 of which $100
           was for fuel and oil, $25 for license, $50 for a tune up and
           $50 for misc. repairs. All of this was paid to Alfred Auto
           Assistance Co. on a monthly billing with check No. 41.

X-25-8X   You paid the Hale and Hearty Ins. Co. $200 for crop insurance
           with check No. 42.

X-25-8X   You paid Ollie's Office Outlet $75 for farm office supplies
           using check No. 43.

X-25-8X   You paid Farm Management Service $500 for farm record service, farm management consulting, and tax management with check No. 44.

X-25-8X   You paid the Usurious Loan Corp. $5,000 principal on farm debt. Check No. 45. Original loan $100,000. Beginning balance this year $40,000. Interest rate 10%, 20 year loan.

X-26-8X   You farm corporation purchased $10,000 worth of stock from a deceased stockholder's estate. Check No. 46.

(Note: Put all of above selected entries into appropriate enterprise designations.)

Other Transaction Items

Personal

X-02-8X   You paid Dr. I.N. Needle $27.50 for flu shots.

X-03-8X   You paid the Corner Grocery Store $50 for groceries and $25 for household supplies.

X-04-8X   You paid the Madman Mutual Fund $2,000 for 100 shares.

X-05-8X   You paid Dr. B.Y. Cuspid $20 for teeth cleaning.

X-06-8X   You paid Satorial Splender $175 for clothing.

X-06-8X   You paid T.V. Tommy's $405 for a new color T.V.

X-06-8X   You donated $50 to the Church of Your Choice.

X-09-8X   You paid the Friendly Finance Co. $15 for interest on the balance due on your new television set.

X-09-8X   You paid the Clear Cinema Corp. $5.00 for movie.

X-10-8X   You paid Corner Store $17.50 for household supplies.

X-11-8X   Principal repayment on television set $100 to Friendly Finance Co.

Financial

X-01-8X   Beginning checkbook balance $500.

X-01-8X   Ending checkbook balance $300.

X-01-8X   Monthly family living draw $1,000 from farm business.

X-01-8X   Beginning inventory and capital accounts.

Inventory

Corn	3000 bu.	@ $3.00
Corn (C.C.C. Corn)	6000 bu.	@ $2.65
Oats	500 bu.	@ $1.90
Hay	50 Tons	@ $60.00
L.M. Silage	45 T.D.M.	@ $65.00
Corn Silage	200 Tons	@ $20.00

Feeder Pigs - 595 cwt. - 340 head - 175 lbs/head - 48 cents/lb

Supplies and Prepaid Expenses

Pesticides	$500
Twine	$250
Fertilizer	$1000
Seed Corn	$500
Fuel	$800

Capital Items

-Breeding and Dairy Livestock-

Diary cows 40 @ $1,000/head
Heifers (over 24 mo) 3 @ $800
Yearlings (12-14 mo) 9 @ $600
Heifer calves (6-12 mo) 9 @ $450
Heifer calves (less than 6 mo) 18 @ $150

-Machinery and Equipment-

Total Adjusted Tax Basis: $60,000
Total Current Market Value: $75,000

-Buildings and Improvements-

Total Adjusted Tax Basis: $55,000
Total Current Market Value: $100,000

-Land and Improvements-

Total Adjusted Tax Basis: $145,000
Total Current Market Value: $220,000

-Liabilities-

Current

Farm (Lender A)	$10,000
Farm (Lender B)	$ 5,000
Farm (Lender C)	$ 5,000
Nonfarm (Lender F)	$ 1,000

Intermediate

Farm (Lender B) $70,000
Nonfarm (Lender P)   none

Long Term

Farm (Lender A) $175,000
Nonfarm (Lender P) $ 5,000

SUMMARY

There are many farm records systems available in hand, hand plus computer and computer only form. Potential users of a system must carefully compare their requirements with what is available and decide which system to adopt. They then need to evaluate the performance and make required adjustments. Time and effort spent on selecting the appropriate system is important to minimize errors in selection and maximize user satisfaction.

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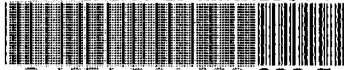
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