

J. H. YEAGER
Auburn University

Use of Credit for Purchases of Fertilizer¹

FARMERS HAVE MADE MANY CHANGES in the kinds and quantities of resources used in production. In 1930 U. S. farmers produced 70 to 80 percent of the production inputs used on farms. By 1960 they bought more than 50 percent. Aside from the family labor input, almost all inputs embodied in agricultural products are purchased.

The advance in production technology has meant increased cash costs and higher farm investments (cf. Chapters 6 and 7). When measured in constant dollars, expenses per farm for fertilizer and lime, feed, petroleum fuel, and oil more than tripled from 1935 to 1960. Depreciation charges and purchases of livestock, seed, and miscellaneous supplies and services doubled. If the costs of all such items at constant prices are added together, they average about 2 1/2 times as much per farm in 1955 compared with 1935-39.²

In Alabama prior to 1956 the amount spent for fertilizer and lime was the major single cash expenditure by farmers. Since 1956 expenditures for feed account for a greater percentage of total cash expenses than fertilizer and lime. In 1957, 30.4 percent of all cash expenses for production was for feed and 21.8 percent for fertilizer and lime.

In view of the importance of fertilizer in the agricultural economy of Alabama, a cooperative study with TVA was initiated in 1957. The purpose of the study was to obtain information from a sample of farmers, fertilizer dealers, and credit agency representatives in order to determine the levels of fertilizer use on selected crops, factors associated with high levels of fertilizer use, acceptance of high analysis fertilizer, and to gain a better understanding of the role of credit and the influence of credit agencies on the demand and use of fertilizers.

Personal interviews with a representative sample of 463 farmers in 16 Alabama counties provided basic data for the farmer phase of the study. In order to qualify as a farmer, the operator must have had \$200 or more of farm income in 1957. Data for the dealer and credit agency phase of the study were secured from a sample of 41 fertilizer dealers

¹Appreciation is expressed to Mr. O. D. Belcher, formerly with the Department of Agricultural Economics, for machine tabulation of most of the data presented in this report.

²R. P. Christensen and R. J. Muck, "More capital goods used in farm production," Farm Cost Situation, ARS, USDA, Washington, D. C., May, 1957, p. 27.

or merchants and 41 credit agency officials, the majority of which represented commercial banks.

USE OF CREDIT BY FARMERS

Fifty-eight percent, or 268 out of the 463 farmers, borrowed funds to buy fertilizer in the spring of 1957. Borrowing was most prevalent in areas of the state where farms were largest in size and agriculture was most commercial. Purchases on 30-day accounts were not considered as borrowing. Only three farmers reported the use of credit for fall purchases of fertilizer.

Based on estimates of the cost of fertilizer purchased, the amount borrowed, and the percentage of farmers using credit, it is estimated that 46 percent of the dollar cost of purchases was on a credit basis. Of the farmers who borrowed, three-fourths obtained loans equal to or greater than the cost of fertilizer purchased. Loans were not strictly for fertilizer purchases. They included funds for seed, insecticides, and other production items. However, fertilizer was the major item.

Sources of Credit

Commercial banks were the source of credit for 38 percent of the farmers. Fertilizer dealers and landlords were the next two most important sources. Production Credit Associations, the Farmers Home Administration, and individuals other than landlords were the next most important sources, as shown in Table 26.1.

Table 26.1. Sources of Credit Used for Fertilizer Purchases,
268 Farmers, Alabama, 1957

Source of Credit	Percent of farmers reporting various sources of credit
Commercial bank	38
Fertilizer dealer	26
Landlord	20
Production Credit Association	8
Farmers Home Administration	4
Individual other than landlord	3
Other	1
Total	100

Many reasons were given by farmers for using the given sources of credit. The most frequently given reason was that the particular source of credit was used due to past use, tradition, or habit. Other reasons given in order of importance were "felt obligated to landlord," "low interest rates," "convenient," "only source available," and "fair and just treatment." More than half (59 percent) of the farmers who borrowed

money said they knew of no other source of credit they would consider using. Besides the sources of credit used, known sources that farmers would consider using were most frequently reported as commercial banks and fertilizer dealers. The amount of money borrowed was less than \$1,000 for 68 percent of the 268 farmers who borrowed for fertilizer purchases. Only 9 percent borrowed more than \$2,000.

