

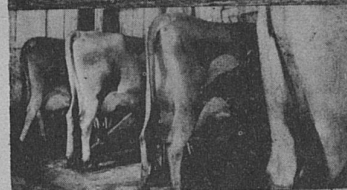
By Glenn L. Johnson  
Department of Farm Economics



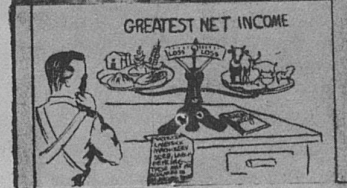
RAW LAND ? *no* SEE PAGE 10



PASTURES ? *Yes* SEE PAGE 7



LIVESTOCK ? *Yes* SEE PAGE 7



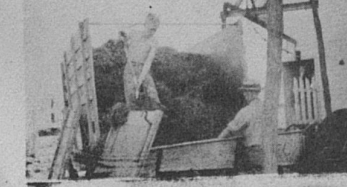
MANAGEMENT ? *Yes* SEE PAGE 16



MACHINERY ? ? SEE PAGE 14



STRAWBERRIES ? *not in 51*



LABOR ? ? SEE PAGE 12

PROGRESS REPORT I  
KENTUCKY AGRICULTURAL EXPERIMENT STATION - UNIVERSITY OF KENTUCKY  
LEXINGTON

## WHAT THE FIGURES ON GROSS INCOME, INVESTMENTS, AND EXPENDITURES MEAN

The following discussions will indicate the meaning of the figures secured for each farm and used as a basis for this report:

Gross Income includes the sales of crops, livestock, and seeds plus the value of products used in the home plus or minus changes in certain inventories. As both beginning and ending inventory values were figured at the same prices, gross income does not include changes in inventory values due to price increases. Further, changes in inventory values due to depreciation of machinery and buildings are left out (for the most part) from gross income. Hence, gross income, as reported here, should be sufficiently large to cover maintenance of the machinery and building investment. Gross income leaves out the rental value of the farm dwelling.

Land is Measured in Acres Only. The dollar value of land was not used because the value of land for building sites along the main highways is not related to its income producing capacity for farm purposes. As Marshall county farm buildings tend to be poorly adapted to the newer types of agriculture, the value of farm buildings was not included in the study. This explains why the rental value of the farm dwelling was left out of gross income.

Labor is Measured in Terms of Months Only. An attempt was made to find out for each farm the number of man months devoted to or spent on the farm.

Machinery Investment. This figure, designed to measure the total machinery investment for the farm, is the beginning inventory value of machinery, plus proportional charges for new machinery purchased during the year, less proportional charges for machinery sold off the farm during the year. Farmers should expect to earn returns on this investment at least high enough to cover an interest charge, plus maintenance and/or depreciation charges.

Breeding Livestock Investment. This figure, designed to measure the investment in livestock for the year as a whole, is essentially the beginning inventory value of breeding livestock, plus proportional charges for breeding livestock purchased during the year, less proportional deductions for breeding livestock sold off the farm during the year. Feeder animals are treated as current expense items because, by and large, farmers expect to get back dollar for dollar each year for expenditures on feeder animals, whereas they expect to cover only interest on their investment and depreciation in connection with breeding stock.

Forage Production Investment. This figure is designed to measure the investment in forage production. It is essentially the replacement value of the hay and pasture stands on the farm, including the residual values of fertilizer applied in establishing such forage crops, plus investments in mechanical structures or land clearing necessary in order to establish such forage crops. An acre of good, well established fescue and ladino was valued at between 35 and 40 dollars--an acre of Jap (Korean lespedeza) in condition to reseed itself was valued at about 2 dollars. Other forage and hay stands were assigned various values.

Other Expenses. This figure is designed to include all current expenditures on the farm expected to yield dollar for dollar returns in a given year except expenditures on hired labor, taxes, insurance, and maintenance of building and machinery investments. It includes expenditures on gas and oil used in the tractor and in the automobile (for farm purposes), annual seeds, feeder stock, feeder stock inventories, miscellaneous supplies, fertilizer nutrients whose values are consumed in one year, the value of perennial forages plowed down for row crops, custom charges for machinery, breeding fees, etc.

SOURCES OF INCOMES  
ON UPLAND MARSHALL COUNTY FARMS



WHAT'S NEW IN MARSHALL COUNTY FARMING

Since the beginning of World War II, four new developments have occurred in Marshall county farming: new forages and production methods have been developed; high wages and many new jobs have become available; markets have strengthened; and land values have increased along with the new tourist trade and the demand for country building lots.

New farm production methods deal mainly with fertilization and pasture production techniques though certain developments in livestock

production are also very important. Research on fertilization methods and forage crops at the University of Kentucky and elsewhere, coupled with the expanded production of fertilizer made possible by T.V.A., have made it possible to produce grass more economically in Marshall county. The development of artificial breeding has become an important source of higher capacity dairy cows capable of profitably using the additional hay and pasture. The Extension Service of the University of Kentucky and T.V.A. -Extension Service cooperation in setting up test-demonstration farms have served to speed up the distribution of the new farming knowledge. The same is true of S.C.S. and F.H.A. activities.

Marshall county wage rates and available "public work" (all off-farm work) have increased tremendously due to the needs of new industry based on T.V.A. power and other local resources.

With the expansion of employment in local industries, the markets for fresh produce have expanded. At present, despite big increases in dairy production in the Purchase region, large amounts of milk are being shipped in daily from Wisconsin and Illinois. The larger milk market cannot be forgotten when the future of Marshall county farming is under consideration.

The entire eastern boundary of Marshall county borders on either Kentucky Lake or the Tennessee River. This area is rapidly developing into a recreational area as a result of both public and private investments. A new federal highway now passes over the dam at Gilbertsville, through Benton and south towards Memphis and New Orleans. This highway will speed up the development of Marshall county's tourist industry and will make Marshall county land more valuable for other than farm uses.

#### FARM PROBLEMS GROWING OUT OF THE NEW DEVELOPMENTS

Better production methods, higher wages, more jobs, expanded markets, a new tourist industry, high land values -- all of these sound good -- and in many respects they are. BUT SUCH DEVELOPMENTS DO NOT COME TO A COUNTY WITHOUT CREATING FARMING PROBLEMS AND OTHER BUSINESS PROBLEMS.

