MISSOURI AGRICULTURE TODAY – TOMORROW

A BRIEF LOOK AT -

- *Current Situations*
- *Trends for the Future*
- *Opportunities for Agriculture in the U.S.'s Third Century*

MP423, 1975
EXTENSION DIVISION
UNIVERSITY OF MISSOURI-COLUMBIA

We are pleased to make available Missouri Agriculture Today-Tomorrow (MATT) to serve as a guide in working together to shape our future. This publication is particularly timely as we prepare to celebrate our American Revolutionary Bicentennial (1776-1976). In Century III, agriculture will assume an ever increasing importance to society.

Missouri agriculture is entering a new and exciting era. As never before, we will be confronted by puzzling problems and unequaled opportunities. Your University of Missouri-Columbia College of Agriculture, through its resident instruction, research and extension programs is dedicated to continue working with you to meet future challenges.

Dean Elmer R. Kiehl

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MISSOURI AGRICULTURE Today—Tomorrow

A look at Missouri agriculture's present and future as we plan for the bicentennial year and our nation's Third Century.

Why This Publication?

Price and supply conditions in agriculture are as unsettled today as they have been in many years. Yet, management decisions have to be made every day. Some involve substantial investments such as for land, livestock feeding setups, grain storage, and breeding animals. In the same way, agribusinessmen and community planning groups, either by action or inaction, are making choices about their future.

It makes sense, then, to look ahead, making plans on the best information available.

Providing such information is the purpose of this publication. It was prepared by research and extension specialists at the College of Agriculture, University of Missouri-Columbia.

It was prepared for use of any group or individual concerned about the development of Missouri agriculture—community planning groups, farm organizations and agencies, extension councils, chambers of commerce, agribusinessmen, and farmers.

In general, the first part of each section deals with the situation today. This is followed by discussion of trends, and problems and opportunities for the future.

At the end of each major commodity section is a box containing a few recommendations of producer advisory committees that helped Extension plan recent area agricultural education programs. Detailed accounts of these area plans can be found in the publications listed on page 61.

Missouri Agriculture Today—Tomorrow is a follow-up on *Guide for Growth,* in Missouri's Food and Fiber Industry, an Extension Circular published in 1968. It's especially fitting to take a fresh look at Missouri's agricultural industry at the time the nation celebrates its Bicentennial! Certainly agriculture has helped make this nation great—and it will play a key role in the world of tomorrow.

Ways to Plan Ahead

The following discussion outlines:

1. *The key role of agriculture in Missouri's economy, and why it is important to plan for its development.*
2. *Some ways planning groups can use to encourage agricultural development along the desired lines.*

Missouri Farms—The Tip of an Iceberg

In 1973, Missouri farmers and ranchers used $9¼ billion in real estate and perhaps another $4 billion plus in machinery, livestock and crops.

Even these large dollar amounts are but the visible tip of the total economic iceberg that agriculture represents to the economy of Missouri. Missouri farmers provided farm supply industries a market for over $2 billion in goods and services. They also provided the raw material for an estimated $5 billion in processing, transportation, and marketing in the total food and fiber industry. Value of final consumption of the 1973 produce of Missouri's farms and ranches is estimated at $7.7 billion—or over $1600 for every man, woman, and child in the state.

Farmers, farm supply workers, and food processors and handlers are all consumers that help support retail and service businesses. In many counties farming is almost the only "export base" around which the local economy has developed.

Thus, while Missouri farms may employ less than 200,000 full-time workers directly, they provide the markets and the raw materials for the employment of many times that number.

Nor can the impact of Missouri farms be measured solely in economic terms. Nearly three-quarters of the area of the state is privately owned farmland, managed by farmers. Thus, the quality of Missouri's physical environment depends much on farming. Many recreational activities (fishing, hunting, boating, picnicing), as well as the simple search for open space, depend on Missouri agriculture.

Many urban workers live in rural areas, some are part-time farmers. To other urbanites the farm is where parents and grandparents live. The "farm" is where cultural and emotional taproots are still firmly attached for many who have long since left the farm for urban jobs.

In summary, the importance of Missouri farms and ranches to the economic, social, psychological, and physical well-being of the people of the state of Missouri far exceeds the "tip of the iceberg" as represented by direct income and employment figures. Continued economic development of Missouri's agriculture in ways consistent with other social and environmental values is important to every citizen in the state.

Public Planning and Private Decisions

Planning for and bringing about economic and social progress is a major responsibility of elected officials, advisory councils, and citizens' groups of many kinds. However, such groups sometimes get carried away with well-meaning enthusiasm. It's essential when starting to plan to note certain political and economic facts of life.

In economies where the state owns production facilities, planning authorities can simply direct that certain reallocations or changes be made. Changes can also be brought about by various governmental and public councils in a free economy. But turning planning council goals into effective action is a more subtle undertaking in a private enterprise economy.

As impressive as the goals and plans may be, the majority of the decisions necessary to accomplish the goals must be made by the thousands

of individual farm operators and agribusinessmen who control the agricultural resources of the state. The planning council is somewhat like a football coach who can neither catch a pass nor run a single play from scrimmage. He is limited to the often more demanding role of establishing an "environment" in which his players develop the needed skills and play a better game than do their competitors on opposing teams.

This is the position of any group that attempts to establish goals and lay plans for future development of Missouri agriculture—or of any privately operated industry. As with the football coach, they may experience feelings of frustration as they observe what they believe to be wide open opportunities that are allowed, by default, to be lost to other areas or simply passed by. It is therefore a must that rural development and program planning groups and councils carefully inventory the means or methods available for influencing the development of their area.

Public Ways to Influence Private Decisions

The following are ways that are or may be available for influencing these decisions.

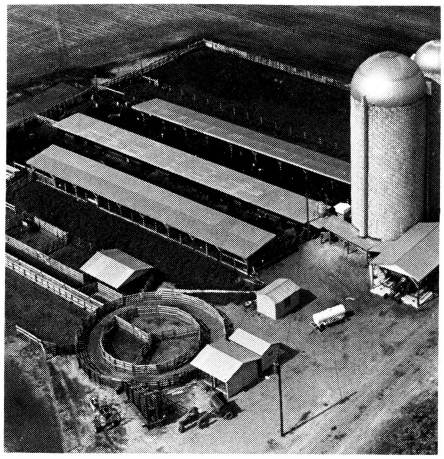
● ● *Public investment through government* includes a variety of investments made by the public through government programs and spending. Transportation, power, communication, education, and research have frequently been owned, regulated, or cost-shared by the public. Any service or product which is believed to be crucial to society, and likely to be underfinanced or not available at all if left to the private sector, is an obvious candidate.

● ● *Outright public subsidization of private activity,* despite its unfavorable image, has been used often to increase or maintain a desired level of certain activities. From the support of a shipping fleet by the federal government to the issuing of municipal bonds to build a new factory in a local community, the public has subsidized to influence private decisions. Such public "cost sharing" is used to encourage investments that otherwise might seem unprofitable to the private decision-maker. In agriculture, examples are the cost-share programs for soil conservation and for livestock waste management.

● ● *Public grading, standards, and product testing* have been employed to "grease" the trade machinery so necessary to a specialized economy. A telephone transaction between a Missouri packer and a New York grocery chain is made more feasible if a standardized grade determined by an impartial public grader can be used to insure accurate communication between buyer and seller. The product testing represented in a corn hybrid trial conducted by an agricultural college probably encourages the seed company to put more dollars in product improvement and less in pure promotion. Fertilizer and feed inspection reduces the buyer's uncertainty as to whether the product is what it is represented to be.

● ● *Creating new kinds of farm organizations,* such as farm cooperatives, has been used to provide a missing service or to remedy what was perhaps believed to be a deficiency in quality, availability, cost of service or product. Sometimes they are organized to overcome an imbalance of power held by an established group.

● ● *Regulation* assumes many forms such as zoning and land use planning, environmental laws, regulation



Modern feedlot in Bootheel Area.

of markets, plant and animal disease laws, and many others. A fundamental characteristic is one of compelling or prohibiting specific actions of individuals. Our tradition of individual freedom places the burden of proof on those who want additional regulation. In principle, new laws are adopted only when the need is clear and urgent.

● ● *Self-Surveys* have proven an effective tool for identifying problems of producer groups, communities, and organizations. In the "self" survey, everyone affected is given an opportunity to submit questions to include in the questionnaire, as well as express an opinion in answering the questionnaire. Once a group has proof of what people are wanting, it is much easier to get unified behind a priority list of needed projects.

No really comprehensive inventorying of means available to effect goals for the private sector has been attempted. This discussion only briefly illustrates some means the public uses to influence private decisions.

The relevant question is: "Which means can we use, as representatives of *ourselves*, to cause *us* as independent individuals, to make private decisions that are *best* from the standpoint of our collective welfare?" This represents a vigorous challenge to the imagination of planning councils concerned with growth and directions.

The Determinants of Agricultural Progress in the Seventies

Fundamental changes taking place in agricultural production make it possible to identify some promising means for affecting agricultural growth.

In the simpler, less specialized agriculture of the past, agriculture tended to be a primary industry tightly tied to natural resources and consuming markets. Specific crops were produced wherever soil and climate gave them an advantage relative to other areas and other crops. Meat production was closely tied to the farms where the feed was produced. Bulky products like fluid milk were often tied by transport costs to consuming markets.

Technological advancement has weakened such natural determinants of the location of agricultural production. Soil fertility can be altered to suit crop needs by lime and fertilizers. Even effects of climate are altered by investments in irrigation, drainage, crop drying, and other technologies.

Poultry now consume a totally manufactured feed and are produced where man invests in a feed industry rather than where the raw ingredients are produced. Fast refrigerated transport has allowed many horticultural crops to gravitate to distant areas where the environment (and thus crop quality) can be controlled by irrigation and where marketing coops and related services are developed.

Cheapening and speeding of long distance transport of perishable commodities like fluid milk have caused an increase in the relative importance of local assembling costs and other specialized veterinary and equipment services. This results in "pockets" of dairying in which specialized services are available and pick-up costs are kept low.

In general, agriculture has become more specialized, less dependent on "natural" factors, and more dependent on and determined by man-made inputs, services, and facilities. In short, the comparative or competitive economic advantage an area may have in the production of a commodity increasingly depends on the deliberate actions of man and less on the "givens" of nature.

Many commodities have become essentially "footloose"—and less tied to natural resources. Livestock that used to be tied to the land that produced the feed have been successfully divorced from it and concentrated in large specialized units determined by availability of markets, input supplies, availability of services, or simply by investment of individuals or groups. Natural resources are still important, but they no longer solely determine the outcome of the economic game. Rising transportation costs, however, could affect how "footloose" these enterprises remain.

A suggested step by step procedure for a planning group is—

- ● Study the situation.
- ● Establish overall goals, targets, and priorities.
- ● Identify people, firms, and/or means available to effect the desired changes.
- ● Decide among alternatives and develop a plan.
- ● Carry out the plan.

The discussion of Missouri agriculture's problems and potentials in later chapters will aid in this process.

Income Sensitivity . . . and the Leverage of Group Action

Because of increasing specialization and reliance of farmers on purchased inputs and services, net farm income has become a smaller percentage of a larger gross income. Even in the better-than-average year of 1972, cash farm expenses represented over 80 percent of cash farm receipts for the 341 farmers in the Missouri Mail-In-Record program. The result is that the income available for family living and debt service has become increasingly sensitive to small percentage changes in yields, prices, and expenses.

Table 1 shows what can happen in a "typical" farm business with a 5 percent improvement in either yields or prices, resulting in a 5 percent increase in gross income.

Only a 5 percent change in amount or value of product results in a 50 percent (or 10 times as large) change in the return on invested capital. Figure a larger wage rate for the farmer and this leverage is expanded still further. Select a poorer year than 1972, and this "leverage" inflates still more.

The return on the farmer's investment is a small percentage "residual" that remains after the deduction of all other expenses. His return, and thus his incentives to expansion, are very sensitive to quite small changes in his yields, conversions, prices, and cost, availability and quality of a host of purchased inputs and services.

Therein lies the real leverage of planning and development councils. *What are the obstacles locally* to just a slight improvement in the yields or prices of, or costs to produce farm products?

Is some service or input lacking to local farmers in availability, quality, or cost?

Could the farmers be helped to obtain a higher level of service or expertise?

Would a pilot-plant demonstration help? Are their markets superior to those in other areas?

Do high transport costs or problems in quality preservation reduce their net price?

Could a cooperative venture cut costs or improve services for the members?

Can better marketing or processing facilities be provided?

Can organizational leadership provide needed coordination?

TABLE 1 -- THE EFFECT OF A 5 PERCENT IMPROVEMENT IN YIELDS OR PRICES ON A MIZZOU FARM BUSINESS

	As Is	+ 5%
Gross Income	$ 50,000	$ 52,500
Total Expenses	40,000	40,000
"Net Income" (Return to operator's labor, mgmt., and net investment)	$ 10,000	$ 12,500
Minus Operator's Wage	$ 5,000	$ 5,000
Remaining for Operator's Investment	$ 5,000	$ 7,500
Operator's Investment	$100,000	$100,000
Percent Return on Investment	5%	7.5%

Farmers, agribusinessmen, and extension specialists planning ahead in Mark Twain Area. All 18 outstate areas in Missouri have published one or more program plans in recent years.

Changing the Structure of Missouri Agriculture

Every Missouri farmer works within a "structural" situation that is not of his own making. That situation relates to:

- Kind of markets available to him.
- System of property and income taxes imposed on him.
- Lease arrangements prevailing in in land rental.
- Types of government programs in force.
- Opportunities for supplemental nonfarm employment and income.
- Pressures from competitive forms of ownership and control of agriculture.

Though the situation is not determined by the individual farmer, it is framed by policy decisions in which farmers as a group can have a voice.

Certainly the present and prospective structure has much to do with the direction of growth in Missouri agriculture.

As of mid 1974, the prospects are that comprehensive acreage control programs will not play a big role in the near future. Total production may be affected more by the availability (and price) of industrial inputs such as feed and fertilizer than by acreage alone. Moreover, federal policy to protect farmers against a severe drop in income may continue to rely mainly on deficiency payments (which make up the difference between target price and market price).

Already Missouri agriculture has become a mixture of many kinds of farming—small commercial farms, small and large part-time farms, family-sized commercial farms, a few larger-than-family farms, and various kinds of contractually integrated relationships. Data from the 1969 Census of Agriculture tell something about the mixture. For example, about two of every five Missouri farms were less than 180 acres. The smallest 37 percent of all farms accounted for only 3.7 percent of total sales from farms. The 4.7 percent of farms that sold $40,000 or more of products in 1969 contributed 36 percent of the state's total sales.

The 32 supercorporation farms (those with 10 shareholders or more) in Missouri in 1969 had average sales of $127,000.

Contractual farming in Missouri has progressed farther in poultry and eggs than in any other enterprises. Contracting has been on a general increase in agriculture in the U.S. and an uptrend is likely to continue. It will especially do so if central markets continue to decline as price-maker for farm products.

Taxes Influence Farm Structure

The structure of Missouri agriculture is affected by property tax rules. If land, particularly around urban centers and recreation areas, continues to be assessed for its value for uses other than farming, the assessments will tend to push it into other uses. On the other hand, any new state policy to tie assessments to current use would tend to preserve farming wherever it is subject to competitive demand for land.

Income tax rules probably have even more effect on the structure of agriculture. Tax shelters offer high-tax-bracket investors a competitive advantage over operating farmers in bidding for agricultural resources. The tax advantage of limited partnerships, for example, has probably been crucial in moving some cattle feeding out of Missouri.

Structural changes offer opportunities for various kinds of **cooperation,** for more use of custom services, for **bargaining** or other **group action** to establish prices.

Policy Choices

Policy choices are positive and negative. Positive policies would aid family farming; negative ones would discourage or prohibit all other kinds.

Among positive policies are those to improve credit sources, including credit for young persons entering farming; to revise income tax laws and rules so that the family farmer would not be at a disadvantage compared with his challengers; to strengthen the marketing system including both open markets and the role of cooperatives and bargaining groups where appropriate.

Turkey production and processing has become a highly integrated industry. How many other farm commodities are destined to go this route?

Terms of government support programs can be written so as to encourage family farms and discourage other types of farming. In fact, it would be possible, when many different policies are being considered, to take into account the effect on the farming system of the future.

The negative approach would prohibit all farming systems other than those which are desired. It would essentially ban large scale agribusiness farming, and very large internally-financed farming as well.

Housing developments and industrial sites compete for farmland. Do we need to preserve good farmland for food production?

Are Land Use Restrictions Coming?

Changes in land use are taking place. Table 2 shows that total land in farms and harvested cropland is decreasing. Higher grain prices in 73-74 brought more land back into crop production.

Total acreages in crops and pasture will continue to fluctuate with grain and livestock prices. Livestock prices and fertilizer cost and availability will influence further clearing of tree land for use as pasture.

Table 2 doesn't show the change around urban areas as farms disappear. It doesn't show how farms once full-time have now become part-time as off farm employment opportunities have increased. Nor does it show the increased recreational component of rural land use. And most of all it fails to show the substantial attitudinal changes toward land that have been and still are taking place.

Many citizens are concerned about good farm land being used for subdivisions, plant sites, or being covered with water. There is growing feeling that the public has a real stake in the way land is used by private owners, and that stricter land use regulations are called for.

There is great opportunity and need for public debate over what should be land use and natural resources policy in the years ahead. It seems likely that the decisions will bring many changes.

Important policy questions arise at national, state, and local levels.

At the state level, shall:

1. *Farm land be assessed on the basis of its agricultural value?*
2. *Land use controls be accepted as a trade for reduced taxes on farm land?*
3. *Planning and zoning enabling legislation be changed to insure protection for agricultural activity?*
4. *Local governments be allowed to assume planning and zoning powers without a vote of the people?*
5. *State land use policy be developed? Should the Governor be encouraged to appoint a special commission on land use to look into land policy in detail? Several states have recently done this.*

At the local level, shall:

1. *Planning and zoning be encouraged?*
2. *Zoning ordinances be written to provide exclusive agricultural zones which exclude general residential and other use likely to result in conflict with agricultural land use?*
3. *Farm people be involved in drafting and administration of zoning ordinances.*

TABLE 2 -- ACREAGE OF MISSOURI FARMLAND, 1940 to 1969 (MILLIONS)

	1940	1950	1959	1969
Land in farms	34.7	35.1	33.2	32.4
Total cropland	23.0	18.8	18.2	21.0
Harvested cropland	12.4	12.3	12.2	10.0
Cropland used only for pasture or grazing	9.2	5.1	4.7	7.4
All other cropland*	1.4	1.4	1.3	3.5
Woodland including woodland pasture	7.0	8.5	7.9	5.8
All other land**		7.9	7.1	5.6

Source: Census of Agriculture

*summer fallow, soil improvement crops, crop failure, etc.

** pastureland other than woodland pasture, rangeland, farmsteads, etc.

What Can Be Done to Influence Land Use Policy?

Farm people and farm oriented organizations should endorse in the strongest terms the involvement of rural people in the development and implementation of land use policy. The pressures for more specific and more restrictive land use policy are building. In all probability they cannot be totally resisted. Thus it becomes very important that farm people involve themselves in the development of policy which will deeply affect them. Enlightened participation is the best tool people have to insure that future land use policy will not be more restrictive than is necessary to achieve legitimate social goals.

LIVESTOCK OUTLOOK

Some meat packing plants, such as this new one near Freeburg, cooperate in carcass shows by providing producers with cutout information.

Wide Fluctuation Likely in Meat Industry

Meat Industry Today

Demand for meat has risen with population and with increase in consumers' income. If people can afford it, they want meat, and the best cuts. As long as wages outstripped inflation and people had more real buying power, they increased their consumption of meat.

In 1973 and 1974, however, consumer protests, including some boycotting of the meat markets, appeared as soaring inflation began to shrink the amount a dollar would buy.

This, plus widely fluctuating cattle prices, export demand, and uncertainty over how the energy crisis will affect grain production, is causing a great deal of uncertainty among livestock producers.

In the last few years we have built a cattle and hog industry on low cost grain. This in turn depends on low cost fertilizer and much of the low cost of fertilizer is dependent on a low cost of petroleum.

Livestock producers were slow to react to rising grain prices in 1973-1974 because slaughter cattle and hog prices were also going up. They continued to expand production until cattle and hog prices slumped. Then the prices of feed began to stand out.

New uncertainties have entered the meat processing industry, too. The future use of additives in meat products is a major cause. The use of nitrites in cured and processed products could be halted at any time by FDA. Nitrites are used in these products to develop color, flavor, and to control botulism.

Meat Industry Tomorrow

Most market analysts expect the wide livestock market fluctuation to continue over the next few years, there are so many uncertainties in the feed and demand picture.

If inflation is brought under control, the per capita demand for meat is expected to continue to rise. If not, per capita consumption could decline some. Any increase in meat sales would depend on exports and on population increase, which has leveled off in this country.

Consumer protection programs will continue to be important. Efforts are needed to inform the public and legislators, so science-based decisions will be made regarding meat processing.

Larger grain crops, which are expected now that acreage controls have been dropped, will tend to reduce grain prices from recent peaks. However, grain prices in the long run will have to reflect rising fertilizer and fuel costs.

Meat quality as we know it today will be affected if the energy crisis continues and results in extreme shortages of feedstuffs for animals. Beef producers may have to turn more to legumes for finishing cattle if more feed grains are used for human consumption. More information will be needed on the acceptability and uses of meat from animals coming to market after little or no grain. Grading standards may have to be restructured.

Meat distribution will continue to be streamlined. More fabrication and packaging will be done away from the retail stores. It is estimated that 75 percent of all beef will be broken into wholesale cuts and sold to retailers *in a box* rather than in the *hanging* carcass form by 1980. In 1973 about 50 percent was boxed. Because of industry and consumer resistance, little increase in sale of frozen meats is anticipated in the next five years.

Non-animal protein products are expected to be used in increasing amounts as extenders in processed meat products. However, little increase is expected in the use of meat substitute products produced entirely from non-meat sources.

Beef cow numbers more than doubled in Missouri in 15 years as vast acres of brush were cleared and seeded to fescue.

Beef Cow Numbers —

Missouri Ranks 2nd

Beef Cows Today

Missouri ranks second nationally in beef cow numbers with the total in 1973 approximating 2.6 million. Beef cow numbers have more than doubled since 1958.

Producer, processor, and consumer hold beef in equally high esteem. This is one reason it is Missouri farmers' largest single source of income. Calves are produced in large numbers in all areas of the state except the suburban areas and the Bootheel.

Trends in herd management include more performance testing and changes in type. At no time in history have beef herds been infused with as much new genetic material. This is coming from more than 20 exotic breeds from which breeders hope to get more size and growth rate.

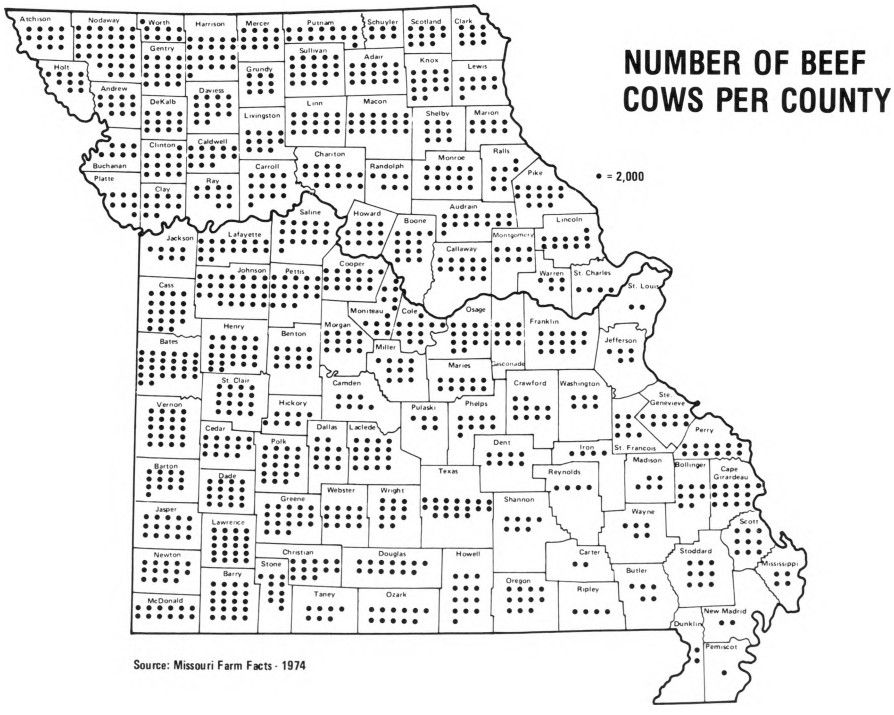
Performance testing has matured substantially. Commercial producers will pay for a good tested bull, and many breeders are producing them.

With the exception of grass tetany, few widespread diseases have bothered the beef industry in the last decade. Heavier concentrations of cattle have not seemed to deter production. Unique weather, fertility, and management conditions combined to produce more than average death loss from grass tetany.

Vast acres of brush have been cleared and seeded to fescue in south Missouri. Cattle numbers have increased substantially in that area. Fescue foot, a disease noted on some farms, has not developed to the level expected. Proper management can keep both grass tetany and fescue foot under control.

Beef Cows Tomorrow

Missouri's future in beef cow operations looks good. We have a relatively good tax advantage, reasonably low fixed costs, a lot of part-time farmers, and many people who like to produce cattle. These people are supported by the nation's best purebred beef cattle industry, a good



supply of veterinarians, and a strong Extension program.

Missouri still has much potential for increasing feed supplies for beef cattle. This can be exploited by greater utilization of crop residues such as cornstalks and by increasing the carrying capacity of pastures by species improvement, addition of legumes, and improved fertility programs.

