

The Farmer-Stockman

Edited to Help Rural Families Grow Better Crops, Improve Their Livestock, Enjoy Modern Equipment and Achieve Finer Living

Five Important Articles

By F. J. Deering, Editor, The Farmer-Stockman

- ★ **Are Oklahoma Farmers Necessary?**
- ★ **Oklahoma Farmers Must Compete**
- ★ **How Oklahoma Farmers Can Compete**
- ★ **Science Can Help Farmers Compete**
- ★ **Research Is Worth 100 Times Its Cost**

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**A Bold Look at Some Cold Facts
Relating to the Future of Farming**

Are Oklahoma Farmers Necessary?

By F. J. Deering
Editor, The Farmer-Stockman



Dr. L. E. Hawkins

WHEN I WAS A BOY, a neighbor pointed out to me a lesson of importance, a lesson of my own unimportance. Just what led up to the conversation escapes me now, but what he said stays.

"If you think you're important, do this," he said kindly. "Put your finger in a bucket of water, then pull it out and look for the hole."

It could be that Oklahoma agriculture—the industry that all of us have regarded as the most fundamental, the most important, and the most essential—may be missing opportunities just because we consider this self-importance as paramount.

In a visit with Dr. Louis E. Hawkins, director of Oklahoma Agricultural Experiment Station, these questions were raised:

1. Can the United States get on very well without the produce of Oklahoma farms and ranches?
2. Why should the consumer of food and fiber continue to keep the Oklahoma farmer and rancher in business?
3. Is Oklahoma agriculture assured a continuing place in the national agricultural economy?
4. What natural advantages does Oklahoma have that will help its agriculture to compete successfully with other areas?

Those questions aren't facetious. They are serious questions that Oklahoma farmers must answer whether they ever voice the propositions or not.

With an abundance of agricultural commodities in the United States, with plenty of just about everything that Oklahoma grows, is Oklahoma agriculture expendable? If Oklahoma farmers quit farming and ranchers quit ranching, would their withdrawal leave a hole in the nation's "agricultural bucket of water."

Let's see what Dr. Hawkins has to say on the subject.

"Suppose, for an overdrawn illustration, Oklahoma's 35 million acres now in farms should go like this for 10 years," he hypothesized. "First, permanently inundate one million acres as reservoirs, ponds and lakes. Second, devote 2 million acres to highways, parks, and recreation areas. Third, absorb 2 million acres in urban and industrial development. Fourth, allocate one million

acres to military facilities. Fifth, contract the remaining 29 million acres to the soil bank either in the acreage reserve or the conservation reserve."

That just about takes care of all the farm land in the state. What will happen then?

"The nation's wheat production would be reduced by 70 to 100 million bushels annually," Dr. Hawkins said. "But we have a national surplus of something over 400 million bushels, and it is obvious other states could grow all the wheat the nation needs."

"There would be less cotton, too, but that commodity also is in surplus and other cotton growing states would be glad to grow more if needed."

"The nation's cattle would be reduced by some 3 million head, but other states now have 92 million head of cattle and could easily expand it to more than 100 million head without Oklahoma's help."

"And so on, with every other commodity of importance which Oklahoma farmers grow and market," our observer concluded. "Removal of Oklahoma-grown farm produce from the market would lessen somewhat the downward pressure on prices for growers in other states, to their relief and assistance. Yet those growers could readily meet requirements for supplies for many years to come."

But that would not be the whole effect, we pointed out. The 1955 census of agriculture showed 118,979 farms in operation in Oklahoma, some supporting more than one family. Thus, about 120,000 farm families representing some 500,000 people would go out of the farming business. Wouldn't that wreck our business economy?

"It certainly would have a drastic effect," Dr. Hawkins said. "Not only does that represent more than 20 percent of the state's population itself. There also are 13,500 families, totaling 54,000 people, who make their principal livelihood—some \$40 million annually—serving farm families and the farm business."

"There are 91,800 families, representing another 367,000 people, who derive their livelihood of \$185 million annually from the handling and processing of Oklahoma farm produce in Oklahoma."

"Others would be affected to an extent impossible to calculate, families whose income stems from businesses and professions, merchants, builders, doctors, lawyers, teachers, insurance and real estate agents, and others who deal with farm people."

The picture was made darker by the observation that the public tax base would be destroyed as related to real estate, income and sales, and public services would be shattered.

The annual production of \$500 million to \$800 million in new wealth from Oklahoma soil would be sacrificed. The subsequent turnover of that new wealth from three to five times would be unrealized, meaning \$1,500,000,000 to \$2,500,000,000 less business done.

Could all of this happen here?

"Yes, it's not probable in its entirety, but it is possible," Dr. Hawkins said. "The degree to which it happens depends upon several things. The possibility of increasing amounts of land going into lakes, highways, parks, urban and industrial sites and military developments is self-evident. It is happening."

"The effect of the soil bank depends on the national farm program and congressional appropriations first, but from the farm operator's point of view, at least four considerations might be named. In the soil bank he would receive an insured income from his land; he would escape production, harvesting and marketing problems; he would avoid acreage allotment and compliance griefs; and he would have a sure way to preserve his investment against inflation."

