

CHANGES IN THE LEVELS OF AGRICULTURAL
 PRODUCTION IN SELECTED
 WESTERN KENTUCKY COUNTIES
 1939 - 1949

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CHANGES IN THE LEVELS OF AGRICULTURAL
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1939-1949

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The purpose of this progress report is to show the changes which occurred between 1939 and 1949 in the distribution of the levels of production 2/ among farms in ten of the eleven extreme Southwestern Kentucky Counties (Ballard, Calloway, Carlisle, Fulton, Graves, Hickman, Marshall, McCracken, Livingston and Lyon 3/). These counties are all in or near the Tennessee Valley portion of the state and have been affected directly or indirectly by activities of the Tennessee Valley Authority.

REQUIRED ADJUSTMENTS IN CENSUS DATA

The 1940 and 1950 United States censuses, as they pertain to agriculture in Kentucky, have been drawn on almost exclusively as a source of information for this study, which is primarily concerned with value of farm products produced per farm.

The "values of farm products produced per farm" reported in the two censuses are not comparable for two reasons. First, the 1940 census report distributes farm income on the basis of total value of products (whether or not sold) whereas the 1950 census report distributes farm income on the basis of value of products sold. Second, price increases which occurred between the two years make it impossible to use the income data for purposes of making comparisons 4/ of the

- 1/ The work reported herein was supported by a grant from the University of Chicago and was being carried out under the general supervision of Glenn L. Johnson in connection with R & MA Project No. 60, Agricultural Economics Department, Kentucky Agricultural Experiment Station. Also, the author is indebted to Professors John H. Bondurant and John C. Redman of the Department of Agricultural Economics for helpful criticism and suggestions.
- 2/ A level of production is considered comparable to one of the six class limits used in the economic classification of farms by the U. S. Census of Agriculture (1945 and 1950).
- 3/ Trigg County was excluded from this report because the reduction in acreage of cropland, due to the military reservation, made it impossible to measure the level of production of the farms on a basis comparable with the counties included in this report.
- 4/ Production items and prices used by the U. S. Census of Agriculture are for the calendar years 1939 and 1949.

levels of production. By a statistical adjustment in the 1940 census figures allowing for the generally higher level of prices in 1949 (the prices used in the 1950 census) and by deducting an estimate of the value of products used in the household from the 1940 census, the income data were made usable for the purpose of comparing the distribution of the levels of production among farms in 1949 with that existing in 1939.

The statistical price adjustment was based on farm-product price indexes of 1939 and 1949. In 1939 the price index was $73\frac{1}{2}$ (1921-29 = 100) and in 1949 it was $199\frac{2}{3}$. By dividing the index for 1949 by the index for 1939, the adjusted price index of 273 was obtained. Thus, by multiplying the 1939 income figures by 273, the 1939 figures were made somewhat comparable to the 1949 figures.

The method of classifying farms by economic classes, begun in the 1945 census and continued through the 1950 census, is used in this study. When farms were previously grouped into economic classes, (chiefly on the basis of value of products and income from work off the farm) wide disparities in size of operations as measured by farm acreage, gross value of farm production, and farm products sold, are evident. The present classification eliminates off-farm incomes, permitting separation of the part-time^{3/} and residential units^{4/} from those that may be regarded as farming units, but in this report part-time units are included because they could not be separated from the 1940 census figures. Since only farms grossing over \$250 are included in the economic classification, the problem of non-comparability of farms due to definition between the 1940 and 1950 U. S. Agricultural Censuses, is eliminated. The farming units with which this study is concerned are farms which are operated primarily as a source of income, or to provide for the farm family rather than primarily as a place to live.

The system used in classifying farms in 1939 was based on "the total value of farm products sold, traded, or used by farm households" falling within certain income class limits, which differ considerable from the class limited used in 1949.

Thus, after the 1939 figures had been properly adjusted for price changes --- as indicated above --- the next task became that of separating the "value of products sold" in 1939 from the "total value of products sold, traded, or used in the household." This was accomplished by multiplying (1 minus the percent of farm products used by the farm household)^{5/} by the

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- 1/ Dana G. Card, A. J. Brown and O. M. Farrington, "Index Number of Prices and Production of Farm Products in Kentucky," Ky. Agr. Exp. Sta. Bul. 411.
 - 2/ Unpublished data from the Department of Agricultural Economics.
 - 3/ Part-time farms include those with value of products of \$250-\$1,199 and operator reporting either 100 days or more of off-farm work or reporting other income exceeding value of agricultural products sold.
 - 4/ Residential farms include all farms except abnormal farms (public and private institutional farms) with a total value of sales of farm products of less than \$250.
 - 5/ As listed in the 1940 Census of Agriculture - Kentucky, Volume II, County Table XVII.

adjusted total value of farm products sold, traded or used in the household. The product of this multiplication is an estimate of the value of farm products sold.

The next task was to make the class limits comparable between the 1940 and 1950 censuses, so that changes in the distribution of the levels of production might be shown. This was accomplished by plotting the 1940 distribution and adjusting the distribution to a set of class limits comparable to those in the 1950 census.

The economic classification and class limits used in the 1950 census and followed in this report are as follows:

Class I	- Value of products sold, \$25,000 or more
Class II	- Value of products sold, \$10,000 - \$24,999
Class III	- Value of products sold, \$ 5,000 - \$ 9,999
Class IV	- Value of products sold, \$ 2,500 - \$ 4,999
Class V	- Value of products sold, \$ 1,200 - \$ 2,499
Class VI	- Value of products sold, \$ 250 - \$ 1,199

In the 1940 census, the farms were classified by total value of farm products sold, traded, or used by farm households. The class limits used in the 1940 census were as follows:

Under \$250	
\$ 250 to \$	399
\$ 400 to \$	599
\$ 600 to \$	999
\$ 1,000 to \$	1,499
\$ 1,500 to \$	2,499
\$ 2,500 to \$	3,999
\$ 4,000 to \$	5,999
\$ 6,000 to \$	9,999
\$10,000 to \$	19,999

These class limits were multiplied by the adjusted price index of 273 and "the estimate of the value of products used in the household," which differed in each county, was then deducted from each class limit. Thus, the 1939 class limits became different for each county, depending on the "estimate of the value of products used in the household," for each county. However, the class width remained the same for each county as both the lower and upper limits of each class were handled alike. By dividing 100 by a 1939 class width and multiplying the quotient by the number of farms in the class under consideration, the average number of farms per \$100 of the class width was determined. This, the average number of farms per \$100 of class width, was plotted on the vertical axis of a graph.

By plotting the 1939 adjusted class width ^{1/} on the horizontal axis and drawing a curve which connected the center of these class limits, it was possible to estimate from the curve the number of farms in 1939 that probably fell in class limits identical to those used in the 1950 census. ^{2/}

The results of this computational process for Ballard county are shown in Table 1-a. The task of determining the changes which occurred in the distribution of the levels of production among the farms of a particular county over the 10-year period then becomes one of inspection. By noting the difference in the number of farms in each economic class, changes in the distribution of the levels of production are easily seen.

Table 1-A. - The Distribution of Gross Income Among Ballard County Farms, 1939 and 1949 Compared Using 1949 Prices

Gross cash farm income classes	1939	1949	Difference (plus or minus)
Class VI (Value of products sold \$ 250 - \$ 1,199)	455	407	-48
Class V (Value of products sold \$ 1,200 - \$ 2,499)	376	317	-59
Class IV (Value of products sold \$ 2,500 - \$ 4,999)	286	308	+22
Class III (Value of products sold \$ 5,000 - \$ 9,999)	47	171	+124
Class II (Value of products sold \$10,000 - \$24,999)	18	30	+12
Class I (Value of products sold \$25,000 - and over)	1	6	+5
Total Number of Farms in the Economic Classification	1183	1239	+56

As the gross farm income of a particular farm increased or decreased, its status in the economic classification changed according to the increase or decrease. Since the effects of price changes have been eliminated, changes in the distribution of income are due primarily to increases in productivity of the farms.

Though a detailed discussion of the ways in which changes in the distribution of the levels of production were brought about is beyond the scope of this progress report, it was felt that an investigation of the income derived from the different major farm enterprises over the 10 years would be a worthwhile part of this progress report. Such supplementary information serves two purposes: (1) it shows the extent of the increase or decrease in income derived from each major enterprise by counties and (2) it indicates trends as to the type of farming being done in the counties included in this study. Changes in the distribution

^{1/} These class limits were adjusted to the 1949 price level and the average amount used by the farm household in 1949 prices deducted from the lower and upper limits of the classes.

