9

CHAPTER 9. FARM ECONOMICS

Farming is big business. Agriculture is the nation's largest industry, and three of every 10 jobs in private employment are related to agriculture, according to the Yearbook of Agriculture (1970). This should not be surprising, since farming, i.e., food production, is fundamental to life; the food requirements for a nation of over 200 million people are staggering. Food production itself is enormous, and then the handling, processing, packaging, distribution, and retailing of foods triple the amount of money involved. All of these costs are part of what is now known as "agribusiness," which is one business that will not fade away as long as there are people on the earth.

Marked changes have occurred in agriculture in the last few years. "Runaway inflation" has made its impact on producers and consumers alike. It is interesting to go over my own farm records of the past 12 years. In 1970, newborn calves were purhased for $30.00 each, in 1982, $60.00. Milk replacer cost $6.00 a bag in 1970, and $24.00 in 1982. Pelleted calf grower was about $6.00 per cwt.(100 pounds) in 1970, and $12.00 cwt. in 1982. Hay was selling for 40¢ per bale in 1970, and 75¢ to $1.00 in 1982. We sold the young stock for $200 each in 1971. In 1982, we sold for less than $200 each! That is called a "cost-price squeeze." The costs go up and the prices go down, and the farmer is caught between the two.

Consider the following quotation from Wood (1982:15):

> "Agriculture is in a severe financial crisis. For the first time in history production expenses as measured by the USDA may very likely exceed farm cash receipts in 1982. This severe constriction of cash flow combined with declining land prices, large debt loads and high interest rates makes it extremely difficult for farmers to capitalize on their high equity."

What is the difference in the descriptive account of my feeder calf enterprise and the above quotation? Scale. In both cases, production costs were high, cash receipts low. Neither I nor the nation's agriculture can continue operating like that very long without realizing it's not worth it. Reminds me of the farmer who won $100,000 in a lucky number drawing. When asked what he would do with all the money, he replied "I think I'll just keep on farming until it's gone."

Since farming cannot disappear if the world population is to eat, let's figure the costs of entering the production part of agribusiness, the cost of becoming a farmer. The categories in Table 9-1 provide indications of the larger, long-term items considered in the business end of farming that are used to calculate net worth.

TOPIC 1. PROPERTY VALUES

Property values have increased greatly in the 20th century, especially since the 1950's. Land sold for a few dollars an acre in the early 1900's, a few hundred dollars an acre in the mid-1900's, and now, in the late 1900's, prices are approaching a few thousand dollars an acre.

Land values, livestock values, and machinery values all rise together, though not necessarily in a balanced way. Livestock values tend to fluctuate more than local values since they have relatively short-term value. Machinery is constantly being improved by agricultural engineers, so increasing machinery values represent not only rising costs of raw materials but also the costs of improvements in product technology.

The high property values associated with the business aspects of farming make it necessary for the farmer to maintain a high level of productivity. This precludes many wildlife considerations, since financial returns of any substance cannot be realized from the wildlife resources on all but a few farms. Land may be leased to hunters, of course, but that brings new legal considerations, responsibilities, and contracts whose overall costs may well outweigh the returns.

The overall measure of the cost of owning land, livestock, and machinery is in the amount of interest either paid on balances owed, or that could be earned on the capital investment. "Farms for sale" in the October, 1982 issue of American Agriculturist include such listings as:

200 acres . . .	330,000,
300 acres . . .	240,000,
320 acres . . .	175,000, and
960 acres . . .	$ 1,500,000.

Table 9-1. Larger items in a farm credit statement, used to calculate net worth (see lower right-hand corner).

ACCOUNTS AND NOTES RECEIVABLE

ITEMS	DATE DUE	AMOUNT
Real Estate Mortgage	_____	$ _____
Chattel Mortgage	_____	_____
Unsecured Note	_____	_____

ACCOUNTS AND NOTES PAYABLE

ITEMS	DATE DUE	AMOUNT
Real Estate Mortgage	_____	$ _____
Chattel Mortgage	_____	_____
Unsecured Note	_____	_____
Unpaid Taxes	_____	_____
Store Accounts	_____	_____

OTHER INFORMATION

INSURANCE	AMOUNT	TAXES PAID	AMOUNT
Farm Insurance	$ _____	Real Estate	$ _____
(fire, wind, liability)	_____	Personal property	_____
Auto insurance	_____	ASSESSED VALUE:	_____
Life insurance	_____	Real Estate	_____
Insurance on other property	_____	Personal Property	_____

NET WORTH STATEMENT

ASSETS	AMOUNT	
Land	$ _____	
Buildings & Improvements	_____	
Machinery & Equipment	_____	
Dairy Cattle	_____	
Beef Cattle	_____	
Swine	_____	
Poultry	_____	
Other Livestock	_____	
Crops & Supplies	_____	
Cash Value Life Insurance	_____	
Other Personal Property	_____	
Cash	_____	
Accounts and notes receivable	_____	
TOTAL ASSETS	_____	
Less accounts and notes payable	_____	
NET WORTH		$ _____
Net Worth Previous Year		_____
Gain or Loss		_____

The annual simple interest costs at 12%, equal $21,000 to $180,000 per year; even the lowest interest cost for the land prices listed is more than beginning salaries of wildlife biologists! All of these are typical farms in New York State; the large 1½ million dollar spread is advertised as a "showplace." All of these farms include livestock and equipment in the asking price; they are business opportunities ready to be assumed.

The UNITS which follow contain a bit more detailed information on the values of farm properties. The wildlife biologist should keep the interest values on capital investments in mind when making wildlife management plans and decisions; To the beginning farmer operating on borrowed money, these are costs to be met, and to the well-established farmer, these are costs to be figured against appreciating property values. Whatever the case, farming is big business when evaluated in relation to many other salaried positions.

UNIT 1.1. LAND VALUES

Land has always been considered a good investment because space and soil are absolutely essential components of the ecosystem. Inflation has been in "double digits," (over 10% per year) in the 1970s, and land values have risen accordingly.

The appraised value of an acre of farmland depends on many factors, including it's topography, natural fertility, tillage characteristics, the weather and growing season characteristics in the area, characteristics, proximity to centers of population, and others. Very fertile, easily- tilled soil, located in a climate with good growing season characteristics and near large centers of population, such as Illinois and Indiana, costs $3000.00 or more per acre at the present time. Prices decline as one goes west (more arid), north (shorter growing season), and east (more wooded).

Average per acre land prices since 1900 are illustrated in Figure 9-1. Note that the 1980 price is about $656 per acre, the figure used later in calculating the cost of becoming a farmer should be adjusted for local land values which could be considerably more than the national average.

Prices for entire farms depend on the amounts of level land, hilly land, tillable land, pasture, woodlots, and other land characteristics. It is important to match livestock operations with land characteristics. Only those species and numbers of livestock which the farm will support should be acquired; farming should be a balanced operation, with the necessary food, cover and space available.