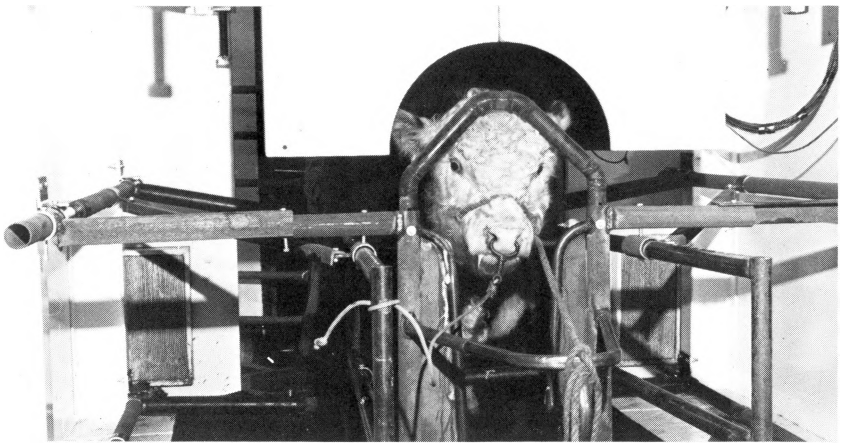
Heavier weaning weights and higher percentage calf crops will be needed in the future to remain competitive. About 85 percent of the cow herd has to calve to break even and 90 percent to yield some profit. Increases in both weaning weights and calving percentages are within the realm of research and production management possibilities. A strong college research program is needed along with a veterinary diagnostic laboratory to increase settling percent.

There are factors that could interfere with growth of the industry. Synthetics may make inroads on the red-meat industry. Also, the energy shortage and population pressure on the food supply may divert grain from beef cattle finishing to direct human consumption or to more efficient users of grain, such as poultry and swine.

Less grain for beef cattle would mean more use of roughage in the growing and finishing phase and a smaller portion for supporting the cow herd.

Scarcity and higher prices of fertilizer are resulting in an emphasis on producing legumes in pastures and hay fields as a source of nitrogen. The increased use of legumes will likely decrease the grass tetany problem but will likely increase the incidence of bloat.

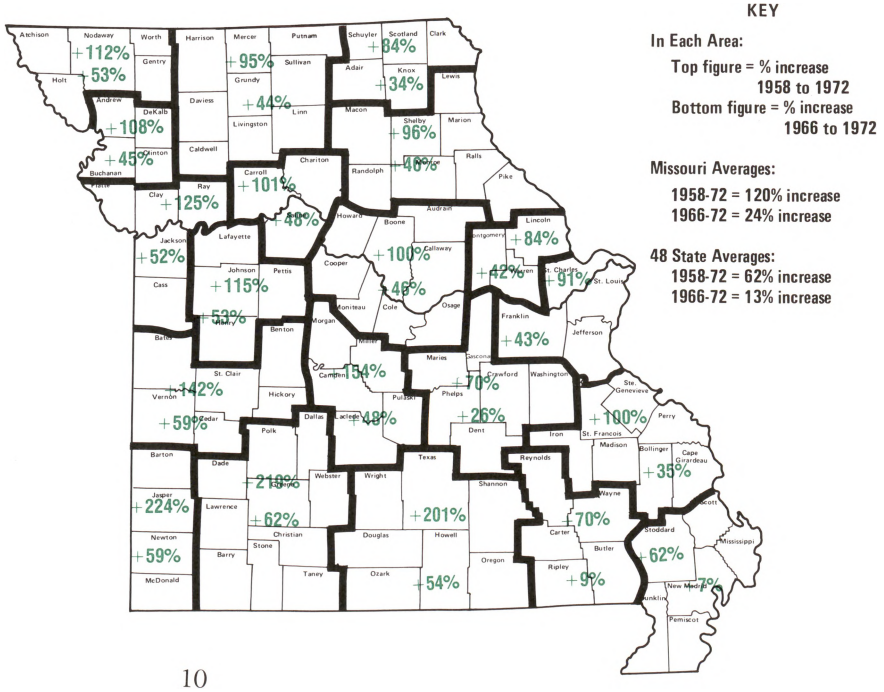
Whenever changes are made in crops or husbandry practices, farmers should seek help from veterinarians to find out what disease conditions will likely be reduced and which ones increased.

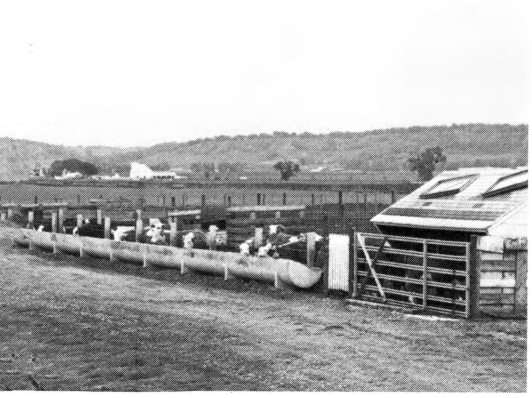


New methods for measuring the lean meat percentage in the body of live animals can aid improvement through breeding.

Scarcity and higher prices of fertilizer are resulting in an emphasis on producing legumes in pastures as a nitrogen source.

PERCENT CHANGE IN BEEF COW NUMBERS BY AREA





Missouri Beef Feeders Are Farmer Feeders

Cattle Feeding Today

About half a million cattle are fed annually in Missouri. Most of these are fed by farmers as a secondary enterprise. Thus, in contrast to several nearby states where most beeves are fed in large commercial lots, Missouri is a farmer-feeder state.

Most of the heavy feeding counties border the Missouri River. Unlike cow-calf production, cattle feeding is restricted largely to areas of heavy grain production. Few cattle are fed in the south central Ozarks and north central part of the state.

Missouri ranks from 12th to 14th in cattle feeding most of the time. Growth in the cattle feeding industry in Missouri during the 60s has been followed by a decline in the 70s.

Cattle feeders are faced with widely fluctuating prices. A $5 a hundred market break means $50 to $60 difference in return per steer. By the same token, an increase of that amount can mean a lot of extra dollars to the feeder. Thus, cattle feeders must be willing to take risks. Missouri's farmer-feeders are perhaps more able to withstand breaks in price than feeders having large commercial cattle feeding operations.

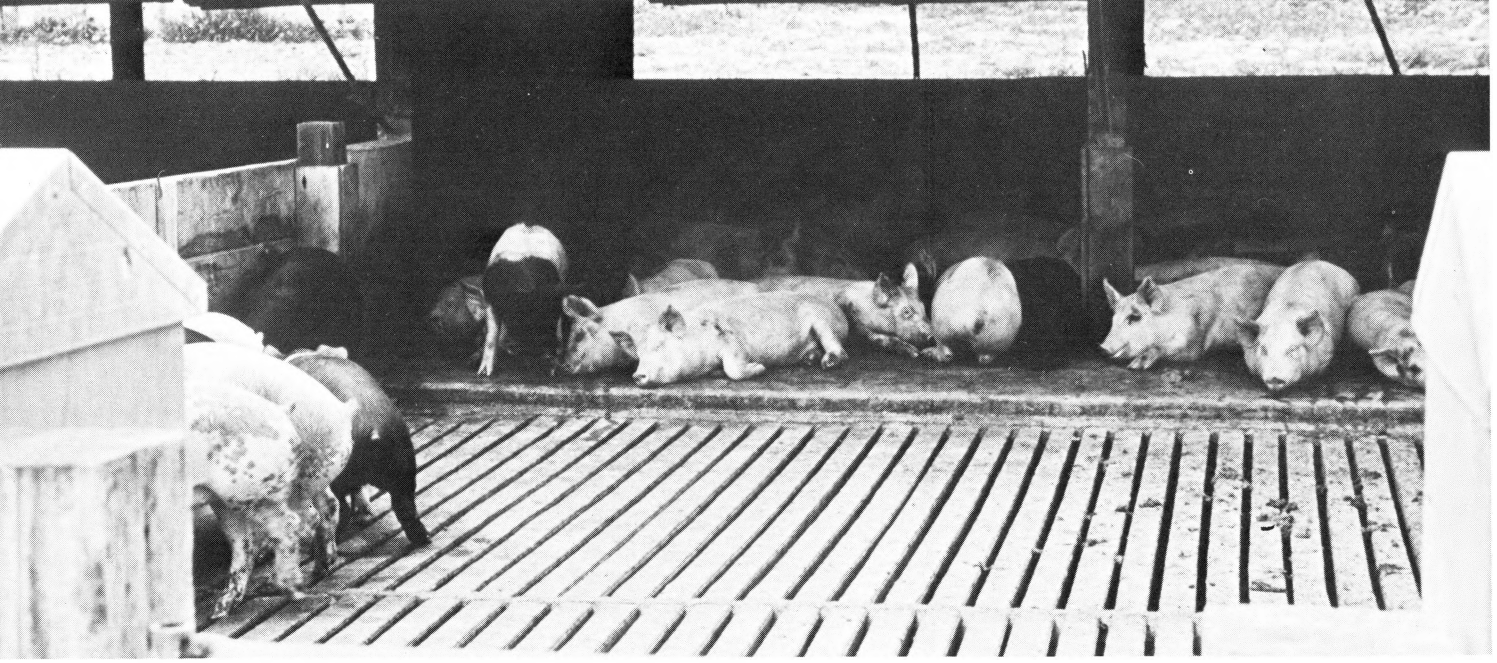
Cattle Feeding Tomorrow

If energy shortages cause a reduction in amounts of grain used for livestock, Missouri cattle feeders will be in good position because of the relative abundance of roughages. Under such conditions, backgrounding programs could be expanded and cattle finished with less grain. Missouri producers can likely do this cheaper than much of their Corn Belt competition. Abundance of replacement calves, good markets, and favorable tax situation also favor Missouri cattle feeding.

The greatest problem with replacement and feedlot cattle comes from respiratory diseases. Even though vaccines are available for respiratory viruses it is unlikely that this condition will be eliminated. It is likely to remain the major problem of feedlot cattle for many years. With the increased emphasis on confinement feeding of feedlot cattle, respiratory diseases may be reduced. Foot rot should be greatly reduced. Cattle in confinement should gain more rapidly and with reduced time in the feedlot present day disease problems should decline. The change from outside lots to confinement feeding will diminish or eliminate some disease conditions. However, we should be alerted to the fact that other diseases may be increased or new disease conditions may appear.

There will remain a need to practice disease prevention and shipping and handling procedures to reduce stress.

Fence line bunks are popular for mechanizing feed operations.



Slotted floors have grown in popularity as a means of handling waste.

Pork Producers Among Nation's Best

State ranks third in number of hogs produced.

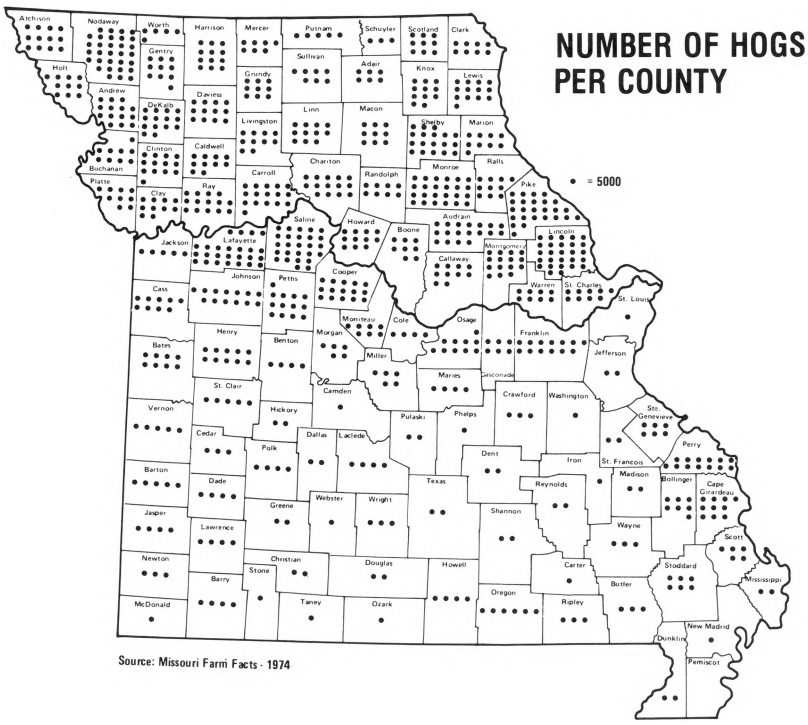
Swine Production Today

Although ups and downs of the market may cause temporary setbacks, the future looks good for Missouri's hog industry.

Swine production is another booming livestock industry in Missouri. The state now ranks third in hog production. Some prominent swine producers have emerged in our state. Their leadership makes it easier for young producers to learn skills necessary for confinement production. Pork production is a major enterprise, not a sideline, on many Missouri pork producing farms.

The state has a strong pork producers' association. This organization supplies leadership to its own producers and supplies funds for promotion, research, and other activities.

Missouri swine producers had a series of record profit years in the early 70s. Higher prices, better disease management, and use of tested breeding stock are some of the



Source: Missouri Farm Facts - 1974

reasons our state is a leader in swine production.

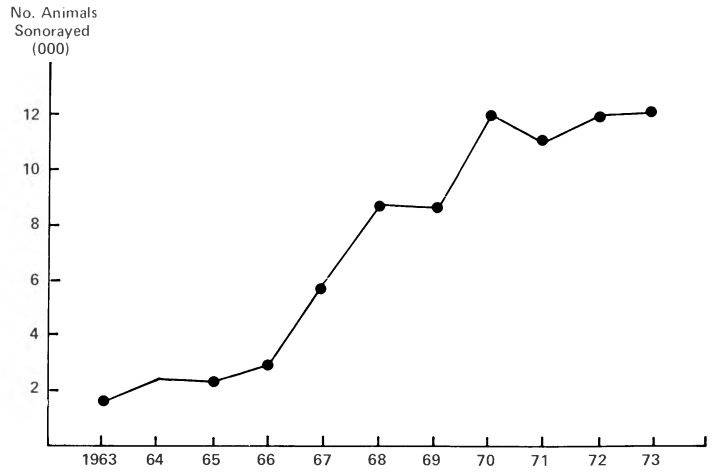
Our producers have access to quality measuring tools that to date are not available to breeders in any other state. Recently, purchase by the University Extension Division of the EMME (electronic meat measuring equipment) has made identification of superior meat animals easy and convenient. The swine industry has developed swine evaluation stations in cooperation with the University of Missouri's Agricultural Experiment Station at Canton, Maryville, Columbia, and Mt. Vernon.

The feeder pig industry, mostly in the south part of the state, has reached two million head annually. Growth in feeder pig production has been due to increased demand, good prices, and organizational educational efforts.

Extensive marketing through producer organizations, use of improved techniques of sorting and grading, and emphasis on healthy, thrifty pigs to the buyer have helped create a good reputation in the Midwest for Missouri feeder pigs.

A national feeder pig show held annually in Missouri has drawn attention and publicized the industry. Small investment, quick turnover, and high returns have brought new people into the business.

RAPID GROWTH IN USE OF ULTRASONICS TO EVALUATE LIVE ANIMALS IN MISSOURI



The ultrasonic measurement program is probably a major factor why Missouri hogs outsell those in neighboring states. It is estimated that this increased price represents $2¼ million additional income to Missouri producers annually, with practically no increase in cost of production.

This program of identification of superior muscling in live animals has been widely accepted by Missouri breeders. It is almost self-supporting from fees.

Swine Industry Tomorrow

The trend in specialization in the pork industry is likely to continue. Pork production units of tomorrow will be larger and the managers more expert in their ability to handle disease situations, which may be a determining factor in expansion plans. Additions to the School of Veterinary Medicine, being funded this year, will enhance educational opportunities in learning to handle disease.

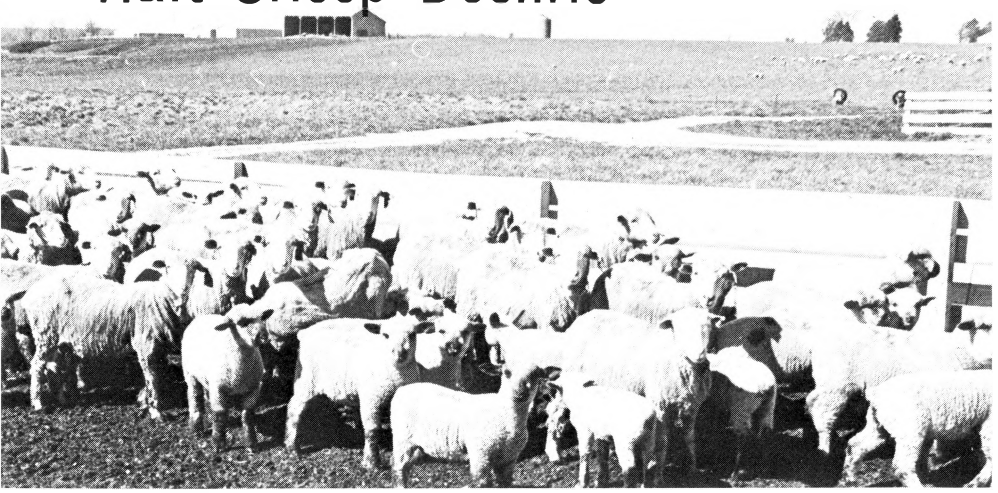
High feed costs will likely force producers to become more knowledgeable about swine nutrition and alternatives in feeding. The state is feeding about all the feed it produces. It is, however, in the center of the states with the largest grain surplus, and thus in a good competitive position. Availability of grain will probably not be the limiting factor in production.

A strong purebred industry, large numbers of people who like to produce swine, good markets, natural drainage, and an interdisciplinary education system that can help all phases of the swine industry seem to be advantages encouraging growth in the state.

Hogs are subject to a large number of diseases. Baby pig diarrhea is an important problem in most feeder pig operations. It appears that hog cholera is going to be eliminated. However, diseases such as erysipelas, atrophic rhinitis, arthritis and mycoplasma pneumonia will remain problems for many years to come. Swine producers should have a herd health program with their veterinarians. Disease will remain as the greatest deterrent to the concentration of large numbers of swine.

EMME, the electronic meat measuring equipment, is transported around the state to aid in selecting breeding stock.

Energy Shortage May Halt Sheep Decline



Sheep numbers have declined about 7 percent in Missouri over the last decade to around 224,000. The 1974 count, however, suggests we are on the increase for the first time in many years. The sheep industry may have reached a slowing down or even an end of decline.

If the energy shortage continues and grain is diverted from animal to human consumption our sheep industry would be favored because of the sheep's ability to grow and finish on grass and roughage. Higher prices for synthetic fibers boost the market for wool. In the event of a recession, probably more farmers would have farm flocks. Even so, sheep are not likely to produce more than a small percentage of the income to farmers in the state.

Horses Are Back — They're Big Business

Horses Today

There are probably 200,000 horses in Missouri, used mostly for recreation. The state ranks fifth in horse numbers. These horses consume approximately 100,000 tons of grain, 300,000 tons of hay, and 100,000 acres of pasture. Missouri's horse industry probably generates around $100 million worth of business each year.

Children have loved horses for generations. Five thousand five hundred Missouri youngsters are enrolled in 4-H horse projects, making it the largest animal project in the state. Their parents also like horses—one family in ten owns one or more horses. Some activities that families engage in involving horses include horse shows, pleasure riding, and trail riding.

A number of large breeding farms have been established in the last decade. Most suburban areas with population of 30,000 or more have at least one riding stable. Growth of horse population in rural areas has also been aggressive. Most cowmen with 50 head or more find a horse useful in working cattle. Both private and commercial trail riding in Missouri's scenic areas have increased rapidly. A commercial ride near Eminence, involving 1,500 riders annually, is one of the largest in the country.

Even draft horses and mules have made a surprising comeback. The showing of large hitches, the use of work teams in mud, and continued use by certain religious groups contribute to growth of this branch of the industry.

A trail ride near Eminence attracts 1500 riders each year.

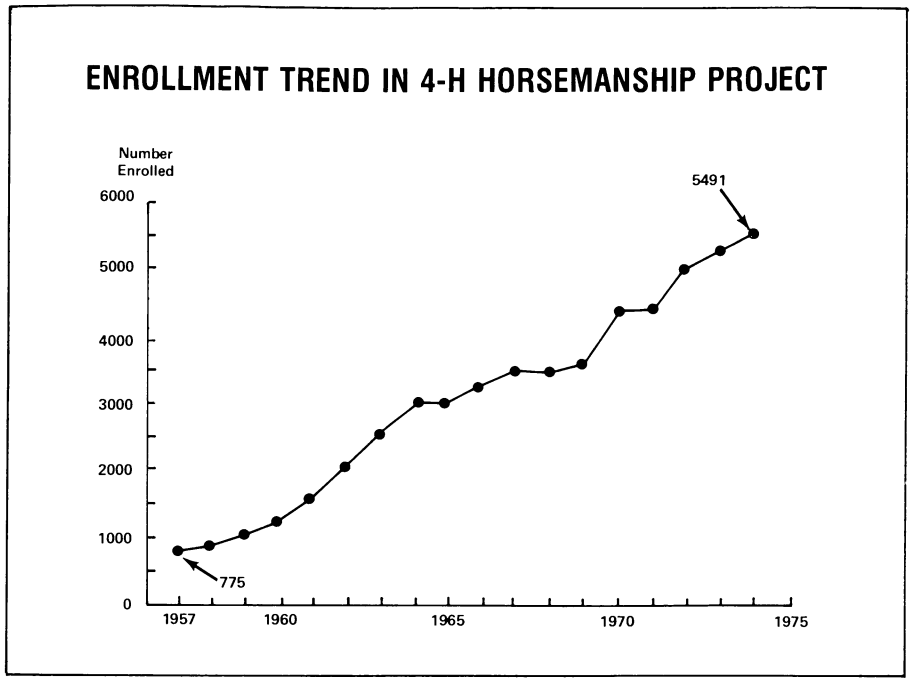
Horses Tomorrow

As long as the economy booms, a goodly portion of Missouri's population will ride horses. This is the fasttest growing livestock industry in the state and nation. Energy shortage probably will not affect it much. A general downtrend in the economy, however, would do so.

It is prestigious to own a horse and engage in horse activities. Organization of horse groups has become effective on a national basis. This will reflect in more research dollars in colleges, more working together by groups with horse interests, and more extension and college teaching. All of these, in turn, will result in more horse-owner satisfaction.

If parimutuel betting is voted in on a statewide basis, there will be a large influx of racing-type breeding establishments, training stables and markets.

Lameness has been one of the most prevalent problems of horses and will likely remain so. Parasite control and vaccination programs against viral diseases will deserve increased emphasis. Great emphasis should be placed on disease prevention, proper nutrition and parasite control. Veterinarians and Extension livestock specialists will face increasing demand for help from horse owners. The equine center, now under development on a University farm south of Columbia, will be one of the most comprehensive in the nation. It will give Missouri horsemen an advantage in solving horse problems.



New Engineering Problems to be Faced

Today:

Major engineering problems connected with livestock in recent years have centered around four categories:

- *waste management*
- *structures for confinement rearing and feeding of animals.*
- *mechanical feed movement.*
- *labor efficiency.*

Interest in confinement housing is at an all-time high, partly as an escape from mud and partly due to advantages offered in controlling animal waste. The recent clamor over pollution of our environment has also brought public attention to all possible sources of water, land, and air pollution, including animal and human waste.

Representatives of livestock producer groups, government agencies, and the University of Missouri cooperated to develop the "Missouri Approach to Animal Waste Management" to meet environmental needs and not be an undue burden on the farmer. (See UMC Miscellaneous Publications 232). More than 300 systems conforming to this guide have been approved thus far by the Missouri Clean Water Commission.

The final step in the "Missouri Approach", however, is not gaining as much acceptance as desired. This is the irrigation with the effluent, using soil and plants as a filter of pollutants.

Tomorrow:

The trend to higher volume production has brought concentration on design of housing and waste handling, and feed moving equipment for confinement rearing and feeding.

These trends are expected to intensify in the future and interest will grow around solutions to waste problems that recycle the waste products or turn them into a resource or valuable byproduct. Questions are coming from many people in and out of the farming community regarding generating and handling methane gas from animal wastes. Ag engineers

Many new swine feeding facilities use lagoons to handle waste.

have assembled this information on methods of generating, collecting and using the gas and on its potential as an energy source.

Irrigation with animal effluent is becoming one segment of research and engineering in the field of waste management. We can expect much expansion of effluent irrigation along with regular water irrigation.

We can expect to see more environmentally controlled livestock buildings. How fast they come depends on livestock prices, availability of materials, and energy costs.

More packaged or modular types of farm buildings will be built. Many will be erected by local building companies and contractors as a service to farmers.

Livestock Marketing System Changing Rapidly

New pricing methods may be needed

The livestock marketing process performs two major functions:

(1) Sets a value or price for livestock as ownership is transferred.

(2) Physically moves the livestock from producer to consumer.

Beef Marketing. While the functions performed remain about the same, substantial changes are taking place in the type of marketing agencies used. Table 3 shows how direct buying and country dealers have become more important in moving slaughter cattle to market.

TABLE 3 -- PACKER PURCHASES OF SLAUGHTER CATTLE BY TYPE OF MARKET OUTLET (UNITED STATES)

Year	Terminal	Auction	Direct, Country Dealer, Etc.
1962	43%	19%	39%
1967	29	18	53
1968	25	18	57
1969	21	17	62
1970	18	16	65
1971	16	16	69

Source:

Table 4 shows that terminals have been used more in Missouri for selling slaughter cattle than for the U.S. as a whole. Even so the terminals' share is declining.

Auctions have increased their share of feeder cattle marketings. However, many feeder calves still move direct from producer to feeder and through dealers (Table 5).

Many terminal markets now use auctions to sell feeder cattle. All of the Missouri terminals have a feeder cattle auction, and marketing through these auctions has increased substantially in recent years.