^{2/} Due to the small size of the standard graph paper used it was necessary to use computations involving "the number of farms per \$100 of adjusted 1940 class width" to estimate the number of farms in classes above \$5,000 (See Appendix, P46).

of the levels of production will be discussed county by county. For the sake of clarity, the discussion under each county title will begin with the lowest gross income bracket (value of products sold \$250 - \$1,199) and work up to the highest income bracket (value of products sold \$25,000 or more) as the greatest changes in the distribution of levels of production occurred in economic class VI (\$250 - \$1,199). Inter-county and inter-censual comparisons will be made throughout this report.

Probably the greatest difficulty in evaluating the changes in the distribution of the levels of production of farms over a period arises from the fact that farms are missing from the economic classification for several reasons instead of a single one. Among the most important reasons are the following: farm consolidation, flooding resulting from the creation of Kentucky Lake, abandonment, conversion to residential status. It is doubtful if farm consolidation accounts for much of the increased levels of production to be noted in the study. Most of the increases are probably due to increased investments and expenditures on a given land resource per farm. The flooding of the Kentucky Lake affected a total of 1,128 families (both tenants and owners). Many farms of the poorer regions were abandoned or converted to part-time and residential units as opportunities for non-agricultural employment became available within reasonable distance. According to the census, the number of farmers in the 10 counties studied, who supplemented their income with as much as a 100 days per year of off-farm work, increased by 53.6 percent over the period from 1939-1949. ^{1/}

CHANGED DISTRIBUTION OF LEVELS OF PRODUCTION, 1939-1949, BY COUNTIES

As the first step in appraising the inter-censual changes in levels of production, county by county discussions are developed. Such discussions help to bring out the changes which have been made, the settings in which they occurred, and the probable number of farmers making the changes. Later, more analytical sections will attempt (1) to explain the causes of the changes and (2) bring out their economic and social significance.

Ballard County

From 1939 to 1949 the number of Ballard County farms selling products worth \$250 or more at 1949 prices increased by 5 percent. This increase in number was due apparently to the growth of part-time farming. Only one other county in this study (Fulton) showed a gain in the number of farms selling products worth more than \$250.

Increases in the productivity of Ballard County farms caused a number of farms to shift from Classes V and VI into classes selling over \$2,500 worth of products. The number of farms selling products worth between \$250 and \$1,199 (Class VI) diminished by 11 percent. The number of farms with value of products between \$1,200 and \$2,499 (Class V) diminished by 16 percent.

^{1/} In 1939, there were 2,179 farmers who supplemented their income with as much as 100 days per year of off-farm work; in 1949 there were 3,425.

Of the 831 farms in the low income Classes V and VI (\$250-\$2,499) in 1939, 107 were missing in 1949. The 107 farms plus some 56 additional farms became situated in the income classes above \$2,500 by the end of 1949. Thus, a total of 163 farms moved into higher income classes.

The gain of 5 percent over the 1939 number of farms over the 10-year period represents a shift toward part-time farming or smaller (acreage) farming units, since the total acreage in all farms in the county did not change significantly. Ballard and Fulton, which are probably the most fertile of the counties studied, were the only counties among those studied in which low-income farms predominately increased production rather than dropped out of farming.

The increase in productivity has resulted largely from livestock production. In the 10-year period, Ballard County had a 30-percent increase in gross farm income from the sale of all farm products, with only a 1-percent increase in sales from crops and a 57-percent increase from the sale of all livestock and livestock products ^{1/} (Table 1-b).

Calloway County

Of the 2,542 farms with value of products sold over \$250 in 1939, only 2,240 appeared in the 1949 data. In 1939, nearly one-half of the Calloway County farms (1,211) grossed a net figure somewhere between \$250 and \$1,199 (Class VI). Of the 359 farms missing from Class IV, V, and VI, a net of 57 were found to be in higher income groups in 1949, leaving 302 farms to be accounted for. According to the best available data, 286 families (some from higher-income categories) moved out of the reservoir area, which was flooded by Kentucky Lake. The remainder -- 16 farms -- became residential units, were consolidated, or were abandoned, etc.

Only two Classes, III and I, showed gains in the number of farms over the 10-year period. These gains were 52 and 5 farms, respectively. Class II, (\$10,000-\$24,999), which had no gain or loss in number of farms, figures into this change in a transitional manner. It is very likely that the five farms which appeared in Class I (\$25,000 and over) came from Class II, and these in turn were replaced by five farms from Class III (\$5,000-\$9,999). To have occurred otherwise, the five farms in Class I would have had to increase their gross income by \$15,000 or more. As some of the reservoir families were in these income categories, these are "net" gains after replacement of the farms lost.

^{1/} In order to make the percentage increases or decreases in income derived from the different major farm enterprises roughly compafable, the 1940 census income figures were multiplied by 273, the adjusting over-all price index for the two years (1939 and 1949).

Table 1-b. --Ballard County: Distribution of Farms by Gross Cash Farm Income Classes

Gross cash farm income classes	Distribution of Farms		
	Number of farms-1939 ^{a/}	Number of farms-1949 ^{b/}	Percentage change (1939-1949) ^{c/}
VI (\$ 250 - \$ 1,199)	455	407	-11
V (\$ 1,200 - \$ 2,499)	376	317	-16
IV (\$ 2,500 - \$ 4,999)	286	308	8
III (\$ 5,000 - \$ 9,999)	47	171	264
II (\$10,000 - \$24,999)	18	30	67
I (\$25,000 and over)	1	6	500
Total	1,183	1,239	+5

Value of Farm Products by Source, 1939 - 49
(Thousands of Dollars)

Source	1939 ^{d/}	1949	Percentage change
All crops	1,229	1,237	1
Field crops other than vegetables and fruits and nuts	1,133	1,165	3
Vegetables	17	3	-84
Fruits and nuts	79	69	-13
Horticultural specialities.....	-----	-----	--
All livestock and livestock products	1,336	2,102	57
Dairy products	400	515	29
Poultry and poultry products	141	82	-42
Livestock and livestock products other than dairy and poultry.....	795	1,505	89
Forest products.....	8	13	58
Total, all farm products	2,573	3,352	30

a/ Estimates based on interpolations. The procedure is described in the introduction.

b/ 1950 U. S. Census of Agriculture.

c/ Base year - 1939.

d/ Corrected to the 1949 price level.

Over the 10-year period (1939-1949), there was only a 4-percent increase in income resulting from sales of all farm products. There was a decrease of 13 percent in income from all crops sold, whereas, there was an increase of 37 percent in income from all livestock and livestock products sold. The small increase in total income and the loss of crop income are due in part to the flooding of the reservoir area. Income from dairying, which is included in the 37-percent increase from sales of all livestock and livestock products, increased by 33 percent. Income from poultry and poultry products decreased by 34 percent. Income from the sale of forest products, which is relatively unimportant as far as total gross farm income is concerned, increased by 169 percent (Table 2).

When changes in the productivity of Calloway county farms are compared with similar changes in Ballard and Fulton county farms, the roles of land fertility, T. V. A. flooding, and opportunities for urban employment begin to be evident. Calloway county farmers adjusted to better employment opportunities by dropping out of agriculture. Ballard and Fulton farmers, blessed with better land and not losing any high income farms to the reservoir, were able to make much larger absolute and proportional gains. Farmers in all counties had new technologies for producing forage made available to them; -- in fact, the availability of the new "know-how's" was greater in Calloway and also Graves (at least as far as public agencies were concerned) as the test-demonstration program ^{1/} was in operation in Calloway but not in Ballard nor Fulton counties. The progress of this work in the Calloway uplands is offset in the census data by the loss of reservoir farms.

Carlisle County

The general improvement in the distribution of the levels of production among the farms included Carlisle county, though it was less favorably affected than Fulton, Ballard, Graves, Hickman and Livingston. Of the 927 farms in the economic classification with value of products sold over \$250 in 1939, 22 were absent in 1949. Only 58 were found to be in higher brackets in 1949.

The changes in the distribution of the levels of production, though moderate in all classes, were greater percentage-wise in Classes III (\$5,000-\$9,999) and II (\$10,000-\$24,999). These classes had gains of 23 and 260 percent, respectively.