Annual Rate of Interest Paid

The annual rate of interest paid varied with source of funds and prevailing rates in local areas. Farmers who borrowed from landlords paid the highest average annual rate of interest (Table 26.2). Financing

Table 26.2. Range and Average Annual Rate of Interest Paid on Fertilizer Loans According to Source of Credit, 206 Farms, Alabama, 1957

Source of credit	Farms (number)	Annual interest rate paid	
		Range (percent)	Average
Landlord	28	0 - 48	11.1
Commercial bank	90	6 - 19	7.3
Fertilizer dealer	48	0 - 18	6.3 ^a
Production Credit Association	20	3 - 6 ^b	6.0
Individual other than landlord	7	0 - 14	5.6
Farmers Home Administration	10	4 - 6	4.9
Other	3	—	7.0

^a In calculating rate of interest paid, the principal amount borrowed was based on the credit price for fertilizer, which was somewhat higher than the cash price.

^b The 3 percent includes the dividends received on stock.

of tenants was most common in the south-central portion of Alabama, known as the Black Belt. Rates of interest paid to other sources of credit in this area were also higher than rates paid in other parts of the state.

Fourteen farmers out of 206 for whom interest rates paid are reported obtained a discounted loan— one in which interest was deducted in advance. As a result, interest rates paid were higher than those stated. This is reflected in the data given in Table 26.2. Many farmers did not know the annual rate of interest they paid. Evidently they did not evaluate the cost of credit from various sources.

From 1935 to 1960 the percentage of farmers in Alabama operating as tenants declined from almost 65 percent to 35 percent. Operating as a tenant is frequently given as a solution or means of best utilizing limited dollar credit, since a higher rate of return is normally made on operating capital than on real estate.

Security for Fertilizer Loans

Security reported for loans included unsecured notes, crop notes, chattel mortgages, and real estate mortgages. Twenty-five percent of the 268 farmers who borrowed money for fertilizer purchases indicated that no security was required. Forty-five percent reported a chattel mortgage; 21 percent, a crop note; 5 percent, a real estate mortgage; and 4 percent, an unsecured note.

Chattel mortgages might be satisfactory security if the lender would handle all of the borrower's operating credit needs. It is doubtful that real estate mortgages should be used as security for operating loans, although the lender may feel this necessary for the risk incurred. In a study conducted in 1955 in three Tennessee Valley counties in Alabama, it was found that only 49 percent of the farmers had fire insurance on buildings and only 38 percent had life insurance.³

Repayment of loans in a majority of cases was from receipts from the sale of crops. Receipts from the sale of livestock and Soil Bank (Acreage Reserve) payments were also used for the repayment of loans. Only 5 percent reported income from off-farm work as a source of funds to repay fertilizer loans.

COMPARISONS BETWEEN CREDIT AND NONCREDIT GROUPS

The credit group consisted of a higher percentage of tenants than the noncredit group (Table 26.3). Only 52 percent of those who borrowed had completed seven or more grades of formal education compared to 72 percent for the noncredit group. Average farm net worth of the noncredit group averaged about twice as great as the net worth for the credit group. The noncredit group also applied fertilizer to a higher percentage of their open land and fertilized cotton and corn at heavier rates than did the credit group of farmers. There was less difference in average amount of plant nutrients applied to hay and pasture crops than to cotton and corn between the two groups of farmers. Sixty-one percent of the noncredit group of farmers checked fertilizer prices with more than one fertilizer dealer prior to making purchases. Only 45 percent of the farmers who used credit checked fertilizer prices at more than one place. Since almost one-half of this group were tenants, many did not have the opportunity to check fertilizer prices if the landlord financed their share of the fertilizer cost.

BASIS FOR FERTILIZER PURCHASES

Apparently tradition and habit play major roles in decisions on the kind and amount of fertilizer bought, just as is true in the use of credit.