Hog Marketing. Most important change in slaughter hog marketing in recent years has been the decline in importance of terminals and the increase in importance of local markets and sales direct to packers. (See Table 6.) Sales through auctions have increased considerably but still have a

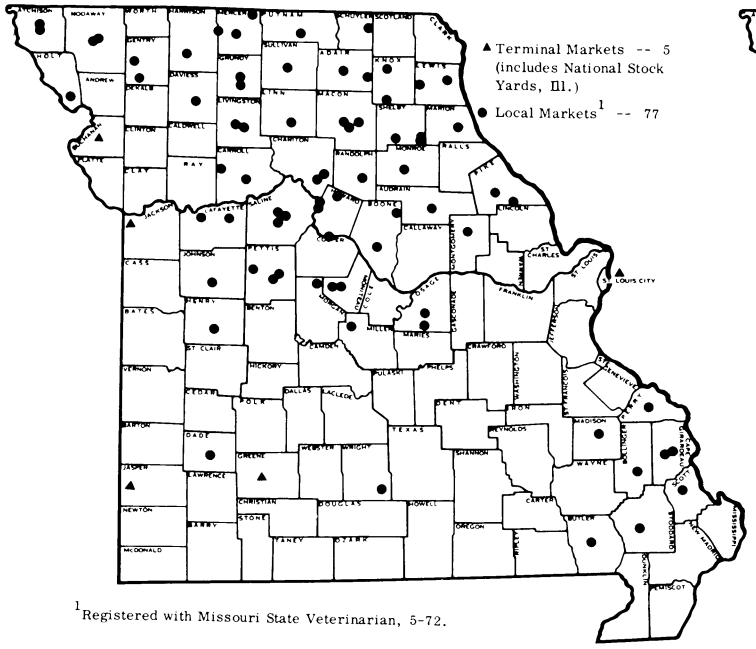
TABLE 4 -- SLAUGHTER CATTLE AND CALVES SOLD THROUGH VARIOUS OUTLETS IN MISSOURI

Type of Market	1956	1965 (estimate)	Recent Trend
Terminal	87%	60%	↓
Auction	3	20	→
Direct to packer	3	18	↑
Other	7	2	→

TABLE 5 -- PERCENTAGES OF FEEDER CATTLE AND CALVES SOLD THROUGH VARIOUS OUTLETS IN MISSOURI

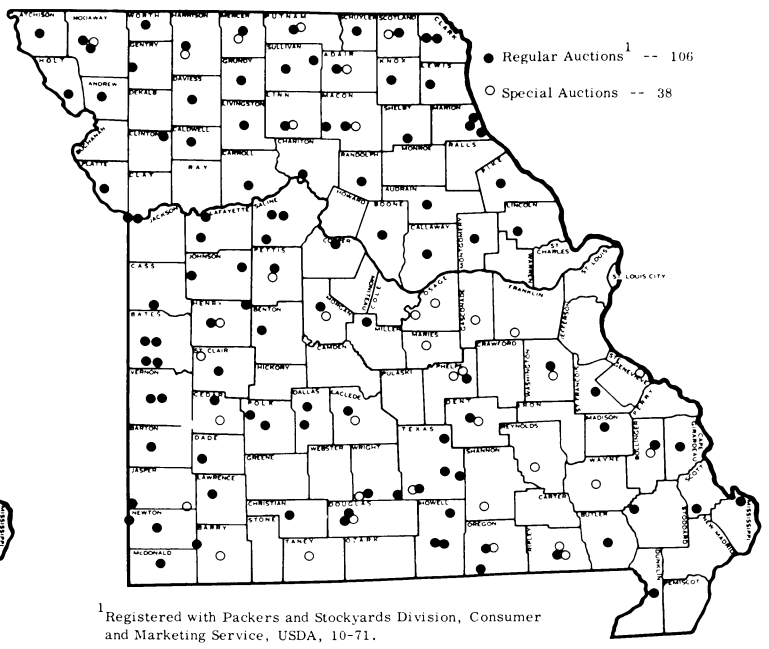
Type of Market	1956	1965 (estimate)	Recent Trend
Auction	42	45	↗
Special co-op sales and direct to farmers	25	27	→
Terminal (including auctions at terminal)	23	20	→
Dealer	10	8	↓

TERMINAL AND LOCAL MARKETS



[1]Registered with Missouri State Veterinarian, 5-72.

AUCTION MARKETS



[1]Registered with Packers and Stockyards Division, Consumer and Marketing Service, USDA, 10-71.

TABLE 6 -- SLAUGHTER HOGS SOLD THROUGH VARIOUS OUTLETS IN MISSOURI

Type of Market	1956	1967	Recent
	(percent)		
Terminal	75	53	↓
Local markets and direct to packers	22	36	↑
Auction	2	8	→
Other	1	3	

relatively small part of total slaughter hog marketings.

Most important outlets for feeder pigs are special co-op sales, sales direct to farmers, and regular auctions. (Table 7).

The teleauction has developed into a major method of selling feeder pigs in Missouri. Pigs are concentrated close to the area of production and sold at auction by telephone from a central location. This method of marketing has several efficiencies:

1. Can concentrate animals close to farm and move them directly to buyer.
2. Buyers don't have to leave home to take part in sale.
3. Providing access to many buyers helps make sale regional rather than local in nature.

This type of sales method may offer possibilities with other classes of livestock.

Marketing Tomorrow. Many cattle and hog producers selling direct to market need a great deal of information about the supply and demand situation, and current prices. Increasingly sophisticated means of communicating marketing information are being developed. This may include further development of "hot line" recorded reports and leased wires.

We expect the current trends in slaughter cattle marketing to continue. The proportion of slaughter steers and heifers marketed at terminal markets or large auctions may be so small in a few years that hard questions will be raised about how these cattle will be priced. Auctions and terminals will continue to be important outlets for slaughter cows, bulls, and feeder cattle.

The teleauction method of selling may offer possibilities for some classes of beef cattle.

A beginning has been made in holding feeder cattle sales where some genetic and production testing information has been made available to potential buyers. More of this kind of information will likely be made available at feeder sales in the future.

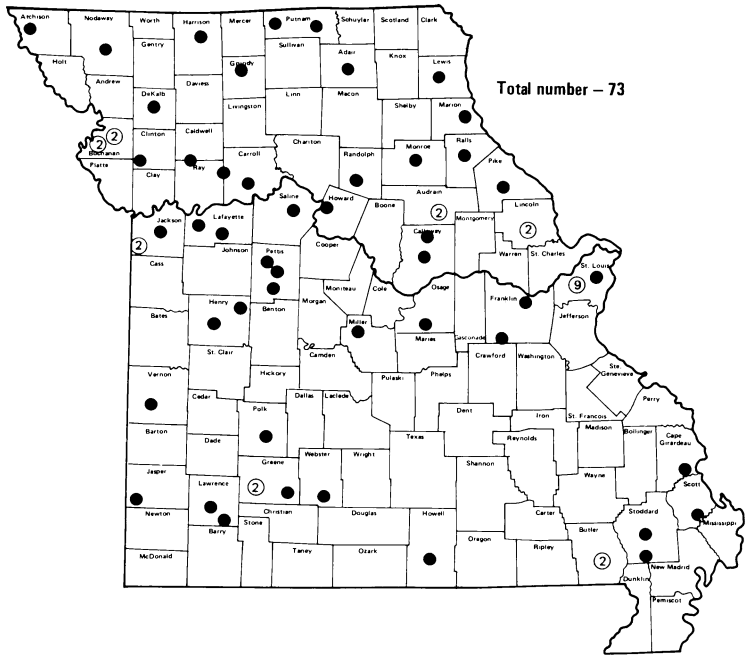
The futures market may provide producers with the opportunity to shift price risk. This market must be used on a selective basis to be of most value.

Greater improvements need to be made in getting prices to more adequately reflect the grade and yield value of carcasses produced.

TABLE 7 -- FEEDER PIGS SOLD THROUGH VARIOUS OUTLETS IN MISSOURI

Type of Market	1956	1967	Recent Trend
Special co-op sales and direct to farmers	57%	55%	↗
Auction	20	25	↗
Dealer	19	16	↘
Terminal	3	4	↘
Other	1	-	

Meat Packing a Possible Opportunity



Slaughter Plants. (Including only those with output of 300,000 pounds or more live weight. Data from Statistical Reporting Service, USDA, 5-70. Figure in circle denotes number of plants at that location.)

Map at right shows location of slaughter plants in Missouri. The major portion of these firms' business is slaughtering and selling the product at wholesale.

A few of the Missouri packing plants buy slaughter livestock only at terminal markets, auctions, or through an order buyer. But the majority also buy at the plant and/or at the farm. Some packers also operate local markets.

There are between 200 and 300 combination slaughter-locker plants in Missouri. They tend to be relatively small. Stricter inspection regulations are resulting in the closing of some of these firms.

Missouri packing plants have enough capacity to slaughter all the fed cattle produced in the state. However, most of this capacity is in the northwest part of the state.

When the cow kill is included in total slaughter, Missouri is short of capacity. Probably more than 75 percent of Missouri cows sold last year were shipped out of state for slaughter. Cow slaughter is not a specialized process, and some packers shift back and forth from fed cattle to cow slaughter, depending on margin.

It is difficult to determine how much, if any, this lack of cow slaughter affects cow prices. If cow prices are not affected now, they may be during the reduction phase of the cattle number cycle. A special study of this would be useful.

Area packing plants add to the jobs and income from livestock produced locally.

Capacity to slaughter hogs in Missouri has increased substantially. A plant has opened recently at Marshall, and new plants replaced old facilities at St. Joseph and National Stock Yards, Ill. Yet not more than 50 percent of the hogs produced in Missouri are slaughtered in the state or at plants just across the state's borders.

The current system of marketing hogs may be competitive enough that Missouri producers are not being penalized pricewise because of this lack of slaughter capacity. However, the economy of the state could benefit from the extra jobs.

It would not be easy to determine the best locations for additional slaughter plants because of lack of concentration in hog production. The concentrated areas of production, in most cases, already have plants or have well established, strong markets. Higher transportation costs probably will increase the advantage of packing plants being close to production in the next few years.

Some Opportunities to Look for–
–in Livestock

1. Missouri has plenty of roughage for backgrounding programs and finishing cattle on less grain.
2. Increasing calving percentage would add to beef herd profits.
3. New sources of marketing information are appearing. Producers need to capitalize on them because this is where a lot of money can be gained or lost, regardless of production skill.
4. The futures market offers an opportunity to shift price risk.
5. A special study of cow slaughter possibilities in Missouri is is needed. Around 75 percent of the state's cows were shipped out of state for slaughter in 1973.
6. Expansion of production testing and sales featuring purebred breeding stock and feeder calves that have production testing records can bring dividends.
7. Since horses are the fastest growing livestock industry, horse breeding holds some good potential.
8. The desirability of adding one or more packing plants in Missouri is worth investigating. Only about 50 percent of Missouri's hogs are slaughtered within the state.
9. New techniques that will improve reproductive efficiency of swine are undergoing intensive research and testing. Tools including drugs to increase ovulation rates and litter size, help synchronize estrus cycle, and initiate farrowing will soon be available for practical use.
10. The trend toward greater confinement and better facilities and equipment will enable the most skilled producers to expand production per operator.

Some Producer Advisory Committee Recommendations–

–in Beef Production:

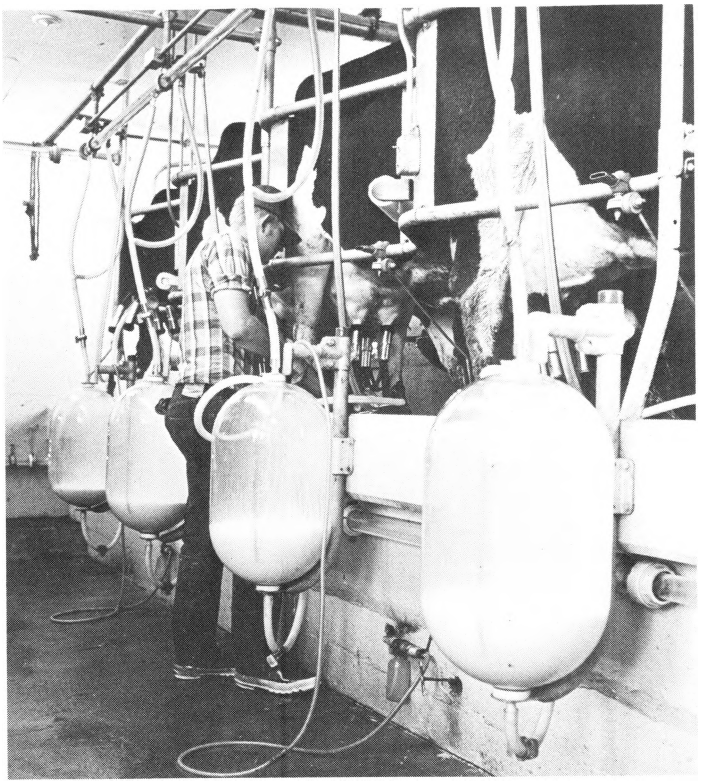
1. Use more of the forage on farms.
2. Stress early calving to get more weight and use of forage.
3. Keep individual cow performance records and aim for 90 to 95 percent calf crops; cull poor cows; pregnancy test.
4. Use performance tested bulls with good records.
5. Develop state approved plans for waste disposal and runoff control.
6. Improve pasture and hay crops.
7. Publish lists of feeder cattle for sale that are backed by performance tested sires.
8. Set aside certain times at auction markets for auctioning test-proven calves.
9. Research on breeding, feeding, multiple births, confinement methods and potentials, etc.
10. Keep cost of production records to guide management plans.

–in Swine Production:

1. Information program on efficient buying and formulation of feeds is needed.
2. Emphasize use of breeding stock with production and littermate records.
3. Organize or support existing producer-agribusiness associations dedicated to improvement and promotion of pork products.
4. Active support of research, education, and promotion by local, state, and national pork producers' associations.
5. Initiate an educational program on disease prevention measures.
6. A feeder pig enterprise is recommended for many small farms that are in need of an intensive enterprise.
7. Follow guidelines developed by UMC and Clean Water Commission on sites, structures, etc.
8. Urge more research to develop improved waste disposal methods.

For detailed producer recommendations for your area, obtain report from County Extension Center. (Reports available are listed at end of this publication.)

Dairymen Skilled Users of Technology



Today's dairymen are among the most skilled users of technology.

Dairymen in the Dairy Herd Improvement Program, for example, no longer obtain just the production figures for their cows. Their computer record program ranks cows by either their Estimated Producing Ability (EPA) or by their Estimated Average Transmitting Ability (EATA). The EATA relates to how they rank in their probable ability to transmit production to their offspring.

The records are also important in directing the feeding program, measuring how efficiently each cow uses feed, and in making management decisions, including the reproduction program.

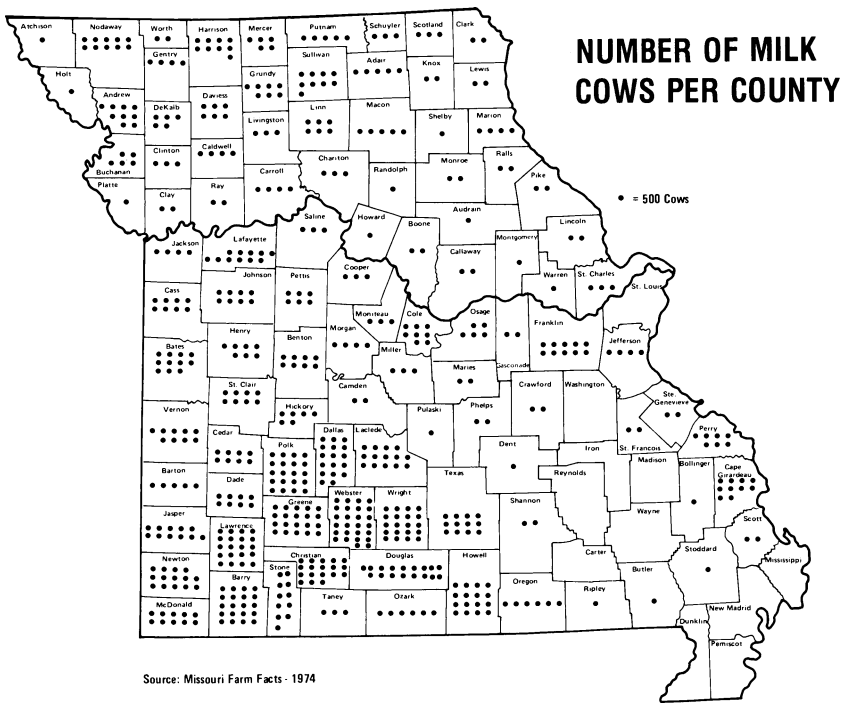
Dairymen have been first and foremost in the use of artificial insemination. They have been leaders in eliminating such diseases as Brucellosis and tuberculosis.

More recently, their attention has been drawn to computerized, least cost nutrition programs which give maximum nutritional balance at a minimum of cost.

Modern buildings and equipment reduce labor by enabling concentration of animals and provide for adequate waste disposal and pollution control.

A profusion of high quality dairy products has resulted from well planned facilities, use of hygienic methods, modern cooling equipment, and sophisticated transportation and marketing schedules.

In 1950, the average Missouri farmer with dairy milk cows sold



about 100 pounds of milk per day. Today the daily average is nearly seven times this amount and the average delivery of milk from Grade A producers is nearly 1,300 pounds per farm per day.

Production per cow has jumped from the 1950 average of 4,400 pounds to 9,521 in 1973. Cows in DHI record keeping increased from 7,920 pounds in 1950 to 12,400 pounds in 1973.

TABLE 8 -- PRODUCTION PER COW - MISSOURI

Year	Avg. (lbs.) All Milk Cows	Avg. (lbs.) DHI Cows
1950	4400	7920
1960	5660	9318
1970	8938	11,783
1973	9521	12,400

For several years, the increased capacity for higher production per cow and per farm exceeded the demand for milk and its products. Competitive alternative foods also had a role in filling demand. These two factors resulted in sharply reducing the population of dairy cows and the number of farms producing milk. (See Tables 9 and 10) How-

TABLE 9 -- MISSOURI FARMS SELLING MILK AND/OR CREAM*

Year	Number Farms
1956	55,000
1960	41,228
1965	25,806
1971	13,908
1974	10,084

* From Brucellosis Ring Test Survey conducted at all plants receiving milk from Missouri farms. This is considered a more reliable source than the Census because the Census definition was changed in 1969.

TABLE 10 -- NUMBER OF MILK COWS ON MISSOURI FARMS JAN. 1

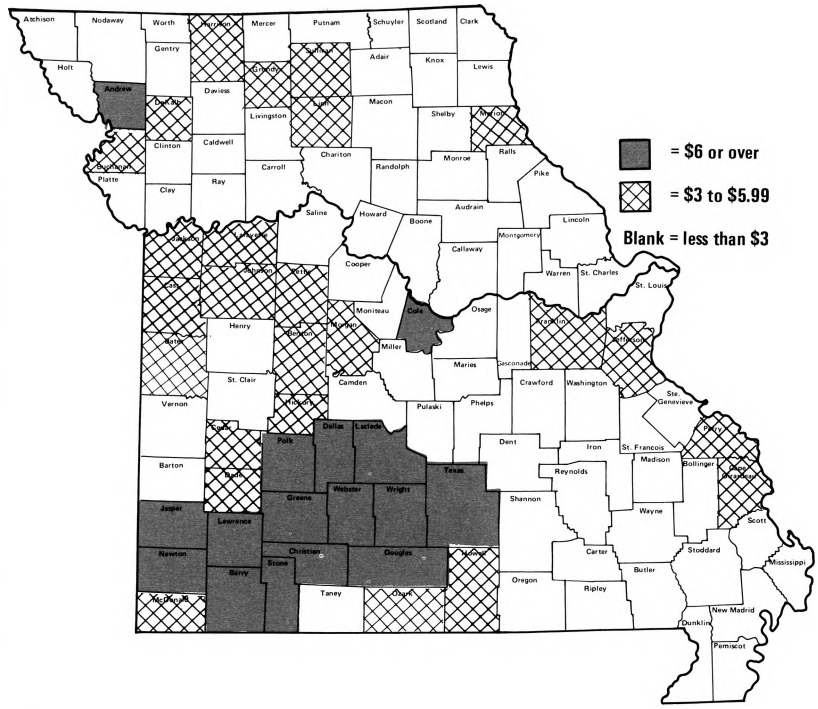
Year	Number Cows
1950	974,000
1960	723,000
1970*	362,000
1974*	315,000

Source: USDA SRS Crop Reporting Board.
*Basis of reporting was changed in 1970 from "all milk cows and heifers 2 years old and over" to milk cows and heifers that have calved and are on farms."

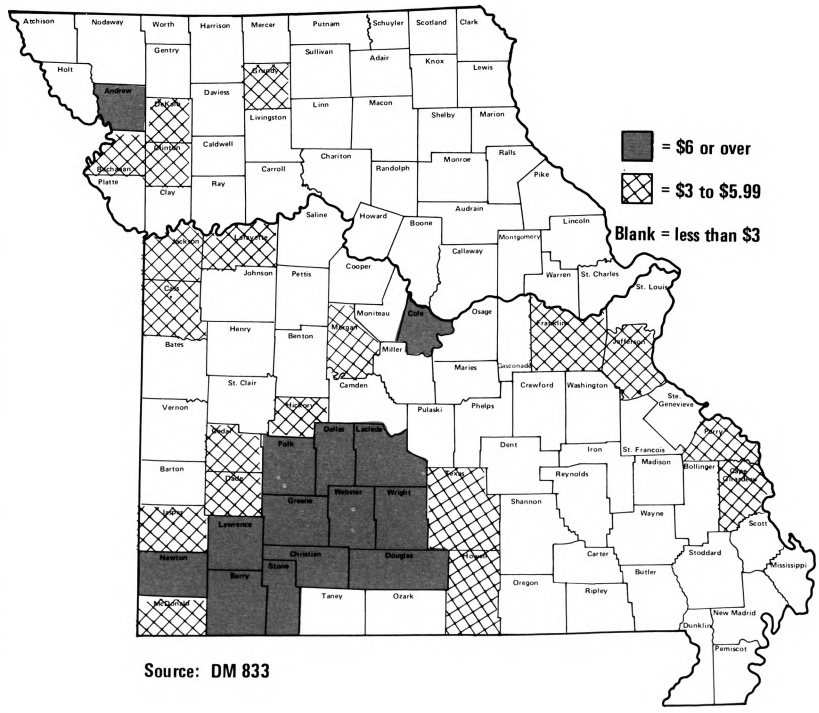
Missouri's Milk Production Areas Are Shrinking

Areas of concentration in milk production are shown on these two maps for 1964 and 1969. The solid color counties produced over $6 worth of milk per acre and the cross-hatched counties, $3 to $5.99 per acre. Values for both years were based on 1964 prices so change in volume would show up, rather than change in price. Note the areas are shrinking, with fewer counties in either category and several dropping from the $6 plus category to the $3 to $5.99 bracket.

1964 MILK SALES PER ACRE OF FARMLAND



1969 MILK SALES PER ACRE OF FARMLAND



Source: DM 833

ever, the number of farms producing Grade A milk shows much less decline.

NUMBER MISSOURI FARMS PRODUCING GRADE A MILK UNDER FEDERAL ORDER

Year	Number
1963	3,950
1965	3,530
1967	3,470
1969	3,350
1974	3,100

About 6,000 dairy farms are equipped with bulk milk cooling equipment. By 1975 most of the remaining farms (about 4,000) will find it difficult to transport and market their milk in cans. The volume of production for most of these farms will be inadequate to justify the expenditure they would need to modernize and adopt bulk milk cooling.

Today, 2,500 Grade A dairy farms produce about 65 percent of all milk produced in the state. These farms average about 45 cows per herd.

Annual milk production for Missouri has been relatively stable for the past six years. It previously declined about 25 percent from its high level of the mid 1950s. (See Table 11)

TABLE 11 -- MISSOURI - MILK PRODUCTION

Year	(Million Pounds)
1950	4,040
1960	3,685
1970	3,012
1973	3,018

Milk is a basic food, needed in almost everyone's diet. But above a certain level, it is subject to being replaced by alternatives. Despite vigorous dairy food promotion programs, the competition from alternative foods has been great during the past 20 years.

The downward trend in per capita consumption slowed in the early 1970s. However, recent inflationary price movements have been detrimental to milk consumption. Lower production, along with strong demand, pushed prices up. Of current concern is an accelerated decline in per capita use of fluid milk.

TABLE 12 -- CIVILIAN PER CAPITA CONSUMPTION OF MILK AND MILK PRODUCTS

Year	Lbs./Milk (Equivalent Fat-Solids Basis)
1950	740
1960	653
1970	561
1973	557

Unfortunately, some special products, including chocolate milk, buttermilk, and to a degree, cottage cheese, lack the uniform quality necessary to get established as regular diet items for large numbers of people.

Tomorrow

Milk and its products are likely to resist further decline in per capita consumption. With population growth, some increase in total consumption is likely to occur.

Dairy products equal to about 2 percent of our annual milk production were imported in 1973. This competition for manufactured products might increase some but most milk (almost 80 percent) produced in the United States is Grade A milk used for daily fluid milk consumption. It has to be consumed fairly close to the point of production.

Most signs point to fluid milk production being a permanent and stable enterprise, closely geared to the demand and use of fluid milk for drinking and cooking.

These factors portray dairying more in the image of a public utility than in the image of a growth industry. Milk prices are expected to continue to be less responsive to rapid changes in the general price level. Increases in milk prices frequently trail increases in the price of many input items of dairy production. But milk prices likewise are more resistant to change in periods of depressed prices, and are likely to become more so in the future.

Probably not too far down the road all milk coming to the milk market will be the one grade, Grade A. It will be used by Missouri's 22 cheese plants as well as the fluid milk distributors.

There are several new challenges facing dairying. The first of these is: "Are we now nearing the end of an era of high grain feeding?" If so, this could mean a complete change in dairy farming.

It has been nearly 15 years since the term "high energy ration" and "challenge feeding" came into the vocabulary of dairymen. Heavy rates of grain feeding can stimulate record levels of production. It has been profitable, even enabling dairymen to amortize high investments and other costs by stimulating record levels of production per cow.