Marshall county is made up of small farms. The average farm consisted of 76.5 acres in 1950; the typical farm is much smaller. In the past, these small farms produced a moderate level of living, first from dark fire-cured tobacco and then from strawberries and both dark fire-cured and dark air-cured tobacco. The overseas market for both of the dark tobaccos has nearly disappeared. And, as everyone knows, high wage rates and the opportunities for "public work" have cut down the profits in strawberry production.

The situation in Marshall county is this: wage rates are high -- much higher than they used to be. Farm sizes are small -- big enough for crops having high labor requirements, such as tobacco and strawberries -- but too small for efficient production of crops which make better use of labor and need modern machinery.

New production methods and new pasture and hay plants have put forage-consuming livestock in a much better position. Such production and methods

are best suited to larger farms than those now typical in Marshall county. Developing pastures and stocking them with livestock is also expensive -- it probably costs between four and five hundred dollars to buy a moderately good dairy cow and develop the pasture and hay crops to support her. Thus, the new developments have created a problem of getting together the money with which to make such changes in their farming.

The larger amount of "public work" available and the new tourist trade have increased the demand for building lots along the main highways and improved roads. Values of such building sites often exceed the value of the land for farming purposes. These high values make it hard to locate land priced for farming purposes when farmers decide they want larger farms.

IN A NUTSHELL, MARSHALL COUNTY FARMERS FACE THE PROBLEMS OF:

- (1) making better use of labor on small farms,
- (2) learning about and using new forage production methods,
- (3) learning livestock production methods,
- (4) getting money together for investments in forage production and livestock,
- (5) the long-run problem of getting money together for expanding their land holdings,
- (6) locating land not over-valued for farming purposes.

THIS STUDY WAS MADE TO DETERMINE  
THE EARNING POWER OF VARIOUS TYPES OF INVESTMENTS AND  
EXPENDITURES ON UPLAND MARSHALL COUNTY FARMS IN 1951

Last spring (1952), University of Kentucky farm management research workers collected 1951 business records of a group of 34 upland Marshall county farms. As 4 of these records did not prove accurate enough for use, only 30 were used. Gross income on these 30 farms averaged about \$4,400. All of the farms studies were upland farms located on the main ridge areas of Marshall county. Many of the farms had been or are now T.V.A. Test Demonstration farms. Records obtained included information on 1951 gross income; investments in forage production, livestock, and machinery; and the amounts (inputs) of labor, land, and miscellaneous items used. These figures are described in more detail on the inside cover page.

The farms represented by the records varied widely as to the amounts of land, labor, forage, machinery, etc., used on the farm. In general, the farms studies were larger than the average for Marshall county, averaging 123.5 acres in size. The 30 farms used as an average of between 11 and 12 months labor per year, the lowest using 2.5 months and the highest using 23.4 months. One farm surveyed had an estimated gross income for 1951 as low as \$1,818, not counting the rental value of the farm dwelling. The largest gross income among the farms studies was \$12,703.

These differences made it possible to estimate the influence of the various investments and inputs on gross income. Once estimates of the influence of labor, land, machinery, forage investments, livestock, and miscellaneous items used on gross farm income were made, the estimated earning power of these various inputs was known. The way the records were analyzed also made it possible to estimate the influence of one investment on the earning power of another; for example, how the amount of machinery used influences the earning power of labor.

The gross farm income WHICH WOULD BE EXPECTED FROM WHAT A FARMER USED AND HAD TO WORK WITH COULD ALSO BE ESTIMATED. <sup>1/</sup> For example, the "usual" farm had the following investment and expenditure pattern:

Land used, in acres .....	103.5
Labor used, in months.....	9.4
Machinery used, in dollars.....	1420
Livestock and Forage Investment, in dollars.....	3016
Other expenditures, in dollars..	783

With this investment pattern, the estimates indicate that the raw land was earning virtually nothing, the labor was earning about \$55 a month, the machinery investment was returning about 4 percent, the livestock and forage investment was making about 56 percent and the other expenditures were making about 86 percent. In addition, other inputs, such as management, buildings, wells, and fences, were earning something, which along with the profits above the rates charged for land, labor, etc., amounted to about \$904.00.

LET'S SEE:

For land .....	000
For labor, 9.4 months @ \$55 .....	\$ 517
For machinery, \$1420 @ 4% .....	\$ 57
For livestock and forage, \$3016 @ 56% .....	\$ 1689
Other expenses, \$783 @ 86% .....	\$ 673
Contribution of management, building, and other investments and profits .....	\$ 904
For a total "Expected Gross Income" of .....	\$3840

<sup>1/</sup> Technical Footnote: A Cobb-Douglas production function was fitted with the following results:  $y$  (gross income) = 261 (land)  $\cdot$ .0245 (labor)  $\cdot$ .135 (machinery)  $\cdot$ .015 (forage invest.)  $\cdot$ .440 (other exp.)  $\cdot$ .174

Where  $\widehat{b}_2 = .1275$ ,  $\widehat{b}_3 = .0920$ ,  $\widehat{b}_4 = .0678$ ,  $\widehat{b}_5 = .1472$ ,  $\widehat{b}_6 = .1009$

While the b's are relatively large, the over-all consistency of the  $b_i$ 's and the  $\frac{dy}{dx_i}$ 's lends confidence to the estimates. In addition, the close agreement between the estimates and the opinions held by extension workers and others familiar with the county lends confidence. Also, see the section, "Earning Power of Management."

It also became possible to estimate what income a farmer could have expected had he used more or less labor, land, machinery, etc. Such estimates help us see how changes in investment patterns affect the earning power of labor, machinery, etc. In other words, such estimates indicate, in general HOW MARSHALL COUNTY FARMS COULD HAVE BEEN REORGANIZED IN 1951 TO INCREASE THE EARNING POWER OF LABOR, LIVESTOCK, MACHINERY, ETC. The remainder of this report is made up of sections discussing the EARNING POWER of these investments and expenditures. Each person interested in the profitability of Marshall county farming will want to study these sections carefully. These sections should help farmers see the profitable over-all directions in which to move in developing Marshall county farms.