³O. D. Belcher and J. H. Yeager, "Insurance coverage of Alabama farmers," Highlights of Agricultural Research, Agr. Exp. Sta., Auburn Univ., Vol. 7, No. 1, Spring, 1960.

Table 26.3. Selected Characteristics of Farmers Who Used Credit and Those Who Did Not Use Credit for Fertilizer Purchases, Alabama, 1957

Item	Noncredit group		Credit group		All farmers	
	Number reporting	Average	Number reporting	Average	Number reporting	Average
Number of farms	195		268		463	
Age of farm operator ^a	195	53	268	49	463	51
Percentage tenants	-	13	-	43	-	31
Percentage that completed 7 or more grades of school	-	72	-	52	-	61
Estimated farm net worth	186	\$22,085	252	\$11,560	438	\$16,030
Months of off-farm work by operator ^b	66	8	80	5	146	6
Acres of open land ^c	193	86	268	120	461	105
Acres of open land fertilized in 1957 ^d	187	55	268	63	455	60
Percentage of open land fertilized	-	64	-	53	-	57
Percentage who had ever had soil tested	-	33	-	27	-	30
Percentage that check fertilizer prices at more than one place before buying	-	61	-	45	-	51
Pounds of plant nutrients used on cotton:						
N	110	52	214	48	324	49
P ₂ O ₅	110	59	215	52	325	54
K ₂ O	110	56	215	47	325	50
Total ^e		167		147		153
Yield of cotton (pounds of lint/acre) ^f	109	419	215	353	324	375
Pounds of plant nutrients used on corn:						
N	167	44	253	38	420	40
P ₂ O ₅	166	31	243	26	409	28
K ₂ O	165	25	241	21	406	23
Total ^g		100		85		91
Yield of corn (bushels/acre) ^h	165	33	252	25	417	28
Pounds of plant nutrients used on hay and pasture crops:						
N	67	19	59	14	126	17
P ₂ O ₅	89	27	80	21	169	24
K ₂ O	86	26	77	22	163	24
Total ⁱ		72		57		65

^aCalculated "t" for difference in means of noncredit and credit group is 3.45**
^bCalculated "t" for difference in means of noncredit and credit group is 4.35**
^cCalculated "t" for difference in means of noncredit and credit group is 11.93**
^dCalculated "t" for difference in means of noncredit and credit group is 0.81
^eCalculated "t" for difference in means of noncredit and credit group is 3.03**
^fCalculated "t" for difference in means of noncredit and credit group is 3.93**
^gCalculated "t" for difference in means of noncredit and credit group is 2.33*
^hCalculated "t" for difference in means of noncredit and credit group is 6.11**
ⁱCalculated "t" for difference in means of noncredit and credit group is 1.26

*Significant at 5 percent probability level.

**Significant at 1 percent probability level.

Fifty-three percent of the farmers surveyed replied that they made the decision on fertilizer grade on the basis of past grades used. Twelve percent mentioned general recommendations, and 7 percent replied that they used soil-test recommendations. Other factors mentioned which led to a decision on grades of fertilizer to use were: "grade neighbor uses," "grade dealer recommends," "grade landlord recommends," and "cheapest grade per ton." Questions about how they decided the amount of fertilizer to use were similar to those for grade decisions.

Only half of the farmers considered cost of the fertilizer in deciding on the grade and amount to buy. Of those considering cost, cost per ton was the major basis for decisions. Twenty-seven percent considered cost per pound of plant nutrients, and 4 percent considered expected returns from using more fertilizer against the cost of this additional fertilizer. Apparently very few, if any, farmers calculated the cost per pound of plant nutrients for alternative sources of single elements or mixed grades of fertilizer. Better use of credit for fertilizer purchases would be achieved by recognizing differences in cost of plant nutrients by sources and by using the cheapest source in most cases. It is doubtful, however, that very many farmers could make such calculations without assistance. Thirty-nine percent of the farmers in the group had completed less than seven grades of formal education.