But the demand for grain for human food will, at some point in the future, take precedence over the use of grain to produce meat and milk. Without doubt the dairy cow is a most efficient animal in converting feed energy and protein to human food. And, her superiority over other animals is further enhanced when roughage is to be converted to human food. In short, the relatively bright future of the dairy cow depends upon the remarkable potential of her rumen to produce excellent human foods from roughage. (See Table 13)

During the past decade, the trend to high energy rations has attracted dairying to production areas of corn and other feed grains. But if the era of "cheap grain" is drawing to a close, dairying can be expected to thrive where it has a comparative advantage of quality roughage. Already dairying has concentrated in the southwest quarter of Missouri. Smaller areas of concentration are in the vicinity of Kansas City and St. Joseph. A residual of dairying remains in Grundy, Morgan, Cole, Franklin, Jefferson, Perry and Cape Girardeau Counties. These presently appear to be resistant to decline because of their adaptation to roughage production and their proximity to fluid milk markets.

Also, it is in these areas where the specialized services - transportation, supplies, service for dairy equipment,

TABLE 13 -- RELATIVE PERCENTAGES OF FEED NUTRIENTS CONVERTED TO FOOD

Animal Product	Energy Convers.	Protein Convers.	Gross Edible Product Output as % of Intake
Milk	20	30	90
Beef	8	15	10
Lamb	6	10	7
Pork	15	20	30
Eggs	15	20	33
Broilers	10	25	45

Source: Hodgson and Plowman

production record keeping, skilled dairy oriented veterinarians, artificial insemination, dairy information programs, etc. - are available. If you plan to locate a new dairy enterprise, it is of growing importance to locate in an established dairy community. Otherwise, the costs of obtaining these services or the effect of having to do without them may place your dairy operation at a distinct disadvantage.

A veterinarian, specially trained in dairy animal practice, is of prime importance. Regular calving intervals and reproductive efficiency mean dollars to the dairyman. Milk production is frequently limited by a combination of disease and stress factors which require skill to diagnose, isolate, and correct. Diseases peculiar to the dairy cow such as mastitis, milk fever, and acetonemia, further require specialized skills. A sound herd health program on every dairy farm is the foundation to profit.

Dairying has followed a trend of increasing herd size for more than a quarter century. This can best be illustrated by the steady growth in size of herds on Dairy Herd Improvement production records program. (See Table 14)

TABLE 14 -- SIZE OF DHI HERDS - MISSOURI

Years	Cows/Herd
1950	21
1960	37
1970	58
1972	60

If grain continues relatively more expensive and the production and feeding of roughages to dairy cows increases, the trend to larger herds could end, or possibly even reverse. This applies predominantly to herds of more than 150 cows. It would no longer be possible to make added investments and maintain or reduce capital invested per cow by the method of adding additional cows to the herd. There is a definite limit in the distance roughages can be transported; and this could be a major factor in limiting herd size.

Dairymen will continue to strive to establish a two man enterprise which permits each worker some free time. Missouri's average herd size will continue to climb so long as we have small herds - less than 50 cows. These must eventually expand or go out of business.

While the advent of heavier rates of roughage feeding may indicate a return to a pasture system, it will probably be more productive to continue the trend toward limited pasturing and feeding at least the milking herd in confinement. Increasing land prices will necessitate yields that are higher than those obtainable by continuous pasturing throughout the growing season.

The total energy situation will have an impact upon our entire nation. While increases in transportation costs seem most obvious, many other cash costs in dairy production will be affected and some supply items may even become unavailable. Priorities may need to be adjusted. New technology will probably be needed. Sound, proven methods of the past may be obsolete.

Environmental regulations and fertilizer costs may require a new look at methods of waste disposal. Estimates of the nutrient value of a ton of cow manure range from 6 to 12 pounds of nitrogen, 2 to 5 pounds of phosphate and 7 to 12 pounds of potassium. In addition the added organic matter value of its addition to land can not be ignored. Current methods of anaerobic lagoon storage bring complaints around urban developments and periodic odor problems are encountered where liquid or solid wastes are applied.

It will be important for dairymen

Missouri herds with less than 50 cows will likely continue to expand but changing feed and energy situation could limit extreme size.

to observe carefully the direction taken in government policy and work together to influence decisions.

If there are higher grain and other cash input costs, dairymen will do well to seek solutions to the following:

(1) How can roughages, along with the available grain be used to provide the least cost ration for best production? The current computer program for determining the least cost ration will continue to save money for those who employ it.

(2) What investments can I as a dairyman afford under these new "economics"? Nothing can give a clear or more reliable answer to this question than a long history of good records of production and records of the farm business.

(3) What changes can I expect in the marketing of Grade A fluid milk? In the past, fluid milk has been priced on a calculated formula based on the value of manufactured products. This must change. As the volume of manufactured milk continues to decline, a point will be reached where the market for it will not be sufficient to establish an accurate indication of value of fluid milk. A new basis will become necessary. Factors should be considered such as: (a) Ability and willingness of consumers to pay, (b) cost factors in milk production, (c) alternative opportunities (farm and non-farm), (d) value of milk when converted into storeable products such as cheese, butter, and dry milk.

Research and information programs will have to be revamped to more accurately serve the new conditions. Dairymen will do well to see that these institutions are kept viable and ready to serve their needs.

Some Opportunities to Watch for—in Dairying

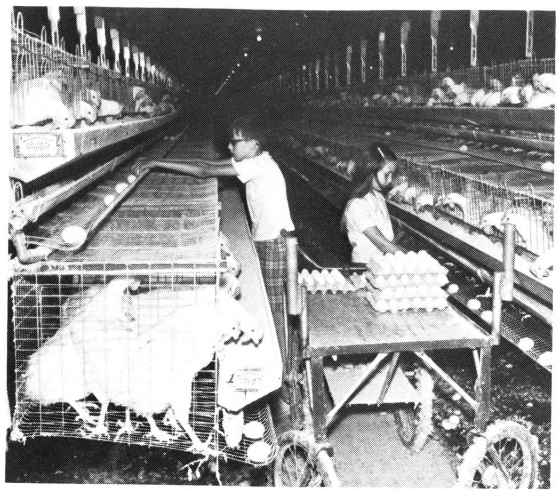
1. Increased energy costs will change ingredient cost of all agricultural production, but it may have less effect upon dairying than many other enterprises. It will encourage more roughage consumption, and gear dairying closer to land used to produce forage.
2. Rapid growth in size and number of large herds is not expected. Watch for some conflict between the advantage of size of operation and increasing costs of energy. Energy requirements increase more rapidly with intensive, highly specialized enterprises, than where herds are moderate in size.
3. The search to find ways to reduce pollution yet save the potential soil improvement features of dairy wastes will continue.
4. There are opportunities for improving the reproduction efficiency of dairy herds through the development of a reproductive health program including the counsel of a skilled veterinarian.
5. More comprehensive planning prior to all major remodeling or new construction will save dollars in first costs and operational costs. There are new methods and technology that should be used.
6. Least cost rations determined by modern computer methods pay dividends whether feed prices are high or low, but more when feed prices are high.
7. Production records continue to be a "best buy" to provide guidance to continued dairy profits —to make adjustments to changes in dairying; —to breed and select better replacements; and —to watch over herd investments.
8. More productive replacements result from use of performance tested sires. More information is available on available sires today than ever before.
9. Genetic progress for increased milk production and traits that add to longevity can and will continue to increase the genetic milk producing ability of dairy cattle. Refinements in Predicted Difference measurements for sire milk transmitting ability will continue to be an important economic input of the future dairy business.
10. Pride in production of good wholesome milk builds a foundation for success in production and marketing. It is the basis upon which effective promotion programs can be established.
11. The last quarter of the twentieth century will require innovations in technology. Strong dairy research programs can help you to adjust to changes in energy and other critical ingredients in dairy production.

Some Producer Advisory Committee Recommendations—

1. Insure high quality with sanitary handling and inspection.
2. Organize strong local dairy producers' association and affiliate with national one to promote products and research
3. Use good performance tested bulls.
4. Keep production records on all animals. (DHIA, Owner-Sample)
5. Plan dairy units with waste disposal in mind.
6. Develop close relationship with veterinarian.
7. Cull according to performance.

For detailed producer recommendations for your area, obtain report from County Extension Center. (Reports available are listed at the end of this publication.)

Poultry Concentrating in Areas of Specialized Production



LAYING HENS

Today

Commercial egg production in Missouri has reached a rather stable level. The number of hens and pullets of laying age on farms in Missouri totals about 6.5 million. Practically all of the market egg flocks are housed in cages. Size of farm unit varies from 6,000 to 300,000 birds.

A definite trend toward concentration of egg production in certain areas of the state has been observed and encouraged. Greatest concentration is in Southwest Missouri and an area south of St. Louis. Missouri is a deficit egg-producing state and is geared to supplying local markets.

The market for started pullets continues to grow. About 8 million started pullets are produced in Missouri annually. Death losses in pullets and laying hens have been reduced drastically as a result of the Marek's vaccine. Birds vaccinated against this disease appear to be more resistant to other diseases, make more efficient weight gains, and lay more eggs than non-vaccinated birds.

High food costs and the "back to earth" movement have resulted in more small family flocks. There is also increased interest in exotic breeds, ducks, geese, and game birds. This trend creates new concern with disease control. Since many owners of these flocks are inexperienced in management, their flocks could be a source of disease outbreaks endangering the large poultry enterprises.

Tomorrow

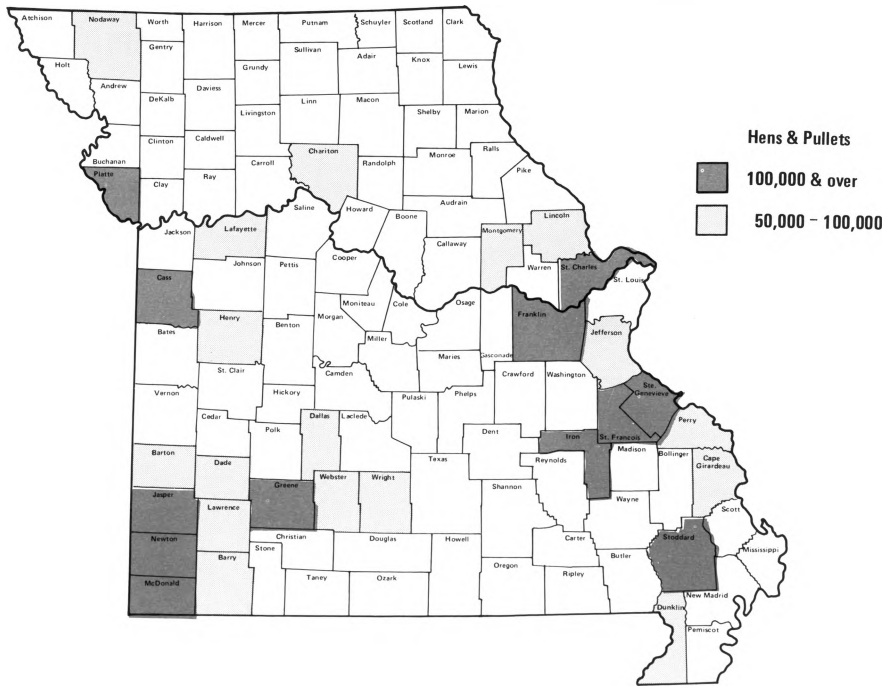
Commercial egg production is expected to remain about the same in the next decade, but new programs, promoted and financed by large firms, could increase the production in a short time.

Numerous opportunities exist for egg production to supply local market needs. To capture larger markets, producers need to concentrate their production, pool their eggs, and reduce marketing costs. Being close to the feed supply, Missouri is in a position to compete effectively for markets in the large populated centers.

The family size unit of 12,000 to 30,000 birds will be predominant in spite of much publicity given to the larger units. Demand for eggs is expected to remain relatively stable with the per capita consumption near 300 eggs. Any new growth or expansion to larger flocks will need to be backed by a firm marketing agreement or contract.

High feed costs and scarcity of some feed ingredients will make it imperative that producers use least cost feed formulation. Services for figuring least cost rations are now available to all poultry producers in Missouri through the Poultry Depart-

MAJOR EGG PRODUCTION AREAS IN MISSOURI



ment at the University of Missouri-Columbia at a nominal cost.

Disease will continue to be a problem. Strict sanitation and isolation from outside traffic will be needed to hold down the spread of infectious diseases. Insect and parasite control programs must be a prominent part of any sanitation and disease control effort.

Detailed records on all phases of the laying operation will be essential for maximum profits.

Major educational needs include: (1) Informing consumers on the value of eggs in the diet, (2) providing management and disease control information to both commercial and small flock owners, and (3) field research on improving manure handling, removal, and utilization; environment-controlled housing; and energy conservation.

TURKEYS

Today

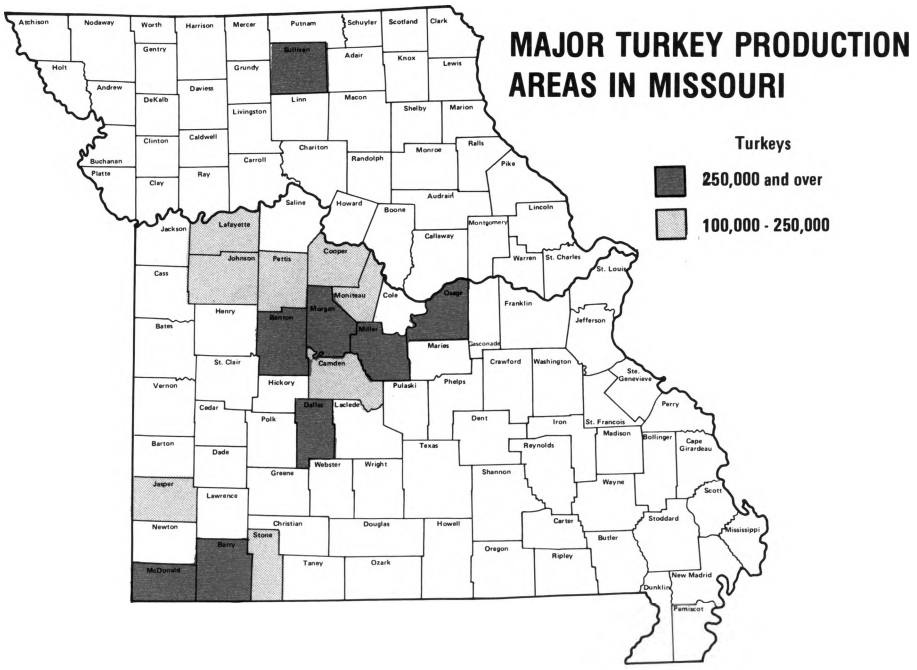
Missouri ranks among the top turkey producing states of the nation, producing about 10 million birds annually. More than 80 percent of the production is located in South Central and Southwestern Missouri.

The turkey industry is highly integrated with the major decision-making concentrated in relatively few firms — mainly large national corporations and large independent operations. Most of the turkeys produced are either owned and managed outright by these firms or produced under contract for them. The bulk of the industry in the state consists of eight hatcheries, eight processing plants, two major feed companies and several smaller ones; in total, fewer than 400 producers.

Most recent trends have been toward year-round production, confinement rearing, further processing, and increased per capita consumption. More than 50 percent of the turkeys produced are now processed into products other than the whole carcass bird.

The turkey is one of the most efficient converters of feed into meat. Turkey meat is a very economical and versatile product that can be fabricated into many consumer food items. It is also a meat that is high in protein, low in calories, and low in saturated fatty acids — a meat that has much appeal for people on special diets.

There has been increased emphasis on improving the quality of the ready-to-cook, whole birds. Such innovative ideas as self-basting, premium labeling, and the "tender-timed" turkey have up-graded the image of the holiday bird and helped to maintain sales during the Thanksgiving and Christmas holidays.



Tomorrow

The turkey industry is firmly established in the state. Production will likely continue to expand at an annual rate of 3 to 5 percent. Many of the smaller, disadvantaged growers will tend to drop out of production, permitting those with improved facilities and management ability to expand and move toward more year-round production. Opportunities for new growers to enter the business will be quite limited unless additional marketing outlets are provided by integrated firms. The typical contract grower will produce three to four broods per year and market 50,000 to 60,000 turkeys annually.

Major problems confronting the turkey industry include: (1) disease prevention and control—specifically, fowl cholera, E. coli, and virus infections. (2) poor reproductive performance of some turkey breeders, and (3) low per capita consumption of turkey meat, particularly during the first nine months of the year. Both basic and applied research is needed to help solve these problems and to promote production efficiency.

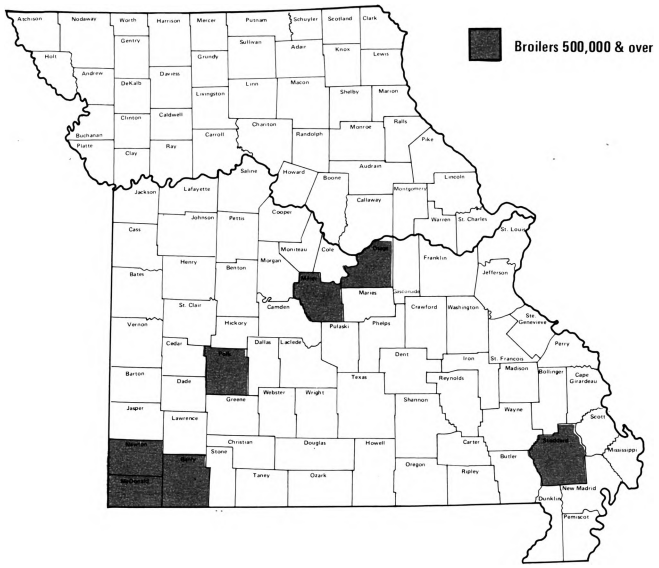
BROILERS

Missouri is not a major broiler producing state. It ranks 17th, and produces about 22 million birds annually. Nearby Arkansas ranks at the top of the list with an annual production of 501 million birds. Missouri production is relatively stable and does make an important contribution to the gross farm income in five southwest counties.

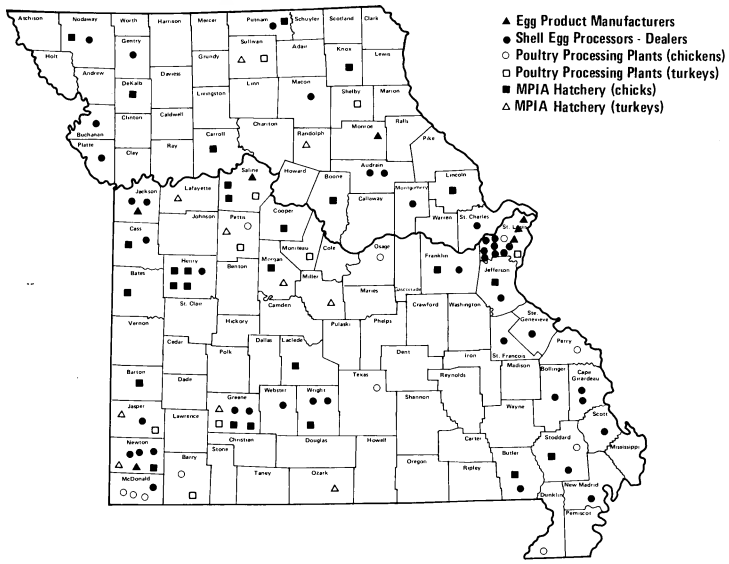
The broiler industry is highly integrated. Almost all growers are on some type of production payment contract. The contract usually specifies a given payment per pound of marketable broilers produced plus a bonus based on feed efficiency and mortality. Three firms in the state control a large percentage of the total production.

The most efficient growers are capable of producing 40,000 to 60,000

MAJOR BROILER PRODUCTION AREAS IN MISSOURI



LOCATION OF POULTRY PROCESSING PLANTS



birds per brood and 4.5 to 5 broods per year. Broilers are generally marketed at 8.5 weeks of age, weighing an average of 3.8 pounds each. Feed conversion will run from 2.2 to 2.3 pounds of feed per pound of bird on an average for all broods produced during the year.

The nation's ability to maintain a high level of production has kept broiler price relatively low and profit margins extremely narrow.

Tomorrow

There is nothing in the picture to indicate that Missouri will expand in broiler production. In fact, total production could decline in the next decade unless some growth stimulus from Arkansas firms makes up for expected declines in Central Missouri. The nation as a whole will continue to expand in broiler production in line with current population trends and with only a slight increase in per capita consumption.

Number of new growers entering the business will be very restricted. Growers quitting the business will be replaced by expanded production of current efficient growers who wish to add to their income.

Opportunities exist for the integrated firms to improve on their distribution of dressed broilers and to change from handling broilers as ice-packed to a more modern, efficient method known as chill-packed; the birds are cut up and prepackaged at the processing plant.

Diseases perhaps are still the major production problem. Included are chronic respiratory disease, gumboro, and dermititis, which tend to build up on the premises. Improved sanitation and allowing more "down-time" between broods can help correct part of the problems.

Research has shown that broilers can be raised successfully in cages. While the movement to cage rearing systems will be slow it will likely occur as present facilities become obsolete and need to be replaced.

In marketing, a major problem is getting consumers to accept chill-packed broilers. Progress along this line has been slower than expected. Another problem is that of loss leader merchandising of broilers at the retail store.

Demand for broiler meat will continue high as consumers react to inflation trends and higher food prices.

WASTE MANAGEMENT

Today

Waste management is an important phase of the poultry production and processing operations. Proper management of poultry waste can provide additional income and help eliminate pollution problems.

During the past few years, emphasis has been on destroying waste, since the use of poultry manure as fertilizer has often been inconvenient or uneconomical. But recent shortages have improved the relative value of poultry waste for the agriculture industry.

Refuse from egg breaking plants and hatcheries has become more difficult to dispose of due to potential pollution problems. In the United States there are over 100,000 tons annual waste from these industries. Disposal is costly. The economic potential to the poultry industry is great once methods of processing, handling, and feeding are developed and refined.

Tomorrow

The outlook for using processed poultry manure as a feedstuff is excellent. However, before it can be used, it will have to be approved by the Food and Drug Administration. Considerable effort is being made to get it cleared as a normal feedstuff.

Waste products from egg breaking plants and hatcheries could provide a large quantity of food nutrients for

single stomach animals such as hens and hogs. Research has been conducted evaluating the chemical composition and nutrient value of poultry manure in livestock and poultry diets.

The nutrient value of these wastes after processing has been estimated at $8,000,000 per year in the United States. The by-product from all types of egg utilization plants must be studied to develop proper processing procedures and equipment to handle commercial quantities.

Additional laboratory evaluation should be conducted to establish the biological value of each new ingredient. Field processing and testing is planned to stimulate progressive industrial action.

Some Producer Advisory Committee Recommendations–

1. Seek new means of establishing egg prices.
2. Seek new markets and expand old ones.
3. Develop waste byproduct and recycling methods.
4. Develop new ways of merchandising broilers.
5. Try to overcome holiday-only use of turkey.
6. Research to develop new products, processing, and packaging.
7. Any area seeking to establish a local turkey or broiler industry, begin by locating an integrated firm as sponsor.
8. Establish close working relationship of lending agencies, producers, Extension workers and others.

For detailed producer recommendations, obtain area reports through County Extension Centers. (Reports available are listed at the end of this publication.

GAMEBIRDS

Today

The commercial gamebird industry is developing to meet the needs created by increasing numbers of hunters and a decrease in natural hunting areas. Pheasants and quail have been the two most popular species for hunting; however, the chuckar and mallard duck are being released by some clubs.

These clubs provide controlled hunts for individual sportsmen, fathers teaching young sons, families, and groups. They guarantee the hunter a chance to shoot a certain number of birds, varying with the fee he wishes to pay. Additional frozen dressed birds are usually made available at the end of the hunt.

There are now 38 such licensed shooting preserves in Missouri, some public, some private. Most are near urban centers, where the demand is greatest.

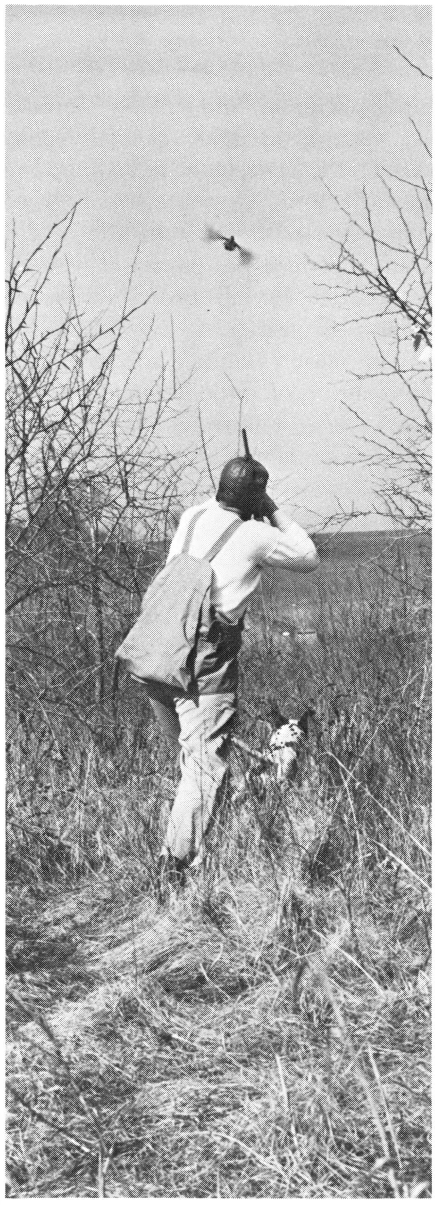
Tomorrow

The gourmet trade in game birds is a limited market but has potential for development. Game birds, packaged and frozen, are provided to shooting preserves and specialty meat markets. As these gourmet items become more familiar and available the demand for them should rise sharply.