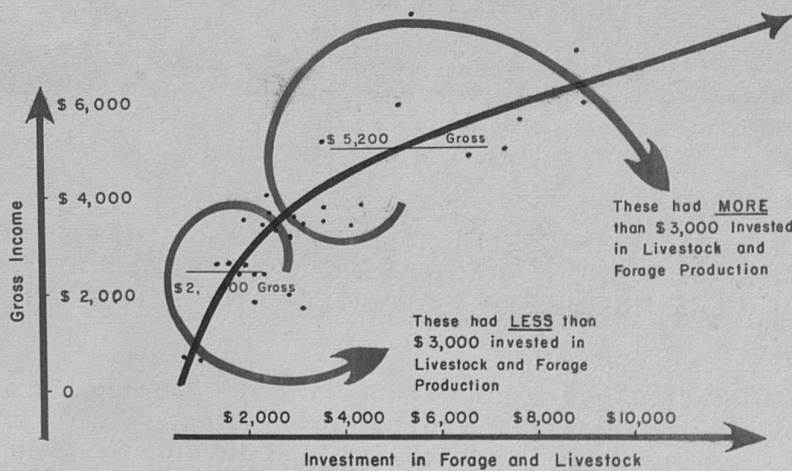
THE EARNING POWER of Investments in Livestock and Forage Production in 1951.

Investments in livestock and forage production probably had a very high earning power in Marshall county in 1951.

The chart below shows how gross income varied with investments in livestock and forage production among the upland farms studied.



AMONG 30 MARSHALL COUNTY FARMS --

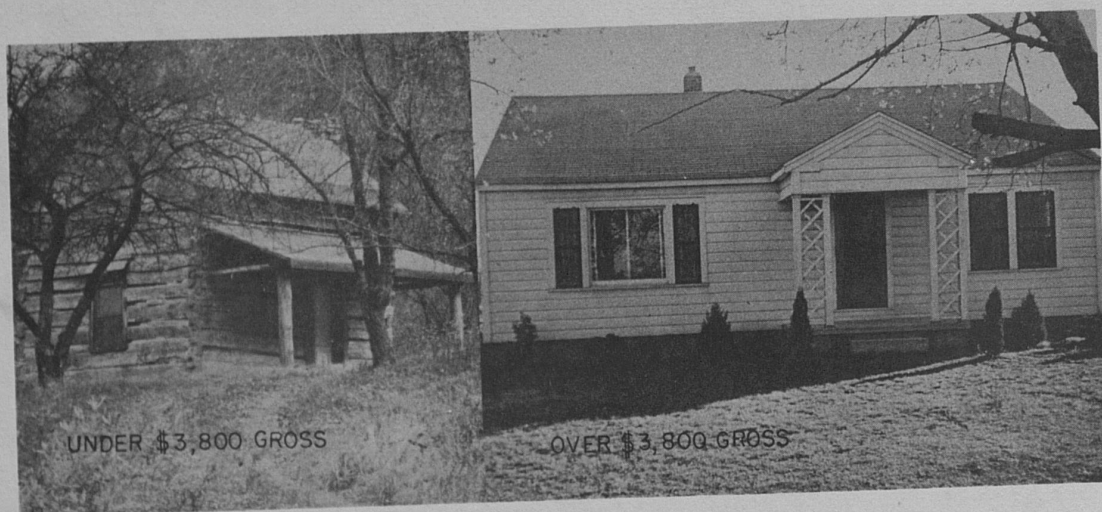


Farmers with over \$3,000 invested in livestock and forage production tended to have gross incomes higher than \$3,800 in 1951.

Farmers with less than \$3,000 in livestock and forage production tended to have gross incomes lower than \$3,800 in 1951.

THE INCOME FIGURES IN THE CHART WERE ADJUSTED TO ACCOUNT FOR FARM-TO-FARM DIFFERENCES IN OTHER INVESTMENTS AND INPUTS.

It is very important to note that farms with investments in livestock and forage (pasture and hay) production amounting to less than \$3,000, fell far below \$3,800 in gross income. Farms having the usual amounts of machinery, labor, and other expenditures, but having only \$1,000 invested in livestock and forage production would have earned \$1,000 gross income in 1951. On the other hand, farms having an investment of \$2,000 in livestock and forage production and the usual amounts of other inputs would be expected to have gross incomes of around \$2,800.



AN ADDITIONAL \$1,000 INVESTED IN LIVESTOCK AND FORAGE PRODUCTION ON AN UPLAND FARM HAVING ONLY \$1,000 SO INVESTED, WOULD HAVE PROBABLY EARNED OVER 100 PERCENT INTEREST IN 1951.

The study also indicates something concerning the earning power of larger investments in livestock and forage production. While the earning power of investments in livestock and land developments in excess of \$3,000 was not nearly so great as investments below \$3,000, the returns for additional investments were still very high. The esti-



mates indicate that:

AN ADDITIONAL INVESTMENT OF \$4,000 BEYOND THE USUAL FIGURE OF \$3,000 WOULD HAVE RETURNED AN ADDITIONAL \$1,600 PER YEAR, 40 PERCENT NET OF THE ADDITIONAL INVESTMENT.

This rate of return appears to be sufficiently high to cover depreciation on the additional \$4,000 invested in forage crops and breeding herds.

In expanding pasture production, farmers often face the question of whether to develop a few acres intensively (say, with a well-fertilized, fescue-legume mixture) or to develop a larger acreage less intensively (say, with lespedeza and redtop). Though this study throws little light on this question, it does indicate that both types of investment are profitable. The total amount of money which could be made, however, was greater with the intensive pasture programs because greater investments could be made.

With forage production so profitable, it seems appropriate to take a quick look at the general ABC's of pasture establishment in Marshall county:

- A. Make soil tests and apply recommended amounts of fertilizer.
- B. Balance plant mixtures to get production, protection against drouth, and legume nitrogen.
- C. Timeliness -- the more drouthy the soil, the more important is timeliness. Plant matter (humus) reduces drouthiness.
- D. If in doubt, see your county agent or soil conservation man.

FARMERS WHO VIOLATED A AND B, IT WAS OBSERVED, GENERALLY WASTED EXPENSIVE SEED.

With livestock production necessary to utilize forage, it also seems appropriate to take a quick look at the ABC's of fitting livestock to a forage production program.

