

**Opportunities
For
College Graduates
Trained In
Agriculture**

UNIVERSITY OF MISSOURI
AGRICULTURAL EXPERIMENT STATION

SPECIAL REPORT 15

APRIL, 1962

OPPORTUNITIES FOR COLLEGE GRADUATES TRAINED IN AGRICULTURE

Speech by Darryl R. Francis, First Vice President, Federal Reserve Bank of St. Louis, at Student-Faculty Assembly, College of Agriculture, University of Missouri, Columbia, Missouri, April 3, 1962

May I begin with an expression of my appreciation for the opportunity of returning to my Alma Mater, nearing thirty years after graduation, to meet with this mixed assembly of students and teachers. It is the centennial year of the nation's land grant colleges, and somehow this adds to the personal satisfaction I feel at having been invited to discuss with you the opportunities for agricultural school graduates and the responsibility of the college to meet a changing need.

We are living in an era of rapid industrial change, and probably no industry is changing faster than agriculture. It is logical for students in this supersonic age to ask, "What tools will I need for success in the years ahead?" Those in charge of the college curriculum must be ever alert to their responsibility for keeping in tune with such needs. Because of the great importance of this problem and the great interest of faculty and students alike, I am delighted with the opportunity of passing on to you some of my thinking relative to the future of agricultural college graduates.

Let me hasten to say, however, that I approach the discussion of this subject with a great deal of trepidation. In the first place, the measuring of outlook even for inanimate farm commodities is not a simple task. Yet in that area of final demand we have done infinitely more research than has been done in determining demand for factors of production, including labor and technical skills. For example, we are reasonably sure that the demand for the sum total of all farm products is relatively inelastic. That is, as the output of such products increases, total sales revenue tends to decline and, conversely, as the output declines, revenue tends to increase. We also know something about how substitutable some farm products are for others, as pork for beef, grain sorghum for corn, or broilers for both beef and pork. On the other hand, we seem to know very little about the demand for people trained in the science of agriculture, and I suspect that our knowledge about the elasticity of demand for any type or quality of labor or skills is really quite limited. Here would appear to be a major area for worthwhile original research by someone with curiosity about the market for the products of agricultural colleges.

Before going further into this subject, however, I want to commend the University of Missouri College of Agriculture for taking some forward steps in developing a curriculum designed to provide students with the skills needed for tomorrow's labor market. The special course of study in agricultural business

is an excellent example of your attempts to meet this need. I'm sure that a closer search of the campus and the curriculum would reveal numerous other examples of efforts to meet the basic needs for agricultural education in our changing farm and industrial economies. It is this knowledge of the willingness of your staff to make adjustments to meet such a changing demand that permits one to speak on this topic without reservation.

So with a confident feeling of being among friends I shall apply myself to the subject which I came here to discuss - What does the future hold for agricultural college graduates?

A three-directional approach to the question will be made. First, I shall review forecasts for job opportunities in the various occupational groups in the years immediately ahead. Second, some judgments will be made relative to the portion of professional and technical jobs in which agricultural training would be desirable. Third, I shall discuss the type of training which agricultural colleges might consider in relation to the needs for technical training in the agricultural and related sectors of our unfolding economy.

Basic material for the first portion of the discussion has been obtained from data in a United States Department of Labor report entitled Manpower Challenges of the 1960's. This publication points up the changing trend in employment by occupational group. In general, employment in the professional, office, and sales occupations has grown fastest. During the 1950 decade, employment in this group for the first time exceeded the number of persons employed in manual occupations. Employment in the manual and service occupations increased in total during the 1950's, and workers in farming have actually declined.

The Department of Labor expects these trends to continue during the decade of the 1960's. Fastest growth is expected to occur in the professional and technical occupations. The need for skilled craftsmen will increase but the number of unskilled jobs will remain at about current levels, continuing a long-term decline relative to total employment. Employment on farms is expected to continue downward both in absolute numbers and relative to total employment. Chart I depicts trends in these occupational groupings since 1950 and the estimated trends through the 1960's.

From Chart I we obtained information relative to types of occupations which would be expanding rapidly in the numbers employed therein. In a second chart, however, the Department of Labor tied in the educational level of workers with the various occupational groups, and the percentage expansion of the groups is broken down in somewhat greater detail.