Admittedly, this total absorption of Oklahoma farms is speculation. The cold statement that Oklahoma agriculture might be expendable as far as the nation's food requirements are concerned is terribly real.

It is also a very real fact that whether the nation needs Oklahoma's agriculture or not, Oklahoma needs an expanded agriculture. Oklahoma needs its farmers and ranchers and the people who do business with them.

That Oklahoma farm numbers have been declining is a well-known fact. What will prevent Oklahoma farm and ranch land from going completely out of pro-

duction? What can be done to keep Oklahoma farmers and ranchmen in business and make them prosperous?

That was a pair of tough questions, and Dr. Hawkins thought carefully before he gave his answers to them.

"First, we must realize and admit that Oklahoma agriculture has few, if any, natural advantages over other agricultural areas and that we must meet head-on the competition of more favored farming areas," he replied.

"And second, we must develop and maintain a research program that will enable Oklahoma growers to produce (a) the kind and quality of commodities which the consumer wants most, and (b) at half the present cost of production."

Those are pretty big orders. Let's explore them further. In the next issue, we will take a closer look at the kind of agricultural competition Oklahoma farmers are up against. Then we'll see what kind of research program is needed to meet the challenge.

While Oklahoma agriculture might not leave a hole in the nation's water bucket if it ceased to exist, loss of any major part of it would leave a big hole in the economy of our state. We don't want that to happen.

Oklahoma Farmers Must Compete

Second Article in a Series

By F. J. Deering
Editor, The Farmer-Stockman

ARE OKLAHOMA farmers necessary? That question was raised in the first article in this series, published in The Farmer-Stockman for August. The article speculated that Oklahoma agriculture might be expendable as far as the nation's food requirements are concerned but for the state itself, there's another story. Oklahoma needs an expanded agriculture, Oklahoma needs its farmers and ranchers, and it needs the people who do business with them. Oklahoma farmers are necessary.

What can be done to assure continued operation of Oklahoma's agricultural industry and to keep it prosperous?

In reply to that question, Dr. Louis E. Hawkins, director of Oklahoma Agricul-

tural Experiment Station, noted first that Oklahoma agriculture has few, if any, natural advantages over other agricultural areas and that we must meet head-on the competition of more favored farming areas.

He had some other comments, too, which will be explored later. Right now, let's take a look at the competitive aspect of our problems.

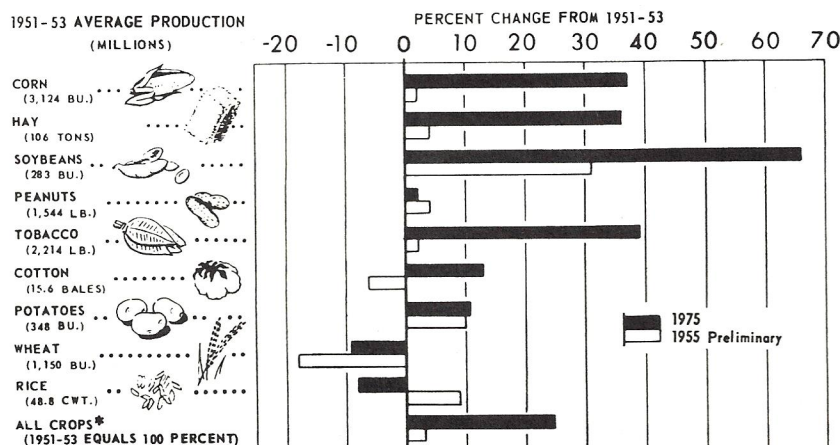
Wheat, cotton, peanuts, grain sorghums, dairying and beef cattle are major commodities produced in Oklahoma, and a number of others account for considerable portions of the total agricultural output.

Each of these might well be analyzed and inventoried to see where Oklahoma stands, but a few examples will illustrate the kind of competition that Oklahoma farmers face. The competition comes from many angles, from other Oklahoma farmers, from the influences of government farm programs, from the development of substitute materials not made from Oklahoma farm products, and competition from other agricultural regions of the U.S. and the world.

Oklahoma farmers have no choice about whether they will compete with all of these other elements for the consumer's dollar. They must compete or collapse. How can they compete?

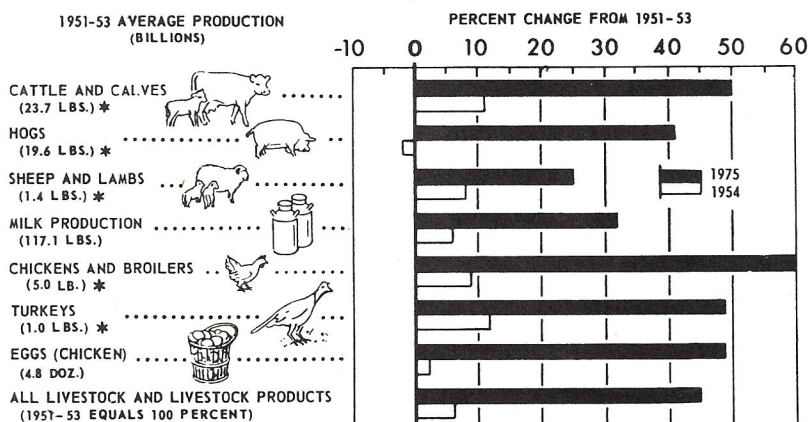
Briefly, Dr. Hawkins suggests that it can be achieved by producing the kind and quality of commodities which consumers want most and do it at half of present costs of production.