Of the 58 farms moving to higher-income groups, 20 lodged in the categories producing over \$4,999. Farmers with such gross incomes are able to participate in community activities, adequately support families, etc. Failure to make gains comparable to those made by Fulton, Graves, Hickman, and Ballard is explained by the low productivity of much of the county. The narrow bottom along the Mississippi is without levees and is subject to overflowing.

^{1/} A cooperative program of the University of Kentucky and T. V. A. , providing for the use of T. V. A. experimental fertilizers in improved systems of farming.

Table 2. --Calloway County: Distribution of Farms by Gross Cash Farm Income Classes

Gross cash farm income classes	Distribution of Farms		
	Number of farms-1939 ^{a/}	Number of farms-1949 ^{b/}	Percentage change (1939-1949) ^{c/}
VI (\$ 250 - \$ 1,199) . . .	1,211	1,056	-13
V (\$ 1,200 - \$ 2,499) . . .	838	788	- 6
IV (\$ 2,500 - \$ 4,999) . . .	440	286	-35
III (\$ 5,000 - \$ 9,999) . . .	43	95	121
II (\$10,000 - \$24,999) . . .	10	10	0
I (\$25,000 and over) . . .	-----	5	
Total	2,542	2,240	-12

Value of Farm Products by Source, 1939 - 49
(Thousands of Dollars)

Source	1939 ^{d/}	1949	Percentage Change
All crops	2,445	2,131	-13
Field crops other than vegetables and fruits and nuts	2,358	2,077	-12
Vegetables	6	8	30
Fruits and nuts	58	34	-42
Horticultural specialities	25	13	-48
All livestock and livestock products	1,150	1,572	37
Dairy products	337	448	33
Poultry and poultry products	274	182	-34
Livestock and livestock products other than dairy and poultry	539	1,042	93
Forest products	18	49	169
Total, all farm products	3,614	3,752	4

a/ Estimates based on interpolations. The procedure is described in the introduction.
b/ 1950 U. S. Census of Agriculture.
c/ Base year - 1939.
d/ Corrected to the 1949 price level.

Table 3. -- Carlisle County: Distribution of Farms by Gross Cash Farm Income Classes

Gross cash farm income classes	Distribution of farms		
	Number of farms-1939 ^{a/}	Number of farms-1949 ^{b/}	Percentage change (1939-1949) ^{c/}
VI (\$ 250 - \$ 1,199)...	416	336	-19
V (\$ 1,200 - \$ 2,499)...	309	318	3
IV (\$ 2,500 - \$ 4,999)...	171	200	17
III (\$ 5,000 - \$ 9,999)...	26	32	23
II (\$10,000 - \$24,999)...	5	18	260
I (\$25,000 and over)...	0	1	---
Total	927	905	- 2

Value of Farm Products by Source, 1939 - 49
(Thousands of Dollars)

Source	1939 ^{d/}	1949	Percentage change
All crops	589	506	-14
Field crops other than vegetables and fruits and nuts	554	478	-14
Vegetables	9	3	-65
Fruits and nuts	26	25	- 2
Horticultural specialities	-----	---	---
All livestock and livestock products ...	1,041	1,643	58
Dairy products	152	227	49
Poultry and poultry products	109	80	-27
Livestock and livestock products other than dairy and poultry	780	1,336	71
Forest products	15	17	13
Total, all farm products	1,645	2,166	32

^{a/} Estimates based on interpolations. The procedure is described in the introduction.
^{b/} 1950 U. S. Census of Agriculture.
^{c/} Base year - 1939.
^{d/} Corrected to the 1949 price level.

The eastern half of the county tends to be rough and of low productivity. There is, however, a small strip of productive soil extending up from Hickman county. Though consolidation may account for some of the 22 farms missing from the economic classification, Carlisle county, especially the northern and eastern boundaries, is close to the industrial center of Paducah and many of the missing farms probably became rural residential units.

Over the 10-year period, there was an increase of 32 percent of gross farm income from the sale of all farm products and a decrease of 14 percent in income derived from the sale of crops. Sales from livestock and livestock products increased by 58 percent. Dairying, which is included in the 58 percent increase, increased by 49 percent. Of the 58 percent increase, however, dairying accounted for only 12.4 percent. Over this same period, the sale of poultry and poultry products declined by 27 percent (Table 3). Thus, the major portion of the increase of productive capacity, as shown by the increase sale of products, was due to the sale of livestock and livestock products, not including dairy and poultry.

Fulton County

The changed distribution of the levels of production of farms in Fulton county is especially significant. To the 879 farms in the 1939 economic classification, 52 were added by 1949. From the lowest three economic classifications (Classes VI, V and IV), a net of 158 farms plus 52 that entered the economic classification moved to a higher economic status. Thus, 210 moved on a net basis into classes with value of products sold over \$4,999. No other county studied succeeded in shifting as many farms percentage-wise from below to over \$4,999. About 25 percent of the farms in Fulton county made this shift. This, coupled with the 6 percent gain over the 1939 number of farms over the 10-year period, indicates a shift toward part-time farming, a low rate of abandonment and residential movement, and a concentration on increased productivity unparalleled among the other counties studied.

Over the 10-year period, Fulton county increased gross farm income from the sale of all farm products by 20 percent. There was an increase in sales of crops by 16 percent and livestock sales by 303 percent. No other Purchase county increased its sales from all crops sold to the extent of Fulton county. The large percentage increase of the livestock sales indicates that the more favorable distribution of gross farm income came largely from the sale of livestock and livestock products. ^{1/}

Graves County

Though the increased productivity of Graves county farms over the 10-year period has resulted in much shifting of farms from the lower economic classes to the higher economic classes, more than one-half as many farms have dropped out of the economic classification entirely. For the entire county there was a loss of 138 farms from the economic classification due to consolidation, urban employment, farms becoming rural residences, and other causes. Of the 360 farms displaced in

^{1/} See Table 4 for absolute increases.

Table 4. -- Fulton County: Distribution of Farms by Gross Cash Farm Income Classes

Gross cash farm income classes	Distribution of farms		
	Number of farms-1939 ^{a/}	Number of farms-1949 ^{b/}	Percentage change (1939-1949) ^{c/}
VI (\$ 250 - \$ 1,199) ...	239	165	-31
V (\$ 1,200 - \$ 2,499) ...	247	227	- 8
IV (\$ 2,500 - \$ 4,999) ...	235	171	-27
III (\$ 5,000 - \$ 9,999) ...	86	199	131
II (\$10,000 - \$24,999) ...	51	146	186
I (\$25,000 and over) ...	21	23	10
Total	879	931	+6

Value of Farm Products by Source, 1939 -- 49
(Thousands of Dollars)

Source	1939 ^{d/}	1949	Percentage change
All crops	2,225	2,578	16
Field crops other than vegetables and fruits and nuts	2,188	2,524	15
Vegetables.....	11	23	114
Fruits and nuts	24	21	-16
Horticultural specialities	-----	10	---
All livestock and livestock products.....	463	1,867	303
Dairy products	122	237	94
Poultry and poultry products	58	48	-16
Livestock and livestock products other than dairy and poultry.....	283	1,582	459
Forest products	55	33	-40
Total, all farm products.	3,858	4,478	20

a/ Estimates based on interpolations. The procedure is described in the introduction.
b/ 1950 U. S. Census of Agriculture.
c/ Base year - 1939.
d/ Corrected to the 1949 price level.

Table 5. -- Graves County: Distribution of Farms by Gross Cash Farm Income Classes

Gross cash farm income classes	Distribution of farms		
	Number of farms-1939 ^{a/}	Number of farms-1949 ^{b/}	Percentage change (1939-1949) ^{c/}
VI (\$ 250 - \$ 1,199)...	1,740	1,527	-12
V (\$ 1,200 - \$ 2,499)...	1,109	962	-13
IV (\$ 2,500 - \$ 4,999)...	526	638	21
III (\$ 5,000 - \$ 9,999)...	48	133	177
II (\$10,000 - \$24,999)...	28	43	54
I (\$25,000 and over)...	1	11	1,000
Total.....	3,452	3,314	- 4

Value of Farm Products by Source, 1939 - 1949
(Thousands of Dollars)

Source	1939 ^{d/}	1949	Percentage change
All crops	2,692	2,955	10
Field crops other than vegetables and fruits and nuts	2,490	2,774	11
Vegetables	31	15	-50
Fruits and nuts.....	154	161	4
Horticultural specialities.....	-----	5	---
All livestock and livestock products.....	2,514	3,346	33
Dairy products.....	860	1,057	22
Poultry and poultry products.....	310	207	-33
Livestock and livestock products other than dairy and poultry.....	1,344	2,082	55
Forest products.....	11	47	332
Total, all farm products	5,217	6,348	22

a/ Estimates based on interpolations. The procedure is described in the introduction.
 b/ 1950 U. S. Census of Agriculture.
 c/ Base year - 1939.
 d/ Corrected to the 1949 price level.