Thirty-six percent of the farmers in the sample said they preferred nitrate of soda, while 40 percent preferred ammonium nitrate. From July 1, 1957, through June 30, 1958, Alabama farmers purchased 66,129 tons of nitrate of soda and 47,411 tons of ammonium nitrate. With an average price of \$58 per ton for nitrate of soda and \$78 per ton for ammonium nitrate, the total cost was \$7,533,540. At the stated prices per ton, N from nitrate of soda cost 18.1 cents per pound, while N from ammonium nitrate cost 11.6 cents per pound. If the total nitrogen purchased in these two materials had all been bought in ammonium nitrate, the difference in cost or savings would have been \$1,371,930. The potentials in cost reductions and in better use of limited capital, either from a farmer's own funds or from credit sources, have not been realized from the use of higher-analysis fertilizers and cheaper sources of plant nutrients.

FERTILIZER DEALERS AND CREDIT AGENCIES

In the dealer and credit agency phase of the study, data were obtained from a sample of 41 fertilizer dealers, 33 commercial banks, 4 Production Credit Associations, and 4 Farmers Home Administration offices.

Dealer sales ranged from 42 to 4,515 tons of fertilizer in 1957, the average being 1,118 tons. Sixty-four percent of the dealers sold less than 1,000 tons. Dealers with a large volume of sales usually handled from 11 to 15 grades or kinds of fertilizer. Most fertilizer dealers also handled other products, although fertilizer sales accounted for 62 percent

of their total sales. The average number of customers who purchased fertilizer was 183 per dealer.

Sixty-two percent of the dealers sold fertilizer on a credit basis, including 30-day account sales. Not considering 30-day account sales, only 30 percent sold on a credit basis. About one out of three farmers purchased fertilizer on credit, according to dealers' reports. On the basis of dollar sales, credit sales represented 30 percent of the total in 1957. Although there was little difference in the average number of tons of fertilizer sold per firm between those that extended credit and those that did not, the average amount sold per customer was 8.8 tons for the credit group compared with 4.5 tons for the noncredit group.

Credit Terms and Practices

The average annual stated rate of interest charged and average number of months that production loans were outstanding for credit agencies providing funds to farmers were as follows:

<u>Source of credit</u>	<u>Annual stated interest rate</u>	<u>Months</u>
Fertilizer dealers	7.4	6.4
Commercial banks	6.7	8.2
PCA	5.0	10.2
FHA	6.0	10.0

Average annual stated rates of interest varied somewhat with size of fertilizer dealers. Those with a large volume of business (sales of 1,000 tons or more) had an average rate of 6.7 percent. Those with medium (sales of 500 to 999 tons) and small (sales of less than 500 tons) volumes of sales had average rates of 7.0 and 7.9 percent, respectively.

Regardless of time the loan was outstanding, interest was charged at a flat rate by 72 percent of the fertilizer dealers and 58 percent of the banks. Based on the average annual stated rate of interest and the average number of months loans were outstanding, dealers who disregarded the length of time that loans were outstanding in calculating interest charges had an effective rate of 13.8 percent, and bankers 9.8 percent. Furthermore, four commercial banks reported making discounted loans or the practice of taking interest out in advance. Some firms — banks, in particular — varied the method of calculating interest according to size of the loan. The length of time that the loan was outstanding was considered in determining the amount of interest due on a large loan but not on a small one. All lenders permitted borrowers to repay their loans prior to the date due. However, 24 percent of the bankers and 32 percent of the dealers said they did not normally adjust the amount of interest due, nor did they adjust the interest for small loans when the loan was repaid prior to the date due. PCA's and FHA's charged interest only for the time that funds were outstanding.

Fertilizer dealers and commercial bankers apparently are influenced in making decisions regarding credit by past experience just as was the case with farmers. Dealers and bankers were asked to state the factors they considered most important in extending credit to farmers with (a) a good credit rating, and (b) a poor credit rating. Past experience in extending credit to the borrowers with good credit ratings was considered most important by both fertilizer dealers and commercial bankers. Character of the borrower was second in importance. For farmers with a poor credit rating, the emphasis was on collateral by both fertilizer dealers and bankers (as shown in Table 26.4).