POTENTIAL PRODUCTION NEEDS Crops - 1975 Compared With 1951-53



SOURCE: AGRICULTURAL MARKETING SERVICE AND AGRICULTURAL RESEARCH SERVICE COOPERATING
*INCLUDES ESTIMATED NEEDS FOR ALL CROP PRODUCTION EXCEPT PASTURE

Livestock-1975 Compared With 1951-53



SOURCE: AGRICULTURAL MARKETING SERVICE AND AGRICULTURAL RESEARCH SERVICE COOPERATING
*LIVE WEIGHT

Wheat

Sharpest competition for Oklahoma in the production of hard red winter wheat comes from Kansas, southern Nebraska and eastern Colorado. These states have generally deeper, less erodible soils and larger farms.

To challenge and overcome this competition, Oklahoma must meet and solve such major problems as:

1. To increase insoak and reduce runoff of rainfall;
2. To ascertain best fertilizer treatments;
3. To enlarge operating units (acreage of wheat per farm) in order to utilize better, costly machinery and time of the operator and this obviously will best be done by orderly and economic free enterprise rather than by government mandate;
4. To learn most effective controls of insects and diseases;
5. To integrate farm enterprises to utilize more fully the farm equipment and working time of the operator.

Cotton

Oklahoma's direct competition for cotton production comes from such areas as the Mississippi Delta, Texas High Plains, Rio Grande Valley, Arizona and California. They have deeper, less erodible soils, larger operating units and available water.

Problems to be overcome include:

1. To increase insoak and reduce runoff of rainfall;
2. To ascertain best fertilizer treatments;

3. To enlarge operating units (cotton acreage per farm) to utilize better the equipment and time of operator;
4. To improve efficiency of planters, harvesters and gin equipment;
5. To develop most effective controls of insects and diseases;
6. To develop more efficient irrigation practices;
7. To integrate enterprises on the farm and at the gin for fuller utilization of equipment and time.

Grain Sorghums

Competition for growing grain sorghums comes from irrigated areas of Kansas, West Texas and California, where farmers obtain high yields per acre, and hence high output per man, per machine and per unit of land.

Major problems affecting Oklahoma farmers' competitive position include:

1. To increase insoak and reduce runoff of rainfall;
2. To control wind erosion;
3. To integrate farm enterprises so that they will utilize more fully the working time and farm equipment of the operator.
4. To improve varieties for earlier maturity and natural drying;
5. To improve artificial drying procedures and facilities;
6. To develop more efficient supplemental irrigation practices;
7. To develop more effective controls of insects and diseases;
8. To increase size of operating units.

Peanuts

Competition for the growing of peanuts comes from the Southeastern states, where more dependable rainfall and longer growing season may be counted as favorable factors.

To offset these, Oklahomans must overcome these problems:

1. To control both wind and water erosion;
2. To maintain soil organic matter content, and to determine the most effective fertilizer treatments;
3. To increase size of operating units;
4. To develop efficient harvesting and threshing machines and methods;
5. To develop satisfactory artificial drying procedures;
6. To develop most efficient methods for utilizing scant water supplies in supplemental irrigation;
7. To improve varieties for yield and disease resistance.

Dairying

In the business of dairy farming, Oklahomans encounter major inter-regional competition from the Corn Belt states, mainly because of their higher per acre feed production, and also because of the acceptance by farmers of the confining and continuous nature of the operation.

Major problems to be overcome by Oklahomans in meeting this competition include:

1. To increase size of operating unit;
2. To grow more feed and pasture per acre;
3. To mechanize more fully the job

4. To stabilize production per season, per farm and over a series of years;
5. To increase the output per cow;
6. To recognize that the dairy cow does not have time to hustle her feed from a scant and sparse pasture;
7. To improve cow health and sanitation.

Beef Cattle

Oklahoma is well situated with respect to natural conditions which influence competition with other major beef cattle producing areas of the country. An important exception is the advantage of the Corn Belt states in the fattening of beef cattle for slaughter.

Major problems to be worked out include:

1. To grow more finishing feeds in Oklahoma;
2. To develop and utilize more effectively roughage rations for finishing cattle;
3. To produce beef cattle capable of better utilizing roughages for slaughter finished beef;
4. To develop feeding methods for production of consumer demand beef using Oklahoma feeds;
5. To make more effective use of pasture in producing slaughter finished beef.

Similar lists might be prepared for swine, poultry, truck crops, fruits, specialty and other minor crops. For many of them, the pattern would be similar.

As a matter of fact, there is a certain sameness that seems to run as a sort of theme-song through Dr. Hawkins' inventory of problems on those listed. Such things as larger operating units, control of erosion, conservation of moisture, improved varieties, equipment and procedures, and better soil management are repeated.

Generally, they add up to a pattern for better farming. That is a goal of most, if not all, farmers. However, in today's highly competitive agricultural system, burdened by surplus supplies and external influences such as acreage control programs, there's no good alternative.