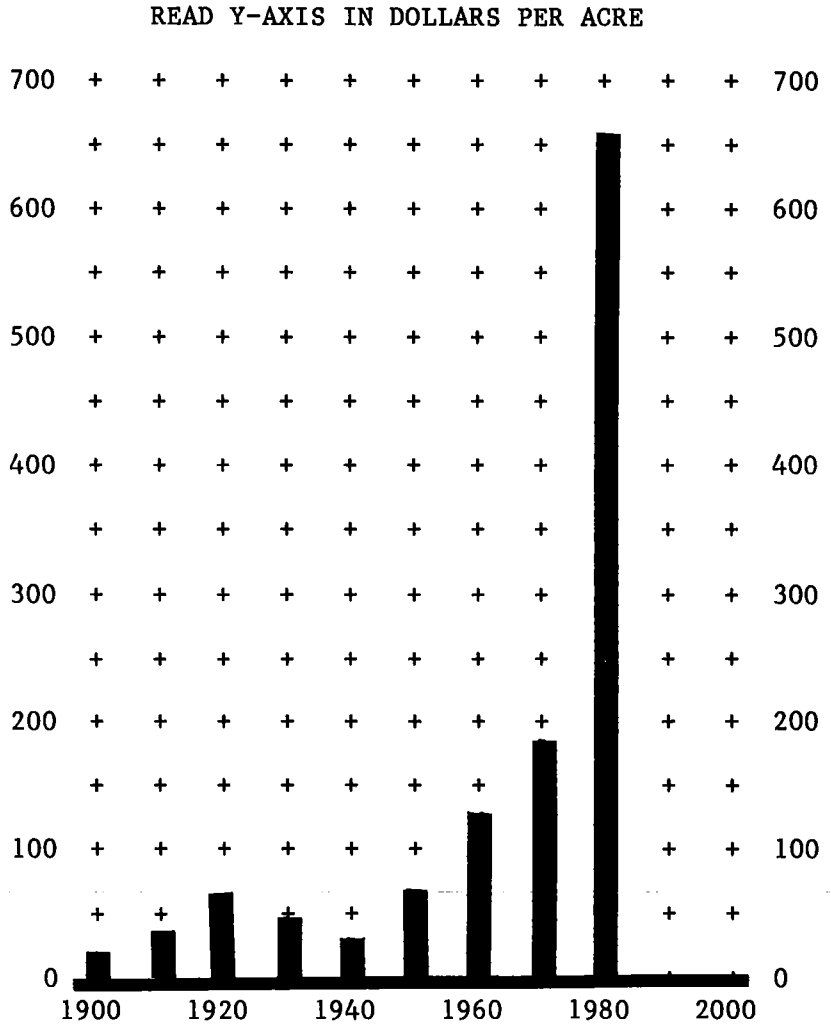

Figure 9-1. Average value per acre of land and buildings in the United States. (Source: U.S. Bureau of Census 1976).

Renting of land is quite a common practice now as farmers own large machines that must be used on large acreages if they are to be profitable. Renting is one way to increase acreage. It does not provide the long-term security of ownership, so rented land is often managed for larger short-term profits rather than long-term production through soil-building management practices.

UNIT 1.3. MACHINERY AND EQUIPMENT

Machinery and equipment needs are much greater today in capital-intensive farming than a few years ago when farming was more labor-intensive. Further, the machines and other items of

equipment manufactured today are "hi-tech," with higher price tags as a result of the costs of development and manufacture. Financing of tractors, trucks, and farm equipment is provided by banks, farmer-owned Production Credit Associations, and equipment dealers.

MACHINERY COSTS

Machinery costs have been increasing because of general inflation, and because of the increases in the power of tractors and concommittant increases in sizes of equipment used. My father purchased a 3-plow Model A John Deere shortly after World War II for $1200--a big price for a big tractor at that time. Now, a riding lawn mower costs about that much, and small tractors cost several thousand dollars. The relationship between dollar costs and tractor size (horsepower) is illustrated in Figure 9-2.

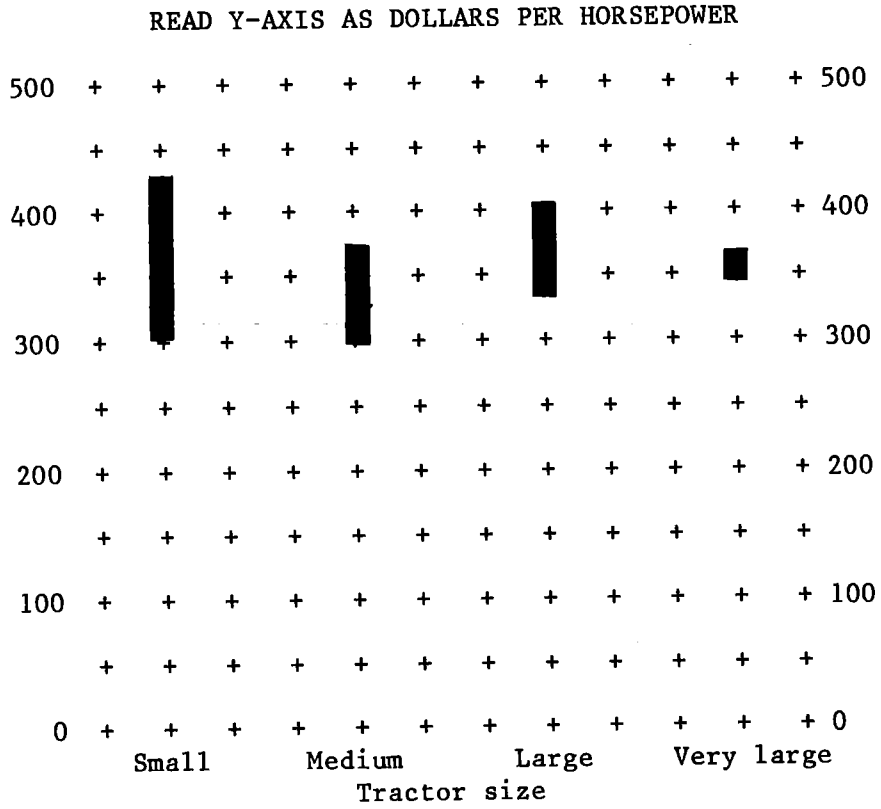

Figure 9-2. Approximate costs of tractors on a per horsepower basis. See page 71 for HP ranges of small to very large tractors.

Machinery ownership usually includes tractors and the tillage, seeding, and harvesting machines needed for the crops raised on the farm. Costs for typically-sized machinery are listed in Table 9-2 for 1980. These figures have generally been increasing about 10% during the last few years.

Table 9-2. Average costs of machinery needed for tillage, planting, and harvesting. (Calculated from data in U.S. Bureau of Census, 1981).

Implement	Cost range
Plows	$ 4500 - 6500
Discs	5000 - 7000
Harrows	1000 - 2000
Grain drills	3000 - 5000
Corn planter	1500 - 2500
Mower-conditioner	4000 - 6000
Balers	5000 - 8000
Combines	25000 -75000
Forage harvestors	8000 -14000
Manure spreaders	2500 - 5000

Large farms are feasible today because modern machinery makes it possible for each farm worker to till more land, with a larger volume of production, larger gross, and potentially larger net income. Larger farms with several workers may not have much lower unit costs of production than smaller one or two-man farm operations, however, because the extensive land areas that are farmed still require a man and machines for tilling and harvesting operations.