(See Chart II)

It will be noted from this chart that the professional and technical worker force is expected to expand 40 per cent during the 1960 decade. This rapid expansion will be needed to take care of our fast-growing research and development activities and the very rapid increase in the application of technological improvements.

Unfortunately no prediction was made relative to the educational level that one will need in the decade ahead. We do, however, have the average number of school years completed by persons in the various occupational groups in 1959. On the average, those in the professional and technical groups had 16.2 years of schooling, or slightly above the college graduate level. A further breakdown of the group, not shown on this chart, reveals that 75 per cent had some college education, 19 per cent had finished high school only, and 6 per cent had less than a high school education.

We don't know the educational backgrounds of the entrants into this field since 1959; however, I would expect the educational level to be at least as high and perhaps higher. Furthermore, in the remaining years of the 1960 decade, I would expect the educational requirements for this group to continue upward.

Of the other major occupational groups, only the proprietors and managers and the clerical and sales workers have a significant portion of workers with some college education, 29 and 22 per cent, respectively.

The upgrading of the nation's work force is expected to be significant during the 60's, as indicated by Chart III prepared by the United States Department of Labor. Seventy per cent of new workers entering the labor force will be high school graduates or better, and the number having some college will be in excess of 6 million compared to less than 4 million in the fifties. Note the decline in number of those entering the work force with less than a high school education. In the 1950's this group exceeded 3 million. But, in the 1960's it is expected to decline to about 2 million.

We might summarize the materials on prospective demand for workers as follows: The demand for trained people in the professional and technical group will increase substantially in the decades ahead and it is becoming almost necessary that a person entering this group have a college background. I think that we can, therefore, reasonably conclude that there will be an increasing demand for college-trained people in these fields. The question for us, therefore, resolves itself into whether or not agricultural college training will meet a substantial portion of this demand.

On the basis of past experience the outlook for agricultural college graduates in several of the occupational groups is quite optimistic. Again the data are quite fragmentary and any observations made involve a considerable amount of

inference. None the less, a look at data relative to current employment of agricultural graduates should be informative.

Dean Shirky furnished me the only useful data that I was able to find on the placement of agricultural college graduates. I found both the survey of the 1960 graduates and the occupational analysis of all Missouri Agricultural College graduates prior to August 1958 to be very interesting. When some of the obvious expectations are eliminated, significant trends can be observed. For example, one would expect a larger per cent of the older graduates to be in the administrative group. Thus, I put little weight on the comparison of pre-1958 graduates in administrative work and 1960 graduates in such occupations.

The substantially lower percentage of the 1960 class going into teaching and agricultural extension work, however, does appear to be significant. Both the vocational agriculture program and the agricultural extension agency grew up and matured during the quarter century ending about 1950. Vocational agricultural training came to almost all high schools outside the larger cities during that period and extension service activities also may be found in almost every county. During the rapid growth period of these agencies they required many more new technical workers than the maintenance of the work force will require. Thus, I would visualize little over-all increase in the demand for agricultural college graduates from these agencies. Furthermore, a substantial portion of the demand for such workers will probably be filled from those students who extend their education beyond the Bachelor of Science level.

Extension work may well expand in the years ahead, but the expansion most likely will result from penetration into new and varied areas quite unlike our traditional concepts of agricultural extension. Required training in terms of the college curriculum will need to change with changing responsibilities. These changes in direction are already evident in Missouri.

The need for vocational agricultural training in high school is rapidly declining, and the need for teachers in this area of instruction may be expected to decline. There appears to be a growing recognition that high school vocational agriculture has too largely become a haven for town kids who are willing to side-step the more useful but more difficult courses in history, the languages, mathematics, and the sciences - important courses that spell college preparedness.

Although the sample is small, the fact that the per cent of older graduates and that of the 1960 class in agricultural research work is the same - 4 per cent - to me is significant. We normally expect most of this group to have some training beyond the Bachelor of Science level. Thus, the 4 per cent of new graduates going into this area most likely indicates an increase in demand for such workers. Furthermore, over half of the 1960 graduates entering research occupations became employees of commercial firms, compared to only 9 per

cent of all previous graduates. Again this is only a straw in the wind because of the smallness of the sample. But this may become a major area of demand for agricultural college graduates in the future.