In any case, to compete successfully, Oklahoma farmers must find ways to achieve lower unit costs of production—a lower cost per bushel of wheat, a lower cost per pound of cotton, a lower cost per pound of animal produced. Selling prices of farm products, unlike most manufactured items, are not established by what it costs to produce them. The farmers' profit margin, if any, is determined by the difference, if any, between production cost and sales price.

"Through resolution and determination, we must get ahead of our competition by doing a better job of solving our farm problems and doing it sooner," Dr. Hawkins summed up. "In agriculture as in other business and industry, competition is a ruthless, dog-eat-dog proposition. No leniency is given to the man beset by the problems. He must compete or collapse!"

The conclusion is inescapable. Oklahoma farmers must compete! They must do it by producing the kind and quality of products that consumers want most and produce them at much lower cost.

HOW

Oklahoma Farmers Can Compete

Third Article in a Series

By F. J. Deering
Editor, The Farmer-Stockman

SOME DAY the food grown by Oklahoma farmers may have to compete with some now unknown goodies brought back from other planets by space ships.

Right now, though, that isn't a problem.

The competition that already exists between Oklahoma-grown commodities and those produced elsewhere in the United States is plenty. This battle for a share of Mrs. America's food dollar is enough to make anybody associated with Oklahoma agriculture consider seriously what we can grow and sell profitably in 1965 or 1970.

Oklahoma farmers face competition from other states, from other regions and even from other countries. Yes, they even have to compete with other farmers in their own state and county.

The competition is a running battle, too, because other areas are also looking for new ways to gain new and larger markets for what they can grow. Inevitably, Oklahoma agriculture must continue to change to meet the changing conditions.

In previous articles in this series, Dr. Louis E. Hawkins, director of Oklahoma Agricultural Experiment Station, has emphasized 2 fundamental steps Oklahoma farmers and ranchers need to take to make a successful bid for more customers.

First, we must realize and admit that Oklahoma agriculture has few, if any, natural advantages over other agricultural areas.

Secondly, we must develop and maintain a research program that will enable Oklahoma growers to produce the commodities that consumers want to buy, of the quality they want, and do it at greatly reduced costs of production.

Consumers have become highly discriminating customers. They demand higher quality products, available in larger quantity, virtually the year around. They are unwilling to pay higher prices and strong consumer pressure groups often demand lower food prices.

As outlined in detail in the preceding article, many specific problems stand in the way of Oklahoma farmers achieving their goals.

Still, Oklahoma farmers and stockmen must compete, they can compete and they will compete to the degree that they do a better job at lower cost.

Of course, not all present-day farmers will be able to meet the rugged, ruthless and crushing competition that exists. A healthy, well-managed Oklahoma agri-

culture can and will improve upon present farm production to increase Oklahoma's farm commodity sales. Family living income, the spendable cash, received by both commercial and part-time farmers above actual production costs will be larger.

Much of Oklahoma was settled and developed on the premise that 160 acres constituted a farm. Those in authority reasoned that was about all the land a man could work with teams and felt that it was enough to produce a fairly good living for his family.

Changing times have proved that 160 acres is far from the ideal size farm unit. Some 160-acre farms in Oklahoma today may be all the owner can work with his available power and some may produce a good living, but they are not typical, and they are decreasing in number year after year.

Some such middle-sized units are being subdivided into tracts that can be operated as part-time or residential acreages, some are going into non-agricultural usage, and the soil bank may be retiring a few. Others are being absorbed into larger units, where the combined operation has a chance of reducing production costs per unit, per bushel, per bale, per pound.

Mechanization of farming has been a major factor in this trend. A well mechanized modern farm requires a heavy investment in machinery that must be charged against the commodities produced and paid for out of cash sales.

"Oklahoma farmers generally are not over-mechanized," Dr. Hawkins says. "Numerous spreads may be too small and thus may be over-machined and over-manned, but not over-mechanized. The machines they own may be essential but both men and machines may be under-employed."

Acquisition of more land (and more acreage allotments) may be the answer in some cases. It may even mean the addition of more equipment but it will be more efficiently used. Each farm must be set up to produce enough units of crops and livestock to keep production costs low.

While diversification has considerable merit in agriculture, it can be carried to a costly extreme by requiring too great a variety of machinery, and hence too great an investment. In meeting competition, farmers may sometimes need to specialize in production of crops that will utilize the same machinery. Thus specialization for the sake of simplification becomes a factor to consider for success.

Management is basic to success in any commercial enterprise and so it is in commercial farming. Because each operation requires larger cash outlay than in the past, mistakes in management can be more costly than in the days when mistakes resulted mainly in lost effort.

"A farmer can go broke faster nowadays," Dr. Hawkins observes.

As usual, farmers are influenced in their operations by those who supply outside capital for their operation. Major decisions now are influenced also by the

various farm programs, plus state or other regulations.

Then, too, a steadily increasing number of farms are being operated under some type of contract farming that bear upon management decisions. Known also as "vertical diversification" or "integrated farming", these operational arrangements with suppliers, processors or marketers are becoming significant. For many, the contract may help farmers to compete successfully by (a) helping them to produce and market what the consumer wants (b) at lower cost per unit.