EQUIPMENT COSTS

There are many items of equipment needed by farmers in addition to the tractors and machinery discussed above. Grain dryers, feed guiders and mixers, milking systems, milk tanks, barn cleaners, silos, . . . are examples of just a few of the larger items. Prices vary according to size, of course; the cost ranges listed in Table 9-3 give some indication of the amounts of money needed for the items listed.

Table 9-3. Approximate costs of some larger equipment used on grain and livestock farms. (Calculated from data in U.S. Bureau of Census, 1981).

Item	Cost range
Grain dryer	$ 20000 - 30000
Feed grinders	1000 - 2000
Feed mixers	6000 - 8000
Milking systems	2000 - 10000
Barn cleaners	2500 - 5000

TOPIC 2. ECONOMIC RETURNS

Farming is a "way of life" and a business. Expenses incurred must be met by income from the sale of farm products. This is a fact of life that cannot be overcome by nostalgia, emotional attachments to the land, or ecological theory. Maintaining a balance between these three while paying expenses is difficult. A look at some financial facts with some insights into how they are accumulated will help put economic considerations into proper perspectives.

UNIT 2.1. ANIMAL HUSBANDRY

Animal values have been increasing in recent years, just as land values have. Dairy cows now sell for between $1,000 and $3,000 each, with the very best ones going for even higher prices. Due to such high costs, the leasing of dairy cows is becoming a way of financing some dairy operations. Leasing makes it unnecessary for the dairyman to tie up his own funds or borrow money to purchase cattle; it is one way for young dairymen to get started.

Specialty farms are becoming more common. Dairy operations of 50-60 head of cattle are now operating successfully in eastern states, on as few as five acres. All of the feed must be purchased, but the price of milk in the highly-populated east may make such an operation profitable, as long as good-producing cows are used. This kind of operation obviously reduces the necessity for large investments in land, and may be a viable option for a young person who wishes to become a full-time dairyman. Financing of production costs through dealer credit is usually possible as long as the bi-weekly milk check makes it possible to pay the bills within 30 days, the usual no-charge period for financing.

What costs are involved in a dairy operation? The WORKSHEET below may be used to estimate the annual cost of keeping a dairy cow.

Table 9-4. Worksheet for determining the annual cost of keeping a dairy cow.

1. Purchase price in 19__ = $_____
2. Sale price in _____ years = $_____
3. Annual cost =
   Purchase price-sales price)/number of years=$_____
4. Annual compound interest at ____% on total
   purchase price =$_____
5. Feed costs per year, including:

   pasture $_____ =$_____
   hay $_____ =$_____
   grain $_____ =$_____

6. Annual breeding charge* =$_____
7. Subtract sale price of offspring per year =$_____
8. Estimated annual veterinary costs =$_____
9. Total annual cost =$_____
10. Milk production per year _____ lbs.
11. Price received per cwt. $_____
12. Income from milk (#10 x #11 ÷ 100) =$_____
13. Return, not counting labor, land,
    taxes, etc. (Subtract #9 from #11) =$_____
14. Hours of labor per cow _____ per year
15. Hourly return on labor =$_____

*The AI charge, or the annual cost of keeping a bull divided by the number of cows serviced.

Table 9-5. Projected and actual cash flow, typical dairy operation. (From Hoard's Dairyman Farm Accounts & Records.)

MONTH					
ITEM	Projected	Actual	Projected	Actual	Projecte
1. Beginning Cash Balance					
FARM INCOME					
2. Milk					
3. Calves					
4. Cull Cows					
5. Steers					
6. Breeding Stock					
7. Other Livestock					
8. Other Income					
9. TOTAL INCOME					
OPERATING EXPENSE					
10. Hired Labor					
11. Machine Hire					
12. Rent (Land, Machinery, Etc.)					
13. Feed Purchased					
14. Repairs					
15. Gas, Oil, Diesel					
16. Utilities					
17. Veterinary Fees and Supplies					
18. Breeding Fees					
19. DHI					
20. Fertilizer, Lime					
21. Chemicals					
22. Seed & Plants					
23. Freight & Trucking					
24. Taxes-R.E. & P.P.					
25. Insurance					
26. Feeder Stock					
27. Other					
28. TOTAL EXPENSES					
29. Livestock Purchases					
30. Machinery & Equipment					
31. Building & Improvements					
32. Principal Payments					
33. Interest					
34. TOT. CAP. EXPENDITURES					
35. Family Living Expenses					
36. Pay't Previous Commitments					
37. TOTAL CASH OUTFLOW					
38. Cash Differences					
39. Ending Cash Balance					

Average values of milk, cows, and feeds in seven states (CA, MI, NC, NY, OH, WA, WI) are listed in Table 9-6, based on data in Hoard's Dairyman,1982, Volume 127(23), page 1568. Use these values and the estimates of feed eaten from data and calculations in CHAPTER 6 to complete the calculations of the annual cost WORKSHEET (Table 9-4).

Table 9-6. Average values of milk, cows, and feeds in seven states in October, 1982.

All milk, per cwt.	$ 13.81
Dairy replacements -	$1079.00
Cull cows, per cwt.	$ 38.22
Alfalfa, per ton	$ 80.00
Soybean meal, per ton (44% protein)	$266.00
Corn grain, per ton	$141.00
Dairy feed, per ton (16% protein)	$170.00

Note that the WORKSHEET (Table 9-4) includes the calculation of an hourly return on labor, which may be compared to wages of persons in business and industry. The minimum wage at the end of 1982 is $3.35 hour. Secretaries may earn $4.00 to $10.00 per hour, carpenters and electricians $10 to $20 per hour, auto workers about $18 per hour, etc. The hourly return to the dairyman and to most farmers is usually not high. Further, insurance, taxes, and other farm and home maintenance costs were not included in the WORKSHEET, and farm families have personal expenses both for health and life insurance, education, clothes, food, travel, and other living expenses, just as non-farm people do. The money for these expenses comes from the hourly return.

A study of 442 dairy farmers in New England, New York, and New Jersey (Bondus 1983) shows the net returns to four different profit groups. The bottom 25% and third 25% had net losses of $1.37 and $0.16 per hundred pounds of milk sold. The second 25% and top 25% had net profits of $0.72 and $1.91 per hundred pounds of milk sold. The average profit was $0.44 cents per hundred pounds of milk sold, which equalled a yield of 1.7% on the farmer's net worth. How many of us would like to invest our money in a savings account that yielded 1.7% interest?