- A. Beef production requires relatively little labor; it is therefore adapted to
  - (1) farms with large acreages of developed forage land;
  - (2) small part-time farms, short of labor, with varying amounts of developed forage lands.
- B. Dairy production requires a relatively large amount of labor; it is therefore adapted to farms having
  - (1) fairly large amounts of family labor;
  - (2) small acreages.

A separate study conducted at the University of Kentucky indicates that costs per 100 pounds of milk fall steadily as size of herd and barns are increased from 10 to 30 cows. Other evidence indicates, costs fall rapidly as higher producing cows are used, but costs increase rapidly as cows of given production capacity are fed to higher levels. Artificial breeding is one way to raise the production of dairy herds.

In the year ahead (July 1952-June 1953), a large supply of slaughter cattle is in prospect. The present record number of beef cattle on farms may continue to increase. Beef prices (including prices of stockers and feeders) are high in relation to other farm prices. The relationship between beef and other prices may be corrected by a downward movement of beef prices one of these days.

On the other hand, the Purchase area is now a milk-deficit area. Further, both the demand for milk per person and the number of persons are increasing and are expected to continue to increase in the Purchase area. Therefore the long-run outlook for milk prices is good.

PROBABLY IT WILL BE LESS RISKY TO OWN DAIRY COWS THAN TO OWN BEEF ANIMALS IN THE NEXT ONE TO THREE YEARS.

#### THE EARNING POWER of Unimproved Land in 1951

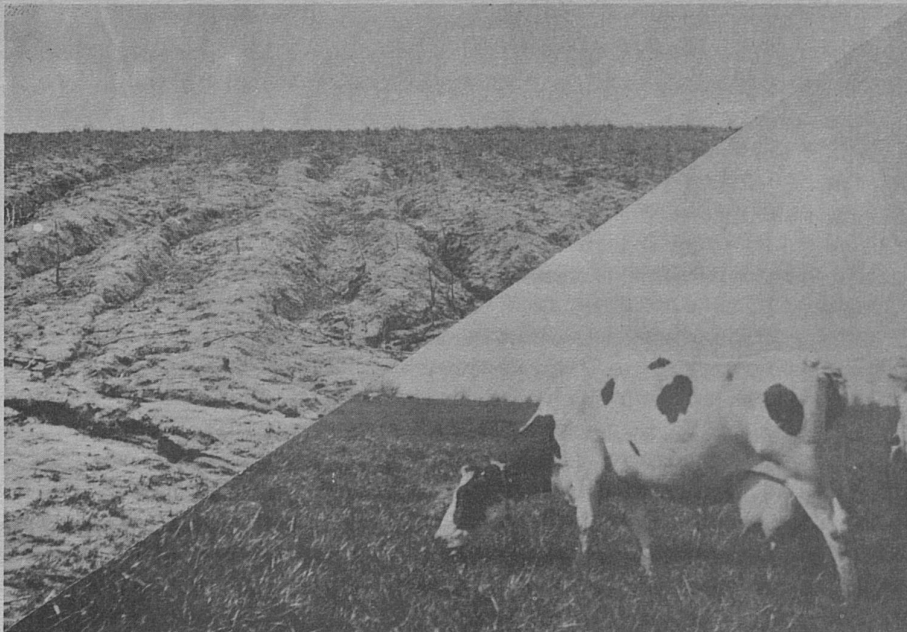
Another figure used in analyzing the 30 Marshall county farms was the acreage of land in each farm. Estimates indicate that the earning power of raw undeveloped Marshall county upland was probably low in 1951. The acreage of physical size of Marshall county farms did not seem to determine their earning power in 1951. Many of the larger farms had low incomes while some of the smaller ones had quite respectable incomes.

JUDGING FROM THE IMPORTANT RELATIONSHIP BETWEEN INCOME AND INVESTMENTS IN FORAGE PRODUCTION AND LIVESTOCK, THE NUMBER OF DEVELOPED ACRES IN THE FARM WAS FAR MORE IMPORTANT IN DETERMINING GROSS INCOME THAN THE TOTAL NUMBER OF ACRES IN THE FARM.

Apparently, acreage or size of farm is unimportant until the farmer concerned has developed all the land capable of development on his farm. Very few of the farmers studied had developed as much as one-half of their acreage. Once a Marshall county farm becomes fully developed, the size of farm (measured in acres) would limit ability to expand other investments and, hence, incomes. Thus, it is just a matter of time before their small acreages will place a limit on the ability of many Marshall county farmers to make further profitable investments in livestock and forage production. As more and more farms reach this condition, the problems of combining farms and of adding more land to commercial farms, will become much more important.

At that time new renting arrangements will be needed so that commercial Marshall county farmers can rent and develop land held by persons not interested in farming themselves. Further, the use of credit facilities for the purchase of land will need to be expanded as more and more commercial farmers reach the practical limit in the development of the present land holdings.

## THE LAND IS THE SAME



## THE DIFFERENCE IS IN THE INVESTMENT

The low earning power of raw land (in 1951) is not out of line with the prices being asked and paid for Marshall county land as those prices are often based on (1) heavy investments in forage production and (2) the use of land for building lots either for businesses or residences. The low earning power of unimproved land, however, does tell us that farmers should be particularly careful in buying land for farming purposes. Land purchases have often proven profitable from residential and speculative standpoints. Further, money could be made by putting forage and fertilizer investments on Marshall county land in 1951. Neither of these two incomes are earned by the raw land; hence, neither should influence what is paid for raw land for FARMING PURPOSES. The problem is one of not paying more for raw land for farming purposes than it is worth so used. Improved land is one thing--raw land is another. The profitability of seed and fertilizer investments should not be confused with raw land value. Also, residential or nonfarming values are too high to be supported from farming uses mentioned above--farming is not that profitable. In order to avoid paying more for land than it is worth for farming purposes, land best suited for residential or nonfarming businesses should be so used. Often that portion of the farm having high residential or business value could be sold off and the money reinvested in (1) land equally good for farming purposes or (2) in livestock and forage production on the remaining land. Another method is to use land for two purposes, i.e. it can be farmed while being held for gains in value due to residential and business developments.