One of the effects of such arrangements is to encourage the production of higher quality in large quantity and selling on a graded basis that will attract stronger bidders.

But neither these things nor government price supports based upon parity or other calculation will guarantee a farmer a profit. He must produce for less than he sells for if he is to compete, and he must produce what the consumer wants if he is to sell at all.

That brings us down to the crux of the problem.

How does the farmer or the stockman know these things? How can he tell what the consumer wants? How can he improve the quality? How can he produce larger quantity? How can he lower costs? How can he get his products to the customer who wants to buy them?

Who can answer those questions for the producer?

As related to present or past conditions, answers may be available. As the questions pertain to the production of the future, positive replies are difficult to obtain, if not impossible. The reason is that answers to many such questions are not yet discovered.

That's where a strong program of agricultural research enters into our agricultural future. A major part of the progress made to date may be attributed directly to application of findings of scientific research.



Back in 1893, the late John Fields began publishing a farm paper primarily to take results of the newly-established Oklahoma Agricultural Experiment Station to farmers in the territory that had just been opened to settlement. Fields' magazine has since been merged into The Farmer-Stockman and he has died, but the purpose of putting research results in the hands of those who can use them goes on, aided by other mediums of communication.

"Science Serving Agriculture" was a slogan used for many years by Oklahoma Agricultural Experiment Station, reflecting the close interrelationship of the 2 fields. As more farmers have applied more science to their farming operations, Oklahoma agriculture has progressed.

It is reasonable to believe that the future of Oklahoma agriculture is closely bound up in the kind of research program that is carried on. Research can and will find practical answers to many of the problems that Oklahoma farmers face. Research can and will enable Oklahoma farmers to meet their competition, if given an opportunity and adequate financing.

The research that will be needed in 1965 and in 1970 must begin soon. Although research has been accelerated as new methods and equipment have developed it has not yet achieved the speed we associate with the jet age. Research still takes time.

For example, in order to determine what kind of cattle may be more profitable for stockmen to raise 5 years from now, the research scientist must have some idea of what kind of meat consumers will want then. He should also know how nearly present animals fit those demands, and where changes may be indicated. Next, he must seek ways to bring about the changes, and finally, a way to make the changes in such a way that production costs may be reduced.

Those steps may take years, but even then more time is needed. The results must be demonstrated and reported to those who can use them. Then foundation stock must be developed to permit larger scale production.

Experiment station officials are frequently confronted with problems related to farm management for which no conclusive answers are available, Dr. Hawkins reports. Extensive research programs are needed to project into the future, involving much more than recording what has already happened to farms, prices and markets. Farmers want some indication of what is going to happen.

Oklahoma farmers have no satisfactory alternative to the matter of competition. They must compete or collapse. They can compete if they meet the challenge of tomorrow, a challenge to produce more of higher quality at less cost.

Farmers cannot do this alone. They must have the backing—and the leadership—of a far-sighted, long-range research program. Such a program is being projected and launched by Oklahoma Agricultural Experiment Station. What it proposes is the topic of the next article in this series.

Science Can Help Oklahoma Farmers Compete

Fourth Article in a Series

By F. J. Deering
Editor, The Farmer-Stockman

IF THE DINNER you just ate was attractive, nutritious, delicious and economical, you can thank agricultural research.

You can't get a meal like that just any place in the world. The less research results and means of application available in a country, the more difficulty you are likely to experience in finding one.

A fundamental goal of agricultural research is ample production for a well-fed nation, with lowest possible prices to consumers for quality foods, with profitable values for producers of raw materials, processors and marketers.

In Oklahoma, the business of seeking this goal is often referred to as "Science Serving Agriculture," the slogan of Oklahoma Agricultural Experiment Station. This institution, a part of Oklahoma State University, has done much in advancing toward this goal but Dr. Louis E. Hawkins, director, would like to see the program greatly accelerated.

"Currently, we are doing about a third of the job that ought to be done," he says.

How do you arrive at that estimate?

"About \$2,000,000 is being spent annually for research in Oklahoma," he said. "This includes state appropriations, plus federal grants to the Oklahoma station, plus private grants and revolving funds. It does not include funds that the United States department of agriculture spends directly on research that may benefit Oklahomans."

Then you are proposing a research budget of about \$6,000,000?

"Yes, if Oklahoma had an agricultural research budget of \$6,000,000, we could obtain more results per dollar spent, too," Dr. Hawkins said. "The administrative overhead is paid out of the first million dollars."

Well, it's easy to propose that more money be spent, but we must recognize that simply spending additional money does not automatically assure us of greater accomplishments.

"True," admitted Dr. Hawkins. "It is essential that a program be developed preparatory to the spending of present or additional money."

Do you have a program three times as large as the present?

"Yes," the director replied, "It is basically the same as we are now carrying on, but greatly expanded and accelerated. Oklahoma agriculture, or the agriculture of any areas for that matter, can be improved in three ways, and only three.

"One is by reducing the cost of producing, processing and handling the produce of the farm and ranch, pri-

marily through increased efficiency.

"Another is by improving the quality, usefulness and desirability of the end product to the consumer.

"The third way is by increasing or expanding the quantity of the product which the market will take at a profit to the grower, the processor or handler."