Some average figures given by Bondus (1983) may be used in the WORKSHEET (Table 9-4). They are:

Average number of cows		89	
Pounds milk sold per cow		14,432	
Average price per cwt.	$	14.04	Income $ 2026.00
Feed expense per cow	$	578.00	
Feed and crop expense	$	741.00	
Interest expense	$	207.00	
Labor and net family draw	$	379.00	Expenses $ 1905.00
Total expenses per cwt. milk		$13.20	Net per cow $ 121.00

Another WORKSHEET (Table 9-7) may be used for calculating the cost and break-even price required when selling feeder cattle in a beef operation. Cost items included are similar to those for dairy cattle. The difference is in the source of income. The dairy cow produces milk, while the beef animal is sold for slaughter. The WORKSHEET in Table 9-7 is arranged differently too. Labor costs are listed on a per hour basis before determining the break-even price, while the hourly return on the labor was calculated after determining the return per cow in Table 9-4. Interviews with farmers in dairy and beef operations would provide estimates for wildlife students to work with. Both of these cost WORKSHEETS may be adapted to other livestock enterprises, of course.

Table 9-7. WORKSHEET for calculating the cost and net return on feeder cattle.

I. Variable Costs

A. Feeder Purchase _____lbs. @_____/lb. = _____

B. Feed Cost

1. Corn	_____bu.	@_____/bu. =	_____
2. Silage	_____tons	@_____/ton =	_____
3. Supplement	_____lbs.	@_____/lb. =	_____
4. Other	_____	@_____ =	_____
5. Other	_____	@_____ =	_____

Total Feed Cost (Cost of Gain) . . . . . _____

C. Other Variable Costs

1. Vet & Medicine	_____
2. Death Loss (2% of Line A for calves, 1% for yearlings)	_____
3. Marketing, commission charges, trucking expense	_____
4. Power, Fuel, Equipment Repair	_____
5. Interest, insurance, taxes on feed and cattle	_____
6. Hedging Costs	
Brokerage Commission	_____
Interest on Margin	_____
7. Miscellaneous	_____

Total Variable Costs . . . . . _____

II. Fixed Costs

A. Buildings & Equipment	_____
B. Labor _____hrs @ _____/hr =	_____
Total Fixed Costs	_____
Total of All Costs (Variable + Fixed) Per Head	_____

III. Break-even Price (per hundredweight)
(Divide total costs per head by market weight per head) . . . . . _____/cwt.

The examples given on the previous WORKSHEETS for dairy (Table 9-4) and beef (Table 9-7) enterprises illustrate reasonable current cost items, but are not as complete as a farmer would want them to be for thorough cost-accounting. They are sufficient for illustration, however, providing the wildlife biologists with insights into the direct costs of animal husbandry, and possible returns.

UNIT 2.2. GRAIN FARMING

The cost of producing crops has been rising very rapidly in the last few years because of the increasing costs of energy. Further, the high level of production technology has resulted in energy demands that are much greater than in the past. Some of these costs are direct--the price of fuel for tractors--and some costs are indirect--the increased price of fertilizer due to increased energy costs associated with fertilizer production. Increased tractor and machinery sizes makes it possible to work much more land in a shorter amount of time. The energy costs per unit time are much higher, of course.

What costs are associated with crop production? Production needs purchased off the farm include fertilizer, hybrid seeds, insecticides, herbicides and fuel. Custom services include fertilizing, spraying of pesticides and herbicides, crop dusting (often by airplane), harvesting and others. In some areas, it is possible to custom-hire all the field operations necessary to plant and harvest a crop. The farmer makes the decisions, and the machinery operator does the work.

What work and cost items are associated with planting? Seedbed preparation usually requires one to three trips over the field, depending on the amount of tillage. If the soil is plowed, disced, and harrowed, then plowing is done first and discing and harrowing next, either as one operation or two.

Seed costs and planting are a critical part of the production process. Seed for planting costs more per bushel than the market value of the grain, because the varieties to be planted have been developed through research, planted and harvested as seed stock, cleaned so the seed is free of weed seeds, tested for germination, and then packaged and distributed. The farmer does not simply plant left-over seed from last year's harvest.

Some field crops must be carefully cross-fertilized to provide 1st generation hybrids with the genetic characteristics desired. Corn, for example, is normally wind-pollinated. Seed corn is produced with controlled pollination; the corn is "detasseled" and pollen from another source is applied, either by hand or with machines that spray the pollen.

Seed stock selection is an important decision because different varieties of corn have different qualities. The days to maturation is an important one, with the early-maturing corn appropriate for the more northern areas or for late planting. Some corn is taller, with more stalk and leaves compared to the cob size. Such corn is best suited for silage. Some varieties have larger and longer cobs, well-suited for grain harvest. There are also variety differences for standability and tolerance to high populations. Thus the farmer does not simply "plant corn," but rather chooses the appropriate varieties for the farm uses and plans the planting schedule accordingly.

Small grains also come in different varieties and sizes. Some varieties of oats, for example, produce a long straw (tall plant), which is good if the straw is used for bedding. Such tall plants are more likely to "lodge," or bend down flat to the ground as a result of wind and rain before harvest. Shorter, stronger plants may be more suitable in some areas.

Rust fungi have the potential for attacking small grains in epidemic proportions, upsetting vascular transport and photosynthesis, weakening the stems, and reducing production. Research is continually in progress to develop new varieties of oats, wheat, and other small grains that are "rust-resistant." Such varieties help ensure a more even supply of grains, reducing the possibilities of large-scale famine as a result of plant pathogens.

Some services associated with planting and caring for the crops are often hired as custom services. Custom services provide several advantages to the farmer. The supplier of herbicides, for example is a specialized businessman who likely knows more about herbicides and their applications than individual farmers do. Thus, the farmer buys not only the herbicide but also the technical knowledge and service that helps ensure proper use.

Harvesting of the crops requires investment in machines or machine and operator time on a lease or custom basis. This is a straightforward and fairly predictable cost. Less predictable are the costs associated with delays in harvesting and damage to the crops as a result of weather factors. Small grains cannot be harvested in wet weather. Corn can be chopped in somewhat wet weather; picking and combining requires dry conditions. High-moisture corn may be dried artificially, but this requires a grain dryer. Dryers are costly to buy and costly to operate. Research in recent years has focused on solar energy and on- farm fuels for drying operations.

After harvest, grains may be sold or stored. If they are stored, additional expenses are incurred, either in payments for storage or for the purchase of grain bins on the farm.

Crop production expenses can be met in four basic ways: the operator's bank reserves from a previous crop, borrowing, dealer's credit, and advances or credit via a producer's contract. The method chosen depends on the financial position of the farmer. Complex farm operations are usually supported by different economic options.

TOPIC 3. ECONOMIC OPTIONS

Farmers have several economic options to consider when beginning, continuing, and expanding farm operations. Ownership seems to be the goal of most farmers, but one that, in most cases, is not financially possible at the start. Large sums of money are required for land, livestock, and machinery, so the young farmer must make plans to borrow as much as necessary to make the farm productive. The different options are briefly discussed in the next two UNITS.

UNIT 3.1. OWNERSHIP

Farm ownership is a goal which may take many years to accomplish since clear title to the property is not attained until all debts and encumbrances have been met. Ownership involves not only the expense of purchasing the land, but also taxes, interest on money owed, and expenses for maintenance of the land. The owner, however, can make long range plans to do what he wishes with the land, subject to zoning restrictions and any other leases or covenants that may be binding on the land.