## THE EARNING POWER of labor in 1951

The earning power of labor was low on upland Marshall county farms when used with the investments in machinery, livestock, land development, and expenditures common among the farms studies. Labor earned about \$58.00 during the last month (the ninth) it was employed on the "typical" farm studied. This low figure compares unfavorably with wage rates in both nearby and distant industries. Even among the "better than average" farms included in this survey, too much labor was used in connection with the relatively small investments in livestock and forage production and other expenditures.

Dairy farmers in the states of Wisconsin, Minnesota, and Michigan have competed for years with nearby industries for labor at a much lower relative price for milk than is now received by Purchase farmers. Similarly, Marshall county farms could have been organized in 1951 to secure labor earnings which would compare much more favorably with industrial employment. In most cases, such reorganizations would have involved development of first class pastures on the available unimproved land for each farm plus the addition and development of more land plus the addition of livestock.

THE STUDY INDICATES THAT HAD THE USUAL INVESTMENT IN LIVESTOCK AND FORAGE PRODUCTION BEEN TRIPLED IN 1951, OTHER INVESTMENTS AND INPUTS BEING UNCHANGED, THE EARNING POWER OF 12 MONTHS LABOR WOULD HAVE BEEN INCREASED FROM \$45.00 TO AROUND \$75.00 PER MONTH.

Such an increase in livestock and forage investment would make an increase in other expenditures advisable and profitable.

A TRIPLING OF THE LIVESTOCK AND FORAGE INVESTMENT PLUS A TRIPLING OF OTHER EXPENDITURES WOULD INCREASE THE EARNING POWER OF TWELVE MONTHS LABOR FROM \$45.00 TO \$90.00 PER MONTH.

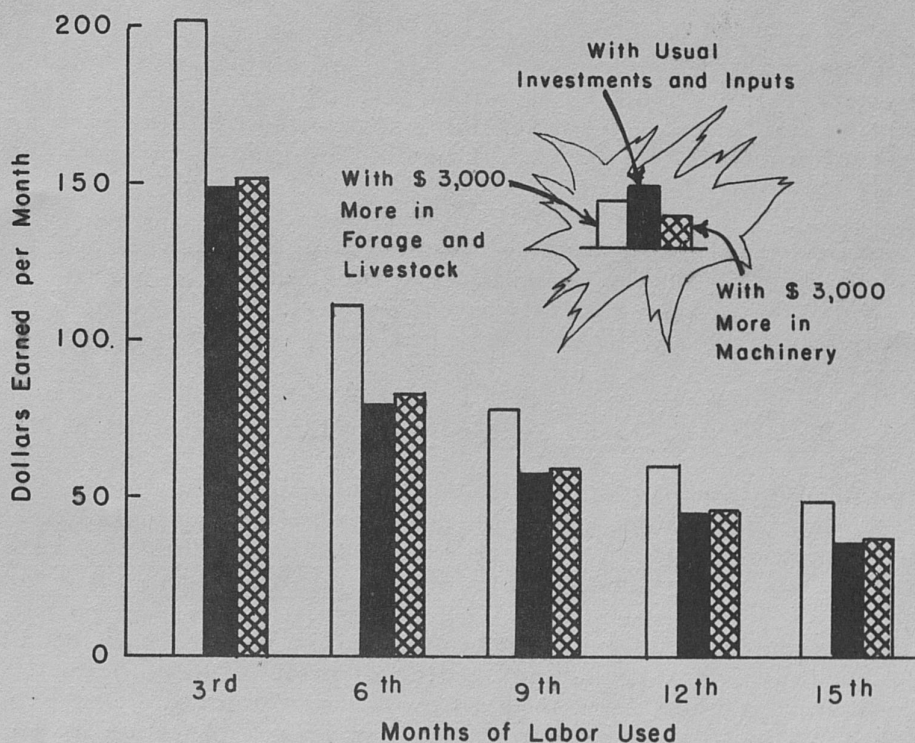
Had the usual land acreage been increased 50 percent thereby permitting livestock and forage investments (seeds and fertilizers) and other expenditures to be increased by five times, THE EARNING POWER OF TWELVE MONTHS LABOR WOULD HAVE BEEN INCREASED FROM \$45.00 TO \$114.00 PER MONTH.

It should be made clear that a farmer whose labor alone was earning over \$100 a month would have been receiving a large gross income as a result of his investments. One such farmer among those studied grossed over \$12,000 and had a net income much higher than earned by factory workers.

The estimates, while subject to many shortcomings, makes it clear that the problem of getting more out of labor on upland Marshall county farms is really:

- (1) A PROBLEM OF MAKING ADDITIONAL INVESTMENTS AND EXPENDITURES IN OTHER PARTS OF THE FARM BUSINESS SO AS TO USE LABOR EFFICIENTLY, AND
- (2) A PROBLEM OF USING LESS LABOR, SOMETIMES IN TOTAL AND, AT OTHER TIMES, IN RELATION TO OTHER INPUTS.

### LABOR CHART — Showing Earnings per Month



THE RATE EARNED PER MONTH OF LABOR USED DECREASED WITH THE AMOUNT OF LABOR USED.

THE RATE EARNED PER MONTH OF LABOR USED INCREASED WITH INVESTMENTS IN EITHER MACHINERY OR IN LIVESTOCK AND FORAGE PRODUCTION.

Investments in livestock and forage production were more effective in raising labor earnings than investments in machinery. Machinery saves labor; livestock and forage investments give labor productive things to do.

IT WAS MORE IMPORTANT TO MAKE INVESTMENTS TO INCREASE THE PRODUCTIVITY OF LABOR THAN TO MAKE LABOR SAVING INVESTMENTS IN MACHINERY IN MARSHALL COUNTY IN 1951.

Labor earnings depend on the amount of labor used and upon what it has to work with. Ordinarily, the less labor used, the higher the monthly rate earned. This was true on Marshall county farms (see the labor chart, page 13). The bars on the chart show the monthly earnings of different amounts of labor. The black bars show the usual amounts earned with the average investments in equipment, livestock, and forage common among the farms studied.

When the investment in livestock and forage production was doubled, the monthly rates earned increased to the amounts shown by the white bars in the charts. A similar increase in the machinery investment had a much smaller effect on the earning power of labor as shown by the grey bars in the labor chart.