Table 26.4. Relative Importance of Factors Considered by Fertilizer Dealers and Commercial Bankers in Extending Credit to Farmers With a Good Credit Rating and to Those With a Poor Credit Rating, Alabama, 1958

Factor	Percentage considering factor most important	
	Fertilizer dealers ^a	Commercial bankers ^b
	(percent)	
Farmers with good credit rating:		
Past experience with borrower	68	46
Character	25	36
Collateral	0	9
Income	7	6
Other or not reported	7	3
Farmers with poor credit rating:		
Past experience with borrower	32	12
Character	14	12
Collateral	43	36
Income	0	15
Do not lend to these farmers	0	24
Other or not reported	11	3

^a Two fertilizer dealers reported two factors each for farmers with good credit ratings.

^b One banker reported two factors for farmers with a poor credit rating.

Discussion

HAROLD G. WALKUP*

Chapter 26 is a research report in which Yeager recognizes the larger role that agricultural credit plays in the farm business and in the welfare of farmers. He indicates that through the institutions of credit farmers are permitted the flexibility of operation which is required to meet the shifting needs to support changing enterprises.

On the other hand, it is discouraging that farmers in Alabama appear to be narrowly oriented when they seek alternative sources of credit. One cannot help feeling that the reported bargaining mechanism for farm credit could be improved. Although the average interest rates paid were generally within the limits of what might be termed "good commercial practice," the range in rates paid indicate either discriminatory practices or recognition of the value-space implications presented in Chapter 24.

Security requirements for loans, such as chattel mortgages, real estate mortgages, and crop notes, emphasize the need for the farmer to maintain, insofar as possible, a flexibility in his employment of resources which is consistent with the revolutionary developments in agriculture. An outlook toward the future, together with a sizable net worth relative to the financial magnitude of his operation and plenty of know-how, are comforting ingredients in any farming operation. Yet, low net worth apparently coincides with greater need for credit. Thus, the need for credit on reasonable terms in order to arrive at this improved financial status is apparent. Certain impediments, such as landlord-tenant relationships, preclude this ready access to lower-cost credit and thereby impede its efficient use in capital formation. In addition, farmers' lack of knowledge of the best buys of particular factors, or their best employment, also reduces income receipts and, thereby, capital formation.

In the discussion of Chapter 24 it was suggested that the use of factors of production with high marginal productivity and a short-term capital outlay might facilitate improvements in farmer use of credit. Fertilizer was mentioned as being such a factor. I still feel this is a promising course to follow, although Yeager's findings on the farmer basis for using specific fertilizers mean that we would be starting rather low on the knowledge scale. This would be particularly true among the low-income farmers where the need to instill the pecuniary motive is great.

A high percentage of farmers seek the dealer's advice on proper fertilizer use. Unfortunately, many dealers do not have an adequate understanding of fertilizer use to give proper recommendations. In many

*Agricultural Economist, Tennessee Valley Authority.

low-income areas of the Southeast we have dealers, as well as other credit sources, recommending to farmers that they use this or that crop maker instead of so much nitrogen, phosphorus, potassium, and needed minor elements based on a soil test. Since 30 percent of the fertilizer is sold on credit in Alabama, the importance of good fertilizer credit and proper fertilizer recommendations and use are important ingredients in the health of agriculture. Fertilizer dealers who are the principal source of advice to farmers on fertilizer use and also are a primary source of credit to farmers are in a strong position to influence farmers toward a general improvement in credit use on farms. Thus, it appears that bankers and others who are primary sources of agricultural credit could make a valuable contribution to improved resource use in agriculture by working more closely with fertilizer dealers and others who provide resources to agriculture having a short-term investment period.

If agricultural credit agencies are to do a good job of merchandising their product, efforts will need to be directed toward the removal of prevailing attitudes among some farmers and farm owners that borrowing is "poor business." The prevalence of such an attitude probably means that farmers are not taking advantage of their opportunities and that credit agencies are missing some good business. An agricultural representative in a bank or other credit agency who has an intimate knowledge of farming in his trade area and who is interested in the farmer's production problems — as well as his collateral — may do much to allay the farmer's fear of using credit.