Another significant change in employment opportunities for agricultural school graduates is indicated by the number going directly into the business world. Here the size of the sample is sufficiently large that we can consider the results significant.

First, let's take a look at the employment statistics for your graduates going into business closely related to agriculture, such as feed, fertilizer, meat packing, farm machinery, agricultural journalism, marketing, farm management, insurance, landscaping, nursery business, and other similarly related industries. Only 7 per cent of all graduates prior to August 1958 were employed in these industries. In contrast, 13 per cent of the 1960 graduating class entered directly into the business arena. This is an area of real growth in the economy and the statistics clearly point to the opportunities that agricultural colleges have in meeting a portion of the growing demand for skilled technicians and professional people in this area. You will recall from an earlier chart that employment in this group is expected to rise 40 per cent during the decade of the 1960's.

I'm sure there's little need for pointing out to you that agriculture is becoming less and less a function carried out on the farm. In the broad sense food production is being dispersed throughout all sectors of the economy both in rural areas and in the large metropolitan centers.

For example, consider the production of farm power, one of the major farm production inputs. Many of the staff members here can recall with ease the days when workstock production was a substantial enterprise on many farms, and when the farm operator who failed to produce most of his workstock feed requirements enjoyed a shabby social standing. But today the oil industry has teamed up with the steel and farm machinery producers to give us a source of power much more efficient than the home-grown variety. The Missouri mule no longer enjoys the prominence that was once accorded him.

The vast chemical industries of the nation have just about replaced the farm-produced organic materials as our main source of fertilizer. We even look upon our sources of seed, especially hybrid seed, as a sort of factory product rather than a farm commodity.

The processing industries, on the farm output side, have also taken over many of the functions which were once performed on the farm. Few farmers slaughter their own meat today. Almost all grading and standardizing of vegetables is done off the farm, and in many instances the actual harvesting has become a function of the canneries. Even dairy cow milking and beef fattening

have developed into factory type operations in many instances rather than on-the-farm functions. The maintenance of a string of pig parlors and broiler production units is also far removed from our former concepts of farming.

The point of emphasis here is that we are in the midst of changing concepts about where agriculture begins and ends, and should the agricultural colleges be concerned only with that narrowing portion in the middle which is performed in shirt sleeves and commonly called farming?

The market opportunities for the output of the agricultural college in the shrinking area of functions performed on the farm is at least at a standstill if not in decline. According to latest estimates farm operators in the nation numbered only 3.7 million and only about 2.4 million of these were classified as commercial farmers. In other words, about one-third of the operators were using the countryside primarily as a place to live. Furthermore, the number of farm operators declined about 30 per cent in the past decade and will surely decline again in the sixties.

On the other hand, the vast industries on the input and output sides of agriculture employ over 18 million people, or almost 30 per cent of the nation's labor force, and the number of trained workers in these occupations is growing each day.

Chart V illustrates this point. We have simply added the number of workers to the top of each segment of an agribusiness chart. There are an estimated 7 million workers in the industries involved in the supply or input side of farming, something less than 6 million workers are required in farm production, and in excess of 11 million workers are employed in the processing and marketing of farm output. So the business of agriculture as a whole employs a healthy 24 million people for a substantial portion of total employment. This picture plus the previously mentioned data on number of farm operators and the job placement data for your 1960 graduates appear to clearly point the direction that agricultural colleges must take.

The 13 per cent of the 1960 class going into agricultural businesses and the 11 per cent going into businesses not so closely related to agriculture are significant and represent a substantial change from the placement of previous graduates. It will also be noted that a slightly higher per cent of the 1960 class went back to the farm. I think that we can safely assume that the farm will continue to get a substantial number of agricultural college graduates despite the decline in over-all number of farmers. It's going to take a better trained man to farm in the future. He must have a grasp of business principles. More often he will be a professional farm manager hired on a salary basis as is a plant manager or conservation foreman.

Capital requirements for efficient farm units have already reached an almost possible level for young, would-be operators to accumulate in a normal lifetime from farming. The following examples of capital invested by specified type of farm in 1960, as reported by the United States Department of Agriculture, will demonstrate this point.