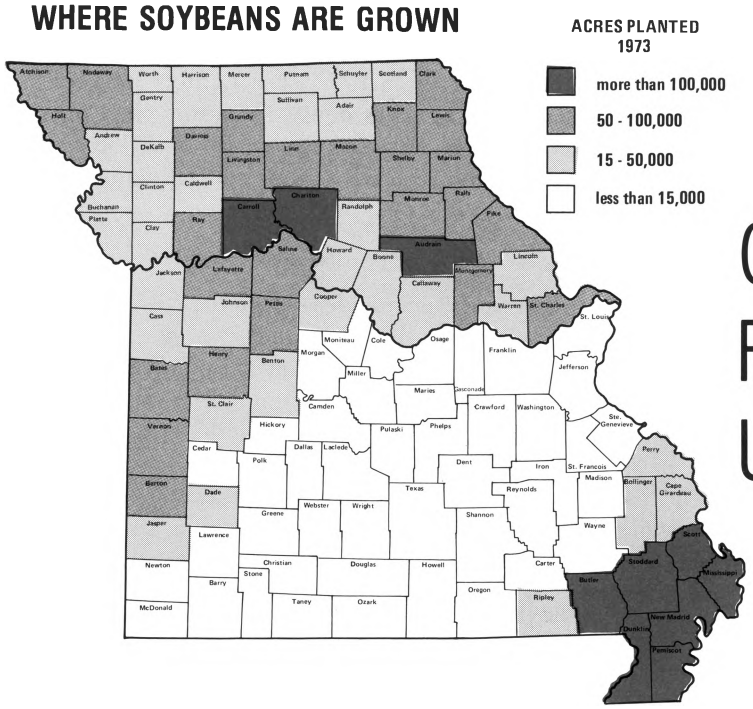
Educational programs on gamebird management and propagation are needed. To have a successful industry, it will be necessary to establish new programs studying nutrition, management, and disease control.

Some Opportunities to Look for– –in Poultry Production:

1. Numerous opportunities exist to supply local markets. Seek contracts with retailers first.
2. To capture large markets, producers need to pool production in a concentrated region and reduce marketing costs.
3. Get help from University computer service or other source to figure least-cost rations.
4. Keep detailed cost records.
5. Watch for ways to handle and use manure profitably.
6. Waste products from egg breaking plants and hatcheries could provide large quantities of food nutrients for single stomach animals such as hogs and hens.
7. A commercial gamebird industry is developing.



WHERE SOYBEANS ARE GROWN



Crop Producers Face Supply Uncertainties

In 1972, rumors of short supplies of fuel, fertilizer, pesticides, and seed were heard. In 1973 and '74 they became a reality, and with them came sharp increases in production costs.

Uncertainties of weather and prices have always been with us and can be expected to continue. To these we will add fossil fuel supply uncertainty, at least for the immediate future, and this will affect fertilizer and pesticide supplies. In the long run, new sources of energy and chemicals will likely enter the picture.

Another change seemingly in store is a switch from overproduction of major crops. U.S. agriculture has experienced a transition from surpluses and government programs designed to limit production to unfettered production to supply hungry people of the world.

The world faces a multitude of food supply uncertainties. Sporadic shortages are bringing a new public awareness of the importance of agriculture. U.S. farmers will likely be in the limelight in coming years. The big question is whether unlimited U.S. crop production can be moved into trade channels at prices attractive to producers.

With this broad view of production in mind, here is a brief look at prospects for specific crops and production supplies.

SOYBEANS

Today

Soybeans emerged from a minor crop in 1940 to the state's number one cash crop in 1973, increasing more than 40 times.

Missouri ranked third in soybean production in 1973, with a record of 127 million bushels. This was a 17 percent increase over 1972. Factors contributing to the expanded production were high prices for beans and a wet spring that delayed corn planting. Much of the increased acreage thus was planted at the expense of corn.

Tomorrow

Continued increase in soybean production is anticipated. Versatility in uses of soybeans plus unfilled needs in world markets assure demand for increased production of this crop.

While researchers have been unable to come up with technology for a spectacular breakthrough like hybrid corn and milo provided, they supplied methods that will give 25 to 50 percent increases in yield. The U.S. average is 28 bushels per acre but the best growers are getting over 45. The average should climb nearer that figure by 1980 as more growers adopt improved practices: close row spacing, timely planting, weed and insect control, correct plant food balance, and use of good quality seed.

New research will undoubtedly continue to increase yields.

TABLE 15 -- MISSOURI SOYBEAN PRODUCTION

Year	Acres (000)	Bu./Acre	Total Production (000)
1940	109	13	1,417
1950	1,209	23	27,807
1960	2,344	22	50,396
1970	3,465	26	88,358
1971	3,605	27	97,335
1972	4,050	28	108,900
1973	4,800	27	126,900

CORN

Today

Corn, the second most important crop in Missouri, has experienced a unique reversal during the last 25 years. Although total acreage of corn has declined 37 percent, total production has increased 39 percent. Yield per acre has risen from 44 to 88 bushels. Fertilization, improved hybrids, and effective pest control have been contributing factors.

Acreages planted to corn in 1972 and 1973 were among the lowest re-

TABLE 16 -- MISSOURI CORN PRODUCTION

Year	Acres (000)	Bu./Acre	Total Production (000)
1940	4,067	30.5	124,175
1950	4,003	44.0	176,132
1960	4,041	52.0	210,132
1970	2,837	61.0	173,057
1971	3,092	88.0	272,096
1972	2,500	91.0	227,500
1973	2,600	88.0	228,800

corded in Missouri annals, although total yields were among the highest. The 88 bushel yield in 1973 was but slightly below the 91 bushel U.S. average.

Tomorrow

Demand for corn as a grain and demand for meat assures the future of corn as a major crop in this state. In the immediate future, corn acreage will reflect the availability of fertilizer (especially nitrogen) and soybean prices.

Speculation of growing crops as a source of fuel has been heightened recently by the oil crisis. As discussed later under machinery and equipment, this development is not likely to occur for some time. It is a possibility and may affect demand for crops from which alcohol can be made, such as corn.

High lysine corn is a new development being worked on by plant breeders that growers will want to take advantage of in the future. It will be worth a premium to livestock feeders because it requires less protein supplement. It will likely be in demand to improve human diets also in developing countries where hunger and malnutrition prevail.

Grain Sorghum Today

Grain sorghum, often thought of as a substitute for corn, has a history of inconsistency in Missouri agriculture. Its indeterminate growth pattern, which contributes to storage problems, has limited its production. It is often relegated to poorer soils.

TABLE 17 -- MISSOURI GRAIN SORGHUM PRODUCTION

Year	Acres (000)	Bu./Acre	Total Production (000)
1940	70	20.9	1,464
1950	30	20.5	615
1960	452	45.0	20,340
1970	242	53.0	12,826
1971	636	75.0	47,700
1972	380	71.0	26,980
1973	440	70.0	30,800

Production totaled 30.8 million bushels in 1973, a 14 percent increase over the 1972 harvest.

Grain Sorghum Tomorrow

Storage losses that have plagued Missouri growers in the past apparently have been solved with the introduction of grain dryers. Limitations of propane gas supplies will aggravate the drying situation in the future so it is hard to predict what the grain sorghum prospects will be relative to corn.

Sorghum is low in protein but plant breeders are making progress in raising its lysine content, like that of corn. This will be a development growers will want to capitalize on as soon as it is available.

Wheat Today

Wheat production also has been characterized by an inconsistent pattern of yield and total production in Missouri. Total acreage has declined 50 percent since 1940. Surpluses, along with low prices, have contributed to the decline.

TABLE 18 -- MISSOURI WHEAT PRODUCTION

Year	Acres (000)	Bu./Acre	Total Production (000)
1940	1,713	19.0	32,547
1950	1,359	17.5	23,782
1960	1,321	28.5	37,648
1970	932	33.5	31,222
1971	848	40.5	34,344
1972	925	39.0	36,075
1973	850	30.0	25,500

Wheat acreage, like that of corn, declined in 1973. Prolonged wet conditions during the fall of 1972 delayed field operations to the extent that considerably less wheat was sown than had been anticipated. The 26.4 million bushel harvest was considerably less than the 36 million bushel harvest in 1972. The number of acres grown was down 8 percent; yield per acre was down, too, as both factors contributed to the total reduction in 1973.

Wheat Tomorrow

Recent developments in world trade have altered the wheat situation; it has now become a profitable crop. The immediate future of wheat has improved and increased production is anticipated.

The future of commercial hybrid wheat remains questionable. Improvements in wheat protein quality and quantity are anticipated.

Cotton Today

Cotton is a major Missouri crop, although grown only in Southeast Missouri Delta counties. It contributes from 50 to 90 million dollars to the state's agricultural income. The largest acreage harvested in Missouri was 583,000 in 1949. During the last ten years, the average has been around 300,000. Acreage planted in 1974 rose to 430,000 as government restrictions were lifted but the acreage was down to around 300,000 again by August due to unfavorable weather.

Weather conditions at planting time and federal farm programs have had the most influence on acreage of cotton.

Cotton yields fluctuate with weather conditions but there has been a slight trend upward with a five-year average (1969-73) of 525 pounds of lint per acre.

Cotton Tomorrow

Missouri's cotton producers have an opportunity to benefit from the strong demand for cotton if they can increase their per acre yield. Cotton appears to be gaining an unexpected advantage over manmade fibers. Fibers made from petroleum are facing a dwindling supply of natural resources and rising costs.

Agricultural leaders in the Bootheel realize that cotton is a basic in-

dustry and have prepared a program called "Planning Ahead in Missouri's Cotton Industry" (MP 9 University of Missouri Extension Division). The publication points up obstacles and suggests the action needed to move ahead in cotton production.

Forage Today

Approximately 16 million acres in Missouri are devoted to some type of forage crop.

Forages are the foundation of Missouri's large beef-cow-calf industry. In general, forage management is now oriented for grass production, rather than for legumes or grass-legume combinations. This has been brought about by a number of factors, but the major ones were, a cheap source of commercial nitrogen and the more persistent life of grass stands as compared to legume stands. This type of management has not been without some undesirable effects, such as lower quality feed, low summer production, and an increase in the number of cases of grass tetany.

Forage Tomorrow

If Missouri cattlemen are to successfully meet future challenges and continue to be competitive in the cattle industry, they must soon make very significant changes in their forage management practices. There is a pressing need for additional extension and research efforts to facilitate this change.

It will be necessary for future cattlemen to develop the management skills to take advantage of the higher yield potential, greater feeding value, more uniform seasonal production pattern, and the lower production cost of legumes as compared to grasses in their forage programs.

If the traditional livestock feeds such as corn and soybeans continue to be diverted into channels for direct consumption by humans, the need for quality forages will become increasingly important. It is only through quality forages that the livestock producer will be able to economically meet the demand for slaughter beef in the future.

Soil Fertility

It is estimated that fully one-third of the increase in per acre yield of crops over the last 25 years has come from the application of chemical fertilizers. Fertilizer consumption by Missouri farmers in 1948 amounted to 355,000 tons. In 1973 the figure was 1,586,000 tons, indicating that producers recognize soil treatments as essential.

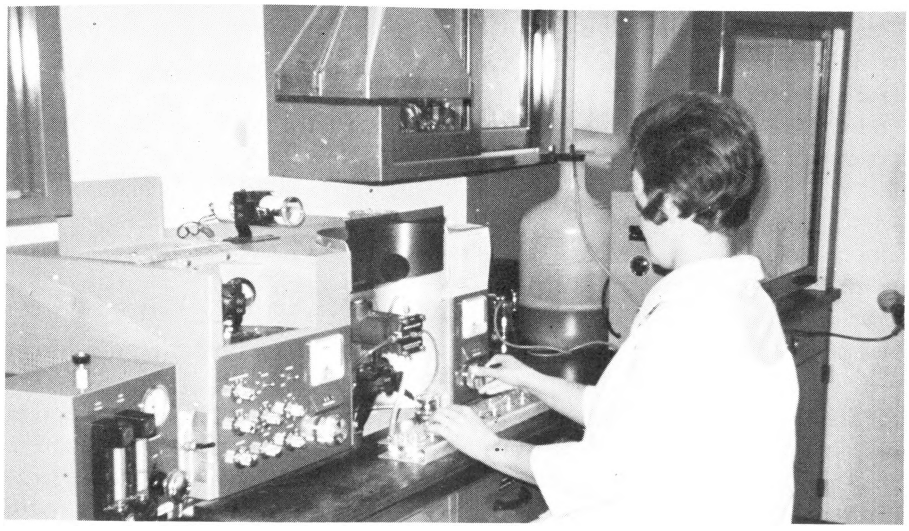
Soil treatments will be necessary in the future if current yield levels are maintained, or increased. Obtaining adequate supplies of some fertilizer materials may be a problem until production facilities can be expanded to meet demand. Higher prices for all production inputs, including fertilizer, is another problem facing producers.

Meeting the complex fertilizer supply and cost of production problems will be difficult. Extra care in adjusting fertilizer applications to the kind and amount needed can conserve limited supplies, while providing the nutrients needed for good yields. This is particularly true for phosphate and potassium. For example, 64 percent of the bagged, bulk, and liquid mixed fertilizers used in the state during 1973 were of a one-to-one ratio in phosphate and potassium. Results from soil tests and the plant tissue-soil analysis program indicate that applying the same amount of phosphate and potassium in such mixtures is not in most cases efficient use of plant nutrients. In many cases, more potassium and less phosphate is needed.

More widespread use of conventional soil tests and plant tissue-soil analysis will be necessary for producers to determine actual nutrient requirements and adjust fertilizer applications to the most efficient levels. The plant tissue-soil analysis program has pinpointed micro-nutrient deficiencies in some local areas of Missouri. However, shortages are not widespread, and the use of micro-nutrient fertilizers is not justified unless analysis and field observations have confirmed that they are needed.

Soil test and plant tissue-soil analysis testing services are available through all University Extension Centers. Missouri currently has 46 soil testing laboratories in Extension Centers across the state to help determine fertilizer needs. Just two years ago there were 80 county laboratories. The reduction in number represents the present trend toward consolidation of laboratories into larger region-

New soil testing technology is resulting in fewer but better equipped laboratories.



By 1980, irrigation is expected to be developed on about 500,000 acres in Missouri—three times the 1973 acreage.

al ones to take advantage of automated, more precise equipment.

Irrigation Today

A survey by Extension specialists indicates about 165,000 acres were irrigated in Missouri in 1973. Most of this is in southeast Missouri but other areas are exploiting irrigation rapidly. Audrain County went from 780 acres irrigated in 1970 to 3,180 in 1973. Cass moved up from none to 925 acres.

Irrigation Tomorrow

Missouri has a potential for 10 million acres under irrigation. By 1980, irrigation is expected to be developed on about 500,000 of these acres.

A relatively new concept, that of trickle irrigation, is gaining acceptance among growers of high value crops, especially grapes, apples, and peaches. This method developed in Israel, Australia, and California uses a small tube to release a small amount of water at the base of each plant. Trickle irrigation research demonstration systems will be installed at several vineyard sites.

Low operating cost, adaptability to uneven terrain, reduced labor requirement, and high returns make the method attractive to Missouri growers.

More use of animal waste in irrigation is expected because of advantages in fertilizer value, recycling waste products, and solving a waste disposal problem.

Soil Erosion

Soil erosion causes 700 times more water pollution than all other forms of pollution combined. The evidence of erosion is increasing, especially where our more rolling lands have been brought back into production.

Sediment control legislation has been enacted in several states. Some form of it will likely be enacted in Missouri since voluntary measures have not reduced the problem.

Much conservation needs to be done. Missouri has had capable conservation contractors but their services are in strong demand for flood control repair and other construction work.

In 1970 "Missouri Conservation Needs Inventory" states that conservation treatment is adequate on only 5 million of the 16 million acres of crop land in the state.

Grain Marketing Today

Farmers are becoming much more knowledgeable about marketing. During the past 10 years approximately 6,000 farmers in the state including about one-third of the larger grain farmers, have attended short courses on grain futures markets.

A recent survey indicated that 14 percent of all Missouri farmers were using the grain futures market in 1972.

The U.S. has an extremely sophisticated system of marketing agricultural products. A soybean producer, for example, has at least 6 alternatives for marketing his crop:

1. Sell the cash commodity at harvest time.
2. Harvest and store in anticipation of a better price (speculate in cash soybeans.)
3. Forward contract cash soybeans.
4. Forward the price by using the futures market and selling the crop at harvest time.
5. He can forward price in the futures market and store the crop, speculating in cash soybeans.
6. He can forward price and hedge the crop in storage.

Producers of wheat and corn have additional alternatives that are not available to the producer of soybeans.

Storage Needs Expanding

A 1972 survey showed Missouri farmers had grain storage capacity on their farms equal to about 67 percent of their 1971 corn and small grain production. Most farmers replying to the questionnaire said they expected to add to their storage capacity within the next 5 years. Since local elevators generally have small capacity, farm storage offers about the only other alternative. Farm storage enables the producer to maintain control over his crop and quite often enables him to eliminate the use of one or two trucks and still keep his harvesting machinery in operation.

Market Channels are Changing

It appears that more and more grain producers are bypassing country elevators to sell at terminals, to processors, or at elevators with water transportation. This is to be expected. As grain farms become larger,

farmers become more interested in marketing alternatives and it is not likely that a producer growing over 100,000 bushels of corn will sell or store it at an extremely small country elevator. After the grain is loaded on a truck, a few extra miles to a better market makes little difference to the producer. This has caused a shift from interior elevators to those along the river system so that barge traffic can be used.

Extensive savings in water transportation will enable large country elevators to be more competitive with other elevators in getting the grain to market. This shift has caused a reduction in small interior elevators and a rapid increase of elevators located along the Missouri and Mississippi Rivers.

Missouri is in a strategic position to compete with other states for the export market. The Missouri River is navigable by barge from Sioux City, Iowa, to the confluence with the Mississippi at St. Louis. It flows down the top half of the state and across the center part. The Mississippi River runs the entire length of the eastern side of the state. This gives Missouri a good outlet to export markets at New Orleans. Missouri's export markets last year contributed $54 million from wheat and flour, $69 million from feed grains, $197 million from soybeans, and $14½ million from oil crops. Adding the $24 million brought into Missouri from cotton exports gives a grand total of $360 million from grain and cotton exports.

Marketing Tomorrow

Grain farms are expected to continue getting larger. On-farm storage will increase very rapidly and grain producers will become more sophisticated in the selection of market alternatives. Better market news services, and timely outlook will be demanded.

PLANT PROTECTION

Emphasis on fertilization for high yields, specialization in crops, and emphasis on minimum tillage have all tended to increase pressure from insect pests, disease organisms, and weeds.

For instance, the last decade has seen the emergence and spread of the western corn root worm. Its resistance to aldrin and heptachlor has necessitated the use of more expensive insecticides and a return to crop rotations.

The alfalfa weevil has spread county by county, resulting in serious losses and necessitating the use of insecticides on this crop.

Insect Control Today

From the first time man stepped on roaches, cursed the filth of flies, swatted the mosquito, and tried to drive the locusts from his fields, he has been in a constant battle with insects to save something for himself.

Every means known to man has been used to alleviate the problem.

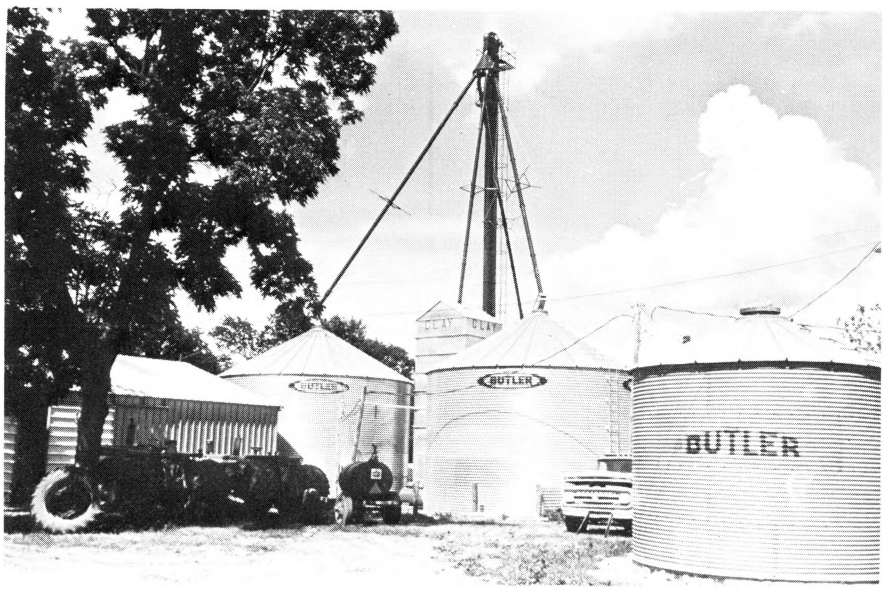
The discovery of insecticides was a great step forward. Through judicious use of chemical insect and weed controls, along with advanced plant breeding, fertilizing, and other practices, our producers have been able to make U.S. agriculture the envy of all nations.

It has not been easy. Recently, misuse of some of the insecticides has resulted in many restrictions being placed on use of chemicals.

The time and cost for new pesticide chemical development and registration continue to increase. Fewer new pesticides are reaching the agricultural market each year.

The Federal Environmental Pesticide Control Act specifies that states must meet certain requirements by October 21, 1976. Missouri now has a pesticide law with sections of major importance to agriculture:

1. Certification of all commercial pesticide applicators.
2. Certification of those pesticide dealers handling restricted category pesticides.
3. The certification of private applicators (farmers) who use restricted category pesticides.



Many farmers plan to increase grain storage capacity on their farms.

An insect scouting program supported by Delta growers may be a forerunner of future pest management methods.

The Missouri Department of Agriculture is responsible for preparing the regulations and certification procedures.

One of the most important sets of regulations to be developed is that of classification of pesticides. This will determine what pesticides will be included under the "general use" and "restricted use" categories. The extent of the "restricted" list will largely determine the number of private applicators (farmers) who will have to be trained and certified.

Insect Control Tomorrow

Not all insects are pests. Only a handful bother man. Another handful are beneficial. The rest are neither helpful nor harmful from man's viewpoint.

Serious consideration is being given today to the principles of *pest management,* rather than eradication. This includes cultural control, regulation of insect predators and parasites, reduction of the amount of pesticides used or at least the judicious use of pesticides to give timely insect control, minimization of environmental pollution, and reduction of production costs.

To apply this concept in years ahead will require a type of insect scouting provided either by individuals or companies in the scouting business or by the producer himself. It will also necessitate closer cooperation between specialists in agronomy, agricultural engineering, economics, chemistry, horticulture, plant pathology, animal science, entomology, and the agricultural producer.

It will be necessary to collect information and determine if enough damage is being done to pay costs of controlling the pests under various sets of conditions and economic values. Even with all the advances in control practices, insects will be present in sufficient numbers to cause serious damage to crops.

Weed Control

Few technological innovations in agriculture rival chemical weed control in magnitude or in rapidity of acceptance.

However, farmers are well aware that herbicides have not solved all of their weed problems. Weeds continue to divert soil moisture and nutrients.

New and more efficient herbicides continue to be discovered and it is hoped that they will eventually close present loopholes in weed control.

The trend is for herbicides that will affect a specific weed or group of weeds. It is foreseen that herbicides of the near future will be less toxic to crop plants, more toxic to weeds, shorter lived and less affected by weather conditions and soil types.

The number of acres of Missouri crops treated with herbicides jumped from 3,477,500 in 1969 to 6,707,160 in 1973.

TABLE 19 -- ACRES TREATED WITH HERBICIDES

Crop	1969	1973
Corn	2,161,913	2,117,785
Soybeans	808,220	3,789,550
Cotton	90,000	179,000
Small Grains	31,175	47,000
Pastures	199,514	273,400
Sorghum	123,530	240,900
Timber Conv.	63,161	59,525
Totals	3,477,513	6,707,160

Missouri ranked fifth among cornbelt states in percent of acres treated in 1973, according to one survey. Eighty-seven percent of the Missouri row crop acreage was treated compared to 95.5 percent in Indiana, the leading state in percent coverage.

PLANT DISEASE CONTROL

Today

Plant diseases caused by bacteria, fungi, viruses and nematodes take their toll each year in Missouri. For example, the soybean cyst nematode in Delta counties, alone, has resulted in annual losses well over $6,000,000. Control has been difficult. Soybean varieties developed for resistance to the cyst nematode were successful only a few years before a

new race of the organism attacked them.

The southern corn leaf blight epidemic of 1970-71, in which Missouri farmers lost several millions of dollars, was also a case of what can happen when disease-causing organisms adapt themselves to a vulnerable situation.

Charcoal rot, a disease caused by a fungus, can affect soybeans, corn and sorghum, causing premature death to soybeans and serious stalk rots in corn and sorghum. Successful control measures are not presently available. Research efforts are underway.

What's Ahead

Plant breeding and plant introduction programs will become increasingly important.

Plant breeding needs include: corn hybrids with increased resistance to corn root worms and the European corn borer, leaf blights, stalk rots, and viruses; soybean varieties with greater resistance to the soybean cyst nematode, several soybean diseases that affect roots, stems, and pods, and several viruses; apple varieties resistant to viruses; tree and ornamental species resistant to such destroyers as the Dutch elm disease, oak wilt, several needle blights of evergreens; wilt resistant tomatoes and other vegetables; crown rot disease-resistant alfalfas; disease resistant turf grass varieties.

Monitoring programs for diseases of corn, cotton and soybeans, and scouting programs for cotton insects are under operation in Missouri. These will need expanding. Forecasting programs will be needed more than ever in the future. More accurate and pertinent disease and insect loss data will also be needed.

Biological control of insects and diseases has always intrigued the public and deserves further research.

FUEL SUPPLIES

For years a few visionaries with a bent toward conservation of natural resources have speculated with the idea of growing crops to produce part of our fuel supplies. It has strong appeal. Oil, coal, and uranium are extracted from the earth and used. They cannot be replaced when they are gone. In contrast, a corn crop could be grown over and over on the same land to produce alcohol, harnessing energy from the sun.

The recent oil crisis heightened this speculation on use of crops for power. Dr. H. Guyford Stever, director of the National Science Foundation, commented in a New York Times interview, we "may depend in part on energy stored in batteries or flywheels, as well as on the burning of hydrogen or alcohol derived from crops and forest products." Methane gas generated from animal waste products has also been discussed as a fuel source.

Considering the need for food for an expanding world population, it appears more likely that land will continue to be used largely for food and other sources will be sought for fuel.