It should not be forgotten that a tractor outfit might reduce labor requirements from 15 to, say, 9 months in addition to increasing the earning power of 15 months labor. For this reason it might be advisable to compare the grey bar for 9 months labor with the black bar for 15 months.

#### EARNING POWER of Machinery Investments in 1951

With the investments in livestock, forage production, the amounts of labor and land, and other expenditures common among the farms studied, the usual amount of farm machinery present on the farms earned a very low rate of return in Marshall county in 1951, unless employed in doing custom work.

Even on the larger Marshall county farms, fairly well represented by the 30 farms studied, machinery investments did not make high returns in 1951. It should be kept in mind that only upland farms were studied. The problem of getting work done on time is probably less important on upland pasture farms than it would be on lowland farms used largely for corn production.

Those farms using hired machinery to establish pastures and for hay making purposes did about as well financially as those farms maintaining large investments in farm machinery. This appeared especially true for farmers able to make "reliable" arrangements for custom work i.e., with members of their family or with good friends. The large number of tractor units moving on to both small and medium sized Marshall county farms in the spring of 1952 will probably make it easier to get custom work done in the future. Apparently, expenditures for custom-hired machine work paid fairly close to dollar for dollar returns on most farms; but investments in machinery on the typical farm studied did not earn enough to cover a moderate rate of interest on the investment plus maintenance and depreciation charges.

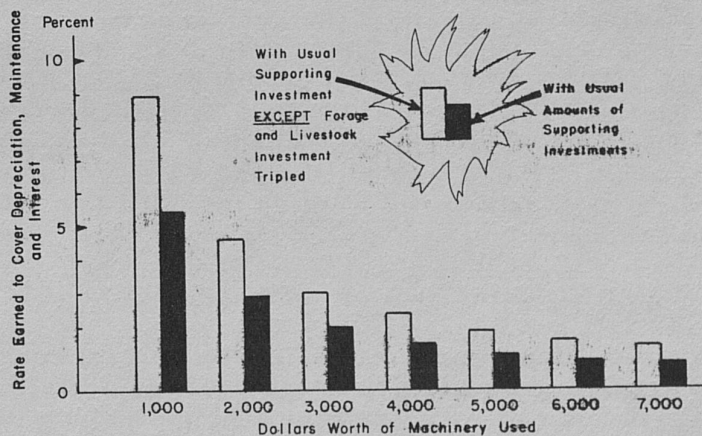
The profit from using custom machinery and the lack of profits from owning machinery should be expected on the small farms commonly found in Marshall county. When the usual investment in forage production and livestock was tripled, the earning power of a dollar invested in machinery became almost high enough to justify ownership, even if custom work were not engaged in. With around \$6,000

invested in livestock and \$3,000 invested in pasture production, between 15 and 20 dairy cows and around 90 acres of improved pasture could be placed on a farm. Under such conditions, the estimates indicate that the usual investment of around \$1,400 in machinery would probably pay a gross return of about eight percent or about double that paid with the usual investment in forage and livestock. This estimate is in line with the experience of the larger Marshall county farms having comparable investments in livestock and forage production.

The general conclusion is that the typical upland farm included in the study is neither large enough nor productive enough to justify large investments in machinery, without doing custom work off the farm; however, such investments begin to pay off on the larger farms having sufficient forage and livestock to make them productive.

The machinery chart below contrasts the estimated earning power of additional dollars invested in machinery under two conditions. Under the first condition, the common amounts of livestock and forage investments, labor, and other expenditures are used with the machinery. Under the second set of conditions, the investments in livestock and forage production are three times the average found on the farms surveyed and the other inputs are at corresponding levels.

MACHINERY CHART



The black bars represent the earning power of machinery under the first set of conditions. The white bars represent the earning power of each additional dollar invested in machinery under the second set of conditions. The earning power of machinery goes up with investments in livestock and forage production.

MACHINERY IS LABOR SAVING. WITH THE INVESTMENTS COMMONLY FOUND ON MARSHALL COUNTY FARMS, LABOR WAS EARNING VERY LITTLE IN 1951. THEREFORE, IT WAS NOT PROFITABLE TO SAVE IT BY BUYING LABOR-SAVING EQUIPMENT.

HOWEVER, WHEN LABOR WAS MADE PRODUCTIVE WITH INVESTMENTS IN LIVESTOCK AND FORAGE PRODUCTION, IT BECAME VALUABLE. UNDER THESE CONDITIONS IT PAID, IN 1951, TO USE MACHINERY TO SAVE LABOR.

Note to Machinery Salesmen: The sound long-run market for farm machines depends on the producing capacity of farms. Under 1951 conditions, the fully developed Marshall county upland could buy, profitably use, and rebuy machinery; the underdeveloped farm could only buy machinery as long as money (savings or "public work" earnings) held out.

#### THE EARNING POWER of Current Expenditures in 1951

Current expenditures include expenditures on feeder stock, feeds, annual seeds, gas, oil, and fertilizers used up in one year, etc. They do not include maintenance repairs on machinery and buildings, taxes, insurance, etc. All T.V.A. fertilizers were charged at commercial prices. The estimated value of fertilizers left in the ground at the end of the year was not counted as a current expenditure.

The study indicates that the Marshall county farmer has been making these expenditures quite efficiently. For smaller than usual expenditures, the farms studied appeared to get back more than a dollar per dollar spent. For usual expenditures Marshall county farmers appeared to get back less than dollar for dollar spent. AS WAS TRUE FOR THE OTHER INPUTS AND INVESTMENTS, THE EARNING POWER OF SUCH EXPENDITURES DEPENDED CLOSELY UPON THE AMOUNT OF OTHER INVESTMENTS AND INPUTS ASSOCIATED WITH THEM. When usual investments in livestock and forage production were tripled, the estimates indicate that the earning power of current expenditures went up for 1951 from 86 cents to 138 cents on the dollar spent.

#### THE EARNING POWER of Management in 1951

The amounts of labor, land, machinery, forage investments, livestock, and miscellaneous expenditures are not the only things determining the gross incomes of farm businesses. The other things include prices, misfortune, good luck, special buildings, and managerial ability. One of the most important of these is management.