Classes V and VI, 222 moved to higher-income brackets. Though movement out of the economic classification predominated, only three other counties studied (Fulton, Ballard, and Hickman) moved more farms into classes above \$5,000. Despite this favorable development, there remains a concentration of farms in the lower income brackets. In 1939, there was one farm with value of products sold over \$25,000; and in 1949, there were eleven (Table 5).

Livestock played a more important role than crop sales in the expansion of productivity --- 1949 sales of crops were 10 percent higher than in 1939, whereas 1949 livestock and livestock product sales were 33 percent higher than in 1939. Graves county, primarily an upland county, has obviously been taking advantage of technological advances in forage production as the base for expanded livestock operations.

Hickman County

Hickman county excels all other Purchase counties, with the exception of Fulton, in percentage decrease in the number of farms from economic Class VI. It lost 91 farms from this class from 1939 to 1949 -- a percentage decrease of 22 percent. Of the 166 farms absent from economic Classes IV, V, and VI in 1949, 31 fell by the wayside, either grossing under \$250 or becoming consolidated, leaving 135 to move to a higher income bracket. Thus, in Hickman county, with superior land relative to most Purchase counties, the changes of the '40's resulted in fewer low-income farmers and more higher-income farmers -- two highly desirable adjustments.

Over the 10-year period, there was an increase in gross farm income of 20 percent from all products sold, while crops sold decreased 15 percent. Here, Hickman county differs considerably from her neighbor to the south-Fulton county, by not having any particular advantage (acreage allotment, etc.) in the production of a cash crop such as cotton. The fact that a county with a prosperous agriculture, such as here described, decreases income from the sale of all crops is not indicative that less emphasis is being put on crops, but that there has been a shift of emphasis, in this instance, from corn to pasture. Income from pasture, of course, does not show up in the Agriculture Census's enumeration of "all crops sold" but rather in the enumeration of "all livestock and livestock products sold." Sales from all livestock and livestock products increased by 40 percent, dairying accounting for about one-third of this increase. Dairying itself increased by 150 percent, the highest percentage increase among the counties in this report. Hickman county sales from poultry and poultry products decreased by 39 percent leaving the balance of the increase to have come from the sale of livestock and livestock products, not including dairying and poultry (Table 6).

Marshall County

Of the ten southwestern counties in this study, Marshall county experienced the largest percentage-wise loss of farms from the economic classification. The total number of farms in the economic classification decreased from 1,645 in 1939

Table 6. -- Hickman County: Distribution of Farms by Gross Cash Farm Income Classes

Gross cash farm income classes	Distribution of farms		
	Number of farms-1939 ^{a/}	Number of farms-1949 ^{b/}	Percentage change (1939-1949) ^{c/}
VI (\$ 250 - \$ 1,199)	411	320	-22
V (\$ 1,200 - \$ 2,499)	403	337	-16
IV (\$ 2,500 - \$ 4,999)	285	276	- 3
III (\$ 5,000 - \$ 9,999)	58	152	162
II (\$10,000 - \$24,999)	26	57	119
I (\$25,000 and over)	1	11	1,000
Total	1,184	1,153	- 3

Value of Farm Products by Source, 1939 - 49
(Thousands of Dollars)

Source	1939 ^{d/}	1949	Percentage change
All crops	1,207	1,020	-15
Field crops other than vegetables and fruits and nuts	1,151	992	-14
Vegetables	18	8	-58
Fruits and nuts	37	20	-47
Horticultural specialities	-----	-----	---
All livestock and livestock products	1,769	2,475	40
Dairy products	165	411	150
Poultry and poultry products	152	92	-39
Livestock and livestock products other than dairy and poultry	1,452	1,972	36
Forest products	12	105	769
Total, all farm products	2,989	3,600	20

a/ Estimates based on interpolations. The procedure is described in the introduction.
b/ 1950 U. S. Census of Agriculture.
c/ Base year - 1939
d/ Corrected to the 1949 price level.

to 1,384 in 1949. This loss of 16 percent over the 10-year period was due in no small measure to the development of Kentucky Lake, which caused 550 families, both owners and tenants, to move and the expansion of employment in nearby industries which has increased the number of farms in the residential status.

The increased productivity of the farms, as indicated by the shifting of the farms from the lower economic classes to the higher economic classes, was very low. In fact, it was the lowest of the counties studied. Only 15 farms were found to have shifted into a higher-income bracket, but a significant feature of this small increase in productivity is that it took place in Class III and II -- above \$5,000. In Classes VI, V, IV--under \$5,000 gross income--there was a loss of farms.

The relatively small increase in productivity is accounted for in part by T. V. A. flooding, which covered some of the most fertile land and most productive farms in the county. Thus, increases in number of high income farms are net increases after offsetting loss of farms from these classes due to the filling of Kentucky Lake.

Sales from all farm products adjusted to 1949 price levels decreased over the 10-year period by 6 percent. Sales from all crops sold decreased by 13 percent due to loss of bottom land previously used for cash crops and conversion of upland to forage production. Sales from all livestock and livestock products increased by 10 percent. With income from dairying having decreased by 11 percent, and income from poultry and poultry products having decreased by 41 percent, it is obvious that most of the increase in productivity in Marshall county came about from the sales of livestock and livestock products, not including dairying and poultry (Table 7).

An analysis of farm business records for upland Marshall county farms indicates that investments in forage and livestock were the most profitable types of investment and expenditures to make on Marshall county farms. ^{1/} The study further indicates that it is possible to convert many more upland farms from less to much more than \$4,999 gross income, the main problems being (1) the acquisition of working capital, investment capital, and managerial capacity and (2) at a later date, following development of existing land resources, the expansion of farm sizes.

McCracken County

Between 1939 and 1949, McCracken county experienced a tremendous drop of farms from the economic classification with a significant number of new farms situated in higher income brackets in 1949. Of the 1,323 McCracken county farms in 1939 with gross income over \$250, about 195 had dropped out by 1949. That is -- they grossed less than \$250 from the sale of all farm products in 1949. Relatively unfertile soil (especially in the eastern side of the county) combined with nearness to industrial employment probably caused this relatively large number to drop out of the economic classification. For this reason, a large proportion of these farms probably could have been identified in 1949 as residential farming units, since urban industrial centers attract population to the nearby rural areas for residence as well as to the urban areas themselves. The over-all improvement in farm

^{1/} Glenn L. Johnson, Sources of Incomes on Upland Marshall County Farms, Progress Report No. 1 R & M Project 60, Kentucky Agricultural Experiment Station, Lexington.

Table 7. -- Marshall County: Distribution of Farms by Gross Cash Farm Income Classes

Gross cash farm income classes	Distribution of farms		
	Number of farms-1939 ^{a/}	Number of farms-1949 ^{b/}	Percentage change (1939-1949) ^{c/}
VI (\$ 250 - \$ 1,199).....	1,051	856	-19
V (\$ 1,200 - \$ 2,499).....	427	368	-14
IV (\$ 2,500 - \$ 4,999).....	142	120	-15
III (\$ 5,000 - \$ 9,999).....	23	35	52
II (\$10,000 - \$24,999).....	2	5	150
I (\$25,000 - and over).....	0	----	----
Total	1,645	1,384	-16

Value of Farm Products by Source, 1939-1949
(Thousands of Dollars)

Source	1939 ^{d/}	1949	Percentage change
All crops	825	718	-13
Field crops other than vegetables and fruits and nuts	496	552	11
Vegetables	5	2	-63
Fruits and nuts	323	159	-15
Horticultural specialities	---	4	---
All livestock and livestock products	905	999	10
Dairy products	196	174	-11
Poultry and poultry products	201	119	-41
Livestock and livestock products other than dairy and poultry	518	706	36
Forest products	36	38	7
Total, all farm products	1,766	1,755	- 6

a/ Estimates based on interpolations. The procedure is described in the introduction.
 b/ 1950 U. S. Census of Agriculture.
 c/ Base year - 1939.
 d/ Corrected to the 1949 price level.