Of immediate concern will be how to get by with fewer gallons of petroleum to offset its rise in price. Here are a few of the steps that can be taken to do this:

1. Minimum tillage system can save as much as half the fuel required by traditional cultivation methods. (See UM Guide 4905.)
2. Conservation measures such as simple maintenance adjustments and use of the right size of tractor for a given job can save as much as 10 percent on fuel bills. (See UM Guides 1202, 1204, 1205, 1206, 1208.)
3. Good storage facilities and care in handling fuel also result in fuel saving.
4. Adequate fertility will maximize the ratio of bushels produced to fuel consumed.
5. Selection of proper herbicides adapted to soil conditions and weed populations can reduce the need for cultivation. (See UM Guides 4903, 4904, 4905.)
6. Low temperature grain drying systems offer a means of saving fuel. These are basically natural air systems with minimum amounts of heat added.

PLANT BREEDING

Included among modern plant breeding developments that have increased crop yields are hybrid corn, hybrid grain sorghum, rust resistant wheat, and improved varieties for all crops.

High-lysine corn has a great future potential. Plant breeders also have made definite progress in searching for breeding material that will enable them to improve protein quality and other nutritive traits in sorghum. Starch quality in relation to digestibility is receiving considerable emphasis. Future objectives are to improve its palatability and nutritional value.

Plant breeders are generally agreed that there is considerable possibility of improving the nutritional value of wheat by increasing its protein quality and quantity. As mentioned in the wheat discussion, the practicality of commercial hybrid wheat remains questionable. Recent progress has been slow.

Plant breeders are making good progress in improving nutritional value and increasing insect and disease resistance of crops.

Some Opportunities to Watch for–

–in Crop Production

1. The many uses of the soybean *assures* that this crop will remain in big demand in spite of increases in production.
2. Watch for improved practices that come from experience and research that boost per acre soybean yields. Best growers are averaging above 45 bushels per acre by following practices now recommended on close row spacing, timely planting, weed and insect control, plant food balance, and good quality seed.
3. Fuel saving of up to 50 percent can be gained through minimum tillage but better total management is required to maintain yields. Other cash costs may increase.
4. Study the profit potential of high lysine corn as seed supplies and markets for this crop develop.
5. Ex-king cotton seems to be rising again in the Bootheel. World demand is on the increase and the manmade fibers coming from a petroleum base face supply and rising cost problems.
6. Cattlemen should investigate changing forage programs to include more legumes. Cost of fertilizing grasses may become too high in the future. Grain may be needed for direct human consumption and the legumes offer the next best finisher.
7. Participate in insect and disease scouting programs. Timely information on insect threats can save bushels of yield and avoid cost of insect sprays.
8. Use soil tests and plant tissue analysis to determine effective fertilizer requirements. A *whole farm fertility inventory* is recommended to enable producers to plan cropping systems and budget the use of limited and more costly fertilizer.
9. There may be a new business opportunity for a commercial plant tissue and soil sampling service in some regions. It could use special sampling equipment and provide testing, interpretation of tests, and field fertility record keeping services.

–in Grain Marketing

1. Additional on-farm storage may pay dividends by enabling the producer to hold grain past the harvest season when prices are usually lowest.
2. Investigate all the alternative ways of marketing grain. "Marketing Alternatives for Producers of Wheat," available from J. M. Ragsdale, UMC Dept. of Agri. Econ., gives alternatives for both wheat and corn. Brokers and the Chicago Board of Trade, 141 W. Jackson Blvd., Chicago, have pamphlets on futures markets and hedging.)
3. Consider selling grain on the futures market to remove risk of downturn in price while still taking advantage of better between-harvest prices.
4. Investigate prices at barge terminals. Their shipping costs are lower and they have ready access to foreign markets.
5. Make use of all grain market and outlook news you can find.

–in Irrigation

1. Wherever a source of water is possible (well, stream, ponds), the practicality of irrigation should be considered. It reduces one big risk for the farmer—shortage of rainfall at critical times.
2. Irrigation with animal waste will become a more widespread practice.

Some Producer Advisory Committee Recommendations–

1. Provide for irrigation wherever practical.
2. Provide drainage where needed.
3. Use adapted varieties of seed.
4. Test soil and fertilize according to test.
5. Improve soil and plant testing methods through research.
6. Provide more education on identification of weeds and insects and use of chemicals.
7. Develop varieties (especially soybeans) with better fertilizer response.
8. Establish more elevators and greater efficiency in present elevators.
9. Capitalize on advantage of river transportation.
10. Try minimum tillage and no tillage systems.

For detailed producer recommendations for your area, obtain report from County Extension Center. (Reports available are listed at the end of this publication.

Potentials in Horticulture

FOOD CROPS

Apples

Today—Apple orchards are mainly located on deep, loessal soils along the Missouri and Mississippi Rivers (except Southwest Missouri). Annual production approaches 1½ million bushels. Missouri takes advantage of an early market and sells 95 percent fresh market from mid-August to November.

Tomorrow—Trends point to fewer growers, slight increase in acreage and an increase in production per acre. Opportunities are limited for new entries. Today's apple production demands top management. Pest problems are a constant pressure. Apple orchards of tomorrow will demand high density plantings, use of labor saving equipment and mechanical harvester aids.

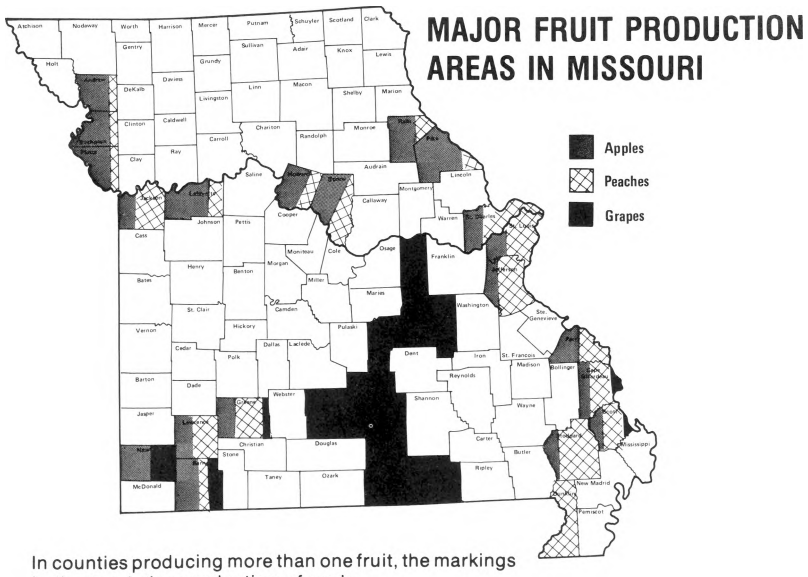
Peaches

Today—Commercial shipping peaches are primarily located in the Crowley Ridge area of Southeast Missouri - an area approaching ½ million bushels and perhaps one of the best peach growing areas in the United States. Roadside and pick-your-own peaches are located statewide near metropolitan areas and large towns. Local sales approach ¼ million bushels. Winter injury to fruit buds and spring frosts limit production some years.

Tomorrow—Trends indicate favorable expansion of both commercial shipping and local market peaches. Special emphasis must be placed on variety selection—for hardiness, bacterial spot resistance, and quality. New thrusts in high density planting and resultant new concepts in pruning management, and harvesting may be near, especially for shipping peaches. Site selection for winter hardiness and spring frosts is very important in all areas.

Grapes

Today—Grape production is located along river hill loessal soils in central and east central Missouri and the poorer Ozark soils in southern Missouri. Current acreage approaches 2,000. Mechanical harvest is a common practice. Production goes entirely to processing - Concords and Niagara for juice and jellies (National Grape Cooperative, Springdale, Arkansas), Concord, Catawba and others to six major Missouri wineries (St. Louis, Augusta, Hermann, St. James, and Rosati).



In counties producing more than one fruit, the markings indicate relative production of each.

Greatest opportunity in vegetable production may be in using family labor for a market garden type operation.

Tomorrow—Very significant in the next 10 years will be the development of Missouri wineries. They are the key to expanded production. With the exception of Concord and Catawba, suitable wine varieties for Missouri are little known. Much testing and breeding needs to be accomplished. Increased acreage should be based on a firm market outlet, a site with reasonably good soil properties and adequate air drainage, and mechanical harvest.

Nuts

Today—Walnuts and pecans are major nut crops in Missouri. Walnuts are native statewide and greatly valued for nutmeat and wood. They do best on the better upland soils. The world's largest walnut processing plant is located in Missouri as well as several small plants. Practically all of the harvested crop comes from native farmstead or roadside trees. Pecans are most abundant in the north central and west central alluvial soils. Some excellent native groves have been developed.

Tomorrow—Some increase in improvement of native pecans is anticipated. Selective spraying will become more prevalent. Little change is expected in the walnut situation.

Some Opportunities to Watch for. . . –in Horticulture Crops

1. Trends favorable for expansion of peach orchards, for both shipping and local markets.
2. Missouri's wineries are back. Increased acreage of grapes will be keyed largely to their development.
3. Research and breeding work will be important to the industry. With the exception of Concord and Catawba, little is known about adaptation of wine varieties to Missouri.
4. Opportunities appear good around populated areas for market garden operations that can be handled by family labor and pick-your-own systems. Both labor shortage and higher transportation costs favor such enterprises.
5. Home gardens offer one way to combat food costs. However, as these gardeners become more aware of different fruits and vegetables, they may also buy more of them at the supermarket.

Vegetables

Today—Vegetable production includes *market gardening* around metropolitan areas and larger cities (small acreages, many vegetables) and *truck farming,* primarily in southeast Missouri (large acreages, few vegetables). Market outlets for the market gardener include local supermarkets, local chains, central wholesale markets in Kansas City and St. Louis, farmers' markets and roadside sales. Much of the southeast truck farming is shipped through brokers to many parts of the United States. Product examples are watermelons, sweet corn and cabbage. Purple hull peas are the only processing crop of any consequence. They are sold to a plant in Arkansas. Some 15,000 acres of vegetable crops are grown in Missouri.

Tomorrow—Is a bit hazy with respect to vegetable crops. Growing vegetables requires hard work. Labor is a problem - both quantity available and quality. Perhaps the greatest opportunity is for utilization of family labor in a market garden type operation. Long distance transportation at best will be costly. Some gain in truck farming and processing vegetables is anticipated as a result of Missouri farmers being located close to some high population areas (within 500 miles).

Home Food Production

Today—Missouri has always been a popular gardening state especially in rural areas and among the retired. It is estimated home fruit and vegetable gardens approach one million in number.

Tomorrow—With the impending outlook for higher food costs, possible food shortages, and limited travel, Missourians will likely plant more gardens and increase garden size. Many will experience (again, or for the first time) the joy of working in the good earth and the satisfaction of contributing to a productive "leisure."

ORNAMENTAL HORTICULTURE

Ornamental horticulture includes the production, marketing and maintenance of plants grown for their inherent beauty and for enhancing man's environment. Increased environmental awareness, more intensive land use and more aggressive marketing have combined to make this one of the fastest growing industries in the field of agriculture.

Because of the diversity of ornamental horticulture, there are no accurate figures available on the total size of the industry, the number of people employed in it, or the volume of business conducted. However, fairly accurate figures are available on some parts of the industry. From these figures it can be shown that the production and marketing phase of the ornamental horticulture industry conducts well over 100 million dollars worth of business in Missouri each year. Few figures are available on the maintenance portion of the industry but it is thought to be as large or larger than the production and marketing phase.

Dollar figures alone do not show the total importance of the industry. Most ornamental horticulture industries require a high labor input to produce their products and services. Consequently, more people derive their livelihood from ornamental horticulture industries than from other industries of similar size.

The seasonal nature of the business and lack of qualified employees are problems common to almost all phases of the industry.

As future travel becomes more limited and a growing population exerts greater pressure on our limited land area, the demand for products and services of this industry should increase at an even faster rate than it has the past few years.

NURSERY INDUSTRY

Because of the number of years required to produce nursery stock, it generally passes through several steps from its initial propagation until it reaches the final consumer. These include propagation, growing, wholesaling, retailing, and landscape planting. Most Missouri nurseries are involved in more than one of these steps and some are involved in all five of them.

Propagation of nursery stock requires a high degree of skill and technical knowledge. A relatively small amount of land area is required and the finished product can be easily shipped. A propagation nursery can be located wherever there is someone with the knowledge and skill necessary to operate it. Lack of individuals with this kind of training will probably limit the establishment of new propagation nurseries and increased production will come primarily from the increases in production by established firms.

Nursery stock can be grown either in containers or directly in the field. Container growing is more expensive but labor can be used more efficiently with this method and plants can be harvested and sold at any time of the year. Container grown plants make up a significant portion of total nursery stock sold in Missouri. However, production of them within the state has been of relatively minor importance because of competition from growers in more favorable climates. Increased freight rates and shortages of many popular items are changing this trend and making container production in Missouri much more competitive with shipped in stock. Therefore, container production in Missouri is expected to increase significantly.

However, field production will continue to be the primary method of producing nursery stock in Missouri because it is less expensive and certain types of plants cannot be grown successfully in containers.

Total nursery production in Missouri has increased dramatically. Many Missouri nurseries have increased production at a rate even greater than the 10-15 percent annual increase reported nationwide for firms of this type in a 1973 survey.

A long term trend has been toward increased specialization. As established firms become more specialized, opportunities are made available for new growers to enter the field. However, to take advantage of these opportunities you must be familiar enough with the industry to recognize them and possess the necessary knowledge and skill to take advantage of them.

Seed, fertilizer, pesticides, and equipment make up a significant part of garden center sales.

The bulk of the 3½ million square feet of greenhouse space in Missouri is used for production of florist crops.

Most nursery stock is sold directly from the wholesale grower to the retailer. However, many wholesale nurseries supplement their own production with stock from other growers in order to offer a more complete line of stock.

This practice will probably become more important in the future as the trend of specialization continues and more growers enter the field. Nursery stock brokers, who do not grow any stock of their own, but who assemble material from a number of growers so that they can offer a diverse selection of plants to the retailer, have made an impact on the industry in other parts of the country. Brokers have had very little influence thus far in Missouri. However, it is reasonable to assume that they will in the future.

Retailing is the fastest growing segment of the nursery industry. Most established firms in the state have increased their volume of business significantly in the past few years and many new firms have entered the field. In addition to landscape plants, most nurseries sell annual flower and vegetable plants. Some also handle specialty items such as hanging baskets, terrariums, and sod. Foliage plants and other indoor plants not even sold by many retailers a few years ago, have become an important item of many businesses. Most retail nurseries and garden centers also sell lawn and garden seed, fertilizers, pesticides, and garden equipment. These allied products make up a significant portion of the sales in many businesses.

This rapid expansion in retailing has created some problems. One of the foremost problems is obtaining quality stock of some of the more popular items. Another is lack of trained personnel.

Still Room for Growth

In spite of this recent growth, the market for products and services of this industry is far from saturated. More businesses of this type will be established in the future.

There is tremendous variation in the businesses doing landscape planting in Missouri. They range from some of the largest nurseries to small part-time operations. Many offer landscape design services but some plant only from plans prepared by others. This is one of the easiest businesses to enter because little capital investment is required. Consequently, there is a large turn over among new entries in the field. Yet, many large successful businesses have started from just such a small one man operation.

All segments of the nursery industry have enjoyed a large increase in business in the past few years. If present trends continue, the industry will need to expand even more rapidly to meet the expected demand of the future. Industry leaders estimate the total volume of business conducted by the nursery industry in Missouri to be well over 50 million dollars annually.

GREENHOUSE AND FLORIST INDUSTRY

There is over 3½ million square feet of greenhouse space in Missouri. Part of this is used for propagation and overwintering of nursery stock and part for the growing of vegetables but the bulk of it is used for the production of florist crops. These crops include bedding plants, potted plants and cut flowers.

The production of bedding plants is one of the fastest growing fields in horticulture. Most experts agree that the potential market for bedding plants is much greater than that being served. Bedding plants are a perishable item and fairly difficult to ship. This makes it possible in some areas for small local growers to compete effectively with large growers serving a regional market.

Production of potted plants tends to parallel the production of bedding plants because scheduling of the

two types of crops is compatible. A grower can use his facilities more efficiently on a year-round basis. Potted plants are also relatively difficult to ship which tends to limit their production to fairly local growers.

Cut flowers are a light weight product that can be easily shipped. Even though consumption of cut flowers has increased considerably in Missouri, competition from flowers shipped in from a more favorable climate tends to limit production to well established firms. Therefore, the production of cut flowers has remained fairly stable in the state.

The traditional retail florist is highly service oriented. In addition to selling flowers, he arranges and delivers them. This type of establishment has enjoyed a considerable increase in business in the past few years but the largest increase in flower sales has been from new market outlets. These new businesses include flower departments in established stores, shopping centers, and other areas which have a high degree of exposure to the public. They differ from the traditional retail florist by offering little service and selling primarily on a cash and carry basis.

Specialized shops selling terrariums, foliage plants, and supplies for maintaining plants in the home are another relatively new type of business that has grown rapidly.

The total volume of business conducted by the greenhouse and florist industry in Missouri is estimated to be about 40 million dollars per year.

SOD INDUSTRY

Sod production has increased notably in recent years. In the past sod production was concentrated primarily in the Kansas City and St. Louis metropolitan areas and imported sod from neighboring states was an important part of the total state market. Within the past few years new producers have established production in the proximity of smaller cities such as Springfield, Columbia, and Hannibal.

A significant amount of sod is still being harvested from semi-improved native bluegrass pastures. The low quality of sod from pastures or that produced by inexperienced growers tends to depress the market in some areas and makes it challenging for progressive growers to obtain reasonably profitable prices.

Some producers lay their own sod but most of it is handled by independent sod contractors. As sod production in the state has increased there has been a corresponding increase in sod contractors. Sod contracting is another business that can be entered with little capital investment and like other businesses of this type there is a high turnover among new entries in the field.

The estimated total value of the sod industry in the state is around 15 million dollars per year.

LANDSCAPE MAINTENANCE INDUSTRY

The landscape maintenance industry includes such things as mowing, turf renovation, pruning, fertilizing, mulching, spraying, and other pest control practices. The industry can be roughly divided into two groups. One group is made up of employees hired on a year round basis to maintain golf courses, parks, playgrounds, athletic fields, grounds of public and private institutions, shopping centers, apartment complexes, etc. The other group is made up of independent companies that provide their service for a fee.

Almost all segments of the landscape maintenance industry have grown rapidly in the past few years. This is a result of increased environmental awareness, more intensive land use, and increased demand for recreational facilities and well landscaped homes.

Interior landscaping, the planting and maintenance of ornamental plants in such places as hotel lobbies, banks and office buildings is a relatively new business that is expanding rapidly in the metropolitan areas. The large franchised lawn service company is another relatively new type of business that is making an impact in some parts of the state.

In spite of the large increase in professional landscape maintenance services the bulk of this type of work is still carried out by homeowners on their own private grounds. Supplying the equipment and materials needed to carry on this type of work is a large industry.

The landscape maintenance industry should continue to expand in the future as long as it can provide service at a price people are willing to pay. However, it is difficult to forecast the effects of future economic conditions upon the industry.

Golf courses are part of a growing landscape maintenance industry.

Future Looks Encouraging in Missouri Forestry, Fisheries and Wildlife

Today

The forests are alive and growing in Missouri. Despite increasing volumes harvested each year we are still growing more wood than we are using. In 1960, Missouri measured 13,195 million board feet of standing sawtimber on commercial forest lands; in 1970, the survey showed 16,050 million board feet. Similar increases were tallied in growing stock. In 1970, growth still exceeded removal, but average tree size is declining and some species are coming into short supply. To those Missourians who are intimately involved with forests and their management, the situation is encouraging but not as optimistic as it should be.

Several trends important to Missouri forestry have been confirmed with the publication of the 1970 National Timber Resources Review. Significant among these are: In the past three decades the demand for wood products has increased 70 percent. Lumber consumption rose 49 percent, use of pulp products increased 235 percent and consumption of plywood and veneer climbed at the phenomenal rate of 475 percent. Predictions through the year 2000 are for similar increases.

In contrast to this increasing demand for forest products, we find net growth of both hardwoods and softwoods to have increased only about one-third between 1950 and 1970. Fitting this to our current levels of forest management for timber production, we find the next few decades will permit only modest increases in timber harvest. Modest increases in supply, plus mammoth increases in demand, will mean but one thing to the consumer—higher prices for timber and timber products.

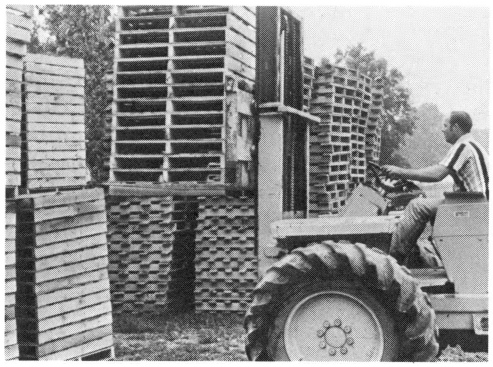
How did this situation come about and what can be done about it? Perhaps the most significant factor is that our commercial forest land area is decreasing and our needs are increasing. Lands capable of growing timber products, and available for that purpose, are being transferred to recreational uses, pasture, urban development, airports, highways, reservoirs, and other purposes. Our most recent concern for protecting the natural environment has also modified our commercial timberland base.

Timberland Base Decrease

This decreasing timberland base is a new trend. Abandoned agriculture lands reverting into forests previously off-set these losses. This is no longer true. In Missouri alone, almost one and a half million acres of timberland were lost to potential wood production in the past 10 years. The trend is likely to continue since other land uses are also important, and our much needed "environmental awareness" is hopefully here to stay.

Immediate solutions to a wood shortage, and the resulting higher cost to consumers, are not as simple as one might suppose. Using substitute materials for wood such as steel, aluminum, and plastics will only compound other problems. We must

Specialized equipment speeds handling of logs.



Much of the world's goods moves on hard wood pallets—many made in Missouri.

Missouri's Department of Conservation has increased effectiveness of fire protection.

realize that these substitute materials are non-renewable resources. They could become rapidly depleted. Also, more energy is required to convert plastics and metals into useful products and the environmental problems of land reclamation following mining contribute to much higher production costs.

The most logical and immediate solutions to an impending wood shortage and higher prices are intensified forest management and more efficient utilization of our present supply of timber.

Producing One-Third of Potential

Intensive forest management means merely to apply more vigorously the forest improvement practices we know will increase growth and improve quality and to improve protection of timber from fire, insects, and disease. The timberlands of Missouri are presently producing only one-third of their potential. More efficient use of our present supply of timber means working toward the concept of total tree utilization. Once a tree is selected for harvest we should strive for a no-waste situation. According to a recent study, 18 percent of the softwoods and 31 percent of the hardwoods harvested each year, never become a useful product. Efficient use of our present supply also includes recycling of our wood pulp and paper. At present, only about 17 percent of our paper and board is being reused. We now believe it is possible to reuse as much as 40 percent of these products.

Missouri is in an excellent position to respond to the national needs for more wood. Approximately one-third, or nearly 13 million acres, of our state is classified as a commercial timberland. We rank 23rd in the nation in timbered acreage and are strategically located to supply markets throughout the Midwest. In addition to potential for wood products, Missouri forest land may have even greater importance economically and sociologically, for recreation, wildlife production and scenic value. These aspects of multiple land use must receive increasing attention under intensive management practices.

Land ownership patterns become important when one talks about intensive land management. Each land owner has his own plans and ideas on how his land will be used. Of Missouri's nearly 13 million acres of forest land, only about 2 million acres are public lands. On these lands we would assume that management plans could most easily be implemented to satisfy the public needs. The remaining 10.5 million acres of commercial timberland in Missouri are privately owned. Nearly 8 million acres are owned by farmers, over 2 million by miscellaneous private owners (railroads, mining corporations, professional people, wage and salary workers, etc.) and less than ⅓ million acres by the forest products industries. The problem of developing a unified management plan to grow more wood, produce more wildlife, provide more quality recreation, and preserve the environment becomes a people problem first—then a land management problem. There are in excess of 200,000 "people" who own timber land in Missouri. To motivate, stimulate and educate this diversified group of private forest landowners into putting their forest and woodlot into their most productive and valuable condition, is a challenge we must all accept.

Many Plants Dependent on Forests

Nearly 700 primary wood-using plants depend on the forests of Missouri for their existence. Eighty percent of these are sawmills. Charcoal plants and cooperage mills are second and third in terms of volume of roundwood used. Other primary wood-using plants include preservation treating, handle manufacturing, veneer mills, pulpwood, shavings mills and fiberboard and roofing felt plants.

There are now approximately 2000 fewer sawmills in Missouri than there were 20 years ago, yet lumber production has shown a steady increase. This increased production per mill is the result of expansion and modernization of plant facilities by the more progressive mill managers.

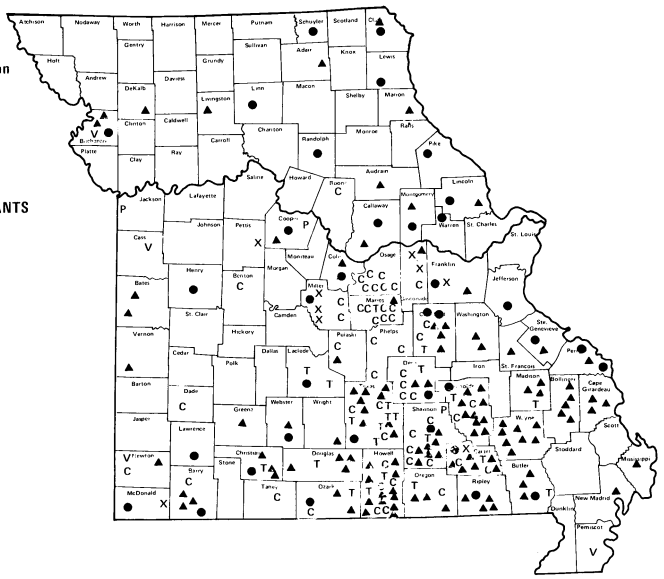
Perhaps the fastest growing and now the largest user of Missouri lumber is the wooden pallet and container industry. Other important users are furniture, flooring, boxes, crating and railroad tie manufacturers. High value specialty items of significant importance are walnut gunstocks,

and walnut novelties. Missouri is the leading producer of cooperage and charcoal, producing one-fourth of the U.S. supply of each of these commodities. It is one of the three leading states in walnut lumber and veneer production.