Ownership usually involves a down payment followed by regular payments to the individual or institution which supplied the balance necessary for purchase. In some cases, a retiring farmer may sell to another farmer, receiving a down payment and financing the balance himself. The new owner pays the financing owner interest plus principal. If the seller wishes to be free from any financial involvements, then a financial institution may provide the loan money, paying the seller in full and collecting principal and interest from the buyer. The financial institution involved would require appraisals, and provide no more loan money than the property would return should foreclosure be necessary.

The major consideration to be made by any farmer when considering ownership of land, livestock, and equipment is the total debt load. When debts get so large that payments cannot be made due to weather effects, depressed production, and fluctuations in prices, financial difficulties result which make farming or any business for that matter, less enjoyable than it should be and financially impossible.

UNIT 3.2. RENTING

Renting of land is quite a common practice now as farmers own large machines that simply must be used on large acreages if the machines are to be profitable.

Land is usually rented in one of two ways: cash rent or sharecropping. In cash rent, the renter pays the owner, or "landlord," a fixed sum per acre. If the crop is bountiful, the renter benefits. If the crop is poor, the renter is responsible for the cash sum, even if there is no profit. Sharecropping divides the crop according to some agreed-on fraction, depending on how much was supplied by the renter and how much by the owner. If the renter does all the tilling, buys the fertilizer and seed, and is completely responsible for the harvest, he should receive a major portion of the crop--two-thirds or three-fourths, perhaps. If the land owner buys the fertilizer and takes part in some of the operations, he may receive half or more of the crop.

Grazing land may be rented for it's forage rather than by the acre. Thus a field that has been harvested may be rented on an animal-day basis for cattle gleaning waste grains and other forages from the harvested cropland. On western ranges, the animal-unit-month (AUM) is the common leasing unit. The Bureau of Land Management makes recommendations on the number of AUM's the range can support, and grazing contracts are drawn up. Pastures in the midwest and eastern states are usually rented out by the head or the acre for the season. Costs vary, depending on the way fencing costs and pasture maintenance costs are divided.

Zoning regulations may prevent certain land uses in some areas, especially near urban centers. Land may be zoned for agriculture, which means it cannot be used for commercial purposes. Building restrictions may also apply. Restrictions on the kinds of livestock that may be raised are becoming more common near suburban areas. In fact, once- fertile farmland has been sold as lots, suburbia has sprawled, and the people involved have passed zoning laws that make it difficult for some farm operations. Suburban residents may encroach on a dairy, beef, hog, or poultry farm, and then find the odors from such farms offensive with certain wind directions or certain farm operations, such as manure-spreading. These odors are a part of farming, and are not offensive to farm residents because they are part of natural cycles. The smell of silage is another example; it is a smell that evokes many pleasant memories to those of us raised on dairy and beef farms, but to a city resident, it may be very offensive.

Renting does not provide long-term security, unless long-term leases are made. Thus, renters are hesitant to invest in costly soil-building practices that may not pay dividends for years to

come. Landlords should be responsible for long-term soil and water management while providing opportunities for renters to work the land for the economic advantage of both.

TOPIC 4. MARKETING

The ten most important farm products in terms of cash receipts from farm marketing are, in order of importance: cattle and calves, milk, hogs, corn, soybeans, eggs, wheat, broilers, tobacco, and cotton. The leading states in Cash Receipts are California, Iowa, Texas, Illinois, Minnesota, Nebraska, Kansas, Wisconsin, Missouri and Indiana. The general distribution of marketing receipts over the United States and Canada is given in Table 9-8.

Table 9-8. General distribution of marketing receipts over the United States and Canada.

Marketing receipt distribution	Products
West North Central States, from Minnesota to Kansas	Cattle and calves, hogs, turkeys, dairy products, wheat, corn, and soybeans.
Western States	Cattle and calves, sheep, dairy products, wheat.
South Central States	Cattle,tobacco,broilers, cotton, rice & soybeans.
East North Central States, from Ohio to Wisconsin	Dairy products, hogs, corn and cattle.
South Atlantic States	Broilers, dairy products, tobacco, citrus products.
North Atlantic States	Milk, eggs, potatoes, maple syrup, wheat, cattle and calves.
Prairie Provinces and Western Provinces	Wheat, cattle and calves, dairy products.
Eastern Provinces	Milk, eggs, potatoes, maple syrup

The total dollar expenditures for farm goods in relation to the dollars received by farmers over the last 10 years are shown in Figure 9-3. (See Farm Journal, October, 1982, p. E-4). Notice that the farm value of food produced is not rising nearly as fast as the cost to the consumer; the "farm-to-retail price spread" is widening.

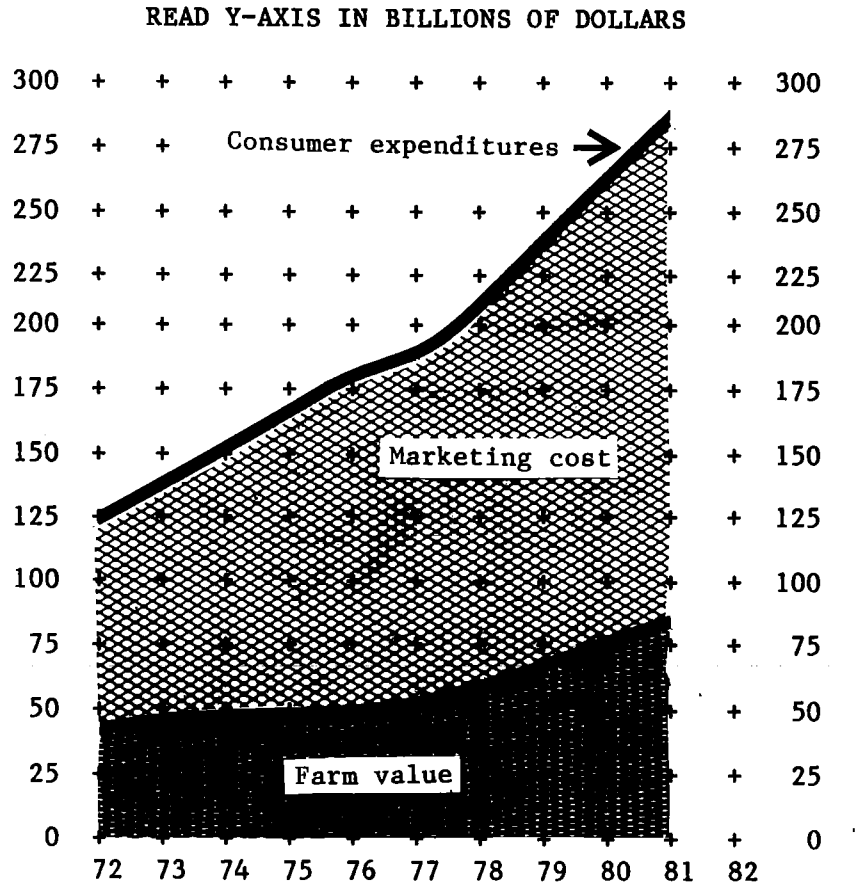

Figure 9-3. The farm value, marketing cost, cost trends of farm foods from 1972-1982. (Data from Farm Journal,October 1982; p. E-4).