Table 8. -- McCracken County: Distribution of Farms by Gross Cash Farm Income Class

Gross cash farm income classes	Distribution of farms		
	Number of farms-1939 ^{a/}	Number of farms-1949 ^{b/}	Percentage change (1939-1949) ^{c/}
VI (\$ 250 - \$ 1,199)...	708	588	-17
V (\$ 1,200 - \$ 2,499)...	360	305	-15
IV (\$ 2,500 - \$ 4,999)...	195	133	-32
III (\$ 5,000 - \$ 9,999)...	34	67	97
II (\$10,000 - \$24,999)...	21	30	43
I (\$25,000 and over)...	5	5	0
Total	1,323	1,128	-15

Value of Farm Products by Source, 1939 - 49
(Thousands of Dollars)

Source	1939 ^{d/}	1949	Percent Change
All crops	1,040	1,127	8
Field crops other than vegetables and fruits and nuts	495	680	37
Vegetables	68	37	-45
Fruits and nuts	322	235	-27
Horticultural specialities	162	175	8
All livestock and livestock products	1,088	1,278	17
Dairy products	491	386	-21
Poultry and poultry products	143	116	-18
Livestock and livestock products other than dairy and poultry	454	776	71
Forest products	6	16	186
Total, all farm products	2,134	2,420	13

a/ Estimates based on interpolations. The procedure is described in the introduction.
b/ 1950 U. S. Census of Agriculture.
c/ Base year - 1939.
d/ Corrected to the 1949 price level.

productivity is reflected in the shift of 42 farms to higher income brackets, -- the 42 concentrated in the economic classes with value of products sold of over \$5,000.

Sales from all farm products increased over the 10-year period by 13 percent with sales from all crops sold having increased by 8 percent and sales from livestock by 17 percent. Though McCracken county experienced a moderate over-all increase in productivity, decreases of 21 percent for dairy products, 18 percent for poultry and poultry products, 45 percent for vegetables and 27 percent for fruits and nuts sold occurred from 1939 to 1949 (Table 8). The percentages pertain to values in 1949 dollars and, as such, indicate quantitative changes.

Livingston County

Livingston county, with its relatively small number of farms having gross incomes above \$250, lost 52 farms from the economic classification over the 10-year period. Seventy-five farms moved from the economic class with value of products sold between \$250 and \$2,499 (Classes V and VI) to higher classes. As only a small decrease occurred in the number of farms in economic class V, it is clear that a farm moved out to a higher economic class for almost every one that moved into Class V. The number of farms producing over \$5,000 worth of products for sale increased by 56 farms.

The absence of 52 farms from the economic classification may be partially attributed to flooding of Kentucky Lake (47 families had to move), consolidation, abandonment, and conversion of farms to residential farming units. Considering the 47 reservoir families relative to the missing farms, it appears that the rate of abandonment, and the rate at which farms moved into residential farming status, must have been low.

The over-all increase in productivity for Livingston county was different from that of the other counties included in this report. Livingston county showed expansion of all major sources of farm income with the exception of a 2-percent decrease from poultry and poultry products. There was an increase in sales from all farm products of 38 percent. Sales from all crops increased by 9 percent and from all livestock and livestock products by 42 percent (Table 9).

Lyon County

Lyon county, like Livingston county, has a small number of farms selling products worth more than \$250, but differs from Livingston in that it experienced about one-half the upward movement of farms within the economic classification. In Lyon county, the 36 farms moved to a higher-income bracket, whereas in Livingston county 75 farms moved to a higher-income bracket. There were 8 farms missing in 1949 in Lyon county, as compared to 52 missing in Livingston county. All the gains in Lyon county stemmed from Class VI, as this was the only class in which there was a loss of farms. The gains to Classes III, IV and V were about the same (11, 14, 10, respectively).

Table 9. -- Livingston County: Distribution of Farms by Gross Cash Farm Income Classes

Gross cash farm income classes	Distribution of farms		
	Number of farms-1939 ^{a/}	Number of farms-1949 ^{b/}	Percentage change (1939-1949) ^{c/}
VI (\$ 250 - \$ 1,199)...	462	340	-26
V (\$ 1,200 - \$ 2,499)...	226	221	- 2
IV (\$ 2,500 - \$ 4,999)...	124	143	15
III (\$ 5,000 - \$ 9,999)...	34	74	117
II (\$10,000 - \$24,999)...	15	31	107
I (\$25,000 and over)...	1	1	0
Total	862	810	- 6

Value of Farm Products by Source, 1939 - 1949
(Thousands of Dollars)

Source	1939 ^{d/}	1949	Percentage change
All crops	169	185	9
Field crops other than vegetables and fruits and nuts	151	150	7
Vegetables	2	8	236
Fruits and nuts	16	28	70
Horticultural specialities	---	--	---
All livestock and livestock products	1,366	1,934	42
Dairy products	27	57	108
Poultry and poultry products	171	168	-2
Livestock and livestock products other than dairy and poultry	1,168	1,709	46
Forest products	29	46	56
Total, all farm products	1,565	2,165	38

a/ Estimates based on interpolations. The procedure is described in the introduction.

b/ 1950 U. S. Census of Agriculture

c/ Base year - 1939.

d/ Corrected to the 1949 price level.

Table 10. --Lyon County: Distribution of Farms by Gross Cash Farm Income Classes

Gross cash farm income classes	Distribution of farms		
	Number of farms-1939 ^{a/}	Number of farms-1949 ^{b/}	Percentage change (1939-1949) ^{c/}
VI (\$ 250 - \$ 1,199)...	345	301	-13
V (\$ 1,200 - \$ 2,499)...	211	221	5
IV (\$ 2,500 - \$ 4,999)...	128	142	11
III (\$ 5,000 - \$ 9,999) ..	21	32	52
II (\$10,000 - \$24,999)...	7	7	0
I (\$25,000 and over)...	1	2	100
Total.....	713	705	- 1

Value of Farm Products by Source, 1939 - 49
(Thousands of Dollars)

Source	1939 ^{d/}	1949	Percentage change
All crops.....	424	555	31
Field crops other than vegetables and fruits and nuts	417	551	32
Vegetables	2	0	99
Fruits and nuts	5	4	-8
Horticultural specialities	----	-----	---
All livestock and livestock products	771	1,071	39
Dairy products	121	100	-17
Poultry and poultry products.....	91	63	-30
Livestock and livestock products other than... dairy and poultry	559	908	62
Forest products	25	47	88
Total, all farm products	1,220	1,674	37

^{a/} Estimates based on interpolations. The procedure is described in the introduction.
^{b/} 1950 U. S. Census of Agriculture.
^{c/} Base year - 1939.
^{d/} Corrected to the 1949 price level.

The flooding of Kentucky Lake caused 97 families (both owners and tenants) to move. With only eight farms missing from the economic classification, it appears that a number of part-time farming units came into the economic classification, and that conversion to rural-residence status was unimportant.

In Lyon county, the increased productivity was about equally distributed between incomes received from the sale of crops and livestock. Sales from all farm products increased by 37 percent, while crop sales increased by 31 percent and livestock and livestock-product sales by 39 percent. The sales from dairying decreased by 17 percent, and the sales from poultry and poultry products decreased by 30 percent. Thus, the increased income from all livestock and livestock products came from livestock and livestock products to the exclusion of dairy and poultry products (Table 10).

SOIL FERTILITY AND ECONOMIC PROGRESS

As most of any increase in productivity must come from increased efficiency and the application of more capital and improved technology to existing land resources, the quality of the existing land resources is important. In this study, the counties showing the highest increases in productivity over the 10-year period (1939-1949) were the counties with the most fertile soil. Fulton county, whose increase in productivity was the second largest as shown by the large number of farms (210) that moved from a lower-economic classification to a higher one, has a considerable portion of her land in the "Big Bottoms." The "Big Bottoms" are the most productive of all the Purchase Area, and the land in the county as a whole is of superior agricultural quality.

Hickman county, which has a considerable portion of her land in the "Big Bottoms" and a high proportion of relatively fertile upland soil, ranks fourth in productivity increase, 135 farms having moved from a lower-income group to a higher income group. Of the 2,084 farms in the 1949 economic classification from these two counties, almost 17 percent increased their productivity from less than to more than \$5,000 (1949 dollars) between 1939 and 1949.