MANAGERIAL ABILITY IS A VERY HARD THING TO PUT ONE'S FINGER ON. IT HAS TO DO WITH THE CAPACITY OF A FARMER TO SEE HIS PROBLEMS, TO LEARN, TO KNOW WHAT TO LOOK FOR, TO REALIZE THE MEANING OF WHAT HE SEES AND HEARS, TO MAKE DECISIONS ON THE BASIS OF "CALCULATED RISKS" WHICH HE IS WILLING AND ABLE TO PUT UP WITH, TO PUT THESE DECISIONS INTO ACTION, AND TO BE WILLING AND ABLE TO ACCEPT RESPONSIBILITY FOR WHAT HE DOES.



The gross incomes of certain Marshall county farms covered by this study were often quite different than expected from the amounts of labor, land, machinery, etc., used. When a farmer's income is considerably higher than would be expected from what he has to work with, he has been either fortunate, or a better than average manager, or he has had some other advantage not turned up in the study.

Among the farms surveyed, one had a gross income almost \$2,900 higher than expected. Another had a gross income \$1,700 lower than expected. The farmer receiving almost \$2,900 more than expected from what he had to work with was probably a better than average manager. On the other hand, the farmer receiving \$1,700 less than expected from what he had to work with was unable to devote much of his time to farming as he was operating one or two other businesses. Perhaps, as much as \$3,000 of the \$4,600 difference was due to a difference in management.

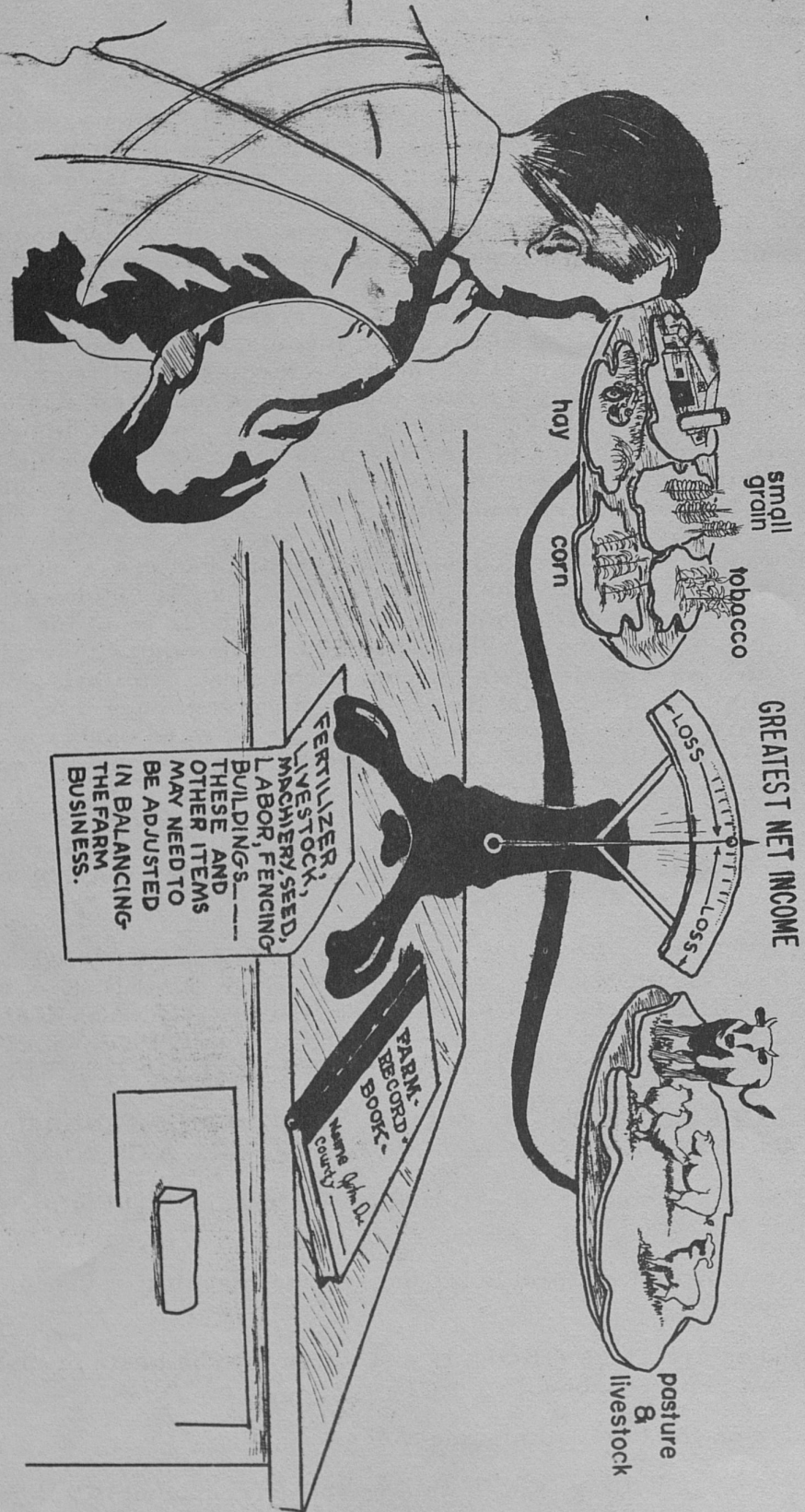
About one-third of the 30 businesses studied had gross incomes which were either more than \$1,000 higher or more than \$1,000 lower than expected from the resources they had to work with. In most instances, there was evidence to indicate that those having incomes more than \$1,000 higher than expected were better than average managers. Similarly, there was generally some evidence that those having incomes more than \$1,000 lower than expected were poorer than average managers or were unable to devote their full managerial ability to the farm business because of public work, illness, etc.

In between the poor and the good managers was the great middle group whose actual gross incomes fell within \$1,000 of what would be expected from the resources at their disposal.

MANAGERIAL CAPACITY COULD NOT BE ACCURATELY MEASURED IN THIS STUDY; HOWEVER, ITS PRESENCE OR ABSENCE WAS GENERALLY EVIDENT. FARMERS HAVING HIGHER MANAGERIAL CAPACITY PROBABLY EARNED \$3,000 MORE GROSS INCOME PER YEAR THAN THOSE LOW IN MANAGERIAL CAPACITY OR UNABLE TO USE THEIR CAPACITY.