<u>Type of Farm</u>	<u>Location</u>	<u>Acres</u>	<u>Total Capital</u>
Cash grain farms	Corn Belt	206	\$109,660
Cotton	High Plains, Texas	326	113,950
Cotton	Mississippi Delta	640	205,770
Tobacco-Livestock	Kentucky Bluegrass	60	98,940

Indeed, as we look at these data one may question whether the owner-operated farm may go the same route as the corner grocery store and the individually owned factory. I feel sure there will be owner-operated farms around for generations, but I believe we may see extensive developments of other ownership-management patterns in the immediate future. Many farms are now in unsettled estates because of the inability of one of the heirs to finance the purchase of portions owned by the remaining heirs. Once some joint stock or other type of share ownership arrangement is worked out, such estates can be settled immediately. I would expect farm estate problems to multiply in the next decade.

Chart VI helps clarify my thinking here. Since 1940 the value of total farm assets has risen from slightly over fifty billions of dollars to in excess of two hundred billions in 1960. Of the 1960 valuation, slightly less than half represents total valuation in 1940 plus the amount added by farmers through additional cash investment. Slightly more than half of the 1960 valuation has accrued to farmers not as a result of their own excellence of management but via the questionable medium of price inflation.

The fantastic growth in total value of farm assets since 1940 has been paralleled by an equally fantastic decline in the rate of return on farm production assets to a level of slightly more than 3 per cent on the average. It takes substantially better than an average farmer today to net a reasonable return on today's value of his production plant. For the farmer who has been in business since 1940 or before, the problem is not so acute - he can still calculate on the basis of the actual amount of his own investment at stake. A purchaser or heir faces an infinitely different problem. Transfers by sale or by estate are made at current values. The traditional American system of paying for the same farm once each generation has hit a snag. As the number of heirs increases above one, the prospects of one heir buying out the others and looking forward to ultimate debt-free ownership becomes increasingly dim.

These prospective developments lead me to believe that increasing numbers of farms will be operated by professional managers who will have social status in their communities equivalent to that of other highly trained people. I thus anticipate that we may change our view toward absentee land ownership before the present generation passes on. We have lived through a generation where management was separated from ownership in most other industries. If this should be the route to greater efficiency in the production of farm commodities, we may decide a few years hence that the change was not so bad after all. We may also decide that the well-paid farm operator who is on an annual salary can be just as good or even a better citizen than an inefficient operator who owns his farm.

As I see this story, it adds up to the following general conclusions. The agricultural college graduate of the future should be more than a production expert in the science of farming. He must be prepared to live in an economy that is closely integrated and have a background of liberal education sufficient to give him a great deal of flexibility in job opportunities. If we expect to turn out graduates for farming and agricultural education purposes only, our agricultural colleges are geared to a declining market.

If we look to the broad field of agriculturally related industries, however, and their demand for specialists, we can visualize a continuous growth in demand for our product. I am reasonably sure that this is the direction in which this college is being oriented, but I submit the following thoughts relative to this change. These ideas are not the result of great research on my part nor are they the results of a life's work as an eminent educator. They may be considered only as modest observations gleaned from my contacts with the business world.

First I would suggest that the general educational requirements of the student should be paramount. This would involve greater stress on scientific fundamentals or basic training rather than so much emphasis on applied courses.

Technology in agriculture has been changing rapidly and will probably continue to do so in the future. Thus a high rate of depreciation must be given present know-how. It will probably not be very valuable 5 to 10 years from now. Since we are preparing the student for a lifetime or work we must be careful of how much of his time we squander in outlining current technology.

I would, therefore, suggest more emphasis on such courses as physics, chemistry, biology, nutrition, mathematics, statistics, genetics and the social sciences in the early years. Finally in the later years I suggest emphasis on such business courses as accounting, commercial law, and money and banking, all of which would be at the expense of the strictly applied courses.