But those steps appear to have the effect of increasing the farmer's costs, while lowering his income, don't they?

"Perhaps they may so appear, but in seeking to achieve greater application of presently available but unused knowledge and the development of new and heretofore unknown ways of achieving these steps, let's look at two basic axioms.

"Let's remember that reducing the cost of production does not of itself lower the selling price of a commodity to the consumer. The selling price is whatever the traffic will bear, or whatever the buyer can and will pay.

"We should also keep in mind that research is apt to upset the status quo, a situation which some do not want disturbed. Application of the findings of research will sustain in business those operators who make effective use of them, but may squeeze out of business those operators who become or continue inefficient."

Well, let's be a little more specific about what you mean by a program of research.

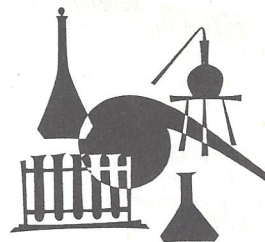
"Take the matter of reducing costs, specialized efficiency research is needed to reduce the production cost of a bushel of wheat, a pound of cotton, hundredweight of milk, crate of eggs, pound of beef, pork or poultry," Dr. Hawkins said. "A great deal of intensive fundamental research will be required to accomplish a break-through in each of several critically important areas if production costs are to be reduced materially."

Such as what?

"The nature of disease resistance in certain species of plants needs to be discovered in order that the resistance factor can be identified and incorporated into commercial varieties, for example.

"Similarly, the basic factors of certain diseases in animals need to be learned to realize the effective remedies and preventive measures. We need to identify the causative organisms. We know what anaplasmosis does to cattle and we know some things to do to control it, but to date, nobody has certainly seen the real body of anaplasmosis. The losses it causes add to the cost of reproduction of animals that reach market. When we learn more about it, we may be better able to control and thus lower cost of production.

"Furthermore, more knowledge is needed about basic soil-plant-moisture relationships to make best use of limit-



ed soil and water supplies, and to determine the most critical times for applying supplemental moisture. We need to know when to irrigate.

"We need to know more about the interaction of plants and climatic factors and ways to anticipate them. Actually, we know too little about temperatures, humidity, duration of seasons and spells within seasons, or about their variations.

"An expanded program of research should seek more basic studies in the tissues of plants and animals as related to edible quality and ways to preserve it."

Those are technical problems, dealing mainly with production. But today farmers may say they know how to produce, but can't make a profit on type of operation they have to carry on.

"Management problems must be given more intensive and extensive attention in research," the director continued. "Economic integration research is needed to combine the best known methods of production, available resources of land, labor, capital or credit, equipment and managerial ability to turn out a high quality product at low unit cost.

"Further research is needed to assist part-time farmers to grow marketable products efficiently while employed off the farm."

How about conservation of resources?

"Since water is a critically limited factor in Oklahoma agriculture and demand for supplies is increasing steadily, much research is needed to conserve water, both as it falls on the land and later in the soil, in ponds and in reservoirs," said Dr. Hawkins.

"Then we must find improved ways to use stored water more effectively in plant and animal production. Again, this refers to the matter of cost and quality."

Does the proposed expanded research program include consumer research, to find out what kind of quality the buying public wants?

"Yes, consumer research of certain kinds is essential to the production of commodities and therefore to the research that bears upon other aspects of production and marketing," the research administrator said. "It is known that consumers respond to eye appeal, taste and utility values when buying foods, but in order to produce commodities that will offer more of these qualities, it is necessary to have some knowledge of what consumers consider good taste or find most useful.

"Consumers also have shown they de-

sire consistency in grade and quality, perhaps even more than high quality. This leads into the area of standardization in meeting market needs, but if consumption is to be increased, we must know more about market needs. We must also develop more objective, tangible and practical ways of measuring market quality."

Does that mean consumers don't know what they want, or that we just haven't found out what it is?

"Both, to some extent. Our research program, to be of greatest assistance to both producers and consumers, must determine the real consumer and trade demand for various kinds of food and fiber products that are now grown in Oklahoma or which we might grow."

Do consumers understand quality well enough to benefit from this research?

"Some do; others may not. Certainly, it would help if we can assist consumers in identifying and evaluating the several products available for them to make a choice, and it also would help the producers and handlers if we could develop improved ways of informing customers what products are available in the retail markets."

Doesn't that branch out from the area of research into education?

"The educational process is involved and that is another field of work, but in order to do a proper and adequate job of education, we must first do the research. Right now, we don't know the answers to many of these problems, and so the educators can't fulfill their part of the responsibility."

Can we expect research to result in extensive new uses for agricultural commodities and develop new markets?

"Perhaps, but increased utilization depends upon the factors enumerated earlier: lower cost and the right quality. If we can make substantial gains on these points, industry itself will find many new uses. At the same time, it is the responsibility of research institutions to expand their processing and utilization studies to increase the number of uses for farm products and to raise the utility value of as many end products as possible."

Does this mean that if we had two to four times as much money for agricultural research in Oklahoma that we could expect two to four times as much progress as at present?