Some interesting facts are given in the Farm Journal issue cited in Figure 9-3 concerning the components of these costs. Farming is big business, but of the $285 billion spent for food in the U.S. in 1981, farmers received only $85 billion, or 30% of the total, for their production. The labor costs for marketing the food were 31% of the total; the labor force involved in marketing the food received more than the farmers who produced it!

Different farm products provide different percent returns to the farmer. While the overall average return to the farmer is 30%

of the total spent, dairyman received 67% and 55% of the retail costs of butter and milk, respectively. Beef returned 58% to the producer, and pork, 46%. Lettuce growers, however, received only 9% of the retail price of a head of lettuce.

In 1970, the yearbook of Agriculture states that the "farmer's market" has all but disappeared. By 1980, farmers began to market more fresh garden produce without going through wholesalers and retailers; the farmer's market was coming back. Direct marketing by producers results in higher prices received and lower prices paid by the consumers because the middleman has been eliminated. There is a time-cost to the producer, however, as someone has to truck the produce in and sell it, so the net return may not be high on a total-cost basis. Further, the produce must be sold since proper storage facilities are usually not available. Farmers markets are successful only in areas with large enough human populationsto consume the produce when it is available; one farmer can grow vegetables and fruits for a lot of families.

The farm-to-retail price spread is calculated on the basis of the cost of raising the produce and purchasing the marketed product. There is another dimension to farm pricing and income levels that is sometimes hard to understand--the matter of value systems and priorities. The non-farm segment of society, striking for higher wages and shorter work weeks, is far removed from the long hours and seven days per week responsibilities of the livestock farmer. The joke about the farmer who called the barn to report in sick but no one answered is more truth than humor. Further, an article in some recent trade literature wondered why:

a pound of steak at $1.80 is "high," but a 3-ounce cocktail at $3.50 is acceptable.

a $4.00 ticket to a movie is OK, but $3.50 for a bushel of wheat that makes 50 loaves of bread is unreasonable.

a 50¢ coke at the ball park is part of the game, but 20¢ for a glass of fresh milk is inflationary.

Cotton is "too high" at 65¢ a pound, but a $20.00 shirt is a bargain.

We humans do have some interesting relative values, and it is my opinion that every attempt should be made to educate young people throughout the country in the basics of such fundamental life support services as agriculture, medicine, and communications.

UNIT 4.1. INCOME LEVELS AND TIMING

Farm income is generally seasonal. Grain production is very seasonal, so income is restricted to harvest-time if the grain is sold off the field. Grain storage is, however, a common practice, either on the farm or in commercial elevators. Then, part of the harvest may be sold immediately, and part, often a major part, is stored for sale later. Prices of grains are usually higher during the off-season, so costs of storage are offset by the higher prices. Sale of stored grain throughout the year provides a more even income through the annual cycle to the grain farmer. to the grain farmer through the annual cycle.

Beef cattle cannot be stored. They are fed to a certain weight and sold because it is costly to feed them, even at maintenance, with no guarantee that prices will rise enough later to offset the added feed costs. Feeder cattle are usually divided into lots based on weight. On smaller farms, this is less critical because numbers are not so great and age differences may be small. In large feedlot operations, with calves being purchased from a variety of sources throughout the year, dividing into lots is a much more important management practice. Large feedlots also have finished cattle ready for the market through much of the year.

Dairy farming probably provides the most stable income through the year of all farming operations. Milk, butter, cheese, and other dairy products are in constant demand by the consumer, and cows are milked for over 300 days of the year. Milk production per cow varies during the lactation period, with peak production reached shortly after calving, followed by a gradual decline until the cow is "dried up." In a herd, cows are bred at different times, so milk production by the herd is quite stable through the year.

Turkey farming is quite a seasonal operation, with turkey being a traditional feast at Thanksgiving, and a marked peak in consumption at that time. Turkey production is also more seasonal in the northern states than the southern states because of the greater differences in weather conditions throughout the year there.

How much income can a farmer expect on an annual basis? Gross and net annual farm incomes are illustrated in Figure 9-4. Gross income has risen sharply, as have expenses. Net income is up some, but less than the gross. While annual income levels themselves may not be a deterrent to persons aspiring to be farmers, the amount of capital needed to get started is a major problem. Considering the cost of land, machinery, livestock, and equipment, farming requires investments of a few hundred thousand dollars, quite unlike the situation 50 years ago when an ambitious

farm family could begin with a few hundred dollars and a strong desire to work hard. The technological revolution has greatly changed farm finances.

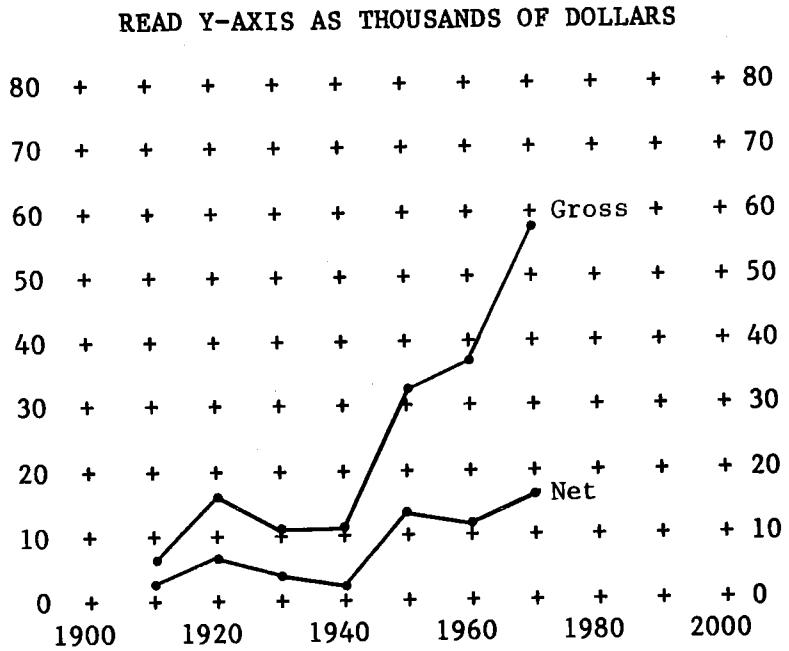

Figure 9-4. Gross and net farm income levels. (Calculated from data in U.S. Bureau of Census, 1976).

A commonly-heard farm term is "parity," which refers to the prices received by farmers and those received by other sectors of the economy (Reich 1983). The term "parity" was first used in 1922 as legislative efforts following World War I attempted to aid farmers by keeping their buying power on a par with the rest of the economy. It is interesting to note that Reich cites a post-depression report of Morrison and Commager who pointed out how vulnerable agriculture is to economic stress, and that agriculture was the victim--not the beneficiary--of the industrial (mechanical) revolution in the first third of this century. This may still be true; I often wonder what farming as a business would be like today if farmers could work more closely with the land and their livestock while receiving sufficient economic returns to meet both business and personal expenses.