The contribution of the wood using industries to Missouri's economy is significant. According to the 1967 Census of Manufacturers, they accounted for 4.3 percent of employment, 3.4 percent of the payroll and 4 percent of the wages of all Missourians employed in manufacturing. Many of the estimated 20,000 employed in the wood-based industries are in small towns and rural areas where their contribution is especially important to the rural economy. The estimated value of timber harvested in Missouri in 1969 was 33.1 million dollars. This value has been increasing since that time. Principal species harvested are the oaks, hickory, cottonwood, sycamore, walnut, and shortleaf pine. Most of the logging is located in, and adjacent to, the eastern Ozark region of the state. An exception is walnut. Half of Missouri's walnut is harvested in the northern prairie region.

PRIMARY WOOD-USING PLANTS IN MISSOURI

▲ SAWMILL (over 1 million bd. ft. annually)
● COOPERAGE MILL
C CHARCOAL PLANT
V VENEER MILL
P PULP MILL
T TREATING PLANT
X MISCELLANEOUS PLANTS



Fish and Wildlife

Missouri is blessed with a wealth of fish and wildlife resources that make a significant contribution to food and fiber production. Production and harvest ranges from the intensive fish farming industry and game bird breeders to the commercial fisheries and fur trapping. In 1973, the wholesale value of production in fish farming had rapidly increased to more than $8,000,000; the value to fur trappers was at a record high, $2,300,000. Important species in fish farming are channel catfish, rainbow trout and bait minnows. Of thirteen wildlife species trapped, the raccoon generates the greatest dollar income.

The agricultural and forest lands and waters of Missouri support populations of game, wildlife, and fish that have great social and recreational value. More than 25 percent of the population purchase hunting and fishing licenses. Fish and game have food and economic value. Based on a 1970 national survey of fishing and hunting, resident Missouri anglers and hunters spend more than $161,000,000 a year in pursuit of these recreational interests. The peo-

Swan Lake Wildlife Refuge in Chariton County attracts hunters and wildlife enthusiasts from throughout the nation.

ple and economy of Missouri will continue to benefit from fish and wildlife habitats and resources. With appropriate research and management, the benefits to society will be enhanced in the future.

To Aid Forest Development

Several forestry programs are available to Missouri's private landowners and wood production industry to help them increase production, improve quality of products and make more efficient use of forest resources. The Extension Forestry Educational Program of the University School of Forestry, Fisheries and Wildlife reaches every county in the state through its University Extension Centers.

The Missouri Department of Conservation and U.S. Forest Service offer assistance to individuals through their farm forestry and state and private forestry programs, including state nursery grown trees, available at low cost to cooperators.

The Soil Conservation Service provides timber production information to cooperators where applicable and the Missouri Tree Farm Program, sponsored by industry, gives recognition to timber owners who are doing outstanding jobs of forest management.

Forestry, Fisheries and Wildlife Tomorrow

The most important fact to keep in mind in years ahead is that Missouri forests are producing only a fraction of their potential in products and services. More intensive management of forests and farm woodlots is needed.

Urban residents are becoming more aware and concerned with the relation of their tree resources to the environmental quality of their communities. Community trees often represent large investments and in many cases are irreplaceable.

Special programs are needed to assist the growing number of absentee owners of forest lands.

The education and training of youth to become major participants in transferring environmental awareness into the forest products industry is another need and possible solution to a growing problem. Industry must abandon inefficient methods where they exist, improve plant equipment and layout, adopt new technology and processes, improve managerial ability and establish better marketing practices in order to reduce waste and increase production.

Fish farming is a growing and dynamic agricultural enterprise. Potential inexperienced producers are faced with many technological and management problems that include engineering and design of facilities, water quality, feeding and nutrition, fish health, and marketing. Efficiency and quality control are keys to success and growth of the industry.

More than 300,000 ponds have been constructed on Missouri farms and the number is increasing annually. With proper management these ponds represent a great potential for both food and recreation.

Wildlife is an important part of multiple land use. Loss of habitat is a threat to the status of populations in the future.

Some Opportunities to Watch for– –in Forestry, Fisheries and Wildlife:

1. Missouri forests are producing only one-third their potential. Merely applying present management knowledge can increase production two-thirds.
2. With the land area in forests shrinking and with demand for wood products soaring far ahead of increases in production on remaining acres, prices and income from forest products can be expected to keep on climbing.
3. Fish farmers need the benefit of better facilities, skills and techniques, which can be assisted with educational programs and research.
4. Multiple uses for forests can be considered for returns to the land owner from fish, game, and esthetic resources as well as wood products.
5. Wood utilization industries can strive to make use of whole trees.
6. Forestry researchers believe that it is possible to recycle 40 percent of our paper and wood. Currently, we recycle only 17 percent.

Some Producer Advisory Committee Recommendations–

1. Prepare and implement management plans for woodland.
2. Research is needed into tree growing techniques and uses for wood residues that are now discarded.
3. Use cost-sharing and tax deferment incentive to encourage small private landowners to improve the the growth on their woodlands.
4. More technical help is needed to get research results applied to Missouri forests.
5. Have public lands managed by professionals for multiple use, including water, forage, wildlife, timber, minerals, and recreation.
6. Continue present public financed program for protection of forests from fire and pests.

For more details, see *Ozark Foothills Agriculture Plans for Tomorrow,* available at Poplar Bluff Extension Center.

Farm Numbers Begin to Stabilize

Missouri Farms Today

While the total number of farms in Missouri declined 10,000 from 1964 to 1969, almost all of this reduction was in the part-retirement class of farms. These were farmers 65 years or older who sold less than $2500 in farm products. Every group of farms with sales greater than $10,000 increased. (See Table 20). Both part-time and small commercial farms (sales $2,500 to $9,999) remained as the same percent of total farms. Therefore, the drop in farm numbers occurred in two groups—part-retirement and the very small farms (sales $50 to $2,499).

The Statistical Reporting Service estimated that the number of farms leveled out at 139,000 in 1972 and continued at that level in 1974.

The average size of Missouri farms is 236 acres. As the number of farms leveled out, the average size of farm stabilized. Today when a farm expands by consolidating some neighboring farms, some other farm is being subdivided to form smaller farms.

Investment per farm has increased rapidly from the $53,034 reported in the 1969 Census. Land values were 74 percent higher in 1974 than they were in 1969. Farm machinery, buildings, and livestock also increased in value.

The value of gross farm production from Missouri farms in 1973 almost reached $2.9 billion. This was double what it was a decade earlier.

As the number of older farmers, especially the part-retired, quit farming, the average age of Missouri farmers dropped to 52 years.

Total number of persons working on Missouri farms declined 7,000 between 1970 and 1973. The number of hired workers was down about 1,000 (see Table 21.) Average farm wage rates are rising (see Table 22.)

Farmers who rent all the land they farm make up less than one farm in ten. In 1959 one farmer in seven was a full tenant operator.

TABLE 20 -- NUMBER OF MISSOURI FARMS BY DIFFERENT AMOUNTS OF SALES

Gross Sales	1959 No.	1959 %	1964 No.	1964 %	1969 No.	1969 %
Large						
$40,000 up	2,274	1	3,425	2	6,386	5
$20,000-$39,999	6,394	4	7,888	5	13,021	10
Total	8,668	5	11,313	8	19,407	14
Medium						
$10,000-$19,999	18,365	11	17,849	12	19,410	14
Small						
$2,500-$9,999	64,842	38	48,666	33	47,686	35
$50-$2,499	14,768	9	17,257	12	9,097	7
Part-time	39,566	23	31,565	21	28,584	21
Part-retirement	22,364	13	20,633	14	12,854	9
Total	141,540	84	118,121	80	98,221	72
Total farms	168,573	100	147,283	100	137,038	100

Management Today

Never before have good management skills been so important to the farmer. As cash costs and total investments continue to rise, the effect of each management decision is increased.

A key to making good decisions is to have a set of records which show what is going on in the farm business. Unfortunately, most farm records are kept primarily to meet requirements of income tax returns.

A few years ago, several private firms appeared ready to enter the field of providing complete record-keeping services to farmers. However, this never really developed and there are few firms offering the service today.

Most farmers today keep their own records and take them to a tax practitioner at income tax time.

TABLE 21 -- AVERAGE NUMBER OF WORKERS ON FARMS
(000)

Year	Missouri			U.S.		
	Total	Family	Hired	Total	Family	Hired
1970	191	161	30	4,523	3,348	1,175
1971	188	157	31	4,436	3,275	1,161
1972	183	154	29	4,373	3,227	1,146
1973	184	155	29	4,395	3,232	1,163

TABLE 22 -- AVERAGE FARM WAGE RATES

Year	Missouri		U.S.	
	Per Month (House)	Per Hour (w/o Room & Board)	Per Month (House)	Per Hour (w/o Room & Board)
1970	$278	$1.57	$328	$1.64
1971	288	1.71	340	1.73
1972	312	1.77	361	1.84
1973	345	1.95	393	2.00

Management Tomorrow

Biggest problem farmers will face in the next few years will probably be widely fluctuating prices. To make right decisions, farmers will need to know what their costs are for each livestock and crop enterprise. Then they can figure breakeven prices and adjust production to meet the wide price swings.

Management tools such as budgeting and cash flow analysis will provide helpful information—especially to farmers who are making sizeable investments and carrying a heavy debt load. Lenders will insist that borrowers have more financial information to back up their loan application.

Again a good set of farm records will be a must. In spite of a rather slow start, commercial recordkeeping services are likely to be used more in the future.

Estate Planning. Rising land prices have greatly increased the value of farm estates. This increases need for more estate planning. First reason often given for estate planning is to save on inheritance taxes. Probably more important is the need to plan the estate adequately so that the farm operation can be passed on to the next generation as a sound operating unit.

Groups and leaders interested in orderly development of agriculture in their community should be concerned that educational and legal services be available for adequate estate planning.

Form of Ownership. Most of the larger farm operations will be more than a one-man unit. This will permit some specialized management and permit flexibility in letting the operators do the work they like best. Also, the very capable people who will be farming these larger operations will want a life style which includes such benefits as time off and vacations.

Partnerships will likely be the predominant form of multiple ownership. They are relatively easy to get in and out of.

There will be more farm corporations formed, primarily by families to make easier the transfer of farm assets to the next generation.

Custom Services. Farm operators will consider more carefully the use of custom services. Machinery will become costlier and more specific for certain uses. By hiring some custom work done, an operator can gain the use of equipment and expert operator without major machinery investments. Stricter laws on use of pesticides may speed the trend to custom application in that area.

Some private and cooperative firms will likely offer greatly expanded custom services.

Education and Information. A growing number of young, well educated, full time farmers will aggressively seek more technical and management information. They will want more information about the research and basis for recommendations made by agricultural colleges and commercial firms.

It will also be important to provide technical and management information to smaller, part-time farmers: (1) to help them make a profit, and (2) to benefit society by making good use of the land, labor, and capital that will be used by these operators.

Today's farmers want more research information and recommendations from colleges and commercial firms.

Credit Needs Continue to Increase

Today

Missouri farmers are using more credit because more inputs must be purchased at higher costs. Land prices also are higher.

On January 1, 1973, non-real estate credit supplied by commercial banks, Production Credit Associations, and the Farmers Home Administration to Missouri farmers totaled $756 million. This represents an increase of 52 percent from January 1, 1968. Merchants and dealers supplied additional amounts of short-term credit.

Real estate loans on Missouri farms were 1.2 billion dollars on January 1, 1973. The amount of real estate loans had increased 33 percent since January 1, 1968.

Economic conditions and Missouri's 8 percent usury law have caused significant changes in the sources of credit used by farmers in recent years. The past several years have been a period of continued uncertainty in the nation's money markets. Prime interest rates reached into the 10 percent range in the 1969-70 credit crunch and higher in 1973-74. As long term rates responded to the market, interest rates on mortgages also increased. When rates which lenders could obtain on mortgages increased beyond the 8 percent level, some lenders, particularly life insurance companies, cut back their Missouri lending operations. Other lenders who were not limited by state law in the amount of interest they could charge or who wished to continue in the local market despite the possibility of better earnings elsewhere, increased their agricultural credit (see Table 23.)

Current Problems. Agricultural credit accounts for less than 4 percent of the private and public debt in the United States. Agriculture consequently has little influence on the level of interest rates. Until the level of inflation in the economy is reduced, interest rates can be expected to continue at record high levels. If agriculture is to obtain the credit needed, it will have to pay the prevailing market rates. Even at higher rates, the availability of credit may be reduced as government monetary efforts to slow inflation reduce the amount of money in the economy.

Merchants and dealers have historically supplied substantial amounts of short term credit to farmers. During the last year, this credit has been reduced, partly because many dealers were themselves in a credit pinch (it takes more capital to operate at the higher price levels experienced recently); also the fertilizer shortage

TABLE 23 -- FARM CREDIT SOURCES IN MISSOURI
1973

Source	Total Loaned	Change from Jan./1/68
Non-Real Estate Farm Loans		
Banks	$ 551,494,000	+ 56%
Production Credit Assns.	180,074,000	+ 44%
Farmers Home Admin.	24,321,000	+ 20%
	$ 755,889,000[a]	+ 52%
Farm Real Estate Loans		
Banks	$ 260,696,000	+ 45%
Federal Land Banks	266,010,000	+ 65%
Life Insurance Cos.	200,087,000	- 10%
Individuals and Others	466,441,000[b]	+ 43%
Farmers Home Admin.	15,772,000	- 7%
	$1,209,006,000	33%

[a]Does not include loans held by nonreporting agencies such as merchants and dealers.
[b]Approximate figure and to be used as general indicator only.

provided the opportunity for many who had been reluctant participants in the credit game to get out. Future credit offered by dealers will be more formalized than in the past and will have carrying charges sufficient to cover the cost of extending the credit.

A dynamic agriculture requires a continuous inflow of young farmers. Getting started in farming has always been difficult, but never more difficult than today. Recent changes in the working relations between the Farmer Home Administration and other lenders whereby FHA will take a second mortgage does open up the possibility of increased credit availability for qualified young farmers.

Tomorrow

The high interest-tight money situation will be with us for some time. This situation, along with the larger amount of credit per farm which can be expected, places an increasing importance on good money management. The farmer can expect to be treated like other businessmen. His credit suppliers will increasingly require financial statements to support loan applications. "Sound loans" (loans which can be justified by both profit and repayment criteria) will replace "safe loans" (loans whose principal justification is the security backing them).

Opportunities

Lenders and farm borrowers can work more closely to:

1. Anticipate credit needs further in advance.
2. Help to better identify payback capabilities.
3. Plan most effective use of short term vs. long term credit.

Missouri farmers need to have equipment, repair services, and supplies available locally at costs equal to or lower than those in other regions to compete favorably.

Farm Supply Industry Has Important Role

Missouri farmers spend more than half a billion dollars each year on feed, seed, fertilizer and lime, chemicals, and other supplies used in producing crops and livestock. This represents about a doubling in dollar purchases since 1960 (Table 24). These figures rose even more rapidly in 1973-74 because of increased

TABLE 24 -- FARM PRODUCTION EXPENSES[1]
MISSOURI, 1960-72

Year	Feed	Seed	Fertilizer & Lime	Misc. Supplies
	million dollars			
1960	168.8	17.3	50.7	88.8
1965	196.1	21.0	69.5	108.4
1970	253.2	28.4	96.1	155.8
1972	317.7	36.5	121.1	178.9

[1]Data from Missouri Farm Income, compiled by the Missouri Crop and Livestock Reporting Service, April, 1974.

TABLE 25 -- ESTIMATED IN-PLANT COSTS FOR BULK BLENDING FERTILIZER OUTLETS*

Average Annual Volume (tons)	Estimated Cost Per Ton Specialized Firm	Multi-Product Firm**
605	$40.50	$16.04
1,434	19.46	9.66
2,270	13.17	7.92
3,380	10.60	6.98
4,438	9.05	6.51
5,499	8.09	6.22
6,446	7.50	6.05
10,199	6.24	5.66

*Data from "The Cost of Retailing Fertilizer in Minnesota," by Robert Rathjen & David Dahl, Minnesota Agricultural Economist, March, 1971.
**Firms handling feed, petroleum, or having an elevator operation.

acreages and higher prices.

To an important degree, the profitability and competitive position of Missouri's agriculture depends upon having effective, aggressive firms handling farm supplies. Recent shortages and higher prices for fuel, fertilizer, chemicals, machinery, and feed have highlighted this dependency.

An efficient agriculture depends upon farmers being able to buy these supplies at the lowest possible cost. Low costs, in turn, require the individual firms making up an industry to be aggressive and up to date. Along with good management, a farm supply firm's ability to operate efficiently depends importantly on the size of the firm.

Size Economies

Economies of size exist when lower costs can be achieved as the size of plant increases. For example, 5,000 tons of fertilizer might be handled with two plants having a 2,500 ton capacity or by one plant having a 5,000 ton capacity. If there are size economies, the total cost of processing through the single plant will be less than through the two smaller plants. However, a co-op or private firm may still choose two smaller operations, such as two grain receiving elevators, because of added customer convenience.

There are several sources for the lower per-unit costs achieved in larger plants. Commonly, the cost of buildings, equipment, land, and management do not increase in the same proportion as plant capacity. Fixed costs per unit decrease. In addition to lower fixed costs per unit of output, larger plants may use larger, more efficient equipment than would be used in smaller plants. Variable costs may also be lowered.

Two recent studies indicate the extent of size economies in farm supply firms (see Tables 25 and 26.)

In Missouri, there are many farm supply firms which do a small volume of business. These firms can compete effectively in the short run—by not covering depreciation costs (the plants may be fully depreciated) and by not replacing buildings and equipment. In the long run, these small volume firms are at a distinct disadvantage because of the economies of size in farm supply firms. A continued exit of firms from the market can be expected.

Inflation and Uncertainty

As the prices of goods increase, a business firm needs more dollars to cover its higher dollar amounts of inventory, accounts receivable, and other items. For many farm supply firms, this means that some dollars will have to be borrowed. Some firms may not find borrowing feasible and will decide to discontinue business. Those firms using a large amount of borrowed money will need better records and better management than many have had in the past.

In an inflationary period, firms often find that selling price increases tend to lag behind cost increases. This decrease in margins requires higher volume if profit levels are to be maintained. Those firms which are unable to adjust quickly enough may be forced out of business.

When prices move up and down in a short time period, the planning processes of managers are upset. Margins which were adequate in more stable times are not sufficient to cover the risk of losses on goods held in inventory while prices are falling. Until the economy becomes more stabilized, farmers must expect that dealer margins on farm supply items will be larger than in the past.

The Energy Situation

The energy situation has or will have a considerable influence on the operating practices of farm supply firms.

TABLE 26 -- ESTIMATED IN-PLANT COSTS FOR CUSTOM MIX FEED MILL* NEBRASKA, 1971

Annual Volume (tons)	Estimated Cost Per Ton Specialized Firm	Multi-Product Firm**
13,780	$ 3.65	$ 3.54
23,140	2.93	2.89
34,580	2.39	2.40

*Data from "Economies of Size, Volume & Diversification in Retail Grain & Farm Supply Businesses" by D.G. Anderson and D.L. Helgeson, Nebraska Agricultural Experiment Station Research Bulletin 261. April. 1974.
**Firms handling feed, liquid fertilizer, grain and petroleum.

The short fertilizer and chemical situation which was experienced this past year has provided an opportunity for many dealers to eliminate burdensome credit programs. To the extent that dealers continue to grant credit to customers, it will be increasingly on a self-supporting basis.

Transportation will become increasingly important in the competitive situation of individual farm supply firms. As gasoline becomes more expensive, firms which can move goods by rail or barge will be able to achieve lower costs.

Legislation

Legislation regulating chemical application will open up increased application and other service activities for farm supply dealers. In order to handle this type of business, the firm will have to provide more expertise in this complex area. Firms which cannot provide these services will be at a competitive disadvantage.

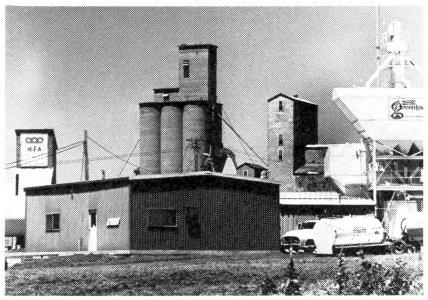
Legislation affecting such activities as feedlot location and fertilizer runoff will also have impact on farm supply firms. This type of regulation will, however, have more impact on the activities of individual suppliers than on the entire industry.

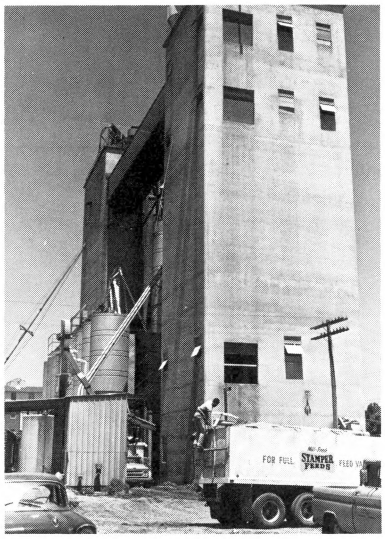
Problems and Opportunities

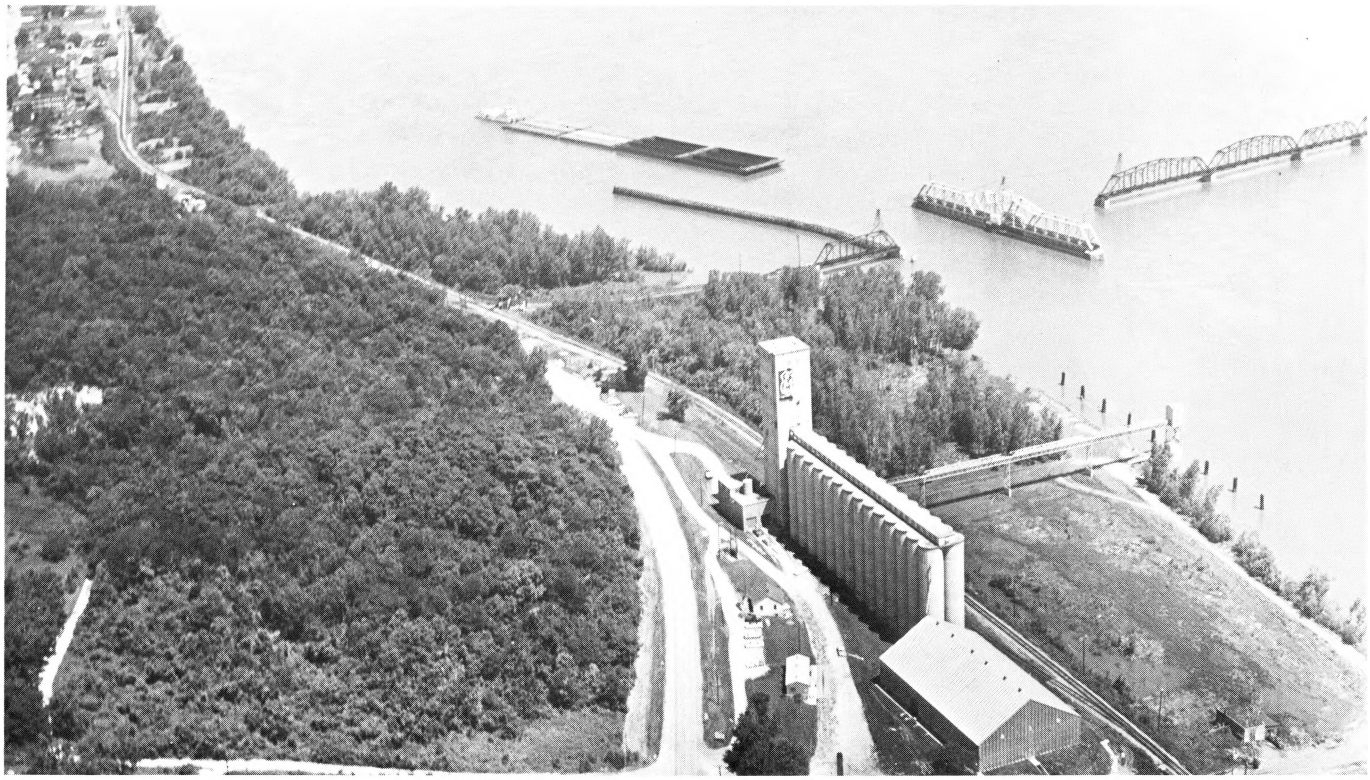
It should be recognized that agribusiness firms face many of the same cost-price pressures that farmers have. This will require management to do an effective job of buying, inventory control, selling, and recordkeeping.

Businessmen who handle commodities will need to look for ways to protect themselves from undue risk because of wide swings in prices. This protection might include hedging or increased operating margins.

The recent shortage of farm supplies has provided reminders of desirability of building long term relationships with suppliers. The advantage of this type relationship must be weighed against possible savings from time to time by shopping around.







Barge transportation on the Mississippi and Missouri Rivers gives Missouri grain farmers access to foreign markets and some cost-price advantage.

Transportation Policy and Problems

Transportation is the lifeline between the farmer and the consumer. The farmer depends on swift, safe and economical movement of his commodities to the market place. The consumer depends on the same services for his supply of food and fiber.

Both farmers and consumers have a keen interest in the cost of these services. Higher rail rates, for example, mean higher costs for getting farm products to market. Either the farmer will absorb these costs—and, as a result, get less for his crops—or consumers will pay the cost through higher prices.

More interest and concern for transportation problems and solutions have been expressed recently in government, marketing, and transportation industry circles than at any time in the past 20 years. Those in agriculture must look at their special transportation needs and become involved in the problem solving and policy determination process. Otherwise, they will simply look on while decisions are made concerning transportation system organization, regulation, pricing and services which will be vital to the economic future of agriculture.