Such a blend of educational background will give the graduate greater flexibility in changing his vocation with new job opportunities or for taking advantage of opportunities which may appear for advancement into administrative levels of the firm in which he may be employed. The potential earning power of the agricultural school graduate, of even greater importance his potential usefulness to society, and in the final analysis the question of whether the agricultural college will wither on the vine, or become a greatly more dynamic contributor to the common good, lie squarely in the hands of today's framers of today's, and tomorrow's, agricultural school curricula. It is my fervent hope that tremendously more research effort will be devoted to this problem and that as new directions take shape we have the courage to break tradition, pattern our teaching efforts to the clearly developing requirements of a changing business world, and allow our colleges of agriculture to fulfill their responsibility to that important agribusiness sector of our national economic life.

CHART I

EMPLOYMENT BY OCCUPATION 1950-1970

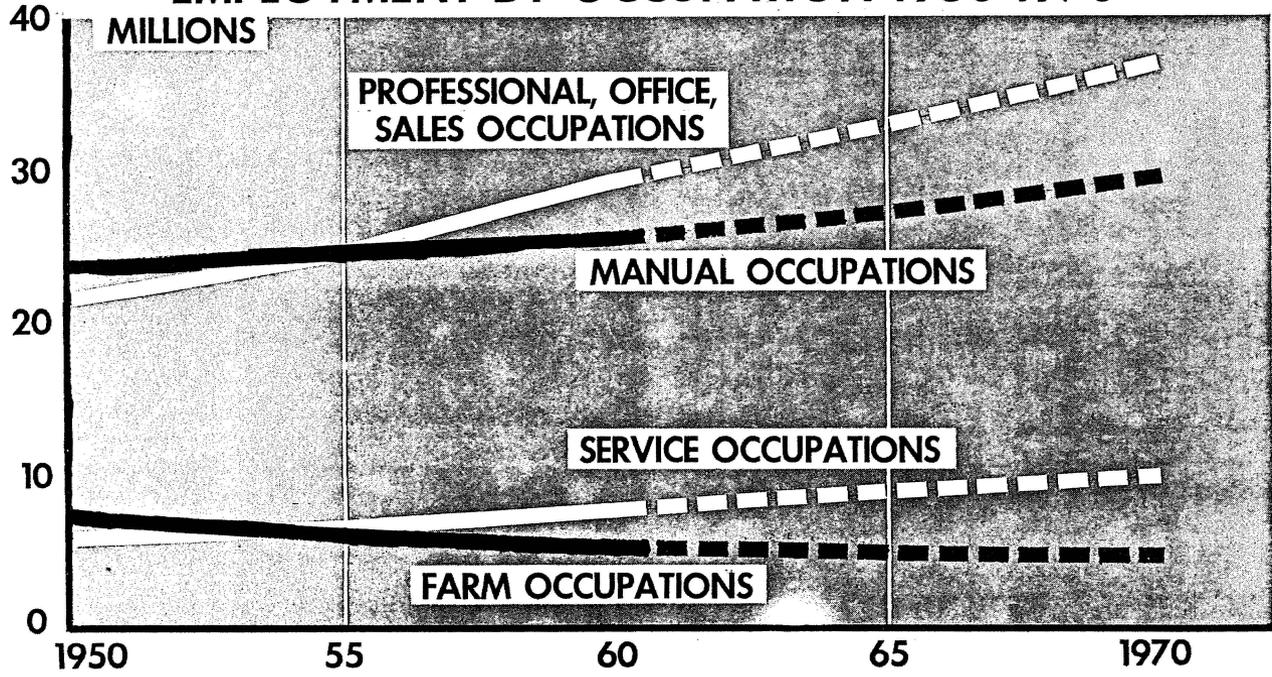


CHART II

PERCENT CHANGE IN EMPLOYMENT 1960-1970

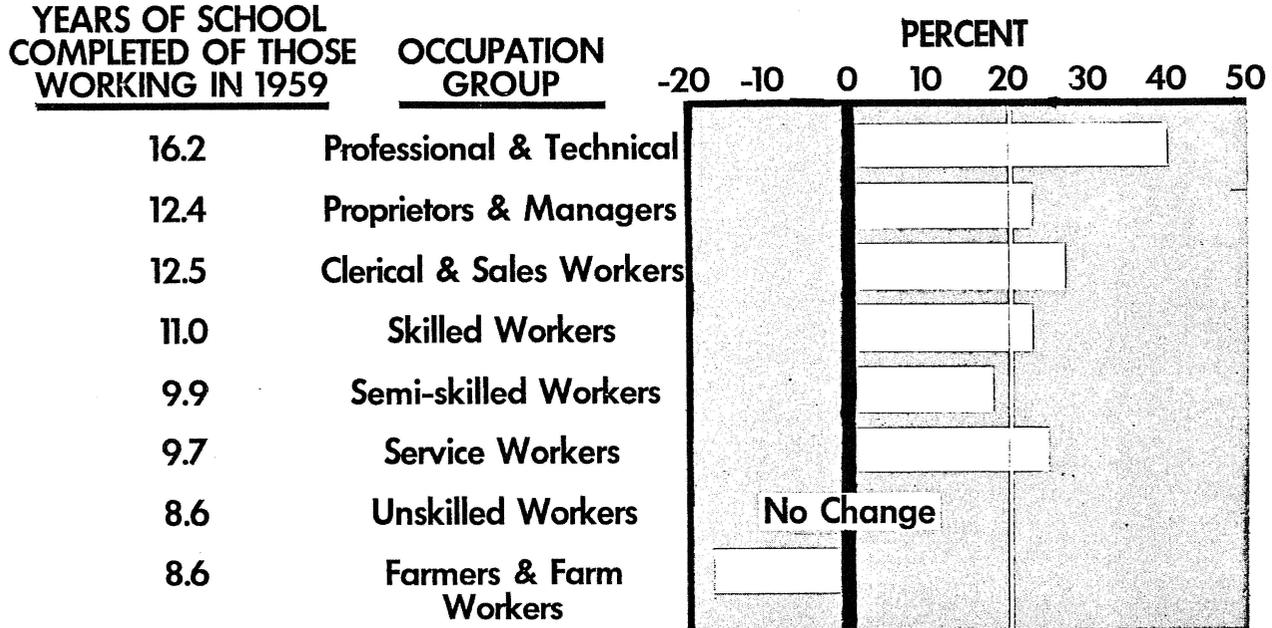


CHART III

AMOUNT OF SCHOOLING OF NEW YOUNG WORKERS IN THE 1960s & 1950s

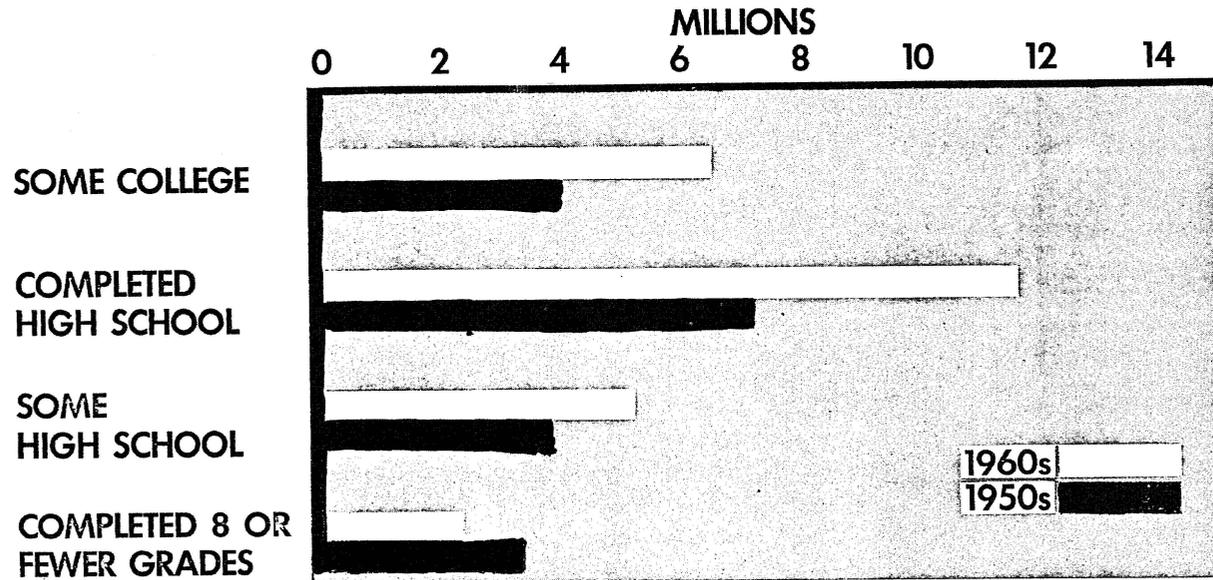


CHART IV
OCCUPATIONS
GRADUATES-UNIVERSITY OF MISSOURI COLLEGE
OF AGRICULTURE

	ALL GRADUATES Through August 1958 (% of Total)	1960 GRADUATES (% of Total)