"No, money is not the only answer," said Dr. Hawkins. "Money is a means to accelerated progress. With the money we must provide, first, an enlarged program of work toward definite goals. Our objectives in this case, again, are to overcome our agricultural competition by producing the kind and quality of commodities that the consumer wants most, and doing it at half the present costs. To accomplish this, we need money to provide facilities and personnel capable of moving toward this goal."



THE FARMER-STOCKMAN

Research Is Worth 100 Times What It Costs

Fifth and Last Article in a Series

By F. J. Deering

Editor, The Farmer-Stockman

FEW INVESTMENTS return as much net profit as does the investment of time and money in research, and specifically agricultural research.

Oklahoma taxpayers are now investing \$1¼ million annually in state and federal appropriations that support the research program of Oklahoma Agricultural Experiment Station.

The annual return in added new wealth is 100 times this investment!

First, it goes to the grower, but the new wealth subsequently is turned over five or six times in the state and 10 times nationally. Altogether, it is a fantastic return.

More directly, the results of research applied by farmers and ranchers bring them more income individually. More profit, too, because research makes a very tangible contribution toward higher quality and lower cost of food and clothing to the consumer. This enables them to buy and use more.

Were it not for improved farming methods that have come out of research, the cost of growing food and fiber would be much higher, and the selling price to the consumer would be higher.

Let's look at some examples of the value of research, cited by Dr. Louis E. Hawkins of Stillwater, director of OAES.

Improved pasture plants, plus fertilization, have produced beef yields of 250 to 450 pounds per acre at the Heavener station. Unimproved native pastures on 2,990,000 acres in the area average 50 pounds of beef per acre. Merely doubling this (to 100 pounds) at \$22 cwt. would mean 149,500,000 lbs. more beef worth \$32,890,000.

Or look at results from the Coalgate and other stations. Tests show the forage yield of 8 million or more acres of native pasture could be increased at least 20 percent by weed control with 2, 4-D. Figuring prairie hay at \$10 a ton, this increase would be worth \$2 an acre taking out a cost of \$1 per acre for chemicals, this would leave \$8 million gain the first year.

Control of hornflies on steers at Woodward has given additional gain of 18 pounds per head for seven seasons.

Proper fertilization, plus one or two irrigations most years, would insure a 100-bushel per acre corn crop on average Oklahoma bottomland, as compared to not more than 60 bushels in good years without irrigation.

Pigs produced at the Fort Reno station from a 3-line cross had an advantage of \$2.83 per head over other pigs through heavier weaning weight, reduced feed cost and greater carcass value.

Egg production of laying hens has been increased better than 4 percent by feeding research-developed high-energy rations.

Peanut tests have disclosed the two leading varieties average 773 pounds per acre, compared to 461 pounds for common varieties. Their increased use undoubtedly helped Oklahoma set a record yield per acre for peanut production in 1958.

Wheat is Oklahoma's biggest money crop. Seven varieties recommended by Oklahoma Agricultural Experiment station have outyielded by 13 percent the Turkey variety generally planted a few years ago. These are now planted on 95 percent of Oklahoma's wheat acreage, and thus the 1958 harvest of nearly 114 million bushels presumably would have been only a little over 96 million bushels had Turkey still been planted. That extra 17½ million bushels is worth some \$35 million.

Many other examples might be used, but these point up the value of agricultural research that is eagerly sought after by Oklahoma farmers and ranchers who literally are "looking over the scientists' shoulders."

Where once the new things of agriculture had to be developed, taken to the country and demonstrated over and over before they met with acceptance, farmers today are searching for improved materials, new varieties, better machinery, and advanced ways of doing things.

Whereas 30 years ago the annual Farm congress brought a caravan of leading farmers in Model-Ts to the campus once a year for a few days, now

field days and other events are held nearly every week of the year. Besides the special occasions, countless farmers drive to the stations and many fly their own airplanes to consult scientists and other agricultural workers regarding their current problems.

But not all research is of the type that a farmer can readily take back to his farm and immediately put to use. Let's see what Dr. Hawkins has to say about that.

"The ultimate value of research is realized when findings are applied in actual improvement, production and handling of commodities," the station director said. "The last step in adaptation of findings to practical application is called applied research. This is the type of research that interests people most, because its immediate value is evident.

"Less clearly understood," he continued, "is the necessity of keeping a fairly full hopper of findings of basic, or fundamental research. Basic research in the agricultural sciences is a must if the hopper of knowledge is to be filled with the stuff that makes applied agricultural research possible."

He asserted that at present the hopper of unused basic research knowledge is "quite empty" due to the heavy drain made upon it by applied research. The drain will continue and must continue, but can continue only if the supply of basic findings is replenished and kept in "full stock."

Is it feasible to step up basic or applied research to build up a stockpile of knowledge and then coast along until we use it up?

"A research program cannot be turned on and off, like a water spigot," Dr. Hawkins replied. "The essential ingredient in research is the trained scientist who plans the work and interprets the results. Without his brains and experience, the land, livestock and laboratories of an experiment station lose much of their value as a source of new knowledge."

Why not just hire more new scientists whenever needed?

"Qualified scientists are hard to find," came the answer. "Once found, they must have time to become familiar with Oklahoma conditions before they are of much value to the state. Therefore, the starting of a new research program, or the resumption of one that has been stopped, often takes several years. On the other hand, a going experiment station, adequately staffed, is in position to take on a new assignment promptly when new problems or new opportunities arise."