UNIT 4.2. MARKETING CYCLES

Cycles are well-known, partially understood, and somewhat predictable characteristics of business trends. Cycles in the marketing of farm products are no exception. Long-term cycles may be recognized (Figure 9-5) and short-term cycles may be used to predict the best time to sell.

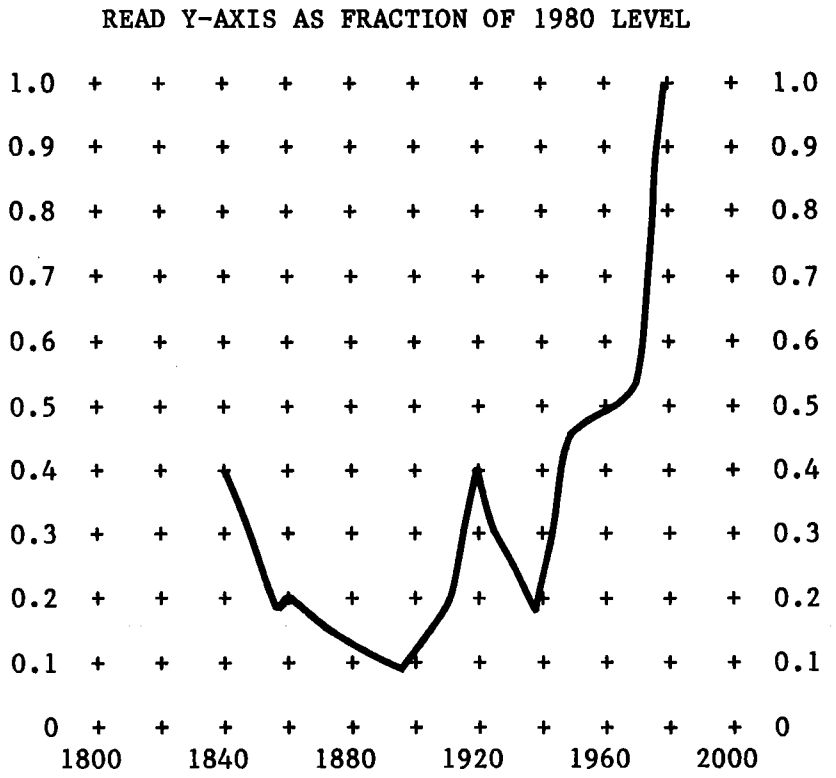

Figure 9-5. Long term cycle of wholesale prices in the U.S. (Redrawn from data in Klus et al. 1982, p.21).

Two sets of time cycles are given by Klus et al. (1982) for five commodities (Table 9-9). The time-periods given represent the average time intervals between tops or bottoms of the cycles, analogous to the wave length (360) of a sine wave.

Table 9-9. Time periods for two sets of cycles in the prices of five farm commodities based on prices in the period 1970-1981.

Commodities	Longer Cycle	Shorter Cycle
Corn	68 months	26 months
Soybeans	39 months	22 months
Wheat	9 years	45 months
Cattle	7.5 years	45 months
Hogs	9 years	3.5 years

Weekly cycles are important to the farmer who is finishing livestock to be sold for meat purposes. The weekly cycles illustrated in Figure 9-6 for live cattle indicate the magnitude of differences observed in 1981; note that prices ranged from over $70 to under $64 per hundred pounds.

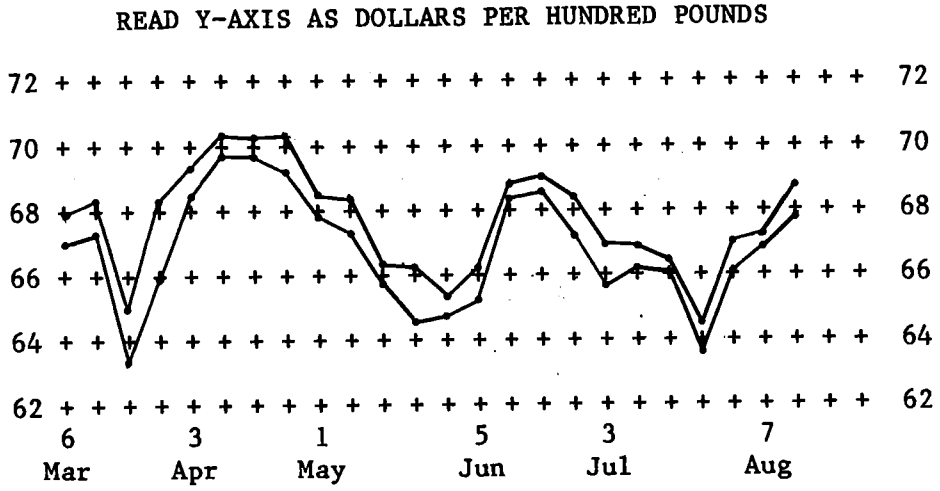

Figure 9-6. Weekly cycles in live cattle prices, March 6-August 28, 1981. (Redrawn from data in Klus et al. 1982, p.9).

How significant are such price changes? Prices dropped from about $70 to $64 in the three-week period from April 24 to May 15, 1981. If 50 herd of cattle averaging 1000 lbs each were sold at the bottom of the cycle, the loss due to the price drop would be $3,000. Keeping the cattle for 3 weeks longer involved feeding and caring for them also so the added costs must also be figured. If they had been gaining 2 pounds per day, the lot would have weighed 2100 lbs more when sold for the lower price. Using some arithmetic:

At peak price of $70: 50 cattle x 1000 lbs x $70/100 = $35000

Three weeks later @ $64: 50 cattle x 1042 lbs x $64/100 = $33344

Difference = $ 1654

The increase in weight is offset by the decrease in price; the dollar difference is $1654. The cost of feeding the animals for three extra weeks may be about $600 for feed plus labor, resulting in a net in income of $2500 to $3000 (close to 10% of the gross) as a result of holding the lot 3 weeks too long.

The illustrations above indicate the importance of price changes to the farmer. If cycles can be predicted, significant dollar returns could be realized. In the illustration above, losses up to $3000 would be enough to pay for a personal computer, an item discussed in the next TOPIC.

TOPIC 5. THE DECISION-MAKING PROCESS

Life is a succession of problem-solving experiences. Decisions must be made regularly, both short-term and long-term ones, and the farmer most likely to succeed is the one who makes the best decisions more often than not. Decision-making in the business world requires rational thought, and the number of considerations that must be made by farmers requires considerable rational thought and mental discipline.

Farming, with all of it's technology, is well served as a business by college graduates who not only have technical knowledge of farm operations but an understanding of psychology, sociology, economics, philosophy, and other courses which contribute to the education of a person. My personal conviction is that a liberal education adds intangibles to one's life that enhance appreciations and broaden horizons, thus contributing to larger overall perspectives which seem to be more essential as society becomes more complex, and the world effectively smaller through enhanced communication and travel capabilities.