ADMINISTRATIVE	15	2
TEACHING	13	6
AGRICULTURAL EXTENSION	7	2
RESEARCH, AGRICULTURAL	4	4
AGRICULTURAL BUSINESS	7	13
STUDENTS	2	12
NON-AGRICULTURAL BUSINESS:		
Public Relations, Sales, Banking & Insurance	7	10
FARMING	14	17
ALL OTHER*	31	34
TOTAL	100	100

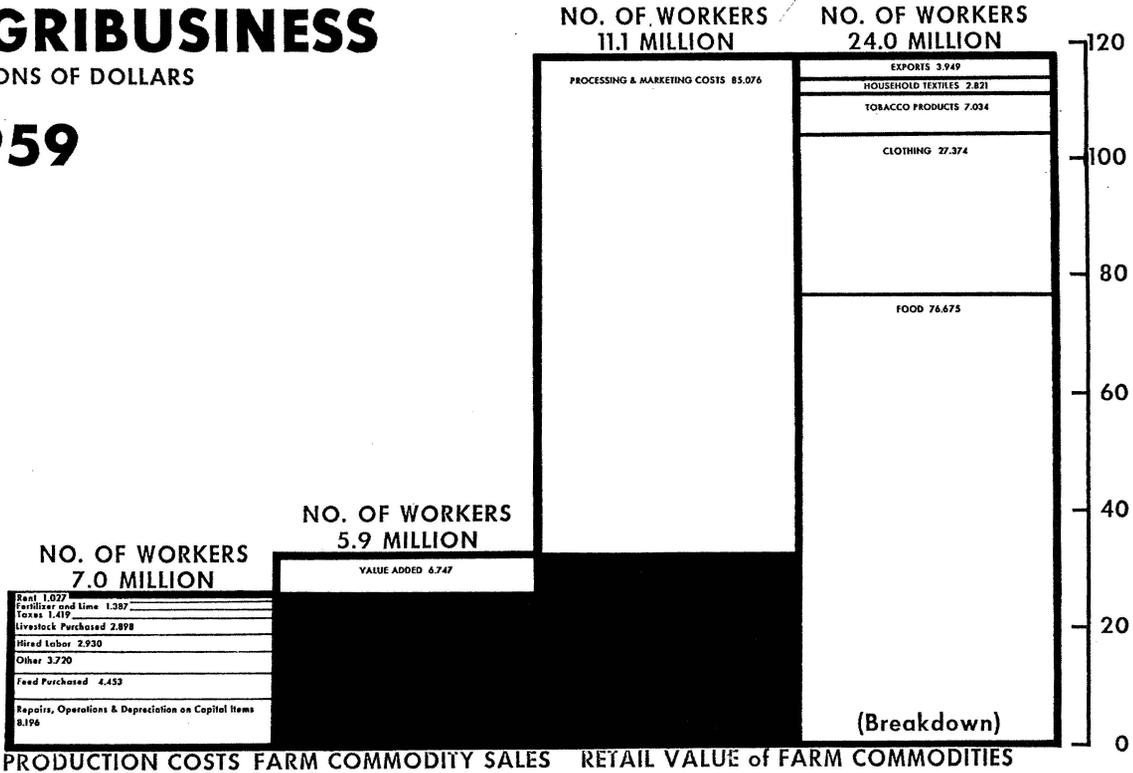
*Primarily housewives and members of armed forces.

CHART V

AGRIBUSINESS

BILLIONS OF DOLLARS

1959



NOTE: Farm commodity sales data exclude government payments and value of products consumed on the farm where grown. Retail value of farm commodities excludes farm products consumed in industrial uses, and value of exports is based on value when exported.

CHART VI

Gains in Total Farm Assets and Rate of Return on Production Assets