Agricultural research is carried on principally in three ways. One is by private concerns seeking to improve their own products or services. These may benefit the public but much of their findings are not made available if they cannot be converted into saleable commodity.

Such a procedure is feasible for large industry, such as chemicals, steel and automobiles, but it would be impractical

Oklahoma Agricultural Experiment Stations and Some of Their Principal Projects

Oklahoma Agri. Experiment Station, OSU campus, Stillwater, headquarters.
Kiamichi Field Station, Idabel, 160 acres, fruits, vegetables, crops.
Pecan Research Station, Sparks, 160 acres, major pecan production problems.
Vegetable Research Station, Bixby, 105 acres, long-time rotation, varieties.
Pasture Fertility Station, Coalgate, 530 acres, soils, pastures, livestock.
**Fort Reno Station, El Reno, 6,200 acres, beef breeding, nutrition, swine, sheep.*
Veterinary Research Field Laboratory, Pawhuska, 910 acres, livestock diseases.
**Irrigation Experiment Station, Altus-Blair, 300 acres, best use of water.*
***Panhandle Exp. Station, Goodwell, 2,000 acres, crops, irrigation, livestock.*
Cotton Research Station, Chickasba, 300 acres, breeding, testing, mechanization.
Southwest Okla. Cotton Station, Tipton, 80 acres, increasing improved strains.
**So. Great Plains Field Station, Woodward, 1080 acres, grasses, horticulture.*
**So. Great Plains Field Station, Fort Supply, 4,315 acres, re-grassing ranges.*
Soil & Pasture Station, Heavener, 110 acres, pasture and crop rotations.
Red Plains Conservation Sta., Guthrie, 360 acres, management reclaimed areas.
**Wheatland Conservation Station, Cherokee, 320 acres, wheat, erosion control.*
Peanut Research Station, Stratford, 80 acres, varieties, rotations, fertility.
Eastern Okla. Field Station, Stilwell, 136 acres, commercial fruits, vegetables.
Sandy Land Research Station, Mangum, 320 acres, deep plowing, leveling.
****Carl Blackwell Range, Stillwater, 4,500 acres, grazing and livestock studies.*
****Perkins Farm, Perkins, 640 acres, field crops, horticulture, turkeys.*

* Co-operative with U.S. Department of Agriculture.

** Co-operative with U.S. Dept. of Agri. and Panhandle A&M College.

*** Operated as a part of the main station on Okla. State Univ. campus.

cal and unworkable to finance all or even most agricultural research in this way.

Privately endowed laboratories dedicated to public service also make worthwhile contributions through agricultural research but frequently are limited in resources and scope. As in private industry, research by these institutions sometimes is curtailed or channeled into unrelated purposes when immediate objectives are determined.

In the main, agricultural research is (and must be) financed by publicly appropriated funds. Public funds are supplemented by private grants, but these provide only a small fraction of the total needed.

"Public support of agricultural research is justified because the entire public, as consumers, benefit," Dr. Hawkins pointed out. "The local, state and national economies are strengthened by this research, through improved quality and greater economy of product, through increased business activity, taxpayers benefit by an improved public tax base. The returns are lucrative compared to the investment by taxpayers."

As noted in an earlier article in this series, the Oklahoma Agricultural Experiment station presently has an operating budget of a little over \$2 million a year. This includes state appropriations, federal-grant funds, private grants and a sales revolving fund. These pay salaries and wages amounting to about \$1½ million to 54 senior scientists and research leaders, 93 assisting technical people, and 230 clerical, farm laborer and other non-professional people, leaving about \$750,000 for operating costs.

"An adequate research program to meet Oklahoma's need, insofar as the state's agricultural experiment station is concerned, is estimated to cost a little over \$6 million annually," said Dr. Hawkins. "This support would be used to

pay salaries and wages of 96 research leaders, 169 assisting technical people, and 383 clerical, farm laborer and other people. This would use about \$3¼ million, leaving about \$3 million to pay other operating costs."

To accomplish this, experiment station officials point out that substantial expansion in physical facilities will be required. Work of the station is conducted at Stillwater and at some 20 other locations over the state. Major facility improvements listed include greenhouse and plant growth chambers, animal nutrition laboratories, farm engineering structures, and biological science laboratories.

Apparently, the station proposes to grow into such an expanded program gradually, rather than to tackle it in a single plunge. This is reflected in the moderate increase sought in the experiment station's budget request presented recently to the Board of Regents for Higher Education (which co-ordinates budget requests for 18 institutions) and to the legislative council (which conducts hearings between legislative sessions). This request proposes these amounts for the year beginning July 1, 1959:

State funds	\$2,222,343
Other funds (estimated) ..	\$1,008,185
Total	\$3,230,528

Dr. Hawkins suggests that this increase, with similar increases in support for the two succeeding bienniums, would make it possible to realize within six years the program that he describes as "adequate for Oklahoma."

If it is true, as shown, that research is worth as much as 100 times what it costs, the proposed enlargement of Oklahoma's agricultural research program could easily be the biggest bargain the legislators can find to buy with the taxpayers' money. Pennies for research return dollars in new wealth!