Graves county, whose increase in productivity was the largest ^{1/} as shown by the large number of farms (222) that moved from a lower economic classification to a higher one, is located in an area of favorable topography and better soils. Ballard county, which is also located in an area of favorable topography and better soils, ranked third in productivity increase, 163 farms having moved from a lower-income group to a higher income group. While the soils of these counties are fairly fertile, they are less fertile than those in Fulton and Hickman counties,

^{1/} Though Graves county moved 12 more farms from a lower-income group to a higher one than did Fulton county, the percentage increases in productivity are all in favor of Fulton county. In Fulton county 22.5 percent of the farms in 1949 had increased their productivity from less than to more than \$5,000 between 1939 and 1949, whereas, the increase in Graves county was only 3 percent. Graves county dropped 4 percent of her farms from the economic classification, whereas, Fulton had a gain of 6 percent. The most of the increase in productivity in Graves county took place in Class IV (\$2,500-\$4,999) where 112 more farms appeared in 1949.

generally speaking. Of the 4,553 farms from Ballard and Graves in the 1949 economic classification, 5.5 percent increased their productivity from less than to more than \$5,000 in 1949 dollars between 1939 and 1949.

The other counties of the Purchase Area -- Calloway, Carlisle, McCracken and Marshall -- are situated largely in sub-areas having both topography and soil which are still less favorable to a highly productive agriculture. Of the 5,657 farms located in these four counties, according to the 1949 economic classification, only 2.4 percent increased their productivity from less than to more than \$5,000 (1949 dollars) between 1939 and 1949.

In the Purchase Area, the association between soil fertility and economic progress(1939-49) can be summarized, as shown in Table 11.

Table 11. Relation Between Soil Fertility and Economic Progress

General Fertility Level	Between 1939 and 1949	
	Percent of 1949 farms which had moved above \$4,999 "gross" (1949 prices) since 1939	Percent of 1939 farms dropping below \$250 "gross" (1949 prices) by 1949
The two most fertile on the average ^{1/}	16.5	1.5
The two next most fertile on the average ^{2/}	5.5	2.9
The four least fertile on the average ^{3/}	1.9 flooded 3.0 not flooded	*12.1

*Includes 836 reservoir families, some of which relocated in these same counties.

^{1/} Fulton and Hickman

^{2/} Ballard and Graves

^{3/} Calloway, Carlisle, McCracken and Marshall

Of the two counties, Livingston and Lyon which are on the east side of the Tennessee River just across from the Purchase Area, Livingston county had 75 farms move into a higher-income group. This figure was roughly twice that of Lyon. Lyon had an upward movement of 36 farms. Again, the quality of soil was paramount in importance. Livingston county is situated on the Ohio and Tennessee Rivers and the bottom-land soils are fairly productive, whereas Lyon has farm land with low gross value of products per acre, which is indicative of low agricultural productivity.

NEARNESS TO INDUSTRIAL EMPLOYMENT AND ECONOMIC PROGRESS

In the 1939-49 decade, the main centers of urban employment in the Purchase Area were at Paducah, Fulton, Mayfield, Murray and Gilbertsville. By and large, more opportunities existed in the northern parts of the Purchase Area for rural residents to find local employment, persons living in all parts of the Purchase Area having about equal opportunity to migrate to such distant urban areas as Indianapolis, Detroit, Chicago, St. Louis, etc.

This study indicates the number of farms dropping out of economic classification and converting (in many instances) to rural-residence status. These data can be compared county by county with nearness to industrial employment as an indication of the effect of this factor on movement out of commercial farming. When the counties are ranked south to north, a relationship between nearness to urban employment and conversion to rural-residence status becomes evident, as shown in Table 12.

Table 12. -- Relation Between Nearness to Urban Employment and Conversion to Rural-residence Status

	Percent of 1939 Farms Dropping Out of Classification		
		Adjusted for T. V. A. Flooding*	
			Adjusted for Fertility**
Fulton	0	0	0
Calloway	11.6	6.3	-4.7***
Hickman	2.6	2.6	-2.4
Graves	3.9	3.9	-1.1
Lyon	1.1	-5.6	-16.6
Carlisle	2.4	2.4	-8.6
Livingston	6.0	1.0	-10.0
Marshall	15.8	.8	-10.2
Ballard	0	0	0
McCracken	14.7	14.7	3.7

* One-half of families flooded out were assumed to relocate in the same county.

** Fulton and Ballard data were unadjusted; Hickman, Graves data were adjusted down 5 percent; Calloway, Carlisle, Marshall, McCracken, Lyon and Livingston data were adjusted downward 11 percent. While Hickman county is probably more fertile than Ballard, on the average, it does contain a larger area of low fertility land.

*** The negative figures indicate that after adjusting for T. V. A. flooding and difference in level of fertility, the number of farms dropping out of economic classification would have been negligible.

Though the above data result from almost arbitrary adjustments, it indicates that some relationship exists between (1) nearness to local urban employment on one hand and (2) the percentage of farms dropping out of the

economic classification. This relationship, however, is by no means as exact as the relationship between (1) the level of soil fertility and (2) the percentage of farms dropping out of the economic classification.

T. V. A. -- ITS INFLUENCE ON
THE DISTRIBUTION OF THE LEVELS OF
PRODUCTION AMONG THE FARMERS OF THE PURCHASE,
AND OF LIVINGSTON AND LYON COUNTIES

The influence of T. V. A. on the changed distribution of the levels of production among the farmers of the area studied has been twofold. First, the acquisition of over 250,000 acres of land and the flooding of a large portion thereof removed some of the most fertile lands from certain counties. Second, T. V. A. has fed experimental fertilizer materials and funds into the area in a cooperative program with the University of Kentucky. This program, including the dissemination of production "know how," has promoted increases in productivity.

A total of 1,128 families moved out of the reservoir area, 286 from Calloway County, 47 from Livingston, 97 from Lyon and 550 from Marshall. This migration accounts in part for the large losses in numbers of farms producing over \$250 worth of products for sale in Calloway and Marshall counties. It also accounts for the failure of these counties to convert as large a net proportion of farms from producing less than to more than \$5,000 worth of products.

The influence of cooperative U. K. Extension Service and T. V. A. Test Demonstration work on economic progress is reflected in the following data comparing 25 out-of-the-valley farms with 25 test-demonstration farms, both groups being situated on the Grenada-Calloway soil association. The out-of-the-valley farms were in Ballard county which, as previously indicated in this report, is a relatively fertile county.

This comparison reveals the fact that in 1936, which was before the cooperative agricultural program had assumed major importance in the Purchase Area, there was little difference between the productiveness of the 25 out-of-the-valley farms and the 25 test-demonstration farms. But even at this early stage, the influence of the U. K. Extension Service and T. V. A. test-demonstration work may be noted in acreage limed and phosphated, and acreage terraced. Through T. V. A.'s provision of experimental fertilizers and the encouragement of erosion control practices, the 25 test-demonstration farms applied more than 7 times as much fertilizer and limed over 1 1/2 times as many acres as the 25 out-of-the-valley farms. The test-demonstration farms terraced 3.5 acres per farm while the out-of-the-valley failed to terrace any.