In simplest terms, I would like to stress the need to develop "thinking abilities," whether we be farmers or wildlife biologists, because such abilities will serve us well for our lifetimes. Training a person how to do something, however, may have limited usefulness, as methods and techniques change. The sudden appearance of the computer in classrooms all across America, the accepted use of information processing in the business world, and the potential for high speed information-processing in agricultural and ecological considerations are examples of how methods and techniques change, but the need for careful thought processes remain.

UNIT 5.1. SUCCESSFUL MANAGEMENT AND ECONOMIC PRINCIPLES

Two principles may be stated as bases for successful management. They are (1) keep records, and (2), use them wisely. How may they be used wisely? Consider the inventory and asset summary, expense summary, and income summary shown in Table 9-10. If there is a consistent net loss (lower right-hand "bottom line"), then thing are not going well economically. In general, income should be rising over a period of years and indebtedness should be decreasing if financial independence is the goal. There are two extremes in approaches to economic decision-making: go for the big years and make it fast, or be conservative and make it more steadily. The latter is the better approach in farming, providing more stability, fewer loan defaults, and a more stable rural society. The key to successful farm management is the first three letters of the word management (person in current terminology). The next UNIT introduces a recent and singularly important trend in farming and business life in general.

UNIT 5.2. USING THE COMPUTER IN FARM MANAGEMENT

> "Use of an on-farm computer . . . prompted a major change in his existing farm operation. His only regret is he didn't buy the computer sooner. 'If we'd had it earlier, I'd have several farm business decisions based on facts . . . I could have paid for the unit ten times over.'"

The above quotation is from an anonymous article "Computer meant major changes" in a 1982 issue of Successful Farming. It describes how a young Illinois farmer not only changed his farm operation, but also formed a computer consulting service to meet the needs for rapid information-processing by area farmers. One program on grain marketing tells the farmer when to store, sell, or put the grain in reserve, another is for feeder calf breakeven, a third for feed-mill calibrations on the hog rations, and a fourth applies to land buying.

Computers do nothing which cannot be done by hand. The time advantage gained by electronic computing is great, however. The computer used by the Illinois farmer quoted above cut bookwork time from two months to 36 hours per year! Without electronic computing, many calculations are simply too time-consuming, so they are set aside and decisions made by judgment.

Computers don't do things by themselves, of course. They need good directions; programs need to be written that correctly represent the interactions among the variables. Programs are bigger and better, and experience resulting from their use will contribute to changes in future programs.

Table 9-10. Generalized Inventory and Asset Summary, Income Summary, Expense Summary, and NET PROFIT (OR LOSS) for a farming operation. (Modified from Hoard's Dairyman Farm Accounts and Records, p.75).

Inventory and Asset Summary

Description	Beg of Year	End of Year
Machinery & Equipment		
Cattle		
Hogs		
Sheep		
Other stock		
Crops and Feed		
Supplies		
Buildings		
Land		
Total Inventory & Asset Summary:		
Inventory & Asset Gain or Loss:		

Income Summary

	Amount
Cash Income	
Dairy Products	
Breeding Stock raised	
Cattle Raised for Sale	
Swine	
Poultry	
Other livestock	
Crops	
Purchased Breeding & Work Stock	
Miscellaneous	
Sale Purchased Livestock	
Capital Assets	

Expense Summary

Cash Expense	Amount
Labor hired	
Feed purchased	
Seeds and Plants	
Machine Hire	
Supplies purchased	
Repairs,Maintenance	
Breeding fees	
Fertilizers	
Chemicals	
Veterinarian	
Fuel and oil	
Storage costs	
Taxes	
Property insurance	
Interest on notes	
Utilities	
Rent	
Trucking	
Farm auto expense	
Employees' Social Security	
Conservation	
Miscellaneous	
Livestock for resale	
TOTAL CASH INCOME	
TOTAL CASH EXPENSE	
NET CASH INCOME (OR LOSS)	
INVENTORY GAIN (OR LOSS)	
NET PROFIT OR LOSS	

There are literally thousands of software programs currently being used in agriculture. About 400 are listed in Strain and Fieser (1982) under the heading "Agricultural Business Management." Subcategories such as farm records, budgets and planning aids, land and investment analyses, machinery, buildings, tax management, labor management, estate planning, and marketing indicate the scope of programs available. Each of these categories has several programs listed as currently available. Some are more complete than others, of course, and different programs are designed for use in different computers. If Table 9-10 were programmed, calculation and print-out lf all these items would take just a few seconds.

Advertisements for computer hardware and software appear regularly in farm magazines such as Farm Journal, Successful Farming, Hoard's Dairyman, American Agriculturist, and others. A monthly publication "Computer Farming Newsletter" devoted to the use of small desktop computers in farming is also available.

The wildlife biologist should be well aware of this technology being used by farmers in decision-making. Unless the wildlife biologists and managers can provide inputs into computer programs and demonstrate wildlife management programs of similar sophistication, credibility will be difficult to establish. The time to start is now.

TOPIC 6. SUMMARY

Farm economics may be summarized with statistics showing trends in the ratio of net to gross farm income since 1910 (Figure 9-7). Both gross and net income have been rising in the last 40 years (see Figure 9-4), but the fraction of net to gross has been falling. Thus, farmers are handling more money but keeping relatively less of it. The overall change in net income from 1910 to 1970 (4000 to 16000; 4X) is a very low annual rate of return, about 2.3 % per year. Such economic trends are certain to affect wildlife. When there is a cost-price squeeze in the business end of farming, there will most certainly be a lower level of interest in modifying productive farming practices to benefit wildlife.

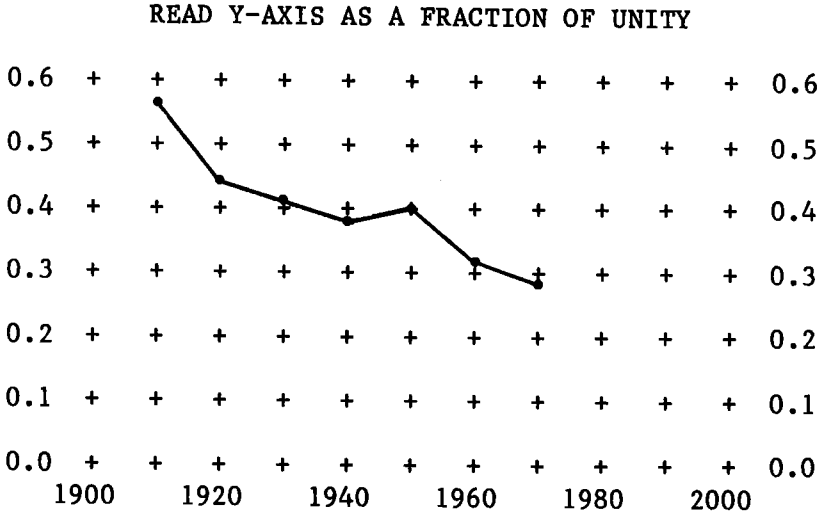

Figure 9-7. The ratio of net/gross farm income. (Calculated from data in Bureau of Census, 1976).

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