THE EFFECTIVENESS OF MANAGEMENT CAN BE INCREASED BY STUDY AND EFFORT TO BE A GOOD MANAGER. A GOOD MANAGER:

- (1) Sees his problems quickly and goes after the right information quickly.
- (2) Can think out his problems and see the meaning of the information he gets.
- (3) Makes decisions efficiently and, often, on the basis of risks calculated to be reasonable.
- (4) Acts on the basis of his decisions.
- (5) Knows, is willing, and is able to accept responsibilities for his acts.



small grain

tobacco

corn

hay

GREATEST NET INCOME

LOSS

pasture & livestock

FARM RECORD BOOK  
Write Right On

FERTILIZER, LIVESTOCK, MACHINERY, SEED, LABOR, FENCING, BUILDINGS, THESE AND OTHER ITEMS MAY NEED TO BE ADJUSTED IN BALANCING THE FARM BUSINESS.

HOW MUCH IS NEEDED TO MAKE A GOOD LIVING  
ON A MARSHALL COUNTY UPLAND FARM?

Would a man owing \$10,000 on:

150 acres of upland Marshall county land,

100 acres of good grass-legume seeding worth \$40 an acre,

30-dairy cows worth \$300 each,

\$2,500 worth of machinery,

and having:

18 months of labor to use a year (himself and a high school son), and

a fair knowledge of dairying

have been able to meet expenses and debt payments and still have a good living in Marshall county in 1951?

The answer is YES if he did as well as the average farm studied.

On the average, the expected gross income (excluding the rental value of the home) of such a farmer would have been \$10,500 in 1951. Assuming that the \$10,000 dollar debt was repayable at the rate of \$1,000 a year, that the rate of interest was 6 percent and that he spent \$3,000 for feed, gas, oil, etc., such a farmer would have had \$5,900 a year left over in addition to the use of his house. This level of income is high enough to support GOOD RURAL HOMES AND A GOOD STANDARD OF LIVING.

The problem is: HOW TO GET SUCH A QUANTITY OF ASSETS TOGETHER?

- A. Persons owning the land could probably borrow the money for the live-stock and forage about as fast as they could establish their operations.
- B. Persons with small unproductive farms cannot get such a quantity of assets together out of savings. The simple fact is that the gross income from a small unproductive farm does not permit rapid savings.

Borrowing for investment in forage and livestock would raise gross income on small farms. Such incomes, supplemented by "public work" incomes, would permit savings with which to acquire more land and make forage and livestock investments. This procedure would involve risks. The balancing of these risks against prospective gains is a personal problem for each farmer, family, and lender involved. The sections in this report on the earning power of various investments and inputs should help people judge the risks in relation to prospective gains.

Renting of land supplemented by public work would permit savings. One

difficulty with renting would be the lack of established customs and practices to encourage forage and livestock production by tenants. Partially offsetting this problem, however, is the lower risk run in renting as contrasted with buying land.

#### GENERAL CONCLUSIONS

Under the price conditions existing in 1951, the following statements can be made concerning Marshall county upland or ridge farms:

1. In 1951 the most important factor determining the earning power of Marshall county farms was the investment in forage production (principally grass seed and fertilizer) and livestock.
2. For the common upland farm in Marshall county, initial investments in forage production and livestock appeared to pay far higher rates of returns than investments in machinery or expenditures of labor.
3. It did not pay individual Marshall county farms to buy more land for farming purposes in 1951 unless they had rather fully developed their present holdings.
4. The average Marshall county farm is about 76 acres in size. Hence, not much more than \$3,000 can be invested in forage production, on the average, per farm. This level of investment, associated with usual proportions of other inputs and investments, was not sufficient in 1951 to yield returns to labor high enough for Marshall county farmers to compete with industry for labor. Therefore, when the investment in forage production and livestock had been expanded to the limit set by the physical size of the typical Marshall county farm, the problem of expanding farm size was important. This indicates that extension men, researchers, credit men, farmers, and legal authorities should give special attention to the problems of:
  - (a) developing rental arrangements which will permit commercial farmers to rent and develop land held by persons desiring neither to sell nor to expand their present holdings.
  - (b) improving and encouraging the use of credit arrangements by farmers truly in need of additional land.
5. The problem of increasing the earning power of labor on Marshall county farms in 1951 was principally a problem of associating sufficient livestock and forage producing capacity with labor. The farm business records indicate that the Marshall county farmers with larger farms having commercial livestock enterprises (and the necessary supporting forage) had incomes permitting them to maintain levels of living better than attainable from nearby industries.
6. The problem of increasing the earning power of labor was essentially a problem of making investments to increase the productivity of labor. Such investments were mainly in forage production (good grass

seed and fertilizer) and livestock. Machinery investments, which are labor saving, became profitable only after the productivity of labor had been increased with other investments.

7. 1951 returns to machinery investments on typical Marshall county farms were very low; despite this, the records of the farm businesses studied indicate that the larger Marshall county farms, with the larger investments in livestock and forage production, earned sufficient returns to machinery to justify a full set of farm machinery without doing off-farm custom work. Under conditions similar to 1951, farmers could expand their investments in livestock and forage production sufficiently to make farm machinery moderately profitable on a larger proportion of Marshall county farms.
8. While managerial capacity could not be accurately measured, the study indicates that differences in managerial ability may account for differences in gross farm income amounting to over \$3,000 per year.
9. The records of the thirty farms indicate that the pasture-livestock production programs advocated by Extension Service, Tennessee Valley Authority, and other agencies are sound. The farms among those studied, which had carried out such programs were among the most profitable. Further, much evidence indicated that the farms developing such programs were on their way towards good incomes and good standards of living.

THANK YOU

This report was made possible by the cooperation of 34 public-spirited Marshall county farmers who made their personal business records and time available to University of Kentucky farm management research workers. Thus, any value which this report may have is due in large part to these cooperating farmers. Though their aid is greatly appreciated, their names are not presented at this point as such presentation might reveal individual business dealings.

Appreciation should also be extended to Mr. Homer Miller, Marshall County Agent, for his cooperation and suggestions in connection with this report.

Gratefully,

Glenn L. Johnson  
Professor in Farm Economics  
University of Kentucky