TABLE 13

Farm Organization and Productivity Data Per Farm, 1936 and 1948

	Land Use On --							
	25 Out-of-the-valley farms		25 Test dem. farms					
	1936	1948	1936	1948				
	Acres	Acre- yield	Acres	Acre- yield	Acres	Acre- yield	Acres	Acre- yield
Total acres in farm	98	...	96.5	...	117.3	...	143.8	...
Woodland (including new plantings)	5.2	...	4.8	...	21.3	...	26.2	...
All tobacco (yield in lb.)	3.7	992	2.4	1442	6.8	908	4.5	1673
Field corn (yield in bu.)	22.8	27.5	18.1	40.5	20.7	26.6	20.6	51.5
Popcorn (yield in lb.)							3.4	2280
Total cultivated crops	26.8	...	20.6	...	28.0	...	31.2	...
Wheat (yield in bu.)	5.3	13.7	1.5	18	10.9	13.7	19.0	15.8
Fall sown small grain and/or winter legumes for pasture or green manure	.3	...	4.1	...	.6	...	13.7	...
All hay (yield in lb.)	12.1	2316	13.3	2605	11.5	2045	15.2	3954
Pastured acreage which has been limed and phosphated	0	...	10.0	...	2.0	...	47.3	...
Total cumulative acreage limed	8.2	...	49.7	...	13.1	...	112.2	...
Total cumulative acreage phosphated	.7	...	23.8	...	7.9	...	114.4	...
Total cumulative acreage terraced	0	...	0	...	3.5	...	19.9	...
Total pounds fertilizer used each year	372	...	4484	...	2866	...	15985	...
Beef cows	1.1	...	2.3	...	0	...	4.2	...
Feeder steers	1.5	...	2.6	...	.24	...	8.1	...
Dairy cattle	5.2	...	10.4	...	5.4	...	12.1	...
Sows	1.4	...	1.4	...	.9	...	2.0	...
Ewes	3.2	...	6.0	...	0	...	0	...
Chickens	66.0	...	65.0	...	85.8	...	86.4	...
Horses and mules	3.5	...	2.2	...	3.3	...	1.9	...
Goats	0	...	.8	...	0	...	0	...
Average number productive animal units (workstock not included; fat hogs ¹ included).	10.9	...	17.7	...	8.3	...	25.9	...
Percentage change in grass consuming livestock (animal unit basis)			+84				+278	
Percentage change in grain consuming livestock (animal unit basis)			No change				+48	

¹/ An estimated 14 pigs per brood sow per year is included in this figure

With reference to livestock carried per farm, there was little difference to be noted in 1936. However, with the passage of 12 years, the impact of the test-demonstration program again shows up. The productivity of the farms has been greatly increased. The test-demonstration farms received a 16-percent larger yield of corn; and 52 percent more hay per acre than the 25 out-of-the-valley farms. The test-demonstration farms had 373 percent more pastured acreage which was limed and phosphated, used 256 percent more pounds of fertilizer than the 25 out-of-the-valley farms, and terraced 19.9 acres per farm to their none. With the application of phosphate and lime to grass and pasture-land an established and expanding practice on the test-demonstration farms, the average number of productive animal units per farm was 46 percent greater on their farms than on the out-of-the-valley farms. With the test-demonstration farms having made larger shifts of land from row to soil conserving crops, it was natural that they make a larger increase in grass consuming livestock.

Thus, the 25 test-demonstration farms, as a result of research on fertilization methods and forage crops at the University of Kentucky and elsewhere, coupled with the availability of experimental fertilizers through the cooperative program, led the way with new emphasis upon phosphate, pasture and livestock. The cooperation between the Extension Service of the University of Kentucky and T. V. A. in setting up test-demonstration farms served to speed up the distribution of new farming knowledge, the same also being true of S. C. S. and F. H. A. activities.

CROPS AND LIVESTOCK GENERALIZATIONS

The trend toward a somewhat smaller percentage of gross farm income being derived from crops has been accompanied by a change in the role which livestock plays in the farming system. Due to the diversity of agriculture in these 10 counties, percentage increases and decreases are best viewed from county averages rather than area averages.

The portion of gross farm income derived from livestock and livestock products, other than from dairy and poultry, increased from a low of 4.4 percent in Livingston county to a high of 28.2 percent in Fulton county. Dairy products showed slight decreases in four counties -- Ballard, Lyon, Marshall, and McCracken -- with the remaining counties showing increases ranging from 0.2 percent for Graves to 5.9 percent for Hickman county. Field crops, not including vegetables and fruits and nuts, showed a decrease in percentage of gross farm income from 1.3 for Lyon county to 11.6 for Carlisle county. Two counties -- Marshall and McCracken -- which had decreases in percent of gross farm income derived from dairy products of 1.2 and 7.1, respectively, also had 3.4 and 4.9 percent increases, respectively, in income derived from crops. These same two counties showed drops of 9.2 and 5.4 respectively in income derived from fruits and nuts.

Increasing livestock production was a natural and profitable adjustment to the trend toward soil-building and soil conservation cropping systems. It provided the best outlet for the roughages produced by the system. Accord-

ing to recent studies ^{1/} of Marshall and McCracken counties, the most important factor determining the earning power of the commercial farms in these two counties was the investment in forage production and livestock.

SUMMARY

After adjustments for changes in price level and changed definitions, the 1940 and 1950 census data permitted inter-county and inter-censual comparisons as to the distribution of the levels of production among farms. All comparisons are made in terms of 1949 dollars and prices.

Ten counties -- eight in the Jackson Purchase, plus Lyon and Livingston -- were studied. In 1939 there were 14,710 farms in these 10 counties, over 11 thousand of which produced products worth between \$250 and \$2,499, and only 634 of which produced products worth over \$4,999 in 1949 dollars. From 1939 to 1949, 1,375 of the farms producing between \$250 and \$2,499 moved out of this category -- a net of 901 dropping below \$250 (due mainly to conversion to rural residence status, T. V. A. flooding and abandonment) while the other 474 moved upward to incomes above \$2,500. The category producing products worth between \$2,500 and \$4,999 both gained and lost, as there were 798 more farms selling products worth over \$4,999 in 1949 than in 1939.

These two movements are highly significant, first 1,699 fewer farmers sold between \$250 and \$4,999 worth of products in 1949 dollars. Second, what is even more important from agriculture's standpoint, 798 more farmers sold over \$4,999 worth of products. In this 10-year period, the number of low-income farmers was reduced over 5 percent, while almost 7 percent of the remaining families moved above \$4,999 in production, with many transfers occurring among farmers producing between \$2,500 and \$4,999 worth of products. At the end of the 10-year period, there were 13,809 farms producing over \$250 worth of products for sale, 10,160 of which were in the \$250 and \$2,499 categories, and 1,432 which produced over \$4,999 worth of products for sale.

The two movements, one out of agriculture and the other toward improved farming, are related to variations in soil fertility, nearness to local employment centers and T. V. A. flooding. The percentage of 1939-farms dropping below \$250 worth of products for sale varies from 0 percent in the unflooded, relatively fertile counties (most remote from employment centers) to about 16 percent in a partially flooded, relatively infertile county near employment centers. The percentage of 1949-farms moving above \$4,999 varies from nearly 23 percent in the most fertile counties to a net of slightly over 1 percent in a relatively infertile county, some farms producing over \$4,999 worth of products in the 1940's being lost to Kentucky Lake. Despite the flooding of agricultural land, and subsequent removal from production, in the six channel counties (Calloway, Marshall, McCracken, Lyon, Livingston and Trigg, the latter not included in the study) where approximately 250,000 acres have been flooded or acquired by T. V. A. control, gross farm income from agricultural production has increased.

^{1/} Glenn L. Johnson, Progress Report I, "Sources of Incomes on Upland Marshall County Farms," and Progress Report II, "Sources of Incomes on Upland McCracken County Farms, 1951."

On the average, and with prices adjusted to the 1949 level, there was an increase of 12 percent in gross farm income from the sale of all farm products over the 10-year period. Sales of livestock and livestock products increased 39.8 percent, including a 19.3 percent increase in sales from dairy and dairy products. As sales of poultry and poultry products decreased by 33 percent, increased sales of beef animals were important.

There was a 3.9 percent decrease in the sale of all crops, including .9 percent decrease in the sales of field crops other than vegetables and fruits and nuts, a 41-percent decrease for vegetable sales and a 31-percent decrease for fruits and nuts. The sale from forest products, though accounting for a very small portion of the total sales, increased by 81 percent.

The substantial increase in the sales from livestock and livestock products and the relatively small decrease in sales from all crops during the same period, indicates that farmers in these 10 counties were moving toward a more adequate use of the increased production of hay and pasture. The U. K. Extension Service, cooperating with the T. V. A., has demonstrated that grass in the form of meat and dairy products is more profitable than row crops in many areas of these counties. The growing use of fertilizer is indicative of the fact that the farmers have been given a liberal education in its use through the test-demonstration program. In this way, these two agencies have instigated a kind of contagion for better farming.

Though there has been a general shift in the major source of income from crops to livestock over the 10-year period, the nature of this and other shifts shows no particular correlation with the counties having made the most progress. Of all the contributing factors to the increase in productivity, the one showing the most correlation was soil fertility.