Several factors emphasize the need to plan and develop a modern transportation system to meet the special requirements of agricultural production and marketing. They include progressive deterioration of our rail transportation system and service, increasing pressure on outdated rural farm-to-market roads, and the urgent need for energy conservation.

Financial collapse, bankruptcy, and poor service of several major railroads have focused the national spotlight on the need for revitalizing the rail system. There is also need for better coordination of the different kinds of transportation and for improved arrangements for pricing and regulation of rates and service.

The traditional position of agriculture has been to favor exemption of agricultural truckers from rate regulation. Railroads are urging that they, too, should be given freedom to set their own rates for agricultural shipments without state or federal regulation. But while railroads ask for rate freedom, many motor carriers and some agricultural producer organizations now favor Interstate Commerce Commission regulation of truck rates for agricultural commodities.

Rail car supply and use have been a chronic problem at harvest time. There has been a drastic reduction over the last ten years in standard box cars available for grain transportation. Numbers of high-volume grain hopper cars have increased, but not rapidly enough to fully replace the lost box car capacity. Furthermore, these larger cars cannot be moved over many of the light rail, under-maintained branch lines serving grain production areas. The car supply problem promises to be with us for some time to come, particularly in branch-line service locations.

Traffic flow and revenue return on many rail branch lines have declined heavily in recent years. Maintenance has been deferred and service has been curtailed. The railroads are asking to be relieved of the financial burden of maintaining, upgrading, and operating unprofitable branch lines.

Many problems of agricultural transportation stem from the lack of a systematic review and analysis of transportation needs involving all kinds and segments of the economy, especially agriculture and the non-metropolitan areas of Missouri. Such analysis is essential to the development and implementation of a state transportation policy and program which would serve these needs.

Major Questions To Be Answered:

1. Do conditions today warrant a change in the provisions for regulating pricing of agricultural transportation?
2. What are the alternatives for transportation in areas threatened with the loss of rail branch line service?
3. What can agriculture do to encourage the use of rail transportation which makes more efficient use of fuel than does truck transportation?
4. What can be done to keep rural highways up-to-date?

Suggested Steps Toward Solving Problems

1. Be alert to problems of equipment availability, service deficiencies, or competitive disadvantage in transportation rates which may affect your ability to market and deliver agricultural output successfully and profitably.
2. Keep transportation carriers, marketing agents and receivers, farm organizations, and State Department of Agriculture informed about transportation problems you encounter in buying or marketing your products. Such communication is important, both for spot handling of current problems and for longer-term adjustment of transportation capabilities and regulatory provisions to the needs of Missouri agriculture.
3. Any Missouri farmer or representative of farmers who wants help in preparing evidence for negotiating improved transportation rates or services, or needs additional information about transportation concerns, can contact the Extension Transportation Economist, Department of Agricultural Economics, University of Missouri-Columbia.

Good rail services, modern equipment, and storage all have a lot to do with the success of Missouri agriculture.

After Food Leaves the Farm

Agriculture's job of producing food is far from finished when trucks roll off the farm loaded with grain, livestock or poultry. One way to visualize agriculture is to look at it as an assembly line. Farm producers turn out the basic raw product, using their land, labor, and a variety of supplies bought from agricultural firms. Then these raw products must be processed, stored, and delivered to consumers through wholesale and retail operations.

Analysis of all these steps is beyond the scope of this publication. Earlier sections discussed briefly some trends in meat packing, and dairy and poultry processing.

However, those interested in agricultural development should consider carefully this fact: Some 55 to 60 percent of the consumer's dollar spent for food goes for processing and marketing services after the raw product leaves the farm. This means processing and marketing firms can make important economic contributions to a community.

Processing in Missouri Today.

There are about 450 food processing and manufacturing plants in Missouri. They process and manufacture such foods as meat, milk, cheese, ice cream, poultry, bakery additives, fish, chile, candy, baby foods, frozen dinners, and many others. Most of these plants are in or near St. Louis, Kansas City, Springfield, or St. Joseph.

The numbers of plants remained about steady over the last five years.

Several nationally known food processing firms have their corporate headquarters in Missouri. Missouri ranks third among the states in cheese production.

More new food regulations were activated in 1973 than in all previous history of the Food and Drug Administration and the Public Health Service. The new rules cover everything from occupational health and safety of employees in food plants to extensive changes in the labeling of all food products.

Tomorrow

In years ahead, plants will get larger, more automated, and probably make more "fabricated" foods (for example, meat extenders and dairy substitutes made from soybean or other plant proteins.) The production of natural food commodities will be supplemented with more formulated foods and derived products.

The impact of intense legislative activity on the food industry will be profound. From the consumer viewpoint, greater confidence in the safe-

Some Opportunities to Look for—

1. Higher costs for transportation may open up opportunities for food processing close to the base of production. The presence of a processing plant in a community often stimulates new interest in the production of the raw product in the surrounding area.
2. There will be opportunities to develop new convenience foods or foods fabricated to meet specific nutritional needs.
3. Processors are searching for ways to convert more of the processing wastes into useable byproducts. This may encourage groups of processors to locate in large complexes, thus providing a greater volume of waste product for further processing.
4. Producers, processors and others in the marketing chain could work harder at understanding the others' problems. Too often, one group accuses the others of being to blame for problems that come up. Certainly, hard bargaining needs to take place but the groups could work more closely on mutual problems and present a more united front for the whole of agriculture.

ty and wholesomeness of our nation's food supply should result. For the food processor, a greater commitment of time, talent and dollars toward food safety, nutritional analysis, and labeling, is essential. A greater degree of skill and knowledge at all levels of employment will be necessary. Long time employees will need refresher courses.

Significant investments will be needed to comply with waste handling regulations. Some types of firms with plants in several locations will continue to consolidate their facilities into larger, more diversified operations.

Demand will grow rapidly for a variety of continuing education programs such as those provided by the Food Science and Nutrition Department of the University. Community groups, processors, and food manufacturers will want more information on nutrition than ever before. Commodity groups will want technical data for product promotion or for defense against attacks by food faddists. Processors and manufacturers will need the information to meet labeling requirements.

More People Eat Out

Just a few years ago the food service industry was made up of "mom and pop" operators. The latter 50s and early 60s marked the passing of many of these operations.

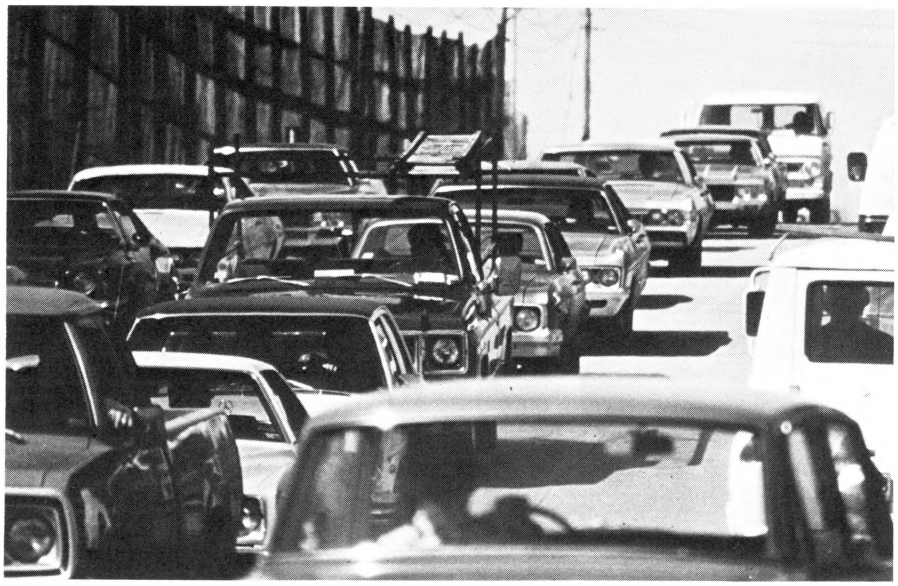
Today, food service is a major industry. In 1972, total U.S. sales for the food service industry were estimated to be $44.7 billion.

By 1986, it is estimated that the total sales of food service industry will be $100 billion. The food service industry is a major user of agricultural products and a major contributor to the tax base in Missouri.

Population, Progress, and Problems

Economic changes and opportunities are really important only in terms of how they affect people.

There have been continuous shifts in Missouri's population from one part of the state to another, and the characteristics or profile of our population is constantly changing. The social institutions which we maintain to help achieve important life-goals, such as schools and churches, also are undergoing dramatic changes.



Missouri Continues to Grow

The official population count for Missouri in 1970 was 4.7 million, an increase of 8 percent from 1960. Statistics indicate this growth is continuing through the first half of the 1970s. Probably the most significant component of this growth is that migration into the state now bal-

ances out-migration. For the first time in several decades, the flow of people moving out of Missouri does not exceed the flow of migrants coming in.

However, metropolitan areas continue to grow much faster than outlying areas. While the state as a whole grew 8 percent during 1960-70, the metropolitan areas increased almost 20 percent. Metropolitan areas are also growing rapidly in geographical size, especially during the past few years. This growth in size is the result of two trends: (1) relocation of many industries and businesses on the fringe of metropolitan boundaries, pushing them continually outward; and (2) relocation of population from the central areas of the city and also from rural areas.

Decline in rural population makes the support of modern schools more difficult and requires consolidation over wide areas.

Rural Areas Lose Population

About 29 percent of Missourians now live in rural areas. At the beginning of the 1960s, one-third of the people in the state were rural. However, many rural areas are not losing population as fast as in the past. Several areas have had increases in population. While the north central part of the state continued to lose its rural population at about the same rate as in previous decades, the rural areas in central and northeastern Missouri decreased their rates of population loss. Southwest Ozark rural areas increased in population.

Two factors affecting these shifts in population have been: (1) For several years Missouri, like many other states, has seen a decline in the birth rate and (2) development of numerous recreational areas and residential areas which appeal to older people after retirement.

Recreation areas which have seen considerable in-migration are the Lake of the Ozarks region and the southern lakes regions. Increasing numbers of people, especially from the metropolitan areas, are building "second homes" in rural areas. This phenomenon is quite evident on the St. Louis side of the Lake of the Ozarks region.

A considerable amount of new industry has moved into smaller cities, especially in the south and southwestern part of the state. This has had an impact on both the population and the economic base of these communities. The rapid mechanization of agriculture in southeastern Missouri continues to encourage a heavy outmigration of people from that region, but new industry has begun to offset employment losses in agriculture.

Other communities which have seen a rapid increase in population are those that have major educational or governmental institutions. This population growth is taking place both in the communities themselves, and in surrounding areas. As a result, such counties as Boone, Adair, Nodaway, Cape Girardeau, and Cole saw significant gains in population density.

The development and enlargement of the mining industry in the areas of Iron, Reynolds, Dent, and Shannon Counties has had impact on the number and characteristics of people living in that area. As mining developed, the people employed in that industry received higher incomes. The population structure in the late 60s showed a larger proportion of young people and a higher level of education than at the beginning of the 60s.

Make-up of Population Changes

The profile of the state's population is changing. The number of farms and number of persons involved in farming has begun to stabilize. About 7 percent of Missourians live on farms, compared to 4.6 percent for the nation. Farmers make up about one-fourth of those living in rural areas.

About half of the people living on farms receive more than 50 percent of their earned income from off-farm employment. As industries and businesses move out from metropolitan areas, there is an increase in the proportion of the rural labor force engaged in manufacturing. This is especially true in south Missouri. Throughout the state, the number of persons in service businesses and industries increased also.

The age structure of Missourians remains relatively constant. The only exceptions are (1) a slight reduction in the number of the very young, and (2) the post-World War II "baby-

With the exception of lake developments and recreation areas, most Missouri rural areas are losing population.

boom" group moved up one notch in the age structure. Fewer children in the lower age groups reflect the declining birth rate.

In north Missouri, small towns continue to increase in proportion of senior citizens, as retiring farmers move from the country into town and young people leave to find jobs elsewhere. In some towns, people over 65 years now make up one-fourth to one-third of the community's population.

More Bedroom Communities

More communities in the vicinity of larger urban centers are becoming "bedroom" communities. Some commuters spend as much as two to three hours traveling to and from work each day. This limits the time available to participate in activities in their home community. As urban people continue to move away from the social and economic problems of cities to the "quiet security" of small towns, this commuting life style will become more prevalent unless transportation costs become prohibitive.

Concern for the Environment

Increasing concern for quality of the environment has also brought changes. During recent years, major environmental protection programs have been started, particularly in air and water pollution control and in solid waste disposal. For example, counties are now required by law to have plans for solid waste disposal.

Rural Institutions

The last 20 years have seen a dramatic drop in number of school districts. Many remaining districts include only elementary schools. Rural schools have been faced with declining population of school-age young people, increasing operating costs, and rising state standards which require more elaborate programs and facilities than many local districts can afford.

Some rural churches also face extinction as congregations dwindle in size and are characterized by older memberships. Although many are "holding their own" they are doing so at a level of membership that provides only a minimum economic base for operations. In many localities, several churches of the same or similar denominational backgrounds are uniting or forming "yoked" parishes, sharing a minister. In other communities, churches of quite different backgrounds are uniting to form federated or corporate congregations, displaying a style of grass-roots ecumenicism that was unknown in previous decades.

As rural people become more urbanized, and adopt life styles more like their city cousins, some very subtle changes occur in rural community life. For example, activities become more fragmented. Families do not spend a great deal of time together, but family members are each pulled their own way to participate in activities with their own associates. Friendship patterns are influenced by these associations rather than by family or neighborhood considerations.

Problems of Rural Areas

As life in rural areas becomes more like urban life, it also is plagued with many of the problems which till now have been associated with city living. Rural young people are breaking away from the influences of their home communities and are adopting many of the styles and activities characteristic of urban youth. Rural ado-

lescents tend to orient themselves more and more to movements and issues beyond the horizons of their own communities.

Youth are not alone in this change. All rural citizens are being influenced by the urban life style that has permeated every part of country—wherever metropolitan newspapers, national magazines, and network TV programs are available. One of the consequences is illustrated dramatically by the problem many communities have had in remaining solvent. Rising expectations of local citizens put pressure on local government to provide services and facilities which previously were not expected or considered essential. Citizens are becoming more and more impatient with the inefficiency of government bureaucratic machinery. But many communities and districts find they do not have the revenue raising capability to keep pace with both inflation and rising expectations.

More Health Care Needed

One of the most pressing problems rural communities face is that of adequate health care delivery systems. Almost half of the counties in the state had a decline in the number of physicians and health care facilities during the past ten years. In addition, there is a trend toward specialization among health care professionals. This makes them less accessible to the public for general forms of care. People do not change their customary patterns of behavior very quickly, which they must do if they are to take advantage of these changed forms of health care.

Tomorrow

The full time farms of tomorrow will consist of fewer but larger production units. For those "family farmers" who have smaller operations and who want to maintain their contact with the soil and a rural life style, there will be a continuing need to adjust farm enterprises to various kinds of off-farm employment.

Persons living in urban areas will continue to migrate to rural areas in increasing numbers. Some of them will want to be involved in part-time agricultural pursuits, both to increase their economic security, and because of strong sentiments toward rural life values.

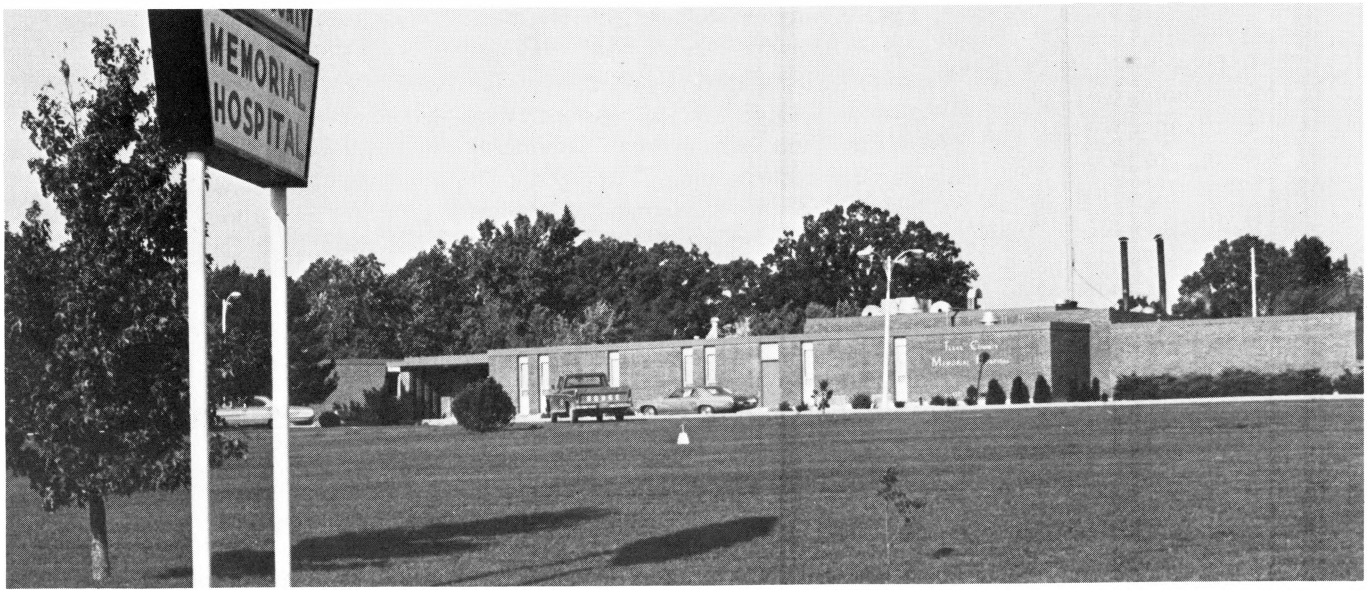
As middle-sized communities in Missouri continue to grow, significant problems will persist, particularly in public services. Water and sewage systems which are outdated and/or inadequate, solid waste disposal, fire protection, emergency medical services, and many other needs will put more pressure on local revenue sources. In addition many communities are studying restrictive land-use policies as ways of either restricting, controlling, or promoting development.

University specialists can help provide communities with information on the alternatives and consequences of various policies or long range plans. They can also provide insight into the processes and consequences of change.

In the past, almost every community has tried to promote growth. However, there is an increasing recognition that growth has costs as well as benefits. More communities will examine alternatives and consequences with the idea of designing policies which will help them achieve desired goals.

Rural villages and hamlets are increasingly finding a larger proportion of their population consisting of persons 65 years and older. These people will particularly need such programs and services as religious, health, welfare, and civic activities.

The decline in population in rural areas is making provision of health care facilities and enough doctors a major issue.



Over the Horizon

Agriculture has been and will continue to be Missouri's most important industry. During the past few years, agriculture has undergone rapid changes. Perhaps the most significant has been the sharp increase in food exports around the world. While the rapid increase in exports was triggered by short crops of the world, it is generally believed that we are moving into an era of greater food exports from the U.S.

Missouri is strategically located and possesses agricultural resources suited to the expansion of agricultural exports. The Missouri-Mississippi barge transportation system will be important to any expansion in the export of corn, soybeans, wheat, rice, and grain sorghum. Missouri farmers are now major producers of these crops and will benefit from this export.

Farming in Missouri is quite unique. While the state is an important part of the Cornbelt, it has important differences. Missouri farms tend to be somewhat smaller and a much higher percentage of Missouri farmers own their land. While there has been a trend toward specialization on farms in Missouri, it has not moved nearly as rapidly as in many areas of the Cornbelt. The typical Missouri farm business is still based upon a cropping program and compatible livestock enterprises.

The predominance of family-type farms with considerable diversity of enterprises adds a degree of strength and stability to Missouri agriculture.

The diversity of soil and climatic conditions in Missouri encourages the production of a variety of farm products.

While U.S. farm numbers continue to decline, the number in Missouri has leveled off. A large number of Missouri farmers are able to stay in farming because of the favorable opportunities to mix farming and non-farms jobs. Agriculture in Missouri is developing into communities with growing numbers of large commercial farms, stable numbers of medium-sized farms, and increasing numbers of small part-time farms. This combination of farms provides for a well balanced community that efficiently uses the resources available.

The smaller farms can make good use of the smaller, sometimes less productive tracts of land. However, some of the small farms with limited resources and low income may require special help in terms of technical and management information.

With a mixture of farms, the total agricultural production from the community is greater, the larger demand for agricultural inputs supports a larger variety of agricultural input suppliers, and the community is better able to supply all of the desirable services necessary for a healthy and satisfactory level of living for all rural citizens.

Tomorrow

No one can predict the future any time, but recent developments seem to cause more uncertainity than usual. We face a precarious balance between world food supplies and human population. We have the complicated interactions of weather, the energy situation, expanded foreign trade and inflationary demand.

Agriculture will face many challenges. Here are four major ones:

1. *Adaptation of food production and processing to environmental and ecological restraints.* We have seen the beginnings of this in laws on pesticide use and livestock waste. Many more developments will take place related to food additives, land use, and soil and water conservation.
2. *Adaptations in energy use.* Few people have realized how much agriculture and forestry depend on fossil fuels. New crop and livestock production systems will be designed to reduce energy requirements.
3. *Adaptations in rural-urban relationships.* There will be more focus on issues of zoning, taxation to provide local public services, rural industrialization, and many others.
4. *Adaptations in the organized structure of agriculture* (or who will control agriculture?). If the present dispersed, predominantly family type of agriculture is to be maintained, a shift in national policies toward agriculture will be required. Farm leaders are grappling with the complicated issues. They must involve the public and explain the alternatives so that society can make an informed choice.

The balanced agricultural community which is developing in Missouri has many specific needs which must be met if optimum growth and development are to be achieved.

1. Open and competitive markets must be available for farmers to sell their products. Small farms do not produce quantities to justify specialized marketing arrangements which are suited to large farms.
2. Agricultural inputs must be available in the quantity and with the needed services suitable for both large-scale commercial farms and small farms.
3. Land use problems must be dealt with in such a way to accommodate modern large-scale farming and rural residents.
4. Educational programs are essential in helping farm families make the needed adjustments to stay abreast of current conditions. These programs will need to include management training as well as new technical information.
5. Adequate financing needs to be readily available for both large and small farms. There will be tremendous pressures on sources of agricultural credit.
6. Governmental regulations, programs, and taxes must be applied so as not to cause disadvantage to any particular group of rural citizens.
7. Those in agriculture must be ready to speak out on specific issues related to agriculture. Some examples are the importance of agricultural exports, the role of prices in stimulating needed production, how pesticides are used to increase quantity and quality of food production, and zoning and taxation.

An issue-by-issue approach to rural-urban communication, with opportunities for give and take between interested groups, should prove more effective than the more general approach of simply "telling agriculture's story."

PRODUCER ADVISORY COMMITTEE REPORTS

The following publications are reports of agricultural program planning done by farmers and agribusinessmen serving on advisory committees for the University of Missouri Extension Division in 19 of the rural areas of Missouri. Copies of the report for each area may be obtained at any County Extension Center within the area.

A-B-C-D Area—**A-B-C-D Area Agriculture Looks to the Future** (1972): Andrew, Buchanan, Clinton, and DeKalb Counties.

Boonslick Area—*Boonslick Agribusiness Evaluation,* MP 322 (1973): Lincoln, Montgomery, and Warren Counties.

Bootheel—Four publications, *Planning Ahead in Missouri's Cotton Industry,* MP 9 (1966) and Five-Year Review (1970); *Soybean Industry Program for Southeast Missouri,* MP 82 (1968); and *Beef Cattle in the Missouri Bootheel,* MP 291 (1972): Dunklin, Mississippi, New Madrid, Pemiscot, Scott, and Stoddard Counties.

East-West Gateway (report due off press in spring of 1975): Franklin, Jefferson, St. Charles, and St. Louis Counties.

Green Hills—*Green Hills Agricultural Development Program,* MP 84 (1968) (Report on 1974 planning at press): Caldwell, Daviess, Grundy, Harrison, Linn, Livingston, Mercer, Putnam, and Sullivan Counties.

Kaysinger Basin—*Kaysinger Area Plans for the Future,* MP 201 (1970): Bates, Benton, Cedar, Hickory, St. Clair, and Vernon Counties.

Lake's Country—*Lake's Country Agriculture Challenge for the Future* (1972): Barry, Christian, Dade, Dallas, Greene, Lawrence, Polk, Stone, Taney, and Webster.

Mark Twain Area—*Mark Twain Agribusiness Looks to Future,* MP 118 (1969) (report on current updating studies probably available by 1976): Lewis, Macon, Marion, Monroe, Pike, Ralls, Randolph, and Shelby Counties.

Meramec Area—*Agriculture in the Meramec Area: The Growth Industry* (1973): Crawford, Dent, Gasconade, Maries, Phelps, and Washington Counties.

Mid-Missouri Area—*Mid-Missouri Agricultural Program (1972): Audrain, Boone, Callaway, Cole, Cooper, Howard, Moniteau, and Osage Counties.*

Missouri Valley Area—*Planning Ahead forAgriculture in Missouri Valley:* Carroll, Chariton, and Saline Counties.

Northeast Missouri Area—*People Planning Programs,* MP 430 (1974): Adair, Clark, Knox, Schuyler, and Scotland Counties.

Northwest Area—*Northwest Missouri Plans for Progress,* MP 389 (1974): Atchison, Gentry, Holt, Nodaway, and Worth Counties.

Ozark Foothills—*Ozark Foothills Agriculture Plans for Tomorrow,* MP 417 (1974): Butler, Carter, Reynolds, Ripley, and Wayne.

Ozark Gateway Area—*Ozark Gateway Area Agribusiness Program Plan,* 1972-1980: Barton, Jasper, McDonald, and Newton Counties.

South Central Ozarks (DOW section)—*South Central Ozarks Area Plans for the Future in Agriculture* (1972): Douglas, Ozark, and Wright Counties.

Show-Me Area—*People Plan Progress in Show-Me Area,* MP 333: Henry, Johnson, Lafayette, and Pettis Counties.

Southeast Area—*Southeast Extension Area–Situation–Opportunities–Recommendations*, MP 389 (1974): Bollinger, Cape Girardeau, Iron, Madison, Perry, St. Francois, and Ste. Genevieve.

Some Highlights from Missouri Agriculture Today—Tomorrow:

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