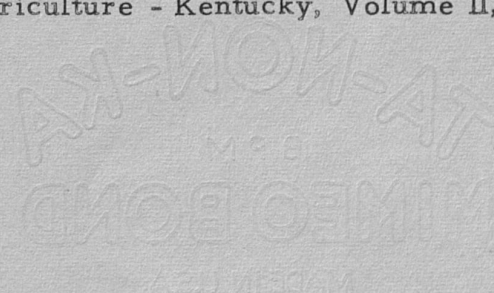
APPENDIX

COMPUTATIONAL PROCEDURE FOR BALLARD COUNTY

1. Adjusted price index ^{1/}	-----	-273
2. Total adjusted value of farm products (\$1,179,210 ^{2/} X 2.73)	-----	-\$3,219,243
3. Average percent of total value of farm products used by the farm household ^{2/}	-----	-20.1%
4. Adjusted value of products used by the farm household (20.1% X \$3,219,243)	-----	-\$647,067
5. Adjusted value of farm products sold (1 - 20.1%)(X \$3,219,243)	-----	-\$2,572,175
6. Number of farms with all farm products sold, traded or used by farm households ^{2/}	-----	1,361
7. Average value of farm products used per farm household (\$647,067 ÷ 1361)	-----	-\$475

^{1/} Page 3, this report.

^{2/} 1940 Census of Agriculture - Kentucky, Volume II, County
Table XVII.



Estimating Number of Farms in Classes Above \$5,000

Computations:

1.	Number of farms per \$100 in adjusted 1940 class limit <u>1</u> / (\$6,350 to \$10,442) - - - - -	0.9
2.	Number of farms in 1950 census class \$5,000-\$9,999 <u>7</u> (\$6,347 - \$5,000) + (\$10,442 - \$6,350) - (\$10,442 - \$9,999) multiplied by 0.9 <u>7</u> - - - - -	47
3.	Number of farms per \$100 in adjusted 1940 class limit <u>2</u> / (\$10,445 to \$15,902) - - - - -	0.18
4.	Number of farms per \$100 in adjusted 1940 class limit <u>3</u> / (\$15,905 to \$26,882) - - - - -	0.04
5.	Number of farms in 1950 census class \$10,000 - \$24,999 <u>4</u> farms (\$10,442 - \$9,999)(0.9), that were substracted from total in computation number 2 above + (\$15,902 - \$10,445)(.18) + (\$26,882 - \$15,905) - (\$26,882 - \$24,999) multiplied by .04 <u>7</u> - - - - -	18
6.	Number in 1950 census class over \$25,000 <u>1</u> (\$26,882 - \$25,000) multiplied by .04 <u>7</u> - - - - -	1

1/ Appendix Table 1, row 7, columns 3 and 6.
2/ Appendix Table 1, row 8, columns 3 and 6.
3/ Appendix Table 1, row 9, columns 3 and 6.

Table 1. - Derivation of the Number of Farms Per \$100 of Adjusted 1940 Class Width

Row	1940 Classification of farms ^{1/} (Class limits)	Adjusted 1940 class limits (2.73 X N)	Adjusted 1940 class limits less value of products used by farm household (\$475)	Adjusted 1940 class width ^{2/}	Number of farms ^{1/} of \$100 of adjusted 1940 class width	Number of farms per \$100 of adjusted 1940 class width (100 X column 5) ^{3/}
	(1)	(2)	(3)	(4)	(5)	(6)
1	Under \$250	Under \$682	Under \$207	207	226	109
2	\$250 to \$399	\$682 to \$1,089	\$207 to \$614	407	191	47
3	\$400 to \$599	\$1,092 to \$1,635	\$617 to \$1,160	543	226	42
4	\$600 to \$999	\$1,638 to \$2,727	\$1,163 to \$2,252	1,089	330	30
5	\$1,000 to \$1,499	\$2,730 to \$4,092	\$2,255 to \$3,617	1,362	216	16
6	\$1,500 to \$2,499	\$4,095 to \$6,822	\$3,620 to \$6,347	2,727	128	5
7	\$2,500 to \$3,999	\$6,825 to \$10,917	\$6,350 to \$10,442	4,092	39	0.9
8	\$4,000 to \$5,999	\$10,920 to \$16,377	\$10,445 to \$15,902	5,457	10	0.18
9	\$6,000 to \$9,999	\$16,380 to \$27,297	\$15,905 to \$26,822	10,917	4	0.04
10	\$10,000 to \$19,999	\$27,300 to \$54,597	\$26,825 to \$54,122	27,297	-	-
11	\$20,000 and over	\$54,600 and over	\$54,125 and over			

^{1/} 1940 Census of Agriculture - Kentucky. Volume 2, County Table XVII

^{2/} These computations are plotted on the horizontal axis of Figure 1.

^{3/} These computations are plotted on the vertical axis of Figure 1.

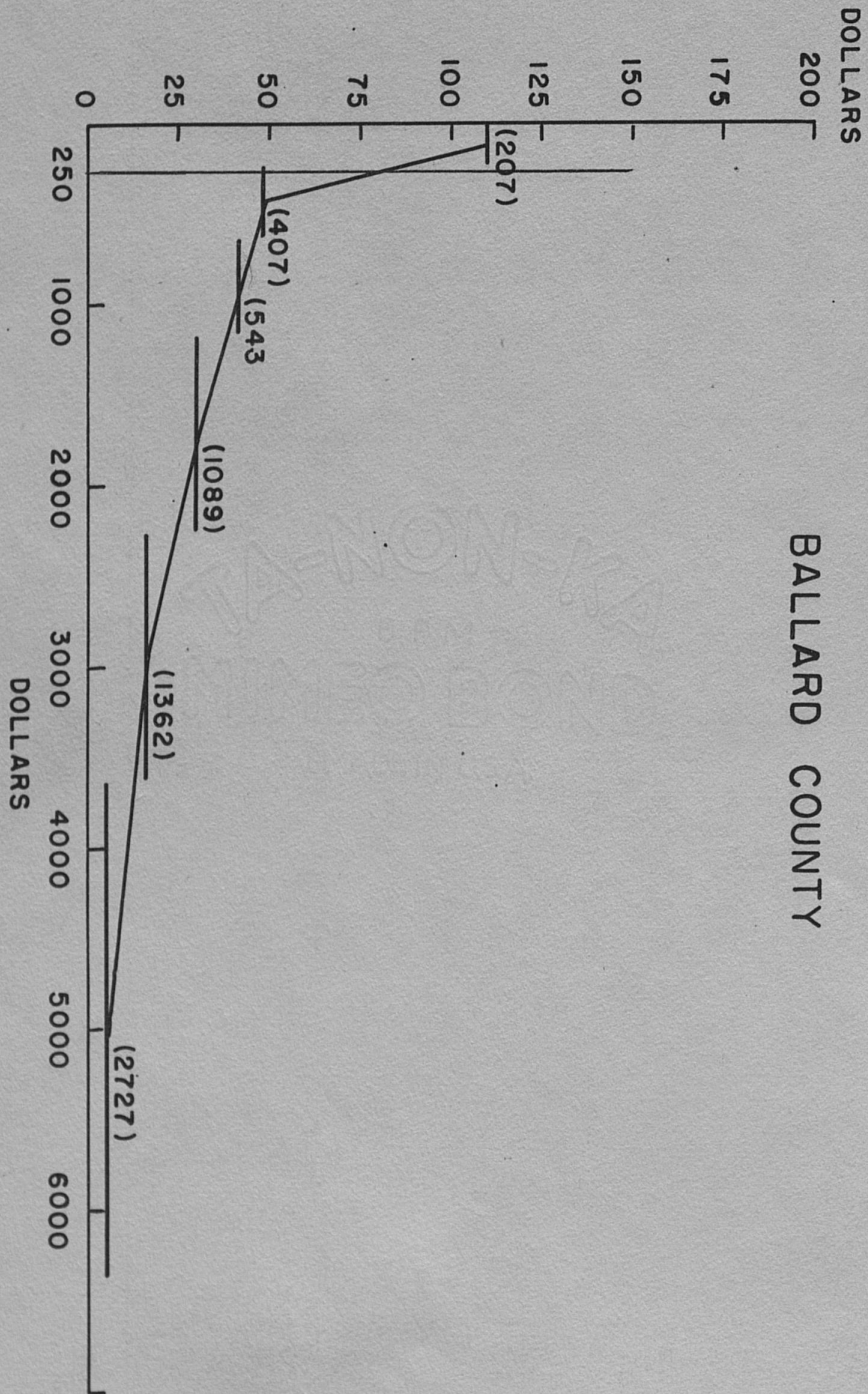


Figure 1. -- Number of Farms per \$100 in Desired Class Width